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# Book of Abstracts

*"From Highlands to Islands  
Towards a Sustainable Philippines"*

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## Influence of Land Use and Land Cover on the Water Quality of the Pinacanauan de Tuguegarao River: A Multi-Buffer Zone Analysis

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The study examined the influence of land use and land cover (LULC) on the water quality of the Pinacanauan de Tuguegarao (PdT) River using 500-meter (m), 1-kilometer (km), and 2-km buffer zones. Water quality data requested from the Environmental Management Bureau (EMB) and land use and land cover (LULC) data obtained from ESRI Sentinel-2 imagery (10-m resolution) for the period 2017–2024 were analyzed using GIS and correlation analysis. The Kappa coefficient was employed to test the accuracy of the processed LULC data. Ocular inspections and focus group discussions (FGDs) were conducted to support the quantitative findings. Results indicated that built-up areas exhibited the strongest influence on water quality, showing significant positive correlations with nitrate, fecal coliform, TSS, BOD, temperature, and phosphate, and negative correlations with DO. These findings are consistent with the communities' perceptions and field observations, such as direct drainage and sewerage discharge, quarrying operations, and improper waste disposal, all of which contribute significantly to the deterioration of water quality. In contrast, forested areas demonstrated a buffering effect, showing negative correlations with major pollutants (nitrate, fecal coliform, TSS, temperature, and BOD) and positive correlations with DO. Moreover, agricultural lands showed weak and localized impacts, displaying negative correlations with temperature and nitrate, likely mitigated by the presence of vegetation (trees and grasses) along riverbanks. These findings emphasize the critical role of vegetation in pollutant filtration, sediment retention, and thermal regulation. The study underscores that land use intensity and spatial scale significantly affect river water quality dynamics.

*Keywords:* buffer zones, correlation analysis, GIS, LULC, water quality

## Sustaining The Flow: Ecological Resilience and Restoration Success of Pansipit River in Batangas, Philippines

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This study aimed to assess the characteristics, and extent of restoration initiatives of the Pansipit River in Batangas, Philippines. The research employed survey questionnaires to obtain comprehensive insights from 309 respondents, including barangay officials, community members, and representatives from local government units (LGUs) and non-governmental organizations (NGOs). Data were analyzed using weighted mean, standard deviation, and t-test to determine the extent of manifestation and stakeholder perceptions. Findings revealed that the Pansipit River, an 8.2-kilometer freshwater system connecting Taal Lake to Balayan Bay, faces challenges such as pollution, illegal fishing structures, and sedimentation. The river's topography and soil composition shaped by volcanic activity significantly influence its ecological dynamics and restoration potential. While legal frameworks under the Clean Water Act of 2004 (RA 9275) and the National Integrated Protected Areas System Act (RA 7586) provide protection, enforcement and stakeholder coordination remain limited. Results showed that ecological success in restoration efforts was perceived to a great extent (WM = 3.60), particularly in improving water quality and aligning initiatives with ecological sustainability. Stakeholder success and learning success were also rated to a great extent (WM = 3.48 and 3.51, respectively), emphasizing community participation, awareness, and adaptive learning. However, moderate perceptions were noted in biodiversity increase and cultural heritage preservation. The study highlights the importance of integrating scientific, legal, and community-based approaches in crafting a sustainable restoration plan for the Pansipit River.

*Keywords:* river restoration, stakeholder engagement, ecological sustainability, community-based management, water quality improvement

## ACC Deaminase Producing *Methylobacterium oryzae* CBMB20 and Exogenous 1 Trehalose Application alleviate salinity stress in *Arabidopsis*

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The farming communities are very concerned about salt stress because of its negative impact on crop productivity. This study evaluated the ability of the *Methylobacterium oryzae* CBMB20 and exogenous trehalose treatments on *Arabidopsis thaliana* growth under salt stress conditions. *A. thaliana* growth was enhanced using *M. oryzae* CBMB20 as a bioinoculant in both saline and non-saline environments. In addition to better photosynthetic efficiency and endogenous trehalose content, the inoculation of *M. oryzae* CBMB20 produced improved growth parameters, such as increased rosette fresh weight and shoot length. Reduced levels of proline and malondialdehyde (MDA) during salt stress (150 mM NaCl) were further indication of the inoculated plants increased salt tolerance. GFP-tagged *M. oryzae* CBMB20 was also used in spatial distribution experiments, which showed that the bacteria colonized *A. thaliana* root, shoot, and hypocotyl. By increasing shoot length and total fresh weight, the exogenous application of trehalose also markedly enhanced plant growth. Proline and MDA contents were decreased by exogenous trehalose during salt stress, while the endogenous trehalose concentration in *A. thaliana* remained unaffected. The use of trehalose and *M. oryzae* CBMB20 can both have a good impact on plant development and stress tolerance in saline environments.

**Keywords:** *Arabidopsis thaliana*, *Methylobacterium oryzae*, PGPR, Salt Stress, Trehalose, Osmolytes

## Salinity Tolerance of Two Rice Cultivars is Related to Enhanced Activities of Enzymatic Antioxidants and Higher Proline Content

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Soil salinity leads to reduced plant health and productivity necessitating the need for salt-tolerant crop cultivars. Thus, the present study evaluated the salinity-induced modulations in morphological, physiological and biochemical responses of two popular rice cultivars bred in Bangladesh, namely BRRI dhan55, which has been developed for growing in dry and pre-monsoon season, and BRRI dhan43, developed for pre-monsoon season. The rice cultivars were exposed to different levels of salt stress (0 - 300 mM NaCl) after seedling establishment under natural sunshine. Salinity posed a significant growth decline in both the rice cultivars. Under increasing salinity stress, BRRI dhan43 exhibited a pronounced reduction in overall growth. Chlorophyll and proline content declined significantly in BRRI dhan43 with rising salt concentration. A marked decrease in antioxidant enzyme activities, including superoxide dismutase (SOD), catalase (CAT), and ascorbate peroxidase (APX) was also observed. Furthermore, salinity severely reduced grain yield and associated yield parameters in BRRI dhan43. In contrast, BRRI dhan55 demonstrated comparatively better tolerance under salinity. Although chlorophyll content was reduced in BRRI dhan55, the decrease was less pronounced than in BRRI dhan43, while proline content increased with increasing salinity. Additionally, antioxidant enzyme activities (SOD, CAT, and APX) were increased in BRRI dhan55. However, grain yield and yield attributes in BRRI dhan55 were moderately affected by salinity, showing noticeably less reduction compared to BRRI dhan43. Results indicate that the higher salt stress tolerance of BRRI dhan55 is attributed to higher protection of photosynthetic machineries, osmolyte biosynthesis, and upregulated antioxidant functions leading to better yield performance compared to less tolerant rice cultivars.

*Keywords:* antioxidant enzymes, chlorophyll content, growth, proline content, rice yield, salinity, stress

## Palawan State University Sponge Campus Development: A Water Resource Management Sustainability Project

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The Palawan State University (Palawan SU) Sponge Campus Development project is a water resource management initiative focused on sustainable development and climate resilience. It aims to address water-related issues at Palawan SU's main and selected cluster campuses by employing nature-based solutions that mimic the properties of a sponge. The project is motivated by the growing campus population, urban development pressures, and the environmental challenges posed by impermeable surfaces, which contribute to flooding, poor water retention, and environmental degradation. The sponge campus concept integrates blue, green, and grey infrastructure to manage rainwater sustainably, thereby reducing runoff, preventing waterlogging, and mitigating flood risks. The project's specific objectives include benchmarking, assessing rainwater flow, computing stormwater volumes and water storage for the artificial lakes. Key technical recommendations of the project include designing a rainwater collection network using pipes and bios and filters based on the calculated water storage, and integration of biodiversity corridors in landscape designs. These lakes or cistern tanks serve a dual purpose of flood control and irrigation during dry periods, enhancing the campus's environmental sustainability. The significance of the Palawan SU Sponge Campus project lies in its potential to reduce the university's environmental footprint, conserve water, improve community well-being, and promote sustainability education. By offering real-world solutions for climate adaptation and fostering biodiversity, the project contributes to broader conservation efforts and positions Palawan SU as a model for sustainable campus development.

*Keywords:* Sponge Campus, nature-based solution, artificial lakes, sustainable campus

## Assessment of Coastal Fisheries Production and Gear Inventory

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This study investigates the production and gear inventory of coastal fisheries across the 13 barangays in the Municipality of Gubat, Sorsogon, Philippines. A total of 90 fisherfolk, including those engaged in gleaning and capture, and who have been involved in fishing activities for at least five years, were randomly selected. Key Informant Interviews (KII) using an adapted instrument were used to collect data on the number of fishing gear units, production, and seasonality of fishing operations. The study revealed that there were 2,051 registered fisherfolk, of which 42% work full-time and 58% part-time. The average age of fisherfolk is 49 years old, with most of the fish caught being coral reef species. Catch was primarily landed in households (51%), local markets (45.6%), and neighboring areas (16.7%), with 49% intended for household consumption and 51% sold to the market. The gear inventory showed that there were 27 variants and 1,705 gear units used by fisherfolk. The estimated annual production is 243.5 metric tons. Entangling nets were the predominant fishing gear used, followed by handlines. This study recommends that the Local Government Unit (LGU) establish a database for fishing gear inventory and production to serve as the basis for policy reform and projects, programs, and activities (PPAs) for fisherfolk.

*Keywords:* coastal fisheries, gear inventory, production, Sorsogon

## A Mathematical Model for Forecasting Rice Pricing in Sibuyan Island: Basis for Sufficiency, Import and Export

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This study presents a mathematical modeling framework designed to forecast retail price trends of rice commodities in Sibuyan Island, Romblon, Philippines. Employing time series methodologies—specifically ARIMA, SARIMA, and ARIMAx models—the research constructs and evaluates predictive models that address the volatility and seasonal characteristics inherent in rice pricing and production data. The investigation is guided by seven objectives: (1) articulating the assumptions underlying the selected time series modeling techniques; (2) assessing the validity of these assumptions with respect to local datasets; (3) developing suitable mathematical models for rice price and production forecasting; (4) evaluating the accuracy and robustness of the developed models; (5) selecting the most appropriate model for capturing retail price movements; (6) analyzing factors influencing rice production and pricing in the context of Sibuyan Island; and (7) providing evidence-based recommendations for stakeholders and policymakers to enhance rice production and pricing strategies. The methodology encompasses comprehensive data collection and preprocessing, rigorous assumption testing, model development, and comparative evaluation using advanced statistical tools. Key determinants are identified to inform the selection of the most effective predictive approach. The findings contribute to the scholarly understanding of rice commodity markets in the Philippines, emphasizing the unique socioeconomic conditions of Romblon province. After undertaking proper procedures and processes in developing the model, it was found that each of the agricultural commodities investigated in the study showed an increasing trend of monthly prices for a ten-year period from January 2014 to June 2024. In terms of estimating the monthly retail prices of rice commodities, ARIMA (1,2,2) emerged as the best model to utilize for regular-milled rice and ARIMA (2,0,3) for well-milled rice. Insights from this research seek to inform evidence-based decision-making among policymakers, agricultural producers, and stakeholders, ultimately supporting sustainable development and supply chain optimization in the regional rice industry.

