BOOK OF ABSTRACTS

The 17th International Conference on Environmental and Rural Development

26-29 March, 2026

Royal University of Agriculture, Phnom Penh, Cambodia

Table of Contents

Our Vision

International Society of Environmental and Rural Development (ISERD)

Recently, in developing countries, subsistence agriculture is being converted to export-oriented mono-culture, and the amounts of agricultural chemicals applied to farmland are increasing every year. The applied chemicals in farmland cause serious environmental problems downstream such as eutrophication, unusual growth of aquatic plants, decrease in dissolved oxygen, and accumulation of bottom sediments in water resources. In addition, there are many cases in which agricultural chemicals are applied without sufficient understanding of their impacts on human health and food safety. Therefore, it is necessary to promote and enhance understanding of sustainable rural development among local stakeholders, including farmers.

Sustainable rural development aims to meet human needs while preserving the natural environment. Because it covers not only social and economic development but also environmental conservation, no single organization can sufficiently achieve the aspirations of sustainable rural development. Collaboration among international, governmental, and non-governmental organizations, together with academia and the scientific community, is therefore indispensable.

The knowledge and intelligence accumulated in universities and research institutions are expected to support programs facilitated by international, governmental, and non-governmental organizations so that they can be implemented more effectively and contribute meaningfully to societal development. However, many valuable local experiences and initiatives remain scattered and have not been sufficiently documented or shared within academic and scientific communities.

Therefore, the **International Society of Environmental and Rural Development (ISERD)**, founded in 2010, aims to discuss and develop suitable and effective processes and strategies for sustainable rural development, focusing on agricultural and environmental aspects in developing countries.

The ultimate goals of the society are to contribute to sustainable rural development through social and economic development in harmony with the natural environment, and to support the strengthening of institutional capacity and human resources in rural areas through academic collaboration.

The 17th ICERD provides an important platform for researchers, practitioners, policymakers, and development partners to exchange knowledge, share innovative solutions, and strengthen international collaboration for sustainable rural development. Hosted by the Royal University of Agriculture, Cambodia, the conference also highlights the growing role of innovation, digitalization, and inclusive sustainability in transforming rural communities in developing countries.

It is expected that the discussions and exchanges during the **17th ICERD** will further stimulate interdisciplinary collaboration and contribute to practical solutions for sustainable rural development.

Organizing Committee of the 17th ICERD

The ISERD Councilors (in March 2026)

President:

- *Prof. Dr. Mario T. Tabucanon, United Nations University Institute for the Advanced Study of Sustainability*

Deputy Presidents:

- *Prof. Dr. Bunthan Ngo, Royal University of Agriculture, Cambodia*
- *Prof. Dr. Eiji Yamaji, The University of Tokyo / Institute of Environmental Rehabilitation and Conservation, Japan*
- *Dr. Chuleemas Boonthai Iwai, Khon Kaen University, Thailand*

Executive Secretary / Editor-in-Chief of IJERD:

- *Prof. Dr. Machito Mihara, Tokyo University of Agriculture / Institute of Environmental Rehabilitation and Conservation, Japan*

Managing Editors:

- *Prof. Narong Touch, Tokyo University of Agriculture, Japan*
- *Dr. Ami Nakagawa, Institute of Environmental Rehabilitation and Conservation, Japan*
- *Dr. Santa Pandit, Institute of Environmental Rehabilitation and Conservation, Japan*
- *Prof. Yoshiko Tanahashi, Tokyo University of Agriculture, Japan (Adviser)*

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- *Dr. Buntong Borarin, Royal University of Agriculture, Cambodia*
- *Prof. Dr. Ping Li, Institute of Grassland Research, China*
- *Prof. Dr. Dieter Trautz, University of Applied Sciences, Germany*
- *Dr. Hatma Suryatmojo, Universitas Gadjah Mada, Indonesia*
- *Dr.Kasumi Ito, Nagoya University, Japan*
- *Dr. Siti Nurhidayu Abu Bakar, University Putra Malaysia, Malaysia*
- *Prof. Dr. Nang Hseng Hom, Yezin Agricultural University, Myanmar*
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- *Prof. Dr. Anthony Makinano Penas, Bohol Island State University, Philippines*
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- *Dr. Nguyen Khoi Ngwia, Cantho University, Vietnam*

Managing Boards of the 17th ICERD

President of ISERD:
Prof. Dr. Mario T. Tabucanon (Professor Emeritus, Asian Institute of Technology, Thailand)

Chair of Managing Board:
• Prof. Dr. Bunthan NGO (Rector, Royal University of Agriculture, Cambodia)

Vice Chair of Managing Board:
• Prof. Dr. Machito MIHARA (Vice President, Tokyo University of Agriculture, Japan)
• Prof. Dr. Eiji YAMAJI, Professor Emeritus, The University of Tokyo, Japan
• Dr. Borarin BUNTONG (Director, Royal University of Agriculture, Cambodia)

Chair of Organizing / Steering Committee:
• Dr. Borarin BUNTONG (Director, Royal University of Agriculture, Cambodia)

Vice Chairs of Organizing / Steering Committee:
- Prof. Dr. Kunthy SOK, Vice Rector, Royal University of Agriculture, Cambodia
- Prof. Dr. Mom SENG, Vice Rector, Royal University of Agriculture, Cambodia
- Assoc. Prof. Thavrak HOUN, Vice Rector, Royal University of Agriculture, Cambodia
- Dr. Savin OUK, Vice Rector, Royal University of Agriculture, Cambodia
- Dr. Ratana ING, Vice Rector, Royal University of Agriculture, Cambodia
- Dr. Bunneth BENG, Vice Rector, Royal University of Agriculture, Cambodia
- Dr. Minea MAO, Vice Rector, Royal University of Agriculture, Cambodia
- Mrs. Sileng SANG, Deputy Director, Royal University of Agriculture, Cambodia
- Dr. Socheath TONG, Deputy Director, Royal University of Agriculture, Cambodia
- Dr. Kim Eang THO, Deputy Director, Royal University of Agriculture, Cambodia
- Prof. Dr. Kumiko KAWABE, Institute of Environmental Rehabilitation and Conservation, Japan
- Dr. Rival VALCIN, Institute of Environmental Rehabilitation and Conservation, Japan
- Dr. Santa PANDIT, Institute of Environmental Rehabilitation and Conservation, Japan
- Dr. Takashi UENO, Institute of Environmental Rehabilitation and Conservation, Japan

Organizing / Steering Committee Members:
- Ms. Danika DOUNG, Division of Research and Innovation, RUA, Cambodia
- Ms. Sophorlkun YIM, Division of Research and Innovation, RUA, Cambodia
- Mr. Rithyphal BUNTONG, Division of Research and Innovation, RUA, Cambodia
- Mr. Kosal CHET, Division of Research and Innovation, RUA, Cambodia
- Mr. SopheaBunnarith THY, Division of Research and Innovation, RUA, Cambodia
- Ms. Chanthin OUK, Division of Research and Innovation, RUA, Cambodia
- Ms. Lyhour ROETHY, Division of Research and Innovation, RUA, Cambodia
- Mr. Sopheap SETH, Freelance consultant, Phnom Penh, Cambodia
- Ms. Keiko AOKI, Institute of Environmental Rehabilitation and Conservation, Japan

Chair of Scientific Committee:
• Prof. Dr. Eiji YAMAJI, Professor Emeritus, The University of Tokyo, Japan

Vice Chairs of Scientific Committee:
• Prof. Dr. Eiji YAMAJI, Professor Emeritus, The University of Tokyo, Japan
For Award of Excellent Paper
• Prof. Dr. Dieter TRAUTZ, Professor Emeritus, Osnabrück University of Applied Sciences, Germany
For Award of Excellent Poster Presentation
• Prof. Dr. Barry N. NOLLER, The University of Queensland, Australia
For Award of Sustainability Promotion
• Prof. Dr. Narong TOUCH, Tokyo University of Agriculture, Japan.
For Award of Outstanding Scientific Achievement

Chairmanship in Each Scientific Presentation on 28 March 2026

Oral Presentation

Session 1, Time: 10:30 – 12:00									
Room 1: Auditorium Theme: EM		Room 2: AERD 1 Theme: RD		Room 3: AERD 2 Theme: ASFI 1		Room 4: AERD 3 Theme: ASFI 2		Room 5: AI Theme: ESD	
Chair	Prof. Barry Neil NOLLER	Chair	Prof. Robert C. KEMERAIT JR.	Chair	Prof. Koshi YOSHIDA	Chair	Asst. Prof. Prakash Murgeppa BHUYAR	Chair	Assoc. Prof. Kasumi ITO
Co-chair	Prof. De Los Santos, WILMA C	Co-chair	Prof. Rowena Dela Torre BACONGUIS	Co-chair	Assoc. Prof. Monalyn Lariosa OLOROSO	Co-chair	Dr. Dyna THENG	Co-chair	Prof. Consuelo De Luna HABITO
			Dr. Samnang NGUON						
Session 2, Time: 13:00 – 14:30									
Room 1: Auditorium Theme: EM		Room 2: AERD 1 Theme: RD		Room 3: AERD 2 Theme: ASFI		Room 4: AERD 3 Theme: ASFI, EM		Room 5: AI Theme: ESD, RD	
Chair	Prof. Masayasu MAKI	Chair	Dr. Marilou Ombid MONTIFLOR	Chair	Asst. Prof. Jeralyn ALAGON	Chair	Prof. Eiji MATSUO	Chair	Prof. Koji HARASHINA
Co-chair	Prof. Narong TOUCH	Co-chair	Dr. Rathna HOR	Co-chair	Dr. Lyhour HIN	Co-chair	Dr. Borarin BUNTONG	Co-chair	Assoc. Prof. Somnath GHOSAL
							Dr. Satya LIM		
Session 3, Time: 15:00 – 16:30									
Room 1: Auditorium Theme: EM		Room 2: AERD 1 Theme: RD		Room 3: AERD 2 Theme: ASFI		Room 4: AERD 3 Theme: ASFI, RD		Room 5: AI Theme: ESD, ASFI	
Chair	Prof. Kazuo OKI	Chair	Prof. Felisa Lazaro MALABAYABAS	Chair	Assoc. Prof. Mosae Selvakumar PAULRAJ	Chair	Dr. Sanara HOR	Chair	Dr. Soriya RIN
Co-chair	Prof. Ivan MINCHEV	Co-chair	Dr. Kimchhin SOK	Co-chair	Dr. Sophak POK	Co-chair	Assoc. Prof. Iman Raj CHONGTHAM	Co-chair	Dr. Mouylin CHEM

Keynote and Special Session Presentation

Keynote Session, Time: 09:20 – 09:50	
Room: Samdech Hun Sen Hall	
Chair	Prof. Dr. Mom SENG
Special Session, Time: 13:00 – 14:30	
Room: LMLA	
Chair	Dr. Sopheap PHIN
Co-chair	Dr. Kim Eang THO

POSTER PRESENTATION (core time: 10:00-10:30 and 14:30-15:00)

Chair: Prof. Dr. Dieter Trautz

	Theme: ESD	Theme: RD	Theme: EM	Theme: ASFI	Theme: IS
Co-chair	Dr. Rithy CHRUN	Asst. Prof. Tricia Custodio ASCAN	Assoc. Prof. Imelida Genson TORREFRANCA	Dr. Gemma Morante GUIGUE	Assoc. Prof. Thavrak HOUN
	Dr. Kay Guiriba LOSABIA	Dr. Tamon BABA	Dr. Sopheap EK	Assoc. Prof. Thong KONG	Dr. Ligaya Rubas LEAL
	Dr. Socheath TONG	Dr. Sophea NHEAN	Dr. Sopheap PHIN	Dr. Hiroyuki HATTORI	Dr. Sophornrith RO

17th ICERD General Program from 26th to 29th March 2026

Time	Activity	Venue
Thursday, 26th Mar 2026 Location: Royal University of Agriculture, Phnom Penh, Cambodia.		
13:00 – 14:00	"Basic R and Graphs Using GGPLOT2" By Dr.Lyhour HIN	Auditorium
14:00 – 14:30	Coffee break and Network building	Auditorium
14:30 – 15:30	"Scientific Writing" By Dr. Santa PANDIT & Dr. Rival VALCIN	Auditorium
15:30 – 16:30	"Environmental & Socio-economic Studies" By Assoc. Prof. Dr. Phanith CHOU	Auditorium
Friday, 27th Mar 2026 Location: Royal University of Agriculture, Phnom Penh, Cambodia.		
13:00 – 18:00	Registration of Participants	Samdech Hun Sen Hall
14:00 – 16:30	The 17th ISERD Council Meeting	Meeting Room 1
	Coffee-Tea Break	
	Steering Committee Meeting of 17th ICERD with ISERD Councilors	
17:00 – 20:00	Welcome Reception	Samdech Hun Sen Hall
Saturday, 28th Mar 2026 Location: Royal University of Agriculture, Phnom Penh, Cambodia.		
08:00 – 13:00	Registration of Participants	Samdech Hun Sen Hall
08:20 – 10:00	Opening Ceremony	Samdech Hun Sen Hall
10:00 – 10:30	Poster Presentation & Coffee-Tea Break	Samdech Hun Sen Hall
10:30 – 12:00	Scientific Program Session 1 (Oral Presentation)	Details on the Oral Presentation Program
12:00 – 13:00	Lunch Break	Samdech Hun Sen Hall
13:00 – 14:30	Scientific Program Session 2 (Oral Presentation)	Details on the Oral Presentation Program
13:00 – 14:30	Special Session for Agri-Business Meeting	LMLA 1
14:30 – 15:00	Poster Presentation & Coffee-Tea Break	Samdech Hun Sen Hall

15:00 – 17:00	Scientific Program Session 3 (Oral Presentation)	Details on the Oral Presentation Program
17:30 – 20:00	Banquet and Awarding Ceremony	Samdech Hun Sen Hall
Sunday, 29th Mar 2026 Location: Phnom Penh, Kampot Province		
07:30 – 19:00	Excursion	Details on the Excursion Program
	Option1: **Beer and Brewery Factory, and Khmer Product Village Experience** - Limited: ~50 Participants - 08:00 – 11:00 > Visit to "Khmer Beverages Factory" - 12:00 – 13:00 > Lunch MEGA Mall (Supported by Chip Mong Group) - 13:00 – 15:30 > Visit to "Chip Mong Mega Mall"	Phnom Penh
	Option2: **Industrial and Agricultural Value Chain Visit in Kampot** - Limited: ~120 - 150 Participants - 07:30 – > Travel to Kampot. - 10:00 – 12:30 > Visit to Chip Mong Cement Plant - 12:30 – 13:30 > Lunch during Excursion - 13:30 – 15:30 > Visit to Pepper Farm - 15:40 – > Travel back to Phnom Penh	Kampot

17th ICERD Scientific Program on 28 March 2026

Opening Ceremony (at Samdech Hun Sen Hall, Royal University of Agriculture)			
08:00-10:00	08:00 – 13:00	Registration of Participants	Organizing Committee
	08:20 – 08:30	Welcome Remarks from ISERD Deputy President	Deputy President, Prof. Dr. Bunthan NGO
	08:30 – 08:40	Opening Remarks from ISERD Deputy President	Deputy President, Prof. Dr. Eiji YAMAJI
	08:40 – 08:50	Message from the Scientific Committee	Prof. Dr. Barry NOLLER
	08:50 – 09:00	Message from the ISERD Secretariat	Prof. Dr. Machito MIHARA
	09:00 – 09:10	Message from the Special Guest	Mr. Dara AN, President of Cambodia Cashew Federation
	09:10 – 09:20	Message from the Special Guest	Neak Oknha Pov LEANG, President of Chip Mong Group
	09:20 – 09:35	Keynote Presentation	H.E Dr. Sieng Heng HUL, MISTI, Cambodia
	09:35 – 09:50	Keynote Presentation	H.E Dr. Asikin YOEU, MAFF, Cambodia
	09:50 – 10:00	Guidance of the 17th ICERD Steering Committee	Dr. Borarin BUNTONG
Scientific Session (at Samdech Hun Sen Hall/Auditorium/AERD Faculty, Royal University of Agriculture)			
10:00-17:00	10:00 – 10:30	Poster presentation	
	10:30 – 12:00	Oral 1 presentation - Session 1	
	13:00 – 14:30	Oral 1 presentation - Session 2 & Special Session	
	14:30 – 15:00	Poster presentation	
	15:00 – 17:00	Oral 1 presentation - Session 3	
Banquet and Awarding Ceremony (from 18:00 at Samdech Hun Sen Hall, Royal University of Agriculture)			
17:30-20:00	17:30 – 20:00	Dinner/ Banquet	Organizing Committee
	18:50-19:00	Ceremony for ERECON Awards with the acknowledgement of ISERD	Organizing Committee
	19:00-19:15	Awarding Ceremony for ISERD Awards	Assoc. Prof. Dr. Kasumi Ito
	19:15-19:30	Invitation to NEXT ICERD Candidates	For Award of Excellent Paper: Prof. Dr. Eiji Yamaji For Award of Excellent Poster Presentation: Prof. Dr. Dieter Trautz For Award of Sustainability Promotion: Prof. Dr. Barry N. Noller For Award of Outstanding Scientific Achievement: Prof. Dr. Narong TOUCH

Oral Presentations: Session 1 (from 10:30 to 12:00 at Auditorium/AERD Faculty/AI Faculty)										
	Room 1: Auditorium		Room 2: AERD 1		Room 3: AERD 2		Room 4: AERD 3		Room 5: AI	
	Theme: EM		Theme: RD		Theme: ASFI		Theme: ASFI		Theme: ESD	
	Chair	Barry Neil NOLLER	Chair	Prof. Robert C. KEMERAIT JR.	Chair	Prof. Koshi YOSHIDA	Chair	Asst. Prof. Prakash Murgeppa BHUYAR	Chair	Assoc. Prof. Kasumi ITO
	Co-chair	Prof. De Los Santos, WILMA C	Co-chair	Prof. Rowena Dela Torre BACONGUIS Dr. Samnang NGUON	Co-chair	Assoc. Prof. Monalyn Lariosa OLOROSO	Co-chair	Dr. Dyna THENG	Co-chair	Prof. Consuelo De Luna HABITO
Time	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title
10:30 – 10:45	EM-17-57	Physico-chemical and Thermal Characterization of Cashew Nut Shell Cake Wastes (Anacardium occidentale L.) as Potential Renewable Solid Biofuel	RD-17-09	Sustainability of Agricultural Cooperatives for Community Development in the Province of Albay	ASFI-17-63	Effectiveness of a Light-Touch Intervention on Hygiene Practice to Improve Pork Safety in Cambodian Traditional Markets	ASFI-17-61	Digital Transformation of Social Media on Small-Scale Dairy Family Agribusinesses in Bangladesh: Application of Technology Acceptance Model (TAM) Theory	ESD-17-01	Education for Sustainable Rural Development: Empowering Indigenous Communities Through School-Based Safe Potable Water Intervention
10:45 – 11:00	EM-17-23	Livestock Integration in Smallholder Oil Palm Systems: Advancing Livelihood Security Through Sustainable Weed Management	RD-17-52	Prioritizing Determinants of Agricultural Cooperative Resilience to External Stressors: An AHP-Based Study	ASFI-17-70	Indirect ELISA for Brucellosis Disease and Lumpy Skin Disease at Svay Rieng and Prey Veng Province, Cambodia	ASFI-17-68	Scarebot: A Solar-Powered Bird Deterrent System with Computer Vision-Based Bird Detection	ESD-17-22	Changes in Educational Disparities in the Low- Country Ceylon Tea Cultivation Community: A Comparative Analysis of 2013 and 2023
11:00 – 11:15	EM-17-21	Assessing the Hazardous Waste Management Strategy of a Higher Education Institution: The Case of the University of the Philippines Los Baños	RD-17-57	Challenges in Implementing Social Protection Scheme: A Case Study from Three Agricultural Cooperatives in Takeo Province	ASFI-17-40	Growth Performance of Buffalo (*Bubalus bubalis*) Calves Fed Fresh and Ensiled Guinea Grass Cultivars Harvested at 30- or 45-Days	ASFI-17-27	Co-Designing Strip Cropping and its Effects on Arthropod Abundance and Crop Performance in Organic Arable Systems	ESD-17-23	Evaluation on the Impact of Low Impact Development (LID) Project Implementation in Coastal Area of Cambodia

11:15 – 11:30	EM-17-40	Edible Plant Biodiversity and Phytonutrients of Wild Edible Plant Species in the Farming Communities of Cordillera Region, Philippines	RD-17-44	We Learn Together: Participatory Action Learning and Research in the Coffee Case Study	ASFI-17-46	Development of Cogon (*Imperata cylindrica*) Plant-based Leather	ASFI-17-66	Evaluation of Consistency and Accuracy of Four Cropland Datasets for Cropland Mapping in Cambodia	ESD-17-17	Pag-ámlig: Social Constructivist Worldview on the Social Fencing Conservation Phenomenon in Leganes Integrated Katunggan Eco-Park in Iloilo
11:30 – 11:45	EM-17-20	Development of Database for Palawan Pangolin (*Manis Culionensis*)	RD-17-36	Sustainability Pathways for Smallholder Coffee Farmers in Sultan Kudarat: An Assessment of Economic, Social, and Environmental Dimensions	ASFI-17-15	Enhancing Survival of Freshwater Aquaculture Selected Tilapia (FaST) Strain using Disinfectants during Transport	ASFI-17-80	Effects of Different Acidic Agents for Rubber Processing on Rubber Quality at Cambodian Rubber Research Institute	ESD-17-16	Incremental and Participatory Design for Informal Settlements in Cavite, Philippines
11:45 – 12:00	EM-17-10	Palawan Pangolin (*Manis Culionensis*) Food Preference	RD-17-47	Extension Interventions and Their Socio-Economic and Environmental Impacts on Almaciga Tappers in Palawan, Philippines	ASFI-17-54	Mortality Loss in Pangasius Catfish Grow-out Farming: Stage-Based Evidence from Smallholder Aquaculture in Cambodia	ASFI-17-43	Bioefficacy of Selected Plant Extracts on Pest Incidence, Damage Reduction, and Yield in Pechay (*Brassica chinensis* L.) Production	ESD-17-14	The Benefits of Urban Agriculture for Communities in Bogor, West Java, Indonesia
12:00 – 13:00	Lunch Break (at Samdech Hun Sen Hall)									
	Oral Presentations: Session 2 (from 13:00 to 14:30 at Auditorium/AERD Faculty/AI Faculty)									
	Theme: EM		Theme: RD		Theme: ASFI		Theme: ASFI		Theme: ESD & RD	
	Chair	Prof. Masayasu MAKI	Chair	Dr. Marilou Ombid MONTIFLOR	Chair	Asst. Prof. Jeralyn ALAGON	Chair	Prof. Eiji MATSUO	Chair	Prof. Koji HARASHINA
	Co-chair	Prof. Narong TOUCH	Co-chair	Dr. Rathna HOR	Co-chair	Dr. Lyhour HIN	Co-chair	Dr. Borarin BUNTONG Dr. Satya LIM	Co-chair	Asst. Prof. Somnath GHOSAL
Time	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title
13:00 – 13:15	EM-17-49	Effects on Local Species from A Coal Mining Extension Wastewater Discharge Using Aquatic Ecotoxicity Testing	RD-17-01	Facilitators And Barriers on the Performance of Barangay Nutrition Scholars (BNSs) in Barangay Integrated Development	ASFI-17-07	Growth, Yield, and Mycelial Quality of Brown Oyster Mushroom (*Pleurotus sajor-caju*) Pre-Treated with Ascorbic Acid	ASFI-17-29	Soil Physicochemical Properties and Fungal Biodiversity Across Organic, Good Agricultural	ESD-17-08	Rebuilding Learning in Crisis-Affected Communities: A Study on Empowerment and Sustainable

				Approach for Nutrition Improvement (BIDANI) Catchment and Non-catchment Barangays in Selected Municipalities in Laguna		under Water-Deficit Stress		Practices, and Conventional Farming Systems in Benguet, Philippines: A Comparative Analysis		Development under Project ACCESS
13:15 – 13:30	EM-17-22	How human activities are affecting sedimentation rates of water reservoirs? Case study: Kalimanci water reservoirs, Republic of North Macedonia	RD-17-29	Safety and Hypoglycemic Activity of Selected Plant Extracts: Comparative Analysis of Blood Glucose and Body Weight in Experimental Rats	ASFI-17-72	Quality of Pickled Bamboo Shoots Using Natural Fermentation and the Addition of *Lactococcus lactis* and *Lactobacillus plantarum.*	ASFI-17-36	Baobab Seed (*Adansonia digitata*) Press Cake as a Soil Amendment for Improving Soil Quality in Dodoma Region, Tanzania	ESD-17-05	Eco-Inclusive Entrepreneurship: Strengthening Local Economies in Mt. Negmisi's Fragile Environment
13:30 – 13:45	EM-17-45	Tracing Sources of Nitrogen Contamination in a Tropical Flood Pulse System: Tonle Sap Lake, Cambodia	RD-17-42	From Pole to Product: Value Chain Analysis of Bamboo for Rural Livelihood Security in Pangasinan, Philippines	ASFI-17-17	Sustainable Drying Innovation: Biomass-Powered Dryer for Climate-Resilient and Profitable Fish Processing	ASFI-17-22	Characterization of Soil Carbon and Nitrogen in the Paddy Agro-Ecosystems of Afghanistan	ESD-17-21	From Plantation to Prosperity: The Asian Palmyrah Palm as a Catalyst for Sustainable Development
13:45 – 14:00	EM-17-64	Short-Term Groundwater Level Dynamics in Response to Rainfall and Flood Events: A Field-Based Study	RD-17-27	Distributional Channels and Prospects of the Traditional Fruit Romdenh in Cambodia	ASFI-17-69	Optimization of Packaging Conditions in the Postharvest Handling Improvement of Okra (*Abelmoschus esculentus* L.) Pods	ASFI-17-38	Soil Fertility Analysis of Farming Systems across Socioecological Production Landscapes in Santa Cruz Watershed, Philippines	RD-17-21	Reimagining Agrarian Futures: Women-Led Agriculture Practices in Rural India
14:00 – 14:15	EM-17-44	Population Dynamics, Livelihood Patterns, and Agriculture Land Cover Changes in Maasin City, Philippines, A Correlation Analysis from 2015 and 2025	RD-17-55	Preliminary Survey on Melaleuca Essential Oil Production and Distribution in Cambodia	ASFI-17-55	Effect of Lead Toxicity Stress on the Antioxidant Property of *Andrographis paniculata* (Burm. f.) Nees.	EM-17-32	Effects of Green Manure on Soil Characteristics in Pineapple Farmlands of Moung Ruessei, Battambang Province, Cambodia	RD-17-53	Solution-Driven Science and Digitalization for Agrarian Reform Communities: Pathways to Inclusive Rural Development in Philippine Agriculture

14:15 – 14:30	EM-17-56	A Unique Showcasing of Urban Trees for Greater Social Participation, People and City Nature Connections and Enhanced City Economics in Tokyo, Japan.	RD-17-28	Characteristics of Game Meat Procurement Among Restaurants in Japan: An Analysis of Food Procurement Preferences and Supplier Selection Factors	ASFI-17-81	Chemical Characterization and Antibacterial Activity of Essential Oils from Cambodian *Melaleuca* Species	EM-17-43	Granular Urea-Based Organo-Mineral Hybrid Fertilizers from Agricultural By-Products: Nutrient Release, Soil Organic Matter, and Crop Growth	RD-17-02	Angkor Voyager: Eco-Villages as Models of Empowered and Sustainable Rural Development in Cambodia
14:30 – 15:00	Coffee Break & Poster Presentation Session 2 (at Samdech Hun Sen Hall)									
	Oral Presentations: Session 3 (from 15:00 to 17:00 at Auditorium/AERD Faculty/AI Faculty)									
	Theme: EM		Theme: RD		Theme: ASFI		Theme: ASFI		Theme: ESD & ASFI	
	Chair	Prof. Kazuo OKI	Chair	Prof. Felisa Lazaro MALABAYABAS	Chair	Assoc. Prof. Mosae Selvakumar PAULRAJ	Chair	Dr. Sanara HOR	Chair	Dr. Soriya RIN
	Co-chair	Prof. Ivan MINCHEV	Co-chair	Dr. Kimchhin SOK	Co-chair	Dr. Sophak POK	Co-chair	Assoc. Prof. Iman Raj CHONGTHAM	Co-chair	Dr. Mouylin CHEM
Time	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title	Tracking Code	Title
15:00 – 15:15	EM-17-30	Effects of Electrode Potential Optimization on Methane Production by Incorporating Conventional Methane Fermentation with Electromethanogenesis	RD-17-35	Decision Support System as a Tool to Improve the Governance of Palakpakin Lake, San Pablo City, Philippines	ASFI-17-78	Protecting the Relevance of Public Agricultural Extension in the United States	ASFI-17-75	Response of Rice (*Oryza sativa* L.) to Biostimulant Application under Simulated Salinity Stress	ESD-17-26	Detection of Coliforms, *Escherichia coli*, and *Staphylococcus aureus* in Papaya Salad Sold in Dangkor District, Phnom Penh
15:15 – 15:30	EM-17-76	Comparative Analysis of Statistically Smoothed and Interpolated Satellite-based Vegetation Indices Time Series Against Ground-Truth LAI Measurements in Rainfed Rice Farm	RD-17-33	YAPAK 2.0: Enhanced Fishing Tool for Local Fisherfolk	ASFI-17-84	Farmer's perception of the Cambodian reformed agriculture extension system: Commune Agriculture Officers (CAOs)	RD-17-34	Economic Profitability and Adoption Determinants of Premium Rice Varieties in Cambodia	ASFI-17-23	Impact of Nanofertilizer Application on Sugarcane Rhizosphere Microbiome Diversity: A Metagenomic Approach

15:30 – 15:45	EM-17-04	GIS-Based Assessment of Sika Deer (*Cervus nippon*) Habitat Suitability and Human Conflict Risk Using Integrated Analytical Hierarchy Process-Multi-criteria Decision Analysis	RD-17-10	Predicting Loan Portfolio Quality in Rural Microfinance Institutions in Cambodia Using Financial Ratios: A Data-Driven Approach	ASFI-17-47	Determination of Pesticide Use and Perceptions of Farmers in Selected Municipalities of Laguna, Philippines	RD-17-46	Challenges and Opportunities of Organic Production in the Philippines	ASFI-17-04	Magnetite and Silver Nanoparticles Mitigate In Vitro PEG-Induced Drought Stress in Arabica Coffee (*Coffea arabica* L.)
15:45 – 16:00	EM-17-55	Comparative Assessment of Remote Sensing Techniques for Monitoring Eutrophication in the Largest Lake in Southeast Asia: Tonle Sap Lake, Cambodia	RD-17-25	Establishment of the Bohol Cacao Industry Information System (BCIIS)	ASFI-17-30	Pastoralists' Willingness to Learn Climate -Smart Agriculture Practices: Implications for Sustainable Cattle Production in Arusha Region, Tanzania	ASFI-17-14	Greenhouse Gas Fluxes from Paddy Rice Cultivation: Evidence from LI-COR Measurements and Mitigation Strategies	ASFI-17-16	Development of *In-Vitro* Mass Propagation Protocol for Turmeric (*Curcuma longa* l.) using Tissue Culture Techniques
16:00 – 16:15	EM-17-71	Climate Change Impacts on Hydrological Regimes and Extremes in Pursat River Basin, Cambodia: Insights from the SWAT Model and CMIP6 Scenarios	RD-17-51	Energy Needs Assessment in an Off-Grid Island Community: A Case for Inanuran Island, Tubigon, Bohol, Philippines	ASFI-17-83	Key Actor's Roles and Perception on Food Safety and Health Risks in Smoked Fish Value Chain in Kampong Chhnang Province, Cambodia	ASFI-17-33	Climate Change Impact on Rice Yield in West Jawa, Indonesia	ASFI-17-35	Tomato Production in Kandal Province, Cambodia: A Review on Problem and Solution
16:15 – 16:30	EM-17-15	Nature-Based Climate Adaptation through Ecological Restoration in the Western Ghats: Advancing People–Planet Prosperity in Rural Landscapes	RD-17-48	Palaw'an Women Woodcarvers: Work, Work, Work in the Philippine Informal Economy	ASFI-17-44	Coconut Farmers' Awareness and Adoption of Climate-Smart Technologies in Kabankalan City, Negros Occidental, Philippines	ASFI-17-49	Comparing Agricultural Practices in Rice Farming Systems: A Study of Living Lab Members Versus Non-Members in the RomSay Sok Community, Battambang Province, Cambodia	ASFI-17-89	Enhancing Climate-Resilient Rice Productivity through Solar-Powered Irrigation in Cambodia

16:30 – 16:45	EM-17-01	Assessing the Monetary Value of Seasonal Climate Forecast on Rice Yield in Victoria through Decision Tree Analysis	RD-17-20	Exploring Women's Participation, Roles, and Challenges in Community-Based Mangrove Rehabilitation Initiatives	ASFI-17-41	Future-Proofing Smallholder Farmers in Selected Rural Communities in the Philippines through Nature-Positive Food Production	ASFI-17-28	Crop Management vs. Rainfall: Determining the Key Drivers of Rice Yield in Partially Rainfed Production System of India
16:45 – 17:00	EM-17-77	Assessment of Natural Adsorbents Derived from Agricultural Waste for Wastewater Treatment	RD-17-49	The Role of Women in Invertebrate Gleaning: Invisible Contributors to Food Security and Livelihood	ASFI-17-39	Promoting and Strengthening of Urban Food Production: A comparative review of urban farms located in Barangay Mangga and Barangay Sto Cristo Quezon City, Philippines	ASFI-17-12	Efficacy of Panyawan (Tinospora Rumphii Boerl) Extract as Dewormer in Native Chicken (Gallus Domesticus)

Keynote Presentations: (from 09:20 to 09:50 at Samdech Hun Sen Hall)

	Chair	Prof. Dr. Mom SENG	
Time	Tracking Code	Title	Presenter
09:20 – 09:35	KN-17-01	Unlocking the Paradigm of Agriculture revolution through technology in Cambodia	H.E Dr. Sieng Heng HUL, MISTI, Cambodia
09:35 – 09:50	KN-17-02	Transforming Cambodia's Rural Economy: Integrating Modern Cooperatives with Global Value Chains	H.E Dr. Asikin YOEU, MAFF, Cambodia

Special Session Presentations: (from 13:00 to 14:30 at LMLA Faculty)

	Chair	Dr. Sopheap PHIN
	Co-chair	Dr. Kim Eang THO
Time	Title	Presenter
13:00 – 13:15	Financing Sustainable Agriculture and Rural Development in Cambodia: The Role of the Agricultural and Rural Development Bank (ARDB)	Representative from Agricultural and Rural Development Bank (ARDB)
13:15 – 13:30	Private Sector Innovation in Agri-Food Value Chains and Sustainable Development	Representative from Chip Mong Group
13:30 – 14:45	Confirel Co. Ltd: Empowering Farmers, Preserving Heritage, and Growing Global	Representative from Confirel Co., Ltd.
14:45 – 15:00	Strengthening the Cashew Value Chain and Export Competitiveness in Cambodia	Representative from Cambodia Cashew Federation (CCF)
15:00 – 15:15	Policy, Knowledge Systems, and Institutional Support for Agricultural Development	Representative from CJA / CAA

15:15 – 15:30	School-Centered Community Development for Sustainable Rural Futures in Cambodia: Where Environment, Society and Economy Meet	Representative from ERECON

