MINDANAO SYMPOSIUM

on the Future of Agrifood Systems

16 NOVEMBER 2023
ACACIA HOTEL DAVAO

Mindanao Symposium Series

The Mindanao Symposium Series is organized by the University of the Philippines Mindanao in order to foster discussions among various stakeholders about various issues affecting Mindanao and the rest of the country as well as help shape the agenda for R&D in shared areas of concern—namely, the agrifood system, biocultural diversity, smart and sustainable environments, sports development, health, innovation, and cross-cutting concerns—for research institutions in the island and beyond.

Mindanao Symposium
on the Future of Agrifood Systems

The "Mindanao Symposium on the Future of Agrifood Systems" is the first of many symposia that will be organized by UPMin Office of Research in partnership with various institutions and stakeholders to bring various stakeholders together to discuss the R&D niche areas of the university, namely: (1) Sustainable Agrifood System, (2) Biocultural Diversity, (3) Smart and Sustainable Environments, (4) Health, (5) Sports Development, and (6) Innovation.

The symposium will gather various speakers to talk about their thoughts on the topic in a roundtable discussion, highlighting various intersecting topics like the role of technology, conflict, environmental trade-offs, public policy, and international collaborations in shaping the future of agri-food systems.

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KEYNOTE & ROUNDTABLE DISCUSSION

Grand Ballroom 2 & 3

Pathways to the Transformation of the Philippine Food System

Acd. Eufemio T. Rasco Jr., PhD
Academician
National Academy of Science and Technology
Department of Science and Technology /
Professor Emeritus
University of the Philippines Mindanao

Acd. Eufemio T. Rasco Jr. is an academician of the National Academy of Science and Technology (NAST) of the DOST and Professor Emeritus of UP Mindanao. Prior to joining UP Mindanao, Dr. Rasco served as a faculty member and an official of UP Los Baños and as a scientist in agricultural organizations. Prof. Rasco's research and advocacies were plant breeding, genetically modified crops, underutilized bioresources, sustainable modern agriculture, and rural transformation through science-based support system for rice farmers, just to name a few. He is the author of The *Unfolding Gene Revolution: Ideology, Science, and Regulation of Plant Biotechnology*, which won the NAST Most Outstanding Book Award in 2008, and *The Nypa Palm: Nature's Gift from the Age of the Dinosaurs*, published in 2011. Some of the awards conferred to Dr. Rasco are the following: Outstanding Senior Staff from the UPLB Institute of Plant Breeding in 1982, 1983, 1985, and 1990; UPLB Outstanding Alumnus for Vegetable Breeding in 1986; Achievement Award for Agriculture from the Camarines Norte Association in 1987; Bicol Exemplar Award from DOST in 1989; Outstanding Senior Faculty from the UP Mindanao Foundation Inc. in 2009; and the Outstanding Alumnus Award conferred by the UP Alumni Association in 2009.

Where Are We in the Innovation Pathway Towards Agri 4.0?

Prof. Larry N. Digal, PhD
Former Chancellor and Professor
University of the Philippines Mindanao /
Program Leader
Agri-Aqua Value Chain Laboratory

Prof. Larry N. Digal, PhD, is a professor of agricultural and applied economics, School of Management, and the former chancellor of the University of the Philippines Mindanao. He finished his PhD and MS in Agricultural Economics at the University of Sydney in Australia and Purdue University in Lafayette, Indiana, USA, respectively. He finished his undergraduate degree in the same field at the University of the Philippines Los Baños cum laude and received the Gamma Sigma Delta Honor Society of Agriculture Gold Medal Award for Academic Excellence and the Joan Gonzales Gold Medal also for Academic Excellence. He excelled in his area of specialization particularly in the "economics of sustainable agricultural value chains." In this area, he developed, led many research projects and programs, developed research networks in UP Mindanao with links to international partners, mentored junior researchers, developed and led interdisciplinary research groups, led conferences and published extensively. His research interests also include industrial organization of agricultural markets, market power, and policy.

The Impact of Conflict to the Sustainability and Resilience Capacity of Local Food Systems

Prof. Emma Ruth V. Bayogan, PhD
Adjunct Professor
University of the Philippines Mindanao /
Program Leader, PULL 2 Project

Prof. Emma Ruth V. Bayogan, PhD, retired this year but continues to work as an adjunct professor at the Department of Biological Sciences and Environmental Studies, University of the Philippines Mindanao. Her research works are focused on postharvest biology and technology, horticulture, sustainable agriculture, and seed technology coupled with extension activities. She is the current President of the PhilFruits Association. Through Dr. Bayogan's leadership, the Postharvest Laboratory was established in UP Mindanao and their laboratory regularly coordinated trainings for postharvest handling technologies. Dr. Bayogan served as the Program Leader of the DOST PCAARRD-funded research program "Enhancing Livelihood Opportunities in Conflict-Vulnerable Areas in Mindanao through the LIFE (Livelihood Improvement through Facilitated Extension) Model" from 2017 to 2021 (LIFE UP Mindanao), which aimed to improve farmers' livelihood and quality of life through facilitated extension. The program's paper "Giving Farmers uwen fananafedew: Improving Agricultural Extension in Conflict-Vulnerable Areas through the Livelihood Improvement through Facilitated Extension (LIFE) Model" won Best Development Paper in 2020 during the SMAARRDEC's Regional Symposium on Research Development and Extension Highlights and in 2021 as representative of Region XI for the National Symposium on Agriculture, Aquatic and Natural Resources Research and Development of PCAARRD.

Transforming Agriculture though Adoption of Climate Resilient Practices

Prof. Moises Neil V. Seriño, PhD
Dean
College of Management and Economics
Visayas State University

Prof. Moises Neil V. Seriño, PhD, is a professor of the Department of Economics, College of Management and Economics, Visayas State University (VSU), Visca, Baybay City, Leyte, Philippines. He is the recipient of the 2023 Outstanding Young Scientist Award given by the National Academy of Science and Technology (NAST) Philippines for his substantial contribution in socioeconomics and development in the Visayas. He finished BS in Statistics in 2005 from Leyte State University, Philippines. He earned his master's degree in International Development Program (IDP) (economics) at the International University of Japan in 2009. He pursued doctorate degree in Economics at the University of Göttingen, Germany in 2014. He was a visiting research fellow at the Center for Southeast Asian Studies, Kyoto University, Japan in 2019. He was a John Dillon Fellow - Philippines (2021) of the Australian Center for International and Agricultural Research (ACIAR), Australia and recipient of the USDA Scientific Exchange Fellow (2023) at Louisiana State University, USA. He is currently the Dean of the College of Management and Economics, Visayas State University (2020 - present) and concurrent director of the Visayas Socio-Economic Research and Data Analytics Center (ViSERDAC) (2020 - present). He was elected board member of the Philippine Agriculture and Economic Development Association (PAEDA) in 2021 and served as the convenor of the Australia Alumni Agriculture, Aquatic and Natural Resources Community of Practice (AANCoP) in 2022.

Promoting Multi-functionality of Rural Landscape: The Need for a Landscape Approach

Dr. Rachmat Mulia
Agroforestry and Sustainable Landscape Scientist
World Agroforestry (CIFOR-ICRAF)

Dr. Rachmat Mulia is an ecological modeler that also has agriculture and forestry statistics as a background. He has more than 10 years of experience linking the development of sustainable agriculture such as agroforestry and sustainable forestry practices, both at farm and landscape scale, with rural food security, farmer's resilience to climate change, and environmental services to include carbon and water services, and biodiversity. Thanks to different projects that he has led or has been participating in, he also has experience in developing green growth orientation and measures at a provincial scale, especially those related to the agriculture and forestry sector, and assess the impact of the measures on the provincial economy and ecosystem services. In addition, he has also been involved in projects and studies related to rural development, especially on the potential role of livelihood diversification to enhance rural household's income and resilience to both economic and environmental shocks.