*Keywords:* time series forecasting, rice commodity, ARIMA, SARIMA, ARIMAx

## Microplastic Ingestion and Phthalate Esters Bioaccumulation in Yellowfin Tuna (*Thunnus albacares*): Tissue-Specific Distribution across Gills, Stomach, and Muscles

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This study examines the contamination of phthalate esters (PAEs) and microplastics (MPs) in yellowfin tuna (*Thunnus albacares*) from Kaohsiung, Taiwan. Significant differences in PAE levels are observed between red and white meat, with red meat exhibiting higher total PAEs (2,595–72,734 ng/g), predominantly DiNP, DnBP, and DEHP. White meat shows lower concentrations (271.98–811.49 ng/g), indicating tissue composition influences accumulation. The study shows that yellowfin tuna are exposed to microplastics through both ingestion and respiration. It was observed that MP particles accumulate more in the gills compared to the stomach. Fibrous rayon predominates in the gills, likely due to water filtration, while fragments and diverse polymers, such as polypropylene, are more common in the stomach, indicating ingestion. Most MP particles are small (1–2 mm) and exhibit blue and transparent colors, suggesting sources such as textiles and plastic films. Principal component analysis (PCA) links bioaccumulation to molecular weight and hydrophobicity. The study emphasizes the necessity for stricter pollution controls to mitigate PAE and MP contamination, thereby reducing potential risks to both marine ecosystems and human health.

*Keywords:* fish, microplastics, Phthalate Esters (PAE), plasticizers, SDG

## Tissue-Specific Bioaccumulation of Light and Heavy Rare Earth Elements in Yellowfin Tuna (*Thunnus albacares*) and Associated Human Health Risks

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Rare earth elements (REEs) are increasingly recognized as emerging contaminants in marine environments due to their widespread use in industrial, technological, and medical applications. This study investigated the tissue-specific bioaccumulation of light (LREEs) and heavy rare earth elements (HREEs) in yellowfin tuna (*Thunnus albacares*), a commercially and ecologically significant pelagic predator. Concentrations of REEs were quantified in white muscle, red muscle, and liver tissues, revealing a distinct accumulation pattern: liver (26.56 µg/kg) > red muscle (20.97 µg/kg) > white muscle (13.41 µg/kg). LREEs such as lanthanum (La), cerium (Ce), and neodymium (Nd) predominated across all tissues, while elevated gadolinium (Gd) levels suggested anthropogenic inputs, particularly from medical and industrial sources. Comparisons with other marine species showed that REE bioaccumulation in tuna is moderate relative to demersal and estuarine fish, reflecting lower environmental exposure in pelagic habitats. Health risk assessments, based on estimated daily intake (EDI) and health risk index (HRI), indicated that REE exposure through tuna consumption remains well below recommended safety thresholds, posing no immediate non-carcinogenic risk to adults or children. However, higher HRI values in East Asian children highlight the need for continued monitoring and precautionary dietary management. These findings demonstrate that *T. albacares* serves as a valuable bioindicator of REE pollution and underscore the importance of long-term surveillance of emerging contaminants in marine food webs and their potential impacts on human health.

*Keywords:* environmental monitoring, Gadolinium contamination, light and heavy REEs, pelagic fish, seafood safety

## Survey of Medicinal Plants in the Selected Barangays of Calatrava, Romblon

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The study determines the dominant species of medicinal plants and classified medicinal plants as to its applications. This study had identified and documented 100 herbal plants used by locals in Calatrava, Romblon. Ethnobotanical documentation was through semi-structured questionnaire, interview and guided field walks. Use-value is used to identify which specie is the most used. Based on the survey, 100 medicinal plants from fiftyone (51) families were identified by 300 local inhabitants. Plants species belonging to Fabaceae were best represented with 11 species, followed by Lamiaceae with 8 species, Poaceae and Euphorbiaceae with five species, Asteraceae and Rutaceae with four species. Top 10 species were also identified, among the species *Blumea balsamifera* has the highest Use-Value (UV) of .59, followed by *Origanum vulgare L.*, *Vitex negundo*, *Psidium guajava L.*, *Moringa oliefera Lam.*, *Citrus x microcarpa*, *Zingiber Oficinale*, *Allium sativum L.*, *Lamium purpureum L.*, *Annona muricata*, and the leaves 72% were the most used part as either a decoction or poultice to cure different illnesses. Making a paste or poultice is the highest percentage of 43% in the mode preparation and administration, followed by boiling is the second most mentioned process whereby decoction 33% is the second mentioned process for the amination. Colds and cough is most treated ailments. Among the species identified by the respondents *mayawmaw* was tagged "unidentified" and *tabubunyang* was not included in the classification due to its unknown identity (no picture is available due to the fact that the respondent can no longer tell the habitat of the plant). This study provides baseline data of plant diversity in Calatrava, Romblon and their medicinal uses which can also be used as a basis for drug discovery to improve the utilization of herbal plants from global perspectives.

*Keywords:* Calatrava, diversity, medicinal plants, traditional healers

## When Crabs Turn Toxic: Understanding the Occurrence of Non-Edible Crabs and Community Awareness in Santa Fe, Romblon

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The occurrence and fatality of eating toxic crabs in the Philippines have been documented over the years, with a notable case reported in Santa Fe, Romblon, in 2022. This study aimed to identify the species composition and distribution of toxic or non-edible crabs (NEC) in the coastal waters of Santa Fe and to assess the community's awareness of these species to help prevent fatalities and enhance public health education. Using a descriptive method, the researchers conducted field sampling and administered questionnaires among coastal residents (30 respondents per area) with prior approval from local authorities. Crab samples were collected from the shoreline, mangrove areas, and coral reefs across 10 coastal barangays. The specimens were cleaned, preserved, measured, and photographed for morphological identification, with species confirmation validated by an expert from the National University of Singapore. Results showed that four out of ten barangays—Mat-I, Guinbirayan, Canyayo, and Guintigbasan—had the presence of toxic crabs. Nine species under five families (Xanthidae, Pilumnidae, Carpiliidae, Ocypodidae, and Majidae) were identified, with *Atergatis floridus* as the most common species. The level of community awareness regarding toxic crabs was 58.27%, with Barangay Mat-I having the highest (92%) and Guinbirayan the lowest (28.67%). These findings highlight the need for a sustained information, education, and communication (IEC) campaign to strengthen seafood safety and community resilience. This research supports SDG 3 by promoting public health and SDG 14 by advancing sustainable coastal resource management and biodiversity conservation.

*Keywords:* coastal waters of Santa Fe, Romblon, community awareness, nonedible crabs, occurrence and fatality, public health and safety

## Growth Performance And Frass Production Of Black Soldier Fly (*Hermetia illucens* L.) Larvae Fed With Different Powdered Leaf Meals

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This study was conducted to evaluate the growth response and frass production of Black Soldier Fly (*Hermetia illucens* L.) larvae fed with different powdered-leaf meals as alternative feed sources. It aimed to explore the potential of agricultural leaf waste as sustainable feed for BSFL, recognizing their role as decomposers and contributors to efficient farming systems. Four treatment groups were tested: C1 (Control – rice bran), T1 (Rice bran + Madre de Agua), T2 (Rice bran + Ipil-ipil), and T3 (Rice bran + Madre de Cacao). Each treatment was replicated three times using a Completely Randomized Design (CRD). Results showed a significant difference in larval length, weight, and frass production across treatments. Statistical analysis using One-Way ANOVA and Duncan’s Multiple Range Test (DMRT) confirmed the variations among treatment groups. Among the treatments, rice bran combined with Ipil-ipil (*Leucaena leucocephala*) leaf meal yielded the most favorable growth and frass production, followed by Madre de Agua (*Trichanthera gigantea*). The findings suggest that the choice of powdered-leaf meal directly influences both the growth response and frass production of BSFL. Rice bran combined with Ipil-ipil leaf meal is recommended for maximizing larval growth, while rice bran with Madre de Agua is more effective for increasing frass yield. The study further recommends exploring other local leaves and agricultural by-products to enhance both larval growth and frass yield. Finally, promoting BSFL farming to farmers and communities is encouraged as a sustainable approach to managing agricultural waste, reducing feed costs, and producing organic fertilizer for crop production.

*Keywords:* black soldier fly, larvae, frass production, leaf-meal

## **Growth and Productivity Assessment of White Oyster Mushrooms Cultivated in Different Substrates: Evaluating Substrate Effectiveness and Economic Feasibility**

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This study focused on investigating and determining the effects of different substrates on the growth and yield performance of oyster mushrooms. Mushrooms are the edible fleshy fruiting bodies of certain fungi, which may be gathered wild or grown under cultivation. This study was conducted using four different substrates namely: Rice Straw, Banana Leaves, Sawdust and Coconut husk. Specifically, it sought to evaluate the effectiveness of the substrates and its economic feasibility. From the results, Banana Leaves showed superior and consistent performance in terms of determining the parameters on growth, yield, biological efficiency and morphological attributes among substrates. It was followed by Rice Straw, then Sawdust and Coconut Husk respectively. Based on the findings, it is then recommended to the mushroom growers to consider utilized banana leaves as an additional substrate. Mushroom production is also recommended to other farmers to use their available farm residues and earned from it. It is also then recommended to the students and researcher to consider implement or conduct mushroom production study to the specific months that have favorable conditions to get positive return on investment.

