



Programme and Abstract Book

ICSAE-XII

The 12th International Conference on Sustainable Agriculture and Environment

Hybrid Conference | 9-10 October 2025
Bali, Indonesia

This conference held by
**Research and Development Center for
Biotechnology and Biodiversity,
Universitas Sebelas Maret
and Udayana University**





ICSAE-XIII

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Programme Book

ICSAE-XII

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**Hybrid Conference | 9-10 October 2025
Bali, Indonesia**

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**Research and Development Center for
Biotechnology and Biodiversity,
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Conference Guide

The 12th International Conference on Sustainable Agriculture and Environment (ICSAE-XII) will be conducted in a hybrid format, encompassing the **General Assembly** and **Parallel Sessions**, both onsite and online.

The General Assembly and **Onsite Parallel Sessions** will take place at the **Shinta Ballroom** Grand Istana Rama Hotel, Bali, Indonesia, on **9 October 2025** starting at **07.30 AM (GMT+8)**. Invited speakers' presentations during the General Assembly will also be streamed live via the Zoom Meeting and ICSAE Network YouTube channel.

The Online Parallel Sessions will be held via **Zoom Meeting** on **10 October 2025** starting at **08.15 AM (GMT+7)**. Further information regarding the conference program can be accessed through this Programme Book.



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General Assembly Session Guide

The ICSAE-XII General Assembly will be held at the Grand Istana Rama Hotel, Bali, Indonesia, on 9 October 2025. Invited speakers' presentations will be delivered onsite and also live-streamed via Zoom Meeting and the ICSAE Network YouTube channel. The detailed General Assembly rundown will be provided on the following page.

During the General Assembly, please kindly follow the rules below:

- Only authors who have registered for onsite participation are allowed to join the General Assembly at the venue.
- Authors are required to complete the registration before the session begins.
- Please wear your conference name tag at all times within the venue.
- Please ensure your mobile phone is set to silent mode during the session.
- Onsite participants may ask questions directly during the Q&A session by raising their hands and waiting for the moderator's permission.
- Online participants can ask their questions via the Zoom chat room.
- Please follow the committee's instructions to ensure the session runs smoothly.



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ICSAE-XII

General Assembly Rundown

Date : 9 October 2025

Onsite Venue : Shinta Ballroom, Grand Istana Rama Hotel, Bali, Indonesia

Zoom Link : <http://uns.id/GA-ICSAEXII>

Meeting ID : 927 2889 3967

Passcode : icsaexii

Youtube Link : <http://www.youtube.com/@ICSAENetwork>

SESSION	TIME (GMT+8)	ACTIVITIES
Opening Ceremony	07.30-08.30	Registration and preparation
	08.30-08.35	Opening
	08.35-08.40	Indonesian National Anthem
	08.40-08.45	Greeting to Participant from Head of the Institute of Research and Community Services, Universitas Sebelas Maret
	08.45-08.50	Opening Remarks from Rector of Udayana University
	08.50-09.00	Photo session
Keynote Speech 1	09.00-09.40	Prof. Sanjib Kumar Panda (Central University of Rajasthan, India)
General Assembly 1	09.40-09.50	Moderator
	09.50-10.20	Prof. Longbiao Guo (China National Rice Research Institute, China)
	10.20-10.50	Prof. Guangheng Zhang (China National Rice Research Institute, China)
	10.50-11.20	Dr. Zhenyu Gao (China National Rice Research Institute, China)
	11.20-11.45	Q n A
	11.45-11.50	Token of Appreciation
Breaks	11.50-13.00	Breaks
Keynote Speech 2	13.00-13.40	Prof. Adrian Smith (University of Oxford, United Kingdom)
General Assembly 2	13.40-13.50	Moderator
	13.50-14.20	Steve Fiddaman, Ph.D (Pirbright Institute, United Kingdom)
	14.20-14.50	Dr. Zhou Wenzong (Shanghai Academy of Agricultural Sciences, China)
	14.50-15.20	I Putu Sudiarta, Ph.D (University of Udayana, Indonesia)
	15.20-15.45	Q n A
	15.45-15.50	Token of Appreciation
Onsite Parallel	15.50-17.01	Onsite Parallel Session
Closing	17.01-17.15	Announcements and closing



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Parallel Session Guide

The **ICSAE-XII Parallel Sessions** will be conducted in two formats: **onsite** and **online**.

- The onsite parallel sessions will be held at the Grand Istana Rama Hotel, Bali, Indonesia, on 9 October 2025.
- The online parallel sessions will be conducted via Zoom Meeting on 10 October 2025.

Below are the guidelines for the parallel sessions:

1. Onsite Parallel Session

Presenters are required to attend and deliver their presentations directly at the conference venue. The detailed oral presentation schedule will be provided on the following page.

2. Online Presentation Session

Authors must prepare and submit a **pre-recorded video presentation**, which will be played by the committee during the session. Each set of three video presentations will be followed by a **5-minute live discussion** led by the Moderator. Therefore, all authors are expected to join the Zoom room during their respective session. The oral presentation schedule and Zoom Meeting links will be provided on the following page.

For online parallel sessions, please follow the rules below:

- During the Zoom Meeting, presenters and participants are required to rename the Zoom display name using the following format: **(ID_Name)**.
- Please use the official virtual background that will be shared by the committee.
- Please keep your microphone muted to avoid background noise or distractions.
- Presenters and participants are welcome to ask questions via the chatroom using the following format: **(Name_Affiliation_To Whom_Question)**.

Please note that a presenter certificate will be given to presenters who deliver their presentations either onsite or through a recorded video. Other authors who join the parallel sessions will receive a participant certificate. The presented manuscript and all listed authors will be given a manuscript certificate.



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ICSAE-XIII

Oral Presentation Schedule

Onsite Parallel Session

Date : 9 October 2025
Location : Shinta Ballroom, Grand Istana Rama Hotel, Bali, Indonesia
Moderator : Prof. Dr.sc.agr. Ir. Adi Ratriyanto, S.Pt., M.P., IPU., ASEAN Eng.
Operator : Galih Pambuko, S.Pt., M.Pt.

Time (GMT+8)	Activities/ID	Title
15:50 - 15:55	Preparations	
15:55 - 16:00	Opening by Moderator	
16:00 - 16:07	ID M-3	Yield and Amylose Content of Two Local Black Rice Varieties Induced by Gamma Rays <i>Edi Purwanto, Aditya Nur Cahyani, Qori Nur Fauziah</i>
16:07 - 16:14	ID M-33	Community-Based Poultry Waste Management Model to Support Sustainable Circular Agriculture and Environmental Conservation in Anggoeya, Southeast Sulawesi <i>Arby'in Pratiwi, Rusli Badaruddin, Putu Nara Kusuma Prasanjaya, Tristianto Nugroho; Candra Pungki Wibowo</i>
16:14 - 16:21	ID M-45	Community Structure of Brown Planthopper Predators Due to Treatment with Several Insecticide Active Ingredients in Rice Fields <i>I Kadek Wisma Yudha, Ketut Ayu Yuliadhi, I Nyoman Wijaya, Syari Jamian, I Wayan Diksa Gargita I Putu Sudiarta</i>
16:21 - 16:26	Discussion	
16:26 - 16:33	ID M-78	The Interplay of Human Development, Fiscal Governance, and Agricultural Dynamics in Shaping Environmental Quality in Indonesia <i>D Prasetyani, S Bintariningtyas, R M Indriawati</i>
16:33 - 16:40	ID M-97	Potential of Dry Land Based on Agroclimate Characteristics In Nawangan Pacitan For Cocoa (<i>Theobroma cacao</i> L.) Cultivation <i>Rahayu, Aktavia Herawati, Ganjar Herdiansyah, Putri Yanuarti Ramadhan</i>
16:40 - 16:47	ID M-103	Morphophysiological analysis of mung bean [<i>Vigna radiata</i> (L.) R. Wilczek] under excess iron condition <i>Asha Kumari, Sanjib Kumar Panda</i>
16:47 - 16:54	ID M-104	Transcriptomic Insights into Drought Tolerance of Pigeon Pea <i>Divya Gupta, Sanjib Kumar Panda</i>
16:54 - 17:01	Discussion	
17:01 - 17:15	Announcements and closing	



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ICSAE-XIII

Online Parallel Session - Room 1 Agriculture Systems

Date : 10 October 2025
 Moderator : Haryani Saptaningtyas, S.P., M.Sc., Ph.D.
 Operator : Rofiq Aryo Bayuaji
 Zoom Link : <http://uns.id/ICSAERoom1>
 Meeting ID : 963 9685 8264
 Passcode : 681120

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-1	Quantitative Morphological Characterization of <i>Phalaenopsis</i> spp. <i>Sri Hartati, Samanhudi, Ida Rumia Manurung, Nafi'a Nurul Firdaus</i>
08:42 - 08:49	ID M-4	Off Season Strawberry Productivity in Response to Supplemental LED Grow light and Variety Choice <i>I Nyoman Rai, Ni Nyoman Ari Mayadewi, I Putu Sudana, Darda Efendi, Putu Winda Eristyana</i>
08:49 - 08:56	ID M-7	Morphological characteristics and biomass production of Chicory (<i>Cichorium intybus</i>) under different seed rates in Yogyakarta, Indonesia <i>Nafiatul Umami, Muhammad Dicky Mandiri Nasution, Farah Aisyabilla Putri, Naura Irtamazati Husna, Syailendra Andika Kusuma</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-10	Yield and Postharvest Quality Responses of Tejakula Tangerine (<i>Citrus reticulata</i> cv. Tejakula) to Gibberellin Concentration and Harvest Maturity Stage <i>Ni Nyoman Ari Mayadewi, I Nyooman Rai, Emmy Sahara, Anak Agung Made Devi Anjalika</i>
09:08 - 09:15	ID M-12	Enhancement of Agronomic and Physiological Traits in <i>Echinacea purpurea</i> BH 1 accession (Indonesia) through Gamma Irradiation in lowland conditions <i>Zainal Arifin, Ahmad Yunus, Edi Purwanto, Yuli Widyastuti</i>
09:15 - 09:22	ID M-21	Identification of Rice Accession Resistance to Blast Disease (<i>Pyricularia oryzae</i>) <i>Wartono, Muhammad Ace Suhendar, Rahmini, Surya Diantina, Ifa Manzila, Try Zulchi, Muhammad Iskandar Ishaq, Saptowo Jumali Pardal</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-24	Response of Germination and Early Seedling Vigor of Sunflower (<i>Helianthus annuus</i> L.) to Colchicine Treatment <i>Genta Bagus Ramadhan, Endang Yuniastuti, Parjanto</i>
09:34 - 09:41	ID M-25	<i>Stevia rebaudiana</i> (Bertoni) Bertoni Growth Response to Chitosan <i>Nur Rahmawati Wijaya, Devi Safrina, Dian Susanti, Aditya Dwi Permana Putra, M. Bakti Samsu Adi, Rizal Maarif Rukmana, Muhammad Qodarrohman</i>
09:41 - 09:48	ID M-26	Preliminary study on plant breeding of <i>Gnetum</i> spp. in Indonesia <i>W Syafira, E Uzlafatunniswah, Ria Cahyaningsih, G Windarsih, Hary Wawangningrum, I P Astuti</i>
09:48 - 09:53	Discussion	