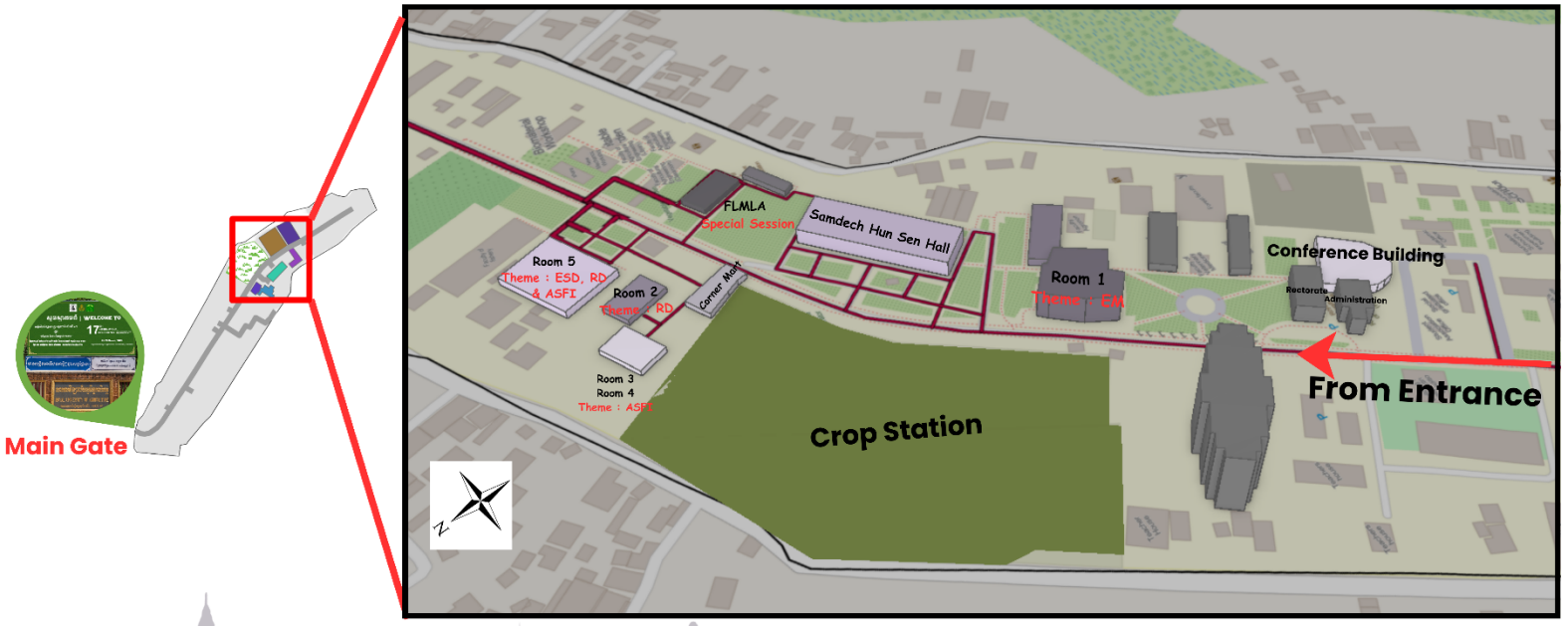
Poster Presentations (core time: 10:00-10:30 and 14:30-15:00 at Samdech Hun Sen Hall)	
Chair: Prof. Dr. Dieter Trautz	
Education for Sustainable Development	
Co-chair	1). Dr. Rithy CHRUN
	2). Dr. Kay Guiriba LOSABIA
	3). Dr. Socheath TONG
ESD-17-24	Transformative effect of a training on the transformation of Neglected and Underutilized Species (NUS) in Burkina Faso: From satisfaction to learning
ESD-17-15	Participatory Soil Conservation Approaches Integrating Brazil Nut (*Bertholletia excelsa*) for Erosion Control in Deforested Areas of Cobija, Bolivian Amazonia
ESD-17-19	Prevalence of *E. Coli* and Salmonella Isolated from Chicken Farm in 3 Provinces of Cambodia and Antimicrobial Susceptibility Profile
ESD-17-20	Prevalence of *E.coli* and *Salmonella* isolated from pig farms in 3 provinces of Cambodia and antimicrobial susceptibility profile
ESD-17-10	Radiography and Ultrasonography Evaluation on Lower Urinary Bladder Disease in Felines
Rural Development	
Co-chair	1). Asst. Prof. Tricia Custodio ASCAN
	2). Dr. Tamon BABA
	3). Dr. Sophea NHEAN
RD-17-12	Digital Bridges for Sustainable Livelihoods: The OUgnayan Wednesdays Model for Eco-Inclusive Rural Enterprise Development
RD-17-13	Strengthening Rural Livelihoods in Cambodia: Institutional Linkages and Resilience in Organic Rice Value Chains
RD-17-18	Digital Play, Traditional Heritage: University-Led Initiatives by Students and Faculty to Preserve ASEAN Indigenous Games in the E-Gaming Era

RD-17-39	Feasibility for Adoption of Novel Granular Hybrid Fertilizers as A Sustainable Practice: Case Study in Anuradhapura District, Sri Lanka
RD-17-54	Development and Performance Evaluation of Bio-Briquettes from Cassava Stem Waste for Sustainable Rural Energy Use in Cambodia
	Environmental Management
Co-chair	1). Assoc. Prof. Imelida Genson TORREFRANCA 2). Dr. Sopheap EK 3). Dr. Sopheap PHIN
EM-17-29	Impact of Electrode Size on Scale-Up of Membrane-Less Microbial Fuel Cells Fueled by Food Waste
EM-17-54	Detection of Sika Deer in Ozegahara Using UAV-Mounted Thermal Cameras and Evaluation of Vegetation Status at Their Detected Sites
EM-17-68	Satellite-Based Contrasts in Methane Emission Patterns of Rainfed and Irrigated Rice Paddies in Thailand
EM-17-69	Temporary Rainwater Storage Function of Paddy Fields under Alternative Wetting and Drying Irrigation
EM-17-73	An integrated analysis of water quality, microplastics contamination, and community awareness in the Tisa Wewa water scheme, Sri Lanka
EM-17-07	Valuing Nature's Contributions: An Integrated Ecosystem Service Assessment Across Protected Areas in Nepal
EM-17-08	Ecosystem Services and Tourism in Two National Parks of Nepal: A Comparative Perception Study
EM-17-78	Accessing Empirical-Based Information to Validate and Address Soil Erosion on Cassava in Preah Vihear Plateau
Agricultural Systems and Food Innovation	
Co-chair	1). Dr. Gemma Morante GUIGUE 2). Assoc. Prof. Thong KONG 3). Dr. Hiroyuki HATTORI
ASFI-17-48	Effect of Transglutaminase (EC 2.3.2.13) on the Physicochemical, Structural, and Textural Properties of Hybrid Plant Meat
ASFI-17-85	Association between Enzootic Pneumonia Lung Lesion Scores and Carcass Weights of Slaughtered Pigs from Commercial Pig Farms in Cambodia
ASFI-17-73	Characterization of Escherichia coli and Salmonella spp. in Cambodian Fermented Fish and Vegetables

ASFI-17-65	Extraction of Calcium from Chicken Eggshells for Nutritional Supplementation
ASFI-17-67	Improvement of Postharvest Quality and Shelf Life of Tomatoes (*Solanum lycopersicum*) Using Water Treatment and Aloe Vera Gel Coating
ASFI-17-79	Quality Evaluation of Phka Rumduol Rice After Milling in Five Small Millers of Banteay Meanchey Province
ASFI-17-74	Development of Snack Products from Rasbora rhrgma through Dehydration Methods
ASFI-17-86	Development of plant-based chiffon cakes using soy protein isolate and maltodextrin conjugates: effects of wet heat treatment
ASFI-17-60	Determinants and Barriers to Innovation Adoption in Ferula Assa-foetida Cultivation in Herat province, Afghanistan
ASFI-17-87	Evaluation of Quality of Raw Cashew Nut in Cambodia
ASFI-17-89	Enhancing Climate-Resilient Rice Productivity through Solar-Powered Irrigation in Cambodia
ASFI-17-90	Nutrient Management for Cassava Production in Upland Sandy Soil in Preah Vihear Province
ASFI-17-91	Farmer's Knowledge of Soil Fertility in Upland Cassava Production
ASFI-17-92	Soil Chemical Properties and Soil Amendments for Mung Bean: A Case Study on Acid Soil in Rik Reay Commune, Rovieng District, Preah Vihear Province
Infrastructural System	
Co-chair	1). Assoc. Prof. Thavrak HOUN
	2). Dr. Ligaya Rubas LEAL
	3). Dr. Sophornrith RO
IS-17-03	Lightweight Concrete Gate Using Waste Expanded Polystyrene for Long-Term Field Performance in Paddy Field Environment
IS-17-06	Impacts of Economic and Social Land Concessions in Cambodia (2000-2017): A Review of Mechanisms, Outcomes, and Failures

Venue Map

17th ICERD RUA-Venue Map



Samdech Hunsen Hall : Opening Ceremony, Poster Presentation, 20th Anniversary Commemorative Ceremony, Welcome Reception & Banquet

Breakout Room

Room 1 : Auditorium	Theme : EM, Pre-Even for young Scientist
Room 2 : AERD 1	Theme : RD
Room 3 : AERD 2	Theme : ASFI
Room 4 : AERD 3	Theme : ASFI
Room 5 : AI	Theme : ESD, RD & ASFI

Special Session : Faculty of Land Management and Land Administration (LMLA)

Council Meeting : Conference Building

Abstract of Scientific Presentation

Keynote

Code	Abstract
KN-17-01	Unlocking the Paradigm of Agriculture revolution through technology in Cambodia Sieng Heng HUL*
KN-17-02	Transforming Cambodia's Rural Economy: Integrating Modern Cooperatives with Global Value Chains Asikin YOEU*

Theme: Education for Sustainable Development (ESD)

Code	Abstract
ESD-17-01	Education for Sustainable Rural Development: Empowering Indigenous Communities Through School-Based Safe Potable Water Intervention Somnath GHOSAL*
ESD-17-05	Eco-Inclusive Entrepreneurship: Strengthening Local Economies in Mt. Negmisi's Fragile Environment Felix A. MADRIÑAN*
ESD-17-08	Rebuilding Learning in Crisis-Affected Communities: A Study on Empowerment and Sustainable Development under Project ACCESS Ma. Josephine Therese Emily G. TEVES*, and Sarah Grace L. CANDELARIO
ESD-17-10	Radiography and Ultrasonography Evaluation on Lower Urinary Bladder Disease in Felines Seryvisal EANG, Dane HEAN, Danin KOUNG, Sath KEO, Saoleap OUCH, Sokea MAB, Thaipheng THORN, Chanlakna KHORN, and Saran CHHOEY*
ESD-17-14	The Benefits of Urban Agriculture for Communities in Bogor, West Java, Indonesia Yuriko SEKIGUCHI*, Koji HARASHINA, and Hadi Susilo ARIFIN
ESD-17-15	Participatory Soil Conservation Approaches Integrating Brazil Nut (*Bertholletia excelsa*) for Erosion Control in Deforested Areas of Cobija, Bolivian Amazonia Juan UEGO PEREZ* and Machito MIHARA
ESD-17-16	Incremental and Participatory Design for Informal Settlements in Cavite, Philippines Ralf Nicos SANTOS, Andrei Bien ABUL*, John Lloyd BRONCANO, John Paolo DESINGAÑO, Jhoanna Marie DIQUIT, Katchalle MARQUEZ, Jamielle PIDLAOAN, Lorenzo II TADLIP, and Mark Angelico SANTOS
ESD-17-17	Pag-ámlig: Social Constructivist Worldview on the Social Fencing Conservation Phenomenon in Leganes Integrated Katunggan Eco-Park in Iloilo Alyanna Buen Aquil P. EGUALAN, Daniel G. HERRADURA, Lorraine Elijah M. ODANGO, Ayeisha Shaffiz PAJOTAGANA, and Jianni Martina M. PROVIDO, and John E. BARRIOS*
ESD-17-19	Prevalence of *E. Coli* and Salmonella Isolated from Chicken Farm in 3 Provinces of Cambodia and Antimicrobial Susceptibility Profile Sothearoat CHEA, Sothyra TUM, Koam SOK, Vorleak MONG, Sochariya LEOK, Chhun TORY, Bunny YOM, and Rortana CHEA*

ESD-17-20 Prevalence of *E.coli* and *Salmonella* isolated from pig farms in 3 provinces of Cambodia and antimicrobial susceptibility profile
Bunny YOM, Sothearoat CHEA, Sothyra TUM, Koam SOK, Vorleak MONG, Sochariya LEOK, Chhun TORY, Bunny YOM, and Rortana CHEA*

ESD-17-21 From Plantation to Prosperity: The Asian Palmyrah Palm as a Catalyst for Sustainable Development
Mosae Selvakumar Paulraj*, Shaika Mohammad Chowdhury, Tawsia Ajrin, Denazia Da Silva, Yunitha Sinnathurai and Sweety Angel Kuldeep and Christine Thevamirtha

ESD-17-22 Changes in Educational Disparities in the Low- Country Ceylon Tea Cultivation Community: A Comparative Analysis of 2013 and 2023
FUKUDA YUKO*, HATTORI TOSHIHIRO, YAMAJI EIJI

ESD-17-23 Evaluation on the Impact of Low Impact Development (LID) Project Implementation in Coastal Area of Cambodia
Kimchhin SOK*, Sopharith NOU, Somaly OUM, Vanny CHHUON, Phanith CHOU, Sophea NHEAN, Raksmey PHOEURK

ESD-17-24 Transformative effect of a training on the transformation of Neglected and Underutilized Species (NUS) in Burkina Faso: From satisfaction to learning
Zakaria KIEBRE, Aimé Florent SOMDA, Fanta Reine Sheirita TIETIAMBOU, Hamid EL BILALI, Sinisa BERJAN*, Pasquale DE MURO, Filippo ACASTO and Jacques NANEMA

ESD-17-26 Detection of Coliforms, *Escherichia coli*, and *Staphylococcus aureus* in Papaya Salad Sold in Dangkor District, Phnom Penh
Rithy CHRUN*, Navy NAT, Sineth CHEV and Mouylin CHEM

Theme: Rural Development (RD)

Code	**Abstract**
RD-17-01	Facilitators And Barriers on the Performance of Barangay Nutrition Scholars (BNSs) in Barangay Integrated Development Approach for Nutrition Improvement (BIDANI) Catchment and Non-catchment Barangays in Selected Municipalities in Laguna Gio Gabriel O. RIMAS*, Deborah Christine A. DE LEON, and Jaidee P. AGNE
RD-17-02	Angkor Voyager: Eco-Villages as Models of Empowered and Sustainable Rural Development in Cambodia Steve JENSEN* and Yanyun (Clare) WANG
RD-17-09	Sustainability of Agricultural Cooperatives for Community Development in the Province of Albay Kay GURIBA-LOSABIA*
RD-17-10	Predicting Loan Portfolio Quality in Rural Microfinance Institutions in Cambodia Using Financial Ratios: A Data-Driven Approach Davuth DY* and Davidseihakbot DY
RD-17-12	Digital Bridges for Sustainable Livelihoods: The OUgnayan Wednesdays Model for Eco-Inclusive Rural Enterprise Development Tricia C. ASCAN* and Emilio B. CLIMACO

RD-17-13 Strengthening Rural Livelihoods in Cambodia: Institutional Linkages and Resilience in Organic Rice Value Chains
Chanmony SEAN*, Amaury PEETERS, Kimchhin SOK, Nicolas ANTOINE-MOUSSIAUX, and Ludivine LASSOIS

RD-17-18 Digital Play, Traditional Heritage: University-Led Initiatives by Students and Faculty to Preserve ASEAN Indigenous Games in the E-Gaming Era
Analyn I DIOLA*, Tyrone V. LOPEZ, and Fionah M. QUINDARA

RD-17-20 Exploring Women's Participation, Roles, and Challenges in Community-Based Mangrove Rehabilitation Initiatives
Elia Maury JADINA* and Marcesar ALEJAGA

RD-17-21 Reimagining Agrarian Futures: Women-Led Agriculture Practices in Rural India
Ashwini PANDHARE* and Praveen Naik BELLAMPALLI

RD-17-25 Establishment of the Bohol Cacao Industry Information System (BCIIS)
Imelida G. TORREFRANCA*, Jorge P. CABELIN, Jr., Gladys R. CABELIN, Kathlyn L. QUION , and Jeomar E. AVERGONZADO

RD-17-27 Distributional Channels and Prospects of the Traditional Fruit Romdenh in Cambodia
Sothea KONG, Hisako NOMURA, Tamon BABA, Hiroyuki HATTORI, and Kasumi ITO*

RD-17-28 Characteristics of Game Meat Procurement Among Restaurants in Japan: An Analysis of Food Procurement Preferences and Supplier Selection Factors
Mayumi NAGAO*

RD-17-29 Safety and Hypoglycemic Activity of Selected Plant Extracts: Comparative Analysis of Blood Glucose and Body Weight in Experimental Rats
Elizabeth T. DOM-OGEN*, Ana B. MENDOZA, Freda M. WONG, Abegail T. BERSAMIN, Kryssa D. BALANGCOD, Jude L. TAYABEN, Ashlyn Kim D. BALANGCOD, and Teodora D. BALANGCOD

RD-17-33 YAPAK 2.0: Enhanced Fishing Tool for Local Fisherfolk
Jeo Rodel M. NACORDA* and Deceryl Gen T. SALIGUMBA

RD-17-34 Economic Profitability and Adoption Determinants of Premium Rice Varieties in Cambodia
Viseth PRUM and Hisako NOMURA*

RD-17-35 Decision Support System as a Tool to Improve the Governance of Palakpakin Lake, San Pablo City, Philippines
Rowena DT. BACONGUIS*, Jeremiah B. CALABIA, Hannah T. MACUROY, Siegfred DE LOS SANTOS, Francis John F. FADERAGAO, Nico Jayson C. ANASTACIO, Roxanne A. BANALO, and Therese O. PARDO

RD-17-36 Sustainability Pathways for Smallholder Coffee Farmers in Sultan Kudarat: An Assessment of Economic, Social, and Environmental Dimensions
Ligaya R. LEAL*, Marilou O. MONTIFLOR and Dave Laurence Q. DELA CRUZ

RD-17-39 Feasibility for Adoption of Novel Granular Hybrid Fertilizers as A Sustainable Practice: Case Study in Anuradhapura District, Sri Lanka
Arachchillage Buddhika Priyadarshani BANDARA and Machito MIHARA*

RD-17-42 From Pole to Product: Value Chain Analysis of Bamboo for Rural Livelihood Security in Pangasinan, Philippines
Felisa MALABAYABAS*, Vivian DARACAN, Aileen JARA, Edgar DEVERA, Jeanette FLORES, Ma. Diana RENDON, Paula Mae DAGSI

Theme: Environmental Management (EM)

Code	Abstract
EM-17-04	GIS-Based Assessment of Sika Deer (*Cervus nippon*) Habitat Suitability and Human Conflict Risk Using Integrated Analytical Hierarchy Process-Multi-criteria Decision Analysis Santa PANDIT*, Kazuo OKI, Timothy DUBE, Satoko MOROFUJI, and Salem Ibrahim SALEM
EM-17-07	Valuing Nature's Contributions: An Integrated Ecosystem Service Assessment Across Protected Areas in Nepal Santa PANDIT*, HUANG WAN HUI and Rival VALCIN
EM-17-08	Ecosystem Services and Tourism in Two National Parks of Nepal: A Comparative Perception Study Santa PANDIT*, Wan Hui HUANG, and Rival VALCIN
EM-17-01	Assessing the Monetary Value of Seasonal Climate Forecast on Rice Yield in Victoria through Decision Tree Analysis De Los Santos, WILMA C*
EM-17-10	Palawan Pangolin (*Manis Culionensis*) Food Preference Abrila M. LANGBAO*, Lea M. CAMANGEG, and Paul John L. GERALDINO
EM-17-15	Nature-Based Climate Adaptation through Ecological Restoration in the Western Ghats: Advancing People–Planet Prosperity in Rural Landscapes Sarika KULKARNI*, Sarayu KAMAT, and Rishikesh PATIL
EM-17-20	Development of Database for Palawan Pangolin (*Manis Culionensis*) Lea M. CAMANGEG*, Abrila M. LANGBAO, and Paul John L. GERALDINO
EM-17-21	Assessing the Hazardous Waste Management Strategy of a Higher Education Institution: The Case of the University of the Philippines Los Baños Christian Paulo C. ALTOVEROS*, Mark Dondi M. ARBOLEDA, Janice B. SEVILLA-NASTOR, and Evaristo Niño T. CANDO III
EM-17-22	How human activities are affecting sedimentation rates of water reservoirs? Case study: Kalimanci water reservoirs, Republic of North Macedonia Ivan MINCHEV*, Aleksandar TRENDAFILOV, Ivan BLINKOV, Bozhin TRENDAFILOV, and Ognen ONCHEVSKI
EM-17-23	Livestock Integration in Smallholder Oil Palm Systems: Advancing Livelihood Security Through Sustainable Weed Management Mohd Yusoff ISHAK*, Shuhaimi Ab RAHIM, Badrul AZHAR, and Frisco NOBILLY
EM-17-29	Impact of Electrode Size on Scale-Up of Membrane-Less Microbial Fuel Cells Fueled by Food Waste Narong TOUCH* and Xiao XIAO
EM-17-30	Effects of Electrode Potential Optimization on Methane Production by Incorporating Conventional Methane Fermentation with Electromethanogenesis Narong TOUCH*, Haruka HIGASHIJIMA, and Takahiko NAKAMURA
EM-17-32	Effects of Green Manure on Soil Characteristics in Pineapple Farmlands of Moung Ruessei, Battambang Province, Cambodia Channa KHOM and Machito MIHARA*

EM-17-40 Edible Plant Biodiversity and Phytonutrients of Wild Edible Plant Species in the Farming Communities of Cordillera Region, Philippines
Joyce N. PAING*, Mari Grace M. GALINO, and Louisa P. PLADIO

EM-17-43 Granular Urea-Based Organo-Mineral Hybrid Fertilizers from Agricultural By-Products: Nutrient Release, Soil Organic Matter, and Crop Growth
Arachchillage Buddhika Priyadarshani BANDARA and Machito MIHARA*

EM-17-44 Population Dynamics, Livelihood Patterns, and Agriculture Land Cover Changes in Maasin City, Philippines, A Correlation Analysis from 2015 and 2025
Thi Thi SOE*, Jayson B. ESPREGANTE, Eduardo C. CALZETA, Jessica D. VILLANUEVA-PEYRAUBE

EM-17-45 Tracing Sources of Nitrogen Contamination in a Tropical Flood Pulse System: Tonle Sap Lake, Cambodia
Mouykeang DET, Sovannara UK, Yoeng CHHOUNG, and Takashi NAKAMURA*

EM-17-49 Effects on Local Species from A Coal Mining Extension Wastewater Discharge Using Aquatic Ecotoxicity Testing
Barry N. NOLLER*

EM-17-54 Detection of Sika Deer in Ozegahara Using UAV-Mounted Thermal Cameras and Evaluation of Vegetation Status at Their Detected Sites
Masayasu MAKI*, Kazuo OKI, and Tadanobu OKUMURA

EM-17-55 Comparative Assessment of Remote Sensing Techniques for Monitoring Eutrophication in the Largest Lake in Southeast Asia: Tonle Sap Lake, Cambodia
Sovannara UK*, and Yoeng CHHOUNG

EM-17-56 A Unique Showcasing of Urban Trees for Greater Social Participation, People and City Nature Connections and Enhanced City Economics in Tokyo, Japan.
Kibalama Marvin BOGERE* and Iwao UEHARA

EM-17-57 Physico-chemical and Thermal Characterization of Cashew Nut Shell Cake Wastes (*Anacardium occidentale* L.) as Potential Renewable Solid Biofuel
Job Y. CAABAY* and Bryan G. ALAMANI

EM-17-64 Short-Term Groundwater Level Dynamics in Response to Rainfall and Flood Events: A Field-Based Study
Vasanthakumary SELVANAYAGAM and Siti NURHIDAYU

EM-17-68 Satellite-Based Contrasts in Methane Emission Patterns of Rainfed and Irrigated Rice Paddies in Thailand
Hiroki ODA*, Naoyuki HASHIMOTO, Masayasu MAKI, Koki HOMMA, Mallika SRISUTHAM, Supranee SRITUMBOON, and Koshi YOSHIDA

EM-17-69 Temporary Rainwater Storage Function of Paddy Fields under Alternative Wetting and Drying Irrigation
Hiromichi KITADA, Kiseki KURASHINA, Meng Hour HOUT, Ty SOK, and Hiromu OKAZAWA*

EM-17-71 Climate Change Impacts on Hydrological Regimes and Extremes in Pursat River Basin, Cambodia: Insights from the SWAT Model and CMIP6 Scenarios
Meng Hour HOUT*, Khamkeo HOAN, Ratana CHHIN, Ty SOK, Kiseki KURASHINA, and Hiromu OKAZAWA

EM-17-73 An integrated analysis of water quality, microplastics contamination, and community awareness in the Tisa Wewa water scheme, Sri Lanka
Arachchillage Buddhika Priyadarshani BANDARA and Machito MIHARA*

EM-17-76	Comparative Analysis of Statistically Smoothed and Interpolated Satellite-based Vegetation Indices Time Series Against Ground-Truth LAI Measurements in Rainfed Rice Farm Melva C. J. MAPILELE*, Sawahiko SHIMADA, Hidetake HIRAYAMA, and Ayako SEKIYAMA
EM-17-77	Assessment of Natural Adsorbents Derived from Agricultural Waste for Wastewater Treatment Sreyoun PHEA*, Vibol SAO, Borarin BUNTONG and Somara OUM, Lytour LOR, and Chhengven CHHOEM
EM-17-78	Accessing Empirical-Based Information to Validate and Address Soil Erosion on Cassava in Preah Vihear Plateau Veasna TOUCH, Sanara HOR, Sophornarith RO, Sarith HIN, and WENDY VANCE

Theme: Agricultural Systems and Food Innovation (ASFI)

Code	Abstract
ASFI-17-04	Magnetite and Silver Nanoparticles Mitigate In Vitro PEG-Induced Drought Stress in Arabica Coffee (*Coffea arabica* L.) Aron Louie L. PALER*, Marilyn M. BELARMINO, Luz G. ASIO, Marilou M. BENITEZ, and Catherine C. ARRADAZA
ASFI-17-07	Growth, Yield, and Mycelial Quality of Brown Oyster Mushroom (*Pleurotus sajor-caju*) Pre-Treated with Ascorbic Acid under Water-Deficit Stress John Mark R. FRANCISCO* and Beatriz S. BELONIAS
ASFI-17-12	Efficacy of Panyawan (*Tinospora Rumphii Boerl*) Extract as Dewormer in Native Chicken (*Gallus Domesticus*) Gemma M. GUIGUE*, Jay Ian C. DOÑA, Lhermy C. SAYCON, and Alican H. CONDAYO
ASFI-17-14	Greenhouse Gas Fluxes from Paddy Rice Cultivation: Evidence from LI-COR Measurements and Mitigation Strategies Prakash BHUYAR*
ASFI-17-15	Enhancing Survival of Freshwater Aquaculture Selected Tilapia (FaST) Strain using Disinfectants during Transport Gedielyn A. PAJE*, Marjorie M. RAMIREZ, Ricardo A. DE GUZMAN, and Karl Marx A. QUIAZON
ASFI-17-16	Development of *In-Vitro* Mass Propagation Protocol for Turmeric (*Curcuma longa* l.) using Tissue Culture Techniques Florenda B. TEMANEL*, Jimson S. RAMIREZ, Ana Daie S. SACAYANAN, Aubrey Jellian G. AQUINO, and Vanessa Rica BALICO
ASFI-17-17	Sustainable Drying Innovation: Biomass-Powered Dryer for Climate-Resilient and Profitable Fish Processing Monalyn L. OLOROSO* and Efren L. LINAN
ASFI-17-22	Characterization of Soil Carbon and Nitrogen in the Paddy Agro-Ecosystems of Afghanistan Amin Mohammad WASIF and Machito MIHARA*

ASFI-17-23 Impact of Nanofertilizer Application on Sugarcane Rhizosphere Microbiome Diversity: A Metagenomic Approach
Angel Lovely PAMA*, Andrew D. MONTECILLO, Erlinda S. PATERNO, Pearl B. SANCHEZ, Lilia M. FERNANDO, Walter A. LAVIÑA, and Lucille C. VILLEGAS

ASFI-17-27 Co-Designing Strip Cropping and its Effects on Arthropod Abundance and Crop Performance in Organic Arable Systems
Iman Raj CHONGTHAM* and Mebrahtom Amare GEREZIHAR

ASFI-17-28 Crop Management vs. Rainfall: Determining the Key Drivers of Rice Yield in Partially Rainfed Production System of India
Anurag AJAY* and Daniel MUELLER

ASFI-17-29 Soil Physicochemical Properties and Fungal Biodiversity Across Organic, Good Agricultural Practices, and Conventional Farming Systems in Benguet, Philippines: A Comparative Analysis
Merlyn G. CONTIC* and Paulina A. BAWINGAN

ASFI-17-30 Pastoralists' Willingness to Learn Climate -Smart Agriculture Practices: Implications for Sustainable Cattle Production in Arusha Region, Tanzania
Upendo Saitabau MOLLEL*, Katsumori HATANAKA, Ramadhona SAVILLE, and Nina N. SHIMOGUCHI

ASFI-17-33 Climate Change Impact on Rice Yield in West Jawa, Indonesia
Koshi YOSHIDA*, Mahiro AKIYOSHI, Kosuke MIZUNO, and Atsushi OTA

ASFI-17-35 Tomato Production in Kandal Province, Cambodia: A Review on Problem and Solution
Kimmouy MENG and Machito MIHARA*

ASFI-17-36 Baobab Seed (*Adansonia digitata*) Press Cake as a Soil Amendment for Improving Soil Quality in Dodoma Region, Tanzania
Martha HILLARY* and Machito MIHARA

ASFI-17-38 Soil Fertility Analysis of Farming Systems across Socioecological Production Landscapes in Santa Cruz Watershed, Philippines
Ma. Diana RENDON*, Maria Theresa Nemesis OCAMPO, Ma. Armie Janica PLETO, Russel Son CANILAN, Arnold Karl CASTILLO, Kenny Krizzet CASTILLO, Romnick BALITON, Jayson ARIZAPA, and Leila LANDICHO

ASFI-17-39 Promoting and Strengthening of Urban Food Production: A comparative review of urban farms located in Barangay Mangga and Barangay Sto Cristo Quezon City, Philippines
Mark Angelico SANTOS*

ASFI-17-40 Growth Performance of Buffalo (*Bubalus bubalis*) Calves Fed Fresh and Ensiled Guinea Grass Cultivars Harvested at 30- or 45-Days
Angelo Francis F. ATOLE*, Jade Dhapnee Z. COMPENDIO, Oscar B. POSAS, Lijueraj J. CUADRA, and Manuel D. GACUTAN, Jr.

ASFI-17-41 Future-Proofing Smallholder Farmers in Selected Communities in the Philippines through Organic Agriculture
Leila LANDICHO*, Christine Joy MANALO, Gennie SOYON, Maria Theresa Nemesis Ocampo, Ramil RODRIGUEZ, Romnick PASCUA, Lenard VISAYA, and Venice Jiezzelle NESPEROS

ASFI-17-43 Bioefficacy of Selected Plant Extracts on Pest Incidence, Damage Reduction, and Yield in Pechay (*Brassica chinensis* L.) Production
Daisy S. CAPON*

ASFI-17-68 Scarebot: A Solar-Powered Bird Deterrent System with Computer Vision-Based Bird Detection
Kishea Kate ANDOY, Kimberly Keith AUTIDA, Aaron RANARA, Francis Ian VILLACICA, and Jeralyn ALAGON*

ASFI-17-69 Optimization of Packaging Conditions in the Postharvest Handling Improvement of Okra (*Abelmoschus esculentus* L.) Pods
Cherry Faye C. GAITE and Jessa B. GISULGA*

ASFI-17-70 Indirect ELISA for Brucellosis Disease and Lumpy Skin Disease at Svay Rieng and Prey Veng Province, Cambodia
Sokun KHOEUN*, Chan BUN, Theary REN, Manay ITH, and Kouch THENG

ASFI-17-72 Quality of Pickled Bamboo Shoots Using Natural Fermentation and the Addition of *Lactococcus lactis* and *Lactobacillus plantarum*.
Mouylin CHEM*, Pisey RY, and Rithy CHRUN

ASFI-17-73 Characterization of *Escherichia coli* and *Salmonella* spp. in Cambodian Fermented Fish and Vegetables
Siveng MENG*, Sopheap EK, Rithy CHRUN, Sineth CHEV, and Sreypov LONG

ASFI-17-74 Development of Snack Products from *Rasbora rhrgma* through Dehydration Methods
Sineth CHEV*, Siveng MENG, Thong KONG, and Socheath TONG

ASFI-17-75 Response of Rice (*Oryza sativa* L.) to Biostimulant Application under Simulated Salinity Stress
Nien Chau NGUYEN*, Linh Thi Thuy HO, and Nghi Thi Truc NGUYEN

ASFI-17-78 Protecting the Relevance of Public Agricultural Extension in the United States
Robert C. KEMERAIT JR.*

ASFI-17-79 Quality Evaluation of Phka Rumduol Rice After Milling in Five Small Millers Of Banteay Meanchey Province
Sopheap EK, Sokhom LAN, Siveng MENG*, Rattana ING, Angkearanich NGET, and Mithona AN

ASFI-17-80 Effects of Different Acidic Agents for Rubber Processing on Rubber Quality at Cambodian Rubber Research Institute
Sylo SOMM*, Mardy SEREY, and Ratha SOR

ASFI-17-81 Chemical Characterization and Antibacterial Activity of Essential Oils from Cambodian *Melaleuca* Species
Ravor SENG, Sambo NA, Soriya RIN, Panhavatey SOKHOM, Fumie NAKASHIMA, Takahiro SHIBATA, and Hiroyuki HATTORI*

ASFI-17-83 Key Actor's Roles and Perception on Food Safety and Health Risks in Smoked Fish Value Chain in Kampong Chhnang Province, Cambodia
Raksmey PHOEURK*, Srong, KEO, Kimchhin SOK, Antoine-Moussiaux NICOLAS, Adrienne JONCKERS, and Thomas DOGOT

ASFI-17-84 Farmer's perception of the Cambodian reformed agriculture extension system: Commune Agriculture Officers (CAOs)
Sothea LOEK*, Tamon BABA, Koma YANG SAING, Heino GUELDEMANN, and Kasumi ITO

ASFI-17-85 Association between Enzootic Pneumonia Lung Lesion Scores and Carcass Weights of Slaughtered Pigs from Commercial Pig Farms in Cambodia
Naiheak BAN*, Bunna CHEA, Sophal CHEAT, Phillip CHRUN, Kriangsak LAOSAKUL, and THENG Kouch

ASFI-17-86	Development of Plant-Based Chiffon Cakes Using Soy Protein Isolate and Maltodextrin Conjugates: Effects of Wet Heat Treatment Sophorlkun YIM, Hyun Woo CHOI, and Jungwoo HAHN*
ASFI-17-87	Evaluation of Quality of Raw Cashew Nut in Cambodia Sopheap NHIM*, Chim CHAY, and Dyna THENG
ASFI-17-89	Enhancing Climate-Resilient Rice Productivity through Solar-Powered Irrigation in Cambodia Ponlork PHENG*, Lyhour HIN, Vary VUN, ChanMakara MEAN, Lytour LOR, Borarin BUNTONG, Joy Flor RICA, and Pavelic PAUL
ASFI-17-90	Nutrient Management for Cassava Production in Upland Sandy Soil in Preah Vihear Province Vanndy LIM* and Sanara HOR
ASFI-17-91	Farmer's Knowledge of Soil Fertility in Upland Cassava Production Panha KHIM*, Sophoanrith RO, Sambo PHEAP, HOR Sanara, Davina BOYD, and Wendy VANCE
ASFI-17-92	Soil Chemical Properties and Soil Amendments for Mung Bean: A Case Study on Acid Soil in Rik Reay Commune, Rovieng District, Preah Vihear Province Kimheang TAING*, Sophoanrith RO, Sanara HOR, Sambo PHEAB, Soklin KHEAM, Wendy VANCE, Richard BELL, and Mike Wong TING FOOK

Theme: Infrastructural System (IS)

Code	**Abstract**
IS-17-03	Lightweight Concrete Gate Using Waste Expanded Polystyrene for Long-Term Field Performance in Paddy Field Environment Eiji MATSUO*
IS-17-06	Impacts of Economic and Social Land Concessions in Cambodia (2000-2017): A Review of Mechanisms, Outcomes, and Failures Socheat TOEUNG*, Maly SO, and Ravuth ROS

List of Participants

Name	University/Organization
Keynote Speaker	
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Tracking Code: KN-17-01

Unlocking the Paradigm of Agriculture revolution through technology in Cambodia

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Abstract

The agricultural revolution has brought tremendous development to the human and economic landscape of the global supply chain. However, this transformation is not merely positive when one closely examines the development of the sector over nearly a thousand years of history. On the one hand, technology has been the driving force behind the agricultural revolution. On the other hand, countries that have rapidly adopted and advanced technological innovations have shaped the paradigm of global supply in the modern era. This pattern remains largely valid today. In general, countries that are advanced in technological development tend to operate at the high end of economic activities, such as services and technological innovation. Meanwhile, countries that developed later—particularly developing nations—often remain positioned at the lower end of economic activities. Technology development originating from research and development, technology licensing, and high value-added product development, such as pesticides and chemical fertilizers, represents common business activities led by advanced economies. This paradigm is strongly supported by technological capability, which emerging economies like Cambodia should not overlook. In practice, from a policy perspective, an Agricultural Technology (AgriTech) Roadmap 2030 has been developed to guide local stakeholders. It is strongly believed that developing nations may share a similar development path if they aspire to become high-income countries while ensuring food security and increasing exports of high value-added agricultural products.The roadmap was developed through a mission-oriented approach that engaged inputs from government, academia, and the private sector, projecting technological needs by 2030 as Cambodia aims to become an upper-middle-income country. The results indicate that human capital, scientific and technological capability, and supportive government policies form the key foundations for technological development across both upstream and downstream segments of the agricultural value chain.