*Keywords:* oyster mushroom, growth, yield performance

## **Growth Performance of Different Varieties of Lettuce (*Lactuca sativa* var. *crispa*, *Lactuca sativa* L., *Lactuca sativa* ‘batavian red’, *Lactuca sativa* var. *longifolia*), Using Tilafer as Additional Source of Nutrient in Hydroponics System**

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Lettuce is a widely used leafy vegetable in salads and medicine, has gained importance beyond just being a food item due to the increasing global demand for green products. Lettuce production has grown increasingly because of the demand from Markets, Hotels, Restaurant, and Fast-food chains. This study was conducted to determine the growth performance of different varieties of lettuce using tilafer as an additional source of nutrients in a hydroponic system. Four treatment were examine using a single factor Complete Randomized Design (CRD). Llolo Rosa (*Lactuca sativa* var. *crispa*), Loose Leaf (*Lactuca sativa* L), Leafy Batavia Red (*Lactuca sativa* ‘Batavian Red’), and Romaine (*Lactuca sativa* var. *longifolia*), each replicated four times. Results show that all treatment is statistically significant different on the growth performance of different varieties of lettuce using the tilafer as additional source of nutrient in hydroponics system. It is evident that the varied response among lettuce varieties is notable in terms of height, leaves and width. Loose Leaf Lettuce demonstrated the greatest height variability among response varieties, Romaine show the highest number of leaves, Also Llolo Rosa received the most width response compared to other varieties. This suggest that using tilafer can improve the growth of different varieties of lettuce. Overall, this study contributes to the development and sustainable production in of lettuce in hydroponic system, which is benefit to the farmers and future researchers.

*Keywords:* Different varieties of lettuce, hydroponic, tilafer

## Assessing the Development Needs of Sectoral Communities in Barangay Balite, San Luis, Batangas

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A community's development is most effective when it is grounded in the actual needs and lived experiences of its people. This study focused on the needs assessment of sectoral groups in Barangay Balite, San Luis, Batangas, the adopted community of Lemery Colleges. Using a descriptive-qualitative approach, the study aimed to identify priority areas for intervention in the barangay. A Focus Group Discussion (FGD) was conducted with representatives from key sectors, including the youth, women, senior citizens, persons with disabilities (PWDs), fisherfolk, LGBTQIA+, barangay tanods, and tricycle drivers. Their insights revealed critical issues in health services, safety and security, environmental sustainability, livelihood, and youth development. Guided by the Achieving Better Community Development (ABCD) Framework, the assessment not only highlighted sector-specific needs—such as limited access to health equipment, lack of livelihood programs, and increasing youth vulnerability, but also emphasized the importance of community engagement in the development process. The results of the FGD informed a set of targeted recommendations, including capacity-building workshops, environmental protection initiatives, skills training, educational support, and inclusive advocacy campaigns. Furthermore, this study aims to serve as a blueprint for community extension programs and collaborative development efforts that are both sustainable and responsive to the needs of Barangay Balite.

*Keywords:* barangay Balite, needs assessment, community extension, ABCD Framework, sectoral development

## Community Based Development and Economic Mainstreaming (CBDEM) on Promotion of Halal Food Products

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The Halal food industry presents a significant economic opportunity, especially in Muslimmajority communities. This extension project was initiated to empower women in the Maguindanaon community of Barangay Kayaga, Kabacan, Cotabato, by enabling them to leverage local resources for economic gain. The project addresses the critical role of Halal food safety in building consumer trust and fostering economic resilience. The project’s primary objective was to facilitate community-based development through Halal food promotion. Its goals included organizing the community, improving existing Halal product production, and enhancing beneficiaries knowledge in enterprise development and financial management to improve their socio-economic status. Named the Community-Based Development and Economic Mainstreaming (CBDEM) project, it was led by the collaborative efforts of the five departments in the college and involved 20 women from the Kayaga Women’s Organization (KWO). Key activities included a needs assessment and a series of trainings. These sessions focused on essential topics such as project identification, leadership, teambuilding, financial literacy, enterprise planning, budgeting, and bookkeeping. The trainings were highly successful, receiving an overall "Excellent" evaluation from participants. A standardized recipe for a Halal food product, Kagikit, was developed based on a previous study since this is a research cum extension project. The project also provided training on technology utilization for processing and positioning the final product in the market. This initiative is a crucial step towards empowering the Maguindanaon community by equipping them with the necessary skills to produce culturally appropriate and economically viable products. The projects model ensures sustainability by building long-term skills for self-sufficiency, creating a strong foundation for future community growth.

*Keywords:* collaboration, promotion, development, economic, management

## Kawayanihan para Sa Kaligtasan, Kapaligiran at Kabuhayan (4ks) Ni Juan

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The "Kawayanihan Para Sa Kaligtasan, Kapaligiran At Kabuhayan Ni Juan (4Ks) project, a collaboration between Isabela State University and LGU Cabagan, addressed community vulnerability to climate change and natural hazards by integrating Disaster Risk Reduction and Climate Change Adaptation (DRR-CCA) with sustainable livelihood using bamboo. Key activities included capacity building in bamboo nursery establishment, processing, and marketing; process documentation and IEC material development; and the establishment of village-based bamboo nurseries and a bambusetum in erosion-prone areas of Cabagan, Isabela. The project successfully enhanced environmental defense mechanisms, created a sustainable income source, enactment of Bamboo Ordinance, and significantly built local capacity for long-term resource management and community resilience.

*Keywords:* bamboo, bamboo development program, Disaster Risk Reduction and Climate Change Adaptation (DRR-CCA)

## Towards the Development of a School-Based Management Framework for Mountain Elementary Schools

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This qualitative study explored the School-Based Management (SBM) practices among school heads in mountain elementary schools in the Province of Romblon, aiming to develop a more suitable framework for these unique educational settings. Using a phenomenological research design and expert-validated interview questionnaire, the study identified five SBM practices, which include leadership and governance, curriculum and learning, accountability and continuous improvement, resource management, and other contextual practices. The key challenges faced by mountain schools included geographical and infrastructure challenges, socioeconomic and parental involvement, limited resources and staffing constraints, community safety concerns, and digital and connectivity issues. In response, school heads implemented innovative approaches to overcome these challenges, such as improving infrastructure access, engaging stakeholders, addressing learning gaps, mobilizing resources, and tackling digital limitations. The findings also disclosed that the existing SBM framework is not entirely suitable for mountain schools; therefore, a community-based self-directed framework was developed and designed to be more responsive to the specific needs of mountain schools. This proposed framework features components like leadership and governance, curriculum and learning process, professional development and growth, resource management and mobilization, student retention and transition, community engagement and partnership, respect for tradition and practices, student support and assistance, and robust monitoring and evaluation. The study recommends the adoption of this framework by policymakers to better support school heads in managing the complexities of mountain schools, crafting targeted policies, conducting relevant training, strengthening monitoring systems, organizing schools by type for shared learning, and encouraging further research in other regions to validate the results.

*Keywords:* school-based management, mountain elementary schools, framework, leadership

## Information Communication Technology Proficiency, Motivation, Institutional Support, and Leadership Aspiration of Employees in Higher Education Institutions

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This study investigated the influences of Information Communication Technology (ICT) proficiency, motivation, and institutional support on the leadership aspiration of faculty and staff in private higher education institutions. Existing studies are heavily focused on gender as the primary variable for identifying leadership aspirations of employees. The study utilized descriptive, correlational, and causal-comparative research designs, using regression analysis and structural equation modeling. 406 participants who served for at least one year at the chosen universities were included. The results indicate that employees possess an advanced level of perceived ICT proficiency and high levels of motivation and institutional support, which together contribute to high leadership aspiration. The structural analysis confirmed that motivation and ICT proficiency were the only direct and significant positive predictors of leadership aspiration. Conversely, institutional support showed no direct significant influence, suggesting a comfort effect where general support fails to translate into a drive for promotion, thereby highlighting an ambition gap, as evidenced by the lowest scores in proactively requesting promotions. The Gumonan Techno-Motivational Leadership Aspiration Framework is recommended to address the gap. Institutions must strategically redirect support funds to invest in specialized ICT training, particularly in data management and cybersecurity. Implement a transparent, merit-based reward system to convert high latent aspiration into active, formal career advancement behaviors. The results of this study can also serve as a basis for succession planning and extension programs to mentor and train young professionals and aspiring leaders, not only in the educational setting but also in other fields of practice.

*Keywords:* leadership aspiration, ICT proficiency, motivation, institutional support, higher education

## Rural Startups and the Quadruple Helix: Pathways to Competitive Advantage in Partido Area, Camarines Sur

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Rural startups are pivotal to inclusive local growth, yet Philippine evidence is limited. This study examines how quadruple helix actors (academia, business, government, and civil society) interact with firm capabilities to shape perceived competitive advantage in the Partido Area. Using the StUpEco framework, we explored ecosystem characteristics and correlates of competitiveness. A survey of 131 startups was analyzed via Mann-Whitney U, chi-square tests of association, and binary logistic regression. Ventures with high perceived competitive advantage ranked higher across StUpEco indicators, especially organizational culture and effective cooperation. Government and academia were most visible across funding and knowledge functions, while associations with helix actors were broadly similar. Regression identified government intervention and a founder outlook as significant predictors of high perceived competitive advantage, while mentorship continuity and technology adoption often plateaued at basic digitization. Findings suggest three mechanisms: collaborative culture converts ecosystem inputs into execution; knowledge and network capital translate institutional support into firm practice; and optimistic outlooks lengthen planning horizons and increase risk taking in thin markets. These insights inform a Secure-Connect-Execute-Scale pathway for rural startups: secure legitimacy and services, connect through dense learning ties, execute via short cycles and team routines, and scale by progressing from basic to second stage digital tools. This study provides insights on how predictable public services, university-led knowledge transfer, and cohort mentoring can convert thin rural ecosystems into engines of competitive, inclusive growth.

*Keywords:* rural startups, entrepreneurial ecosystem, quadruple helix, competitive advantage

## Perception, Practices, and Promotion of Democratic Values among Grade 12 Students

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This survey-correlational study aimed to determine the perception, practices, and promotion of democratic values among Grade 12 students of Don Carlos M. Mejias Memorial National High School for the school year 2024–2025. It specifically examined students' perception in terms of voice, participation, and transparency; their practices in terms of actions, attitudes, and behaviors; and their promotion in terms of equality, justice, and respect for human rights. The study further analyzed significant differences in the promotion of democratic values across varying levels of perception and practices, as well as the relationships among the three variables. The participants were 185 randomly selected Grade 12 students from 13 sections. Data were gathered using a researcher-made questionnaire. Descriptive statistics such as mean, frequency, percentage, and standard deviation were employed, while inferential tests included t-test, One-way ANOVA, and Pearson  $r$  at a 0.05 significance level. Findings revealed that students demonstrated a very high level of perception, practices, and promotion of democratic values. They exhibited strong participation, transparency, and voice, along with attitudes and behaviors reflecting democratic ideals. Significant differences were observed in promotion across perception and practice levels, with a very strong positive correlation between perception and practices and moderate positive correlations among all other variables.