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09:53 - 10:00	ID M-35	Growth of F0 Enokitake Mushroom (<i>Flammulina velutipes</i>) on Three Types of Media <i>Bram Mukhaimin, Umul Aiman, Tyastuti Purwani</i>
10:00 - 10:07	ID M-37	Transcriptomic approach to detect gene expression in <i>Hevea brasiliensis</i> Muell. Arg <i>J I Royani, D Hardianto, L Herliana, Karyanti, H Khairiyah, T Handayani, F R Mira, S Marwanto</i>
10:07 - 10:14	ID M-6	The Influence of Innovation Characteristics, Perceived Benefits, and Barriers on Frugal Innovation Adoption in Food MSMEs <i>Fanny Widadie, Nuning Setyowati, Emi Widiyanti</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-105	Exploring the Role of <i>Rhizophagus proliferus</i> in Soil Carbon Dynamics and Plant Health: Implications for Agricultural and Environmental Sustainability <i>Sadhana Shukla, Nidhi Didwania</i>
10:26 - 11:00	Announcement and closing	



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ICSAE-XIII

Online Parallel Session - Room 2 Agriculture Systems

Date : 10 October 2025
 Moderator : Dr. Akbarudin Arif, S.S., M.A.
 Operator : Shidqi Ramadhani
 Zoom Link : <http://uns.id/ICSARoom2>
 Meeting ID : 996 5251 1082
 Passcode : 904000

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-19	Ethnomedicinal Assessment of Maternal and Child Health among the Malay Community: A Case Study in Sanggau Regency, West Kalimantan, Indonesia <i>Zidni Ilman Navia, Adnan, Rikhsan Kurniatuhadi, Adi Bejo Suwardi, Muhammad Jamil</i>
08:42 - 08:49	ID M-20	Ethnobotanical Study of Wild Fruit Species Utilized by the Pamona People in Central Sulawesi, Indonesia <i>Adi Bejo Suwardi, T Harmawan, Sara Gustia Wibowo, Zidni Ilman Navia</i>
08:49 - 08:56	ID M-27	Evaluation of Quality Characteristics of Gluten-Free Wet Noodles Using Modified Sorghum Flour and Mocaf <i>Najwa Adelia Chayrani, Wiwit Amrinola, Gusti Setiavani</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-40	Effect of PPFD variability on the growth of kangkung microgreen under T5 LED 6000K illumination <i>Muhammad Fajri, Alfisyahrin, Syukriyadin</i>
09:08 - 09:15	ID M-50	The Effect of Shade Levels on Growth, Biomass Production, and Nitrogen Fixation of Legume Cover Crops (LCC) <i>Gian Sapta Adrialin, Wawan, Hapsoh</i>
09:15 - 09:22	ID M-64	The Biodiversity Potential of Home Gardens: A Systematic Literature Review and Bibliometric Analysis <i>Burhan Efendi, Syarif Husen, Erny Ishartati, Khalid Mahmood Khavar, Siti Maesaroh</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-65	The Role of Health and Environmental Awareness on Plant-Based Milk Purchase Decisions <i>Septin Ajeng Imo Pramesthi, Nuning Setyowati, Raden Kunto Adi</i>
09:34 - 09:41	ID M-71	Physicochemical and sensory characteristics of sugar-free chocolate formulated with fructooligosaccharides and allulose <i>Ri In Yuan Hui Lee, Diana Lo</i>
09:41 - 09:48	ID M-72	Effects of isomalt as sucrose substitute on physicochemical and sensory characteristics of peanut candy <i>Siti Safira Rahmadina Nasution, Diana Lo</i>
09:48 - 09:53	Discussion	
09:53 - 10:00	ID M-74	In Vitro Growing Of Pomegranate (Punica granatum) Plants On Various Media With Cytokinin <i>Endang Yuniastuti, Nona Chayanie Puri, Retna Bandriyati Arniputri</i>



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10:00 - 10:07	ID M-83	Genetic diversity of the F2 maize inducer haploid generation based on SSR markers <i>Karlina Syahrudin, Fristy Damanik, R Efendi, M Farid, Muhammad Azrai, Amin Nur, Muhammad Fuad Anshori</i>
10:07 - 10:14	ID M-9	Sustainable Agricultural Practices Improve Food Security in Ethiopia <i>Temesgen Kabeta Kidane, Teferi Tolera, Tsega Lemma, Dessalegn Obsi Gemed</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-106	Effect of Biochar as Urea Fertilizer Coating on Soil Chemical Properties and Available Nitrogen Release in Sandy Soil, Madura <i>Erick Yuhardi, Slamet Supriyadi, Nurlaili Sudarwati</i>
10:26 - 11:00	Announcement and closing	



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ICSAE-XII

Online Parallel Session - Room 3 Agriculture Systems

Date : 10 October 2025
 Moderator : Dr. Cynthia Permata Sari, S.Si., M.Ling.
 Operator : Hairur Rozak
 Zoom Link : <http://uns.id/ICSAERoom3>
 Meeting ID : 953 9935 7448
 Passcode : icsae-xii

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-2	The effect of biofertilizer application on the growth and yield of cauliflower (<i>Brassica oleracea</i> var. botrytis) and pests disease infestation <i>Retno Wijayanti, Abelia Rizqi Noor Fatimah, Retna Bandriyati Arniputri, Supriyadi, Subagiya</i>
08:42 - 08:49	ID M-13	Effect of inorganic fertilization methods on growth and yield of soybean on alfisols <i>Ongko Cahyono, Suntoro, Siti Maro'ah, Silfi Berliana Putri, Juan Yherin Wihangga</i>
08:49 - 08:56	ID M-17	Goat Manure and Rabbit Urine Fertilizers on The Growth of Citronella <i>Najwa Salsabila Khairunnisa, Fitria Roviqowati, Ahmad Yunus</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-44	Utilization of Fruit and Vegetable Waste as Organic Liquid Fertilizer to Improve the Growth and Production of Local Shallot cultivar from Sabu Raijua <i>C T B Pandjaitan, E H A Juwaningsih, O E Kondo</i>
09:08 - 09:15	ID M-48	Types of biochar application affect soil chemical properties and growth of mung bean (<i>Vigna radiata</i> L.) <i>Lily Ishaq, Peters Oktovians Bako, Moresi Airtur, Elda S. Ludji, Yoke I Benggu, Anthonius S. J. Adu Tae</i>
09:15 - 09:22	ID M-49	Analysis of the utilization organic waste into liquid organic fertilizer on the growth and yield of cucumber <i>Nova D. Lussy, C T B Pandjaitan, L Walunguru, H M C Sine, M S Ratu Rihi, M U Lay</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-57	The Potential of <i>Bacillus</i> spp. Isolated from Safric, Hemic, and Fibric Peat in West Kalimantan Province as a Biofilm Biofertilizer <i>Dwi Isyana Achmad, Suntoro, Edi Purwanto, Retno Rosariastuti</i>
09:34 - 09:41	ID M-60	Effect of organic material application on the growth of cowpea (<i>Vigna unguiculata</i> L.) <i>Muji Rahayu, Fitri Amelia Rachmadhani, Retna Bandriyati Arniputri, Iswahyudi</i>
09:41 - 09:48	ID M-67	Exploration of Arbuscular Mycorrhizal Fungi in the Rhizosphere of Shrub <i>Chromolaena odorata</i> in Nusa Tenggara Timur, Indonesia <i>Lily Ishaq, Anthonius S. J. Adu Tae, Welhelmus I. I. Mella, Moresi Airtur</i>
09:48 - 09:53	Discussion	



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09:53 - 10:00	ID M-89	Effect of nitrogen balance with biofilmed biofertilizer in NPK compound fertilizer on the growth and disease intensity of basal rot of garlic <i>Hadiwiyono, Oktaviana Dewi, Sudadi</i>
10:00 - 10:07	ID M-91	Vigor and disease incidence of clubroot on cabbage seedlings using biochar, trichocompost and gliocompost media <i>Hadiwiyono, Rahma Marga Retha, Rizka Nur Fadhillah, Susilo Hambeg Poromarto, Supyani, Salim Widono, E Joeniarti</i>
10:07 - 10:14	ID M-68	Mobile Application Based Guidance for Coconut Tree Management System <i>Dharanesh V, Ijaz Ahamed M, Gowtham G</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-109	Effects of fat source and exogenous emulsifiers on growth performance, nutrient digestibility, blood profile, and carcass characteristics of broiler chickens <i>K M Alapar, J R Conejos</i>
10:26 - 11:00	Announcement and closing	



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ICSAE-XIII

Online Parallel Session - Room 4 Agriculture Systems

Date : 10 October 2025
 Moderator : Dr. Siti Khoiriyah, S.Si, M.Si.
 Operator : Mirza Muhammad Ali Syah Abadi
 Zoom Link : <http://uns.id/ICSAERoom4>
 Meeting ID : 995 8791 2130
 Passcode : 503254

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-5	Digestibility Profile of Broiler Consuming Pogostemon cablin Leaf Flour as A Source of Fitobiotic <i>Jola Josephien Mariane Roosje Londok, Mursye Nataly Regar</i>
08:42 - 08:49	ID M-14	An Analytical Study of Commercial Poultry Farmers' Awareness, Perception, and Adaptive Strategies Toward Climate Change <i>Agung Heri Susantho, Tian Jihadhan Wankar, Restiyana Agustine, Ahmad Romadhoni Surya Putra</i>
08:49 - 08:56	ID M-31	Genetic Improvement of Kedu Chicken: Evaluating Selection Response for Increased Body Weight <i>Rahayu Kusumaningrum, Nuzul Widyas, Adi Ratriyanto, Sigit Prastowo</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-42	Optimizing palm oil mill by-product (solid decanter) as sustainable livestock feed: A strategic analysis using SWOT-TOWS and ARETPSLE frameworks <i>Endang Baliarti, Farly Putra, Veronika Suryajuanti, Hamdani Maulana, Subejo, Rio Olympias</i>
09:08 - 09:15	ID M-62	The effect of cellulase enzyme, l-carnitine, and fish oil supplementation in the diet on the performance of male tegal ducks in the grower phase <i>Neldino Soares Sarmiento, Sudibya, Adi Ratriyanto</i>
09:15 - 09:22	ID M-63	The effect of cellulase enzyme, L-carnitine, and fish oil supplementation in the diet on the carcass quality of male tegal ducks in the grower phase <i>M A T Obe, Sudibya, Adi Ratriyanto</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-70	Effect of location and betaine supplementation on nutrient efficiency of Kedu chickens <i>Salma Aulia Rahma, Sigit Prastowo, Adi Ratriyanto</i>
09:34 - 09:41	ID M-87	The Effect Of Using Corn Tumpi In Rations On The Performance Of Local Male Sheep <i>Dinar Anggraeni Az Zahra, Adi Ratriyanto, Susi Dwi Widyawati, Aqni Hanifa, Wara Pratitis Sabar Suprayogi, Rendi Fathoni Hadi</i>
09:41 - 09:48	ID M-88	Genetic Variation of the Beta-lactoglobulin Gene for Milk Yield Trait Selection in Indonesian Dairy Cattle Population <i>Sigit Prastowo, Deddy Fachruddin Kurniawan, Rebecca Vanessa, Galih Pambuko, Arief Boediono, Ivan Rizal Sini</i>
09:48 - 09:53	Discussion	