SPECIAL SESSION 1

Grand Ballroom 2

Co-Design Approach to Developing Gender Responsive Intervention Models for Cacao Value Chains in Davao City, Philippines

Mia Barbara Aranas[1], **Aileen Lapitan**[2], **Mitchiko Lopez**[3], **Nico Jayson Anastacio**[2,*], **Canesio Predo**[2], **Mara Faylon**[4], **Emmanuel Flores**[2], **Claire Estelle Cruz**[3], and **Anjelyn Joy Enong**[3]

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Keywords

social equity, agricultural production, participatory approach

Abstract

This study developed a co-design approach to creating solutions that will improve gender relations in agri-food value chains. Co-design is highly participatory. It is an approach in which solutions are designed with (not just for) the people with lived experiences of the issue. The approach underscores the importance of understanding the barriers and opportunities related to gender and using such insights in creating government intervention that aim to improve efficiency in the value chain and at the same time achieve equitable distribution of gains. The co-design protocol was developed and tested with men and women cacao farmers in Davao City, Philippines, in collaboration with their cooperatives, local government offices, and industry groups. Results of the pilot came in a suite of policy measures and other government interventions for improving gender equality such as: creating a culturally sensitive ecosystem, providing incentives for gender responsive and inclusive businesses, prioritizing research and development (R&D) projects that are gender-sensitive, giving premium to social labelling or certification (i.e., socially inclusive, women producer groups, etc.), and giving massive promotional opportunities for products that are produced by groups of women.

Agritourism Farms as Conduit of the Adoption of Good Agricultural Practices (GAP) in Eastern Visayas, Philippines

Nico Jayson Anastacio[1]**, Dhenber Lusanta**[2,*]**, Jewel Joanna Cabardo**[1]**, Hadasha Bongat**[2]**. Gideo Neil Tan**[2]**, and Gracielle Gamotin**[2]

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Keywords

agricultural innovations, food safety, PhilGAP, sustainable agriculture, agritourism farms

Abstract

Philippine Good Agricultural Practices (PhilGAP) is an important policy mechanism adhering to the food safety act of the Philippines (RA 10611) in ensuring food safety, environmental sustainability, and social responsibility in the agricultural sector. However low adoption of PhilGAP standards has been observed particularly in the Eastern Visyas Region. This is in spite of the region having vast agricultural areas. A significant challenge in the low adoption of PhilGAP is the low awareness of both producers and consumers of PhilGAP processes along with its benefits. Grounded in this premise, this project highlights the potential contribution of the local agritourism farms in the promotion of PhilGAP within the Eastern Visayas Region. The significant number of agritourism farms within the region could serve as a conduit for education, communication, and collaboration between farmers and consumers in increasing awareness and appreciation of PhilGAP. Using multiple case studies as research design, the project is aimed at identifying and understanding the challenges and prospects of agritourism farms in Eastern Visayas for PhilGAP certification and ultimately, in the promotion of PhilGAP within the region. The results of the study reiterate the different challenges in relation to the absence of niche market of PhilGAP-certified produce, which could be further associated with the lack of awareness. With the status of the local agritourism farms as learning sites, this study reaffirms their significant role in establishing the market niche of PhilGAP certified produce. It further recommends the provision of institutional support emanating from local government units and national government agencies in relation to PhilGAP certification and promotion through these agritourism farms.

Adoption of Pre- and Postharvest Technologies to Improve the Competitiveness of 'Carabao' mango in the Local and International Markets

Vlademir Shuck[1,*]**, Roxanne Aguinaldo**[1]**, Jewel Joanna Cabardo**[2]**,
Ronilo De Castro**[3]**, Vladimer Kobayashi**[1]**, Angelyn Lacap**[1]**, Mitchiko Lopez**[1]**,
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Keywords

mango production, proper
harvest maturity, hot water
treatment

Abstract

While global demand for mango has increased over the past 10 years, the country's mango producers in the Philippines, mainly dominated by smallholder farmers, cannot consistently deliver high-quality mangoes to major markets due to the high losses that are attributed to pests, diseases, and poor pre- and postharvest management, compounded by gaps in the supply chain. The research endeavor performed a field trial on a one-hectare mango farm in Brgy. Aumbay, Island Garden City of Samal, Davao del Norte. Specific activities include the following: preharvest bagging on mango using improved material, harvesting at proper maturity stage, hot water treatment, conduct of focus group discussions and benchmarking, conduct of capacity building activities, and the development of a website. Results showed overall positive outcome. Fruits bagged with the improved bagging material showed to have minimized pre- and postharvest losses while preserving better fruit quality longer and achieving higher antioxidant activity. Harvesting the mango fruits at 110-115 d after flower induction (DAFI) leads to 91-100% mature fruit at harvest with better fruit quality with moderately high total soluble solids (TSS), better visual quality, and a lower incidence of anthracnose. The application of hot water treatment (HWT) also increased the percentage of marketable fruits by up to 42% at 12 d after harvest or three days after arrival in Manila, compared to only 1.67% for untreated fruit because of the reduced number of fruits affected by anthracnose and stem end by 45% and 68% compared to untreated fruit, respectively. Mango farmers and contractors also show willingess to adopt the three technologies, especially the adherence to proper harvest maturity and use of HWT. The project also conducted season-long training on pre- and postharvest technologies where the participants were exposed and actually handled the technologies themselves.

Technical and Economic Evaluation of Selected Technologies in Mango Production: A Case in IGaCoS, Philippines

Vlademir A. Shuck*, Leizel B. Secretaria, Angelyn T. Lacap, Michael Angela J. Urquila, Nadzma D. Darimbang, Larry N. Digal, and Emma Ruth V. Bayogan

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Abstract

The Philippine mango industry contributed Php 35.520 billion in gross value added in 2020 and remained as the top three most exported crop from the country. However, the mango industry is currently facing enormous challenges specially in the aspect of production and postharvest. In this study, we evaluated the technical and economic aspects of three technologies introduced in the Island Garden City of Samal, namely: preharvest bagging using Taiwan paper bag (TPB), harvesting at proper maturity, and use of hot water treatment (HWT). A field trial was conducted using 53 randomly selected 'Carabao' mango trees in a one-hectare portion of the Gabonada Farm located in Brgy. Aumbay, IGaCoS, Davao del Norte. The freshly harvested mango fruits were transported and stored in ambient room conditions at the Postharvest Biology Laboratory in UP Mindanao, Davao City. For 12 d, the fruits are evaluated every 4 d for physico-chemical quality (percentage weight loss), total soluble solids (TSS), peel color, visual quality, shelf life, and the degree and onset of anthracnose and stem-end rot. The data were subjected to two way and three-way analyses of variance (ANOVA) for harvest and postharvest assessment, respectively. The use of TPB significantly improved the quality of mangoes by almost doubling (98%) the proportion of Class A (fresh export grade) and increasing Class B (Hong Kong and Local Manila markets) by 38%. We also proposed harvesting at 110-115 days after flower induction (DAFI), which led to 91-100% mature fruits compared to only 34% when harvested at 105 DAFI. Fruits have also higher total soluble solids (16.72 and 19.48% Brix, respectively) compared to only 15.34% Brix during the 8th day of evaluation period. We also recommend HWT for 10 minutes at 52-55 °C, which reduced the degree of anthracnose and stem-end rot thereby improving its marketability. The results of using these technologies were proven to improve the overall quality of mangoes in the Island Garden City of Samal. Furthermore, the results of this studymay also be applicable in many mango-producing areas in Mindanao since their practices are generally similar.