Keywords: Paradigm, AgriTech, economic activities, human capital

Tracking Code: KN-17-02

Transforming Cambodia's Rural Economy: Integrating Modern Cooperatives with Global Value Chains

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Abstract

Agriculture remains a fundamental pillar of the Cambodian economy, contributing significantly to the national GDP. Despite global crises, the sector demonstrates resilience through steady increases in production and expanded land use for rice, industrial crops, rubber, and horticulture. Cambodia has transitioned into a major global exporter, reaching nearly one hundred international destinations and generating billions in economic value. To address the loss of value in raw material exports, the Ministry of Agriculture, Forestry and Fisheries (MAFF) is prioritizing a strategic shift toward high-value agro-processing and resilient diversification. Central to this transformation is the establishment of Modern Agricultural Cooperatives (MACs) to optimize productivity, alongside the development of dedicated agro-industrial zones such as the Kampong Thom Cashew Industrial Park. Beyond crops, the sector is diversifying into animal production and expanding aquaculture to ease pressure on natural freshwater sources, which remain vital for the population's protein intake. Forestry management has shifted toward sustainable intensification, ending new Economic Land Concessions to prioritize responsible land governance. Furthermore, the natural rubber sector is successfully integrating into domestic automotive clusters, where localized tire manufacturing has significantly boosted industrial exports. By fostering backward linkages between these industrial clusters and MACs, Cambodia aims to achieve high-middle-income status by 2030 through a sustainable, food-secure production system.

Keywords: Agro-processing, value addition, strategic investment, Modern Agricultural Cooperatives (MACs), sustainable development

ESD

Tracking Code: ESD-17-01

Education for Sustainable Rural Development: Empowering Indigenous Communities Through School-Based Safe Potable Water Intervention

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Abstract

Access to safe and potable drinking water at school premises is the fundamental right of every student to pursue a healthy and quality education. Still, worldwide, 11% of child deaths are due to waterborne diseases, and nearly 2 billion school days were missed due to a lack of improved water supply at school premises. The present action research thus aims to explore the changing knowledge, attitude and health benefits of consuming safe drinking water among the young indigenous population through school-based safe and cost-effective potable water intervention in the Jhargram district of eastern India. A sample of 120 students, both male and female, were recruited using a semi-structured questionnaire on availability, accessibility, and quality of drinking water and their impact on health outcomes. From the study findings, nearly 95% of students reported that the quality (in terms of taste, colour, and smell) of drinking water significantly improved after such an intervention. Concerning awareness towards consuming safe drinking water, almost 58% of students do not have proper knowledge about the consumption of safe and clean drinking water. As a result, half of them were affected by different water-borne diseases such as diarrhoea, stomach pain, and typhoid, and this situation is more prominent in their household, and especially for female members. However, after consuming water from the intervention, about 90% of them mentioned that they were not affected by any such diseases during the past couple of years. Overall, the project deliverables proved that such an intervention has immense benefits not only for health but also for knowledge, behaviour and practices on consumption of clean and safe drinking water among indigenous resident scholars. Therefore, similar community-level interventions may be helpful in different parts of rural India to ensure a healthy lifestyle for underprivileged communities.

Keywords: Safe drinking water, Community initiative, Community Health, Tribal, Action Research, India

Tracking Code: ESD-17-05

Eco-Inclusive Entrepreneurship: Strengthening Local Economies in Mt. Negmisi's Fragile Environment

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Abstract

Mt. Negmisi, a culturally sacred mountain located in Maasin, Quezon, Palawan, exemplifies the profound interconnection between ecological integrity and ancestral heritage. Traditionally celebrated as a "fertility mountain" by indigenous communities, it embodies centuries of intangible cultural practices and spiritual symbolism. In recent decades, however, the mountain's biodiversity has suffered significant decline due to anthropogenic pressures, including habitat Degradation, unsustainable resource extraction, and Tourism outgrowth. These environmental disruptions threaten not only the ecological balance but also the socio-economic stability of local livelihoods reliant on eco-tourism, traditional farming, and nature-based cultural enterprises. This research investigates the primary drivers behind Mt. Negmisi's biodiversity degradation and examines its evolving effects on the local economy. It further explores opportunities to reposition the mountain as a catalyst for sustainable development through eco-cultural tourism and community-led green enterprises. By integrating conservation principles with inclusive entrepreneurship, the study proposes strategic interventions to restore biodiversity, preserve cultural heritage, and foster long-term socio-economic resilience in the area.

Keywords: Mt. Negmisi, Sacred Spaces, Cultural Heritage, Eco-Tourism, Biodiversity Conservations

Tracking Code: ESD-17-08

Rebuilding Learning in Crisis-Affected Communities: A Study on Empowerment and Sustainable Development under Project ACCESS

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Abstract

This endline assessment examines the outcomes of Project ACCESS, a multi-partner Education in Emergencies (EiE) initiative implemented in conflict- and disaster-affected communities across BARMM, Northern Mindanao, and the Zamboanga Peninsula. Using a mixed-methods approach integrating HALDO, ILET, DRRM-AA assessments, learning facility audits, structured surveys, and post-distribution monitoring, the study evaluates how integrated learning, protection, and preparedness interventions strengthened continuity of education and community resilience. Results show significant gains in children's literacy, numeracy, social-emotional learning, and executive functioning, particularly among learners who accessed Temporary Learning Spaces, structured learning kits, and psychosocial support. Improvements in school safety, inclusive teaching practices, and DRRM mechanisms demonstrate that community-driven, multi-sectoral interventions can mitigate the impacts of complex emergencies on education systems. Critically, the project elevated community empowerment by reinforcing the roles of parents, teachers, barangay leaders, and local institutions in sustaining safe, inclusive, and emergency-ready learning environments. Findings highlight that education, when rooted in community participation and local capacity strengthening, becomes a pathway for sustainable development, social cohesion, and long-term resilience in fragile contexts.

Keywords: Education in Emergencies, Community Empowerment, Sustainable Development, Child Protection, Learning Continuity, Disaster Preparedness

Tracking Code: ESD-17-10

Radiography and Ultrasonography Evaluation on Lower Urinary Bladder Disease in Felines

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Abstract

Feline lower urinary tract disease (FLUTD) comprises a spectrum of disorders that often present with nonspecific clinical signs, making diagnostic imaging essential for accurate evaluation. Survey radiography and ultrasonography are the primary modalities used to identify lower urinary tract abnormalities in feline patients. This retrospective study reviewed 16 feline patients, representing a total of 20 diagnostic FLUTD findings, of varying sex, age, and breed presented to the Veterinary Teaching Hospital, Faculty of Veterinary Medicine, Royal University of Agriculture. All cats exhibited clinical signs consistent with lower urinary tract dysfunction, including reduced water intake, discolored urine, stranguria, abdominal pain, anorexia, weight loss, and vomiting. Each patient underwent abdominal radiography (lateral and ventrodorsal views), ultrasonography, and serum biochemical analysis (BUN and creatinine). Radiographs were evaluated for bladder position, size, shape, and radiopacity, while ultrasonographic assessments focused on bladder wall thickness, lumen characteristics, intraluminal echogenicity, and the presence of acoustic artifacts. Ethical approval and informed owner consent were obtained for all cases. Diagnosed FLUTD conditions included bladder calculi (n=8), bladder hematuria/sludge (n=3), bladder wall inflammation (n=5), and urethral obstruction (n=4). The most common clinical signs were decreased water intake, discolored urine, and stranguria (75%). Markedly elevated BUN (mean 73.88 mg/dL) and creatinine (mean 6.61 mg/dL) were recorded. Radiographic abnormalities included ventral bladder displacement (87.5%), increased bladder size (68.75%), bladder distension (56.25%), and radiopaque calculi (87.5%). Ultrasonography demonstrated severe bladder wall thickening (>3.0 mm) in 31.25% of cases, hyperechoic bladder walls in 50%, intraluminal echogenic debris in 75%, cystolithiasis in 50%, and acoustic or edge shadowing artifacts in 37.5%. Cases study on radiography and ultrasonography provide complementary diagnostic information in the assessment of FLUTD. Radiography is highly effective for detecting radiopaque calculi and evaluating bladder displacement, whereas ultrasonography offers superior characterization of bladder wall changes, intraluminal contents, and non-radiopaque abnormalities. The combined use of both imaging modalities enhances diagnostic accuracy and supports more informed clinical decision-making in feline FLUTD cases.

Keywords: Feline Lower Urinary Tract Disease (FLUTD); Radiography; Ultrasonography; Blood Urea Nitrogen (BUN); Creatinine; Cystolithiasis; Bladder wall thickness

Tracking Code: ESD-17-14

The Benefits of Urban Agriculture for Communities in Bogor, West Java, Indonesia

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Abstract

Urban agriculture provides various benefits to residents, including improved quality of life, enhanced food security, and increased household income. However, introducing urban agriculture is challenging because urban areas face competing demands for commercial and residential land use. To implement urban agriculture, it is necessary to balance such demands. This study examined the benefits of urban agriculture for communities to provide fundamental information for urban planning and to support discussions on its implementation. This study focused on a women farmers' group in Bogor, West Java, Indonesia. Indonesia is experiencing rapid population growth and urbanization. Bogor is part of Jabodetabek, a metropolitan area that includes Jakarta. As a result of urban sprawl, Bogor keeps a mosaic of commercial, residential, and rural landscapes. The women farmers' group is a rare example of successful farmers' group, by staying active and engaging in farming as its main activity. The method employed both qualitative and quantitative approaches. We investigated the activities and issues related to urban agriculture through interviews and participant observations. Additionally, we measured the perceived benefits using a questionnaire survey, defining the benefits of urban agriculture in three categories: quality of life, household economics, and food security. Quality of life includes residential satisfaction, community benefits, and health. Household economics includes income improvement and food cost reduction. We applied the Food Insecurity Experience Scale (FIES) to assess food security. A total of 101 residents, including members of the women farmers' group (participants) and residents outside of farmers' group (non-participants), responded to the questionnaire. The participants showed significantly higher scores in community volunteer frequency, willingness to join community-improvement events, and overall community evaluation. Future research should identify the factors that contribute to successful urban agriculture and determine the appropriate scale for its implementation. (287 words)

Keywords: food security, household economics, Indonesia, quality of life, urban agriculture, women farmers' group

Tracking Code: ESD-17-15

Participatory Soil Conservation Approaches Integrating Brazil Nut (*Bertholletia excelsa*) for Erosion Control in Deforested Areas of Cobija, Bolivian Amazonia

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Abstract

This study investigated participatory soil conservation strategies in deforested areas of Cobija, Bolivian Amazonia, emphasizing the integration of locally available Brazil nut (Bertholletia excelsa) residues as a community-supported measure for erosion mitigation. Using a participatory action research (PAR) approach, 91 farmers were engaged through surveys and workshops, representing a statistically reliable portion of Cobija rural population at a 95.3% confidence level. Survey results revealed strong community belief in the role of education in reducing deforestation (OR = 3.24), contrasted by low satisfaction with the availability (OR = 0.47) and accessibility (OR = 0.47) of existing environmental education programs. Formal, non-formal, and informal educational pathways influence awareness in different ways, with social media emerging as a major informal source of environmental information. Farmers expressed high interest in practical conservation approaches, selecting Brazil nut mulch as the most preferred option (80%) compared to contour planting, ground covers, or terracing. To verify this preference, a brief rainfall simulation experiment was conducted, showing that mulch application improved soil moisture retention and reduced surface runoff. Regional production data indicate that more than 277,000 metric tons of Brazil nut shell residues are generated annually, representing an abundant and underutilized resource for soil conservation applications. Economic assessment further demonstrated that Brazil nut mulch is highly cost-effective, with estimated implementation costs of USD 80–220 per hectare, considerably lower than conventional mulching materials commonly used in Amazonian agriculture. Overall, this study shows that integrating Brazil nut residues into soil conservation practices offers a socially endorsed, economically viable, and environmentally appropriate strategy for mitigating erosion in deforested landscapes. The findings strengthen the role of participatory approaches in identifying feasible nature-based solutions and highlight the importance of improving environmental education to support long-term conservation efforts in the Bolivian Amazonia.

Keywords: Amazonia, education, deforestation, Brazil nut, Mulch

Tracking Code: ESD-17-16

Incremental and Participatory Design for Informal Settlements in Cavite, Philippines

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Abstract

Informal settlements remain a pervasive issue in the Philippines, yet many government- led housing solutions often fail to address the specific economic and social needs of marginalized residents. This research addresses this gap by proposing architectural solutions rooted in incremental and participatory design, applied to the context of a dense, coastal informal settlement in Rosario, Cavite. This study examines the challenges, opportunities, and impacts of participatory design in informal communities, focusing on how community involvement shapes housing and infrastructure development. It also aims to develop architectural solutions through inclusive and incremental design approaches. This study utilized integrated Mixed Methods and Action Research Design to explore participatory strategies in the informal settlement of Sapa II, Rosario, Cavite. Data was gathered from 17 selected residents (aged 20+) with direct settlement experience, using a structured survey, a community workshop, and semi-structured interviews. The data analysis combined frequency and percentage for quantitative data with thematic analysis for qualitative data, integrating interview insights to validate survey and workshop findings. The study's results demonstrate that applying incremental and participatory design significantly improves spatial understanding and supports sustainable development in informal settlements. These findings indicate that the approach effectively addresses the interconnected physical, social, and environmental needs of the community.

Keywords: Participatory, Incremental, Community Planning, Community Engagement

Tracking Code: ESD-17-17

Pag-ámlig: Social Constructivist Worldview on the Social Fencing Conservation Phenomenon in Leganes Integrated Katunggan Eco-Park in Iloilo

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Abstract

The concept of conservation has gained increasing relevance as environmental crises intensify globally. In Leganes Integrated Katunggan Eco-Park (LIKE) in Iloilo, Philippines, Social Fencing—a community-based approach emphasizing collective responsibility and engagement, emerged. However, a notable gap exists in examining how Social Fencing shapes environmental worldviews and community identity within localized conservation initiatives. While existing research focuses on communal resource management strategies and contemporary applications, the interpretive, cultural, and meaning-making processes remain underexplored. This study aims to explore the worldviews on Social Fencing phenomenon in Leganes Integrated Katunggan Eco-Park using social constructivist analysis. Employing a Constructivist Grounded Theory (CGT) approach, semi-structured in-depth interviews and a focus group discussion were conducted to capture participants' lived experiences. Findings revealed *Pag-amlig*, a localized expression of Social Fencing, as the core concept. Six interrelated Panan-awan (worldviews)—*Pagtudlo* (Education), *Pagbinuligay* (Cooperation), *Panag-iyâ* (Ownership), *Pangabuhián* (Livelihood), *Pagpalangga sa Palibut* (Love for Environment), and *Pagkalipay* (Fulfillment)—emerged, shaping participation through interdependent and cyclical phases. These insights offer a culturally grounded understanding of Social Fencing, inform community-based conservation strategies that integrate local values, and provide a framework for future research in environmental and cultural contexts.

Keywords: Pag-ámlig, Social Fencing, Worldviews, Social Constructivism, Grounded Theory (GT), Community-based Conservation Strategy

Tracking Code: ESD-17-19

Prevalence of *E. Coli* and Salmonella Isolated from Chicken Farm in 3 Provinces of Cambodia and Antimicrobial Susceptibility Profile

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Abstract

Antimicrobial Resistance (AMR), a critical global public health threat, is a leading cause of mortality and a significant challenge for food safety. This study aimed to assess the prevalence of *Escherichia coli* and *Salmonella* and their antimicrobial susceptibility profiles across 3 provinces in Cambodia, including Kampong Cham, Prey Veng, and Pursat. A total of 180 environmental and biological samples were collected from farms (60 per province). Six sample types were collected per farm, including boot swabs, environmental swabs, and specimens from water tanks, feed tanks, and animals. Species identification was performed using culture methods and confirmed with the API 20E system, and the antimicrobial susceptibility test (AST) was performed using the broth microdilution method. The overall prevalence of *E. coli* was 61.6% (111 positives), while *Salmonella* was detected in 13.3% (24 positives) of samples. The AST showed the *E. coli* isolates (n=111) at a high prevalence of resistance to Ampicillin at 73.9% and Trimethoprim-sulfamethoxazole at 69.2%. Resistance was also observed to Gentamicin 46.8%, Colistin 17.1%, and Ciprofloxacin 12.6%. Other tested antibiotics remained largely effective against *E. coli*. Alarmingly, AST results for *Salmonella* isolates (n=24) showed 100% resistance to critically important antibiotics, including Ceftriaxone, Cefepime, Cefotaxime, and Cefuroxime. Among commonly used antibiotics, Ampicillin resistance was observed in 66.6% of isolates (16/24). This widespread multidrug resistance presents a significant threat to treatment options. The findings underscore the urgent need for strengthened antimicrobial stewardship, enhanced biosecurity measures on farms, and the integration of this surveillance data into national AMR policies under a One Health framework. This study provides a crucial foundational dataset for ongoing efforts to combat foodborne AMR in Cambodia's livestock sector and suggests activities to address it.

Keywords: Antimicrobial Resistance (AMR), *Escherichia coli*, *Salmonella*, Chicken Farm, Cambodia

Tracking Code: ESD-17-20

Prevalence of *E.coli* and *Salmonella* isolated from pig farms in 3 provinces of Cambodia and antimicrobial susceptibility profile

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Abstract

Researchers estimate that antimicrobial resistance in bacteria causes nearly 5 million human deaths each year. There is no time to wait; we need to ACT now. This study design is for antimicrobial resistance (AMR) surveillance in pig farms across three provinces in Cambodia in Prey Veng, Kampong Cham, and Pursat. A total of 180 samples were collected from 15 pig farms (5 farms per province). The sample types included boot swabs, rectal swabs, water, feed, and environmental swabs. Bacterial identification was performed by API20E and the Antimicrobial Susceptibility Testing (AST) against 13 different antibiotics using the broth microdilution method. The result showed that *E. coli* was detected in 50% of the samples (90/180), while *Salmonella* was found in 14.4% (26/180). Kampong Cham province showed the highest prevalence of *E. coli* (31/60), whereas Prey Veng province recorded the highest prevalence of *Salmonella* (12/60). *E. coli* isolates exhibited the highest resistance to Ampicillin (86.7%) and Trimethoprim/sulfamethoxazole (80.0%), while remaining highly sensitive to Carbapenems and Ceftriaxone (0% resistance). In contrast, *Salmonella* isolates exhibited high levels of resistance, with 100% resistance to Ceftriaxone, Cefepime, and Cefotaxime. Furthermore, approximately 40% of *Salmonella* isolates were resistant to Colistin. The result suggested that AMR is a concern on pig farms, and ongoing activities are needed to manage it.

Keywords: *E. coli*, *Salmonella*, Pig Farm, Antimicrobial Resistance (AMR), Cambodia, Food Safety

Tracking Code: ESD-17-21

From Plantation to Prosperity: The Asian Palmyrah Palm as a Catalyst for Sustainable Development

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Abstract

This study presents a comprehensive ecofeministic and Ecopreneuship model for environmental conservation and suatianable development through the large-scale plantation and multi-faceted valorization of the Asian Palmyrah Palm (Borassus flabellifer L.). Over 15,000 palmyrah palms have been planted on the AUW campus and the Sitakundu coastal embankment area, involving local women and students through Green Bangle Project and movement. The research demonstrates a sustainable value chain from plantation to diverse product development. Culinary innovations include transforming Palmyrah tubers into traditional Bengali dishes (Bharta, Bhaaji) and extracting sugar from ripe fruit pulp, offering a non-destructive alternative to traditional sap tapping. The fruit pulp's nutraceutical potential is harnessed through the development of an edible gel and its investigation as a natural galactagogue, supported by proteomic and in vivo studies. Furthermore, carotenoid-rich pulp extracts are formulated into high-antioxidant facial creams and soaps. Beyond food and nutraceuticals, the project promotes ecopreneurship by crafting biodegradable products from Palmyrah leaves, including printed business cards, bookmarks, wedding cards, nursery bags, educational periodic table game and etc.. This integrated approach—spanning plantation, food security, healthcare, eco-friendly materials, and education—empowers communities, fosters a circular economy, and establishes a replicable framework for achieving sustainable development.

Keywords: Palmyrah Palm, Edible and Non edible products, Ecofeminism, Sustainable Development, Ecopreneurship, Green Bangle Project

Tracking Code: ESD-17-22

Changes in Educational Disparities in the Low- Country Ceylon Tea Cultivation Community: A Comparative Analysis of 2013 and 2023

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Abstract

This study examines changes in educational disparities among children from families engaged in the Low-country Ceylon tea cultivation community and explores the factors behind these changes. Although the tea sector has been a cornerstone of the national economy since the colonial era, educational disadvantage in the tea estate sector has long been recognized as a persistent challenge. This study investigates whether educational gaps by management type have narrowed between 2013 and 2023. Data were collected in the Kotapola Division of Matara District, a major tea-growing area in southern Sri Lanka, through household surveys of 300 households (534 children) in 2013 and 85 households (139 children) in 2023, targeting children aged 5–17 years. Educational attainment was assessed by school enrollment status and grade repetition/dropout. Cross-tabulation analysis was applied to compare changes in educational attainment across three management types: Regional Plantation Company (RPC), Private Estate (PE), and Individual Farming (IF). The results indicate that educational disparities across management type have narrowed over the past decade. Enrollment rates rose markedly in PE (76.1% to 92.3%), and dropout/grade repetition rates declined across all management types (PE: 43.8% to 17.6%, RPC: 28.6% to 7.7%, IF: 3.8% to 0%). The study clarifies the relationships between these improvements and multiple factors, including the extension of compulsory schooling in 2016, increased parental aspirations for higher education, and improvements in infrastructure such as roads and transport services. By examining changes over a decade, this study contributes to a deeper understanding of the dynamics of educational inequality in tea-growing communities and provides insights for further research on how structural and attitudinal changes influence educational outcomes.

Keywords: Children, Educational inequality, Tea cultivation community, Management type, Sri Lanka

Tracking Code: ESD-17-23

Evaluation on the Impact of Low Impact Development (LID) Project Implementation in Coastal Area of Cambodia

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Abstract

Rapid urbanization and climate change threaten Cambodia's coastal cities. The expansion of Kampot, Kep, Koh Kong, and Preah Sihanouk Provinces can cause environmental degradation, urban environmental issues, and inadequate amenities that harm human health. Sea level rise and floods pose serious threats to infrastructure and coastal communities, making metropolitan centers more vulnerable. Cambodia's coastal cities must balance progress and environmental responsibility. Low-impact construction uses Rain Gardens, Green Roofs, Rain Barrels, Vegetative Swales, Infiltration Trenches, and Permeable Pavement to create a sponge-like city. Baseline and Endline surveys targeted cities in these provinces. Both scales—"Active Practitioner, Fully Aware, Moderately Aware, have a little knowledge, and Do not have knowledge"—were used to assess coastal management stakeholders' knowledge and willingness to adopt Low Impact Development (LID) best practices in urban planning. Scenario evaluation platforms, workshops, and active-learning resources were used for this evaluation. The survey used national and sub-national in-depth interviews and sub-national focus group discussions. Comparing Baseline and Endline survey results showed stakeholders understood LID concepts. Rain barrel use has increased from 46% to 51%, Infiltration trenches from 4% to 8%, Green roofs from 0% to 5%, and Rain gardens and Vegetative swales from 0% to 1% among "Active practitioners". Four percent of people are "Fully aware" of Permeable pavement, up from zero. Both trials increased participants' awareness of Low Impact Development (LID) benefits in the Coastal Area. The majority of CLID workshop participants after the Baseline and before the Endline survey believe climate change and environmental issues require quick LID implementation for coastal areas. The policymaker will get significant capacity building and planning support from the National level and Development Partner to increase stakeholder participation in the LID procedure.

Keywords: Coastal Zone, Sustainable Urbanization, Low Impact Development

Tracking Code: ESD-17-24

Transformative Effect of a Training on the Transformation of Neglected and Underutilized Species (NUS) in Burkina Faso: From Satisfaction to Learning

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Abstract

Neglected and underutilized species (NUS) are emerging as reliable alternatives for ecosystem resilience and food and nutrition security in sub-Saharan Africa. However, their valorization requires the development of processing. Thus, a training on NUS transformation techniques was organized for 39 processors in Burkina Faso. A good understanding of the relationship between the satisfaction perception and the learning level could help in the adoption of NUS processing techniques. The present study aims (i) to evaluate the level of perceived satisfaction of the participants and (ii) to assess the actual level of learning achieved by participants. First, an assessment of the participants' knowledge of the NUS processing techniques was performed before (BT) and after (AT) the training. Then, through individual semi-structured interviews, participants' perceived satisfaction was evaluated after the training. The individual scores ranged from 4 to 10, with the majority falling within the interquartile range (Q1 = 5, mean = 6.8, Q3 = 9) for BT, while they varied from 4 to 13, with the majority falling within the interquartile range (Q1 = 7, mean = 8, Q3 = 10) for AT. More than 65.5% of the participants obtained a score below the mean score (6.8) for BT, while the majority (56.4%) obtained a score above the mean score (8) for AT; indicating that the training contributed to improving the participants' skills. The perceived satisfaction of the participants seems to follow the trend of the scores. In general, the participants were satisfied or very satisfied except for the relevancy of the topics and the consistency between participant profiles and the topics (16.67% were not satisfied). The participants' satisfaction seems to be based more on the new skills acquired than on a simple feeling of having learned something. This innovative approach could be used to facilitate the promotion of NUS.

Keywords: Opportunity crop, rural development, processing, Education for Sustainable Development, participatory learning, SUSTLIVES

Tracking Code: ESD-17-26

Detection of Coliforms, *Escherichia coli*, and *Staphylococcus aureus* in Papaya Salad Sold in Dangkor District, Phnom Penh

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Abstract

Foodborne illness remains a critical global health challenge, particularly in regions like Southeast Asia where street food is a dietary staple. This study was initiated to determine the prevalence and concentration of Coliforms, *Escherichia coli* (*E. coli*) and *Staphylococcus aureus* (*S. aureus*) in papaya salad samples to evaluate the potential health risks posed to consumers. A total of 21 papaya salad samples were purposively collected from seven distinct street-vended stalls within the Dangkor district. To account for temporal variability, three samples were obtained from each stall over three consecutive weeks. The analytical framework utilized Coliform Agar for the initial detection of Coliforms (pink colonies) and *E. coli* (blue colonies). Results were validated through subculturing on Tryptic Soy Agar (TSA) and definitive biochemical characterization using the API 20E system. For *S. aureus*, samples were inoculated onto CHROMagar™ *Staphylococcus aureus*, with presumptive colonies confirmed via TSA subculturing and API Staph identification kits. The findings revealed systemic hygiene failures. Total Coliform counts in all samples (100%) exceeded permissible food safety limits, ranging from 4.38 to 7.00 Log CFU/g. *E. coli* was detected in 100% of samples from stalls 1, 2, 3, and 5; 67% from stalls 6 and 7; and 33% from stall 4. Furthermore, *S. aureus* was present in the majority of samples, with stall-specific prevalence rates between 33% and 100%. These results indicate that the microbiological quality of the sampled papaya salad consistently fell below acceptable safety thresholds. The high levels of indicator organisms and pathogens suggest inadequate sanitary practices during food preparation, cross-contamination, or poor raw material handling. These findings underscore an urgent need for rigorous food safety training and the implementation of standardized hygiene protocols for street food vendors to mitigate consumer health risks.

Keywords: Papaya Salad, Microbiological Analysis, Food Safety Standards, Pathogenic Contamination

RD

Tracking Code: RD-17-01

Facilitators And Barriers on the Performance of Barangay Nutrition Scholars (BNSs) in Barangay Integrated Development Approach for Nutrition Improvement (BIDANI) Catchment and Non-catchment Barangays in Selected Municipalities in Laguna

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Abstract

Barangay Nutrition Scholars (BNSs) are community volunteers who serve as the primary link for nutrition programs at the barangay level. The barangay is the smallest administrative and political unit in the Philippines, equivalent to a village. BNSs play a critical role in addressing malnutrition through nutrition programs targeted at these grassroots levels. However, there remains a lack of in-depth understanding of the factors that affect their performance. This study aimed to assess the facilitators and barriers influencing the performance of BNSs in the Barangay Integrated Development Approach for Nutrition Improvement (BIDANI) catchment and non-catchment barangays in selected municipalities in Laguna. BIDANI is an extensive nutrition-in-development strategy that involves a community-based, development-oriented, multi-sectoral, and holistic approach in strengthening and empowering the rural poor in addressing nutrition issues in the community. A qualitative descriptive design was utilized, employing focus group discussions (FGDs) and key informant interviews (KIIs) with the BNSs and Municipal Action Officers (MNAOs). For the processing of data, thematic analysis was conducted to identify recurring patterns and insights of the respondents. Findings revealed that the performance of BNSs in both BIDANI catchment and non-catchment areas is influenced by various facilitators and barriers. Common facilitators include capacity-building activities, incentives, resource support, and recognition, while barriers include lack of resources, administrative support, extreme weather, health issues, familial obligations, and participant cooperation. Notably, BNSs from the BIDANI catchment area emphasized that BIDANI impacts their performance through additional training programs that they receive from them. This study highlights the need for consistent support mechanisms and localized policies to empower BNSs and sustain their contributions to the nutrition situation in barangays. Enhancing institutional partnerships, such as BIDANI, may further improve their reach and effectiveness.

Keywords: Barangay Nutrition Scholars (BNS), BIDANI, facilitators, barriers, performance

Tracking Code: RD-17-02

Angkor Voyager: Eco-Villages as Models of Empowered and Sustainable Rural Development in Cambodia

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Abstract

The future of rural Cambodia offers an opportunity to reimagine how cultural landscapes, ecological systems, and local economies can evolve in synergy. This paper explores the potential of eco-villages as integrated, community-driven models of development—settlements that balance cultural continuity, environmental stewardship, socio-economic vitality, and individual empowerment. Moving beyond top-down planning, eco-villages foreground local agency and ownership. Residents are not passive beneficiaries but active co-creators, shaping spatial, economic, and cultural decisions. This participatory ethos ensures that new settlements meet material needs while strengthening identity, fostering self-determination, and cultivating long-term stewardship of the land. The Angkor Voyager project illustrates this approach. Conceived as a modular, mobile architecture, it functions as both an adaptable micro-housing solution and a foundational unit for larger eco-village networks. Each unit supports entrepreneurial activity, accommodates cultural practices, and enhances environmental resilience—while remaining individually owned and adaptable to evolving needs. Critically, the eco-village is conceived not simply as a cluster of buildings, but as a social infrastructure inspired by the spatial logic of traditional villages. Its layout emphasises adjacency and interdependence: neighbours, useful amenities, and essential services are intentionally positioned in proximity to foster collaboration, mutual support, and shared responsibility. Such design encourages spontaneous social interaction, cooperative resource management, and a collective sense of belonging—qualities often eroded in conventional rural development models. Beyond their ecological and economic functions, eco-villages serve as infrastructures of empowerment—spaces where individuals build livelihoods, exercise agency, and sustain cultural knowledge. By positioning eco-villages as strategic interventions at the intersection of design, ecology, and community, this paper envisions a future where rural communities are not recipients of change but authors of it—creating regenerative, self-determined, and socially cohesive settlements capable of sustaining both people and place.

Keywords: Eco-villages, Community empowerment, Participatory design, Cultural sustainability, Spatial adjacency, Mobility and voyaging

Tracking Code: RD-17-09

Sustainability of Agricultural Cooperatives for Community Development in the Province of Albay

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Abstract

The Cooperative Development Authority Region V reported that 11 out of 51 registered cooperatives in the province of Albay are active. This study was conducted to determine the practices of agricultural cooperatives in the Third District of Albay. An intensive analysis of two agricultural cooperatives through key informant interviews and focus group discussions was employed to gather first-hand narratives from participants. Both cooperatives under study were established to provide significant improvement in the quality of life of the members, Majority of members are male and aging. Using 10 sets of sustainable criteria, the study shows that both cooperatives have moderate sustainability level which denotes the adaption and integration of sustainable practices in their cooperatives. Hence, this study contributes to a more sustainable and equitable future for Filipino agriculture by examining the potential of agricultural cooperatives. Finally, the development of a holistic framework to enhance the sustainability of agricultural cooperatives in the province of Albay and in the Philippines.

Keywords: agricultural cooperatives, sustainable criteria, community development, holistic agricultural framework

Tracking Code: RD-17-10

Predicting Loan Portfolio Quality in Rural Microfinance Institutions in Cambodia Using Financial Ratios: A Data-Driven Approach

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Abstract

This study examines what drives loan portfolio quality in Cambodia's rural MFIs by leveraging financial ratios constructed from balance sheet and income statement data covering 2006–2024. Using a quantitative, data-centric approach, we combine statistical analysis with machine-learning models—Logistic Regression, Random Forest, Support Vector Machine, K-Nearest Neighbors, and Neural Networks—to forecast Non-Performing Loan (NPL) ratios. The predictor set spans profitability, liquidity, leverage, efficiency, and growth metrics. Data originate from the National Bank of Cambodia (NBC). The expected outcomes are to isolate the most influential credit-risk predictors and to develop an early-warning framework that supports sustainable risk management within MFIs. This work extends Davuth & Davidseihakbot (2025), advancing financial inclusion and strengthening data-driven practice—particularly around profitability prediction in Cambodian banking via interpretable logistic regression.

Keywords: Microfinance, Non-Performing Loans, Financial Ratios, Machine Learning, Cambodia

Tracking Code: RD-17-12

Digital Bridges for Sustainable Livelihoods: The OUgnayan Wednesdays Model for Eco-Inclusive Rural Enterprise Development

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Abstract

Rural micro-entrepreneurs in the Philippines are faced with challenges from accessing markets and sustaining livelihoods in an increasingly digital economy. To address these gaps, the **University of the Philippines Open University (UPOU)** launched **OUgnayan Wednesdays** which stands for *Open University na Gumagabay at Nagbubuklod sa Pamayanan*, a university–community partnership initiative that promotes eco-inclusive enterprises. Anchored on the principles of sustainability, digital innovation, inclusion, and local economic empowerment, it provides local micro-enterprises with opportunities to market locally sourced and eco-friendly products. By activating the university campus as a hub for local enterprise, OUgnayan Wednesdays links **academic knowledge, digital tools, and community participation** to foster inclusive economic growth. This study used a **qualitative case study approach** involving document review, participant observation, and interviews with six active merchants. Thematic analysis was employed to identify key outcomes, challenges, and enabling factors influencing enterprise growth and community participation. This paper demonstrates the role of universities as catalysts for **digital and ecological transformation** in rural enterprise development, offering a replicable framework for other institutions seeking to integrate **science, technology, and community empowerment** toward **sustainable livelihood security**.

Keywords: sustainable livelihood, university-community partnership, eco-inclusive, digital innovation, rural enterprise development

Tracking Code: RD-17-13

Strengthening Rural Livelihoods in Cambodia: Institutional Linkages and Resilience in Organic Rice Value Chains

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Abstract

Rural communities in Cambodia are increasingly seeking sustainable and inclusive agribusiness pathways that enhance livelihoods and ensure equitable benefits. The organic rice sector offers a compelling case of how local innovation, cooperative organization, and strategic market partnerships can drive such transformation. This study adopts a systemic and action-oriented approach to examine the institutional linkages among smallholder farmers, agricultural cooperatives, private buyers, and support agencies in Preah Vihear Province. Using a mixed-methods design—combining household surveys, in-depth stakeholder interviews, and participatory system-mapping workshops—the research identifies the causal mechanisms that shape trust, compliance, and collective performance within emerging organic value chains. Causal Loop Diagrams reveal several reinforcing and balancing feedbacks: trust between farmers and buyers strengthens when payments are timely, quotas stable, and prices fair, forming a self-reinforcing cycle of compliance and market stability. Conversely, delayed payments, weak cooperative governance, and capped quotas trap the system in low-trust, low-income equilibria. Robust post-harvest infrastructure, effective certification systems, and sustained institutional support further reinforce resilience, while deficiencies in these areas, along with limited credit access, perpetuate uncertainty. The findings highlight that predictable financial flows, transparent contracting, and functional Internal Control Systems are foundational for maintaining certification and market confidence. Practical leverage points include strengthening cooperative financial and managerial capacities, investing in local post-harvest infrastructure, and institutionalizing multi-stakeholder coordination platforms to bridge market, technical, and policy gaps. By linking institutional with participatory learning processes, this study provides actionable, evidence-based insights for policymakers, Non-Governmental Organizations, and private partners to co-design inclusive organic rice systems that enhance farmer income, strengthen cooperative resilience, and sustain market trust amid persistent climatic and economic uncertainties.

Keywords: Organic rice; Institutional linkages; Agricultural cooperatives; Value chain resilience; Trust and compliance; Participatory system mapping; Cambodia

Tracking Code: RD-17-18

Digital Play, Traditional Heritage: University-Led Initiatives by Students and Faculty to Preserve ASEAN Indigenous Games in the E-Gaming Era

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Abstract

Southeast Asia's rapid shift toward digital play risks eroding indigenous games that historically transmit community knowledge, values, and intergenerational bonds. This study examines university-led initiatives that digitize ASEAN indigenous games through mobile applications, AR/VR experiences, and open repositories. Using a convergent mixed-methods design across 10 projects in 5 countries, we integrate interviews with faculty, students, and cultural bearers, digital ethnography, and platform analytics. Results show that (a) fidelity to indigenous rule-logics combined with optional difficulty scaffolds improves sustained engagement; (b) co-governance with community partners enhances perceived authenticity and share rates; and (c) embedding builds within coursework supports iterative updates and long-term maintenance. Interpreted through cultural sustainability, digital anthropology, and heritage studies, digitization functions as living heritage rather than static archiving. The projects align with the UNESCO 2003 Convention by prioritizing viability and transmission, and with ASEAN Socio-Cultural Community priorities on cultural diversity and digital inclusion. We propose a university–community–policy model for safeguarding intangible cultural heritage through ethical design, participatory governance, and interoperable assets. The findings position higher education institutions as mediators between tradition and innovation, ensuring that indigenous play remains accessible, meaningful, and resilient in the e-gaming era.