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09:53 - 10:00	ID M-100	The Role of Serotonin and Dopamine Related Protein Pathway Interactions in Equine (<i>Equus caballus</i>) Behavior: An In Silico Study <i>Trisianto Nugroho, Diyan Eka Hantari, M Danang Eko Yulianto</i>
10:00 - 10:07	ID M-98	Community-Based Sustainable Organic Household Waste Management Model in Rural Areas: A Case Study of Women's Farmer Group Mandiri Sejahtera <i>B Saputra, A Frinaldi, A Mubarak, D F Syolendra, L Magriasti, N E Putri, A L Pegi</i>
10:07 - 10:14	ID M-110	Biostimulant Potential of Agave americana Leaf Extracts on Growth and Development of Sugarcane (<i>Saccharum officinarum</i>) <i>E. B. Coelho, P. de Oliva Neto, M. S. Oliveira</i>
10:14 - 10:19	Discussion	
10:19 - 11:00	Announcement and closing	



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ICSAE-XIII

Online Parallel Session - Room 5 Agriculture Systems

Date : 10 October 2025
 Moderator : Rufidah Maulina, SST., M.Sc.
 Operator : Dimas Arya Pangestu and Shipa Amalia Saputri
 Zoom Link : <http://uns.id/ICSARoom5>
 Meeting ID : 914 4336 3775
 Passcode : 297950

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-32	Identification of factors determining organic rice marketing strategy in subak kedisan <i>Ni Made Classia Sukendar, Widhianthini, Ni Putu Rahayu Sastra Dewi, Trisha Susana Andrea</i>
08:42 - 08:49	ID M-34	Urban Agriculture: Multiple Roles Of Women For Food Security Amidst The Climate Crisis In Semarang City-Indonesia <i>Haryani Saptaningtyas, Tri Sujatmiko, Ginanjar, Akbarudin, Suminah, Sapja Anantanyu, Siti Khoiriyah, Agung Hidayat</i>
08:49 - 08:56	ID M-36	Assessing the Factors Influencing Rice Consumers' Behavioural Intention Toward Website Use Behaviour: A UTAUT 3 Approach <i>Nico, Andreas Raharto Condrobimo, Lasmy</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-39	Bridging Tradition and Innovation: Local Wisdom-Based Organic Farming Development in Ngawi Regency <i>Agung Wibowo, Arip Wijianto, Anantanyu, Suwanto, Putri Permatasari, Diwi Acita Irawati</i>
09:08 - 09:15	ID M-46	Information behavior of agricultural extension workers in supporting food security Emi Widiyanti, Prahastiwi Utari, Nuning Setyowati
09:15 - 09:22	ID M-47	The Use of Social Media for Agricultural Extension to Support Local Food Supply in Magelang Regency <i>Hanifah Ihsaniyati, Emi Widiyanti, Bekti Wahyu Utami, Dwiningtyas Padmaningrum, Suminah</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-52	Optimizing the Potential of Porang (<i>Amorphophallus muelleri</i>) for Export Sustainability and Economic Growth <i>Bintariningtyas Selfia, Dina Nuritza Wibowo, An Nurahmawati, Ayya Agmulia</i>
09:34 - 09:41	ID M-54	Biocontrol Potential of Entomopathogenic Fungus <i>Metarhizium</i> sp. against <i>Plutella xylostella</i> L. <i>I Wayan Diksa Gargita, I Wayan Wirya Kusuma, Ketut Ayu Yuliadhi, I Kadek Wisma Yudha, Ni Nyoman Sista Jayasanti, I Putu Sudiarta</i>
09:41 - 09:48	ID M-56	Barriers and Motivations for Youth Engagement in Farming in Rural Rwanda. Case study Mimuli Sector, Nyagatare District <i>Uwiringiyimana Xavier, Darsono, Ernoiz Antriyandarti</i>
09:48 - 09:53	Discussion	
09:53 - 10:00	ID M-58	Rumah Pangan Berkemajuan (RPB) Model as a Family-Based Strategy for Strengthening Food Security and Household Economy in Rural Indonesia



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		<i>Burhan Efendi, Susanti, Nova Tri Romadloni, Khalid Mahmood Khavar, Aulia Adillah, Muhammad Syahriza, Maryam</i>
10:00 - 10:07	ID M-59	Intermediation and Sustainability in Agricultural Supply Chains: A Bibliometric Exploration <i>Niken Anggraini Savitri, Iwan Vanany, I Nyoman Pujawan, Benny Tjahjono</i>
10:07 - 10:14	ID M-107	Elucidating the efficacy of fruit peel derived biochar on arsenic accumulation and biochemical responses in rice (<i>Oryza sativa</i> L.) <i>Saurabh Kumar Pathak, Sudhakar Srivastava</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-112	Optimizing water use in sustainable agriculture: A computational fluid dynamics (CFD) approach to drip irrigation systems <i>M F Seña, J P Honra</i>
10:26 - 11:00	Announcement and closing	



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ICSAE-XII

Online Parallel Session - Room 6 Agriculture Systems, Policy and Politics in Environment

Date : 10 October 2025
 Moderator : Nurul Jannatul Wahidah, S.ST., M.Kes.
 Operator : Triya Nur Khasanah and Aisah Nurul Aulia Rahma
 Zoom Link : <http://uns.id/ICSAERoom6>
 Meeting ID : 918 9875 0111
 Passcode : icsaexii

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-61	Analysis of Blockchain Technology Implementation for Agricultural Product Traceability in Indonesia: A Systematic Review of Opportunities, Challenges, and Strategic Recommendations <i>Rifka Atmajaya, Mohamad Harisudin, Putriesti Mandasari</i>
08:42 - 08:49	ID M-76	An ISM-FMEA Framework for Risk Factor Prioritization in Chili Pepper Agro-Supply Chains for Food Loss and Waste (FLW) Reduction <i>Rini Oktavera, Imam Santoso, Wike Agustin Prima Dania, Sujarwo Sujarwo</i>
08:49 - 08:56	ID M-85	Seeds of tomorrow: pioneering a transparent future in Indian agriculture <i>Rehana R, Pavithra R, Monika B and Nirmala Deve P</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-92	AI-Driven and Cloud-Based Data Integration of Agricultural Supply Chains for the Innovative Development of Sustainable Models and Educational Tools <i>Esther Daniels, Boluwatife K Ikuerowo</i>
09:08 - 09:15	ID M-28	From Competition to Sustainability: How Banking Rivalry Influences Corporate ESG in Indonesia and Malaysia <i>Toifsa Rosita Dewi, Bimo Saktiawan, Tastaftiyan Risfandy, Deny Dwi Hartomo</i>
09:15 - 09:22	ID M-38	Evaluation of technical efficiency across different sustainable rice farming practices in Central Northeast Thailand <i>Orawan Srisompun, Ho Thanh Tam, Tran Quoc Thinh, Koji Shimada</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-43	UV-Chlorine Disinfection for Deepwell water distribution system in Philippine Estate Systems: Performance, Compliance, and CFD-Guided Design <i>Gat Laya H. De Guia, Niño Jose A. Lopez, Jaime P. Honra</i>
09:34 - 09:41	ID M-66	The Effectiveness of Dark and Light Mordanting in the Ecoprint Process as an Eco-Friendly Fashion Product <i>M Rudianto, Sarwono, Sujadi Rahmat Hidayat, Ratna Endah Santoso, Nisaul Hasanah A Rosyad</i>
09:41 - 09:48	ID M-90	Optimizing Water Meter Installation in Philippine Utilities: A 3D CFD Investigation of Straight-Run and Elbow Configurations <i>Mc. Luginn Seña, Gat Laya De Guia, Jaime Honra</i>
09:48 - 09:53	Discussion	
09:53 - 10:00	ID M-94	Local Government Collaborative Strategies in Accelerating Extreme Poverty Reduction



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ICSAE-XII

		<i>Soetji Andari, Elly Kuntjorowati, Lisa Yuniarti, Martino</i>
10:00 - 10:07	ID M-96	Is the Environmental Performance Index Shaped by Climate Policy? <i>Sepviana Nur Kumala, Suryanto, Sarjiyanto, Muh Hisjam, Supriyono</i>
10:07 - 10:14	ID M-22	Value-added analysis of coffee cherries processing into coffee beans in Magetan Regency <i>Mei Tri Sundari, Endang Siti Rahayu, Heru Irianto, Sugiharti Mulya Handayani, Setyowati, Fanny Widadie</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-99	From Advocacy to Policy: Tracing the Influence of Women Leaders in Shaping Sustainable Environmental Policy <i>L Magriasti, R Syafril, B Saputra, N E Putri, A Amalda</i>
10:26 - 10:33	ID M-102	Environmental Law Enforcement and Food Security in Ampek Angkek: Gaps, Impacts, and a Collaborative Action Framework <i>R Syafril, A Frinaldi, R Efrina, A Mubarak, A Jenita</i>
10:33 - 11:00	Announcement and closing	



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ICSAE-XIII

Online Parallel Session - Room 7 Climate Change and Environment

Date : 10 October 2025
 Moderator : Dian Ayu Pramukawati, S.Tr.Keb., Bdn., MKM.
 Operator : Faisal Ubaydillah Gilang Ramadhan and Ahmad Ghaiyyas Afsaruddin
 Zoom Link : <http://uns.id/ICSARoom7>
 Meeting ID : 98048635664