Challenges and Strategies in Optimizing the Calamansi Value Chain in Small Island Agribusiness: A Case Study of Homonhon Island, Philippines

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Keywords

calamansi, small island, market analysis, value chain upgrading

Abstract

Calamansi (*Citrofortunella macrocarpa* W.) is a top crop in the small island communities in Homonhon Island, Guiuan, Eastern Samar, Philippines, with significant production and potential for adding value. However, due to their isolation, scarcity of resources, and exposure to climate and natural disasters, Homonhon's calamansi farmers are more vulnerable to economic and environmental problems. In this paper, we analyze the calamansi value chains on the small island of Homonhon. Examination of the product, information, and payment flow of an island-based value chain from the input supply sector, production, and trading until the products are delivered to the end consumers was done. We conducted key informant interviews (KIIs) with diverse participants, including farmers, assemblers, traders, and other institutional buyers, to comprehensively understand the calamansi value chain. The Dephi methods was employed to gain deeper insights into strategies and assess the feasibility of interventions within the value chain. Results showed a huge gap in the supply of calamansi in the region. In the island-based value chain, product perishability, market size, farmer's income are all negatively impacted by the island's environmental restrictions, lack of processing facilities, and high transportation costs. Payment methods vary within the value chain, with cash and credit terms in the upstream and cash preferred downstream. These findings highlight the need for improvements in production practices, communication, and processing capacity, emphasizing the importance of government support and stakeholder cooperation. Furthermore, the identified challenges within the value chain highlight the necessity for improvement in post-harvest technologies, value addition through processing, and market diversification to enhance the overall competitiveness and profitability throughout the entire value chain.

Enhancing Climate Resilient Agriculture using Decision Support Tools in Vegetable Production in Leyte, Philippines (e-CRISP)

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Keywords

collaboration; partnership; public service

Abstract

With the geographical location of the Philippines, agriculture in the country, especially in Leyte Island, is extremely vulnerable to climate change. To address the negative impacts of climate change, one of the feasible approaches is the adoption of climate-resilient agricultural practices. This study used two-step approach to address its objectives. First, we gather data about vegetable farmers' practices, evaluate whether they can be considered climate resilient, and assess its potential for scaling up. Second, co-development of climate decision support tools such as crop climate calendar, Verbal Decision Analysis (VDA), and Rapid Climate Decision Analysis (RCDA) was introduced to farmers to integrate weather and climate information into different stages of vegetable production through a series of workshops. Results suggest that adoption of climate resilient agricultural practices generates higher farm productivity, contributes to reduction in carbon emissions, and enhance the achievement of year-round supply of vegetables despite changing climate conditions. Results of the verbal decision analysis and rapid climate decision analysis highlighted different events, decisions, and consequences per crop at various growth stages. These tools presented different possible outcomes per scenario. Farmers would then be able to make a decision depending on the results of the matrix. However, when the results from the VDA matrix are not yet clear and farmers will then proceed to the RCDA simulation. From the RCDA results, the farmers would have an idea of how much profit is estimated to be generated at different decision levels and climate events. Using the abovementioned tools provided options for decision makers to change the optimal decision from planting various crops resulting in a positive outcome. Results of study can provide essential inputs to policy making in prioritizing agricultural practices and harnessing decisions support tools that can contribute to the improvement of food security and livelihood of small-scale vegetable farmers.

SPECIAL SESSION 2

Grand Ballroom 3

Readiness and Drivers of Intention to Adopt I4.0 Technologies for Smallholder Coffee Farmers in the Philippines

Marvin Louie G. Orbeta*, **Larry N. Digal, Carol Q. Balgos, Shemaiah Gail P. Placencia, and Melissa P. Loquias**

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Keywords

coffee, readiness, technology adoption, Industry 4.0

Abstract

In developed countries, the application of information and communications technology (ICT) have improved farm productivity, enhanced food systems efficiency, increase profitability of its users, and facilitated better flow of information, as well as access to extension and advisory services. The importance of these technologies becomes even more apparent when value chains are disrupted with food system shocks such as extreme weather events and pandemics. While benefits of these technologies are clear, there are issues particularly in terms of adoption among farmers and micro-, small- and medium enterprises (MSMEs) in developing countries. Innovation in the coffee sector is being pushed by the Philippine government through the promotion of I4.0 technologies. Hence, the main objective of this study is to assess the readiness of smallholder coffee farmers to adopt I4.0 technologies and identify the factors that drive their willingness to adopt the same technologies. To assess the readiness of smallholder coffee farmers, the proponents used the IMPULS Model, modified and contextualized to fit the Philippine coffee sector. This was used to assess the farmer as an individual enterprise and their readiness for technology adoption. Using a logit model, the study tries to measure the factors influencing the willingness to adopt I4.0 technologies for coffee farmers. Our I4.0 readiness assessment classified smallholder coffee farmers as newcomers. Logit model results revealed that volume of production and farmers' regional location had a positive influence on adoption. This suggests highly productive farms of farmers in key coffee-producing regions positively influence the adoption of I4.0 technologies. The model also revealed farmers' experience had a negative influence on their intention to adopt. The younger, less-experienced coffee farmer is more likely to adopt I4.0 technologies than older farmers. It is important to orient farmers about I4.0 technologies in the coffee sector through awareness campaigns that teach the use of available technologies and highlight the benefits important to farmers. Considering younger farmers in key coffee-producing regions will facilitate participation in these knowledge sharing activities and lead to higher rates of adoption.

Identifying Optimal Market Choices to Increase the Profitability of Coffee Farmers in Sultan Kudarat through Modelling and Scenario Analysis

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Abstract

Philippine coffee production experienced a significant decline in the year 2019-2020 due to low productivity, lack of capital, limited access to credit, limited knowledge of farming technologies, high production costs, price volatility, and inability to meet market requirements in terms of quality and volume. This study focuses on the coffee chain of Sultan Kudarat – the coffee capital of the Philippines. Coffee farmers in this area allocate their harvested cherries as fresh cherry, dried cherry, and green coffee beans to five market outlets: Nestle Philippines, local traders, growers' association, direct selling, and other markets (e.g., coffee shops and hotels). Choosing the best market to sell their product is a problem for farmers, especially when there are restrictions in marketing their coffee. Hence, a supply chain network design model and simulation are developed to investigate the changes in the profits of coffee farmers as they market their products, whether to be sold as fresh cherry, dried cherry, or processed into green coffee beans before marketing to the above-mentioned market outlets, based on the average annual costs affecting the production, primary processing, and market prices of coffee products. Assuming that the annual coffee yield per tree and the average prices of coffee product in different markets are constant, the results show that selling fresh cherry or dried cherry gain positive profits given the farmer's current resources and farming practices. Our approach was inspired by the developed SCND model for the Cavendish banana commodity in the Davao Region, which serves as a diagnostic tool for assessing the profitability of a commodity in different market options. Therefore, the developed model can be modified and used for regular coffee farms and other commodities, and the results from the scenario analysis can offer recommendations to smallholder farmers by identifying the optimal market choices to increase their profitability.

Empowering Small-Scale Coffee Farmers through a Cost and Profit Calculator with Market Optimization Tool

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Keywords

cost calculator, profit calculator, market optimization, coffee

Abstract

The absence of a farm performance analysis tool leaves coffee farmers dependent on their personal experiences to navigate their expenses and product sales. This dependence leads to high production costs and low income. As of 2021, coffee farmers earn PhP 107,204 annually, which is lower when compared to the minimum annual salary in the Philippines, which is around PhP 150,000. To address these challenges, a web application has been developed that provides a set of essential tools for farmers. Specifically, the features offered by the application are a cost calculator, profit calculator, and market optimization. The application empowers farmers to discern the most cost-efficient and lucrative scenarios, facilitating reductions in coffee farming expenditures and the maximization of profits. In the current phase of this project, the functionalities are available on an online web application to perform a cost calculation, profit calculation, or market optimization. In the future, we also plan to create offline versions of all the other modules to help farmers access the application more easily. Additionally, we aim to translate the app into local languages to make it understandable to local farmers. Application testing with farmers will also be done to further refine the application to make sure that it is user-friendly. To ensure the accuracy of the results generated, the equations and bounds used in our calculators and Market Optimization Tool are based on the Supply Chain Network Design of coffee markets in various regions of Mindanao and collected datasets from farmers. The Cost and Profit Calculator with Market Optimization Tool serves as a valuable asset, benefiting not only small-scale coffee farmers but also holding the potential to foster the growth and sustainability of the coffee industry in both Mindanao and the entire Philippines. This innovative tool empowers farmers by equipping them with essential knowledge and decision-making resources, leading to enhanced financial outcomes and the fortification of the coffee sector.