Keywords: *ASEAN; indigenous games; intangible cultural heritage; cultural sustainability; digital anthropology; gamification*

Tracking Code: RD-17-20

Exploring Women's Participation, Roles, and Challenges in Community-Based Mangrove Rehabilitation Initiatives

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Abstract

This study aimed to explore women's participation, roles, and challenges in community-based mangrove rehabilitation initiatives in the barangays of Sabang, Punta, and Jaena in Baybay City, Leyte, Philippines. Specifically, it sought to examine women's participation, identify the challenges they face in leading these initiatives, and understand the significance of their involvement in ensuring the effectiveness and sustainability of the projects. The study involved seven participants, all active members of women-led mangrove rehabilitation initiatives, who were purposively selected for their experience and knowledge. Data were collected through focus group discussions guided by a validated FGD guide and analyzed using thematic analysis to identify patterns and key themes in the participants' experiences. The findings revealed five themes on women's participation and roles: (1) women as leaders and organizers, (2) hands-on environmental work and site management, (3) teamwork, cooperation and mutual support, (4) growing knowledge, skills, and environmental awareness, and (5) empowerment, family support, and women's identity in the work. Eight themes emerged regarding challenges they face: (1) heavy leadership burden and personal sacrifice, (2) time, family, and work conflicts, (3) environmental and maintenance challenges, (4) administrative, logistical, and resource problems, (5) internal group conflicts and difficult member behavior, (6) declining motivation and member dropout, (7) dependency on leaders and limited autonomy, and (8) physical strain and labor intensity. Finally, four themes highlighted the significance of women's participation: (1) environmental protection and disaster risk reduction, (2) long-term sustainability and environmental improvement, (3) economic and social benefits generated by participation, and (4) personal growth, empowerment, and motivation. The study concludes that women play a vital role in mangrove rehabilitation, contributing to environmental care, community strength, and their own empowerment. The study recommends improving support, shared duties, and access to training and resources to better assist women in these initiatives.

Keywords: Women's participation, Community-based conservation, Mangrove rehabilitation, Gender roles, Challenges and barriers

Tracking Code: RD-17-21

Reimagining Agrarian Futures: Women-Led Agriculture Practices in Rural India

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Abstract

Agriculture remains the backbone of India's economy, employing more than half of the country's workforce and serving as a primary livelihood source for rural households particularly for women. Despite their indispensable role, women's contributions often remain undervalued and underrepresented in agrarian discourse. Globally, women constitute 43 per cent of the agricultural labour force, but structural inequalities, gender norms, and limited access to resources constrain their agency. In India, 40.67 per cent of women workers are agricultural labourers and 30.33 per cent are cultivators, revealing a deeply gendered agrarian structure. Over recent decades, agrarian distress, male out-migration, and the growing unsustainability of small-scale farming have prompted women to assume greater leadership in agricultural production, reshaping the socio-economic fabric of rural communities. This study examines the emergence and significance of women-led agriculture practices in the drought-prone Osmanabad district of Maharashtra a region emblematic of the broader agrarian crisis in India. The research employs a mixed-methods approach, combining survey data from 378 women farmers with in-depth qualitative interviews. It explores how women are negotiating livelihood security, ecological sustainability, and social recognition through their leadership in farming. The findings demonstrate that women farmers are increasingly adopting sustainable and diversified agricultural practices reviving traditional food crops such as millets and pulses, engaging in organic cultivation, and integrating allied activities like dairy and poultry to stabilise income and enhance food security. Women-led farming initiatives have not only improved household resilience but also redefined gender relations within rural spaces. These practices represent a transformative shift from women as agricultural labourers to decision-makers and innovators. However, persistent challenges limited access to credit, land ownership, and markets, coupled with patriarchal norms continue to restrict their full potential. While government and non-government initiatives have begun Recognising women farmers, their interventions often remain fragmented and inadequately gender-sensitive. By situating women's experiences within the broader sociology of agrarian change, this study highlights how women-led agriculture offers a pathway towards more inclusive, sustainable, and equitable rural futures. It contributes to ongoing debates on gender, power, and development by foregrounding women's agency in reimagining the contemporary Indian agrarian landscape.

Keywords: Women farmers, Gender and agrarian change, Sustainable agriculture, Rural livelihoods, Empowerment

Tracking Code: RD-17-25

Establishment of the Bohol Cacao Industry Information System (BCIIS)

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Abstract

Cacao (*Theobroma cacao* L.), a backyard crop grown for the traditional, nutrient-rich beverage 'tableya', has evolved into a priority high-value commodity in the Philippines, driven by rising market demand and its potential to uplift rural livelihoods. To harness this momentum, the Bohol Cacao Industry Information System (BCIIS) was established as a strategic tool, enabling data-driven planning and targeted interventions to accelerate sectoral growth. Farm profiles including the collection of bio-edaphic factors for cacao's growth and productivity, pests and diseases, and farmer and processor's information were collected and analyzed to get insights into the industry's production dynamics in Bohol. The GIS-based crop-land suitability assessment integrated with the Analytic Hierarchy Process (AHP) revealed that most areas in Bohol are moderately suitable for cacao, with highly suitable zones concentrated in specific upland municipalities. Soil pH and organic matter emerged as critical determinants of suitability. This spatially explicit assessment provides a scientific foundation for guiding cacao expansion, supporting farmers, planners, and policymakers in efficient land use and sustainable crop production. Despite the opportunities, the Cacao industry in Bohol is confronted with persistent challenges: an aging farmer population with limited youth engagement, financial constraints that hinder investment in modern technologies, knowledge gaps in farm management and post-harvest practices, vulnerability to pests and diseases, and disruptions caused by erratic weather conditions. These constraints collectively depress yields, compromise bean quality, and weaken competitiveness. By establishing the BCIIS, the study underscores the necessity of targeted strategies—engaging younger generations through specialized training, strengthening farm-to-market infrastructure, expanding financial support mechanisms, and promoting premium cacao varieties alongside accessible inputs. Addressing these challenges through data-driven interventions will enable Bohol's cacao industry to achieve sustainable growth, enhance farmer livelihoods, and contribute meaningfully to both provincial and national economic development.

Keywords: Cacao, crop-land suitability, information system, rural development

Tracking Code: RD-17-27

Distributional Channels and Prospects of the Traditional Fruit Romdenh in Cambodia

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Abstract

Romdenh (រំដេញ) or madenh (ម៉ាដេញ) is a traditional fruit that can be eaten raw, and it is also pickled and smashed into sugar. While it is widely consumed in Cambodia as a snack, few studies have focused on its production status and distribution channels. This study investigated the distribution channels and market prospects of romdenh in Cambodia by exploring the status of its production and the inflow and outflow of its products in the capital city of Phnom Penh and several rural provinces. The results showed that domestic production is minimal, with most growers having one to two trees and not purchasing or selling seedlings. Further, most growers have even stopped selling completely due to the lack of interest by middlemen to buy their unfavorable quality product. In the largest market in the capital city, all fresh and pickled romdenh is imported. Cambodia's reliance on imports, even for traditional fruits such as romdenh, may lead to unsustainable distribution and loss of food culture. The first step in distributing domestic romdenh would be a shift from backyard home cultivation to commercial agricultural production to reduce dependency on imported products, and preserving cultural heritage. Moreover, quality characteristics of romdenh would have to be improved and stabilized.

Keywords: romdenh (រំដេញ), distribution channel, domestic production, food culture, Cambodia

Tracking Code: RD-17-28

Characteristics of Game Meat Procurement Among Restaurants in Japan: An Analysis of Food Procurement Preferences and Supplier Selection Factors

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Abstract

Game meat utilization, which promotes the consumption of wild game meat to reduce damage to agricultural products, has been increasingly adopted in rural areas across Japan as a strategy for of rural development. However, expanding game meat consumption requires the establishment of an effective food system, because game meat is rarely distributed through conventional markets. As matching suppliers (hunters and processing facilities) with demand-side actors (distributors, restaurants, and consumers) is essential, understanding restaurants' needs is critical for designing market-oriented supply strategies. Thus, this study investigates the characteristics of restaurants' game meat procurement behavior by examining the relationship between general food procurement preferences and the factors influencing supplier selection. For this purpose, a nationwide web-based survey of independently owned restaurants was conducted between December 2024 and January 2025, yielding 200 responses, of which 60 restaurants currently handling game meat were analyzed. In this case, best–worst scaling (BWS) was employed to identify restaurants' procurement preferences, followed by cluster analysis based on BWS scores. Subsequently, principal component analysis with promax rotation was applied to extract supplier selection factors and examine their associations with procurement preferences and regions. Three groups emerged from the cluster analysis: a cost–performance-oriented group, a customer-oriented group, and a quality- and origin-oriented group. Furthermore, three supplier selection factors were identified: stability, responsiveness, and expertise. Specifically, the cost–performance-oriented group prioritized stability, the customer-oriented group showed low dependence on all factors, and the quality- and origin-oriented group emphasized expertise. Moreover, cost–performance-oriented restaurants frequently procured game meat from distant regions, whereas the quality- and origin-oriented group had the highest within-prefecture procurement rate. These findings indicate that supply-side actors should tailor their sales strategies to regional conditions and restaurant types, thereby improving game meat distribution and contributing to sustainable rural development.

Keywords: game meat procurement, food procurement behavior, best-–worst scaling, rural development

Tracking Code: RD-17-29

Safety and Hypoglycemic Activity of Selected Plant Extracts: Comparative Analysis of Blood Glucose and Body Weight in Experimental Rats

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Abstract

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia and associated metabolic changes, and remains one of the fastest growing public health problems worldwide. This study investigated the acute toxicity and hypoglycemic activity of ten selected plants traditionally associated with antidiabetic properties, while also assessing their effects on body weight in experimental rats. The ten plant materials were collected with prior informed consent from the community and in compliance with National Commission on Indigenous Peoples (NCIP) guidelines. Extracts were prepared as herbal teas (1:50 ratio, steeped at 70–80 °C for 3–5 minutes). Nulliparous female rats weighing 200–300 g were randomly assigned into twelve groups: negative control, positive control, and ten treatment groups (T1–T10). Acute toxicity was assessed following OECD Guideline 423, with doses of 300 mg/kg and 2000 mg/kg administered orally. No mortality or clinical signs of toxicity were observed during the 14-day observation period, and LD50 values were estimated to be greater than 2000 mg/kg, indicating a wide margin of safety. Blood glucose levels were measured at –30, 0, 10, 30, 60, 120, and 240 minutes, while body weights were recorded before and after treatment. Results showed significant time-dependent differences in glucose levels at 0, 30, 120, and 240 minutes, with treatments T5, T8, and the positive control consistently lowering glucose, while T3 and T7 induced hyperglycemia. Body weight analysis revealed significant reductions in most groups after treatment, with the strongest effects in the positive control and T9. Overall, the integration of acute toxicity and efficacy data may confirmed that selected plants are safe at high doses and exhibit promising hypoglycemic and weight-reducing properties, highlighting their potential as candidates for further phytochemical and mechanistic studies in diabetes management.

Keywords: Diabetes mellitus, hypoglycemic activity, acute toxicity, rat models, body weight, OECD 423

Tracking Code: RD-17-33

YAPAK 2.0: Enhanced Fishing Tool for Local Fisherfolk

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Abstract

The main thrust of this study was to enhance and redesign the existing traditional Yapak, assess its performance, and determine its level of acceptability among fisherfolk in various coastal areas of the Province of Bohol. A purposive sampling method was employed, selecting fifty (50) fisherfolk who regularly use the traditional Yapak and could provide informed perspectives on its efficiency and limitations. The research utilized both experimental and descriptive designs to comprehensively evaluate the redesigned prototype, Yapak 2.0. The performance assessment of Yapak 2.0 was conducted through computer-aided simulations, which measured hydrodynamics, durability, flexibility, buoyancy, stability, and performance under varying water currents. To determine user acceptability, a structured survey was administered, focusing on aesthetic value, functionality, comfort, safety, material quality, and cost. It was revealed that Yapak 2.0 had promising results across all simulated performance indicators, demonstrating how digitalization, material innovation, and engineering design can substantially improve traditional tools used by rural fishing communities. Respondents also gave high acceptability ratings, indicating readiness for adoption and the potential of this upgrade as a practical and user-friendly alternative to the conventional Yapak. The study highlights that integrating digital design tools and simulation-based evaluation can transform locally made tools into more efficient, durable, and sustainable solutions, thereby contributing to the upliftment of local coastal communities.

Keywords: Coastal communities, computer-aided simulation, fisherfolk, product acceptability, sustainable design, Yapak 2.0

Tracking Code: RD-17-34

Economic Profitability and Adoption Determinants of Premium Rice Varieties in Cambodia

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Abstract

Adoption of premium aromatic rice varieties—Phka Romdoul (PR) and Sen Kro Ob 01 (SK)—is central to Cambodia's strategy for improving farmer income and market competitiveness. Using survey data from 267 smallholders, this study estimates profitability differences across rice variety portfolios with ordinary least squares (OLS) and analyzes multi-variety adoption decisions using a multivariate probit (MVP) model. Marginal effects derived from the MVP show that institutional factors exert the strongest influence on adoption, i.e. access to extension services and cooperative membership increase SK adoption by approximately 63 and 44 percentage points (pp), while financial constraints add 21 pp. Rainfed conditions reduce SK adoption but increase the likelihood of adopting PR and domestic varieties, whereas imported varieties decline sharply under these systems. These adoption patterns align with OLS-based profitability gradients, indicating that premium varieties perform best within diversified, portfolio-based cultivation strategies rather than single-variety promotion. The findings highlight the importance of institutional support and water management in enabling profitable adoption of premium rice varieties.

Keywords: Cambodia premium rice varieties, Multivariate probit, Profitability

Tracking Code: RD-17-35

Decision Support System as a Tool to Improve the Governance of Palakpakin Lake, San Pablo City, Philippines

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Abstract

The governance of Palakpakin Lake is characterized by a multi-tiered institutional framework, with the Laguna Lake Development Authority (LLDA) serving as the lead agency mandated to ensure the sustainable management of the lakes within Laguna, Philippines. Supporting the LLDA are several national government agencies, the San Pablo City local government unit, and the Fisheries and Aquatic Resource Management Council (FARMC). This study examined the historical intersections of human activities and environmental change in Palakpakin Lake by employing participatory tools and techniques. These activities involved fisherfolk, representatives from national and local government institutions, and civil society organizations. Findings were validated through key informant interviews, review of relevant documents and official statistical datasets, as well as spatial analysis. To develop a decision support system (DSS), the study utilized the Water Evaluation and Planning (WEAP) model, adopting 1996 as the current account year based on the earliest available water quality data collected by the LLDA. Satellite imagery revealed that Palakpakin Lake functions as a catch basin receiving sediments from two adjacent lakes and several tributaries. Problem tree analysis further indicated that the deterioration of water quality constitutes the core problem attributed to inappropriate aquaculture practices, improper disposal of solid and liquid wastes, and surface and agricultural run-offs, adversely affecting aquaculture productivity. Key informant interviews confirmed that current interventions focus on regular clean-up activities and enforcement of fish-cage limits following Republic Act 8550 (1998), which restricts aquaculture structures to 10 percent of the lake's surface area. Results from the DSS indicate, however, that strict adherence to RA 8550 alone is insufficient to significantly improve water quality indicators. Addressing household waste disposal and agricultural run-off is essential. This study recommends the establishment of a multi-sectoral technical working group with clearly defined roles and responsibilities to strengthen monitoring, regulation, and coordination of aquaculture practices and watershed-based pollution control.

Keywords: lake governance, decision support system, participatory tools and techniques, decision support system

Tracking Code: RD-17-36

Sustainability Pathways for Smallholder Coffee Farmers in Sultan Kudarat: An Assessment of Economic, Social, and Environmental Dimensions

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Abstract

Abstract Sustainable agricultural systems are essential for improving rural livelihoods and enhancing climate resilience in upland communities across Southeast Asia. In the Philippines, smallholder coffee farmers face persistent challenges in production capacity, market access, environmental degradation, and organizational governance. This study examines the sustainability of coffee-based livelihood communities of the Nuling Coffee Growers Association (NCGA) and Coffee Farmers Association of Hinalaan (COFAH) in the towns of Lebak and Kalamansig, Sultan Kudarat, with the aim of identifying priority interventions aligned with economic, social, and environmental goals. The study employed a participatory rural assessment and sustainability analysis. Data were synthesized across the Triple Bottom Line (TBL) dimensions—Profit, People, and Planet—to evaluate present initiatives, gaps, and proposed actions. The analysis covered farm diversification practices, access to support services, organizational structures, water and waste management, agroforestry, climate risks, and market systems. A gap analysis was conducted to determine required resources, capacity-building needs, and opportunities for institutional partnerships. Findings show that farmers practice diversified integrated farming (rice, coconut, coffee, livestock, vegetables, fishponds), but market dependence on traders results in low bargaining power and minimal value addition. Socially, the community benefits from local and national support programs, yet faces weak organizational capacity and limited women- and youth-centered participation. Environmentally, the area experiences water scarcity, deforestation, slope instability, and disaster risks intensified by Typhoon Paeng. Priority needs identified include post-harvest infrastructure (warehouse, dryers), market consolidation mechanisms, potable water systems, formal training on sustainable farming and cooperative management, and expansion of agroforestry and reforestation efforts. The sustainability of coffee farmers' activities requires integrated interventions focused on strengthened cooperative governance, improved market and post-harvest systems, climate-resilient environmental management, and inclusive capacity building. Enhancing partnerships with government and private stakeholders will be critical in enabling NCGA and COFAH to advance a competitive and environmentally sustainable rural coffee economy.

Keywords: sustainability, participatory, coffee, partnership, communities, environment

Tracking Code: RD-17-39

Feasibility for Adoption of Novel Granular Hybrid Fertilizers as A Sustainable Practice: Case Study in Anuradhapura District, Sri Lanka

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Abstract

This study aimed to assess the adoption potential of urea-based novel granular hybrid fertilizers as viable not only sustainable agricultural inputs but also as quality products for rural entrepreneurship opportunities. A structured questionnaire survey (n=73) and follow-up hands-on workshop were conducted, with paddy farmers in Tisa Wewa Irrigation Scheme, Anuradhapura District in Sri Lanka's Dry Zone. The survey captured perceptions and awareness, acceptability, and adoptability for granular hybrid fertilizer applications. As well, the willingness for self-production of novel hybrids, as a low-cost granulation technique using a small-scale concrete mixture with locally available agricultural by-products, was evaluated. Survey results revealed that the primary adoption barriers; crop yield and quality concerns (68.49%), fertilizer cost (47.95%), and application uncertainty (46.58%). Of the respondents 65% expressed willingness to self-produce hybrid granules. Detailed production/use training was requested by 82.2%, and 38.36% planned initial trials on 10-20% of the farm area. The findings confirm the dual potential of agronomic benefits and economic viability, with this farmer-led concrete mixer granulation model to address sustainable fertilizer self-sufficiency in the future.

Keywords: granular hybrid fertilizers, low-cost granulation, farmers' acceptability and adoption, rural entrepreneurship, sustainable agriculture

Tracking Code: RD-17-42

From Pole to Product: Value Chain Analysis of Bamboo for Rural Livelihood Security in Pangasinan, Philippines

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Abstract

Bamboo has long been a lifeline for many rural communities in the Philippines, providing materials for furniture, handicrafts, and textiles while supporting thousands of households. In Pangasinan, where bamboo resources are abundant, this study set out to trace the journey of bamboo from the moment it is harvested to when it becomes a finished product displayed in local and regional markets. By talking directly with farmers, gatherers, processors, and traders through interviews, surveys, and focus group discussions, the study pieced together the human stories and interconnected roles that shape the bamboo value chain. Mapping of bamboo from poles to products helped illustrate how it moves across locations, revealing patterns of trade and market reach that are often invisible in traditional studies. Through value-added analysis, the research showed the value created at each stage of transformation, especially when raw poles are turned into intricate handicrafts or durable furniture. The findings highlight that the success of the bamboo industry depends not only on resource availability but also on access to knowledge, technology, and markets. It is recommended to integrate solutions such as improved bamboo cultivation practices and product innovation with digital platforms for coordinating supply chains and widening market access so that rural communities can strengthen their competitiveness and secure their livelihoods. The study underscores the importance of targeted extension services and digital support systems to ensure that Pangasinan's bamboo industry continues to thrive in a rapidly changing, technology-driven landscape.

Keywords: value chain analysis, bamboo, Pangasinan, Philippines

Tracking Code: RD-17-44

We Learn Together: Participatory Action Learning and Research in the Coffee Case Study

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Abstract

Implementing a research and development project with a multidisciplinary and interdisciplinary team is complex. Because of this, our team used Participatory Action Research and Learning to analyze a project on smallholder coffee farmers in Sultan Kudarat in the Philippines. This is an approach that integrates participatory action research and action learning to address complex development challenges. The purpose of using the participatory action research and learning is to emphasize that the project team collaborated and co-designed interventions with the partner communities. The action research was drawn from field observations, focused group discussions, training/workshops, and meetings. Meanwhile, the participatory learning process was drawn from the observations during the field visits, training/workshops, formal and informal meetings with the farmers, and video captures. This method also allowed the project team to provide applicable, co-designed and farmer/community-driven interventions. Through this, the coffee farmers were revealed to be knowledgeable of their local contexts and their immediate environments, with rich field experiences that made their inputs important. To make matters inclusive, smallholder coffee farmers, who formed themselves into organizations, co-produced projects for their associations and their communities. Furthermore, it involved forging partnerships and connecting with other stakeholders. The partner farmer organizations and the community were involved in the whole research and learning process. The research team considered their inputs and willingness to engage with the activities. Aside from the farmer organizations, the project team went to the local government and village leaders to discuss each activity and the level of engagement needed from them. This ensured transparency, showing who was making decisions and how said decisions were undertaken.

Keywords: participatory, coffee farmers, co-design intervention

Tracking Code: RD-17-46

Challenges and Opportunities of Organic Production in the Philippines

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Abstract

A recent study conducted in upland farming communities in the Philippines revealed that the lack of and high cost of farm inputs were the main impacts of the COVID-19 pandemic on smallholder farmers engaged in a vegetable-based agroforestry system. Previous initiatives and capacity development projects centered on building the resilience and adaptive capacity of smallholder farmers through training and participatory technology development. However, central to resilience-building is their capacity to produce food with minimal reliance on external sources. Hence, this project addresses this gap by building the capabilities of smallholder farmers to engage in nature-positive food production. A pool of 10-15 farmer-trainors in three communities in Benguet, Quezon, and Nueva Vizcaya were trained in soil testing, organic agriculture, and agroforestry. One demonstration area in each project site was likewise established, incorporating organic farming practices such as crop diversification, mulching, cover cropping, composting and conservation tillage to promote soil health. After the training, the farmer-trainors have also begun producing their own organic plant supplement, Fermented Plant Juice (FPJ), and composts to improve soil fertility and plant growth without using synthetic fertilizers. One farmer-to-farmer training session was also conducted in each project site, aimed at sharing their knowledge on nature-positive food production with at least 10 farmers in their nearby communities or sub-villages. The 'expansion sites' have also established their own community demonstration farm showcasing organic farming practices, including the production of their own organic soil amendments. This capacity development promotes nature-positive food production to enhance resilience and future-proof smallholder farmers.

Keywords: farmer-to-farmer training, organic agriculture, resilience, agroforestry, mulching

Tracking Code: RD-17-47

Extension Interventions and Their Socio-Economic and Environmental Impacts on Almaciga Tappers in Palawan, Philippines

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Abstract

This study evaluates the impact of extension interventions on Almaciga *(Agathis philippinensis)* tappers, particularly the Batak tribe in Cleopatra's Needle Critical Habitat, Palawan. Implemented by Western Philippines University under the E-RESTORE program, the initiative promoted sustainable tapping techniques, nursery establishment, and alternative livelihood practices. Data were gathered through a focus group discussion with ten Batak participants. Results revealed improvements in knowledge, attitudes, and practices, including adoption of sustainable tapping methods, awareness of overtapping's effects, and interest in replanting. Economically, higher quality resin production and rising market prices enhanced income, enabling investments in education and basic assets. The intervention also encouraged community organization through groups like Tatak Batak, which strengthened local governance and access to support services. Additionally, participants gained conservation awareness, though challenges such as illegal logging, typhoons, and weak monitoring persisted. The findings underscore the need for sustained support, proper program turnover, and regular monitoring to ensure long-term impact.

Keywords: indigenous people, conservation, community organization, sustainable livelihoods

Tracking Code: RD-17-48

Palaw'an Women Woodcarvers: Work, Work, Work in the Philippine Informal Economy

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Abstract

Observations of woodcarvers in Hungduan, Guagua, Paete, and Tugaya, all woodcarving towns in the Philippines, show that it is mainly an occupation dominated by men. This general trend however is surprisingly contradicted in the woodcarving town of Sofronio Espanola in Palawan, where there are more women than men woodcarvers. Working women thrive in an environment of unemployment or underemployment, poverty, lack of alternatives, poor governance and low productivity. Their roles are often invisible, unrecognized, ignored and undervalued in low-income productive activities. This study explores the triple burden (not just double) (Moser, 1999) of the indigenous women of Palaw'wan ethnolinguistic group. It presents the roles of Palaw'an women of Sofronio Espanola, Palawan as productive household members engaged in woodcarving, their reproductive role as childbearers and home managers, and community managing work. They have an important agricultural role in the upland rice farms, clearing weeds and planting other crops for sustenance. They are also involved on the marketing and selling of agricultural crops during market days. They contribute to the additional source of income to their family by making bamboo rain-sticks and woodcarving. The important roles of women in the management of the household, childbearing, and community work cannot be ignored despite the fact that it is mostly undervalued and unrecognized.

Keywords: women woodcarvers, livelihood, rural development

Tracking Code: RD-17-49

The Role of Women in Invertebrate Gleaning: Invisible Contributors to Food Security and Livelihood

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Abstract

Women play a crucial yet frequently unrecognized role in invertebrate gleaning fisheries, contributing significantly to household food security and community livelihoods. Although their work is largely invisible in official fisheries statistics, women's gleaning activities sustain local coastal economies and preserve traditional ecological knowledge. In Laguidingan, Misamis Oriental, Philippines, women emerge as the primary actors in reef gleaning, placing them at the center of household nutrition and livelihood resilience. This study examines the socio-economic importance of reef gleaning in Laguindingan, highlighting its contributions to household nutrition, income supplementation, and community stability amid declining artisanal fish catches and increasing environmental pressures. It also identifies key challenges to the sustainability of gleaning, including increasing harvesting pressure, habitat degradation, and the limited inclusion of gleaning activities in coastal resource management frameworks. By situating reef gleaning within a localized social–ecological context, this study underscores the need for improved documentation, gender-sensitive research, and inclusive fisheries management to support food security, women's livelihoods, and sustainable coastal governance in Laguindingan.

Keywords: women, livelihood, gleaning fisheries, rural development

Tracking Code: RD-17-51

Energy Needs Assessment in an Off-Grid Island Community: A Case for Inanuran Island, Tubigon, Bohol, Philippines

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Abstract

Energy is a vital resource for modern life, the foundation for economic development, social progress, and overall quality of life. However, its availability and distribution remain uneven across the planet. For an archipelagic nation like the Philippines, understanding the extent of this uneven distribution, which has implications for equitable development and sustainable progress, remains a fundamental challenge. This study assesses the energy needs of Inanuran Island, an off-grid community in Tubigon, Bohol, Philippines, facing challenges due to its remoteness and limited resources. It aims to establish a detailed energy profile covering electricity, cooking, and transportation, based on the results of surveys, interviews, and focus group discussions conducted among households, businesses, and community groups on the island. Findings indicate that the island's limited electricity supply, mainly from solar panels and generators, falls short of residents' needs. Cooking largely depends on firewood for cost reasons, though residents are interested in switching to cleaner, more efficient options like gas stoves and electric appliances. Gasoline is the primary fuel for transportation, mainly powering pump boats, which shows the island's reliance on fossil fuels for mobility. Residents identify electricity access as their top energy priority, with hopes for a supply similar to the mainland that would improve living conditions and local development. The study offers insights into the energy situation in Inanuran Island, highlighting the need for sustainable solutions that ensure energy access and reliability, thereby improving the quality of life and economic prospects in this remote community.

Keywords: Energy Needs Assessment, Electricity, Energy for Cooking, Energy for Transportation, Island Communities, Philippines

Tracking Code: RD-17-52

Prioritizing Determinants of Agricultural Cooperative Resilience to External Stressors: An AHP-Based Study

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Abstract

Agricultural cooperatives are an important mechanism for helping smallholder farmers cope with external stressors, including climate variability, production shocks, and market instability. Yet cooperatives differ widely in their ability to absorb, adapt to, and recover from these shocks. This study applies the Analytic Hierarchy Process (AHP) to prioritize the determinants of cooperative resilience based on stakeholders' judgments, supporting more strategic sequencing of capacity-building and investment support. The study was conducted in Svay Rieng Province, Cambodia, covering six agricultural cooperatives and 31 cooperative representatives holding leadership and operational roles. Respondents completed a structured AHP questionnaire using pairwise comparisons across seven resilience domains: administration, participation, motivation, resources, knowledge, production management, and market management. Consistency diagnostics indicate strong coherence in the group judgments (CR≈0.011). Results show that knowledge (19.0%), production management (18.0%), and resources (16.8%) are the highest-priority domains, together accounting for about 54% of overall importance. Within domains, the most important sub-factors include external support and additional capacity building (knowledge), soil and pest management (production), leadership and human resources (resources), cooperation and benefit sharing (participation), clear regulations and transparent selection (administration), promotion-based incentives (motivation), and trust and competitiveness (market management). Qualitative responses further highlight compounding challenges related to heat, water scarcity, pests and diseases, weak collective action, low prices and limited market access. These findings provide evidence for targeting interventions toward knowledge strengthening, production risk management, and leadership and human resources as first-order priorities for cooperative resilience.

Keywords: agricultural cooperative; resilience; external stressors; Analytic Hierarchy Process (AHP); Cambodia; governance

Tracking Code: RD-17-53

Solution-Driven Science and Digitalization for Agrarian Reform Communities: Pathways to Inclusive Rural Development in Philippine Agriculture

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Abstract

Agrarian reform beneficiaries (ARBs) remain central to rural development and food security in many developing countries, yet they continue to face persistent challenges related to low productivity, weak market integration, and vulnerability to climate and logistical shocks. In the Philippines, these constraints are most evident among smallholder farmers organized into Agrarian Reform Beneficiary Organizations (ARBOs), particularly in geographically isolated rural areas. This paper examines how solution-driven science and inclusive digitalization can contribute to sustainable livelihood security in agrarian reform communities within the agriculture sector. The study aims to: (1) assess the production, logistics, and digital readiness of ARBOs engaged in agriculture; (2) examine how science-based and digitally enabled interventions address structural constraints faced by ARBs; and (3) identify region-specific conditions that enable or limit rural transformation. The analysis draws on a mixed qualitative approach using key informant interviews with national and regional institutions, focus group discussions with ARBO members, and SWOT and thematic analyses of agricultural operations in selected regions of Luzon, particularly the Cordillera Administrative Region and Central Luzon. Findings reveal significant regional disparities in rural development outcomes. These regional disparities are largely driven by geographic and agro-climatic conditions: Central Luzon's flat terrain and market proximity support better infrastructure and institutional access, while the Cordillera's mountainous landscape, dispersed farms, and climate-related risks constrain connectivity, logistics, and digital adoption among ARBOs. Although digital connectivity has expanded, its utilization remains shallow due to skills gaps and infrastructural constraints. The results demonstrate that science-based agricultural practices and digital tools improve efficiency and reduce losses only when complemented by logistics investment and institutional support. The study concludes that sustainable rural development for agrarian reform communities requires integrating solution-driven science, accessible digitalization, and participatory institutional frameworks grounded in local agricultural realities.

Keywords: Agrarian Reform Beneficiaries; Digital Agriculture; Rural Development; Sustainable Livelihoods; Solution-Driven Science

Tracking Code: RD-17-54

Development and Performance Evaluation of Bio-Briquettes from Cassava Stem Waste for Sustainable Rural Energy Use in Cambodia

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Abstract

Cassava has become a major agricultural commodity in Cambodia, yet the expansion of its cultivation has also increased the generation of post-harvest residues, especially stems, which are frequently disposed of through open burning. At the same time, many rural households remain dependent on firewood and charcoal for daily cooking, placing continued pressure on forest-derived biomass resources. To address the linked challenges of residue burning and dependence on forest-derived fuels, this study conducted a technical and practical evaluation of cassava-stem charcoal briquettes for community use in rural Cambodia, combining laboratory-based analysis with household user evaluation. Briquettes were produced using four tapioca starch binder levels (5%, 8%, 10%, and 12%) and evaluated for physicochemical characteristics, mechanical durability, and combustion performance. In addition, household user evaluation was conducted for the 10% binder formulation (T10) to assess practical acceptability under community conditions. The results showed that cassava-stem briquettes had generally suitable fuel properties, while binder content significantly influenced mechanical and combustion performance. Shatter resistance increased significantly between 5% and 8% starch addition, whereas higher binder contents yielded limited further improvement and tended to reduce the combustion rate. Household evaluation of T10 indicated favourable overall acceptance, particularly in terms of size/fit, ignitability, and reduced sparks. These findings suggest that cassava-stem briquettes can serve as a viable community-level cooking fuel. From a practical standpoint, 8% starch appears to be the minimum level required to ensure adequate durability, while 10% represents the most balanced formulation for field implementation. Overall, the findings suggest that cassava-stem briquettes have potential for implementation as a sustainable community-based model, providing evidence for direct local application as well as broader replication in comparable rural settings.

Keywords: Cassava stem waste, bio-briquettes, alternative cooking fuel, mechanical durability, household acceptability and rural Cambodia

Tracking Code: RD-17-55

Preliminary Survey on Melaleuca Essential Oil Production and Distribution in Cambodia

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Abstract

Melaleuca (ដើមប្រចាក់), a tree native to Australia and commonly known as tea tree, is widely recognized for its essential oil, which is used in aromatherapy. In rural areas of Southeast Cambodia, Melaleuca woodlands occur naturally, and essential oil is produced by small-scale producers using extremely rudimentary distillation equipment. This study aims to clarify the current status of Melaleuca essential oil production and its market prospects for sustainable oil production in Cambodia. Interviews with producers in two districts of Svay Rieng province were conducted to clarify the historical background and production status. Additionally, semi-structured interviews were conducted at 20 souvenir shops and massage shops in Phnom Penh that offer essential oils to assess the availability of the Cambodian Melaleuca essential oil. The results indicate that Melaleuca essential oil production in Svay Rieng province began among Vietnamese residents during the civil war and was later taken over by Cambodian producers; several hundred households now produce it. The current production method requires large quantities of Melaleuca leaves and substantial labor, resulting in low productivity and profitability. All the essential oil produced was sold to Vietnam via local middlemen and were not available in the local market. On the other hand, Melaleuca essential oil was a rare product in the major markets in Phnom Penh, available in only two of the 20 shops, all of which sourced it from Thailand and China. Cambodian oil was unavailable. These results indicate that there is room for Cambodian melaleuca essential oil to enter the market. Further study of the region's overall production volume, productivity, product quality, and related factors is necessary to develop a strategy for selling the products as Cambodian products in Cambodia.

Keywords: melaleuca (ដើមប្រចាក់), distillation, production, distribution, Vietnam, Cambodia

Tracking Code: RD-17-57

Challenges in Implementing Social Protection Scheme: A Case Study from Three Agricultural Cooperatives in Takeo Province

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Abstract

Agricultural cooperative (AC) acts as a backbone for smallholder farmers as preparedness for potential shocks such as economic shocks, market volatile and climate risks. This safety net provided smallholder farmers resiliency to withstand current evolving and challenging economy. This case study was conducted to investigate challenges and opportunity of implementing social protection schemes (SPS), as part of the response action to shocks which potentially could affect farmers livelihood. Three agricultural cooperatives in Takeo provinces were selected as part of the study. Data collection was achieved through a semi-structured interview with a total of 30 members from the three ACs. A diversified of stakeholders including Board of Directors and members were invited to participate thus allow for cross-validation of the results. Data analysis was conducted using thematic analysis framework. Base on the result of our data collection, three challenges were identified to hinder the progress of SPS implementation including lack of implementing budget within the ACs, limited knowledge regarding the importance of SPS and lack of enforcement from the government authorities. In this regards, A technical support on budget management is crucial for the ACs to effectively managed and reserve their budget for SPS implementation. A workshop regarding members rights and benefits is necessary for the AC members to understand what they expect to receive from the ACs and make their demand to the ACs.