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-8	Innovative Biofermentor Design with Aeration, Venturi Flow, and Vortex Circulation for Sustainable Soil Microbial Consortium Cultivation <i>Arie Sudaryanto, Carolina, Fithria Novianti, Mochamad Khairul</i>
08:42 - 08:49	ID M-15	Crossing Performance of Selected Soybean Genotypes for the Development of High Temperature Tolerant and High Yielding Variety <i>Samanhudi, Parjanto, Andriyana Setyawati, Elsa Fatia Salam, Muthia Salma Kamila, Eva Nor Rahmawati, Rima Tri Fatmawati, Hassan Bashir</i>
08:49 - 08:56	ID M-16	Lead (Pb) Uptake and Adaptive Responses of Monstera in Polluted Aquatic Environments <i>Ahmad Arif Darmawan, Chatarina Lilis Suryani, Umul Aiman, Warmanti Mildaryani</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-18	Bibliometric Analysis of Forest Carbon Stock Research toward FoLU Net Sink 2030 <i>Ahmad Arif Darmawan, Widyatmani Sih Dewi, Yus Andhini Bhekti Pertiwi and Dwi Priyo Ariyanto</i>
09:08 - 09:15	ID M-23	Toward Sustainable Rice Farming: The Role of Climate-Smart Practices in Improving Technical Efficiency and Farm Income in Pasuruan, East Java, Indonesia <i>Isnurdiansyah, Nadia Pratami, Septa Galang Saputra, Paramaputra Wisnu Mahastian, Ni'matul Khasanah, Beria Leimona</i>
09:15 - 09:22	ID M-29	Bracing for Climate Challenges: The Effect of Readiness on ESG Performance in ASEAN-5 Firms <i>Desti Indah Pratiwi, Vira Amalia Putri, Tastaftiyan Risfandy, Nasyiah Hasanah Purnomowati</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-41	Evaluation of biogas production potential of shrimp (<i>Penaeus monodon</i> Fabricius, 1798) aquaculture sludge with cow dung inoculum <i>Dee Lucena, Kevin Yaptenco</i>
09:34 - 09:41	ID M-51	Adaptation strategies of Indonesian smallholder maize farmers to climate change <i>Ening Ariningsih, Ashari, Helena Juliani Purba, Adang Agustian, Handewi Purwati Saliem</i>
09:41 - 09:48	ID M-53	Local Ecological Knowledge among the Sasak Community in Lombok: Examining Resilience and Adaptation Strategies to Climate Change <i>Suparman Jayadi</i>



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09:48 - 09:53	Discussion	
09:53 - 10:00	ID M-55	Regenerative agriculture for post-war soil recovery: a case study on Ukraine <i>Alberto Cavallito, Barbara Marchetti</i>
10:00 - 10:07	ID M-95	Between Values and Practices: Unpacking Sustainable Consumption Behavior for Sustainable Development <i>Arie Gunawan, Imma Andiningtyas, Gundur Leo, Sitti Nur Azmi F</i>
10:07 - 10:14	ID M-108	Agricultural System Resilience Model to Climate Anomalies: A Quantitative Study Based on Secondary Data and Its Implications for Regional Food Security <i>S Bintariningtyas, A Ratnadewati, D S Pratomo, W Syafitri1, F W Pangestuty</i>
10:14 - 10:19	Discussion	
10:19 - 11:00	Announcement and closing	



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ICSAE-XIII

Online Parallel Session - Room 8 Climate Change and Environment

Date : 10 October 2025
 Moderator : Muhammad Arifin, S.P., M.App.Sc., PhD
 Operator : Darmawan Didi Candra and Ahmad Rizky Prayogo
 Zoom Link : <http://uns.id/ICSARoom8>
 Meeting ID : 953 9887 8821
 Passcode : 12345

Time (GMT+7)	Activities/ID	Title
08:15 - 08:30	Presenters and participants enter the room	
08:30 - 08:35	Opening by Room Chair	
08:35 - 08:42	ID M-69	Effect of Sidoarjo Mud (LUSI) Discharge on Salinity Stratification and Sediment Transport in the Porong River <i>Rossana Margaret Kadar Yanti, R A A Soemitro, M A Maulana, T R Satrya, D D Warnana, M Muntaha</i>
08:42 - 08:49	ID M-73	Microbiota Shifts in Laying Hens Supplemented with Betaine and Sodium Bicarbonate under Tropical Heat Stress <i>Zainudin Al Wahid, Adi Ratriyanto, Elham Assadi Soumeh, Sigit Prastowo</i>
08:49 - 08:56	ID M-75	Spatial Analysis of Volcanic Ash Dispersion and Effects on Scallions (<i>Allium fistulosum</i> L.) Cultivation on the Western Slopes of Mount Marapi, West Sumatra <i>Dipo Caesario, Devi P Pratama, Endah Purwaningsih, Paus Iskarni, Ander A Nugroho</i>
08:56 - 09:01	Discussion	
09:01 - 09:08	ID M-77	Biofermentor-Based Lignolytic Microorganism Cultivation for Rice Straw Degradation: A Review <i>Arie Sudaryanto, Carolina, Yanyan Achmad Hoesen, Mohamad Khoirul, Sriharti</i>
09:08 - 09:15	ID M-79	Producing DIY Video Tutorials, Recycling Patchwork Products for Interior Design Accessories as an Effort to Spread Public Awareness Regarding Climate Change <i>Nurhayatu Nufut Alimin, Silmi Cahya Pradini Priliana, Anugrah Aji Pratama, Nadhifia Iryadini Rohadatul 'Aisy, Ayu Fibrantya Adi, Trisna Dwi Putri Novitabella</i>
09:15 - 09:22	ID M-80	The Application Analysis of Eco Interior Design Concepts In Shipping Container Buildings: Case Study in The Arbanat Restaurant Malang <i>Zilzal Ananta Mustofa, Nurhayatu Nufut Alimin, Mulyadi</i>
09:22 - 09:27	Discussion	
09:27 - 09:34	ID M-81	Assessment of microplastics pollution in selected surface water resources of Dehradun district, Uttarakhand, India <i>Rama Pal, Shreyshi Aggarwal, M Muruganandam, M Madhu</i>
09:34 - 09:41	ID M-82	River Hydraulic Quantification Model and Its Effect on Irrigation Water Availability for Increasing Rice Production <i>Ariani Budi Safarina, Iin Karnisah, Muttaqiyah Fatimah Azzahra</i>
09:41 - 09:48	ID M-84	SDGs-Based Merdeka Curriculum for improving students' knowledge of climate change impacts: A study at junior and senior high schools in Karimunjawa <i>Ignatius Agung Satyawan, Aisyah Zakiyah Nur Aini, Arofah Minasari, Hasna Dherin Syakira</i>



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09:48 - 09:53	Discussion	
09:53 - 10:00	ID M-86	Surakarta's Green Open Spaces: An Exploration of Their Biodiversity <i>Okid Parama Astirin, Widya Mega Rahmawati, Puguh Karyanto, Nugroho Andi Purnomo, Hadi Wiwit Hendro Cahyono, Edy Suparmanto, Kristiana Hariyanti</i>
10:00 - 10:07	ID M-93	Biodiversity and Carbon Stock Estimation in Tukad Yeh Kajang Riparianscape of Marga Village, Tabanan, Bali to Mitigate Climate Change <i>I Gusti Agung Ayu Rai Asmiwyati, I Made Sukewijaya, Kaswanto, Ni Wayan Febriana Utami, Anak Agung Keswari Krisnandika, Kadek Edi Saputra, I Dewa Gede Agung Surya Prandhita, Megisterina</i>
10:07 - 10:14	ID M-101	Empowering Women's Groups (PKK) And Youth In Utilizing Waste Into Multipurpose Eco-enzymes <i>Syamsir, Jumiati, Intan Slipilia, Putri Febri Wialdi</i>
10:14 - 10:19	Discussion	
10:19 - 10:26	ID M-111	Faith and waste: exploring determinant factors in liquid waste management in the Indonesian textile industry <i>Susminingsih, Ahmad Rosyid, Muhammad Nasrullah, Junaeti, Siti Aminah Caniago</i>
10:26 - 11:00	Announcement and closing	



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Abstract Book

ICSAE-XII

The 12th International Conference on Sustainable Agriculture and Environment

Hybrid Conference | 9-10 October 2025
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**Research and Development Center for
Biotechnology and Biodiversity,
Universitas Sebelas Maret
and Udayana University**





ICSAE Abstract ID M-1

Quantitative Morphological Characterization of *Phalaenopsis* spp.

Sri Hartati^{1,2*}, Samanhudi^{1,2}, Ida Rumia Manurung^{1,2}, Nafi'a Nurul Firdaus¹

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²Center for Research and Development of Biotechnology and Biodiversity, Institute of Research and Community Services, Universitas Sebelas Maret

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Abstract. *Phalaenopsis* spp. is one of the national pride orchids known as Puspa Pesona and has high economic value that diversity and clarification of *Phalaenopsis* spp. can show the level and relationship between plant cultivars as a guide for plant selection. This study aims to determine the character and level of similarity between species in several species of *Phalaenopsis* spp. The research was conducted at the Screenhouse of the Faculty of Agriculture, Universitas Sebelas Maret, Surakarta, from March-May 2022. The method used was a experimental research that used five *Phalaenopsis* orchids species: *P. Ox. Honey star*, *P. Ox. Red Lion the conqueror*, *P. Ox. Firebird*, *P. Ox. Happy girl papillon*, and *P. Ox. Lottery Prince Ox1639*. Parameters observed were quantitative parameters. Data analysis with descriptive analysis and kinship tests with the NTSYS-PC application to determine the similarity between *Phalaenopsis* species and their similarity coefficients. The results showed that closest level of similarity based on quantitative morphological characters was *P. Ox. Honey star* and *P. Ox. Red Lion the conqueror* with *P. Ox. Firebird* showed the greatest similarity with a similarity coefficient of 0.65.

Keyword: Orchidaceae, petal length, similarity.



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ICSAE Abstract ID M-2

The effect of biofertilizer application on the growth and yield of cauliflower (*Brassica oleracea* var. *botrytis*) and pests disease infestation

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Abstract. In recent years, the demand for cauliflower (*Brassica oleracea* var. *botrytis*) has continued to rise but it has not been matched by stable productivity, which has declined, especially in lowland areas prone to pest and disease attacks. Pests such as *Spodoptera litura*, *Crociodolomia binotalis*, and *Plutella xylostella*, as well as soft rot disease caused by *Erwinia* sp. are common problems in these environments. One promising solution is balanced fertilization by combining biofertilizers with chemical fertilizers to improve plant growth and resistance. This study aims to determine the effect of combining biofertilizers and chemical fertilizers on cauliflower growth, yield, pest populations, and disease intensity. The research was conducted from July to September 2024 in Gemawang Village, Ngadirojo district, Wonogiri, Central Java, used a single-plot design with five treatments: 100% chemical fertilizer (control), and four combinations of 75% chemical fertilizer with PGPR, *Bacillus* sp., PSB, and *Nitrobacter*. Data were analyzed using a T-test. The results showed that combining biofertilizers with 75% chemical fertilizer improved plant height, flower diameter, flowering time, leaf number, and also yield components. While it did not significantly reduce pest or disease intensity, it effectively lowered pest population compared to the control treatment.