The Role of Clustering and Value Adding in Improving Small-scale Cacao Farmers Income: The Case of Talle Farmers Association in Laak, Davao de Oro

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Abstract

Various value chain upgrading strategies have been implemented to help small-scale farmers improve their income such as improving market linkages and value-addition. In Mindanao, the main cacao-producing region in the Philippines, various value-adding efforts were introduced for small-scale cacao farmers. However, the adoption and sustainability of value-adding initiatives among these farmers have presented notable challenges. To gain insight into the adoption dynamics among farmers, an action research project was conducted among the small-scale cacao farmers in Laak, Davao de Oro, which has a main goal of enhancing their income. A value chain analysis was employed to identify issues and opportunities in improving the performance of the farmers in the cacao value chain. Logit regression was applied using the baseline survey to understand the factors influencing the farmers' choice of buyers. The project also implemented various production and post-production training initiatives to improve the productivity and quality of their cacao beans and establish a link with sustainable buyers. The baseline results revealed that farmers preferred selling to nearby buyers regardless of the type of buyer, price, and the quality of their dried cacao beans. Distance is their primary consideration. Many of these farmers engaged in value-adding through the drying of cacao beans and opted to sell their produce individually, avoiding higher marketing costs by choosing proximate buyers. Initial results also revealed the positive impact of clustering in attracting institutional buyers. Selling consolidated wet cacao beans to institutional buyers appears to be more profitable compared to value-adding through drying and selling dried beans to nearby buyers. These observations raise the question of whether value addition consistently translates to improved income. Small-scale farmers may potentially end value-adding endeavors if they have better options to improve their income. This study implies value adding does not always guarantee better income. It is significant to align cacao farmers' output with the demands of sustainable buyers considering that Mindanao, particularly the Davao Region, is the major producer of cacao beans in the country.

Estimating the Demand for Banana Ketchup in Rural and Urban Supermarkets in Davao Region, Philippines

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Abstract

In the Philippines, the banana sector is recognized to play an important role in the economy. The country produces an average of 4.8 million metric tons of Cavendish Banana annually from 2018-2022. Fifty-three percent of this volume is produced by Region XI. Around 10 percent of the total cavendish banana produced accounts for reject or off-grade banana. One of its by-products produced from reject and surplus is banana ketchup, a cheaper and sweeter substitute to tomato ketchup. With this, this paper explores the demand for different ketchup brands in the market to better understand how efficiency is achieved and wastage is minimized in the banana value chain through demand response. An Almost Ideal Demand System model using point-of-sale data was utilized, while focusing on key performing brands. Own-price, cross-price, and expenditure elasticities across brands and across branches were also estimated to see the substitutability and market potential across different ketchup brands and variants. As expected, tomato ketchup was highly substitutable with banana ketchup. Cheaper local brands were also seen to be highly competitive compared to. Specifically, showed that UFC is most sensitive to changes in its own price, while cross-price elasticities show that Del Monte is highly substitutable to Queen, Papa, and UFC. Papa carries the highest expenditure elasticity for rural areas and Queen for urban areas. With these results, retailers may consider increasing their selling price for Papa and Queen for potentially higher revenues. Also, the competitiveness of cheaper substitutes in urban retail markets is also acknowledged, especially because of the emergence of smaller businesses which are predominant buyers of said product. Hence, it is worthwhile to support smaller processors, offering cheaper alternatives to the banana ketchup market by linking them with banana growers, and subsequently allowing them to access the supply of underutilized off-grade bananas. This will help reduce food waste by increasing the utilization off-grade bananas and help the processors access cheaper inputs to production. The feasibility of their expansion is supported by the results of the AIDS estimation.

ORAL PRESENTATION SESSION 1

Grand Ballroom 2

Duck Egg Embryonic Classification Using Convolutional Neural Networks (CNN)

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Keywords

duck eggs, balut, penoy, convolutional neural networks, image processing, machine learning

Abstract

Duck egg remains a vital source of food and income for many Filipino households. Duck eggs are considered a delicacy and are used in various dishes such as salted salted egg, boiled incubated fertilized duck egg known locally as "Balut", and boiled incubated unfertilized duck eggs known locally as "Penoy." In small to medium poultry farms, farmers manually inspect each duck egg during the incubation period to determine individual embryonic development status such as fertilized, unfertilized, and rotten. Rotten eggs must be identified and removed from the incubator to prevent them from exploding and contaminating other duck eggs. The efficiency of the manual inspection relies solely on the experience and skill of a worker. This manual process, when done on a large scale, is tedious and subject to human limitations which can lead to inaccurate classifications. In this study, we propose image processing and machine learning techniques to automate the classification of duck eggs into fertilized, unfertilized, and rotten. Contrast Limited Adaptive Histogram Equalization (CLAHE) is used as a preprocessing technique to enhance the contrast of the internal features of the duck egg before feeding it into a Deep Convolutional Neural Network (CNN) that would learn the features that distinguishes the different embryonic development classifications. A dataset of 5760 duck egg images was preprocessed and then used for training and testing 5 CNN models (AlexNet, VGG16, InceptionV3, ResNet50, and Xception). Experiments show that the CNN models can distinguish the duck egg images between fertilized, unfertilized, and rotten. Among the 5 models, the VGG16 model achieved the highest accuracy of 96% on the test set. The outcomes can motivate the development of smart and affordable solutions for duck egg farmers to streamline their processes and increase their efficiency. More efficient and profitable duck egg farming can contribute to economic development, not only for individual farmers but also for the region or country as a whole. It can enhance food production, create jobs, and stimulate economic growth.

Development of the Porcine Meat Detection Test for Traceability and Halal Screening

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Keywords

Halal, meat adulteration, porcine detection, traceability, labeling, PCR

Abstract

Meat adulteration, the addition of a cheaper meat alternative without declaring on the product label, is a fraudulent activity in the meat industry, since a complete list of the meat species ingredients is important to protect consumer health, religious practice and promote fair trade. Furthermore, as a food security issue, it must therefore be highly regulated to protect the welfare of consumers. PCR test is a reliable method to detect and verify the accuracy of meat ingredients in the product label. We are currently revalidating our developed porcine meat detection test, a conventional PCR-based technology utilizing the barcode region (*cytochrome b* gene), a conserved region at the species level of the animals. Preliminary analysis showed that the test can detect porcine ingredients of meat and meat products, whether they be raw cooked, or processed. The test is a duplex PCR, the use of 2 primer pairs in the same reaction tube, to address the false-negative results. The technology can be used for Halal verification and traceability. It can also be used by food regulatory agencies to implement compliance in product labeling.