*Keywords:* Perception, Practices, Promotion, Democratic Values, Voice, Participation

## Assessment of Agricultural Performance and Rural Development in Romblon: Evidence for Policy Framework Development

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This study examined the baseline agricultural performance and rural development indicators in the province of Romblon to identify key socio-economic conditions, livelihood practices, and challenges among its farming, fishing and livestock raising communities. Using the different descriptive statistics, findings revealed that the agricultural population is predominantly male, middle-aged, and married, with most respondents relying on personal resources and government assistance for their livelihood. The majority, composed of high school graduates and indigenous people, derive income from fishing and crop farming, often utilizing self-supplied planting materials and engaging in direct buyer-trader arrangements. Although many households save or invest part of their income, frequent disruptions caused by typhoons, financial constraints, and limited access to capital hinder consistent productivity. Despite these challenges, a willingness to join cooperatives and adopt innovative practices was evident among respondents. Grounded in these findings, a policy framework for enhancing agricultural productivity and rural development in Romblon was developed to guide evidence-based interventions and policy reforms. The framework consists of five major pillars: (1) Sustainable Agricultural Practices, focusing on organic, climate-resilient, and resource-efficient farming; (2) Financial Inclusion and Support, emphasizing accessible credit systems, low-interest loans, and financial literacy programs; (3) Cooperative and Community Empowerment, promoting collective resource management and public-private partnerships; (4) Disaster-Resilient Agricultural Systems, integrating risk mitigation, crop insurance, and early warning mechanisms; and (5) Capacity-Building and Knowledge Development, aimed at strengthening human capital and promoting innovation. Anchored on the 1987 Philippine Constitution and aligned with key laws such as Republic Act No. 8435 (Agriculture and Fisheries Modernization Act) and Republic Act No. 9520 (Philippine Cooperative Code), the policy framework provides a strategic roadmap for sustainable and inclusive rural development. It emphasizes resilience, financial empowerment, and environmental stewardship as essential foundations for ensuring long-term agricultural growth and socio-economic stability in Romblon.

*Keywords:* assessment, agricultural performance, rural development, policy framework

## Assessing Cost Allocation and Contractor Concentration in Flood Control Projects: Implications for Infrastructure Sustainability and Competitive Bidding in the Province of Romblon

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This study examined the patterns of contractor concentration, cost allocation, and governance mechanisms in flood control projects across municipalities in the province of Romblon. Specifically, it sought to (1) analyze patterns of contractor concentration and their implications for competition and cost efficiency, (2) evaluate cost allocation trends to identify vulnerabilities to kickbacks and overpricing, (3) determine differences in cost allocations across municipalities, and (4) propose monitoring and evaluation improvements for infrastructure sustainability. Using descriptive statistics, trend and variance analyses, and inferential tests such as the Chi-square and ANOVA with Tukey’s HSD post-hoc comparison, the study revealed significant variations in project distribution and cost allocation patterns among municipalities. Results of the Chi-square test indicated a strong association between contractor concentration and project location, suggesting potential dominance of specific contractors in particular municipalities. The ANOVA and post-hoc results further showed that San Agustin had significantly higher mean project costs than Outside Tablas municipalities combined implying possible cost inefficiencies or inconsistencies in budgeting and implementation. These findings underscore the need for enhanced transparency, cost standardization, and evidence-based monitoring mechanisms in infrastructure development. In alignment with the 1987 Philippine Constitution (Art. XI, Sec. 1) and Republic Act No. 9184 or the Government Procurement Reform Act, the study recommends the implementation of standardized cost benchmarks, establishment of a provincial infrastructure costing review board, and strengthening of local government capacity in procurement and project evaluation. Moreover, the creation of a centralized project cost database and utilization of Geographic Information Systems (GIS) are advised to promote data-driven policy decisions. By institutionalizing accountability and technical competence, the province can achieve equitable, transparent, and sustainable infrastructure development that supports inclusive growth.

*Keywords:* contractor concentration, cost allocation, flood control projects, transparency, governance, Romblon

## Factors Affecting Job Satisfaction of Regular and Non-Regular Faculty and Staff of Palawan State University in the New Normal

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This study examines job satisfaction levels among employees at Palawan State University during the new normal, involving 423 participants. The research aims to identify demographic and professional profiles that significantly influence satisfaction across various domains. Using descriptive statistics (frequency, percentage, mean, rank) and inferential statistics (Mann-Whitney U and Kruskal-Wallis H tests), the study reveals a predominantly young, female, and single workforce, most of whom hold bachelors degrees and work as instructors, either under contract or permanent status. The overall job satisfaction level is rated as "Satisfied" (mean score = 3.49). High satisfaction scores are noted in interpersonal relationships and flexible work arrangements, particularly with colleagues (mean score = 4.05) and flexible working hours (mean score = 4.00). However, employees report only "Moderate Satisfaction" in structural areas, such as compensation (mean score = 2.96) and technology support (mean score = 3.02). Inferential analysis reveals that sex, age, educational attainment, employment status, and job position have a significant impact on satisfaction in specific domains. Satisfaction with the Supervisor and Colleagues domains was generally unaffected by the tested profile variables. The institution has good interpersonal relationships and flexible work arrangements. To sustain and enhance overall satisfaction, targeted interventions are necessary, particularly in areas of concern. Recommendations include reviewing compensation policies, ensuring transparency in salary frameworks, strengthening selection guidelines, improving training programs, and investing in technology support. Additionally, enhancing the university's rewards and recognition program to make it more personalized and aligned with career development goals will further improve employee satisfaction.

*Keywords:* job satisfaction, compensation, satisfaction domains, employees, Palawan State University

## Do Cooperative Principles Matter? Understanding Their Influence on Cooperative Sustainability in Emerging Economies

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Cooperative principles are essential to governing and ensuring the long-term sustainability of Multi-Purpose Cooperatives (MPCs), particularly in emerging economies. However, research evidence demonstrating their influence on cooperative sustainability is limited. Employing a quantitative research design, the study examines how adherence to cooperative principles impacts the economic, social, and environmental performance of MPCs in Odiongan, Romblon, Philippines. Data were collected through a validated survey questionnaire tailored to the study's objectives. Fifty-six (56) individuals were selected using convenience sampling. Of these, 49 survey responses were deemed valid for analysis. Data was analyzed using descriptive statistics, regression analysis, and Pearson's correlation with the SPSS software. The respondents, primarily mid-career, college-educated women in financial service-oriented cooperatives, demonstrated strong agreement with all seven cooperative principles. In particular, these principles are voluntary and open membership, education and training, and concern for the community. Sustainability outcomes were positively rated from economic, social, and environmental perspectives, with strengths from regulatory compliance, customer relations, and ecological concerns. Adoption levels of renewable energy technologies are considered an aspect to be addressed. Regression analysis revealed consistencies between cooperatives in their perception of voluntary membership and education subjects, while differing in their views on democratic control, economic participation, autonomy, cooperation, and concern for community, as well as economic and social sustainability among cooperatives. Pearson's correlation analysis reveals that cooperative principles are highly correlated with sustainability outcomes, underscoring the importance of collaborative governance. Thus, the study concluded that stronger adherence to cooperative principles ensures better sustainable performance of MPCs in terms of economic, social, and environmental implications. Differing levels of practice across cooperatives highlight areas that require further improvement, particularly in governance and ecological initiatives. Hence, cooperative governance remains fundamental to the all-encompassing sustainability development agenda.

*Keywords:* cooperative principles, cooperative sustainability, emerging economies

## Toward Sustainable Seaweed Supply Chain: Assessing Farmer Practices, Bottlenecks, and Adaptive Strategies in Romblon, Philippines

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The seaweed industry is one of the most active aquaculture sectors in the Philippines, providing support to coastal communities and generating significant national revenue and exports. Seaweed farming remains the primary source of income in Sta. Fe, Romblon, but the supply chain remains fragmented, inefficient, and vulnerable to economic and environmental challenges. The research aimed to evaluate supply chain management among seaweed producers, pinpoint the main bottlenecks, and examine the link between supply chain management practices and the impact of challenges faced by seaweed farmers. A descriptive-correlational design was used, and a validated Likert-scale questionnaire was administered to 100 seaweed farmers who were selected through systematic sampling. It was revealed that farmers rely heavily on traditional production, warehousing, and logistics systems, with very little institutional and technological support. Some significant constraints attested are the prevalence of ice-ice disease, high input costs, and limited marketing opportunities. The correlation results suggested that environmental vulnerability could reduce institutional and economic constraints, while also enhancing efficient production, inventory, and logistics practices. The regression analyses established that even weak coordination reinforced the economic challenges; however, inventory, management, and logistics systems can lessen the environmental risks. Seaweed farming remains conventional mainly in nature and is currently under-supported; therefore, there is a need for integrated governance, innovative technology, and cooperative systems. Sustainable farming practices, post-harvest logistics, and adaptive capacity frameworks must utilize this as a foundation to strengthen the development of a climate-smart and sustainable seaweed supply chain model for Romblon.

*Keywords:* adaptive strategies, bottlenecks, farmer practices, seaweed supply chain, sustainable

## Examining Teaching Competence, Professional Attitude, Job Satisfaction, and Organizational Commitment: A Tracer Study of Teacher Education Graduates in a Philippine State University

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This tracer study investigated the teaching competence, attitude towards the teaching profession, job satisfaction, and organizational commitment of teacher education graduates from Romblon State University (RSU), Philippines. The study aimed to provide insights into the post-graduation professional experiences of these educators. A descriptive survey research design was employed, involving 121 school administrators who evaluated RSU graduates employed in public secondary and elementary schools within Romblon municipality. Data were collected using two validated survey questionnaires, one adapted from SEAMEO-INNOTECH (2010) for teaching competence, and another multi-part instrument for attitude, job satisfaction, and organizational commitment. Means, frequency, and percentage distribution were utilized for data analysis. RSU teacher education graduates were found to be "Competent" in overall teaching competence, with particular strengths in Professional Ethics and Morality, and Social and Human Dimension Competencies. Their attitude towards the teaching profession was "Very Positive," driven by intrinsic factors like student learning and the perceived prestige of the profession. Graduates reported being "Satisfied" with their job satisfaction, particularly in Job Security and co-worker relations, though "Benefits and Compensation" showed the lowest satisfaction. Organizational commitment was rated as "Committed," with high dedication evident in the willingness to work beyond office hours for organizational success. The findings highlight the overall preparedness and positive disposition of RSU teacher education graduates. They underscore the importance of robust pre-service training and supportive work environments for teacher retention and quality education in the Philippines. Recommendations include enhancing professional development in specific competence areas and addressing compensation concerns to further boost job satisfaction and commitment.