Keywords: Social protection schemes, agricultural cooperative, Takeo

EM

Tracking Code: EM-17-01

Assessing the Monetary Value of Seasonal Climate Forecast on Rice Yield in Victoria through Decision Tree Analysis

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Abstract

This paper assessed the economic value of seasonal climate forecast for rice production in Victoria, Oriental Mindoro, Philippines. The economic value was calculated using decision tree analysis to determine the monetary value of the forecast. Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) Seasonal Climate Forecast (SCF) – probabilistic rainfall forecast (below normal, near normal and above normal) has been used as reference for the calculated value. The income then compared between "with" and "without" the use of SCF. The National Food Authority (NFA) and traders' prices were employed to calculate the difference in income with and without the use of SCF. Traders' palay price is Php 13.00 per kilogram (kg) and the NFA's price is Php 19.00 per kg. Results show that at trader's price, the value of outcome using probabilistic rainfall forecast in the decision tree analysis is 24% higher than the value of the outcome without forecast. At NFA's price, the value of the outcome is 10% higher than the value of the outcome without forecast. The use of climate information influences the value of the crop yield and is tantamount to greater income for farmers. This study shows how climate forecast is beneficial to farming decisions and how apparent economic differences between farm decisions using the SCF. The model shows that incorporating a science-based decision in the cropping calendar and farm decision making could help farmers manage and adapt to climate risks effectively. The result further shows that the highest yield during climate extremes could possibly be attained if the decision makers give value and utilize SCF in farm decision making. Thus, this study recommends policies to improve the use of SCF for rice farming in the municipality of Victoria.

Keywords: Monetary Value, Seasonal Climate Forecast, Rice Yield, Decision Tree Analysis

Tracking Code: EM-17-04

GIS-Based Assessment of Sika Deer (*Cervus nippon*) Habitat Suitability and Human Conflict Risk Using Integrated Analytical Hierarchy Process-Multi-criteria Decision Analysis

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Abstract

This study employed geospatial techniques to determine habitat suitability for sika deer (*Cervus nippon*) and evaluated the risk of human-deer conflict (HDC) in the Hatase district of Taki Town, Japan. The assessment of deer habitat appropriateness and HDC risk involved a structured four-step approach: criterion selection, decision hierarchy development, expert ranking collection, and Analytical Hierarchy Process (AHP) for variable weight assignment. Habitat suitability was categorized into land factors (elevation, slope, land use, and agricultural land area) and environmental factors (proximity to rivers, total wetness index (TWI), land surface temperature (LST), normalized difference vegetation index (NDVI), and precipitation). The risk of HDC was assessed using proximity (distance to deer occurrence, forests, fences, roads, and croplands) and exposure metrics (habitat suitability, population density, and settlement density). Insights were derived from ten experts in diverse fields. The results revealed that environmental factors played a more significant role than land-based parameters in determining habitat suitability for the species. Among these, NDVI was the most influential factor, followed by precipitation and land use. The risk assessment identified habitat suitability as the primary driver of HDC potential, with settlement and population density as notable secondary contributors. In the risk matrix, the exposure metrics substantially outweighed the proximity metrics. Spatial analysis of habitat suitability revealed a heterogeneous distribution, with moderate suitability covering approximately 45% of the study area. The HDC risk assessment further highlighted conflict hotspots in the northern and eastern regions, where optimal deer habitats overlap with human settlements. The integration of these analyses provides a robust spatial framework for targeted conservation planning and the development of conflict mitigation strategies. These findings enhance our understanding of sika deer ecology within human-modified landscapes and provide practical guidance for wildlife management, particularly in regions experiencing intensified human–wildlife interactions due to evolving socioecological conditions.

Keywords: conflict hotspots, environmental prioritization, proximity metrics, socioecological dynamics

Tracking Code: EM-17-07

Valuing Nature's Contributions: An Integrated Ecosystem Service Assessment Across Protected Areas in Nepal

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Abstract

Protected areas are vital for biodiversity conservation and for maintaining ecosystem services that support ecological integrity and human well-being. This study assessed the Ecosystem Service Value (ESV) of 11 national parks and one wildlife reserve in Nepal, focusing on both core areas and adjoining buffer zones. Land use and land cover (LULC) data were obtained from the National Land Cover Monitoring System (NLCMS) for 2000 and 2010, from FAO-Nepal for 1990, and generated using the Google Earth Engine (GEE) platform for 2021. Five land cover categories were considered: forest, shrubland, cropland, waterbodies, and barren land. ESV was estimated using the benefit transfer method, by multiplying the area of each land cover type with its corresponding ecosystem service coefficient (USD/ha/year) and aggregating the results. Results showed that forest cover consistently provided the largest share of ecosystem services, followed by waterbodies and shrublands, while cropland and barren land contributed less. Between 1990 and 2021, the total ESV of core zones increased from 1141.9 million USD to 1195.6 million USD, reflecting relatively stable ecosystem service provision despite moderate land cover change. In contrast, buffer zones showed a slight decline in ESV, from 731.7 million USD in 1990 to 717.9 million USD in 2021, largely due to stronger anthropogenic pressures and land conversion. Temporal variations were strongly influenced by changes in shrubland and waterbodies, while agricultural expansion in buffer zones often reduced regulating and supporting services. The findings highlight the crucial role of core protected areas in maintaining ecosystem service values, while buffer zones remain more vulnerable to degradation. Conserving forests and waterbodies and promoting sustainable land management in buffer zones are essential for balancing conservation and livelihood needs. By quantifying the economic value of ecosystem services, this study provides an evidence base to inform conservation planning and management of Nepal's protected areas.

Keywords: ESV, protected areas, buffer zones, valuation

Tracking Code: EM-17-08

Ecosystem Services and Tourism in Two National Parks of Nepal: A Comparative Perception Study

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Abstract

Protected areas in Nepal serve a dual purpose: conserving biodiversity while supporting tourism-based livelihoods. The objective of this study is to examine and compare perceptions of tourism activities, ecosystem services, and environmental responsibility in two contrasting national parks of Nepal, Shivapuri Nagarjun National Park (SNNP) and Chitwan National Park (CNP), from the perspectives of tourists, local stakeholders, and park managers. A mixed-methods approach was used, combining questionnaire surveys with tourists and local stakeholders and interviews with park managers. Quantitative data were analyzed using descriptive statistics, correlation analysis, and multiple regression. The results revealed both shared and site-specific patterns. In both parks, tourists ranked biodiversity enhancement, water and air regulation, and natural landscapes and scenic beauty as the three most important ecosystem services. However, the services most frequently experienced differed by site: in Site I, respondents most commonly reported natural scenery, clean air, and plant diversity, whereas in Site II they most frequently reported wildlife viewing, natural scenery, and clean air. Multiple regression further showed that environmental awareness was the only significant predictor of tourists' environmental responsibility in both parks (Site I: $\beta = 0.086$, $p = 0.008$; Site II: $\beta = 0.057$, $p = 0.005$). Stakeholder results also reflect contrasting tourism structures, with hotels and guesthouses dominating in Site I and tour operators in Site II. Overall, tourists highly valued ecological and regulating services, but the services they actually experienced differed by park, and environmental awareness was the strongest predictor of environmental responsibility. Park managers emphasized tourism pressure, waste management, visitor behavior, and limited institutional resources as key challenges in balancing conservation and tourism development. Together, these findings underscore the need for park-specific tourism planning and conservation strategies in Nepal.

Keywords ecosystem services, stakeholder perceptions, protected areas, nature tourism, tourism governance, Nepal Himalaya

Tracking Code: EM-17-10

Palawan Pangolin (*Manis Culionensis*) Food Preference

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Abstract

This study aimed to determine the food preference of Palawan pangolin (*Manis culionensis*) from the selected sites in Palawan from August 2022 to December 2023 using four (4) methods such as pitfall trap (day and night), opportunistic sampling (day and night), rotten log and collection of fecal samples for fecal analysis. Results showed from the actual ants and termite collection that 13 genera of ant taxa were identified including *Aenictus sp*., *Anoplolepis sp*., and *Camponotus spp*. (four morphospecies), *Diacamma sp*., *Leptogenys spp* (two morphospecies)., and *Carebara sp*. *Polyrhachis sp*., *Odontomachus sp*., *Odontoponera sp*. Meanwhile, nine (9) genera were identified from pangolin fecal samples, including *Anoplolepis*, *Camponotus*, *Carebara*, *Diacamma*, *Dolichoderus*, *Leptogenys*, *Odontomachus*, *Odontoponera*, and *Pheidole*. The variety of ant genera found highlights the pangolins' specialized yet opportunistic myrmecophagous eating behavior and represents the wide range of food they consume. These results offer crucial information for habitat conservation and management plans targeted at maintaining the native prey populations of pangolins in Palawan, as well as critical insights into the dietary makeup and foraging ecology of these animals.

Keywords: ant genera, pangolin, fecal samples, diet

Tracking Code: EM-17-15

Nature-Based Climate Adaptation through Ecological Restoration in the Western Ghats: Advancing People–Planet Prosperity in Rural Landscapes

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Abstract

Rural communities across India's Western Ghats are among the most climate-vulnerable populations, facing erratic rainfall, extended monsoon periods, and declining soil productivity. Small and marginal indigenous farmers—dependent almost entirely on agriculture for income—have suffered crop losses ranging from **30% to 80%**, threatening both livelihoods and local food security. These recurrent weather shocks highlight the urgent need for approaches that combine ecological regeneration with economic resilience. The **Raah Foundation's ecological restoration initiative** in Nashik district, Maharashtra, offers evidence of how **nature-based solutions** can serve as effective climate adaptation strategies. Over **3,000 acres** of severely degraded land were restored through native tree plantations, soil and moisture conservation structures, removal of invasive species, creation of fire lines, and controlled grazing. These actions revived the natural hydrological balance—reducing runoff, improving infiltration, and enhancing groundwater recharge. The restored ecosystems now buffer rainfall extremes while providing vital ecosystem services to surrounding farms. Empirical observations from the **village of Dari**, located at the base of a rewilded hill, demonstrate tangible outcomes. Within two years, groundwater levels rose, enabling farmers who once grew only a single kharif crop to now cultivate **two to three crops annually**. During a recent season of severe waterlogging and widespread crop losses across Nashik district, Dari remained largely unaffected—the rewilded slopes acted as a natural sponge, absorbing excess rainfall and preventing flooding. This study presents **field-based evidence** that ecological restoration not only restores biodiversity and water systems but also strengthens rural prosperity by reducing vulnerability and diversifying livelihoods. It illustrates how aligning ecological health with human wellbeing creates enduring **people–planet harmony**. Integrating restoration-based adaptation within rural development and climate policies can transform vulnerable landscapes into self-sustaining systems of prosperity and resilience.

Keywords: Ecological Restoration; Nature-Based Solutions; Climate Change Adaptation; Western Ghats; Rural Livelihoods; Water Security; People–Planet Harmony; Sustainable Agriculture

Tracking Code: EM-17-20

Development of Database for Palawan Pangolin (*Manis Culionensis*)

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Abstract

An information reservoir is created as a result of the organization of data sets within a database system through the process of data storage. One of the most efficient ways to manage data is to establish a database that can be searched. In order to enable access to all of the information included inside the database, databases make use of a program. This application provides a way that is not only convenient, but also quick and flexible for accessing, storing, and retrieving data. The establishment and upkeep of a database containing information about the Palawan pangolin (*Manis culionensis*), what is commonly referred to as balintong in the local community, is the primary objective of this project. A library of information that is derived from unpublished, published, and digitized data files is saved, retrieved, and organized by this database. The purpose of this database is to identify gaps in studies and to act as a source of evaluation of significant data for future research. Offers individuals from all around the world the opportunity to access and search for research that is pertinent to the Palawan pangolin. A well-organized and user-friendly computerized record-keeping system that works to the advantage of the research community, students, institutions, and both local government and non-government organizations.

Keywords: balintong, Philippine pangolin, data

Tracking Code: EM-17-21

Assessing the Hazardous Waste Management Strategy of a Higher Education Institution: The Case of the University of the Philippines Los Baños

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Abstract

Higher education institutions (HEIs) are vital centers of research and innovation, yet they also generate significant quantities of hazardous waste (HW) that can threaten health and the environment if mismanaged. This study assessed the hazardous waste management (HWM) strategy of the University of the Philippines Los Baños (UPLB) to establish a baseline for improving institutional practices and promoting sustainability in academic research environments. Using a mixed-methods approach, the study integrated institutional data review, key informant interviews, and a survey of 50 laboratory and administrative personnel from top HW-generating units. Descriptive statistics were used to evaluate knowledge, attitude, and practice (KAP) levels; Chi-square and Cramer's V tests measured associations between demographic and KAP variables; and Spearman's rank correlation assessed relationships among KAP components. The Institutional Analysis and Development (IAD) Framework guided the analysis of institutional arrangements, stakeholder roles, and interaction patterns. Results showed that UPLB generated approximately 9,988.49 kilograms of hazardous waste from 2023 to 2024, with laboratories as the primary sources. Respondents exhibited high knowledge but only moderate attitude and practice toward HWM. Statistical analyses revealed no significant association between demographic factors and KAP, though attitude and practice were positively correlated ($r = 0.446$, $p < 0.01$). Institutional analysis indicated a linear, cradle-to-grave HWM process, heavily focused on regulatory compliance. Key gaps were identified in training, coordination, documentation, and inventory systems. The study concludes that while UPLB maintains compliance with existing regulations, its current system remains fragmented and reactive. Transitioning to a circular and preventive HWM model—featuring centralized data systems, green procurement, and regular capacity-building—will enhance compliance, minimize waste, and foster a safer, more sustainable academic environment. The findings provide valuable guidance for HEIs and similar institutions aiming to integrate environmental stewardship into research and educational operations.

Keywords: hazardous waste management, higher education institutions, sustainability, circular economy, institutional analysis, environmental education

Tracking Code: EM-17-22

How human activities are affecting sedimentation rates of water reservoirs? Case study: Kalimanci water reservoirs, Republic of North Macedonia

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Abstract

The human activities in one catchment is the main factor which is influencing soil conservation. The water reservoir "Kalimanci" and its catchment is taken as a case study. The main water source of the reservoir is the river Bregalnica. The Kalimanci reservoir is with total storage of $127x10^6$ m^3. The period which is analyzed is connected with the creation of the reservoir (1969) until 2013. At first, the land use in the catchment/municipal level was examined in order to assess the dynamics of the land use over the time. The change of the land use is connected with the demography, cultivated land, the area covered with pastures, the number of livestock in the region and the forested areas**.** In comparison of the period when the reservoirs were built and today, there are considerable differences. The inhabitants migrated from the villages to the towns, then the agriculture land is diminished and the areas under forest and pastures are increased by 25% on the account of arable land. The share of town vs. village population is 29% in 1971 and 64% in 2022. Also, the livestock numbers are decreased by half. Further on, the amount of accumulated sediment in the reservoir over the time is discussed. There can be observed two periods of sedimentation rates. Kalimanci reservoir for the period 1969-1985 has sediment deposition rate of 467.686 m^3/year, and in the latest period 1985-2013 has sediment deposition rate of 214.325 m^3/year. The first sedimentation period shows amounts of accumulated sediment in the reservoirs which is 2,5 times more than the second period.

Keywords: Sedimentation rates, Land use changes, population decrease, soil erosion

Tracking Code: EM-17-23

Livestock Integration in Smallholder Oil Palm Systems: Advancing Livelihood Security Through Sustainable Weed Management

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Abstract

Oil palm cultivation is a cornerstone of rural economies in Malaysia, providing income and employment for over 500,000 smallholder households directly advancing Sustainable Development Goals 1 and 8. Yet reliance on chemical herbicides for weed control increases production costs and environmental risks, particularly for resource-constrained farmers. This study evaluates livestock integration specifically cattle and buffalo grazing as a sustainable, low-cost alternative in smallholder-managed oil palm plots in Peninsular Malaysia. Using a comparative experimental design, we assessed three treatments: (1) cattle-only grazing, (2) combined cattle–buffalo grazing, and (3) non-grazed control plots maintained with herbicides. Data on soil compaction (penetrometer), weed coverage/height (smartphone-based Canopeo app), and canopy cover (GLAMA) were collected via systematic random sampling. Statistical analyses (ANOVA, GLM, GLMM) showed grazing significantly reduced weed coverage and height ($p < 0.001$), performing equivalently to chemical controls. Soil compaction was slightly higher in grazed plots (mean: 1.4 MPa vs. 1.2 MPa) but remained below the 2.0 MPa agronomic threshold for oil palm root restriction, indicating negligible impact on soil health under current management. Canopy cover moderately influenced undergrowth height but not compaction. Critically, integrating livestock offers dual-income potential of palm oil plus animal products and enhancing economic resilience while reducing input dependency. The use of low-cost digital tools like Canopeo enables farmers to monitor vegetation independently, exemplifying solution-driven digitalization that is accessible and scalable. This agroecological approach aligns with Malaysian Sustainable Palm Oil (MSPO) and Roundtable on Sustainable Palm Oil (RSPO) standards, while directly supporting smallholder livelihoods. By replacing costly herbicides with natural grazing, farmers can lower expenses, diversify income, and create on-farm employment to advance both poverty reduction and decent rural work. We recommend scaling this model through farmer cooperatives and extension services, positioning integrated crop–livestock systems as a practical pathway toward inclusive, digitally enabled rural transformation.

Keywords: oil palm, smallholders farmers, livestock integration; weed dynamics, SDG8, livelihood security

Tracking Code: EM-17-29

Impact of Electrode Size on Scale-Up of Membrane-Less Microbial Fuel Cells Fueled by Food Waste

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Abstract

In pursuit of achieving carbon neutrality by 2050, methanation and biomass utilization in non-power sectors have been positioned as key pillars. Our research group has developed a proton exchange membrane-less microbial fuel cell (MFC) system capable of generating electricity from food waste. In this study, we scaled up this system and evaluated the resulting changes in the MFC performance. We also proposed a numerical model for predicting temporal variations in power generation characteristics. Furthermore, we constructed steelmaking slag-based sediment MFCs (SS-SMFCs) with three different diameters, namely, 11.2, 15.5, and 25 cm, hereafter referred to as Cases 1, 2, and 3, respectively. The anode surface areas for Cases 1, 2, and 3 were 25, 49, and 121 cm^2, respectively, with the cathode surface area set to be twice the anode surface area in each case. To evaluate the SS-SMFC performance, the maximum power density (P_{max}), exchange current density (I_0), and limit current density (I_{limit}) were determined. On Day 67, we observed that enlarging the SS-SMFC by a factor of 1.9 resulted in an average 36% decrease in performance (P_{max}, I_0, and I_{limit}), whereas enlarging it by a factor of 5 resulted in a 72% decrease. These results indicate that smaller-scale SS-SMFCs achieve better performance. In addition, a numerical model was successfully developed to predict changes in the power density at different scales with a maximum relative error of approximately 13%. The findings suggest that manufacturing SS-SMFCs at a small scale and stacking them in series to increase the voltage or in parallel to increase the current is a more effective strategy for scaling up.

Keywords: SS-SMFC, food waste, electricity, scale-up, performance change

Tracking Code: EM-17-30

Effects of Electrode Potential Optimization on Methane Production by Incorporating Conventional Methane Fermentation with Electromethanogenesis

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Abstract

A major challenge of anaerobic digestion is the high carbon dioxide (CO_2) content (~40%) of the generated biogas, which necessitates reduction methods for this fraction. Electromethanogenesis has recently emerged as a promising technology that addresses this issue by efficiently converting the CO_2 into methane (CH_4), thereby enhancing CH_4 production. Crucially, the optimal electrode potential for maximizing CH_4 generation remains undefined. However, since the efficiency of electromethanogenesis depends highly on operating parameters, the optimal electrode potential for maximizing CH_4 generation is crucial. To define this key operating parameter, electromethanogenesis was incorporated into conventional CH_4 fermentation to investigate the CH_4-generation efficiency across different cathode potentials: −500, −550, −600, −650, and −700 mV vs. Ag/AgCl using a potentiostat. Thereafter, the generated gas amount and composition were analyzed by gas chromatography after one and two weeks, after which the pH and adenosine triphosphate (ATP) concentration of the catholyte were measured after the experiments. The results revealed that the optimal cathode potential for enhancing CH_4 production was −550 mV, which significantly increased the CH_4 fraction while decreasing the CO_2 content. Overall, these findings confirmed the contribution of electromethanogenesis to CH_4 fermentation, highlighting those cathode potentials of less than −700 mV might inhibit methanogenic activity.

Keywords: methane fermentation, electromethanogenesis, methane, carbon dioxide

Tracking Code: EM-17-32

Effects of Green Manure on Soil Characteristics in Pineapple Farmlands of Moung Ruessei, Battambang Province, Cambodia

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Abstract

Pineapple is an economically important crop for small- and medium-scale farmers in Moung Ruessei District, Battambang Province, Cambodia. However, continuous cultivation, low organic matter, and limited use of soil-improving practices have contributed to soil degradation, reduced fertility, and declining fruit quality. Green manure (GM) crops such as soybean, mung bean, and green bean are increasingly promoted as cost-effective, sustainable strategies for restoring soil health. This study evaluated the effects of different GM application rates on the chemical and physical properties of soils under pineapple cultivation. Soil was collected from pineapple fields in Cambodia and incubated under controlled conditions in Japan. Green manure was applied at 1%, 3%, and 5% (w/w), and soils were incubated for 60 days after incorporation. Chemical properties, including pH, total nitrogen (T-N), total phosphorus (T-P), potassium (K), electrical conductivity (EC), and soil organic matter (SOM), were measured at 0, 15, 30, 45, and 60 days. Physical parameters such as water retention (pF 2 and pF 3.8), soil aggregate stability, and mean weight diameter (MWD) were also analyzed. Green manure application significantly improved soil fertility throughout the decomposition period. The 5% mung bean treatment produced the greatest increase in SOM (3%) and notable enhancements in T-N, T-P, and K. EC increased moderately, indicating active nutrient mineralization, while soil pH showed slight but positive improvements compared with the control. Physical properties also improved: soil aggregation strengthened, with MWD increasing from 0.075 mm in the control to 0.167 mm at 5% GM, and water retention increased from 13.81% to 18.37%. The results demonstrate that green manure, particularly mung bean at 5% rate, effectively enhances soil nutrient status, structure, and moisture retention. These findings support the integration of GM into pineapple cultivation systems as a practical approach to improving soil chemical and physical properties.

Keywords: changes in soil properties; green manure types and application rates; pineapple- cultivated soil; soil fertility

Tracking Code: EM-17-40

Edible Plant Biodiversity and Phytonutrients of Wild Edible Plant Species in the Farming Communities of Cordillera Region, Philippines

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Abstract

The Cordillera Administrative Region is renowned for its diverse landscapes and rich biodiversity embedded with Indigenous cultures and traditions. Among the region's natural resources are wild edible plant species (WEPS), which play a vital role in providing ecosystem services that directly and indirectly contribute to human well-being. Due to their abundance and significance to local livelihoods and traditional food systems, it is imperative to document the diversity and utilization of these species. This study used an ethnobotanical survey to assess the relative importance (RI) values and the phytonutrient contents of WEPS. A participatory approach combined with triangulation method was used to collect information from farmers, housekeepers, and key informants. The research identified a total of sixty-seven WEPS, which belong to 32 families. The WEPS' seasonal availability contributes to the nutritional security of Indigenous communities. Respondents demonstrated extensive knowledge of WEPS, integrating them as essential components of their diets as fresh fruits, condiments, tea, alternative medicines, and as an additional income sources. Among these WEPS, *Psidium guajava* and *Vaccinium myrtoides* exhibited the highest RI values, indicating their exceptional value to these communities. Furthermore, WEPS were found to be essential source of phytonutrients including phytochemicals (alkaloids, flavonoids, tannins, etc.), micronutrients (iron and iodine), and vitamin C. Tapping and maximizing the utilization of WEPS offers dietary diversification and conservation strategy, which can contribute to improving the economic and nutritional security of rural communities.

Keywords: Wild edible plants, importance values, phytochemicals, Cordillera Region, ecosystem services

Tracking Code: EM-17-43

Granular Urea-Based Organo-Mineral Hybrid Fertilizers from Agricultural By-Products: Nutrient Release, Soil Organic Matter, and Crop Growth

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Abstract

Hybrid fertilizers benefit on farmland by combining instant nutrient release from the chemical fraction and soil organic matter (SOM) enhanced by the organic fraction. In this research, six granulated hybrid fertilizers (T1 to T6) were produced based on urea and agricultural by-products in Sri Lanka, such as leafy compost, chicken manure, cow manure, rice husk biochar, and molasses. The objective was to evaluate the effects of fertilizer formulation and granule sizes (2.01-4.75 and 4.76-8.00 mm) on nutrient release, SOM, and plant growth performances. Soil pots without plants under waterlogged conditions with a completely randomized design were used to study nutrient release behavior over 172 days. A pot experiment with a leafy vegetable (Komatsuna) growing for 42 days was undertaken to determine the plant growth parameters. Leaf number, leaf length, leaf width, leaf area, and plant height were determined weekly. SPAD value, root length, and wet and dry biomass were recorded at harvest. The results indicated that biochar-rich hybrids T1 and T2 (with a high C:N ratio) had slow and low nutrient release, but T3 and T5 (with low C:N ratio) had higher cumulative available nutrient release of N, P, and K. T4 with large amounts of leaf compost but without chicken manure showed a gradual release of N, P, and K. Smaller granules (2.01-4.75 mm) released nutrients faster than large ones. SOM was increased in all treatments, with better increases in 2.01-4.75 mm sizes of T3 (1.92%) and T4 (1.98%). Significantly higher plant growths were shown in T5 ($P<0.05$), followed by T3. T4 showed balanced growth; T1 and T2 were lower. Organo-mineral hybrid fertilizers can fit many uses, from fast-release nutrients to slower-release nutrients, plus increase soil SOM, by varying their ingredient mixing ratios and granule size. Notably, this kind of simple hybrid fertilizer formulation is better for encouraging sustainable agriculture in developing nations.

Keywords: organo-mineral fertilizers, granule size effects, nutrient release, soil organic matter, plant growth

Tracking Code: EM-17-44

Population Dynamics, Livelihood Patterns, and Agricultural Land use Changes in Maasin City, Philippines: A Correlation Analysis from 2015 to 2025

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Abstract

This study examines population dynamics, livelihood patterns, and land use changes and projection of changes in Maasin City between 2015 and 2025. Descriptive analysis of population pyramids reveals a transition from a youthful, rapidly growing population in 2015, characterized by a broad base and high fertility, to a moderately growing population in 2025 with an increasing working-age population (15–64) and early signs of aging. This shift toward a more balanced age structure presents opportunities for economic growth through a demographic dividend while highlighting the need for healthcare, eldercare, and social services. Analysis of livelihood groups shows increased participation in non-agricultural and semi-skilled occupations, whereas agricultural labor remains significant, particularly among males. Land cover change assessed using QGIS indicates a decline in agricultural land and fishpond areas and an expansion of built-up areas, reflecting urbanization and conversion pressures. Pearson correlation analysis demonstrates interrelationships among education, livelihood types, population size, religion, and land use, with education and unskilled labor playing key roles in shaping livelihood patterns and agricultural land dependence. The findings underscore the importance of integrating population trends, livelihood diversification, and land management in local development planning to promote sustainable socioeconomic growth in Maasin City.

Keywords: Population dynamics, Livelihood groups, Land cover change, Demographic dividend, Maasin City

Tracking Code: EM-17-45

Tracing Sources of Nitrogen Contamination in a Tropical Flood Pulse System: Tonle Sap Lake, Cambodia

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Abstract

Tonle Sap Lake, the largest freshwater lake in Southeast Asia, supports vital ecological functions and the livelihoods of millions in Cambodia. However, rapid socio-economic development, intensified agriculture, and population growth in its catchment have raised concerns about water quality degradation, particularly eutrophication due to excessive nutrient inputs. Effective strategies for protecting water resources require not only concentration-based assessments but also an understanding of the contamination origins. This study investigates the sources and biogeochemical processes influencing nitrogen dynamics in Tonle Sap Lake, considering both spatial and seasonal variations. Water samples were collected from multiple sites across the lake during the dry (March 2025) and wet (September 2025) seasons. Hydrochemical analysis and nitrogen stable isotope techniques were employed to quantify nitrogen species and identify potential contamination sources. Nitrogen concentrations were generally higher during the dry season (low-water period) than the wet season (high-water period). This seasonal variability is likely driven by monsoon hydrology, including dilution, the reverse flow of the Tonle Sap River, and biogeochemical transformation processes. Spatial heterogeneity was observed, with elevated nitrate and nitrite in northern upstream and southern downstream zones, and high ammonium levels in Beong Tonle Chhmar, indicating localized hotspots possibly from in-lake anthropogenic inputs in the dry season. Analysis of the dry-season nitrate isotopes suggests multiple overlapping nitrogen sources, including chemical fertilizers, mineralization of soil nitrogen, and manure/sewage inputs. Spatially, the isotopic compositions, supported by hydrochemical indicator, the relationship between Cl^- concentrations and dissolved inorganic nitrogen (DIN), and DIN/Cl^- ratios, indicate that synthetic fertilizers are a primary contributor to elevated nitrate levels in the lake. These findings provide important insights into nitrogen contamination pathways and identified hotspots, supporting the development of evidence-based policy recommendations for sustainable water resource management in Cambodia.

Keywords: nitrate isotopes, source identification, eutrophication, biogeochemistry, flood-pulse system

Tracking Code: EM-17-49

Effects on Local Species from A Coal Mining Extension Wastewater Discharge Using Aquatic Ecotoxicity Testing

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Abstract

The Duralie Coal Mine, located in NSW, Australia is 50 km from the Pacific Ocean. The site is in the Mammy Johnsons River catchment that flows via the Karuah River into the ocean. The area surrounding the site is extensively cleared for pastoral-based agriculture and limited intensive poultry farming. The Mammy Johnsons River flowing along the eastern boundary of the site receives tributary flows from creeks draining the site. Following a judgement in the NSW Land and Environment Court, Duralie Coal mine received approval to extend its existing open pit on 10 November 2011. The court ruling was to monitor surface water impacts by undertaking ecotoxicity of waste freshwater samples from the coal mining operation. Sampling and ecotoxicity testing were undertaken using six tests with five different aquatic species. The ecotoxicity tests were undertaken by Ecotox Services Australia, Sydney. on a quarterly basis from 2013-2014 before being reduced to bi-annual monitoring. The program continued until 2018 and was able to demonstrate a continued lack of observed toxicity results from the ecotoxicity program required by the NSW Department of Planning and Environment (DP&E). The ecotoxicity results for all five test species showed no observed effects on test species for samples from the Mammy Johnson River (GB1 and Site 11) and Coal Shaft Creek (SW2) for the sampling times December 2016 to March 2018, except for some minor effects that were not considered significant due to the highly sensitivity test species. The Main Water Dam (SW3-MWD) showed sporadic effects to some test species, but there was no consistent mortality of species for SW3 to indicate any association with effects in the creek and river sites. Based on the consistent evidence from 2013-2018 for aquatic testing in the Main Water Dam it was recommended that the Ecotoxicity Testing Program was no longer required.

Keywords: ecotoxicity, freshwater, aquatic species, coal mining, wastewater, effects

Tracking Code: EM-17-54

Detection of Sika Deer in Ozegahara Using UAV-Mounted Thermal Cameras and Evaluation of Vegetation Status at Their Detected Sites

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Abstract

In Ozegahara, one of Japan's representative marshlands, damage caused by the increasing population of Sika deer has become a serious issue. Therefore, increased effort to control the deer is required. This study aims to efficiently grasp the population size and detection locations of Sika deer appearing in the Ozegahara by analyzing thermal images taken by UAV at night using deep learning, thereby contributing to the expansion of the scope and improvement of the accuracy of population counts. Furthermore, the study also aimed to evaluate the degree of browsing damage using images captured during daytime by a UAV equipped with a multispectral camera to understand the relationship between deer occurrence and feeding damage. Specifically, a deep learning-based automated deer detection model was developed using images captured by thermal camera-equipped UAVs from 2018 to 2024. Then, this model was applied to images taken in 2025 to evaluate its automated detection accuracy. For browsing damage assessment, the sites where deer were detected at night were photographed using a UAV during the daytime on the following day. Regarding the deer detection accuracy, although some incorrect detections were observed, such as small puddles in the marshland or tree branches, it was confirmed that the detection of individual deer was performed with high precision. It was also confirmed that many deer were detected at locations that were difficult to find using light census method which is one of the conventional census methods. This suggests that estimation of browsing damage is possible in areas where conventional surveys were insufficient to determine browsing impact. Furthermore, it was found that most of the detected deer locations were along the rivers and near puddles within the marshland.

Keywords: Unmanned Arial Vehicle, Thermal camera, Sika deer, Object detection

Tracking Code: EM-17-55

Comparative Assessment of Remote Sensing Techniques for Monitoring Eutrophication in the Largest Lake in Southeast Asia: Tonle Sap Lake, Cambodia

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Abstract

The health of Tonle Sap Lake (TSL), the largest lake in Southeast Asia, is foundational to the livelihoods and food security of surrounding rural communities in Cambodia. The proliferation of algae biomass poses a significant threat to this aquatic ecosystem and the people that depend on it and its resources. Conventional water quality monitoring methods, particularly for large lakes, are time-consuming and costly, creating a major management challenge. This study aims to address this gap by leveraging digital innovation in remote sensing technology to monitor the distribution of algae biomass, using chlorophyll-a (Chl-a) as a key proxy. Particularly, we assessed and compared Sentinel-2 and Landsat-8 satellite images using a color index-based algorithm to estimate Chl-a concentration, integrated with in-situ Chl-a measurements from 15 sampling sites across TSL between February 23 and March 2, 2019. Both satellites demonstrated satisfactory performance for Chl-a estimation in TSL. Sentinel-2 data exhibited a high correlation with in-situ Chl-a concentration ($R^2 = 0.93$), indicating that the Sentinel-2 model explained 93% of the Chl-a variation. The Landsat-8 model data also performed well ($R^2 = 0.81$), explaining 81% of the variation in concentration. The Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Normalized Mean Absolute Error (NMAE%) were 1.34, 1.80 µg/l, 15.45% for Sentinel-2 and 2.27, 2.91 µg/l, and 26.17% for Landsat-8, respectively. These results indicate the efficacy of both satellites for assessing water quality parameters in large aquatic ecosystems such as TSL. Sentinel-2 is found to have a slightly better performance in the estimation of Chl-a concentration. Overall, these findings reinforce the potential for applying publicly available satellite imagery as a cost-effective and scalable tool for environmental monitoring. This approach helps support the health, economic stability, and inclusive sustainability of the rural communities that depend on TSL and its resources.

Keywords : Chlorophyll-a, Sentinel-2, Landsat-8, Digitalization, Water Quality, Tonle Sap Lake

Tracking Code: EM-17-56

A Unique Showcasing of Urban Trees for Greater Social Participation, People and City Nature Connections and Enhanced City Economics in Tokyo, Japan.

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Abstract

Trees and the urban forest are a prominent presence in the places where people come together, social interactions occur and relationships or partnerships take form. Urban trees provide aesthetics value, help regulate urban climate, cleanse the air and improve physical and psychological health of urban dwellers among other benefits. These services that are intangible are often under appreciated, less documented and need to be incorporated into urban planning and development. In this research, we analyzed different efforts in the city of Tokyo that showcase urban trees in public spaces and street lanes which draw out masses of people to visit, and enjoy scenic beauty every year. Urban green spaces have become a crucial element in shaping public participation and strengthening people - nature relations. Publicly available also data shows that popular destinations for tree viewing in Tokyo include Shinjuku Gyoen National Garden, Yoyogi park, Ueno park, Odaiba symbol promenade park, Meiji Jingu Gaien, and Marunouchi Naka Dori street e.t.c. Also, the peak tourist seasons in Tokyo include summer vacation months of July to September followed by spring season months of March to May characteristic with cherry / Sakura tree blossoming, and followed by October to November period characteristic with autumn tree leaf-coloring. The city governments in conjunction with private companies also illuminate the trees and tree spaces at night to create surreal environments that people enjoy. Of the total tourists visiting Tokyo, 27.8% indicate that they find nature, scenic spots and night views attractive to them. Social media has also been pointed out as a big influence on tourism into Tokyo. The gatherings of this research argue that urban / city green is increasingly becoming a major attraction for local dwellers and foreign visitors.

Keywords: Showcasing trees, Public participation, People -nature relationships, Urban tourism, city economics

Tracking Code: EM-17-57

Physico-chemical and Thermal Characterization of Cashew Nut Shell Cake Wastes (*Anacardium occidentale* L.) as Potential Renewable Solid Biofuel

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Abstract

Cashew nut shell (CNS) cake, an abundant agro-industrial byproduct in the Philippines, remains largely underutilized despite its potential as a renewable solid fuel. This reflects a broader challenge of biomass waste mismanagement and missed opportunities for energy generation in the country. This study aims to establish the baseline physico-chemical and thermal characteristics of raw CNS cake from Palawan in order to evaluate its suitability as a biomass feedstock. The material was analyzed through proximate and ultimate analysis, lignocellulosic composition profiling, higher heating value (HHV) determination, and thermogravimetric analysis to generate a comprehensive assessment of its fuel-related properties. Proximate analysis showed high volatile matter (70.3%) and moderate fixed carbon (21.3%) with low ash (1.36%), indicating good reactivity and clean fuel potential. Ultimate analysis revealed a carbon (47.2%) and oxygen (44.6%) rich composition. Lignocellulosic profiling highlighted high extractives (57.7%) and substantial lignin (26.1%), while hemicellulose (14.1%) and cellulose (2.2%) were minor. The HHV of 18.94 MJ/kg showed the energy content of CNS cake. Thermogravimetric analysis indicated an ignition temperature of 209.43°C, a burnout temperature of 482.20°C, and a total mass loss of 80.22%, reflecting its thermal degradation pattern. These results provide key baseline chemical, structural, and energetic information for understanding the properties and utilization potential of CNS cake as a biomass resource, supporting local energy security, reducing environmental waste, and contributing to the development of sustainable bioenergy systems.