CLS Assessment for the Development of Web Applications for SMART Crop Production and Marketing

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Keywords

SMART agriculture, web application, GIS, soil fertility, land suitability

Abstract

Despite the region's significance in high-value vegetable crop cultivation, farmers in Zamboanga del Sur face limited access to resources and marketing difficulties. The study aims create web applications that can assess soil fertility and land suitability to support smart crop production and marketing. The study employs a combination of primary and secondary data collection methods, including surveys and soil sampling, to assess soil fertility and land suitability. Additionally, the research utilizes GIS-based maps and web applications to provide farmers with spatial insights and optimization opportunities for vegetable production, from planning to marketing. These methods empower local farmers to make informed decisions, increase efficiency, and engage in the online market, ultimately bridging the knowledge gap and promoting economic growth in the province. The research project has successfully developed a comprehensive web and mobile application that provides crucial information on soil properties, suitable crops, fertilizer recommendations, market supply, optimal sales markets, commodity prices, online marketing, and weather conditions. These features collectively contribute to the advancement of the agricultural sector in the province, boosting the local economy and improving overall farming practices. The study's implications are particularly significant for Mindanao and the broader Philippines. The developed web and mobile application can serve as a valuable agricultural tool not only in Zamboanga del Sur but also across Mindanao and the entire Philippines. It offers a model for sustainable farming practices, improved crop management, and enhanced marketing strategies, thereby promoting food security, economic growth, and increased income opportunities for farmers in the region. Given the symposium's emphasis on Mindanao, the study's direct impact on local agriculture and the potential for scaling this approach to benefit the broader Philippine agricultural landscape make it a pertinent and valuable contribution to the region.

Analysis of Tuna Value Chain in the Davao Region: Opportunities for a Mobile Traceability System

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Abstract

Illegal, unreported, and unregulated (IUU) fishing has brought an adverse effect on the food safety, sustainability, and international competitiveness of the Philippine tuna industry. A sustainable traceability system is a crucial requirement for Philippine tuna exporters to continue trade with the EU, Japan, and the USA. Despite the growing demand for traceability, the process is unarguably challenging. Existing traceability efforts related to tuna are observed to be less comprehensive and only focused on the level of the catch node. The idea of a point-of-catch-to-plate traceability system is relatively new in the country; and implementing such a system would entail studying the whole tuna value chain, which allows to track the flow of the product from the place of catch, consolidating stations, processing, up to the distribution outlets. A value chain analysis (VCA) approach was used to map out the actors and their roles along the chain. Personal interviews, KIIs, and FGDs were conducted in 11 coastal communities in Davao Region which gathered a total of 484 respondents. Results show that paper-based traceability has been implemented for catchers through Catch Origin Landing Declaration (COLD), an important documentation required particularly by traders (byahedors) to secure a Land Transportation Permit (LTP) and Auxiliary Invoice allowing them to carry tuna and other types of fish to any domestic destinations and publicly owned retail outlets. Furthermore, processors and traders consistently maintain their records as they adhere to stringent standards related to traceability, food quality, and safety certifications. Thus, there is a big opportunity for a traceability system in the nodes of catch, consolidation, processing, and distribution. However, it could be challenging due to the lack of technical knowledge and resources such as mobile phone and internet access. The relationships, communication, and transparency among the different actors were found to need major improvements. However, the traceability system for tuna in the Davao Region would be feasible with the provision of equipment. Strong partnership with the LGUs is also important to monitor data accuracy and ensure sustainable implementation.

ORAL PRESENTATION SESSION 2

Grand Ballroom 3

Valuable But Undervalued Food Systems: Sustaining Gleaning Fisheries for Social and Ecosystem Services in Mindanao

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Keywords

gleaning, invertebrate fisheries, aquatic food system, role of women in SSF, food and nutrient security, social and ecosystem services, resource management

Abstract

Gleaning for edible seafood from shallow nearshore ecosystems (i.e., reef flats and seagrass beds) known as "panginhas" in Mindanao and the Visayas, is a traditional and chronic activity during low tides, mostly carried out by women and children, mainly to provide food and a source of income in impoverished coastal communities. As an aquatic food production system, invertebrate gleaning is an essential but rarely documented component of the small-scale fisheries, and is not mainstreamed into government databases. In order to gather data on the gleaning fisheries to support resource management, case studies were conducted in nine sites in Northeastern Mindanao and Sarangani Bay in 2015 to 2016. On-site surveys of catch, effort, and revenues of 732 gleaners were performed, supplemented by data from a month-long monitoring by local enumerators, to determine catch composition, production, and economic values from gleaning. Household surveys were done to obtain socio-economic, food consumption, and nutrient adequacy data, and also information on gleaning practices and potential environmental impact. Gleaning fisheries surveys showed an overall dominance of female (55%) over male gleaners, and generally higher CPUE values (average of 3.7 kg·gleaner^{-1}·day^{-1}) but average daily incomes were very low (<PHP100). Poverty incidence among fishing households often exceeded 70% and about 56% live below subsistence level. Reprised data (2021-2022) from selected sites of the 2015-2016 case study showed higher CPUE values, increased intensity of harvesting, and higher revenues during and after the COVID-19 lockdowns - evidence of increasing exploitation of these resources. Biodiversity loss of high value species was also observed. Virtually no management policy exists to regulate chronic gleaning in most areas, and overharvesting will likely threaten the sustainability of invertebrate fisheries and the social, economic, and ecological services they provide. These can be mitigated by appropriate, rights-based, and effective management policy to conserve this vital food system.

Formulation of Biocontrol Agent Against Panama Disease from Native Microbiota of Davao del Norte

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Keywords

Foc TR4, Panama disease, biocontrol agent

Abstract

Panama Disease caused by Foc TR4 is wiping out the banana plantations in Mindanao. There are different management strategies available to suppress infection such as fungicide treatments, however these methods do not provide total protection against the fungi and may contribute to chemical pollution. Using biocontrol agents that naturally occur in Mindanaoan soil may be harnessed to combat the spread of Foc TR4. As a new strategy to address the infection of Foc TR4, the use of biocontrol formulation composed of mixed bacteria provides protection inhibiting the growth of Foc TR4. Inoculating the soil during transplantation and throughout plant growth provides protection against infection of Foc TR4 by allowing the active strains of actinobacteria to colonize the rhizosphere early in the development of the banana. The resulting product is a formulation with powderlike and mostly dry texture. Initial testing via plating shows the presence of the mixed bacterial growth from the product stored for more than a week at 4C. Presently, the product is being tested in a field trial of banana plants in a farm in Kapalong, Davao del Norte, where parameters such as number of leaves and plant height will be measured to monitor plant growth. The results and products derived from this study hopes to alleviate the damage done by Panama disease in the banana industry specially in Mindanao given that many farmers rely on the industry for their livelihoods. Moreover, the study also hopes to lessen chemical pollution and minimize the dependence on inorganic fertilizer and fungicides by using a consortium of locally-derived microorganisms for biocontrol of Panama disease.

Split Crown Technique for Mass Propagation of Pineapple (*Ananas comusus* L.) var. Queen

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Keywords

crown preparation, sucker production, sucker quality

Abstract

The major problem limiting large scale commercial production and/or expansion of pineapple production is the difficulty in obtaining large quantity of quality planting materials due to slow rate of multiplication by conventional methods of propagation that mostly relies on the use of suckers and slips. The study investigated the effect of the methods of crown preparation on the sucker production of pineapple var. Queen and to evaluate the horticultural qualities of suckers produced from plantlets prepared using different methods of crown preparation. The method of crown preparation significantly affected survival and sucker production (emergence & number). Destroying the growing point without splitting reduced percentage survival of plantlets, but destroying the growing point and splitting the crown into two and or four sections improved survival comparable to the intact crown. Destruction of the growing point and then splitting the crown promoted emergence and increased number of suckers relative to the intact crown, which did not produce suckers after 3 months from planting. Increasing the number of sections prepared per crown from two to four did not reduce the number of suckers produced per plantlet and thus increased the multiplication rate by 7 and 8 times, respectively. Among the three methods of crown preparation, destroying the meristem and splitting into two or four produced more number of ready-to-plant Queen pineapple suckers (1 foot tall), within a period of 5 months. Farmers can use the method of crown preparation to produce more Queen pineapple suckers in a shorter period of time, which can help them to meet the growing demand for Queen pineapples from both domestic and international markets and reduce their production costs by using fewer crowns to produce the same number of suckers. The method can also help farmers to improve the quality of their Queen pineapple suckers, which can lead to higher yields and better prices for their fruits. Overall, the method of crown preparation has the potential to make a significant contribution to the Queen pineapple industry in Mindanao and the Philippines.