*Keywords:* teaching competence, professional attitude, job satisfaction, organizational commitment, teacher education graduates, tracer study, Philippines, Romblon State University

## Willingness of Public Duty Bearers to Pay and Adopt Ecosystem-based Disaster Risk Reduction: A Policy Implication for Climate Resilience in Selected Local Government Units of Oriental Mindoro, Philippines

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The successful implementation of Ecosystem-Disaster Risk Reduction and Climate Change Adaptation (Eco-DRR/CCAM) initiatives significantly hinges on the willingness of public duty bearers, such as policymakers and implementers, to support and adopt these programs. A critical method for assessing this willingness is through testing their financial contributions to the initiative, known as willingness to pay (WTP). The survey results reveal a strong community commitment to ecosystem-based strategies for disaster risk reduction and climate change adaptation, with all 147 respondents from Calapan City and the Municipalities of Naujan and Victoria (100%) expressing readiness to engage in these initiatives. Notably, 95.9% of individuals indicated a willingness to participate in forest reforestation efforts, highlighting the vital role of forests in mitigating climate change and enhancing biodiversity. Although a small percentage (4.1%) expressed reluctance to contribute, the majority demonstrated significant financial commitment, pledging a cumulative total of 73,000 pesos for reforestation. However, concerns regarding accountability and transparency in funding emerged, as some respondents believed the government should lead these efforts. Despite these hesitations, substantial contributions were made, particularly from individuals willing to donate higher amounts, reflecting a robust base of support for reforestation initiatives. The findings underscore the potential for community-driven action to enhance environmental sustainability and manage flood risks, advocating for educational outreach to further engage individuals in these essential efforts.

*Keywords:* WTP, adopt eco-DRR, policy, public duty bearers, climate resilience

## Does Going Green Pay Off? How Firm Size and Age Shape MSMEs' Sustainable Performance

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Amid growing environmental pressures and heightened expectations for sustainable business practices, MSMEs are increasingly encouraged to adopt eco-innovation as a strategic pathway to enhance long-term performance. However, empirical evidence on its actual benefits remains limited, particularly in the food service sector. This study investigates whether eco-innovation contributes to the sustainable performance of micro, small, and medium enterprises (MSMEs) and examines the moderating roles of firm size and firm age. Focusing on 89 Quick Service Restaurants (QSRs) in Odiongan, Romblon, a quantitative research design was employed using stratified random sampling. Data were collected through a structured questionnaire measuring four dimensions of eco-innovation—eco-product, eco-process, eco-organizational, and eco-marketing innovation—and sustainable performance, encompassing economic, environmental, and social outcomes. Multiple and hierarchical regression analyses revealed that, among the eco-innovation dimensions, eco-process innovation has a significant and positive influence on sustainable performance. In contrast, the other dimensions do not exhibit significant direct effects. Furthermore, results indicate that firm age significantly moderates the relationship between eco-process innovation and sustainable performance, suggesting that older firms derive greater sustainability benefits from eco-process initiatives compared to younger firms. Conversely, firm size does not significantly moderate these relationships. The findings highlight the strategic importance of eco-process innovation in enhancing the sustainability outcomes of MSMEs and underscore the need for policymakers and support agencies to tailor sustainability programs based on firm maturity. This study contributes to the eco-innovation literature by providing empirical evidence from the food service sector and reinforcing the relevance of firm characteristics in shaping sustainability performance.

*Keywords:* green management strategies, environmental process optimization, resource efficiency practices, Natural Resource-Based View (NRBV), operational sustainability, business resilience, performance optimization, organizational maturity

## Integrating Global Citizenship and Transformative Learning: An Explanatory Sequential Analysis of Graduate School Curricula

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This study explores the integration of Global Citizenship Education (GCED) and Transformative Learning Theory (TLT) in the graduate curricula of Romblon State University, highlighting their role in cultivating globally competent, socially responsible, and ethically grounded leaders. Anchored on TLT, the research investigates the extent to which graduate programs operationalize GCED through critical reflection, dialogic learning, experiential learning, rational discourse, and perspective transformation. Employing an explanatory sequential mixed-methods design, the study first gathered quantitative data from 88 graduate students analyzed through descriptive statistics, chi-square tests, t-tests, correlation, and the Kruskal–Wallis test. The qualitative phase involved interviews with graduate students, faculty, and administrators, which were analyzed through thematic analysis. Findings indicate transformative learning components are strongly embedded in the graduate curricula, resulting in enhanced outcomes related to global awareness, social justice advocacy, cultural competence, ethical responsibility, civic engagement, community participation, global collaboration, sustainable practices, and lifelong learning. Overall, the study emphasizes the critical role of GCED and TLT in fostering transformative educational experiences that prepare graduates to engage meaningfully in an interconnected and rapidly changing world.

*Keywords:* global citizenship education, transformative learning theory, graduate curriculum, social justice, civic engagement

## Gender and Sexuality Differences in Emotional Regulation Difficulties among Filipino First-Year Students at A Rural University

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First-year college students in rural Philippine areas face unique challenges that impact their academic performance and well-being. Limited resources and support systems often worsen emotional regulation difficulties. Traditional values and social expectations around gender roles and sexual orientation add extra pressure, especially for students with diverse identities. However, research on emotional regulation differences in this population remains limited. This study examines emotional regulation difficulties among Filipino first-year students in a rural campus of a public university and whether there are significant differences based on sex, gender identity, and sexual orientation. Using a descriptive research design, 265 first-year students were randomly selected and surveyed using the Difficulties in Emotion Regulation Scale. Data were analyzed using descriptive and inferential statistical tools. Results indicated that the majority of respondents reported moderate emotional regulation difficulties, with no significant differences between males and females. However, non-cisgender respondents experienced significantly higher difficulties in accepting negative emotions and accessing regulation strategies, while non-heterosexual respondents reported greater impulse control and emotional awareness difficulties. This study highlights some issues with emotional regulation among first-year university students. These challenges are notably more pronounced among non-cisgender and non-heterosexual individuals underscoring the need for culturally-sensitive support interventions and inclusive mental health services to support the diverse emotional regulation needs of students.

*Keywords:* emotion regulation, gender, rural, university students

## How Socioeconomic Determinants and Fishing Methods Predict Fishing Productivity: A Case of Small-Scale Fisherfolks in Romblon, Philippines

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Fisheries play a crucial role in global food security, employment, and poverty reduction, particularly in vulnerable coastal and island communities. However, small-scale fisherfolks continue to face significant challenges due to climate change, overfishing, and persistent socioeconomic inequalities. In the Philippines—an archipelagic nation heavily reliant on marine resources—municipal fisheries sustain rural coastal economies. Santa Fe, Romblon, a fifth-class municipality, exemplifies this dependency, with fishing serving as the primary livelihood for many households. This study examines how educational attainment, monthly income, and fishing methods predict fishing productivity among fisherfolks in the municipality. An explanatory-sequential mixed methods approach was employed. Quantitative data were collected from 330 fisherfolks through stratified random sampling across 11 barangays using a validated, self-made questionnaire that underwent expert validation and reliability testing. Linear regression analysis was used, treating educational attainment and monthly income as numerically coded ordinal predictors, fishing methods as continuous predictors, and productivity as a continuous dependent variable. To enrich interpretation, qualitative interviews were subsequently conducted to provide contextual insights into the quantitative results. The analysis revealed that monthly income significantly predicted fishing productivity, with higher income associated with greater output. In contrast, educational attainment and fishing methods were not statistically significant predictors. Qualitative findings revealed key barriers to adopting more sustainable and productive fishing methods, including financial constraints, lack of access to modern equipment, and limited training. These barriers help explain the limited impact of fishing methods on productivity in the quantitative phase. The study highlights the need for cooperative-based interventions that expand fisherfolks access to capital, training, and direct market opportunities—allowing them to reduce reliance on middlemen and improve monthly income. Ultimately, the findings contribute to ongoing discussions on cooperative economic empowerment and align with the United Nations Sustainable Development Goals 1 (No Poverty) and 14 (Life Below Water).

*Keywords:* cooperative development, fishing productivity, small-scale fisheries, socioeconomic determinants

## Skills for the Digital Era: Is There a Gender Gap in the Province of Romblon?

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This study, "Skills for the Digital Era: Is There a Gender Gap in the Province of Romblon?", explored the digital skills and potential gender disparities among the residents of Romblon, Philippines. Building on the understanding that women often exhibit lower digital skill levels due to factors like limited education, training opportunities, and societal expectations (UNESCO, 2019), this research aimed to assess the local situation. Utilizing a survey of 322 participants from ten municipalities, the findings revealed that while most respondents (68%) have experience with and access to digital technologies (87%), their overall digital proficiency was consistently at an intermediate level. Interestingly, despite a general confidence in their digital abilities (76%), a significant portion of respondents identified a lack of formal training opportunities (37%) as the key obstacle to further skill development. Although nearly half (49%) did not perceive a significant gender gap in technology use, the expressed preference for gender-specific and age-specific coaching sessions suggested an awareness of differing needs in skill development. The study concludes that while a strong perception of a gender divide in technology usage may not be prevalent, a critical need exists to enhance targeted and accessible digital skills training within the province to ensure equitable participation in the digital age.

*Keywords:* gender gap, digital skills, training program, rural Philippines, digital literacy

## HADOP KA! Pagdalumat sa mga Metaporang Hayop sa Wikang Asi

Bahagi ng komunikasyon ang mga metapora. Hindi man ito madalas mapansin mahalagang instrumento ito sa paglalarawan na humuhubog at sumasalamin sa pag-iisip ng mga tagapagsalita ng isang wika. Lumaglagpas ito bilang disenyong ornamental ng pakikipagtalastasan, sa halip salamin ng intelektwal na pinagkakasunduan ng isang komunidad o tagapagsalita ng isang partikular na wika. Nagbibigay ito ng hitik na mga materyales upang unawain ang pagtanaw sa mundo (Fabregas, 2021 p.2). Kaugnay nito, pangunahing layunin ng pag-aaral na ito na dalumatin ang mga metaporang hayop sa wikang Asi. Maitala ang mga metaporang hayop at maipaliwanag ang mga kahulugan nito. Gayundin maikategorya ang mga metaporang hayop sang-ayon sa motibasyon ng pagkakabuo ng mga ito gamit ang Conventional Figurative Language Theory (CFLT) bilang kasangkapan sa pananaliksik. Ang pag-aaral na ito ay isinagawa sa isla ng Banton na tahanan ng etnolinggwistikong Bantoanon na tagapagsalita ng wikang Asi. Sa ulat ng Ethnologue, 2021 iniuri ang wikang Asi bilang papaunlad na wika at mayroong 75,000 tagapagsalita.