Keywords: low land, pest population, productivity



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ICSAE-XIII

ICSAE Abstract ID M-3

Yield and Amylose Content of Two Local Black Rice Varieties Induced by Gamma Rays

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Abstract. Local black rice, a valuable functional food with significant health benefits, is often constrained by several undesirable agronomic traits, such as a long maturity period, tall stature, and low productivity. Mutation breeding via gamma-ray irradiation offers a proven and effective method for improving these local varieties by increasing genetic diversity. This research aimed to evaluate yield components, determine amylose content, and select high-yielding individuals from two Indonesian black rice varieties after irradiation. The results confirmed that irradiation successfully broadened genetic diversity, with doses of 200 Gy and 300 Gy significantly reducing plant height and accelerating flowering time compared to the control. In the Boyolali variety, the 300 Gy dose decreased amylose content from 27.35% to 22.86%, improving the texture from firm to more tender. Conversely, in the Bantul variety, the 300 Gy dose slightly increased amylose to 17.28%. While the 100 Gy dose often produced the highest average grain weight, superior individuals with yields more than double the control were successfully selected from the 200 Gy and 300 Gy treatments. In conclusion, gamma-ray irradiation is a highly effective tool that improves key agronomic traits, enabling the selection of promising high-yielding candidates for future breeding generations.

Keywords: Amylose, Black Rice, Gamma Rays



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ICSAE Abstract ID M-4

Off-Season Strawberry Productivity in Response to Supplemental LED Growlight and Variety Choice

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Abstract. Strawberry (*Fragaria × ananassa*) cultivation in Bali supplies fruit not only to traditional markets, supermarkets, hotels, and restaurants but also supports direct-pick agritourism. A key problem is its seasonal production, leading to non-continuous fruit supply and disrupting agritourism sustainability. This seasonality occurs because strawberry flowering is highly dependent on stable day length; optimal sunlight ensures good flower induction and high yields, while cloudy, rainy weather drastically reduces fruit set. This study aimed to overcome production discontinuity by testing the effectiveness of supplemental LED growlight during the off-season. The experiment used a Split-Plot Randomized Block Design with two factors: main plot was supplemental light duration (L0=0, L1=3, L2=6 hours/day) and subplot was strawberry variety (Jumbo Bali/Vj, Merland/Vm, Sachinoka/Vs, Sweetstar/Vt). Results up to 5 months after planting showed the combination of 3 hours/day on Merland (L1Vm) yielded the highest fruit count (42 fruits/plant), but with smaller fruit size. Individually, both 3 and 6 hours/day treatments (L1, L2) increased the number and weight of fruits per plant compared to the control (L0). Supplemental lighting also resulted in better fruit sweetness. For varieties, Merland and Sachinoka produced more fruits than Jumbo Bali, but Jumbo Bali fruits were larger. It is concluded that applying 3 or 6 hours/day of supplemental LED growlight is an optimal strategy to stimulate off-season flowering and productivity, ensuring a sustainable fruit supply.

Keywords: Agritourism; LED Growlight; Off-Season; Strawberry; Supplemental Lighting.



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ICSAE-XIII

ICSAE Abstract ID M-5

Digestibility Profile of Broiler Consuming *Pogostemon cablin* Leaf Flour as A Source of Fitobiotic

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Abstract. This study was conducted to determine the in vitro digestibility of feed substances in broiler rations, which consume *Pogostemon cablin* Leaf (PCL) Flour as A Source of Fitobiotic. This research was conducted in the dairy livestock laboratory of the Faculty of Animal Husbandry IPB. Using a completely randomized design with 4 treatments and 5 replications. The treatment was the level of PCL, namely T1 as much as 0% PCL, T2 as much as 0.5% PCL, T3 as much as 1% PCL, and T4 as much as 1.5% PCL. The feed used was commercial feed SINTA BR 21-E, given ad libitum starting from one day old chickens until day 35. Each treatment was repeated 4 times. The parameters measured in this study were the digestibility of dry matter, organic matter, protein, ether extract and feed crude fiber. The results showed that there were significantly differences between treatment for dry matter parameter, so it could be concluded that the used of 1. 5% PCL level on the diet would have a best in vitro digestibility value of dry matter, organic matter, protein, extract ether, and crude fiber on broiler chicken.

Keywords: digestibility, leaf of *Pogostemon cablin*



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ICSAE Abstract ID M-6

The Influence of Innovation Characteristics, Perceived Benefits, and Barriers on Frugal Innovation Adoption in Food MSMEs

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Abstract. This study aims to examine the influence of innovation characteristics (affordability, quality, and simplicity), perceived benefits, and adoption barriers on the adoption of frugal innovation among micro, small, and medium-sized enterprises (MSMEs) in the food sector. A quantitative research design was employed using a survey method and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The results confirm that all constructs exhibit strong validity and reliability. Structurally, barriers were found to have the most substantial impact on innovation adoption, followed by benefits, quality, simplicity, and affordability. The R^2 value of 0.237 indicates that the model explains approximately 23.7% of the variance in frugal innovation adoption. These findings offer important implications for technology developers, business incubators, and policymakers in promoting the diffusion of frugal innovations. Emphasis on reducing barriers, demonstrating tangible benefits, and ensuring that innovations remain affordable, simple, and high-quality can accelerate adoption and enhance the competitiveness of food MSMEs.

Keyword: Frugal Innovation, Food MSMEs, PLS-SEM, Innovation Barriers, Technology Adoption



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ICSAE Abstract ID M-7

Morphological characteristics and biomass production of Chicory (*Cichorium intybus*) under different seed rates in Yogyakarta, Indonesia

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Abstract. This study aimed to evaluate the effects of different seed rates on the morphological characteristics and productivity of Chicory (*Cichorium intybus*). The experiment was conducted at the experimental field of the Faculty of Animal Science, Universitas Gadjah Mada, Yogyakarta, Indonesia, using 1 m² plots with two seed rates (2 g/m² and 3 g/m²) arranged in a completely randomized design. Morphological traits assessed were plant length, plant height, number of leaves, leaf width, and stem diameter, while production traits included fresh biomass production, dry matter content, organic matter content, dry matter production, and organic matter production. Data were analyzed using a t-test at P<0.05. Plants grown at 2 g/m² generally showed higher values for most morphological traits, while plants at 3 g/m² tended to have lower values, with significant differences only in plant length and stem diameter. The 3 g/m² treatment produced higher fresh biomass, while dry matter and organic matter contents were slightly lower, and dry matter and organic matter production were not significantly affected by seed rate. This study indicates that seed rate affects several morphological traits but does not significantly influence dry matter or organic matter production in chicory.

Keyword: chicory, morphology, productivity, seed rates.



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ICSAE Abstract ID M-8

Innovative Biofermentor Design with Aeration, Venturi Flow, and Vortex Circulation for Sustainable Soil Microbial Consortium Cultivation

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Abstract. Biotechnological advancements that may enhance soil fertility while lowering dependence on artificial inputs are required for sustainable agriculture. Although conventional systems frequently have issues with oxygen transfer, mixing uniformity, and energy efficiency, biofermentors are widely used to activate and cultivate soil microbial consortia. In order to overcome these obstacles, this study proposes the conceptual design of a novel biofermentor that combines vortex circulation, venturi-assisted return flow, and aeration. In order to create continuous vortex motion, the prototype was built using a 40 L plastic drum equipped with an air injector, a tangential discharge at the upper section, and a funnel-shaped outlet at the base that was connected to a return pipe. While vortex circulation produces a naturally occurring turbulent flow that homogenizes nutrients and microbial distribution without the use of mechanical stirrers, aeration and Venturi acceleration work together to guarantee sufficient nitrogen availability. This design improves operational reliability, lowers energy consumption, and minimizes moving parts. The system provides a low-cost and low-maintenance solution for the production of microbial biofertilizer and is flexible enough for small- to medium-sized farming operations. The invention shows enormous promise for enhancing soil health management, promoting soil microbial activation, and advancing climate-smart, sustainable farming methods.

Keywords: Biofermentor design, soil microbial consortium, aeration, venturi flow, vortex circulation, sustainable agriculture



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ICSAE Abstract ID M-9

Sustainable Agricultural Practices Improve Food Security in Ethiopia

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Abstract. The adoption of sustainable agricultural practices (SAPs) by smallholder maize farmers in southwest Ethiopia could significantly increase food security. This study aims to contribute to the broader discussion on how sustainable agriculture could enhance the food security and economic stability of smallholder farmers in southwest Ethiopia. A simple random selection method was used to choose 382 maize growers for the study, which was mainly focused on Bunno Bedelle Zone maize producers. Both qualitative and quantitative data were collected, and the results were analyzed using inferential statistics and econometric estimates. Average Treatment effect value on treated (ATT) demonstrated that adopting intercropping, crop rotation, soil and water conservation, organic fertiliser, and a combination of SAPs improved the Food Consumption Score (FCS) and Household Dietary Diversity Score (HDDS) compared to non-adopters. Furthermore, compared to non-adopters, SAP adoption reduced Household Food Insecurity Scale (HFIES). However, as compared to SAP adopters, the Average Treatment Effect (ATU) value based on multinomial endogenous switching regression indicated that non-SAP adopters' FCS and HDDS declined. In contrast, individuals who did not use SAPs had greater HFIES than those who did. Smallholder maize farmers' food security is improved by their decision to adopt SAPs. In addition to improving maize production resilience and productivity, supporting SAPs is critical for addressing food security concerns.