Keywords: biomass waste, high heating value, lignocellulose, proximate, thermogravimetric

Tracking Code: EM-17-64

Short-Term Groundwater Level Dynamics in Response to Rainfall and Flood Events: A Field-Based Study

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Abstract

Rainfall and flood events can significantly alter the quantity and quality of groundwater worldwide. Under the different hydrological conditions, groundwater levels may vary depending on aquifer responses, which are influenced by various environmental and anthropogenic factors. Thus, understanding aquifers' responses under different hydrological conditions is critical for assessing the surface-groundwater interactions and groundwater management, yet such responses are insufficiently documented through field observations. The main objective of this study is to measure short-term changes in groundwater levels and identify localised responses in aquifer dynamics under rainfall and flooding conditions. This study presents ongoing research on groundwater level changes, based on field measurements from 42 wells situated in the downstream areas of the Maduru, Meiyankal, and Mundeni river basins. The outlets of these three rivers discharge into the lagoon, which subsequently flows into the sea on the Eastern coast of Sri Lanka. Pre-flood baseline measurements were collected during the typical rainy period in the region, and a second set was collected after the flood, allowing comparison of groundwater levels. The results show that the wells' water levels have risen significantly after heavy rainfall and subsequent flooding, suggesting rapid infiltration through permeable soils. The most pronounced response was observed in wells located within or near inundated areas, whereas wells in non-inundated areas showed minimal change. Ongoing work involves extending monitoring of additional wells, integrating regional geology and soil characteristics, and validating results against rainfall and discharge data. Accordingly, this study contributes to a better understanding of how rainfall and flooding influence local aquifer recharge and groundwater management.

Keywords: Flooding, Groundwater, Infiltration, Rainfall, Spatial Variability, Water Level

Tracking Code: EM-17-68

Satellite-Based Contrasts in Methane Emission Patterns of Rainfed and Irrigated Rice Paddies in Thailand

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Abstract

Methane (CH4) emissions from rice paddies are an important agricultural greenhouse gas source in Asia, but mitigation and monitoring require information on where emissions concentrate, how they vary by year, and how emissions relate to rice production. This study develops a 1-km, paddy-specific CH4 emission dataset for Thailand for 2002-2022 by integrating remotely sensed water indicators with paddy land-use information. Using MODIS surface reflectance, we computed the Normalized Difference Flood Index (NDFI) at daily time steps and converted the resulting inundation signals into the annual number of inundated days for each 1-km cell (accounting for missing observations). Annual CH4 emissions were estimated as the emission factor (EF) multiplied by the annual inundation duration (days per year) and paddy density, Raw national totals exceeded the Thailand Biennial Transparency Report (BTR) because our framework represents full-year conditions. We applied a constant bias correction of 2300 ktCO2eq and scaled this correction by annual paddy area relative to the 2015 land-use baseline to account for temporal changes in paddy extent. Agreement with the BTR improved (correlation r = 0.58; mean absolute error 1757.9 ktCO2eq, 5.19%). Spatially, high mean emissions were concentrated in irrigated paddies of the Chao Phraya basin and in flood-prone areas around the Mun and Chi rivers. Provincial coefficients of variation indicated lower interannual variability in the Central region and higher variability in several Northeast provinces, consistent with the sensitivity of rainfed systems to water availability. Combining emission estimates with provincial rice production statistics, we mapped emission intensity (tCO2eq per ton rice), which was generally higher in the Northeast than in the Central region, reflecting lower yields and predominantly single cropping under limited irrigation. The dataset provides a practical, water-sensitive complement to inventory workflows and supports region-specific mitigation prioritization to target hotspots and improve yield stability.

Keywords: Rice paddies, Methane emissions, Remote sensing, Thailand

Tracking Code: EM-17-69

Temporary Rainwater Storage Function of Paddy Fields under Alternative Wetting and Drying Irrigation

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Abstract

With the increasing frequency of extreme rainfall events in monsoon regions, paddy fields are gaining renewed attention for their ability to temporarily store water and mitigate downstream flood risk. While Alternative Wetting and Drying (AWD) irrigation is widely promoted for reducing irrigation water use, its potential contribution to rainfall retention and flood mitigation has not been fully quantified. This study evaluates the hydrological behavior of AWD in comparison with conventional continuously flooded (CF) irrigation using field observations in Kanagawa, Japan. Two adjacent rice paddy plots (each 1,000 m²) were used: one managed under CF and the other under AWD. To capture spatiotemporal variations in water storage, water-level loggers were installed at both the upstream and downstream ends of each field. The evaluation period extended from 12 June to 13 September (2,245 hours; 94 days). During this period, nine rainfall events occurred, totaling 422 mm over 112 hours, with a maximum hourly intensity of 22 mm h^{-1}. Under CF irrigation, surface water was present 93% of the time, and meaningful rainfall retention occurred primarily during the mid-season drainage. In contrast, the AWD field exhibited substantially longer non-flooded periods: the upstream portion was flooded 85% of the time, whereas the downstream portion was flooded only 54%. During non-flooded phases, mean groundwater levels reached −0.39 m upstream and −0.11 m downstream. Importantly, rainfall coincided with non-flooded conditions for 29 hours in the downstream AWD plot, compared with essentially zero hours in CF plot, indicating active temporary storage opportunities outside the mid-season drainage. These findings demonstrate that AWD not only saves irrigation water but also enhances rainfall retention capacity during 46% of the growing period. When coordinated with weather forecasts and drainage timing, AWD has the potential to function as an effective, farmer-managed nature-based solution for rural flood mitigation.

Keywords: Alternative wetting and drying (AWD), Rice paddy, Rainfall retention, Flood mitigation, Water level

Tracking Code: EM-17-71

Climate Change Impacts on Hydrological Regimes and Extremes in Pursat River Basin, Cambodia: Insights from the SWAT Model and CMIP6 Scenarios

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Abstract

Climate change alters hydrological cycles and streamflow regimes at the local, regional, and global levels. The variation of rainfall and hydrological regime is significant for understanding the variability of hydrological conditions caused by climate change in the Pursat River basin, the sub-basin of Tonle Sap Lake of Cambodia. This study assessed the impact of climate change on the hydrological regimes and extremes in the Pursat River basin using the Soil and Water Assessment Tool (SWAT) model based on the CMIP6 model under the two climate change scenarios (SSP2-4.5 and SSP5-8.5). Key findings indicate significant alterations in hydrological extremes across both near-future (2031-2060) and far-future (2061-2090) periods. Maximum streamflow is projected to increase substantially in both magnitude and frequency. Specifically, the rainy season (September-October) is anticipated to see monthly streamflow increases ranging from 1% to 22% under SSP2-4.5 and 0% to 29% under SSP5-8.5. Conversely, the dry season exhibits considerable monthly percentage fluctuations in streamflow. The Q5 hydrological extreme (representing high flows) is projected to increase significantly, between 27% and 108%. Analysis of monthly maximum flows for 10-year and 100-year return periods also reveals projected increases ranging from 33% to 38%. These results indicated the alteration of the hydrological instability in the Pursat River basin, marked by an increased likelihood of more intense and frequent flood events. The study provides valuable, data-driven insights for developing and enhancing adaptive water management aimed at strengthening climate resilience within the basin.

Keywords: Climate Change, CMPI6, Hydrological Extremes, Hydrological Regimes, SWAT

Tracking Code: EM-17-73

An integrated analysis of water quality, microplastics contamination, and community awareness in the Tisa Wewa water scheme, Sri Lanka

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Abstract

The Tissa Wewa provides an uninterrupted water supply to the Anuradhapura sacred city and for irrigation purposes. The Tisa Wewa water quality was analyzed, together with microplastics from the inlet canal, main inlet, and three water outlet points included the water purification center inlet. Employing an integrative mixed-methods framework, public awareness and knowledge gap regarding the water quality and plastic pollution were obtained via a structured survey questionnaire for the community of water users (n=180) for both consumption and irrigation purposes. The data were further explained with observations at the critical sites around the catchment and farming areas and through interviews with stakeholders. The data indicated that the waters regularly had elevated levels beyond the standards, with major concerns for turbidity (>200 NTU) and pH. This study offered the first paper-based evidence of evaluating the microplastic pollution in the Tisa Wewa. Survey data showed that 88% were aware that plastic pollution was a major problem. A majority, 82.73%, practiced plastic waste disposal through burning due to weak awareness of environmental regulations. The burning of plastics was a major problem in areas where there was no formal waste management from the government. The lack of alternatives for daily plastic usage was highlighted. 81.8% of respondents believed that the main responsibility for reducing plastic pollution lies with the government. There was a significant lack of awareness about microplastics among the respondents. Interviews with key officials showed that there was a regulatory gap whereby traditional factors were regulated, while microplastic pollution was not within the operation of the present regulation. This paper concluded that there was a need for a two-fold pivot strategy: immediate institutionalization of a sophisticated contaminant detection system, and a transformational public pedagogy that transcends a generic awareness of hydrological well-being into a water resource protection service for a sustainable rural life in Sri Lanka.

Keywords: microplastics, water quality, knowledge gap, Tisa Wewa, Sri Lanka

Tracking Code: EM-17-76

Comparative Analysis of Statistically Smoothed and Interpolated Satellite-based Vegetation Indices Time Series Against Ground-Truth LAI Measurements in Rainfed Rice Farm

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Abstract

Rice (*Oryza sativa*) is a major staple food in both developed and developing countries. In Mozambique, rice is one of the priority crops promoted by the government and mostly produced by smallholder farmers under rainfed conditions. However, its productivity is constrained by multiple environmental challenges, resulting in stagnant or declining yields. Crop growth parameters are essential indicators for yield prediction and crop model calibration. This study to address the limited ground-based Leaf Area Index (LAI) measurements, developed an integrated evaluation framework combining field measurements, remote sensing and statistical smoothing and interpolation techniques to evaluate their performance in estimating LAI dynamics. The field data collection was conducted in 2025 rice growing season (January-June) using two spatial replications of 1m² each (plot-1 and plot-2) used to track the LAI and Sentinel-2 derived Normalized Difference Vegetation Index (NDVI) time series. The analysis revealed that the NDVI time series smoothed with the Whittaker method in Plot-1 achieved the highest accuracy (R^2 = 0.76 and RMSE = 0.236), while in Plot-2 NDVI time series processed with the Spline filter performed best (R^2 = 0.61 and RMSE =0.489). These findings demonstrate that smoothed and interpolated satellite derived NDVI time series is effective for accurately capturing canopy dynamics in rainfed rice systems and can serve as important input parameters for the calibration and validation of crop growth models, including DSSAT (Decision Support System for Agrotechnology Transfer).

Keywords: Rice, Leaf Area Index (LAI), Sentinel-2 Vegetation Indices (VI), Time-series Smoothing and Interpolation methods.

Tracking Code: EM-17-77

Assessment of Natural Adsorbents Derived from Agricultural Waste for Wastewater Treatment

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Abstract

Industrial expansion significantly impacts water security through the discharge of effluents that often exceed environmental safety thresholds. These effluents, characterized by fluctuating pH, high organic loads, and toxic substances, require stringent management to meet standards such as the Pollution Index (PI) and the Environmental Protection Act. Developing sustainable pre-treatment methods for parameters like BOD_5, COD, and Total Suspended Solids (TSS) is essential for mitigating industrial water pollution. This study evaluates the synthesized from Calcium Hydroxide ($Ca(OH)_2$) and biochar derived from locally abundant agricultural wastes: **Mango Seed Shell Charcoal (MSH)** and **Coconut Shell Charcoal (CS)**. The primary goal was to evaluate the ability of these biochar-based composites to remove Total Phosphorus (TP) and neutralize pH in industrial liquid waste. The composite was synthesized using a mass-based ratio of $Ca(OH)_2$:1 and biochar (MSH, CS):4, with 75% deionized water added to facilitate the hydration reaction. Adsorption experiments targeted TP at an adsorbent-to-wastewater ratio of 1:100 (1g per 100ml). The efficiency was evaluated across multiple contact times: 1, 3, 8, 12, and 24 hours. Both biochars demonstrated significant adsorption capacity, though MSH consistently outperformed CS. **MSH** achieved an average TP removal efficiency of **80.1%** (ranging from 69.8% to 93.7%) and increased pH by **56.1%**. In comparison, **CS** achieved an average TP removal efficiency of **43.5%** (ranging from 9.2% to 66.01%) and increased pH by **49.3%**. The study confirms that mango seed shells and coconut shell are viable, low-cost precursors for high-performance adsorbents. Repurposing these discarded agricultural wastes offers an effective solution for wastewater remediation while promoting a circular economy and carbon sequestration. This research provides a scalable model for rural-industrial integration, aligning with global environmental standards for sustainable effluent management.

Keywords: Adsorption, Mango Seed Waste, Wastewater Treatment, Calcium Silicate Hydrate (CSH)

Tracking Code: EM-17-78

Accessing Empirical-Based Information to Validate and Address Soil Erosion on Cassava in Preah Vihear Plateau

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Abstract

The rapid expansion of cassava cultivation in upland areas of Cambodia has raised growing concerns about soil erosion and land degradation. In the Preah Vihear plateau, cassava is widely cultivated on sloping land where soil conservation measures are often limited. Under such conditions, rainfall impact and surface runoff can accelerate soil erosion processes, leading to significant losses of topsoil, nutrients, and organic matter. These losses threaten soil fertility, reduce crop productivity, and compromise the long-term sustainability of cassava-based farming systems. Despite the increasing importance of cassava in Cambodia's agricultural economy, empirical field data on soil erosion in cassava cultivation systems remain scarce. This lack of field-based evidence limits the validation of soil erosion prediction models and constrains the development of effective soil and land management strategies. This study aims to generate empirical data to quantify soil erosion and sediment yield in cassava fields across different slope gradients in the Preah Vihear plateau region. Standard soil erosion monitoring plots will be established in fifteen cassava farms selected based on slope classification, representing low, medium, and high slope categories. Each monitoring site will be equipped with sediment collection structures designed to capture surface transported sediments during rainfall events. Sediment samples will be systematically collected and analyzed to estimate soil loss and evaluate the influence of slope gradient on erosion dynamics under cassava cultivation. The field measurements will provide valuable empirical evidence for improving the understanding of soil erosion processes in upland cassava systems. In addition, the collected data will support the validation and refinement of soil erosion prediction models applicable to the region. The findings are expected to contribute to the development of practical and evidence-based soil conservation strategies that can enhance sustainable land management and support long-term agricultural productivity in upland farming landscapes of Cambodia.

Keywords: Soil erosion monitoring, Cassava-based systems, Sediment yield, Slope gradient, Upland soil

ASFI

Tracking Code: ASFI-17-04

Magnetite and Silver Nanoparticles Mitigate In Vitro PEG-Induced Drought Stress in Arabica Coffee (*Coffea arabica* L.)

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Abstract

Arabica coffee (*Coffea arabica* L.) is highly sensitive to drought, posing significant challenges to sustainable and resilient coffee production under changing climatic conditions. Emerging nanotechnologies offer innovative strategies to alleviate drought stress and enhance plant resilience. Here, we present a study that explores the potential of metal-based nanoparticles to mitigate drought-induced damage and enhance stress tolerance in Arabica coffee. In this study, we evaluated the morpho-anatomical, physiological, and biochemical responses of *in vitro* regenerants exposed to PEG 6000-induced drought stress and assessed the ameliorative effects of magnetite nanoparticles (Fe_3O_4 NPs) and silver nanoparticles (AgNPs). Three-month-old coffee regenerants were pretreated with 1.0 mg L^{-1} Fe_3O_4 NPs and 0.5 mg L^{-1} AgNPs in Murashige and Skoog (MS) medium for two weeks before exposure to 6% (w/v) PEG 6000 for four weeks. MS alone and MS + 6% PEG 6000 served as controls. The experiment was arranged using a Completely Randomized Design with three replications. PEG-induced drought significantly increased leaf temperature and membrane injury while reducing root and shoot length, stomatal density, relative water content, and gas exchange. Remarkably, Fe_3O_4 NPs exhibited the strongest drought-mitigating effect by enhancing chlorophyll content, sustaining stomatal function, and osmotic adjustment while reducing membrane damage. AgNPs also improved chlorophyll content and soluble sugar accumulation, though with modest effects compared to Fe_3O_4 NPs. Antioxidant activity and carotenoids were unaffected. Our findings demonstrate that metal-based nanoparticles, particularly magnetite, represent a promising, climate-resilient strategy for sustaining coffee production under water-limited conditions. These results provide actionable insights for enhancing crop drought tolerance, contributing to sustainable and resilient agricultural practices. Further validation under *ex vitro* conditions is recommended.

Keywords: arabica coffee, drought stress, metal-based nanoparticles, PEG 6000

Tracking Code: ASFI-17-07

Growth, Yield, and Mycelial Quality of Brown Oyster Mushroom (*Pleurotus sajor-caju*) Pre-Treated with Ascorbic Acid under Water-Deficit Stress

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Abstract

Water stress is a critical limiting factor in oyster mushroom production, as it delays fruiting initiation, reduces yield, and impairs overall crop efficiency. This study aimed to investigate the potential of ascorbic acid (ASA) in mitigating water stress effects on brown oyster mushroom production. Specifically, it evaluated the individual and interaction effects of three watering frequencies (daily, every 2 days, every 3 days) and five ascorbic acid (ASA) concentrations (0, 50, 100, 150, and 200 ppm) on the morphological characteristics, yield, and mycelial quality of brown oyster mushroom (*Pleurotus sajor-caju*) across two flushes. The experiment was arranged in a factorial complete block design with three replications. Results showed that daily watering significantly increased the stalk length, stalk diameter, pileus thickness, pileus diameter, number of total primordia, and number of effective fruiting bodies. Daily watering also significantly increased the yield parameters and mycelial visual quality. A concentration of 200 ppm significantly enhanced the morphological characteristics of the mushroom. It significantly enhanced body weight, biological yield, economic yield, dry weight, mycelial growth rate, early completion of mycelium running, and had the highest visual quality rating. However, the highest biological efficiency (BE) was observed at 0 ppm, suggesting that while ASA improves yield quantity, it may reduce substrate-to-yield efficiency, but resulting to bigger individual mushrooms. The interaction of daily watering and 200 ppm ASA resulted in the best overall performance. Additionally, watering every two days coupled with ASA application significantly improved growth compared to the untreated control, showing that ASA can partially mitigate the effects of water stress. In contrast, no fruiting occurred under the 3-day watering interval across all ASA levels. These findings highlight the critical role of consistent moisture and the application of ASA as antioxidant supplementation in mitigating water-deficit stress help increased yield in mushroom cultivation

Keywords: Ascorbic acid, water deficit stress, *Pleurotus saju-cajor*, oyster mushrooms, mycelial growth quality

Tracking Code: ASFI-17-12

Efficacy of Panyawan (*Tinospora Rumphii Boerl*) Extract as Dewormer in Native Chicken (*Gallus Domesticus*)

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Abstract

The study evaluated the efficacy of *Panyawan* (*Tinospora rumphii* Boerl) extract as a potential organic dewormer in native chickens (*Gallus domesticus*). A Completely Randomized Design (CRD) was employed with five (5) treatments and three (3) replications, using a total of forty-five (45) undewormed free-range native chickens. Each replication consisted of three chickens per treatment group. The treatments were as follows: T_1 – distilled water (negative control), T_2 – commercial dewormer (positive control), T_3 – 1 mL *Panyawan* extract, T_4 – 2 mL *Panyawan* extract, and T_5 – 3 mL *Panyawan* extract. The extract was orally administered using a syringe, with dosage levels based on the concentrations evaluated by Pareñas (2018), which previously demonstrated no detrimental effects on native chicken growth. Results revealed that the administration of *Panyawan* extract had no significant effect on the daily weight gain and feed consumption of the native chickens. Fecal examination identified the presence of various internal parasites, including *Strongyloides* spp., *Coccidia* oocysts, *Ascaridia* spp., and *Trichuris* spp. Post treatments analysis indicated that chickens treated with *Panyawan* extract expelled internal parasite eggs in their feces; however, fecal egg counts increased compared to pre-treatment levels, suggesting limited anthelmintic efficacy at the administered doses. In contrast, the commercial dewormer exhibited the highest percentage reduction in fecal egg count, confirming its superior effectiveness against internal parasites. Based on these findings, it is recommended that future research explore the use of higher dosages of *Panyawan* extract to enhance its efficacy. Moreover, alternative formulations—such as powdered, encapsulated, or pelleted forms—should be developed to improve shelf life and ease of use. Further investigation into other ethnobotanical plants with anthelmintic properties is also suggested, particularly for potential synergistic combinations with *Panyawan* extract as a sustainable and organic deworming alternative for poultry production.

Keywords: *Tinospora rumphii*, Panyawan extract, native chicken, organic dewormer, anthelmintic efficacy, fecal egg count

Tracking Code: ASFI-17-14

Greenhouse Gas Fluxes from Paddy Rice Cultivation: Evidence from LI-COR Measurements and Mitigation Strategies

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Abstract

Rice paddies are recognized as significant anthropogenic sources of greenhouse gases (GHGs), particularly methane (CH_4) and carbon dioxide (CO_2), arising from complex soil–plant–microbe interactions under flooded conditions. Precise quantification of these fluxes is essential for advancing our understanding of biogeochemical processes and for parameterizing models of agroecosystem carbon dynamics. LI-COR gas analyzer systems, based on infrared gas detection and cavity ring-down spectroscopy, provide high-resolution, non-destructive measurements of CH_4 and CO_2 fluxes directly in the field. This research consolidates current evidence from LI-COR–based studies on rice cultivation, examining spatial and temporal flux variations across growth stages, water management regimes, organic amendments, and fertilizer applications. Mechanistic pathways of methanogenesis and CO_2 production are evaluated with emphasis on redox potential, root exudates, and microbial community dynamics. The reliability of LI-COR measurements of paddy rice by the collar method highlights advantages in detection sensitivity and real-time monitoring. Mitigation strategies, including alternate wetting and drying (AWD), mid-season drainage, biochar incorporation, and precision nutrient management, are assessed for their efficacy in reducing flux magnitudes without compromising yield. The integration of LI-COR flux data with process-based models and isotopic tracing is also discussed as a means of improving the predictive accuracy of GHG budgets in rice agroecosystems. Overall, this investigation demonstrates that LI-COR-enabled measurements provide critical insights into the drivers and controls of GHG emissions from rice paddies, supporting the development of mechanistically grounded and scalable mitigation practices.

Keywords: Methane emissions; Carbon dioxide fluxes; Rice paddies; LI-COR measurements; Mitigation strategies

Tracking Code: ASFI-17-15

Enhancing Survival of Freshwater Aquaculture Selected Tilapia (FaST) Strain using Disinfectants during Transport

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Abstract

Transportation-induced stress remains a major cause of mortality in tilapia aquaculture, particularly during handling and post-transport recovery. This study evaluated the effectiveness of salt baths and disinfectant treatments in enhancing the survival of Freshwater Aquaculture Selected Tilapia (FaST) strain under simulated transport conditions. Three experimental setups were conducted using non–fin-clipped, nearly fin-clipped, and completely fin-clipped FaST fingerlings. In the first experiment, non-fin-clipped fingerlings were subjected to salt baths at 0, 5, and 10 g/L for 8 hours prior to transport and cultured for 14 days. Survival was significantly higher in the 5 g/L and 10 g/L treatments (82.13%) compared to the control (58.45%), with no difference between salt concentrations. The second and third experiments evaluated the effects of disinfectants on nearly and completely fin-clipped fingerlings using four treatments: no disinfectant, 10 g/L NaCl, Betadine, and a NaCl–Betadine combination. Survival did not differ among the control, NaCl-only, and Betadine-only treatments in both fin-clipped conditions, while the combined treatment consistently resulted in higher mortality. Water quality parameters remained within optimal ranges throughout the study, indicating that observed differences were treatment-related. The results demonstrate that salt baths effectively improve survival in non-fin-clipped FaST tilapia, while single disinfectant treatments are safe for fin-clipped fingerlings; however, combined disinfectant application may induce additive stress and increase mortality.

Keywords: betadine, salt bath, transportation handling, survival, fin-clipped FaST

Tracking Code: ASFI-17-16

Development of *In-Vitro* Mass Propagation Protocol for Turmeric (*Curcuma longa* l.) using Tissue Culture Techniques

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Abstract

The growing demand for high-quality, disease-free turmeric (*Curcuma longa* Linn.) planting materials in the Philippines is limited by traditional propagation methods and the high cost of micropropagation. This study aimed to develop an efficient, cost-effective *in vitro* propagation protocol by optimizing sterilization, hormonal treatments, culture systems, and acclimatization methods. Results showed that 60% NaClO for 10–20 minutes provided optimal sterilization and survival. Murashige and Skoog (MS) medium supplemented with Thidiazuron (TDZ) at 2.0–2.5 mg/L promoted bud emergence, while 0.01 mg/L enhanced root development. The double-phase culture system (DPS) produced longer, heavier roots than the conventional system (CMS), though with higher contamination (35%) and lower survival (65% vs. 85%). Hydroponic acclimatization outperformed soil, yielding superior shoot and root growth with 100% survival. Additionally, hydroponic supplementation with 1.00 mL seaweed extract produced the most vigorous growth, while both low (0.50 mL) and excessive (1.50 mL) levels were less effective. Overall, the optimized sterilization, TDZ application, and hydroponic acclimatization significantly improved turmeric micropropagation efficiency, offering a practical approach for large-scale, high-quality plantlet production.

Keywords: hydroponic acclimatization, micropropagation, sterilization techniques, seeweed extract, shoot and root development

Tracking Code: ASFI-17-17

Sustainable Drying Innovation: Biomass-Powered Dryer for Climate-Resilient and Profitable Fish Processing

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Abstract

For centuries, sun drying has been the predominant method for fish preservation; however, its slow drying rate and the unpredictable weather often results in spoilage and contamination, while modern dryers powered by LPG or electricity are efficient, they entail higher operating costs. Hence, this study employed a developmental research method to design, fabricate, and evaluate the performance of a biomass-fired multi-layer fish dryer aimed at improving drying efficiency, climate resiliency, and profitability in dried fish processing. The dryer was designed for a 100 kg per batch capacity, targeting a drying temperature of 40 to 70 °C. The design was developed using SolidWorks CAD, and Computational Fluid Dynamics (CFD) simulations were conducted to optimize air temperature and flow distribution within the drying chamber. The dryer was fabricated with major components including the biomass furnace, fan assembly, air transition duct, drying chamber, control panel, indicator, exhaust fan, and exhaust vents. Performance testing followed PNS/BAFS 344:2022 – Methods of Test for Agricultural and Fishery Commodity Dryers at Capiz State University, while pilot testing was conducted with the Dumolog Dried Fish Association in Roxas City, Capiz, for cost–return analysis and operator acceptability. Results showed that in drying *Sardinella longiceps* at 55 °C, the drying time was 7.5 hours, drying rate 8.62 kg/hr, and heating system efficiency 64.29%, exceeding the 50% requirement under PNS/BAFS 342:2022. The final moisture content averaged 35.51%, and drying air temperature ranged from 52.75 °C to 58.13 °C. Operator evaluation rated the dryer as very good in ease of use and in producing dried fish comparable in quality to sun-dried products. Economic analysis revealed a net income of ₱407,530.69 per year, 77% return on investment, and a 1.3-year payback period. The developed dryer is technically and economically viable, and environmentally sustainable for fish drying applications.

Keywords: biomass-fired fish dryer; developmental research; drying efficiency; climate-resilient technology; postharvest processing; economic feasibility

Tracking Code: ASFI-17-22

Characterization of Soil Carbon and Nitrogen in the Paddy Agro-Ecosystems of Afghanistan

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Abstract

Paddy agroecosystems are crucial for food security in Afghanistan; however, a comprehensive scientific characterization of their soil fertility status is lacking. This study provides the first detailed assessment of soil carbon and nitrogen pools across Afghanistan's eight central rice-producing provinces. Soil samples (0-20 cm depth) were collected after the rice season and analyzed for total nitrogen (TN), total carbon (TC), carbon-to-nitrogen (C/N) ratio, soil organic carbon (SOC), nitrate nitrogen (NO_3^--N), and ammonium nitrogen (NH_4^+-N). The results revealed significant spatial variability in all measured parameters. TN was generally low, ranging from 0.17% to 0.60%, with only one site (KM) exhibiting a moderately higher value. TC and SOC also varied widely, with values from 1.38% to 4.27% and 3.85% to 12.78%, respectively. The C/N ratio exhibited a broad spectrum, ranging from 3.31 to 24.83, indicating divergent states of organic matter decomposition and nitrogen availability across regions. Inorganic nitrogen pools were highly variable, with NO_3^--N concentrations ranging from very low (2.84 mg/kg) to exceptionally high (195.67 mg/kg), while NH_4^+-N levels ranged from 7.74 to 12.78 mg/kg. These findings confirm our hypothesis that Afghan paddy soils possess low to moderate fertility with pronounced spatial heterogeneity. The data establish a critical baseline for soil health, highlighting specific regions where targeted management practices are urgently needed to enhance soil organic matter, optimize nitrogen use efficiency, and ensure the long-term sustainability of rice production in Afghanistan.

Keywords: Paddy soils, soil fertility, soil carbon, C/N ratio, Afghanistan

Tracking Code: ASFI-17-23

Impact of Nanofertilizer Application on Sugarcane Rhizosphere Microbiome Diversity: A Metagenomic Approach

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Abstract

Growing more food while protecting the environment is the primary concern in agriculture nowadays. Nanofertilizers present a promising alternative for sustainable agriculture by reducing dependence on conventional fertilizers. To fully realize their benefits, it is essential to understand how nanofertilizers influence microbial communities in the soil as the characteristics of the soil microbial community structure can be used as an important index to detect soil quality. Microbial communities in soil, also serve as major sites of nanofertilizer application. However, most of these microorganisms are considered unculturable, making culture-independent techniques crucial for studying them. To address this limitation, researchers have increasingly employed advanced tools such as metagenomics, which investigates the genetic composition of microbial communities, including unculturable microbes. This study aimed to evaluate the impact of nanofertilizer FertiGroe® N and FertiGroe® K on sugarcane rhizosphere microbiome diversity. Metagenomic analysis including next-generation sequencing was used. Results revealed that the relative abundance of bacterial and fungal groups at the phylum level and class level of samples with fertigroe observed an almost similar in abundance with the untreated control and bulk soil. There were also an increased in abundance of some fungal and bacterial genera under nanofertilizer-treated rhizosphere soil. Functional profiling of 16S rRNA gene sequences using PICRUSt2 revealed that the application of FertiGroe® N and K nanofertilizsers did not disrupt essential microbial metabolic functions. Majority of the fungal taxa are dominated by saprotrophs when analyzed using FUNGuild. This highlights their crucial role in organic matter turnover and soil health. Therefore, application of nanofertilizer does not inhibit but rather supports the proliferation of some beneficial microbial communities. These findings highlight the potential of nanofertilizers to serve as a sustainable and ecologically sound alternative to conventional fertilization practices.

Keywords: amplicon sequencing, bioinformatics, DNA, bacteria, fungi

Tracking Code: ASFI-17-27

Co-Designing Strip Cropping and its Effects on Arthropod Abundance and Crop Performance in Organic Arable Systems

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Abstract

Current cropping systems in Europe are highly simplified and intensified with few crops grown as sole crops (SC) or monocultures in large open fields and relying heavily on external inputs. Such systems contribute to biodiversity loss, pesticide resistance, climate change, and increases vulnerability to drought and market disruptions. Organic farming faces even greater challenges due to high yield variability and lack of quick solutions like synthetic fertilizers and pesticides. Although crop diversification practices such as intercropping and strip cropping can enhance sustainability by reducing inputs and increase biodiversity in organic farming, their adoption remains limited. This study aims to co-design and demonstrate feasible, multifunctional agroecosystems based on strip cropping of winter oilseed rape (WOSR) and winter wheat (WW), and pea (P), and to assess their effects on biodiversity and crop performance in southern Sweden. The experiment consists of sole crops of WOSR, WW, and P grown in strips (6 × 100 m), as well as intercrops of WOSR+P and WW+P grown in the same strip configuration. These treatments were established in four replicates in a randomized block design, alongside large reference (Ref) plots of 50 × 50 m, of each crop grown as SCs. We observed higher arthropod abundance in the strip treatments compared to the large Ref plots. There was also a tendency for higher grain yields at maturity in strip treatments of both WOSR and WW relative to their respective references. In contrast, pea yields were higher in the large Ref plot than in the SC pea strips, but lower than pea yields in the two intercrop treatments. We conclude that strip cropping is a promising agroecological approach that can simultaneously enhance biodiversity and improve crop performance. Overcoming barriers such as limited local adaptation, weak researcher–farmer knowledge exchange, and entrenched socio-technical lock-ins is essential for wider adoption.

Keywords: Agroecological approach, Biodiversity, Crop Diversification, Crop Performance, Organic farming, Strip Cropping

Tracking Code: ASFI-17-28

Crop Management vs. Rainfall: Determining the Key Drivers of Rice Yield in Partially Rainfed Production System of India

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Abstract

Increasing rice production in rainfed systems is difficult to achieve without a research-based, context-specific targeting strategy. This study provides a guiding framework for approaching rice yield improvement in one of India's largest rainfed rice producing regions. We investigate the relative contribution of crop management practices and seasonal rainfall on rice yields. Using cross-sectional data collected from 4,713 randomly selected farmers across 27 districts of Bihar state, we applied a Random Forest algorithm coupled with SHAP value interpretation to quantify global variable importance and local field-level effects of individual predictors on yield outcome. We employed 16 crop management variables alongside spatial rainfall data coinciding with rice growing period for yield modelling. Results highlight irrigation and its affordable access as the most powerful driver of rice yields, under partially rainfed conditions. Fertilizer management and weed control practices were the next strongest contributors. Rainfall exhibited heterogeneous effects: mid-season rainfall generally enhanced yields, while excessive late-season rainfall showed a negative influence. Although crop management factors collectively exerted a stronger direct influence of 74% on yield variability, rainfall functioned as an important moderator, shaping overall production environment. By integrating large-scale farmer data with interpretable machine learning, this study provides robust, field-realistic evidence on the relative and interactive roles of management and rainfall in determining rice yields. The findings offer actionable insights for improving productivity and resilience in partially rainfed rice systems and highlight the need for targeted interventions that combine improved management with strategies to buffer rainfall variability.

Keywords: India, management practices, rainfall, rice, yields

Tracking Code: ASFI-17-29

Soil Physicochemical Properties and Fungal Biodiversity Across Organic, Good Agricultural Practices, and Conventional Farming Systems in Benguet, Philippines: A Comparative Analysis

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Abstract

Agricultural soil management practices strongly shape microbial diversity, yet variations in fungal communities across farming systems remain insufficiently documented. This study investigated the physico-chemical properties and fungal biodiversity in three soil management systems: organic, Good Agricultural Practices (GAP), and conventional farming. It aimed to characterize soil properties, identify fungal species, and compare diversity among the three systems. Soil samples were analyzed for pH, organic carbon, total nitrogen, available phosphorus, exchangeable potassium, moisture content, and water-stable aggregates. Fungal identification was determined using sequence-based identification via Sanger sequencing to determine species composition, followed by biodiversity analysis using Shannon's Index and Simpson's Diversity Index. Results revealed distinct physico-chemical profiles among the three systems. Organic soil exhibited the highest pH (8.92) and substantial organic carbon content (9.07%), while GAP soil showed the highest organic carbon (12.07%) and moisture content (22.05%). Conventional soil displayed the lowest pH (6.72), organic carbon (5.94%), and moisture content (10.96%), but the highest available phosphorus (448.36 mg P/Kg). Fungal diversity varied considerably across management systems. Organic soil harbored the highest species richness with 9 fungal species, including Aspergillus ochraceus, Trichoderma koningiopsis, and Cladosporium cladosporioides. GAP soil contained 8 species, while conventional soil showed reduced diversity with only 5 species. Shannon Index values (Organic: 2.197, GAP: 2.079, Conventional: 1.609) and Simpson's Diversity indices (Organic: 0.889, GAP: 0.875, Conventional: 0.800) confirmed that organic systems support greater fungal diversity. Rhizopus stolonifer and Rhizopus oligosporus were present across all systems, suggesting their adaptability to various soil conditions. These findings demonstrate that organic and GAP management practices enhance soil fungal biodiversity compared to conventional farming, highlighting the ecological benefits of sustainable agricultural approaches for maintaining soil health and microbial community structure.