*Susing salita:* Conventional Figurative Unit (CFU), metapora, Asi

## Artificial Intelligence Literacy and Situated Academic Writing as Inputs to Writing Intervention Program

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This study explored the relationship between artificial intelligence (AI) literacy and situated academic writing among 54-first year English major students of Romblon State University-Main Campus. The researchers employed a mixed-method approach, utilizing survey questionnaires, the Scale for the Assessment of Non-Experts' AI Literacy (SNAIL) and the Situated Academic Writing Self-Efficacy Scale (SAWSES), all adapted and modified from their original authors. It assessed the level of students' AI literacy across dimensions such as technological understanding, critical appraisal, and practical application and their perceived level of situated academic writing in terms of writing-essentials, relational-reflective, and creative identity. The findings indicate that while students demonstrate strong awareness of AI ethics and practical applications, their understanding of AI's technical aspects remains limited. Similarly, students exhibit confidence in reflective and creative aspects of writing but face challenges in formal academic language and source synthesis. A positive relationship was observed between AI literacy and writing proficiency, which suggests that higher AI literacy contributes to stronger situated academic writing skills. To address these gaps, the study proposes a writing intervention program focused on improving students' technological understanding of AI and strengthening their writing essentials, particularly in synthesizing sources, structuring arguments, and using formal academic language effectively.

*Keywords:* AI literacy, situated academic writing, English major students

## Enhancing Lexical Mastery Through Play: Development and Validation of “Enimage” as a Game-Based Tool for Teaching Content Words

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Content word knowledge is fundamental in building sentence meaning affecting comprehension, vocabulary development, and critical thinking skills. In this study, the researchers conducted a baseline and needs assessment involving thirty (30) Grade 8 students and three (3) English teachers in Tablas Island, Romblon, which revealed difficulties in using verbs, adjectives, and adverbs, worsened by limited instructional time, low motivation, and poor study habits. Guided by Type I developmental research and the Talisayon & Vistro-Yu (1997) curriculum-development model, the researchers designed, piloted, and validated Enimage—an interactive instructional manipulative aimed at reinforcing content word mastery. A curriculum alignment and formative evaluation was conducted with six (6) curriculum experts and twenty-five (25) English teachers using DepEd’s Guidelines and Processes for Learning Resource Management and Development System (LRMDS), questionnaires, structured interviews, rubrics, and Flesch–Kincaid readability test. As a result, Enimage satisfied the predetermined criteria for visual design, educational value, engagement, and social interaction. A readability analysis also confirmed its appropriateness for the target grade level. Additionally, evaluators noted its promotion of critical thinking, vocabulary retention, and broad learner engagement through scaffolded challenges incorporated into gameplay. These findings support Enimage as an effective instructional material. Evaluators recommended its integration into classroom instruction, securing a copyright protection, and explore digital adaptations for blended learning environments.

*Keywords:* Enimage, instructional manipulative, content words, comprehension, vocabulary development

## Process Evaluation of Agricultural Extension Delivery through the Minus One Element Technique (MOET) in Rural Farming Communities

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Smallholder rice farmers in Itombato, Masbate, face persistent challenges in nutrient management due to limited access to laboratory soil analysis and overreliance on nitrogen-based fertilizers. This process evaluation study investigates the implementation and adoption of MOET. A mixed-methods design was used. Results showed that the farmer-participant perceived MOET as highly useful for diagnosing nutrient deficiencies ( $M=4.57$ ), improving fertilizer management ( $M=4.43$ ), and guiding timely application ( $M=4.14$ ). Perceived influence and willingness to use the technology were shown to be significantly correlated ( $p=0.575$ ,  $p=0.031$ ). Despite strong interest, barriers such as ease of set-up ( $M=3.57$ ), complexity of use ( $M=3.4$ ), and replication capacity ( $M=2.21$ ) suggest the need for continued technical support and accessible materials. Involving farmers children, particularly those studying agriculture programs, emerges as a best practice. However, to date, no farmer-participant has replicated or adopted the technology. Future extension training should integrate localized instructional materials, peer mentoring, and monitoring mechanisms to enhance adoption.

*Keywords:* Extension, MOET, rice farmers, Training, Process Evaluation, Masbate

## Z-Card A Game-Based Approach in Teaching and Learning the Fundamental Operations of Integer

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The ability to perform integer operations proficiently is a prerequisite for more advanced mathematical concepts. Facilitators of learning, curriculum planners, and researchers have suggested interventions to improve students' mastery in learning the fundamental operations of integers, and yet the problem is still evident. Non-numeracy and low mastery of grade-7 students at San Andres National High School is evident based on the result of the diagnostic test, hence the development of Z-Card, a game-based approach in mathematics education. It adapted the ADDIE framework focusing on designing, developing, and validating of Z-Card based on the following criteria: goals and objectives, card design, components and organizations, playability, and usefulness. Additionally, a quasi-experimental design was employed to evaluate the effectiveness of Z-Card in teaching and learning the fundamental operation of integers. The result revealed that integrating Z-Card in the teaching and learning process significantly improves the students mastery in learning the fundamental operations of integers, suggesting that students improved their numeracy skills and mathematical proficiency. Thus, educators must consider utilizing Z-Card in teaching and learning the fundamental operation of integers in classroom instructions to further validate the findings of the study and expand its application to other mathematical topics across different grade levels.

*Keywords:* effectiveness, game-based approach, innovation, integer operations, Z-Card

## Exploring Teachers' Perception on the Integration of Artificial Intelligence (AI) in Education

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This study aimed to assess the perceptions of teachers from 7 secondary schools in the municipality regarding the integration of AI tools in education. A total of 143 respondents participated. Using a quantitative method, data were gathered through two sets of questionnaires with 40 questions in total: one focused on teachers perceptions of AI in terms of roles, pedagogy, and professional development, and the other measured their level of acceptance of AI integration. This study answered the following questions: What is the demographic profile of the respondents in terms of age and length of service? What is the perception of teachers toward the utilization of AI in education in terms of the teachers role, teachers pedagogy, and professional development? What is the level of acceptance of teachers regarding the integration of AI in education? Is there a significant difference between the level of acceptance of AI utilization and the demographic profile of the respondents in terms of age and length of service? Finally, is there a significant relationship between the level of acceptance and teachers perceptions of AI utilization in education in terms of the teachers role, teachers pedagogy, and professional development? The data were analyzed using SPSS, weighted mean, and Spearman's rho. The findings revealed that most respondents were aged 30-38 years and had 7-12 years of teaching experience. The average acceptance score was 4.41, indicating a "Strongly Acceptable" level. Teachers expressed positive views on AI's potential to enhance professional development ( $M = 3.99$ ), pedagogy ( $M = 3.89$ ), and their roles ( $M = 3.85$ ). However, there were no significant relationships between teachers demographic characteristics (age, length of service) and their acceptance of AI. Additionally, no significant correlation was found between the level of acceptance and perceptions of AI's impact on their roles, pedagogy, or professional development. These results suggest that demographic factors and teachers' perceptions of AI's impact do not influence their acceptance of AI in education. The study provides valuable insights for future AI integration strategies, emphasizing the importance of user-friendly tools and ongoing professional development for educators.

*Keywords:* artificial intelligence, level of acceptance, teacher's roles, pedagogy, professional development

## Regional Perspectives on Organic Rice Production: A Study of Farmers in Mindanao

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Organic rice farming serves as a cornerstone for promoting food security and environmental sustainability, particularly in Mindanao, where favorable agroclimatic conditions enable productive cultivation. This study investigated the perceptions of farmers toward organic rice farming across Regions IX, X, and XII. Data on farmers' socio-demographic characteristics, farming practices, and perspectives on organic rice technologies were collected through interviews and structured questionnaires. These data were systematically analyzed using descriptive statistical methods to identify prevailing trends and relationships. Results revealed that organic rice farmers in the study areas are predominantly male, married, and high school graduates, largely belonging to the Visayan ethnic group. Most have participated in government-sponsored agricultural training programs to varying degrees. The majority practice ecologically sound farming methods, such as the application of organic fertilizers, compost, and bio-based pest management techniques. Moreover, surplus yields are typically sold in local markets, contributing to household income diversification and reinforcing the regional organic value chain. The findings underscore the integral role of organic rice farming not only as a sustainable agricultural practice but also as a socio-economic mechanism for rural resilience and local empowerment. By fostering both ecological balance and livelihood stability, organic rice production in Mindanao demonstrates the interconnectedness of sustainable food systems, community participation, and environmental stewardship that are key elements essential for advancing regional agricultural sustainability and long-term food sovereignty.

*Keywords:* organic farming, rice farmers, rice production, farming practices

## Determinants of Resiliency among Employees of Food-Related Businesses in Region XII

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This study investigated the influence of financial literacy, entrepreneurial capability, and organizational learning on employee resiliency within food-related businesses in Region XII. Utilizing a descriptive-causal design, data was collected from 305 purposively selected employees. The analysis, employing Mean, Standard Deviation, Pearson correlation, and Multiple Regression Analysis, revealed that financial literacy, entrepreneurial capability, and organizational learning, and resiliency are consistently demonstrated among employees. All three factors significantly influenced resiliency, collectively accounting for 62% of its variation. These findings underscore the importance of enhancing employees financial literacy, entrepreneurial skills, and organizational learning capabilities to foster greater resiliency in an industry prone to external shocks. The study offers valuable insights for business managers and policymakers, emphasizing the need for targeted training programs to promote workforce adaptability and long-term sustainability in the food industry.

*Keywords:* entrepreneurial capability, organizational learning, resiliency

## Dark Tourism in MIMAROPA: What Influences Visit Intentions

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This study examined the interplay of emotional engagement, ethical practices, tourist awareness, and motivations in shaping tourists' visit intention to dark tourism sites in the MIMAROPA region of the Philippines. Despite MIMAROPAs wealth of historically significant yet underutilized dark tourism sites – including war memorials, colonial-era ruins, and culturally embedded heritage locations – tourism development remains primarily nature-focused, limiting opportunities for heritage-based community resilience and socioeconomic development. Using a quantitative approach and Partial Least Squares Structural Equation Modeling (PLS-SEM), data were collected from 160 visitors across eight dark tourism sites. Grounded in the Theory of Planned Behavior and existential authenticity frameworks, results identified motivations as the most influential predictor of tourists' visit intention, followed by tourist awareness. Emotional engagement and ethical practices, while not directly significant, indirectly impacted tourists' visit intention through awareness, confirming the importance of cognitive framing in translating affective and moral perceptions into behavioral outcomes. Moderation analysis showed that gender did not significantly influence emotional or ethical pathways, whereas visit frequency enhanced the effect of ethical practices on revisit intentions. These findings support the need for educational and interpretive strategies such as storytelling, survivor narratives, and ethical site framing to deepen tourist learning and foster responsible tourism behaviors. The study contributes to understanding the psychological dimensions of heritage tourism and offers practical guidance for culturally sensitive tourism planning that strengthens community identity, supports local livelihoods through sustainable heritage conservation, and promotes socioeconomic linkages in community development in the Philippines' island regions.