Keywords: Crop Rotation, Intercropping, Soil and Water Conservation, Organic Fertiliser, Food Security, Sustainable Agricultural Practices



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ICSAE-XIII

ICSAE Abstract ID M-10

Yield and Postharvest Quality Responses of Tejakula Tangerine (*Citrus reticulata* cv. Tejakula) to Gibberellin Concentration and Harvest Maturity Stage

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Abstract. Tejakula tangerine (*Citrus reticulata* cv. Tejakula) is a promising commodity currently being revitalized in Bali following an outbreak of Citrus Vein Phloem Degeneration (CVPD). A primary constraint in its cultivation is its still low productivity and fruit quality. This study aimed to determine the most effective concentration of gibberellin (GA₃) and harvest maturity stage to improve the yield and postharvest quality of Tejakula tangerines. The research employed a factorial Randomized Complete Block Design (RCBD) with a nested pattern and three replications. The first factor was GA₃ concentration (G), consisting of four levels: 0, 100, 200, and 300 ppm. The second factor, harvest maturity (M), was nested within each GA₃ level and comprised three stages: immature (dark green, shiny rind), physiologically mature (yellowish-green rind), and over-mature (greenish-yellow rind). The results indicated that both individual treatments and their interaction significantly influenced quality parameters. The application of 200 ppm GA₃ (G₂) combined with harvesting at the physiological maturity stage (M_f) demonstrated the best performance. This G₂M_f combination yielded the highest fruit weight (370.97 g), maintained better fruit firmness (285.34 kg/cm²), and resulted in a lower weight loss rate. Throughout three weeks of storage, this treatment was also the most effective in retaining firmness and Total Soluble Solids (TSS) values. Conversely, vitamin C content declined across all treatments and was not significantly influenced by the treatment combinations. It is concluded that applying 200 ppm GA₃ to fruits harvested at physiological maturity is an optimal strategy for preserving the physical and chemical quality of Tejakula tangerines during storage.

Keywords: GA₃, Harvest Maturity, Postharvest Quality, Nested Design, Storage.



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ICSAE Abstract ID M-12

Enhancement of Agronomic and Physiological Traits in *Echinacea purpurea* BH 1 accession (Indonesia) through Gamma Irradiation in lowland conditions

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Abstract. *Echinacea purpurea*, commonly known as coneflower, is a medicinal plant from the Asteraceae family, widely used in the pharmaceutical industry for producing medications, multivitamins, and energy drinks. Native to America, *Echinacea* is cultivated in Indonesia, where tropical conditions and rising temperatures due to global warming threaten its agriculture. Significant climate changes affect the plant's growth, physiology, and yield. To enhance its ability to adapt to high temperatures, gamma-ray irradiation has been used to improve plant characteristics. This study aimed to evaluate the growth, physiology, and biomass of *Echinacea purpurea* exposed to gamma radiation. The experiment was conducted using a completely randomized design without replication, utilizing one *Echinacea purpurea* accession from the National Research and Innovation Agency in Indonesia. Irradiation doses included 0 (control), 5Gy, 10Gy, 15Gy, and 20Gy. Results showed that moderate doses, especially 15Gy, improved growth, physiology, and yield, increasing plant height, stem diameter, leaf count, chlorophyll content, and overall biomass. However, higher doses, such as 20Gy, had negative effects on development and caused visible changes in leaf morphology

Keywords: *Echinacea*, Gamma-ray, agronomic, physiology, Yield



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ICSAE Abstract ID M-13

Effect of inorganic fertilization methods on growth and yield of soybean on alfisols

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Abstract. The ever-increasing demand for soybeans has not been matched by increased yields. This is partly due to farmers not fertilizing properly. Many farmers apply urea, SP36, KCl, or compound NPK fertilizers at doses that are inappropriate for the plants' needs. Many even fertilize haphazardly. Appropriate fertilization methods are needed. This study aims to determine the effect of some of fertilization methods on soybean growth and yield on Alfisol. This study used a completely randomized block design (RCBD) with five treatments and five replications. PT0 (no fertilizer), PT1 (Farmer's Method: Urea, SP36, and KCl), PT2 (Balanced Fertilization Method: Urea, SP36, and KCl), PT3 (Farmer's Method: NPK Compound Fertilizer), PT4 (Balanced Fertilization Method: NPK Compound Fertilizer). The results of this study show that inorganic fertilizers given in a balanced manner can increase soybean yields from 2.28 g/plant to 13.82 g/plant. The results of this study indicate that the best treatment method, PT2 (Balanced Fertilization Method: Urea, SP36, and KCl), is able to support plant growth and increase soybean yields.

Keyword: alfisol, fertilization, soybean



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ICSAE Abstract ID M-14

An Analytical Study of Commercial Poultry Farmers' Awareness, Perception, and Adaptive Strategies Toward Climate Change

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Abstract. Climate change is having a substantial negative impact on the global poultry business and the availability of animal protein sources. This study aims to analyse the awareness, perception, and response of commercial poultry farmers (broilers and layers) to climate change in Boyolali, Karanganyar, and Sukoharjo Regency, Central Java Province. This quantitative research collected data through surveys using structured questionnaires. The study involved 119 respondents from commercial poultry farmers consisting of 62 broiler farmers and 57 layer farmers. The data were analyzed by quantitative descriptive and logistic regression analysis. The results showed that most farmers were aware that climate change (96.64%) and high air temperature ($\bar{x}$ = 2.68) affected commercial poultry production, which led to a high increase in the spread of diseases in chickens ($\bar{x}$ = 3.09), production disruptions in chickens ($\bar{x}$ = 3.05), and increased water consumption ($\bar{x}$ = 2.89). Some of the adaptation strategies implemented by farmers include the construction of cages with ventilation systems (22.69%), the provision of vitamins and vaccination of chickens (21.25%), and the use of superior chicken strains (18.49%). Therefore, commercial poultry farmers need to continually improve technical training by enhancing extension services to help mitigate the impact of climate change on commercial poultry production.

Keyword: climate change adaptation, farm management, rural development



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ICSAE Abstract ID M-15

Crossing Performance of Selected Soybean Genotypes for the Development of High Temperature Tolerant and High Yielding Variety

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Abstract. Rising temperatures linked to climate change threaten soybean production by disrupting flowering, reducing pod set, and ultimately lowering yields. Developing heat-tolerant genotypes with stable productivity is therefore crucial for sustaining national soybean output. This study represents the first phase of a breeding program aimed at combining high yield potential with heat tolerance through hybridization. Four genotypes were selected from previous screening, comprising two heat-tolerant but low-yielding lines and two high-yielding yet heat-sensitive lines. A full diallel crossing scheme was implemented using emasculation and manual pollination techniques. Observations were made on days to flowering, number of flowers pollinated, crossing success rates, and early pod formation. Flowering occurred between 31 and 38 days after sowing, showing good synchrony among parents. Cross success varied from 6% to 26%, with the highest rates recorded in Dega1 × Demas1, while Demas1 × Dega1 produced the most pods with two to three seeds. These findings indicate reproductive compatibility among the selected parents and provide F₁ seeds that will be advanced for evaluation under heat stress, forming a genetic foundation for developing heat-resilient soybean varieties.

Keyword: soybean, hybridization, heat stress, crossing success, F₁ generation



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ICSAE Abstract ID M-16

Lead (Pb) Uptake and Adaptive Responses of *Monstera* in Polluted Aquatic Environments

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Abstract. This research evaluated the influence of different water types and *Monstera* sp. species on lead (Pb) absorption in contaminated aquatic media. The study employed three water sources—mineral water, distilled water, and surface irrigation water, while the tested species included *Monstera obliqua*, *M. tetrasperma*, and *M. peru*. Several physiological and environmental parameters were analyzed, including pH and TDS of the media, plant morphology, photosynthetic pigments, and Pb accumulation in plant tissues and residual media. The results demonstrated that water type significantly influenced TDS values, Pb content in plants, and leaf area, with surface water generally promoting higher Pb uptake. Variability among species also contributed to differential remediation performance, with *M. obliqua* emerging as the most efficient hyperaccumulator due to its enhanced uptake capacity and adaptive physiological traits. Correlation analysis indicated a strong positive association between light intensity and Pb absorption ($r = 0.75$) and a moderate relationship between leaf number and Pb accumulation ($r = 0.60$). Overall, the findings emphasize the potential of *Monstera* sp., particularly *M. obliqua*, as an effective phytoremediation agent for mitigating Pb contamination in aquatic ecosystems. This study provides important insights for advancing sustainable agricultural biotechnology by integrating tropical ornamental plants into environmental remediation strategies.

Keyword: phytoremediation, lead, agricultural biotechnology



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ICSAE Abstract ID M-17

Goat Manure and Rabbit Urine Fertilizers On The Growth of Citronella

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Abstract. Efforts to enhance the growth of citronella (*Cymbopogon nardus* (L.) Rendle) can be made through the application of rabbit urine and goat manure. Both goat manure and rabbit urine contain essential nutrients such as nitrogen, phosphorus, and potassium. This study aimed to determine the optimal dose of goat manure and the effective concentration of rabbit urine for enhancing the growth of citronella. Conducted in Kemuning Village, Karanganyar, Central Java, from October 2024 to February 2025, it employed a Completely Randomized Block Design (CRBD) with two factors: goat manure (0, 1, 1.5, and 2 tons ha⁻¹) and rabbit urine (0, 100, 200, and 300 ml L⁻¹). The experiment included 16 treatment combinations, each repeated three times, for a total of 48 plant samples. Data were analyzed using ANOVA and Duncan's Multiple Range Test (DMRT) at a 5% significance level. Results showed that goat manure positively affected plant weight, while rabbit urine improved plant height. Goat manure, rich in stable macronutrients, increased biomass, whereas rabbit urine, high in nitrogen, promoted vertical growth. No significant interaction was observed between the two treatments, indicating that each fertilizer's effects on growth were independent. The study concludes that goat manure primarily supports biomass growth, while rabbit urine is more effective for height development.

Keywords: goat manure, rabbit urine, citronella



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ICSAE Abstract ID M-18

Bibliometric Analysis of Forest Carbon Stock Research toward FoLU Net Sink 2030

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Abstract. Forest carbon stocks play a crucial role in climate change mitigation, particularly through vegetation dynamics and the use of vegetation indices for accurate estimation. This study applies a bibliometric approach to analyze research outputs over the past two decades, focusing on publication trends, collaboration networks, keyword patterns, and methodological progress. The findings reveal a significant global increase in forest carbon stock studies, mainly driven by climate policy agendas and the development of land-based carbon credit mechanisms. Remote sensing and machine learning are increasingly applied to improve biomass estimation, offering higher precision and efficiency compared to conventional methods, while sustainability issues related to soil carbon management and the integration of system dynamics modeling in policy planning have emerged as important research frontiers. Within this framework, the FoLU Net Sink 2030 target designed to balance emissions and absorptions in forestry and land use has become a strategic policy driver that encourages innovation in carbon monitoring, ecosystem restoration, and sustainable forest management. Overall, forest carbon stock literature has advanced both quantitatively and thematically, integrating ecological, technological, and policy perspectives, and providing a strong scientific foundation to achieve FoLU Net Sink 2030 and broader global climate mitigation strategies.