Preliminary Report on the Establishment of Milk-based Circular Food Shop at UPLB Campus

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Abstract

The need to transition from linear to circular food system is necessary to reduce resource input, regenerate soil fertility, minimize pollution, and greenhouse gas emission. State agricultural universities, regularly produce research co-products that can be used in the formulation of circular food for the utilization its own stakeholders. The Dairy Training and Research Institute established a food shop in the UPLB campus from repurposed construction materials. The facility was also designed to run with solar energy as its power source. Available research co-products of UPLB research units were used to prepare circular food recipes, which were targeted to contain 75% of raw materials from within the campus while the remaining 25% was sourced from nearby farmer collaborators. We also integrated a black soldier fly (BSF)–rearing facility to upcycle food waste of the shop to insect protein (as animal feed) and frass (natural fertilizer). The food shop was made accessible to UPLB faculty and staff, students, and alumni. Preliminary estimation of the parameters necessary for the calculation of circularity indicators was also started. The circular food shop produced fifteen (15) milk-based drinks, three (3) ice cream flavors, four (4) sandwiches, two (2) pizza, and five (5) rice meal products that utilized campus raw materials equivalent of 85%, 91%, 73%, 75%, and 90% of the recipes, respectively. We also perfected the BSF rearing that produces insect protein for feed application and frass as fertilizer. While we are still in the process of calculating the circularity indicator of each product, we report that the shop proved to be sustainable for the past 5 months in catering some of the nutritional needs of our stakeholders. Implementation of campus food circularity system can be adapted by academic and research institutions and local government in Mindanao towards food sovereignty. It also ensures low-carbon food products through regenerative food system while supporting local farmer collaborators.

It's All in the Family: Exploring the Social Connections of Sultan Kudarat Coffee Traders

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Abstract

Familial succession had always been an issue for the farmers. Most of the farmers do not encourage members of their family, especially their children, to engage in farming. On the contrary, the traders involve their family members and relatives. This paper explores why this is the case of the coffee sector in Sultan Kudarat. Key informant interviews and field observations in Lebak and Kalamansig, Sultan Kudarat were done from 2022 to 2023 to gather information. Distribution is one of the main components of the agrifood system. One of the main actors are the traders. They provide links from production to processing until the consumption. In two municipalities in Sultan Kudarat, it was observed that the significant coffee traders have social connections. Aside from coffee trading, they also participate not only in buy and sell of agricultural crops but also in other businesses such as operating general merchandise ang agricultural supply stores. Furthermore, when a trader retires, another member of the family takes over. It may be through a male or female member. Coffee trading remains to be a livelihood of households and traders encourage their family members to engage in the same work.

POSTER SESSION

Foyer

MSS002

Determinants of Adopting Climate-Resilient Vegetable Production Practices in Cabintan, Ormoc City, Leyte

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Keywords

Livelihood, smallholder farmers, climate change

Abstract

Climate resilient agriculture (CRA) involves local measures to boost productivity, reduce greenhouse gas (e.g., carbon dioxide, methane, and nitrous oxide) emissions, and enhance food security and resilience in changing climate. This study aimed to explore the different vegetable production practices of smallholder farmers in Cabintan and determine which of these practices are climate-resilient. The study also determined the factors that influence the number of CRA practices that the vegetable farmers adopted in their farms. Using random sampling, 216 farmers were selected to be interviewed using pre-tested questionnaires. The study used descriptive statistics, ordinary least squares, and Poisson regression as methods of analysis. The result of the study revealed that farm size, attendance to agricultural seminars, and owner-like possession of land influences the increase of CRA practices adopted by the vegetable farmers in Cabintan. Furthermore, cultivation under a protected structure is a better practice than open field cultivation, in terms of net returns and profitability. The results imply that the concerned government agencies may provide the smallholder vegetable farmers free trainings and organize them into farmer-based organizations since this allows for easier information exchange and dissemination whenever there are upcoming trainings and seminars. The result of the study also implies that the government should strengthen its laws regarding land redistribution and tenure reform. Concerned government agencies might also want to extend help to farmers whose main practice is open field cultivation for them to have access to protected structures such as tunnels.

MSS006

Factors Influencing the Market Outlet Choice of Coffee Farmers in Sultan Kudarat, Philippines

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Keywords

market outlet, marketing margin, coffee, multinomial logistic regression, farmers, Sultan Kudarat, market access

Abstract

The choice of farmers of where to sell their produce is often driven by the motivation to maximize its profit. There are, however, several factors that come into play when farmers decide the outlet for their produce. This study aimed to analyze the factors influencing the farmer's market outlet choice in Sultan Kudarat—the top coffee producer in the Philippines. A total of 2,551 coffee farmers participated in the survey covering Lebak and Kalamansig. Multinomial logistic regression was employed to determine the factors affecting farmers' market outlet choice. Traders, direct sellers, and Nestle were the three main market outlets identified in the study. Results showed that high price and access to credit positively and significantly influenced preference for direct seller market outlet relative to traders. Whereas, farmers who buy their own fertilizer, low selling price, access to post-harvest facilities, high transportation cost, and poor farm to market road, have a negative effect on choosing direct sellers as market outlets, compared to traders. Similarly, farmers buying their own fertilizer, with high harvesting expense, households with higher income, high transportation cost, high selling price, and when a farmer is located in Lebak, have a positive effect on choosing Nestle compared to choosing traders. On the other hand, the choice of Nestle market outlet is negatively influenced by low price, relative to trader market outlet. The study implies that farmers in Sultan Kudarat should have flexibility in choosing and accessing alternative market outlet choice, and not be constrained with one market outlet only. Interventions that enable better access to alternative market outlets should be put in place in order to improve marketing margins and ensure economic welfare among coffee farmers in Sultan Kudarat.

MSS009

The Role of Irrigation in Increasing the Technical Efficiency and Productivity of M'lang Rice Farmers

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Abstract

Food insecurity has been a long-standing issue in the Philippines., with the pandemic worsening the situation with about 51 million Filipinos suffer from insufficient access to food. Surprisingly, 25% of the Filipino agricultural households were more food insecure than those who rely on non-agricultural livelihoods. This study aims to determine the levels of technical efficiency, productivity, and profitability of both irrigated and rainfed rice farms in M'lang, Cotabato before and during the pandemic and determine the influencing factors. Using non-proportional quota sampling, 150 rice farmers from M'lang were randomly surveyed. Descriptive statistics and stochastic frontier analysis using the Cobb-Douglas production function were used. Result show that irrigated rice farmers were more productive than the rainfed before and during the pandemic periods. Seed and fertilizer quantities, total land area, labor days, family and hired labor, land tenancy, and lined irrigation access significantly increase farmers' productivity levels. However, their mean technical efficiency dropped during the pandemic from 75% to 64% TE level. Age positively contributed to technical inefficiency while farmers' sexuality, farming experience, frequency of extension services of National Irrigation Authority (NIA) personnel, and irrigation access showed contrary effects. The pandemic also decreased their net profits by PhP2,471.69 due to inefficiency, price decreases, and NIA's mobility restrictions. Lined irrigation indeed improves farmers' productivity, technical efficiency, and profitability, especially amidst pandemic; alongside efficient input usage in seed quantity, land area, labor days, and hiring farmworkers. Thus, local irrigation associations under NIA should enhance irrigation facilities and extension services to rice farmers; conducting peer learning from experienced farmers; and sufficient government and research development programs must be done.