*Keywords:* dark tourism, tourist visit intention, emotional engagement, ethical practices, sustainable tourism, MIMAROPA

## Language, Labor, and Education: An Ethnolinguistic Study of Iní in Marble Industry of Romblon

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The general objective of this study is to develop a linguistic ethnography of marble craftsmanship in Romblon through an analysis of the Iní language as a medium of technical expertise and cultural identity among marble workers. Specifically, the study aims to: gather preliminary data on the history, culture, and livelihood practices of marble industry-dependent communities; produce a comprehensive documentation of Iní terminologies, discourses, and narratives used in the processes of quarrying, carving, and polishing marble; and share the research findings with the community for practical applications in cultural and educational initiatives, as well as for the enrichment of Filipino linguistic and cultural discourse. The primary output of the research is a detailed linguistic ethnography of marble industry in Romblon. The study presents the perspectives and responses of marble workers regarding the significance of their language, labor, and heritage of craftsmanship. Insights were drawn from the researcher's analysis and reflection on lived experiences within the community. Overall, the ethnography and its accompanying cultural documentation are proposed as foundational resources for the development of supplemental materials and other instructional resources grounded in the local culture and livelihood of Romblon, in alignment with the goals of the Mother Tongue-Based Multilingual Education (MTB-MLE) framework. In this way, the study demonstrates that despite differences in language, skill, and geography, communities are unified by shared wisdom, traditions, and values that embody the collective identity of the people of Romblon.

*Keywords:* ethnography, iní language, marble, MTB-MLE, Romblon, supplemental materials

## Brand Love and Affective Commitment of Hotel Employees in Romblon: Mediating Role of Autonomous Motivation

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Brand love and commitment are not just a marketing concept but a strategic imperative for hotels in the modern hospitality industry. It drives customer loyalty, revenue growth, positive reputation, employee advocacy, and resilience, positioning hotels for sustained success and competitive advantage. Hence, the researcher aims to conduct a study on how brand love affects commitment of employees towards the hotel and how motivation mediates between the two (2) variables. Specifically, (a) to assess the hotel employees' love for the brand; (b) evaluate their level of commitment to the hotel; and (c) assess the effects of autonomous motivation to their commitment to the company. The principal objective of this study is to construct a framework centered on quality, with the intention of assisting the hotel sector in mitigating turnover rates and fostering a more engaged and dedicated workforce. The researcher will utilize a causal predictive study approach to evaluate the brand love and emotional commitment of hotel employees in selected hotels in Romblon, focusing on autonomous motivation.

*Keywords:* brand love, affective commitment, autonomous motivation

## Examining Digital Competence Among Filipino Public School Teachers: Generational Gaps, Institutional Support, and ICT Perceptions

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This study examines the digital competence of public elementary school teachers in the Romblon District, Philippines, with a focus on generational differences, support for capacity building, and attitudes toward technology use in education. Addressing the growing need for teacher readiness in digital classrooms, the study used a descriptive-correlational research design with 296 participants. Teachers were grouped as digital natives (born after 1980) and digital immigrants (born before 1980). Findings showed that digital natives demonstrated higher levels of digital competence compared to digital immigrants. Teachers who reported greater access to training, technology resources, and peer collaboration also had stronger digital skills. Additionally, a positive attitude toward ICT integration was linked to higher competence. These results suggest that institutional support and teacher mindset play essential roles in developing digital proficiency. The study recommends targeted training programs based on generational needs, equal access to digital resources, and stronger peer learning communities. These strategies can help bridge gaps in digital competence and enhance the overall integration of technology in teaching. The findings contribute to ongoing efforts to improve teacher preparedness for digital education in both local and global contexts.

*Keywords:* digital competence, generational differences, ICT in education, teacher training, technology attitudes

## **Bridging Confidence and Preparedness: A Quantitative Study on Self-Efficacy and Institutional Factors Affecting Licensure Examination Readiness Among Pre-Service Teachers of a State University**

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This study examines the preparedness and confidence of Romblon State University (RSU) pre-service teachers for the Licensure Examination for Teachers (LET), framed by Bandura’s Self-Efficacy Theory. A descriptive-correlational design surveyed 116 participants, assessing self-rated preparedness, confidence, and influencing factors. Descriptive statistics revealed moderate preparedness (53.4% neutral) but high confidence (58.6%). A strong positive correlation ( $r = .599, p < .01$ ) linked preparedness and confidence, underscoring their interdependence. Key factors boosting both preparedness and confidence included informal reviews, mentor support, mock exams, and internship experiences. Kruskal-Wallis tests indicated significant differences by academic program (e.g., lower confidence in Mathematics) but none by sex or age. Findings highlight institutional support’s critical role, particularly structured/unstructured reviews and mentoring, in fostering self-efficacy. The study advocates for program-specific interventions, especially in technical disciplines, and sustained investment in experiential learning and review processes. Recommendations emphasize integrating academic and psychological strategies to enhance licensure outcomes. By addressing gaps in preparedness and leveraging confidence-building practices, teacher education programs can better equip candidates for LET success.

*Keywords:* Licensure Examination for Teachers, pre-service teachers, preparedness, confidence, teacher education, self-efficacy, Romblon State University

## Who Stays Committed? Demographic and Sectoral Lessons for Theory and Practice

Ellaine Joy G. Eusebio

Organizational commitment is vital for employee performance, engagement, and retention. This study examined differences in affective, continuance, normative, and overall commitment across demographic factors (age, sex, educational attainment, tenure) and employment sectors among 380 Filipino employees. Results showed no significant differences across demographics, but sectoral differences were evident: public sector employees reported higher commitment levels than those in the private sector. These findings suggest that organizational context, culture, and practices shape commitment stronger than personal characteristics. Private organizations may enhance commitment by adopting effective practices from the public sector. Future research should explore mechanisms behind these sectoral differences and evaluate interventions to strengthen employee commitment.

*Keywords:* employment sector, government employees, organizational commitment, private employees

## Analyzing the Determinants of Entrepreneurial Intentions between Business and Non-Business Students at a State University

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Given the crucial role of entrepreneurship in driving economic growth and job creation, understanding the factors that shape entrepreneurial intentions has become essential for developing effective support systems and educational strategies. This research aims to investigate the influence of perceived educational (university) support (PES), perceived relational (family) support (PRS) and perceived structural (government/institutional) support (PSS) on the entrepreneurial intentions (EI) of both business and non-business students. It further seeks to determine whether significant differences exist between these two groups regarding their perceived support and entrepreneurial intention levels. Using a purposive sampling technique, a total of 300 students, comprising 150 business and 150 non-business students, from five state university colleges participated in the study through a Google Form questionnaire. A comparative causal research design was employed to explore the relationships among the variables. The findings revealed that PES, PRS, and EI were higher among business students, while PSS was lower. However, the Mann-Whitney U test indicated no significant difference between business and non-business students regarding their perceptions of support and entrepreneurial intentions. Moreover, multiple linear regression analysis showed that PES, PRS, and PSS significantly and positively influence students' entrepreneurial intentions. The study recommends that universities, families, peer networks, and government institutions strengthen their support mechanisms to foster a more conducive environment for nurturing entrepreneurial aspirations among students, regardless of academic discipline.

*Keywords:* entrepreneurial intention, entrepreneurial support, theory of planned behavior

## Development of a Microcontroller-Based Paddlewheel Aeration System for Aquaculture Do Management

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Dissolved oxygen (DO) is one of the most significant water quality parameters that needs to be improved and maintained in an aquaculture pond. This research developed a microcontroller-driven paddlewheel aeration system that helps improve and maintain dissolved oxygen levels in aquaculture environments. The system consists of a paddlewheel aerator, microcontroller, dissolved oxygen (DO) sensor, real-time clock (RTC) module, GSM module, and supplementary parts for real-time monitoring and management of DO levels. Two sets of aeration experiments were performed: an initial evaluation in a 3 m<sup>3</sup> water tank and a final evaluation in a 24 m<sup>3</sup> tank. The evaluations assessed the systems oxygen transfer rate (OTR) and aeration efficiency (AE) at various paddlewheel speeds (N) (151, 160, and 169 rpm) and paddle immersion depths (PID) (4, 8, and 12 cm). The results demonstrated a desirable speed-depth combination of 169 rpm and 12 cm, yielding in an OTR of 0.7820 kg-O<sub>2</sub>/h and an AE of 0.6982 kg-O<sub>2</sub>/kW-h, and higher volume of tank leading to a 10.28% increase in OTR and an 8.56% increase in AE. Evaluations of the automation systems reliability and response sensitivity were carried out, demonstrating that the system is 100% reliable and demonstrates high sensitivity in setting several modes of operation and in transmitting and receiving data to and from the user. The system was proven to be effective, reliable, and highly sensitive in improving and maintaining dissolved oxygen levels in aquaculture ponds.

*Keywords:* dissolved oxygen sensor, microcontroller, paddlewheel aerator, automation system, reliability, sensitivity

## **i-Support: A Web-Based Mental Health Support System For College Students**

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Like many academic institutions, students in colleges today suffer from numerous mental health concerns, ranging from academic burdens, personal factors, social pressures, uncertainty about the future, and financial stress, all of which remain unaddressed. Students often try to cope by talking to friends or family, but this has its pitfalls: issues of confidentiality, lack of understanding, or inadequate emotional support. This study aimed to develop i-Support, a web-based mental health care system that offers stress self-assessment, educational videos, a Q&A module, and a referral booking feature for consulting with school guidance personnel. Using the Agile Software Development Life Cycle and convenience sampling, the system was evaluated by 200 college students. Findings showed that younger students, particularly first-year and male students, are more vulnerable to mental health issues. The system addressed the need for a more accessible and supportive platform. With a high acceptability rating (weighted mean = 4.54) and compliance with ISO/IEC 25010:2011 standards, i-Support was found to be effective, user-friendly, and reliable. It offers a practical digital solution that supports student mental well-being and contributes to SDG 3: Good Health and Well-being.