Keywords: soil management systems, fungal diversity, organic agriculture, microbial diversity, Good Agricultural Practices

Tracking Code: ASFI-17-30

Pastoralists' Willingness to Learn Climate -Smart Agriculture Practices: Implications for Sustainable Cattle Production in Arusha Region, Tanzania

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Abstract

Climate-smart agriculture (CSA) practices help the pastoralists to sustainably increase cattle productivity, improve climate resilience and protect the environment through mitigation of greenhouse gas emissions. The study analysed the socio-economic factors affecting the willingness of the Maasai pastoralists to learn CSA practices and examined the methods preferred by the pastoralists for learning. CSA practices selected for the study included improved fodder production and conservation, rainwater harvesting, rotational grazing, manure management, zero grazing and improved cattle breeds. Purposive and random sampling techniques were employed in selecting 270 pastoralists. Data was collected through a semi-structured questionnaire survey and analysed using descriptive statistics and logistic regression. From the descriptive results, majority of the pastoralists (74.8%) are willing to learn CSA practices. Logistic regression results revealed that age, land conservation concern, market-oriented production, and climate-related cattle mortality influence the willingness of the Maasai pastoralists to learn about CSA practices. Descriptive results also showed that the preferred learning methods for CSA practices are extension services (68.1%), pastoralists associations (61.5%) and community radio (50.7%). Agricultural policy makers should focus on providing training opportunities to the youth in the Maasai pastoral communities about CSA practices and ensure improvement and effective use of the preferred learning methods to disseminate important information, knowledge and skills to all pastoralists for better adaptation of CSA practices to enhance sustainable cattle production.

Keywords: climate-smart agriculture, Maasai pastoralists, sustainable cattle production

Tracking Code: ASFI-17-33

Climate Change Impact on Rice Yield in West Jawa, Indonesia

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Abstract

Indonesia ranks third largest country in rice production; however recently Indonesia could not achieve the rice self-sufficiency due to unstable climate condition. Particularly in 2023, drought caused by abnormal weather led to the lowest production in a decade, causing market prices to rise by approximately 15% due to the decline in supply. Furthermore, imports reached 3 million tons in 2023, seven times the previous year's volume. To keep the rice self-sufficiency, Indonesian government has set increasing rice production as a key policy goal, implementing various initiatives including promoting superior rice varieties, fertilizer subsidies, providing agricultural machinery, and developing irrigation infrastructure. However, recent climate change-induced extreme weather patterns expose the country to further risks of reduced yields. Java Island is a crucial production area, accounting for 50% of Indonesia's rice output. This study specifically focused on West Java, an agriculturally advanced region with well-developed irrigation systems dating back to the Dutch colonial era, to project climate change impacts using a rice yield prediction model. Comparing statistical yield data from 2000 to 2023 with calculated values showed the model accurately reproduced yield changes. Inputting climate data from 2024 to 2100 from the global climate model MIROC5 under the RCP8.5 scenario into the developed model to predict future yield changes revealed significant yield declines, particularly in areas with low irrigation rates, due to increased evapotranspiration caused by rising air temperatures.

Keywords: climate change, MIROC5, agricultural damage, risk assessment, Indonesia

Tracking Code: ASFI-17-35

Tomato Production in Kandal Province, Cambodia: A Review on Problem and Solution

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Abstract

Tomato (*Solanum lycopersicum*) production in Cambodia, especially in Kandal Province, continues to face major challenges such as soil-borne diseases, pest pressure, low input-use efficiency, and significant postharvest losses. These issues limit yield, reduce profitability, and undermine the long-term sustainability of production systems. Although practices like grafting and integrated pest management (IPM) have helped address some problems, many underlying constraints still remain. Electrokinetic treatment (ET) is an emerging technology that may offer a new and complementary solution. ET is the application of low-voltage electric fields to the soil through two electrodes. This process can stimulate the movement of ions, improve nutrient uptake, support soil remediation, and encourage root development. While ET has been widely investigated in environmental engineering and has recently gained attention for its effects on plant growth, it has rarely been tested in vegetable cultivation. This review synthesizes the current knowledge on tomato production constraints in Cambodia, explains the principles and potential agricultural uses of ET, identifies key research gaps, and proposes an experimental approach for testing ET in tomato cultivation. The analysis highlights that one of the challenges in tomato farming is poor nutrient availability and uptake, which closely aligns with the strengths of ET technology. By enhancing nutrient movement toward the root zone, ET could help improve plant growth and increase yields. Overall, ET shows strong potential as an innovative tool for sustainable agricultural development in Cambodia. It may help boost productivity while reducing its dependence on chemical inputs.

Keywords: Electrokinetic Treatment, ET, Tomato Production Constraint, nutrient movement

Tracking Code: ASFI-17-36

Baobab Seed (*Adansonia digitata*) Press Cake as a Soil Amendment for Improving Soil Quality in Dodoma Region, Tanzania

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Abstract

Agriculture remains central to Tanzania's economy and rural livelihoods, with maize serving as the dominant staple for food, income, and national food security. Yet maize production is increasingly at risk, particularly in semi-arid Dodoma, where long-term monocropping, continuous plowing, and overgrazing have intensified soil degradation leading to compaction, low permeability, nutrient loss, and steadily declining yields. Meanwhile, rural households widely depend on the African baobab (*Adansonia digitata*) for income and nutrition. Its seeds are commonly processed for oil, yet the remaining by-product, baobab seed press cake (BSPC), is often discarded as waste despite being organic, porous, and locally abundant. This study examined how communities use and manage baobab products and evaluated the effects of BSPC on key physical and chemical soil properties in degraded maize-growing areas. A structured household survey (n = 50) in Mkoka Village revealed universal involvement in baobab harvesting and processing, yet 76% of respondents reported disposing of BSPC, even though most expressed willingness to adopt value-adding uses. Laboratory experiments using sandy clay loam soils applied BSPC at 0%, 1%, 2%, and 4% under four compaction energies (1.6–3.6 kJ m^{-2}). BSPC significantly enhanced soil quality ($p < 0.05$): bulk density decreased from 1.65 to 1.48 g/cm^3, porosity increased to 34.6%, water-holding capacity improved from 55% to 61.25%, permeability rose to 1.68×10^{-2} cm s^{-1} at 4% under low compaction, and organic carbon, total nitrogen, pH, EC, and exchangeable bases increased. Effect size analysis confirmed BSPC rate as the primary driver ($\eta^2 = 0.88$). These findings reveal BSPC as both an underutilized livelihood asset and a promising, low-cost amendment for restoring degraded soils, supporting resilient maize production, and advancing circular bioeconomy pathways in semi-arid Tanzania.

Keywords: Baobab seed press cake (BSPC), Soil degradation, Maize production, Organic soil amendment, Semi-arid Tanzania

Tracking Code: ASFI-17-38

Soil Fertility Analysis of Farming Systems across Socioecological Production Landscapes in Santa Cruz Watershed, Philippines

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Abstract

Soil is a fundamental natural resource that sustains agricultural productivity and ecosystem functions. Maintaining soil fertility is crucial for food security and environmental sustainability, especially under changing climatic conditions. This study analyzed the soil fertility of farming systems across the socioecological production landscapes of the Santa Cruz Watershed, an important agricultural area in Laguna, Philippines. It aims to provide a scientific basis for decision-making that promotes sustainable agricultural practices, strengthens local soil management, and supports the long-term resilience of the watershed ecosystem. Three municipalities representing the watershed's elevation levels, low (Patimbao, Sta. Cruz), medium (Baanan, Magdalena), and high (Luquin, Liliw), were selected. A total of 55 soil samples were collected from different farming systems, including diversified and monocropped fields. Soil fertility indicators, particularly pH, organic matter (OM), phosphorus (P), and potassium (K), were analyzed, while nitrogen (N) was computed from OM. Multivariate analysis of variance tested the effects of elevation, farming system, and their interaction, followed by pairwise comparisons. Results revealed significant variations in soil fertility across both elevation and farming systems. Organic matter and nitrogen exhibited strong variability shaped by the combined effects of elevation and farming systems, indicating how altitude-driven changes and farming practices influence these properties. In contrast, soil pH, phosphorus, and potassium varied primarily across farming systems, suggesting that land use and crop composition exert strong influence on these properties than elevation alone. The findings highlight that soil fertility dynamics are shaped by the interaction between ecological conditions and human management practices. Strengthening site-specific interventions, such as organic matter enhancement, soil liming, and balanced nutrient replenishment, can sustain soil productivity, linking agricultural productivity and resilience within the socioecological production landscapes of the Santa Cruz Watershed.

Keywords: agroecosystem management, agroforestry, land-use practices, soil fertility indicators

Tracking Code: ASFI-17-39

Promoting and Strengthening of Urban Food Production: A comparative review of urban farms located in Barangay Mangga and Barangay Sto Cristo Quezon City, Philippines

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Abstract

Urban farming has been an active initiative of the Quezon City local government, which offers food security benefits and economic advantages for various target community members through the Hapag Kontra Gutom project. The Milan Urban Food Policy Pact (MUFPP), which consists of several indicators that contribute to the development of urban food security, has served as the foundation for various international local government strategies, programs, and projects related to urban food security. The study will investigate the challenges faced, programs implemented, and opportunities met by two urban farms located within Barangay Mangga and Barangay Sto Cristo for future application into other various locales of the city, considering the indicators laid out in the MUFPP Action 20, which tackles the promotion and strengthening of urban food production. This comparative review will explore the various strategies, dynamics, and mechanisms involved in the two top barangays in the city, as defined by the city's yearly urban farming competition. The review will consider rapid urbanization, community support, climate change, and the impact of government policies on the overall success and replicability of these farming developments. The analysis will delve into community integration, accessibility of the farms, policy support and communication, as well as site suitability based on the assessment of program stakeholders, which has contributed to the overall success of the farms in the Hapag Kontra Gutom programs of the local government. Overall, effective urban planning, promotion and communication strategies, and community involvement will be analyzed to determine their impact on studying locales and help integrate crucial recommendations and solutions to existing gaps and issues in promoting and strengthening urban food production, such as limited access to land, financial capacities, and environmental challenges.

Keywords: Urban Farming, Urban Food Security, Urban Planning, Sustainable Agriculture, Comparative Analysis, Milan Urban Food Policy Pact

Tracking Code: ASFI-17-40

Growth Performance of Buffalo (*Bubalus bubalis*) Calves Fed Fresh and Ensiled Guinea Grass Cultivars Harvested at 30- or 45-Days

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Abstract

No prior studies have compared the feeding value of fresh and ensiled Guinea grass cultivars grown in the microclimate of Visayas State University, Baybay City, Leyte, Philippines. This study evaluated the feeding value of two Guinea grass cultivars—Local Guinea grass (LG) and Mombasa grass (MG)—harvested at 30 and 45 days. Six test diets were prepared: fresh LG (FLG), fresh MG (FMG), and ensiled LG and MG harvested at 30 and 45 days (LG30, LG45, MG30, MG45, respectively). Twenty-four Murrah buffalo calves were blocked four times according to age and body weight, dewormed, and adjusted to the test diets with concentrate for 14 days. The feeding trial lasted for 90 days. The results showed that feeding either fresh or ensiled Guinea grass cultivars did not significantly improve ($P \geq 0.05$) the final weight, weight gain, average daily gain, dry matter intake, feed conversion ratio, hip height, and wither height of buffalo calves. Only the body condition score of buffalo calves fed with MG30, MG45, and FMG was significantly higher ($P \leq 0.012$) than that of FLG. These findings indicate that feeding fresh and ensiled MG can improve the body condition score, making it a promising forage option for ruminant diets.

Keywords: Buffalo, cutting interval, feeding value, mombasa

Tracking Code: ASFI-17-41

Future-Proofing Smallholder Farmers in Selected Communities in the Philippines through Organic Agriculture

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Abstract

A recent study conducted in upland farming communities in the Philippines revealed that the lack of and high cost of farm inputs were the main impacts of the COVID-19 pandemic on smallholder farmers engaged in a vegetable-based agroforestry system. Previous initiatives and capacity development projects centered on building the resilience and adaptive capacity of smallholder farmers through training and participatory technology development. However, central to resilience-building is their capacity to produce food with minimal reliance on external sources. Hence, this project addresses this gap by building the capabilities of smallholder farmers to engage in nature-positive food production. A pool of 10-15 farmer-trainors in three communities in Benguet, Quezon, and Nueva Vizcaya were trained in soil testing, organic agriculture, and agroforestry. One demonstration area in each project site was likewise established, incorporating organic farming practices such as crop diversification, mulching, cover cropping, composting and conservation tillage to promote soil health. After the training, the farmer-trainors have also begun producing their own organic plant supplement, Fermented Plant Juice (FPJ), and composts to improve soil fertility and plant growth without using synthetic fertilizers. One farmer-to-farmer training session was also conducted in each project site, aimed at sharing their knowledge on nature-positive food production with at least 10 farmers in their nearby communities or sub-villages. The 'expansion sites'have also established their own community demonstration farm showcasing organic farming practices, including the production of their own organic soil amendments. This capacity development promotes nature-positive food production to enhance resilience and future-proof smallholder farmers.

Keywords: farmer-to-farmer training, organic agriculture, resilience, agroforestry, mulching

Tracking Code: ASFI-17-43

Bioefficacy of Selected Plant Extracts on Pest Incidence, Damage Reduction, and Yield in Pechay (*Brassica chinensis* L.) Production

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Abstract

The field experiment aimed to evaluate the effectiveness of various plant extracts on pest incidence, severity, and damage in pechay (Brassica rapa L.) and to assess the yield response of pechay. Analysis of variance showed significant differences among plant extracts in their ability to reduce stripe flea beetle populations. Pechay treated with kakawate extract and vermin tea had significantly lower pest populations than those treated with oregano, turmeric, or organic herbal nutrients (OHN), while treatments with oregano, turmeric, and OHN performed similarly to the synthetic insecticide. Turmeric extract, kakawate extract, and vermin tea resulted in the least leaf damage. Conversely, oregano extract, OHN, untreated plots, and the synthetic insecticide caused over 50% damage to leaves and stalks. The highest marketable yield (365.75 g) was from plots treated with synthetic insecticides, whereas the greatest number of marketable plants was observed in plots treated with turmeric extract. Non-marketable yield was highest in plots treated with turmeric extract and synthetic insecticide. Overall, the results indicate that turmeric rhizome extract and OHN are effective in suppressing insect pests and possess great potential as sustainable alternatives to synthetic insecticides in pechay cultivation.

Keywords: bioefficacy, plant extract, pest incidence, sustainable alternatives

Tracking Code: ASFI-17-44

Coconut Farmers' Awareness and Adoption of Climate-Smart Technologies in Kabankalan City, Negros Occidental, Philippines

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Abstract

Climate change continues to threaten coconut-based livelihoods among smallholder farmers in rural communities. It presents significant challenges to coconut farmers that need to adopt climate-smart technologies (CSTs) designed to improve farm productivity and enhance resilience and sustainability under climate risks. CSTs are resilient and sustainable farming practices, tools and management options that promote environmentally sound coconut-based farming systems. This study assessed coconut farmers' awareness and adoption of CSTs and examined the role of extension services in promoting CSTs among coconut smallholder growers in selected barangays of Kabankalan City, Negros Occidental, Philippines. A total of 113 registered coconut growers were selected as respondents of the study through a simple random sampling. With a descriptive-correlational research design, data were gathered through a structured survey which were then analyzed using SPSS and enriched through focus group discussions (FGDs) and key informant interviews (KIIs). Descriptive statistics and chi-square analysis were used to analyze quantitative data. Findings reveal that while farmers demonstrate moderate awareness of CSTs, technology adoption remains low. Low adoption is constrained by financial limitations, perceived risks and resistance to change, and inadequate technical and institutional support. Results emphasize the critical role of government agencies and association-led training in translating climate-related science into locally relevant, solution-driven extension interventions. This study recommends enhanced financial assistance schemes, extension outreach and more relevant and inclusive farmer-led capacity-building initiatives that can be supported and scaled through digital and ICT-enabled advisory platforms. There is a need for strengthened institutional support and localized agricultural training programs for coconut smallholder growers. This will foster and strengthen climate-resilient and sustainable livelihood systems aligned with education for sustainable coconut farming practices and food innovation initiatives locally and globally.

Keywords: climate-smart technology, awareness, inclusive extension, climate risks

Tracking Code: ASFI-17-46

Development of Cogon (*Imperata cylindrica*) Plant-based Leather

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Abstract

The principal purpose of this research is to explore the potential of cogon grass (*Imperata cylindrica)* fiber, an invasive weed that affects agriculture, as a plant-based leather material. The researchers employed an experimental design, utilizing observation guides and laboratory tests as research instruments. The observation guides evaluated the physical appearance of different ratios of fibers, binders, and additives, as well as water absorption capacity, water vapor absorption, and thermal stability. Additionally, laboratory tests conducted at the Department of Science and Technology - Philippine Textile Research Institute (DOST-PTRI) assessed the tensile strength, tear resistance, and abrasion resistance of two variants, with and without backing. The developed plant-based leather's tensile strength and tear resistance are competitive with those of plant-based and synthetic leathers. It also demonstrated promising abrasion resistance and low water vapor absorption. Despite these positive findings, creasing, needle resistance, and seam integrity emerged as concerns. These features indicate potential, but further enhancements in production techniques and structural treatments are needed to match the robustness of animal leathers. Overall, this research highlights the significance of addressing the cogon grass issue, the environmental impact of conventional leather production, and promoting animal welfare by developing a novel, eco-friendly material that leverages the unique properties of these fibers. This could open up new possibilities for creating sustainable materials, contributing to environmental conservation, and generating livelihoods.

Keywords: cogon grass leather, Imperata cylindrica, bio-leather, sustainable material, environment-friendly material, experimental design

Tracking Code: ASFI-17-47

Determination of Pesticide Use and Perceptions of Farmers in Selected Municipalities of Laguna, Philippines

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Abstract

Pesticide use can negatively affect the farming community health. Eighty-five (85) farmers aged 30 to 79, from Calauan, Majayjay, and Victoria, Laguna, Philippines, were interviewed from September 2018 to June 2019. Of these, 96.4% of respondents reported spraying their fields with pesticides. Demographics, farming habits, crop type, pesticide usage, perceptions about pesticides, and history of adverse symptoms related to pesticides were collected. The rice black bug, Scotinophara sorsogonensis, and rice ear bug, Leptocorisa oratoria, were the most reported pests. In Calauan, day labourers were responsible for spraying (62.5%), while in Majayjay farmers joined their day labourers in applying pesticides (44.8%). In Victoria, farmers, day labourers, and family sprayed pesticides. Most farmer-respondents wore protective gear when they sprayed, however these were said to be cumbersome and restrictive, and some did not provide day labourers with protective gear, while others did provide these but did not enforce usage. Farmer-respondents from Calauan, Victoria, and Majayjay were aware of the relationship between the safe usage of pesticides and human life due to seminars hosted by the Municipal Agricultural Office and private stakeholders such as agrichemical companies. However, adherence to Philippine Fertilizer and Pesticide Agency regulatory guidelines were lacking, (1) identification of pests and pesticide matching, (2) following recommended spraying times, (3) storage of pesticides, (4) disposal of empty containers, and (5) adherence to medical protocols after pesticide exposure. Local pesticide dealers and manufacturers did not adhere to product stewardship guidelines, (1) provision of protective clothing and equipment for consumers, (2) provision of necessary training on safe handling, usage, and disposal of pesticide products and empty containers, and (3) participation in the safe disposal of pesticide containers. Farmer respondents relied heavily on day labourers that did not have the same access to information about safe pesticide handling and could not guarantee adherence to safety protocols.

Keywords: pesticides, pesticide use, agricultural pests, agrichemical usage, policy adherence

Tracking Code: ASFI-17-48

Effect of Transglutaminase (EC 2.3.2.13) on the Physicochemical, Structural, and Textural Properties of Hybrid Plant Meat

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Abstract

Hybrid plant-meat (HPM) products have gained substantial market traction over the past decade, yet their texture often remains inferior to that of conventional animal meat. This study evaluated the effect of transglutaminase (TGase, EC 2.3.2.13) on the physicochemical and structural properties of HPM nuggets formulated from soy protein, oyster mushroom, and chicken. TGase was incorporated at four levels (0 %, 0.5 %, 1.0 %, and 2.0 %). Color parameters (L*, a*, b*), texture profile analysis (TPA), microstructure (scanning electron microscopy, SEM), and proximate composition were measured. Color analysis showed no significant differences in lightness (L*) or yellowness (b*), while redness (a*) increased significantly with higher TGase concentrations. Hardness increased with TGase treatment, rising from 121.07 ± 2.50^{a} in the control to 149.1 ± 5.28^{c} at 2% TGase. Firmness also improved from 1.78 ± 0.09^{a} in the control to 2.25 ± 0.17^{bd}, 2.07 ± 0.18^{cd}, and 2.18 ± 0.15^{bd} at 0.5%, 1.0%, and 2.0% TGase, respectively. The improvements of the texture detected at 0.5%, 1% and 2%, reflecting the protein cross-linking and increased matrix stability. SEM revealed that increasing TGase levels promoted denser microstructures with smaller pores, indicating improved gel formation and tighter protein interactions. The proximate composition, no significant differences were observed in fiber and fat content among HPM nugget. In contrast, protein content increased with higher TGase levels, rising from 15.84 ± 0.53^{a} in the control (0%) to 17.34 ± 0.34^{b} at 0.5%, 17.76 ± 0.27^{b} at 1.0%, and 18.62 ± 0.43^{c} at 2.0% TGase. Additionally, carbohydrates and fat in all levels of TGase treatment are significantly different. In conclusion, incorporating TGase into hybrid plant meat nuggets enhance their textural firmness, hardness, and microstructural density without altering visual color attributes. These improvements suggest that TGase is a promising functional ingredient for elevating the sensory quality and consumer acceptance of hybrid plant-based meat products.

Keywords: Hybrid plant-meat (HPM), Transglutaminase EC 2.3.2.13 (TGase), Texture profile analysis (TPA), Color parameters (L*, a*, b*), Scanning electron microscopy (SEM), Protein cross-linking

Tracking Code: ASFI-17-49

Comparing Agricultural Practices in Rice Farming Systems: A Study of Living Lab Members Versus Non-Members in the RomSay Sok Community, Battambang Province, Cambodia

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Abstract

Rice production systems in Cambodia are undergoing rapid intensification, characterized by increasing use of agrochemical inputs such as synthetic fertilizers and pesticides. This shift raises concerns regarding human health, environmental impact, and food safety. In this context, a Living Lab (LL) was established in Rom Say Sok community (RSS) in 2022 to address the question of health. This study aimed to characterize agricultural practices in rice cropping systems and to measure, after one year of activities, if there is a change by farmers engaged in the living lab. The research was conducted using a quantitative survey of 46 farmers (23 farmers engaged in the living lab and 23 non-LL farmers, conducted from March to April 2025, and 8 villages in the Cheu Teal and Phnom Sampov communes of the Bannan district in Battambang province, Cambodia. The main result is that the overall usage patterns of mineral fertilizers and pesticides remained similar between Living Lab and non-Living Lab groups. However, we found that some Living Lab farmers used biofertilizer, liquid compost, EM fertilizer, and natural pesticides on their rice crops. In contrast, none of the farmers in the non-LL group used these practices. Hence, although some Living Lab farmers applied more organic fertilizers and natural pesticides, these efforts have yet to produce notable changes in overall farmer practices. Improvements in soil fertility and reductions in pesticide usage remain at the experimentation stage in the LL but some positive results after only one year show the interest of farmer in this participatory approach.

Keywords: Living Lab, Health, Innovation, Agricultural practices

Tracking Code: ASFI-17-54

Mortality Loss in Pangasius Catfish Grow-out Farming: Stage-Based Evidence from Smallholder Aquaculture in Cambodia

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Abstract

Food loss in aquaculture is a major challenge for farm profitability and food system efficiency, yet evidence at the farm level remains limited. This study investigates the occurrence of food loss, the magnitude of mortality loss, and the key drivers of mortality loss among Pangasius catfish farmers in Cambodia. Using purposive and snowball sampling, 122 farmers in Kampong Chhnang, Kandal, and Prey Veng provinces were interviewed across production stages, including seedling transportation, grow-out sub-stages, pre-harvest, harvest, and market distribution. Descriptive statistics summarized the incidence of food loss and the magnitude and drivers of mortality loss at each stage of production. At the same time, nonparametric tests and regression analyses examined patterns of mortality loss and their relationships with farmers' socioeconomic characteristics and production and management practices. The results show that most food loss is attributable to mortality, particularly during the grow-out stage, with 94.3% of farmers reporting fish losses. The first month of the grow-out stage revealed the highest mortality incidence (80.4%). Mortality loss was concentrated during the grow-out stage, with a moderate magnitude (median 5.0%; whole-cycle production median of 6.2%), but highly skewed distributions and occasional extreme losses (over 70%). The analysis found only weak associations between mortality loss and farm-level factors, while sudden biological and environmental problems, such as disease, poor water quality, and weather stress, appeared as the primary drivers. These results suggest that interventions targeting specific production stages are likely to be more effective than general farm-wide strategies for reducing mortality loss in Pangasius catfish production.

Keywords: mortality loss; food loss; aquaculture; Pangasius catfish, grow-out farming; Cambodia

Tracking Code: ASFI-17-55

Effect of Lead Toxicity Stress on the Antioxidant Property of *Andrographis paniculata* (Burm. f.) Nees.

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Abstract

In this greenhouse study, the common medicinal plant *Andrographis paniculata* exhibited tolerance to high levels of lead (Pb) in the soil. The plant showed no visual symptoms of lead toxicity when 200, 400, 600, 800, and even the highest concentration of 1000 ppm Pb was added to the soil. Antioxidant activity of the plant under increasing Pb toxicity stress was estimated by measuring the total phenolic content and determining the antioxidant activity using the 1,1-diphenyl-2-picryl-hydrazyl (DPPH) assay. Antioxidant activity of the plants expressed as Percent Free Radical Scavenging Activity (% FRSA) significantly increased with increasing concentration of Pb applied to the soil with the highest antioxidant activity obtained in plants applied with 1000 mg/L lead (49.29%) compared to the control (42.58%), suggesting that when the plants were exposed to increasing Pb toxicity stress, they responded by increasing their antioxidant activity to mitigate the stress. The total phenolic content of the plants was found to increase when 200 mg/L lead was applied compared to the control, but when the concentration was increased further to 400, 600, 800 and 1000 mg/L, phenolic content remained unchanged and were not statistically different from each other, suggesting there may have been other antioxidant compounds produced by the plant, other than phenolic compounds, which greatly contributed to the observed high antioxidant activity at high Pb concentrations.

Keywords: phenolics, free radical scavenging activity, lead tolerance, heavy metal stress

Tracking Code: ASFI-17-60

Determinants and Barriers to Innovation Adoption in Ferula Assa-foetida Cultivation in Herat province, Afghanistan

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Abstract

This study identifies the factors influencing the adoption of *Ferula assa-foetida* cultivation among farmers in Herat Province, Afghanistan. A descriptive–analytical methodology was employed, with the statistical population comprising farmers operating in areas agro-climatically suitable for this crop. Data were collected via a structured questionnaire and analyzed using both descriptive and inferential statistics—specifically, chi-square tests, the Mann–Whitney U test, and discriminant function analysis. The results revealed that within the innovation attributes framework, observability and relative advantage were the most significant factors differentiating adopters from non-adopters. The derived discriminant function accurately classified 97% of cases based on adoption status. At the individual level, farmer education and age also exerted a decisive influence. Key adoption barriers were identified as: limited land ownership and insecure tenure, lack of financial capital, difficulties in procuring agricultural inputs, inadequate extension and training support, and the absence of robust marketing structures. Consequently, the findings indicate that enhancing extension services, developing sustainable market linkages, and providing targeted credit and insurance mechanisms are critical for promoting *Ferula assa-foetida* cultivation. For effective scaling, policymakers and rural development institutions must leverage local capacities while systematically addressing these underlying socioeconomic constraints.

Keywords: Ferula assa-foetida, Adoption of innovation, Agricultural extension, Farmers' decision-making, Herat Province

Tracking Code: ASFI-17-61

Digital Transformation of Social Media on Small-Scale Dairy Family Agribusinesses in Bangladesh: Application of Technology Acceptance Model (TAM) Theory

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Abstract

The digital transformation of social media has significantly impacted small-scale family agribusinesses, particularly among dairy farmers. The study explores and analyzes social media's transformative role in enhancing the growth, market access, and operational efficiency of small-scale family dairy agribusinesses. A structured questionnaire was used to collect data from 380 smallholder farmers through convenience random sampling in March-April 2024, focusing on demographics, farm characteristics, social media use, and challenges. The collected data were analyzed using descriptive statistics, inferential statistics, and Partial Least Squares Structural Equation Modeling (PLS-SEM) through the SmartPLS04 software to achieve the study's objective. The findings revealed that most farmers had positive perceptions toward adopting social media, as the digital transformation of social media showed a positive and significant association with the growth of family dairy agribusiness in Bangladesh. However, the usage of social media platforms remains low, particularly for family agribusiness purposes. Most farmers have yet to fully leverage social media's potential for marketing, advertising, and connecting with extension agents and livestock institutions. The study recommends that the government implement cost-subsidization policies for social media platforms to support smallholder farmers. Extension organizations and advisory services should offer capacity-building programs to educate farmers on effectively utilizing social media for agricultural purposes. Policymakers should promote affordable access to social media, implement digital literacy training, and support capacity-building initiatives to help small-scale dairy farmers leverage social media for marketing, networking, and agribusiness growth.

Keywords: Digital literacy; Capacity-building; Small-scale dairy farmers; Agribusiness growth

Tracking Code: ASFI-17-63

Effectiveness of a Light-Touch Intervention on Hygiene Practice to Improve Pork Safety in Cambodian Traditional Markets

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Abstract

In low- and middle-income countries (LMICs), animal-sourced food sold in traditional markets plays a crucial role because of its importance for livelihoods and concerns about food safety. Light-touch interventions can change practice (*by nudging*) and are especially well-suited to contexts with high demand for food safety**.** ***This study aimed to assess improvements in hygiene practices in pork from traditional markets in Cambodia, using total bacterial count and Salmonella as indicators***. A randomized controlled trial was designed in 12 trial and 12 control markets in 6 provinces in Cambodia in 2022. The intervention package included the provision of shop equipment and training on good hygiene practices. Pork sampling (for total bacteria count, TBC, and *Salmonella* contamination (n_control = 180; n_trial = 180), and Knowledge, Attitude and Practice (KAP) evaluation were conducted and analyzed. The results showed low to moderate compliance among pork vendors in applying cleaning and disinfection spray to shop equipment, and hands were observed in the trial group, resulting in a low reduction in microbial contamination. While there was a slight reduction of total bacteria count load and *Salmonella* prevalence in pork, there was no significant difference between the trial and control groups (n=180). A major issue was that the entire intervention period occurred during the COVID-19 pandemic, which disrupted follow-up and monitoring**.** Vendor's behavior regarding cleaning and disinfection practices at the shop needs to be followed up during the intervention period. Stronger policy engagement and consumer recognition of the vendor's food safety practices are required to strengthen vendors' compliance with the intervention packages. This result could serve as an indicator of how incentives and an enabling policy environment influence improvements in both food hygiene practices and indicators. Scale up this low-cost intervention to improve hygiene practices and reduce microbial contamination.

Keywords: Food safety, hygiene practice, intervention, traditional market, pork retailer, retail shop

Tracking Code: ASFI-17-65

Extraction of Calcium from Chicken Eggshells for Nutritional Supplementation

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Abstract

Calcium is an essential mineral for human health, playing a critical role in bone growth, muscle function, nerve signaling, and cardiovascular regulation. Inadequate dietary calcium intake is common in many regions, particularly in Asia, where deficiency can lead to osteoporosis and other health issues. Chicken eggshells, a byproduct of the poultry industry, are rich in calcium carbonate and represent a low-cost and sustainable source of calcium. This study aimed to extract calcium from chicken eggshells using lactic acid at varying concentrations (12%, 14%, 16%, and 18%) to produce calcium lactate. Eggshell powders (100 g) were treated with 400 mL of lactic acid solution, and the resulting calcium products were analyzed for yield, solubility, pH, and chemical composition. The results indicated that increasing lactic acid concentration improved total calcium recovery, reduced residual waste, and influenced product characteristics. The highest calcium content and solubility were obtained using 18% lactic acid, while pH values remained within an acceptable range for nutritional applications. Statistical analysis ($P < 0.05$) confirmed significant differences in calcium yield and solubility among treatments. The study demonstrates that chicken eggshells can be effectively processed into calcium supplements, offering a cost-effective and environmentally sustainable approach to improve dietary calcium intake and reduce agricultural waste. The findings support the development of functional food products that enhance public health while promoting waste valorization in Cambodia.

Keywords: calcium, eggshell, lactic acid, calcium lactate, nutritional supplement, waste valorization

Tracking Code: ASFI-17-66

Evaluation of Consistency and Accuracy of Four Cropland Datasets for Cropland Mapping in Cambodia

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Abstract

Accurate cropland mapping is vital for agricultural management in countries that heavily depend on agriculture, like Cambodia. Despite the widespread availability of satellite-derived cropland datasets, significant spatial and quantitative discrepancies persist among existing products, impeding further applications of these datasets. Moreover, the factors influencing their consistency are unknown. This study evaluated the performance of four major cropland maps for Cambodia in 2023: three global products at 10 m resolution (ESRI, Dynamic World, and GLC_FCS10) and one regional product at 30 m resolution (RLCMS). A comparative analysis was conducted across four distinct agro-ecological zones in Cambodia: Coastal zone, Plateau and Mountainous zone, Tonle Sap Lake zone, and Plain zone. Accuracy assessments using ground-truth samples derived from high-resolution Google Earth imagery revealed substantial variability in product performance. GLC_FCS10 achieved the highest accuracy in the Coastal zone (86.25%). The 30m-resolution RLCMS map proved most effective in the Plateau and Mountainous zone and the Tonle Sap Lake zone with accuracies exceeding 82%, while the ESRI product yielded the highest accuracy for the Plain zone (82.85%). Significant areal inconsistencies were identified across all four cropland maps and zones, with products underestimating the actual cropland area by up to 83% or overestimating it by up to 11%. The lowest spatial inconsistency among the maps was found in the Plain zone (57%), while the highest disagreement was observed in the topographically complex Plateau and Mountainous zone (95%). These inconsistencies are likely due to the varying classification accuracies of the cropland maps, cropland fragmentation, and agricultural management practices. These findings provide key insights for careful selection of the products based on regional geographic characteristics and for future cropland mapping efforts, especially in highly inconsistent areas.

Keywords: consistency, accuracy, cropland mapping, agricultural management, Cambodia

Tracking Code: ASFI-17-67

Improvement of Postharvest Quality and Shelf Life of Tomatoes (*Solanum lycopersicum*) Using Water Treatment and Aloe Vera Gel Coating

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Abstract

Tomato (*Solanum lycopersicum*) of syngenta variety is a climacteric fruit and is widely consumed by people of the world. The postharvest life is normally short and susceptible to the risk of damage and spoilage due to soft skin and flesh leading to high respiration rate. Application of hot water treatment could control infection, maintaining quality and improving the shelf life. Because the spoilage microorganism is on the surface or in the few upper cell layers of the fruit, hot water treatments are applied for a short time. Combination of hot water treatment with environment friendly coating such as aloe vera gel could overcome the postharvest losses due to delaying the respiration rate and minimizing the microbial growth; therefore, promote marketable life of fruit. The objective of this study is to improve the storage quality and shelf life of tomato through application of hot water treatment and aloe vera gel coating. The tomato fruits were purchased from local market, washed and soaked in tap water for 20 minutes and hot water (40°C) for 30 seconds in hot water bath. Then the fruits were coasted without aloe vera gel and with 15% and 20% of aloe vera gel. The fruits were stored in room temperature for 18 days and changes in weight loss, total soluble solid (TSS), pH, color, firmness and decay were observed and recorded every 3 days. The data obtained were statistically analyzed using IBM SPSS Statistic 20 software, ANOVA repeated measure to find out the significance among the treatments. The level of significance used is ($p < 0.05$). The results showed that weight loss increased with storage time in all treatments. Hot water treatment with 20% aloe vera gel is more suitable than other treatments showing the lowest weight loss. Application of aloe vera gel at 20% and hot water treatment delayed pigment changes, slow pH and TSS increase and reduce decay rate. In conclusion, application of hot water treatment at 40°C for 30 seconds and using of aloe vera gel generally help to control quality of mango.

Keywords: tomato, aloe vera gel, hot water

Tracking Code: ASFI-17-68

Scarebot: A Solar-Powered Bird Deterrent System with Computer Vision-Based Bird Detection

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Abstract

This study presents the development and evaluation of a Scarebot, an automated bird-deterrent system designed to reduce agricultural losses caused by severe bird intrusion. The Scarebot integrates multiple deterrent mechanisms, including laser emission, sound generation, and coordinated arm and head rotation, to disrupt bird activity and prevent habituation. These features operate under a mode-based control scheme to enhance deterrence effectiveness across varying field conditions. Experimental results demonstrate that the Scarebot significantly reduced both bird presence and the duration of bird stays in agricultural fields when the system was active. Statistical analysis confirmed the effectiveness of the deterrent mechanisms, with consistent reductions in bird intrusion. The system achieved an average bird detection accuracy of 72.42%, indicating reliable real-time identification and activation of deterrent responses. The Scarebot is powered by a solar energy system, enabling continuous operation for up to 12 hours at full capacity. This confirms the system's suitability for extended outdoor deployment and highlights its potential as a sustainable, low-maintenance solution for agricultural environments. Overall, the results demonstrate that the proposed Scarebot is an effective and energy-efficient solution for managing bird activity in agricultural fields. The integration of multimodal deterrent mechanisms, autonomous operation, and renewable energy support positions the system as a practical alternative to traditional bird-scaring methods. Future work will focus on improving detection accuracy and evaluating long-term field performance across diverse crop types and environmental conditions.