MSS011

Preliminary Report on the Establishment of Near-Infrared Reflectance Spectroscopy Calibration Data for Improved Animal Productivity and Feed Quality Regulation

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Keywords

animal performance, animal products, feed analysis, efficiency

Abstract

The rising demand for animal meat products in the Philippines underscores the need for the local feed industry to uphold product quality, consequently ensuring optimal animal productivity. However, evaluating feed quality demands substantial investments in labor, chemical inputs, resources, and time, a challenge addressed by the adoption of near-infrared reflectance spectroscopy (NIRS) technology, which is a rapid, nondestructive and multi-analytical tool that can give accurate results for the feed determination and evaluation. Feed and feed ingredient samples all throughout the country were gathered, processed, and subjected to standard chemical analysis using the AOAC method for crude protein (CP) determination. The same samples were scanned in the NIRS for the calibration method using OPUS Quant Software to generate prediction equations. Residual prediction deviation (RPD) for the CP of some feed ingredients were obtained: yellow corn (n=26), Trichantera (n=23), and pollard (n=46) have RPD values of 1.6, 2.53, and 2.70, respectively. This indicates the quality of the predictive performance of the calibrations. While the initial results allow differentiation between lower and higher concentrations in feed ingredients, they are not yet recommended for practical applications. The preliminary data gave us an insight on the capacity of NIRS to be a powerful tool for efficient and greener feed analysis. The technological innovation can be a support to the position of Mindanao as the next food basket of the country, assuring the quality of food and feed industry. NIRS technology emerges as a comprehensive and multifaceted solution to meet the imperatives for the secure and high-quality production of food products of the country, offering efficiency and environmental sustainability.

MSS012

A Low-Cost Technique to Utilize Remote Sensing of Large-Scale Banana and Rice Crops for Davao Region

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Keywords

Landsat 8, MODIS, cloud masking, crop masking, land use land cover classification, banana, rice

Abstract

In addressing food security, being knowledgeable over the strategic locations of agricultural products is essential for management and sustainable utilization. During severe drought or frequent heavy rains, visual interpretation, through maps, could point out where and how wide the potential crop damages are. Land use and land cover (LULC) classification delineates these economically important footprints, the geographic locations of critically important facilities, as well as urban sprawling over a large geographic scale. However, several challenges are encountered by remote-sensing practitioners in utilizing freely available satellite imageries due to the prevalence of scene contaminations like aerosols and clouds, especially on high elevation areas. This study demonstrated a process innovation approach for a straightforward preprocessing of Landsat 8 satellite imageries without the need for complex processing and sophisticated software or hardware. This procedure would also be useful in wetlands delineation, watershed characterization, forest resource mapping and monitoring, and in forest fragmentation analysis in high elevation and densely forested protected areas in the region.

MSS014

Puffed Adlai: Adding Value to an Indigenous Grain

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Abstract

The Philippine Department of Agriculture (DA) is promoting rice alternatives, and this program creates more impact when traditional, locally grown grains are prioritized. One such grain is adlai (*Coix lacryma-jobi* L.), which can be cooked and consumed as is, but has great potential as raw material for value-added and innovative products. This study was conducted to optimize the production process of puffed adlai. Specifically, the effect of moisture content (MC) on the puffing properties of adlai were examined. Raw milled adlai was washed, soaked, steamed, and dried to three moisture levels of 10, 15, and 20% (±2%), then puffed using a hot-air popper. The proximate composition and consumer acceptability of the final product were likewise evaluated. Puffing adlai at 10% MC resulted in significantly lower bulk density (0.49 g/mL) and higher puff yield (90%), expansion ratio (3.34), and puff size (0.12 mL/grain), which translates to lighter and bigger puffed grains. Adlai puffed at 10% MC had 6.78% moisture content, 6.55% protein, 3.25% fat, 1.04% ash, 0.65% fiber, and 81.73% carbohydrates. Moreover, the plain puffed adlai sample was evaluated by 100 panelists and was liked slightly in terms of color and taste and liked moderately in terms of texture and overall acceptability. Puffed adlai, like its rice counterpart, can be added with flavors and molded into shaped snack foods. It can also be used as an ingredient in other food products like snack bars (e.g., chocolate and granola bars), trail mixes, breakfast cereal, or used as toppings, among others. Adlai has long been a staple indigenous food source but has only recently been studied and promoted. This study contributes to the DA's Food Staples Sufficiency Program. Specifically, this is in line with the adlai production and utilization program of NoMIARC and SMIARC (Northern/Southern Mindanao Integrated Agricultural Research Centers) based in Bukidnon and Davao City, respectively.

MSS016

Factors Affecting Fisher's Willingness to Trace Tuna Catch in Davao Region, Philippines

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Keywords

tuna, traceability, sustainable supply chain, Davao Region, logit model

Abstract

Tuna is among the major commodities in the Philippines. However, the sustainability of the industry is threatened by issues like illegal, unreported, and unregulated fishing (IUU), unregistered fishing boats, and unsustainable fishing methods. Traceability system is one potential solution to help address these issues. This system enables tracking and documentation of the entire movement of tuna from catch to plate, providing transparency, accountability, and consumer confidence. It has also become a need in global trade with some countries requiring their seafoods to be traceable. As one of the exporters of tuna, traceability can also be beneficial to the fishers in the Philippines. While it can be a promising tool in addressing issues in the industry, it is a relatively new technology in the country. As such, implementation and adoption by the stakeholders, especially the fishers, can be challenging. Understanding what influences fishers to trace their tuna catch would be helpful in the implementation of a tuna traceability. To explore the factors affecting the willingness of fishers to trace their tuna catch, a survey was conducted among 377 fishers in the coastal communities of Davao Region, one of the key players in tuna fishing. To determine the variables affecting the willingness to trace, a logit model was used to run a total of 115 valid observations using Stata. Results show that majority of the fishers (87.5%) are willing to comply with traceability requirements while 12.5% indicated otherwise. Moreover, results from the logit model show that factors such as fisher's age, boat ownership, having a vocational course, finishing high school, experience in record keeping of tuna catch, years of fishing, volume of catch per trip, and perceived benefits on market access significantly affect willingness to trace. The key results imply an opportunity for traceability among the fishers in Davao Region, however, the significant factors should be considered when implementing the system. Consequently, this can help the country comply with global trade requirements and achieve a more sustainable supply chain for tuna.

MSS019

Comparative Analysis of Women-Led and Agrarian Reform Beneficiaries Cooperatives in Davao City Cocoa Value Chain Using a Gender Lens in the Face of Vulnerability

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Abstract

This paper presents a comparative study using a gender lens in examining how two groups engaged in the cocoa value chain in Davao City, Philippines addressed challenges and leveraged innovative strategies amidst a backdrop of vulnerability. The first group is a women-led cooperative while the other group is a cooperative of Agrarian Reform Beneficiaries (ARB) operating for 35 and 30 years within conflict and non-conflict areas. A rapid value chain assessment was conducted through a series of Focus Group Discussions and Key Informant Interviews with members/officers of the cooperatives. The assessment was also supported by the available secondary data. Results highlight the unique roles and contributions of women in Davao City's cocoa value chain. A women-led cooperative has one-of-its-kind innovation of buying and consolidating cocoa pods from tagged trees rather than wet or dried beans to ascertain "tree-to-bar" quality standards. It is a way of navigating various challenges in cocoa production - accessibility of needed services, lack of post-harvest facilities, and marketing difficulties within a community in transition from conflict. The ARB cooperative with its access to diverse services, and capital (financial, equipment, facilities) has diversified from dried fermented cocoa beans to a wide array of value-added products involving mostly women workers. Innovation thrives when women workers and/or leaders have agency and power. Innovations are eased by persistent gender sensitivity and mainstreaming efforts. Recommendations leading to desired transformative change in agri-food systems in this part of the world are also discussed in the paper.