*Keywords:* mental health support, decision support, web-based system, self-assessment, referral booking

## LUGIT: A Smart Farming System for Coconut Tree Disease Identification and Intercropping Farm Classification

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Intercropping is common in the coconut farm which composed of fruit trees and timber trees grow together. The Philippines stands out as a major agricultural producer which includes coconut cultivation among other crops commonly employ a conventional technique to detect pests and diseases in their coconut crops. This involves scrutinizing the state of the coconut leaves that were examined for any abnormalities, such as holes, damage, or discoloration. The current setup is inefficient since it requires individual tree assessments, hence limiting the capacity to oversee large agricultural expanses. Labor shortages worsen the problem, requiring that farm owners and their family undertake the monitoring responsibilities independently. The LUGIT system employs CNN, specifically efficientNetV2B0 to analyze high-resolution leaf images for two main applications which include disease detection in coconut tree and trees species identification that grown together inside intercropping farm. The unified system enables data-driven decision making for farmers and agriculturist and researchers by integrating coconut disease detection and crop classification. The main goal of this research is to help develop smart farming practices through building a deep learning model based on an efficientNetV2B0 for disease classification in coconut trees and the classification of intercropping species. The system provides recommendation from the agriculture experts, including procedures for trimming diseased leaves, specific sanitation protocols, and disease-specific nutritional recommendations. The combination of agriculturist knowledge generates localized guidance that helps farmers execute successful disease control practices. The LUGIT evaluation results showed that the system received positive feedback from both farmers and experts. The LUGIT achieved a grand mean of 4.9 with descriptive interpretation of Strongly Agree. The system fulfilled all essential requirements of ISO 25010 standards which proves its capability to serve as an efficient reliable user-friendly tool for disease classification and recommendation generation in agriculture.

*Keywords:* LUGIT, deep learning, EfficientNetV2B0, intercropping farm, Coconut disease, classification

## Poisson Recurrence Modeling of Earthquakes in the Philippines for the Year 2025: A Probabilistic Approach to Seismic Risk Assessment

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This study applied the Poisson recurrence model to earthquake data recorded in the Philippines in 2025 to estimate the probability of moderate-to-strong seismic events and identify regional risk patterns. Using quantitative analysis of PHIVOLCS records from January to October 2025, a total of 229 mainshock events ( $M \geq 4.0$ ) were evaluated. The mean occurrence rate ( $\lambda$ ) was computed per month and per region to assess the probability of at least one event within specific time intervals. Results showed a national mean rate of 22.9 events per month for moderate earthquakes and an annual rate of 0.20 events for  $M \geq 6.0$ , translating to an 18% annual probability of a major earthquake and nearly 100% monthly probability for moderate events. Regionally, Mindanao accounted for 56% of total seismic activity, with the highest recurrence rate ( $\lambda = 12.9$  events/month), followed by Luzon (5.9) and Visayas (4.1). The magnitude–frequency relationship ( $b = 1.03$ ) confirmed that Philippine seismicity follows a Poisson-type distribution, with frequent small events and rare but inevitable large ones. These findings indicate that strong seismic activity is a statistically predictable characteristic of the country’s tectonic environment. Thus, integrating Poisson-based recurrence modeling into national hazard mapping and building codes may guide infrastructure retrofitting, risk communication, and disaster preparedness, particularly in high-risk zones such as Mindanao, to strengthen earthquake resilience and support data-driven mitigation planning.

*Keywords:* seismology, Poisson distribution, recurrence modeling, probabilistic hazard analysis, Philippines

## Smart Composting Machine

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Composting plays an essential role in sustainable agriculture, although traditional composting practices often result in a long decomposition process with inappropriate ratios of input organic materials. This study addresses these limitations by developing a Smart Composting Machine intended to automate key composting processes for small-scale farmers in General Mariano Alvarez, Cavite. It aims to improve efficiency and maintain optimal conditions for compost production. The system uses an Arduino microcontroller to control the integrated shredder, paddle mixer, AC motors, sensors for temperature, moisture, pH, and nutrients and a touchscreen display for monitoring, LED status indicators, and an emergency stop for safety. Fabrication involves assembling an 800W shredder motor and a 2HP mixer motor within a compact frame, with a 5 mm safety-designed opening and a heating element attached to the mixing tub. The machine can handle up to 5 kg of organic material per cycle and can maintain moisture between 30% and 60%. Performance trials indicated an average full-load current of 2.51 A and produced shredded materials averaging 3.65 mm in size. The compost met acceptable quality levels: 32.3% moisture, pH 6.81, nitrogen 0.204%, phosphorus 0.122%, and potassium 1.289%. Daily monitoring over 14 days showed stable temperature and pH, with sensor readings validated against analog tools. Using the Technological University of the Philippines standard evaluation instrument, the prototype achieved an overall mean rating of 4.68, categorized as “Excellent”, the study concludes that this low-cost automated system can reduce manual intervention and improve composting efficiency. It can be recommended for wider use among rural communities to promote sustainable agriculture.

*Keywords:* Smart Composting Machine, automation, organic waste, sustainable agriculture, sensor monitoring

## The State of GIS Implementation: A Bibliometric and Systematic Study

Geographical Information Systems (GIS) are specialized information systems that integrates spatial and non-spatial data, and other functions like database management, remote sensing, and spatial analysis. It spans various sectors, like education, health, transportation, natural resources management, and urban planning, primarily due to its ability to improve decision-making, efficiency, communication, and cost savings. Despite its widespread applications and substantial economic impact, GIS implementation often faces challenges, especially in developing countries. It is often underutilized, with issues on limited adoption, ineffective use, and conflicts during implementation. In response to these concerns, a bibliometric and systematic review of GIS implementation literatures was conducted to guide researchers, practitioners, and other stakeholders in navigating implementation challenges, maximizing GIS utility, and fostering its broader diffusion and success. The research categorizes trends, themes, adoption factors, methodologies, and theoretical frameworks, emphasizing the social and contextual dimensions of GIS use. The scarcity of GIS implementation studies stems from several factors. They are the lack of documentation culture which is not a common practice or priority in most organizations, the long maturity period of the GIS system, the prevalence of unsuccessful implementations, resource and workload constraints of GIS personnel, difficulties in gathering and sharing data, and limited academic focus. GIS implementation studies are mostly concentrated in environment agencies, government, education and business. It usually tackles the implementation process, adoption factors, analysis of the current GIS situation, use or practice and identification of factors or barriers in its effective implementation. The theories, frameworks, or models usually used are the Diffusion of Innovation (DOI), Actor-Network theory (ANT), the Technology Enactment Framework (TEF) and the Technology Acceptance Model (TAM). The study serves as a compass pinpointing where GIS is at the moment, is it living up to its potential or is it just a hyped-up innovation? GIS implementation literatures acts as a check and balance that takes into account users' experiences which could not compensate for the tons of “what it can do” materials. It underscores the necessity of written accounts to track progress, enabling comparisons and informed decision-making.

*Keywords:* GIS, Geographical Information System, bibliometric analysis, systematic study, Diffusion of Innovation (DOI), Actor-Network theory (ANT), Technology Enactment Framework (TEF), Technology Acceptance Model (TAM), social context

## The CARLWIN Framework: A Learner-Centered Pedagogical Methodology for Human-AI Collaboration in Software Engineering Capstone Projects

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The proliferation of Generative AI has created a pedagogical crisis in computer science education, enabling students to produce "functional" code without internalizing architectural design or robust debugging skills. This challenge is exemplified by a real-world case study: the SEAMS (School Event Attendance Management) capstone project. While functional, the initial student-built system was not mobile-responsive, had a poor UI, and exposed significant data privacy risks, making it unready for real-world deployment. Attempts to recruit human experts for integration failed due to scheduling conflicts, a common bottleneck. This impasse led to the development of the CARLWIN Framework, a new pedagogical methodology born from the necessity of managing AI partners. This paper documents the primary hurdle in AI collaboration: "session-based amnesia" (the context window limit), which renders the AI unable to recall project details between sessions. The framework's solution is the `project_context.md` file, a critical "paalala" (reminder) that functions as an external "save file" for the entire team, both human and AI. The framework reframes the student as a "System Architect" and the AI as a "Senior Developer with amnesia," guiding them through seven iterative phases: Conceptualize, Architect, Run, Locate, Witness, Integrate, and Nurture. This paper details the framework and its application in a new case study—the integration of a complex "Poll Module" into SEAMS—proving that this methodology transforms AI from a "crutch" into a genuine collaborator, forcing students to master the high-level skills of architecture, delegation, and "meta-work" (the work of managing the work).

## An Android-Based Rice Leaf Infection Classifier (Rice) Using Machine Learning

Preexcy B. Tupas; Dayne N. Fradejas; Sarah Joy A. Lucidos; Marvin Rick G. Forcado; Catherine Bhel B. Aguila

Rice is a staple food for over half of the global population, making it a crucial crop for food security. Diseases such as Bacterial Leaf Blight, Brown Spot, and Leaf Smut significantly threaten rice production, reducing yield and quality. This study introduces an Android-based Rice Leaf Infection Classifier (RICE) that leverages machine learning to provide real-time disease classification and actionable insights for farmers. Utilizing the EfficientNetLite2 architecture, the model was trained on a dataset sourced from Kaggle, achieving a training accuracy of 55.41% and a validation accuracy of 41.28% over 10 epochs. Quantization techniques optimized the model for mobile deployment, enabling seamless integration into an intuitive mobile application built with Android Studio. While validation accuracy highlights areas for improvement, the research demonstrates the potential of combining machine learning and mobile technology to enhance agricultural practices and support sustainable food production.

*Keywords:* android application, EfficientNetLite2, machine learning, mobile technology, rice diseases

## Optimization and Response Surface Modeling of Peanut Roasting Using Gasified Biomass Fuel

Engr. Orley G. Fadriquel

Roasting is a method used to enhance the flavor, color, and overall appearance of peanuts. To achieve the desired quality of peanuts, the roasting process must be optimized. The common roasting process utilizes electricity, wood or LPG as source of heat, which is costly and pose environmental threat. In this study, the roasting process utilized gasified biomass that supplies constant heat to the drum type roasting chamber. Response Surface Methodology Central Composite Design was employed to examine the impact of roasting temperature ( $^{\circ}\text{C}$ ), roasting duration (min), and cylinder speed (rev/min) on the 5 response variables that includes color parameters (CIE  $L^*a^*b^*$ ), moisture content (%), aflatoxin concentration (ppb). The Design-Expert numerical and graphical optimization tool was employed to develop a mathematical model for the responses and to present the relationship between the variables. The result of the study revealed that RSM CCD developed an adequate prediction model for describing response variables in peanuts after roasting with gasified rice husk as fuel. Multiple regression analysis was used to estimate the values of model coefficients, which were subsequently validated by one-way ANOVA. The roasting parameters were described by linear, quadratic, and two-factor interaction (2FI) models. Results indicated that longer roasting times of 25 minutes with cylinder rotating at 15 rpm, and higher temperatures at  $180^{\circ}\text{C}$  generally resulted in reduced moisture levels and increased CIE  $L^*a^*b^*$  values. The aflatoxin levels were predominantly stable across treatments and were still below the 20-ppb standard level of concentration.

*Keywords:* peanut roaster, RSM-CCD, CIE  $L^*a^*b^*$ , moisture content, Aflatoxin concentration, gasified biomass



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