Keywords: agricultural automation, bird deterrence, computer vision, solar-powered system

Tracking Code: ASFI-17-69

Optimization of Packaging Conditions in the Postharvest Handling Improvement of Okra (*Abelmoschus esculentus* L.) Pods

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Abstract

Okra (*Abelmochus esculentus* L.) is a widely cultivated vegetable in the Philippines, particularly in Oriental Mindoro, where it serves as a significant source of income for smallholder farmers. Due to its high perishability, okra is prone to rapid postharvest deterioration, which significantly affects marketability. This study aimed to determine the effects of packaging conditions, specifically the thickness of Low-Density Polyethylene (LDPE) film, the number of perforations, and the diameter of perforation holes, on the postharvest quality of okra pods. The experiment was designed using a Box-Behnken (BBD) design in Response Surface Methodology (RSM) to evaluate seven postharvest quality parameters: color change, visual quality rating (VQR), days with>5% weight loss, browning index, shriveling index, disease index, and firmness. Among these parameters, VQR and days with weight loss exceeding 5% were significantly influenced by the interaction between packaging variables. Optimization analysis identified a 42.48 μm film thickness, 17.19 perforations, and 2.80 mm perforation spacing to preserve okra pods. A verification study was conducted using a close practical setup with a 40 μm film thickness, 20 perforations, and a 3 mm perforation diameter. The results validated the model's prediction, showing improved visual quality and delayed deterioration. Although other parameters showed no significant changes, the study confirms that appropriate packaging configurations can substantially improve postharvest management and marketability of okra pods. These findings provide valuable insights for farmers and supply chain stakeholders seeking cost-effective storage conditions.

Keywords: okra pods, postharvest quality, packaging conditions, visual quality rating, response surface methodology

Tracking Code: ASFI-17-70

Indirect ELISA for Brucellosis Disease and Lumpy Skin Disease at Svay Rieng and Prey Veng Province, Cambodia

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Abstract

LSD is a viral infection caused by a member of the Poxviridae family, specifically the Capripoxvirus genus, and is transmitted primarily through hematophagous arthropod vectors. Although the disease generally exhibits a low mortality rate, it has significant economic impacts due to reduced cattle productivity, including lower milk yield, miscarriages, infertility, and hide damage. Brucellosis, a highly contagious zoonotic disease, presents a serious concern due to its high morbidity rate and potential to cause lifelong sterility in cattle. Serological testing methods, particularly Enzyme-Linked Immunosorbent Assays (ELISA), are utilized to detect exposure to both Brucella spp. and the LSD virus in cattle populations. The objective of this study was to detect the presence of immunoglobulin G (IgG) antibodies in serum samples post-recovery. The sample-to-positive ratio (S/P ratio) was calculated to interpret test results, with S/P % values <20% indicating a negative result and S/P % values ≥20% indicating a positive result. The research was conducted in two provinces of Svay Rieng and Prey Veng, Cambodia, from July 2021 to January 2022. The sample size was calculated base on the formular for detecting at least one positive. The final sample size comprised 300 cattle (227 from Svay Rieng and 73 from Prey Veng). The result identified only one case of antibody titer of brucellosis in Svay Rieng, with no cases detected in Prey Veng. Conversely, antibody titer of LSD was notably highly detected in Prey Veng, accounting for 80% of the cattle tested, compared to 69% in Svay Rieng. Body condition scoring revealed that 66.7% of the tested cattle had a Body Score (BS) of 4, indicating good overall condition. The findings indicate a high incidence of Lumpy Skin Disease (LSD) in the surveyed regions, with cattle often developing natural immunity post-recovery. The disease poses a significant risk of economic losses due to its adverse effects on cattle productivity. This underscores the critical need for implementing effective preventive measures to mitigate its impact. Although brucellosis was infrequently observed in the study areas, its potential for rapid transmission and its capacity to induce abortions in both cattle and humans.

Keywords: Zoonosis, Brucellosis, LSD, Antibody, ELISA

Tracking Code: ASFI-17-72

Quality of Pickled Bamboo Shoots Using Natural Fermentation and the Addition of *Lactococcus lactis* and *Lactobacillus plantarum*.

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Abstract

Pickled bamboo shoots are a popular fermented staple in Cambodia, valued for their extended shelf life and reduced hydrocyanic acid (HCN) levels. This study aimed to determine the most effective fermentation method by comparing natural processes with the addition of specific starter cultures. The research evaluated the chemical properties (pH, water activity, total acidity, and Vitamin C content), sensory attributes, and microbiological safety of the final product. The study included four different treatments: 1). Control Natural (T_{CN}): Just only ingredients were added, 2). Control + *E. coli* (T_{CE}): Indicator *E. coli* at 10^5 CFU/g was added, 3). *Lactococcus lactis* + *E. coli* (T_{LE}): *Lactococcus lactis* at 10^8 CFU/g was added along with Indicator *E. coli* at 10^5 CFU/g, 4). *Lactobacillus plantarum* + *E. coli* (T_{PE}): *Lactobacillus plantarum* at 10^8 CFU/g was added along with Indicator *E. coli* at 10^5 CFU/g. The other ingredients used in the same proportions included fresh bamboo shoots, garlic, salt, sugar, fish sauce, red chili, monosodium glutamate, and water. The results indicated that the fermentation method significantly influenced the chemical and microbiological profiles of the pickles. The *Lactobacillus plantarum* treatment yielded the most superior results, achieving a lactic acid bacteria count of 9.91 log CFU/g. Notably, *Lactobacillus plantarum* effectively eliminated *E. coli* within 48 hours, significantly faster than the *Lactococcus lactis* treatment (3 days) and natural fermentation (5 days). Sensory evaluations involving 32 participants confirmed a significant preference for the *Lactobacillus plantarum* treatment. Furthermore, the absence of Coliform bacteria across all treatments confirmed the microbiological safety of the products. In conclusion, the addition of *Lactobacillus plantarum* as a starter culture is the most effective method for enhancing the safety, quality, and consumer acceptance of pickled bamboo shoots.

Keywords: *Lactobacillus plantarum*, *Lactococcus lactis*, Bamboo Shoots, Fermentation, Food Safety, Cambodia

Tracking Code: ASFI-17-73

Characterization of Escherichia coli and Salmonella spp. in Cambodian Fermented Fish and Vegetables

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Abstract

In Cambodia fermented fish and vegetable are play an important role in a daily dish such as main dishes, side dishes, or seasonings. Generally, fermented product in Cambodia produced by Spontaneous ferments method whereby the food can be fermented naturally by microorganisms. Since it's produced in a small or medium scale using traditional methods, and the processing steps are poor in hygiene practices. It's easier to for pathogenic bacteria to grow. The aim in this study was to provide the physicochemical properties and microbiological hazard contaminated in fermented product and also study about the characterization of isolated bacteria from the samples. A total of 134 fermented foods were collected from 4 provinces, which locates next to the Tonel Sap Lake. The conventional culture methods for microbiological analysis and include the use of API 20E Kit use for identification of bacteria species. The major contamination rate of *E.coli* was (35%) of total fermented samples, follow by *Proteus* spp. (19%), *Providencia* spp. (4%) and *Citrobacter* spp. (1%). The other 2% species bacteria refer to the bacteria from Enterobacteriaceae family such as, *Enterobacter aerogenes, Morganella moganii and Klebsiella oxytoca.* The result of salt and pH tolerance proved that those isolated bacteria have no ability to survive at high salt concentration (≥10%) and low pH concentration (pH ≤4). The results showed that the manufacture, distribution, and domestic management of fermented foods all need to be reconsidered. Further research is required in order to establish appropriate preservation methods in Cambodia.

Keywords: *E.coli*, *Salmonella* spp., Fermented vegetable and fish

Tracking Code: ASFI-17-74

Development of Snack Products from *Rasbora rhrgma* through Dehydration Methods

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Abstract

The Great Lake had offered various kinds of fish, and it should be able to generate a variety of products, but only a few processed fish products as mentioned above were produced. Since small fish species have lower market value, making them more accessible to low-income individuals, especially during the highest-producing seasons limited-value fish are those with limited commercial worth due to small size, or low customer demand. small fish species often have lower market value, especially during the highest-producing seasons. This study explored the potential benefits and opportunities associated with producing dried small fish snacks in Cambodia. Specifically, it investigated the dehydration method for making proper fish snack products and analyzed the quality of the final products in terms of chemical and biological properties. Nine different drying treatments were applied, varying temperature (50°C, 60°C, and 70°C) and air velocity (0.3 m/s, 0.5 m/s, and 0.7 m/s). The statistical analysis was significant at ($P \leq 0.05$). The quality parameters (Protein, crude fat and Ash). as the chemical analysis revealed variations in fat (19.60% to 28.49%), protein (41.34% to 49.22%), moisture (5.38% to 18.68%), and ash content (7.23% to 13.20%) across the treatments.

Keywords: *Rasbora rhrgma,* dehydration, chemical properties, biological properties

Tracking Code: ASFI-17-75

Response of Rice (*Oryza sativa* L.) to Biostimulant Application under Simulated Salinity Stress

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Abstract

Vietnam's Mekong Delta, the top rice-producing area, is facing production loss due to saltwater intrusion. Biostimulants have been extensively studied for their potential to improve growth, nutrition, quality, yield, and abiotic stress tolerance in rice plants. This study investigates the optimal concentration and timing for a plant extracts derived biostimulant (PEDB) application to alleviate salt-induced stress in rice plants. A single-factor experiment was arranged in a randomized complete block design (RCBD) with four replications. Six treatments were tested: five treatment were exposed rice plants to 4‰ salinity (one untreated with PEDB as a negative control, four were treated with PEDB at concentrations of 3,000 and 5,000 ppm at two schedules, each schedule at three times at 3, 10, 20 day after sowing (DAS) and 10, 17, 27 DAS, respectively), and one control treatment under normal conditions. The results showed that PEDB treatments had positively affected the growth, development, and yield of rice plants under saline conditions, but not met with those observed in the control group. Notably, application of PEDB at a concentration of 5,000 ppm at 10, 17, and 27 provided the most significant improvements in rice plant growth under salinity stress, as indicated by increases in root length, plant height, number of effective tillers, panicle length, number of filled grains, and actual yield by 27.3%, 2.6%, 44.7%, 3.9%, 34.1%, and 22.2%.

Keywords: Salt tolerance, biostimulants, *Oryza sativa*, rice

Tracking Code: ASFI-17-78

Protecting the Relevance of Public Agricultural Extension in the United States

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Abstract

The United States Agricultural Extension Service was created with the Smith-Lever Act of 1914. The act was established to bring university research to farmers and rural families. Building on the 1862 Morrill Act (Land-Grant Colleges) and 1887 Hatch Act (Research Stations), the Extension Service, guided by the United States Department of Agriculture (USDA) and land-grant universities, deployed agents to provide practical education in agriculture, home economics, and youth development directly to the public. Extension in Georgia was introduced by Senator Hoke Smith, who created a partnership between federal, state (University of Georgia), and county governments to deliver research-based agricultural and home economics info to rural Georgians. Such was built on earlier county corn clubs and demonstration work that began in 1904. Extension has become a vital part of the University of Georgia, focusing on practical education for farmers, homemakers, and youth. Extension in Georgia has prided itself on providing research-based, non-biased, recommendations to farmers to help them remain profitable. Such effort has resulted in the trust of generations of farmers for Extension agents. Today, public agricultural Extension is under significant pressure, in part to the decline in people involved in farming, the decline in the agricultural sector resulting in reduced political support, Extension's struggle to document economic benefits, farmers now have access to other information sources, and universities increased focus on grantsmanship and scholarly output. For Extension to remain relevant in the future, it must continue to provide non-biased recommendations and education based upon research. Most importantly, Extension must adopt innovative technology for sharing information, document economic impact, and further relationships built on trust and expertise with policy makers, stakeholders and the public.

Keywords: Extension, university, United States, farmer, agriculture, relevance

Tracking Code: ASFI-17-79

Quality Evaluation of Phka Rumduol Rice After Milling in Five Small Millers Of Banteay Meanchey Province

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Abstract

The study on topic of The Quality Evaluation of *Phka Rumduol* Rice After Milling in Five Small Millers of Banteay Meanchey Province. That was conducted in the purpose of studying rice quality determined by physical and chemical characteristics of *Phka Rumduol* Rice, after milling in five small millers of Banteay Meanchey Province. This study was conducted in grain laboratory of Division of Research and Extension of Royal University of Agriculture. The study has divided into five treatments represented as miller, one miller with three different milling, one milling with 3 replications, and 5 kilograms of rice from one milling. After collecting the sample from millers, 5 kilograms of sample were separated randomly to get the last 500 grams for analysis. After separation process, the rice was measured the moisture content immediately, and selected 1000 kernels for further weight measurement, 100 kernels for (length, width) measurement, scanning, 20 grams (about 100 grain kernels for accepted and defected grain, immature kernel, red kernel, yellow kernel, chalky kernel, damaged kernel, glutenous rice, whole kernel, broken rice (large and small) and head rice) and for free fatty acid determination, 25 grams for sensory test, 8 grams (grain dimension, aroma, hardness, whiteness, and the favorability), and grain elongation after cooking (L2/L1 and W2/W1), in all five treatments. As shown in the results of the experiment, all five treatments have higher moisture contents in accordance with the milled rice standard of Cambodia (≥ 14%). Length of rice kernels is in accordance with the long grain of milled rice standard of Cambodia, in between 7.30 to 7.34 millimeters. Width of rice kernels is between 1.91 to 1.94 millimeters. The length elongation of rice kernels ranges from 1.56 to 1.62 millimeters. The width elongation of rice kernels is between 1.48 to 1.63 millimeters. Amount of 1000 rice kernels weight is range from 19.02 to 19.49 grams. As a result of physical analysis by the grain scanner, only the treatment 5 had better characteristics value than other parameters compare to the milled rice standard of Cambodia providing the result as accepted grain (59.62%), defected grain (40.37%), immature kernel (99.12%), red kernel (2.34%), yellow kernel (0.54%), chalky kernel (34.11%), damaged kernel (6.18%), glutenous rice (0.04%), whole grain (55.62%), large broken (9.66%), small broken (2.11%), and head rice (12.20%). For the Free fatty acid indication ranges from (0.06 to 0.07mgKOH/100g.d. w). For sensory test of *Phka Romdoul* rice can assume that: it has length simple long, good aroma, soft and hard enough, good white color, and so likeness. According to the results of this study, it can be concluded that all five treatments have lower standardization compared to the milled rice standard of Cambodia, but the treatment 5 is acceptable compared to the other treatments.

Keywords: Phka Romdoul rice, physical-chemical characteristics, rice mill, grain scanner and Cambodian national standards

Tracking Code: ASFI-17-80

Effects of Different Acidic Agents for Rubber Processing on Rubber Quality at Cambodian Rubber Research Institute

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Abstract

There is a great deal of potential for producing high-quality rubber products using the coagulation agents and processing methods used in rubber processing. Waste rubber, cup lumps, and natural coagulant latex can all be combined with sheet rubber to create block rubber. In otherwise, smallholder or householder used acid salt in way to coagulate natural rubber latex as cup lumps. The objective of this current study was to compare the rubber quality when coagulated with different acidic agents. Three types of acid salts were purposive random selected from a market in a downtown of Tboung Khmum province, Cambodia. They had blue, dark and yellow colorful inside and including formic acid as control sample. In this experimental as completely randomized design (CRD) there were four treatments of different types agents likewise formic acid, blue, dark, and yellow acid salt. Where A0 assigned as formic acid as control sample, A1 as blue acid salt, A2 as dark acid salt and A3 as yellow acid salt. All agents first phase used 2%, second phase 5%, and third phase 10%. The experiment's findings demonstrated that employing formic acid concentrations of 2% and 5% for latex coagulation as a method decreased DRC and pH that P0, PRI, Mooney viscosity, volatile matter content, and ash content all parameters met the CSR10 standard. All three kinds of acid salts and 10% formic acid, failed to meet the CSR10 standard's threshold. It had not passed the grade if one of the parameters failed to meet the criteria, according to the CSR standard for rubber quality analysis. Overall, we found that in TSR processing, formic acid of 2% to 5% was suited for coagulation by reduced DRC and pH. In contrast, the three types of acid salts were not appropriate for use in rubber manufacturing, and also the formic acid concentration was 10%. In order to provide more information that will be helpful to industrial rubber companies in the processing of rubber, we recommend more research on the quality of skim rubber using different agents and concentrations that are less costly and highly efficient.

Keywords: Acidic agents; rubber quality; rubber processing

Tracking Code: ASFI-17-81

Chemical Characterization and Antibacterial Activity of Essential Oils from Cambodian *Melaleuca* Species

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Abstract

Melaleuca species are widely distributed across Cambodia, particularly in Svay Rieng (SVR), Kampot (KP), and Koh Kong (KK) provinces, where their leaves are utilized for essential oil (EO) production. Although *Melaleuca* EOs are recognized for their broad bioactivity, the specific potential of Cambodian varieties remains to be fully elucidated. This study aimed to characterize the chemical constituents of EOs from these three regions and evaluate their antibacterial activities via Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) assays. The *Melaleuca* leaves were collected from the three provinces. The EOs were extracted via steam distillation and subsequently analyzed using Gas Chromatography-Mass Spectrometry (GC-MS). The results showed distinct major constituents were identified for each region: guaiol ($C_{15}H_{26}O$) in SVR, caryophyllene oxide ($C_{15}H_{24}O_2$) in KP, and cubenol ($C_{15}H_{26}O$) in KK. The antibacterial activity of *Melaleuca* EOs were assessed using the broth microdilution method. Serial two-fold dilutions of the EOs were incubated with a standardized bacterial suspension (5×10^5 CFU/mL) for 24 hours at 37 °C. The assays demonstrated a significant regional variation in the efficacy of the EOs. The SVR-derived EO exhibited the highest effect with MIC (10 mg/mL) and MBC (20 mg/mL) against *Acinetobacter pittii*. In contrast, the KP-derived EO showed moderate effect with MIC (160 mg/mL) and MBC (320 mg/mL), while the KK-derived EO showed no detectable antibacterial activity until 320 mg/mL. These findings indicate that the antibacterial activity of Cambodian *Melaleuca* EOs is strongly influenced by geographical origin, which could be result from the differences of the chemical profile in the EOs. This study highlights the potential of Cambodian *Melaleuca* EOs, particularly from SVR, as a promising natural antibacterial agent.

Keywords: *Melaleuca*, Essential Oil, Antibacterial effect, Minimum Inhibitory Concentration, Minimum Bactericidal Concentration, GC-MS

Tracking Code: ASFI-17-83

Key Actor's Roles and Perception on Food Safety and Health Risks in Smoked Fish Value Chain in Kampong Chhnang Province, Cambodia

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Abstract

Inland fish catch, main source of nutrition in the tank, is provided by the Tonle Sap Lake of Cambodia. Two main forms of processing are fermented and smoked fish. Smoked fish is practised by smallholder processors using traditional ways. The value added of smoked fish is still low, thanks to their practice techniques and the lack of market system improvement. Health risks are exposure and concern. The study consists of three specific objectives, including 1). Mapping the value chain; 2). Identifying the key roles of actors in the value chain, and 3). Analyse the key actors' perceptions of food safety and health risks along the value chain. Kampong Chhnang province was selected. Mixed methods were applied with interview guidelines. Data collection was conducted with one focus group discussion and individual interviews with 85 respondents, were interviewed including 30 of processors, 10 wholesalers/retailers, 40 consumers and 5 key informants. As results, the majority of processors process smoked fish seasonally, and around 20 percent of them practice whole seasons. All of them practice traditionally which rely on woods which majority is Freshwater mango (Barringtonai Acutangula) and locally called "*Reang*". Smoked fish was identified into two groups, high-value and low-value smoked fish. Wholesalers played key roles in enabling fish processors to expand capacity, initial capital deposit, and contracting on the sold price. Processors, wholesalers, and retailers showed low negative effects on consumers while addressing the negative effects on their health, especially their eyes. However, consumers are likely concerned on negative effects of some on their health. Health risk and Food safety should be disseminated to processors and consumers broadly for future intervention.

Keywords: Value chain, Smoked fish, Food Safety, Health Risk, Perception

Tracking Code: ASFI-17-84

Farmer's perception of the Cambodian reformed agriculture extension system: Commune Agriculture Officers (CAOs)

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Abstract

The agricultural extension system in Cambodia has undergone significant changes alongside the country's political and economic transformations. Since late 2023, the Royal Government of Cambodia, under the Sixth Priority Policy Program, has deployed Commune Agriculture Officers (CAOs) to address long-standing challenges in the existing agricultural extension system and to transition from a fragile, multi-managerial, and project-dependent approach toward a unified, state-led, and sustainable model. This study presents the first empirical analysis of this new system by examining farmers' recognition of CAOs and their perceptions of CAO's performance. A total of 892 villagers from 44 communes across 17 provinces were randomly selected and interviewed using a semi-structured questionnaire between June and July 2025. The results indicated that 86.1% of respondents recognized CAOs, primarily through community meetings (61.1%), household visits (30.8%), and field visits (27.8%). Agriculture landholders were more likely to recognize CAOs than landless respondents, and 96.1% of respondents admitted a need for CAO services. Respondents who recognized CAOs evaluated their performance across six dimensions: supportiveness, communication, knowledge transfer, market facilitation, problem solving, and follow-up, using a five-point scale. Overall, higher CAO performance scores were associated with CAOs' gender, respondents' understanding of CAOs' roles and responsibilities, and CAOs' residential location, with all significant differences at the 1% level. Further study is necessary to identify the underlying factors driving these results and to improve the current agricultural extension system in Cambodia.

Keywords: agricultural extension, commune agriculture officers (CAOs), sustainable rural development, Cambodia, policy reform

Tracking Code: ASFI-17-85

Association between Enzootic Pneumonia Lung Lesion Scores and Carcass Weights of Slaughtered Pigs from Commercial Pig Farms in Cambodia

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Abstract

Enzootic pneumonia (EP), caused primarily by *Mycoplasma hyopneumoniae*, is one of the most prevalent respiratory diseases in pigs worldwide and is associated with growth performance reduction and substantial economic losses in commercial pig production. This study aimed to evaluate the association between EP lung lesion scores and carcass weights of slaughtered pigs from commercial farms in Cambodia. A total of 190 pigs slaughtered from eight commercial farms were evaluated in June 2025. Macroscopic lung examinations were performed during routine slaughter operations, and lung lesions suspected of EP were visually identified and scored using standardized macroscopic evaluation criteria. The presence or absence of lung scars was also recorded. Carcass weight and average daily carcass weight gain (ADCWG) were measured at the slaughterhouse. The results showed that 84.74% of pigs were suspected of EP based on lung lesions, while 15.26% showed no EP lesions. Lung lesion score 1 was the most prevalent (88.16%), with a mean carcass weight of 88.73 kg, followed by score 2 (11.80%) with a mean carcass weight of 86.94 kg, and score 3 (4.35%) with a mean carcass weight of 84.76 kg. Pigs with lung scars had significantly lower carcass weights (84.65 kg) and ADCWG (0.58 kg/day) compared with pigs without lung scars (88.77 kg and 0.60 kg/day, respectively; $p < 0.05$). No statistically significant association was detected between EP lung lesion scores and carcass weight ($p > 0.05$); however, a decrease in carcass weight was observed with increasing lesion severity. In conclusion, EP was highly prevalent among slaughtered pigs in the studied farms. Although no statistically significant effect on carcass weight was detected, the observed reduction in carcass weight and growth rate, along with the significant impact of lung scarring, suggests a potential negative impact of EP on pig production performance and economics. These findings highlight the importance of improved respiratory disease prevention with continuous monitoring of herd health and control strategies in commercial pig farms in the studied areas of Cambodia.

Keywords: Average daily carcass weight gain, carcass weights, commercial pig farm, enzootic pneumonia, lung lesion scores

Tracking Code: ASFI-17-86

Development of Plant-Based Chiffon Cakes Using Soy Protein Isolate and Maltodextrin Conjugates: Effects of Wet Heat Treatment

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Abstract

The potential of soy protein isolate (SPI) and maltodextrin (MD) conjugates for the development of plant-based chiffon cakes with desirable properties was investigated by optimizing the SPI-MD conjugation process through wet heat treatment. The SPI:MD ratio was fixed at 2:1, and the heating time was varied (0, 60, and 180 min). Key functional properties (degree of grafting, zeta potential, protein solubility, and foaming properties) were analyzed. Heating for 60 min with a 2:1 SPI:MD ratio (C60) provided the most favorable outcomes, including higher protein solubility, optimal zeta potential, and improved foaming capacity, leading to better cake texture and stability. The C60 sample is a potentially viable egg substitute for plant-based chiffon cakes, offering a promising approach for developing vegetarian bakery products of similar quality as their animal-based counterparts. Further research is required to refine this conjugation method and explore its broader applications in plant-based food development.

Keywords: Soy protein isolate (SPI) · Maltodextrin (MD) · SPI-MD conjugate · Wet heat treatment · Plant-based chifon cake

Tracking Code: ASFI-17-87

Evaluation of Quality of Raw Cashew Nut in Cambodia

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Abstract

The cashew (*Anacardium occidentale* L.) has emerged as a cornerstone of Cambodia's agricultural sector, flourishing across both the highland plateaus and non-flooded lowlands. Recognizing its immense potential, the Royal Government of Cambodia has designated the Raw Cashew Nut (RCN) as a priority product. This strategic focus aims to drive national economic growth, expand employment opportunities, and elevate the livelihoods of rural populations. Furthermore, cultivation area are increasing such as in Kampong Thom, Preah Vihear, Kratie, Kampong cham, Stung Treng, Ratanakiri and Mondulkiri provinces. Despite the sector's growth, there remains a significant knowledge gap regarding geographic superiority. Currently, there is no definitive classification identifying which specific regions in Cambodia produce the highest-quality nuts. This lack of data makes it difficult to brand or market specific regions as "premium" sources. This research is designed to determine the quality of raw cashew nut and to compare the taste of nut from different locations in Cambodia. The study of the physicochemical properties of cashew nuts by specifically focusing on total carbohydrates, protein, fiber, and oil highlights the superior quality of Cambodia varieties. Individual nut weights typically fall between 6.51g to 8.10g. chemically, the kernels are highly nutritious, consisting of 43.60-47.20% Fat, 18.31-21.11% Protein, 26.82-29.51% carbohydrates, and 2.10-2.60% Ash. The peak lipid concentration of 47.21% was found to be directly linked to higher kernel yields, indicating that oil accumulation and nut size are shaped by local microclimates and soil health. Furthermore, the mineral profile matches international standards, with notable levels of Magnesium (255-277mg/100g) and Zinc (4.20-4.80mg/100g). While these findings position Cambodian cashews as a high-tier export commodity, the research notes that inconsistencies in quality often stem from variations in agricultural management and fertilization techniques. Ultimately, Cambodia is well-positioned to become a leading force in the Southeast Asian cashew market. To unlock this potential, the study suggests a collaborative approach between the public and private sectors to developing cooperative-run drying and grading facilities to ensure uniform quality control. And Value Addition: Enhancing the marketability and export value of raw nuts through modernized technology.

Keywords: Anacardium occidentale L, Raw Cashew Nut, Quality, Geographic Superiority

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Enhancing Climate-Resilient Rice Productivity through Solar-Powered Irrigation in Cambodia

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Abstract

Agriculture plays a crucial role in Cambodia's economy, accounting for roughly 27% of the national GDP, with rice being the dominant crop cultivated by over 60% of the rural workforce. Of the country's total 3.2 million hectares of rice fields, around 500,000 to 600,000 hectares are planted during the dry season, where irrigation access is demanded and often affected by climate variability. Although solar-powered irrigation systems have gained attention, by 2022, they made up only about 6% to 10% of all irrigation methods. Most farmers still rely on diesel and gasoline pumps, raising environmental and economic concerns. This study explores the differences in agricultural practices and socio-economic conditions between farmers using solar irrigation systems provided by SOGE and those using conventional fuel-based pumps. The study was conducted in Batheay district, Kampong Cham province, surveying purposively 30 smallholder households, 15 using solar pumps and 15 using traditional pumps. The findings reveal that solar users are generally younger, include more women, and are more active in local water user groups. Despite having slightly smaller landholdings (2.1 ha compared to 2.6 ha), they engage in more diversified farming and report higher rice yields (7.3 tons/ha vs. 6.6 tons/ha). In addition, solar irrigation helps reduce labor by half, cuts irrigation time from 7.2 to 3.1 hours per day and lowers fuel expenses by over 65%. In conclusion, the transition from diesel-powered to solar-powered irrigation offers significant benefits for smallholder farmers. By reducing dependence on fuel, solar irrigation helps lower operating costs and enhance rice production performance. In addition to these economic advantages, it contributes to sustainable agriculture, environmental conservation, and greater climate resilience. Therefore, expanding access to solar irrigation technologies is essential for improving rural livelihoods, strengthening agricultural productivity, and supporting long-term food security systems.

Keywords: Solar irrigation, rice productivity, greenhouse gas emissions, sustainable agriculture, smallholder farmers

Tracking Code: ASFI-17-90

Nutrient Management for Cassava Production in Upland Sandy Soil in Preah Vihear Province

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Abstract

Cassava (Manihot esculenta Crantz) has expanded rapidly in the upland sandy soils of Cambodia, particularly in Preah Vihear Province, driven by increasing market demand and the crop's tolerance to marginal environments. However, continuous cultivation under low fertilizer inputs and limited soil conservation practices has accelerated soil degradation, nutrient depletion, and erosion, threatening the long-term sustainability of cassava-based farming systems. This study aims to evaluate cassava growth, yield performance, and soil fertility dynamics under different nutrient management strategies, while quantifying soil erosion and associated nutrient losses in upland sandy soils. The experiment will be conducted at the Koh Ke Satellite Station, using a split-plot design with four replications. The main factor comprises two cover crop systems: cassava without cover crop and cassava intercropped with mung bean, later applied as surface mulch. Subplot treatments include: (i) no fertilizer (control), (ii) recommended NPK (80–17.5–66.4 kg ha^{-1}), and (iii) reduced NPK combined with organic fertilizer (300 kg ha^{-1}). Soil chemical and physical properties, erosion indicators, and crop growth parameters—including plant height, biomass accumulation, tuber yield, and starch content—will be monitored throughout the cropping cycle. Baseline soil analysis indicates sandy loam soil with moderate acidity and low nutrient reserves, typical of upland sandy environments. The study is expected to identify optimal integrated nutrient management strategies that enhance cassava productivity, improve soil fertility, reduce nutrient losses, and strengthen soil conservation practices.

Keywords: Cassava, Integrated nutrient management, Sandy upland soil, Soil erosion, Soil fertility dynamics, Sustainable agriculture

Tracking Code: ASFI-17-91

Farmer's Knowledge of Soil Fertility in Upland Cassava Production

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Abstract

Cassava is Cambodia's second most important crop after rice, and its rapid expansion into upland areas supports thousands of farming households. However, most upland soils are sandy, nutrient-poor, and highly susceptible to erosion. As a result, continuous cassava monocropping accelerate nutrient depletion and threatens long-term soil fertility. In practice, farmers often manage soil fertility based on personal experience or knowledge shared by other farmers, however, this may not align with actual soil conditions. Therefore, this study aims to assess farmers' knowledge of soil fertility management in cassava cultivation and to examine its alignment with the actual soil fertility status of their fields. To achieve this, a survey will be conducted with 207 cassava-growing households. Based on the survey results, farmers' knowledge and current practices will be classified into three levels: low, medium, and high. In addition, soil sample will be collected from 62 cassava field (30% of the respondents). These samples will then be analyzed for key soil properties, including soil pH, nitrogen (N), phosphorus (P), potassium (K), soil organic carbon (SOC), cation exchange capacity (CEC), soil texture, and bulk density. The survey data will be analyzed using descriptive statistics, while relationships among farmers' knowledge, practices, and soil fertility will be examined using ANOVA and correlation analysis. Ultimately, the findings are expected to identify gaps in nutrient management, fertilizer use, crop rotation, and soil conservation practices. In addition, the study will highlight mismatches between farmers' knowledge and actual soil conditions. Consequently, the results will help bridge the gap between scientific knowledge and on-farm practices, thereby supporting more sustainable cassava production in Cambodia's upland farming systems.

Key Worlds: Cassava, soil fertility, farmers' knowledge, farmers' practice, nutrient management, upland regions, Cambodia

Tracking Code: ASFI-17-92

Soil Chemical Properties and Soil Amendments for Mung Bean: A Case Study on Acid Soil in Rik Reay Commune, Rovieng District, Preah Vihear Province

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Abstract

Soil acidity is a key constraint for crop diversification in upland rice-based system. In Rik Reay, rice farming growth only once cycle a year during the rainy season, leaving the fields fallow in dry season from December to May and prolonged oxidation during this period contributes to soil acidification. In addition, the soils of Rik Reay developed on volcanic rocks and sandstone and tend to be sandy, acidic, and poor in nutrients and organic matter. However, Mung bean is a warm-season annual legume well suited for rotation with before or after the rainy-season rice harvest not only provides additional income but also enhances soil nitrogen levels, benefiting subsequent crops more than leaving the fields fallow whereas it is sensitive to acid soil. To address soil acidity, application of lime, manure and biochar, and co-applied, which can raise soil pH, reduce toxicity, and improve soil fertility. The overall objectives of this study aim to access on key chemical properties of acid soils on paddy fields across Rik Reay Commune and to evaluates the effectiveness of soil amendments on Mung bean growth and productivity. The soil samples were tested using MIR and traditional analytical methods. Pot experiments were undertaken in the greenhouse at the Royal University of Agriculture from February to May 2026. The first findings indicate that the soil at Rik Reay is slightly acidic, with a pH range of 5.4 to 6, with a few samples exhibiting a lower pH of 4.8. The treatments that received lime and lime in combined with organic amendments exhibited less signs of acidic toxicity compared to the treatments without lime application. The expected results such as key chemical properties of acid soils, mung bean growth and yield will be influenced by soil amendments and lime co-applied with manure or biochar out performance than single application.

Keywords: *soil acidity, oxidation, mung bean, lime, manure, biochar*

IS

Tracking Code: IS-17-03

Lightweight Concrete Gate Using Waste Expanded Polystyrene for Long-Term Field Performance in Paddy Field Environment

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Abstract

There are many steel gates installed in Japanese paddy fields, where high humidity accelerates steel corrosion and creates a challenging environment for structural durability. Many of these gates are now approaching the time for replacement due to age and environmental degradation. When replacing them, gate height is sometimes increased for projected water-level rise caused by climate change and extreme weather events. This height increase typically requires reinforcement of the supporting structures to accommodate the additional mass, which adds cost and complexity. If the height can be increased without increasing mass, such reinforcement can be omitted. Lightweight concrete offers a potential solution to achieve this objective while maintaining structural integrity. The author has developed a lightweight concrete that incorporates waste expanded polystyrene as aggregate and has experimentally produced a gate using this material. The gate has a height of 1640 mm, a width of 1576 mm, and a thickness of 100 mm, and weighs 415 kg. It is reinforced with a carbon-fiber mesh to provide planar strength, and a stainless-steel frame is added to protect the concrete from operational impact and abrasion during opening and closing. A demonstration test began in 2010 in Shimane Prefecture, Japan, and the gate has been continuously monitored to evaluate its long-term durability and performance under real environmental conditions. Investigation items include visual inspection, air-permeability coefficient, rebound-hammer strength estimation, and natural frequency measurements. This paper reports on the monitoring results over the past decade. Only minor scaling was observed, and the overall appearance remains sound and the estimated compressive strength exceeds the design strength. Although the air-permeability coefficient has gradually increased, it has remained nearly constant since 2015. These findings suggest that the gate has not yet reached its serviceability limit and that lightweight concrete with expanded polystyrene is a promising material for corrosion-prone irrigation infrastructure.

Keywords: paddy field gate, lightweight concrete, expanded polystyrene, carbon fiber reinforcement, durability

Tracking Code: IS-17-06

Impacts of Economic and Social Land Concessions in Cambodia (2000-2017): A Review of Mechanisms, Outcomes, and Failures

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Abstract

Following the implementation of the economic and social land concession policy, Cambodia has witnessed significant societal progress. However, challenges persist, as not all citizens have access to employment that aligns with market demands. The introduction of economic land concessions has created new opportunities for individuals residing both near and far from these areas, enabling them to secure employment and enhance their quality of life. For example, the development of rubber plantations has increased the demand for skilled labor, benefiting local residents by providing jobs and improving living standards. These employment opportunities help individuals afford essential needs such as food, shelter, and clothing, particularly when working far from home. The government's primary objective is to improve the quality of life for its citizens and alleviate poverty, a critical step toward national development and global competitiveness. Furthermore, the Royal Government of Cambodia has instituted innovative policies to foster sustainable economic growth. These policies utilize media and associated institutions to attract investment, including from foreign investors, by facilitating diplomatic initiatives abroad. Economic land concessions are specifically intended to serve economic interests, necessitating substantial financial contributions from both the government and investors. While these concessions can stimulate economic growth, their effects are varied. Reports indicate both positive outcomes, such as enhanced livelihoods, and negative consequences, including land disputes, workplace challenges, and adverse impacts on indigenous communities.

Keywords: economic land concession, government policy, livelihoods, poverty reduction, social land concession

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