Keyword: sustainable forest management, ecosystem services, climate change



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ICSAE Abstract ID M-19

Ethnomedicinal Assessment of Maternal and Child Health among the Malay Community: A Case Study in Sanggau Regency, West Kalimantan, Indonesia

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Abstract. Traditional medicinal knowledge remains central in maternal and child healthcare among the Malay Mengkiang community in West Kalimantan, Indonesia. This study documented ethnomedicinal practices in Mengkiang Village, Sanggau Regency, situated along the Mengkiang River. Data were collected through semi-structured interviews with 60 respondents using snowball sampling aged 16–70 years, supported by five key informants including elders, community leaders, and traditional birth attendants. A total of 20 species from 14 families were recorded for maternal and child health. These were prepared in six formulations, comprising one single-plant remedy (16.7%) and five polyherbal mixtures (83.3%). Oral administration dominated (66.7%) over topical applications (33.3%). Zingiberaceae was the most represented family, with *Curcuma longa* showing the highest Use Value (UV $\approx$ 0.9). *Piper betle* had a Fidelity Level (FL) of 100% for child fever, while Informant Consensus Factor (ICF) values were highest for postpartum care (0.92) and child fever (0.95), reflecting strong agreement among informants. These findings underscore the importance of local biodiversity in sustaining maternal and child healthcare. The predominance of polyherbal remedies highlights cultural beliefs in synergy and efficacy. Documentation of this knowledge is vital for cultural resilience, biodiversity conservation, and the sustainable use of local bioresources.

Keyword: Ethnomedicine, Maternal and child health, Malay community, Medicinal plants, West Kalimantan



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ICSAE Abstract ID M-20

Ethnobotanical Study of Wild Fruit Species Utilized by the Pamona People in Central Sulawesi, Indonesia

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Abstract. This study documents the diversity and traditional knowledge of wild fruit plants utilized by the Pamona ethnic group in Poso Regency, Central Sulawesi, Indonesia. Fieldwork was conducted between July and August 2025 using semi-structured interviews with 60 respondents aged 16–70 years, complemented by specimen collection and botanical identification. A total of 44 species from 27 families were recorded as being used by the Pamona people. The majority of species are consumed as food, while others serve medicinal purposes, building materials, handicrafts, agricultural tools, and livestock fodder. Among the documented species, *Pometia pinnata* (RFC = 0.89) was the most frequently cited, followed by *Passiflora foetida* (0.85), *Melastoma malabathricum* (0.84), *Rubus moluccanus* (0.82), *Dillenia serrata* (0.81), and *Timonius minahassae* (0.80). The highest Informant Consensus Factor (ICF) value was observed in the food category (ICF = 0.998), indicating strong cultural agreement on the importance of wild fruits as dietary resources. These findings highlight the significant role of wild fruit plants in sustaining local food security, cultural identity, and livelihood practices of the Pamona community, while emphasizing the need for conservation strategies to maintain this biocultural heritage.

Keywords: ethnobotany, wild fruit, Pamona, Central Sulawesi, traditional knowledge



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ICSAE Abstract ID M-21

Identification of Rice Accession Resistance to Blast Disease (*Pyricularia oryzae*)

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Abstract. Blast is considered a major disease of rice because of its wide distribution. The research was conducted in the ICABIOGRAD glasshouse, Bogor and on farmers' land in Sukabumi to test the resistance of 20 rice accessions against blast race 033, race 073, and race 133. In the glasshouse, rice seeds are inoculated by spraying spores on the entire leaf surface. Research in Sukabumi aims to test the resistance of 20 rice accessions to natural attacks from blast disease. The test was designed in a randomized block design with 3 replications. The results showed that in the glasshouse, 5 rice lines were resistant to race 033, 3 rice lines resistant to race 073, and 10 lines were resistant to race 13. In the observation of disease 9 weeks after planting, 8 rice lines had resistant reactions and a total of 7 rice lines reacted moderately resistant. Five rice lines reacted susceptible. Based on the suitability of the level of resistance of rice lines to blast disease, the results showed that the Segon line reacted with resistance to the three races tested in the glasshouse test. In the Sukabumi test, the Segon line changed its reaction to be susceptible to blast disease.

Keyword: Resistance, rice, *Pyricularia oryzae*



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ICSAE Abstract ID M-22

Value-added analysis of coffee cherries processing into coffee beans in Magetan Regency

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Abstract. Coffee is one of the promising export commodities. Indonesian coffee has advantages in terms of its diverse varieties, quality, and distinctive flavors. As a plantation commodity, coffee can be processed further to generate profits and enhance its value-added potential. This study aims to examine the profitability of coffee farming and to analyze the value added from processing coffee cherries into coffee beans. The research was conducted in Magetan Regency. The analytical methods employed include profit analysis and value-added analysis using Hayami method. The results of this study indicate that coffee farming generated monthly profit of Rp4.032.717. The value added from processing coffee cherries into coffee beans amounted to Rp22.808 per kilogram, with value-added ratio of 59%.

Keywords: coffee cherries, coffee beans, profitability, value-added



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ICSAE Abstract ID M-23

Toward Sustainable Rice Farming: The Role of Climate-Smart Practices in Improving Technical Efficiency and Farm Income in Pasuruan

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Abstract. The agricultural sector is a major source of greenhouse gas emissions and highly vulnerable to climate change. Climate-Smart Rice Cultivation (CSRC) offers a pathway to improve productivity, resilience, and reduce emissions in rice farming. This study evaluates CSRC's impact on technical efficiency and income in Pasuruan District, East Java, under the 'Rejoso Kita Phase 2' project by World Agroforestry (ICRAF). A total of 249 rice farmers—168 CSRC adopters and 81 non-adopters—were surveyed using structured interviews. Stochastic frontier analysis and Propensity Score Matching (PSM) were applied to control for selection bias and estimate treatment effects. Results show CSRC adoption significantly improves technical efficiency, with adopters achieving higher scores than non-adopters. Although CSRC farmers reported higher income, the difference was not statistically significant. Key determinants of adoption include age, experience, and land tenure; younger and more experienced farmers are more likely to adopt. These findings highlight CSRC's potential to support sustainable rice farming through improved efficiency and environmental outcomes. Policy recommendations include targeted outreach to younger farmers, mentorship programs, and incentives for landowners. Strengthening the value chain and promoting CSRC rice via branding and direct marketing may further enhance adoption and improve farmer livelihoods.

Keywords: Climate-Smart Rice Cultivation (CSRC), Farm Income, Propensity Score Matching (PSM), Sustainable Agriculture, Technical efficiency



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ICSAE Abstract ID M-24

Response of Germination and Early Seedling Vigor of Sunflower (*Helianthus annuus* L.) to Colchicine Treatment.

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Abstract. This preliminary study aimed to evaluate the effect of colchicine as a mutagen on the germination capacity and early seedling vigor of sunflower (*Helianthus annuus* L.). A total of 250 seeds were tested under six colchicine treatment combinations, consisting of 0,0% (Control) 0.2%, 0.4%, and 0.6% concentrations with soaking durations of 6 hours and 12 hours, along with one untreated control. The results showed that most seeds germinated successfully, with only five seeds (2%) failing to grow. Differences among treatments were observed in seedling morphology, particularly in hypocotyl length, cotyledon size, and the occurrence of abnormal seedlings. The treatment of 0.2% colchicine for 6 hours produced seedlings comparable to the control, whereas 0.6% for 12 hours tended to reduce seedling vigor and induced abnormalities such as thicker leaves and stunted growth. These findings indicate that colchicine affects seed viability and early seedling morphology of sunflower and provide a basis for determining the effective concentration and soaking duration in subsequent polyploidy induction experiments.

Keyword: *Helianthus annuus* L., colchicine, germination capacity, seedling vigor, preliminary study.



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ICSAE Abstract ID M-25

***Stevia rebaudiana* (Bertoni) Bertoni Growth Response to Chitosan**

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Abstract. Stevia is a plant that is used as a low-calorie sugar substitute. Chitosan acts as a growth regulator, enhancing plant growth and development by increasing the biosynthesis of auxin and tryptophan. The objective of this study was to determine the optimal concentration for stevia growth. Chitosan seedlings measuring ± 15 cm were sprayed with chitosan at concentrations of 0 g/l, 0.075 g/l, 0.125 g/l, and 0.175 g/l every week for 2 months. Harvesting was carried out when flowering began. The parameters observed included plant height, stem diameter, number of branches, number of internodes, number of leaves, leaf length, leaf width, leaf area, and leaf thickness. The data were analyzed using ANOVA, followed by Duncan's Multiple Range Test (DMRT). The results showed that the use of 0.125 g/l chitosan resulted in increased growth in the parameters of plant height, stem diameter, number of branches, internodes, number of leaves, leaf length, leaf width, and leaf area. Meanwhile, leaf thickness increased at 0.075 gr /l chitosan. It is concluded that 0.125 gr/l chitosan increase stevia growth.

Keyword: stevia, chitosan, growth



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ICSAE Abstract ID M-26

Preliminary study on plant breeding of *Gnetum* spp. in Indonesia

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Abstract. *Gnetum* spp. has much potential for medicinal use. Unfortunately, basic information on this genus's development regarding plant breeding has not been widely reported. This study aims to obtain basic information that is very useful for the plant breeding program of *Gnetum* spp., that is, including the genus's morphological diversity, kinship, flavonoid content, and the link between morphology character and flavonoid content. A total of 23 living collections of *Gnetum* spp. were observed morphologically, and their leaves were extracted for flavonoid analyses. Morphological characters were analyzed with NTSYSpc 2.02i to see their kinship, while correlation and regression analysis between morphological characters and flavonoid values and were carried out using Microsoft Excel 2013. The results showed wide diversity in young and mature leaf length, young petiole length, stem diameter, young leaf color, young petiole color, young and mature leaf vein color. The similarity index amongst *Gnetum* spp. ranged from 49–81% based on the dendrogram. The highest flavonoid content was obtained in *G. cuspidatum* at 157.30 ± 0.40 mgEQ/g, and the lowest is in *G. gnemon* (TA-3) at 20.79 ± 0.06 mgEQ/g. Correlation and regression analysis between morphological characters and flavonoid level showed a weak positive relationship in leaf length, petiole length, petiole color, and flavonoid content. Thus, the characters could not describe the flavonoid level.

Keyword: Morphological, character, Flavonoids, *Gnetum*



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ICSAE-XIII

ICSAE Abstract ID M-27

Evaluation of Quality Characteristics of Gluten-Free Wet Noodles Using Modified Sorghum Flour and Mocaf

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Abstract. The increasing demand for gluten-free foods, particularly among individuals with gluten intolerance and those on the autism spectrum, has prompted the exploration of alternative raw materials to replace wheat flour in noodle production. This study aims to evaluate the effects of incorporating modified sorghum flour and modified cassava flour (Mocaf) on the physical, chemical, and sensory characteristics of gluten-free wet noodles. Five formulations were prepared with varying ratios of Mocaf to modified sorghum flour (100:0, 80:20, 60:40, 40:60, and 20:80). The parameters analyzed included proximate composition, water absorption capacity, cooking loss, cooking time, elasticity, water activity (aw), and sensory attributes. Data were statistically assessed using ANOVA and multivariate analysis (Principal Component Analysis, PCA). The results indicated that increasing levels of modified sorghum flour enhanced protein and ash content but reduced sensory acceptability, particularly in taste, texture, and aroma. The formulation with 100% mocaf achieved the highest hedonic scores, while higher proportions of sorghum flour ($\geq 80\%$) significantly lowered panelists' preference. The most acceptable formulation was identified at an 80:20 mocaf-to-sorghum ratio, which provided a balance between nutritional quality and consumer acceptability.