MSS020

Exploring Socially Responsible Consumption Intentions for Gender-Responsive Cacao Value Chains in the Philippines

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Keywords

agricultural value chain, cacao, choice-based experiment, gender inequalities

Abstract

In the Philippines' cacao sector, women and men take on various roles in the production and creation of values for the commodity. As gender-based inequalities are rife in agricultural value chains, addressing equity issues is justified in terms of business, social justice, or development cases. The social justice argument for gender equality as desired outcome is widely accepted by the development practitioners and scholars. On the other hand, the development case relies on the mutually supportive links between social justice and the business case. This paper focuses on the role of gender in the business case that goes beyond the productivity benefits of encouraging women's participation and removal of gender-based barriers to production and processing. It explores the potential of tapping into the buying power of consumers who are willing to place premium value on socially desirable and gender-responsive actions in the cacao value chain. Using data gathered through an online survey in emerging markets for Philippine chocolates and a series of focus group discussions, the study examined intentions for socially responsible consumption among chocolate consumers. Findings show some opportunities and difficulties in expanding the scope of social certifications while bolstering the commercial case for gender equality for social justice. Policy implications and recommendations are discussed in the paper.

MSS021

Review of Existing Studies on the Status of Neglected and Underutilized Crops in the Philippines

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Keywords

neglected and underutilized crops, nutrition security

Abstract

Consumers prefer to buy and eat food based on taste, cooking characteristics, convenience, and cultural acceptability. Staple grains such as rice and corn are prevalent in the Philippines because these are available, accessible, and appealing to the consumers in their natural and processed forms. Aside from these common crops, the country has many traditional vegetables and legume crops that are underutilized but are important sources of nutrients. The adoption of neglected and underutilized crops (NUCs) and/or indigenous crops is promoted by the Food and Agriculture Organization (FAO) of the United Nations to address hunger and malnutrition, and to sustain livelihoods of agriculture producers through its Future Smart Food (FSF) initiative. With the prevalence of nutrient deficiency, it is important to look into previous studies in the Philippines. This is a review of existing literature in the Philippines related to NUCs. This study aims to take stock of the research done in the Philippines, particularly in Mindanao. It will also identify the gaps that is potential for future research. Studies showed that NUCs are not only abundant but also full of nutrients. It can be found in many different areas of the Philippines. It is also traditionally consumed by a number of indigenous cultures. However, it also has a number of challenges, including its obtainability, convenience, and appeal to consumers. Moreover, due to its limited production and perishability, its supplies are limited and the prices are usually high. It can provide an indicator of the possible areas for further research in the topic of NUCs/ indigenous crops which the university can engage into.

MSS024

Typology of Milkfish (*Chanos chanos*) Farms: Their Operations, Socio-economic Viability, and Production Constraints

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Keywords

climate change impacts, feeding times, mariculture, stocking density, water quality

Abstract

Milkfish (*Chanos chanos*) locally called *bangus* in Philippines, is a popular food fish in terms of production and consumption in the Philippines. This study characterized a typical grow-out milkfish farm in the Davao region in terms of socioeconomic profile, farming practices, and simple costs and returns. Three sites were chosen to conduct this study, mainly in Mati, Pantukan and Panabo where N=43 farm workers provided information of their daily farming practices while key informants gave additional insights on milkfish farming. The typical age of farm workers is 40 years old with a farm experience of seven years. Farms are commonly stocked with 16,000 fingerlings, harvesting occurs after every 6 months with six feeding times in a day. Moreover, workers were paid an average of PhP 10,000 per month per cropping cycle while, the company had a gross income of PhP 930,000 amount per cropping cycle. The feed cost shares 76% of the overall operational cost with a 27% return on investment for the first year of operation. Climate change impacts and worsening water quality conditions were seen as bigger threats than pathogens in the culture. Other results have shown no relationship between the number of feeding times and the volume of harvest and income, but stocking density was positively related to volume harvested (df=1, MS=0.0907, F=40.13, P=0.000) and income (df=1, MS=0.048, F=21.22, P=0.000). The study also showed little benefit to farm workers and that overfeeding can be avoided by limiting it to four times a day.

MSS025

Residue Valorization of Waste Products from Vegetable Production in Leyte, Philippines

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Abstract

The focus of these projects is mostly on improving production of fresh and safe vegetables. However, less attention has been given on the utilization and management of vegetable crop residues, this project aims to fill that gap by investigating agricultural residue utilization. Evaluate how wastes and residues from vegetable production are currently being handled by farmers and institutions. Assess the feasibility of utilizing wastes product and reintegrating them back into the system to promote circular model or responsible production. Vegetable farms employ several methods to manage their crop waste, these methods primarily include allowing them to rot in the field or on the farm's outskirts, incorporating them into the soil during plowing, throw or bury it on a pit to decompose then used them as natural fertilizers. Another way to manage agricultural waste is through vermicompost production which is already adopted by some institution. The potential impact of the study is on reducing wastes from vegetable production. It can have positive implications across various sectors including economic and environmental aspects. By reducing wastes and using it as another raw material for another process, it can provide additional source of income for farmers. For example, the benefit cost analysis shows that over the span of 10 years, vermicomposting is a profitable business opportunity.

MSS026

Gender and Disaster: Impacts and Adaptation of Women After Typhoon Pablo in Baganga, Davao Oriental

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Abstract

Women in the fisheries sector tend to be more vulnerable to crises caused by disasters, climate change, and extreme events. The present study investigated the impact of disasters on the roles of women. It also assessed the adaptation strategies of women to recover from the impacts of extreme events. To do that, we gathered data through focus group discussions (FGD) in four fishing communities in Baganga, Davao Oriental and key informant interview (KII) for validation. About 10-15 women respondents (e.g., fishers' wives, fishers, vendors, financers, traders, and gleaners) participated during FGD (N=51) and six key informants from different government agencies and experts for KII. During the discussions, women identified storms, heavy rains, and typhoons as common natural hazards experienced by coastal communities. The findings revealed that women were affected by different disasters over the past ten years. Women were more vulnerable during disaster. For instance, when fishing operations stop, their livelihood as fish vendors will also be affected, forcing them to engage in men-headed work such as being laborers and vegetable or crop farmers. These adaptation strategies affect the domestic roles of women. Moreover, most women were not members of community organizations, which resulted in fewer opportunities for them. Even if women have higher access to credit, their participation in the fisheries sector is limited because they have limited opportunities to lead. This study revealed that women suffer from disasters and need help in their adaptation strategies to be resilient to disaster impacts.

MSS027

Impact of Extreme Climate Change Events on Small-scale Fishers Community and Their Adaptation in Baganga, Davao Oriental

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Keywords

adaptive strategies, climate change, climate risk management, livelihoods, small-scale fisheries

Abstract

Climate change is unpredictable and can occur rapidly or over time; anthropogenic stressors work synergistically to strengthen their impact on vulnerable ecosystems and fisheries sectors. This study documented the past occurrence of extreme climate change impacts, such as super typhoon Pablo (Bopha), which severely affected Baganga, Davao Oriental, about ten years ago. A mixed-methods data collection was used, combining semi-structured interviews with small-scale fishers (N=120) in four fishing villages and focus group discussions (N=135) on assessing the impacts and their adaptation after climatic events occurred. The finding indicates that the four selected fishing villages were exposed to common factors of climate change events that destroyed livelihood and lifestyle. Including a decrease in catch per trip and the fishing operations disruption (98%). However, due to the impact, small-scale fishers in Baganga developed psychological distress (emotional 44% and physical 24%) due to the effects of climate change including disaster and economic losses (32%). In order to survive, their adaptation strategies relied on government and non-government-provided projects, e.g., planting trees, constructing a sea wall with wave breakers, cash for work, and tourism as an alternative livelihood. Despite this, our study revealed that the community had limited knowledge about climate change, a lack of different types of agenda, especially for fishers, and active use of illegal fishing gear. The local government must consistently implement rules, policies, and adaptation services. These factors contribute significantly to building a resilient community to respond to future shocks and provide sustainable fisheries resources that will benefit all fishers. The study will be useful to policymakers, and disaster management group and organization that help assist affected communities by climatic events.