Keyword: gluten free noodle, sorghum flour, modified sorghum flour, modified cassava flour, mocaf



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ICSAE Abstract ID M-28

From Competition to Sustainability: How Banking Rivalry Influences Corporate ESG in Indonesia and Malaysia

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Abstract. Limited access to financing has hampered companies in adapting sustainability programs, including environmental, social, and governance (ESG) campaigns. Furthermore, most companies still rely on bank loans for their funding. This study examines the impact of bank competition on the ESG performance of non-financial companies in Indonesia and Malaysia. Data covering 2016-2024 years of observation with 1,224 companies was used. We found that increased bank competition boosts companies' ESG performance by providing easier access to loans and lower interest rates. Our findings are even stronger in highly leveraged companies. These results also support the "competition-sustainable" hypothesis. Reflecting on these findings, policymakers and regulators can develop policies that foster a favorable climate for banking competition to support real sustainability commitments, one of which is by lowering the minimum capital requirements for commercial banks.

Keyword: Bank Competition, ESG, Sustainable Commitments



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ICSAE Abstract ID M-29

Bracing for Climate Challenges: The Effect of Readiness on ESG Performance in ASEAN-5 Firms

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Abstract. Strengthening each country's readiness for climate-related challenges has become a critical priority in recent years. Particularly in the ASEAN region, implementing Environmental, Social, and Governance (ESG) practices has yet to reach its full potential. This study aims to investigate the impact of climate change readiness on ESG performance, with a specific focus on firms operating within ASEAN-5 countries. Using the data panel of 715 listed firms from 2016 to 2022, this study employs a fixed effects (FE) test to examine the relationship between climate change readiness and ESG outcomes. The preliminary results indicate that a higher level of climate change readiness significantly affects ESG performance in ASEAN-5 firms. Climate change readiness encourages companies to be more proactive in ESG sustainability campaigns. This study encourages firms to be prepared to face climate risks, aligning them with the Sustainable Development Goals (SDGs). Second, it provides cross-country evidence from the ASEAN-5 region, broadening the scope of ESG studies. Third, it highlights heterogeneity across countries and industries, offering a deeper understanding of how readiness can contribute to ESG performance. Moreover, this study provides practical implications for companies in the ASEAN region to enhance climate adaptation strategies and promote faster ESG integration.

Keywords: Climate Change, ESG, SDGs, ASEAN-5



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ICSAE Abstract ID M-31

Genetic Improvement of Kedu Chicken: Evaluating Selection Response for Increased Body Weight

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Abstract. The Kedu chicken, an indigenous breed from Central Java, holds cultural significance, supports local livelihoods, and has been integral to the region's agricultural heritage for generations. Among its various economic traits, body weight is an important indicator of productivity and market value. However, in traditional breeding practices, selection for economically important traits is non-existent, presenting an opportunity for genetic improvement. The primary objective of this study was to evaluate the genetic improvement of Kedu chicken through selective breeding for increased body weight across three successive generations. The research focused on implementing a structured selection program based on body weight measurements taken at measurement time points namely 30, 60, 90, and 150-days post-hatching. This approach allowed for a comprehensive assessment of growth patterns and genetic potential throughout the early developmental stages of the chickens. The results of the study revealed a consistent positive selection response in both male and female Kedu chicken populations, with body weight, measured in kilograms, showing a progressive increase across generations, indicating successful genetic improvement. This trend was observed at all measurement time points. A notable finding of the study was the consistent sexual dimorphism in body weight. Male Kedu chickens exhibited higher body weights than females at all measured time points across all three generations. In conclusion, this study on the genetic improvement of Kedu chicken through selection for increased body weight demonstrates the potential for improving the genetic of indigenous poultry breeds through scientific breeding methods.

Keyword: Kedu chicken, Body weight, Genetic improvement, Selection response, Indigenous poultry



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ICSAE Abstract ID M-32

Identification of factors determining organic rice marketing strategy in subak kedisan

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Abstract. Subak Kedisan is one of Subak with the potential to produce organic rice. However, organic rice marketing in Subak Kedisan still faces obstacles, primarily in the marketing sector. Therefore, this study aims to identify factors that influence organic rice marketing strategies in Subak Kedisan. This study uses a qualitative approach with qualitative descriptive techniques to identify the strengths, weaknesses, opportunities, and threats that occur specifically in organic rice marketing in Subak Kedisan. Key informants were selected purposively, considering that the selected informants are those who are most knowledgeable about the state of organic rice marketing in Subak Kedisan. Data collection methods were carried out through observation, interviews, documentation, and literature review. The results of the study indicate 14 internal factors and 11 external factors. These factors include six strengths, eight weaknesses, six opportunities, and five threats.

Keyword: Marketing, organic, rice, subak



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ICSAE Abstract ID M-33

Community-Based Poultry Waste Management Model to Support Sustainable Circular Agriculture and Environmental Conservation in Anggoeya Southeast Sulawesi

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Abstract. The increase in poultry population in semi-urban areas such as Anggoeya Village, Kendari City, Southeast Sulawesi, has resulted in a significant amount of organic waste that has not been optimally managed. Poultry waste, particularly manure and feed residues, has the potential to cause environmental pollution if not handled in an integrated manner. This study aims to evaluate the poultry waste management system of the Anggoeya Livestock Farmers Group and assess its potential for integration into a sustainable agricultural system. The research methods included participatory observation, in-depth interviews, and documentation studies. The results of the study show that most farmers do not yet have a standardized waste management system, but there are local initiatives to utilize chicken manure as organic fertilizer through a simple composting process. This practice has been proven to increase the fertility of horticultural land and reduce dependence on chemical fertilizers. The main obstacles include technological limitations, lack of technical knowledge, and the absence of collective waste management institutions. In conclusion, the integration of poultry waste into the agricultural system in Anggoeya has great potential as a community-based circular agriculture model. Appropriate technological support, ongoing training, and incentive policies from the local government are needed to accelerate the implementation of this system more widely and sustainably.

Keyword: sustainable agriculture, circular farming system, community-based approach



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ICSAE-XIII

ICSAE Abstract ID M-34

Urban Agriculture: Multiple Roles of Women For Food Security Amidst The Climate Crisis In Semarang City-Indonesia

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Abstract. Involving women in urban farming becomes important in building community resilience due to climate change. Urban agriculture has played a pivotal role in food security and environmental sustainability, particularly amid global population growth and increasing urbanization. This article examines the dynamics of urban agriculture, highlighting the significant contributions of women in ensuring food security and promoting sustainable practices. Climate change and rapid urbanization have transformed the agricultural landscape and changed consumption patterns. Empowering women with education and access to resources plays a major role in their ability to provide food for their families and communities. This article portrays the women farmers' group in Semarang City, which provides a clear example of addressing the impacts of urbanization and climate change to create community resilience. The complex relationships between gender, ecology, and agriculture provide critical insights for policy development in urban agricultural practices. We argue that women's involvement holds multiple roles in urban agriculture. Although it is often overlooked, it has proven essential for food security amidst the impacts of the climate crisis. Direct involvement of women in food production and food access, encouraging closer connections with local food sources, and maintaining the basic needs for their households when food access is limited.

Keywords: Urban Agriculture, Food Security, Women's involvement, Community Resilience, Climate change



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ICSAE Abstract ID M-35

Growth of F0 Enokitake Mushroom (*Flammulina velutipes*) on Three Types of Media

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Abstract. To obtain quality F0 mushroom seeds, it is essential to select nutrient-rich media that support optimal mycelial growth. This study aimed to identify the best medium for F0 mycelium growth of enokitake mushroom (*Flammulina velutipes*). The experiment, conducted from July to September 2022 at the Biotechnology Laboratory, Mercu Buana University Yogyakarta, used a Completely Randomized Design with three media treatments (PDA, bean sprout extract, and taro tuber extract) and five replications. The results showed that bean sprout extract medium produced superior mycelial growth in terms of length, thickness, and fresh biomass, with no contamination observed. In comparison, PDA and taro tuber extract media showed lower growth performance. These findings suggest that bean sprout extract medium can be recommended as an effective alternative for producing high-quality F0 enokitake seeds.

Keyword: enokitake mushroom, F0 mycelium, growth media, bean sprout extract, *Flammulina velutipes*



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ICSAE Abstract ID M-36

Assessing the Factors Influencing Rice Consumer's Behavioural Intention Toward Website Use Behaviour: a UTAUT 3 Approach

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Abstract. This study investigates the factors influencing rice consumers' behavioural intention and actual use of website-based platforms by applying the Unified Theory of Acceptance and Use of Technology 3 (UTAUT 3). Given the increasing digitalization of the agricultural sector in Indonesia, understanding consumer adoption of web-based marketing is essential for improving competitiveness and supporting digital transformation. Data were collected through a structured questionnaire distributed to 402 rice consumers who had previously used websites to search for rice product information. The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. The results indicate that performance expectancy, social influence, hedonic motivation, and habit significantly affect behavioural intention, while habit and behavioural intention directly influence actual website use behaviour. Conversely, effort expectancy, facilitating conditions, and personal innovativeness in IT were found to be insignificant predictors. The model explains 69.2% of the variance in behavioural intention and 56% in use behaviour, demonstrating strong explanatory power. These findings highlight the importance of psychological, social, and habitual drivers in shaping digital adoption within the rice industry. From a practical perspective, the study provides insights for businesses and policymakers to design more effective website-based marketing strategies, focusing on enhancing perceived usefulness, creating enjoyable user experiences, and reinforcing habitual engagement. Overall, the research contributes to the broader understanding of technology acceptance in the agricultural sector and underscores the potential of digital platforms to transform consumer interaction and distribution practices.

Keywords: UTAUT 3; Behavioural Intention; Website Use Behaviour; Rice Consumer



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ICSAE Abstract ID M-37

Transcriptomic approach to detect gene expression in *Hevea brasiliensis* Muell. Arg

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Abstract. *Hevea brasiliensis*, commonly known as the rubber tree produces latex and serves as a vital raw material for numerous industrial sectors. Despite its importance, latex productivity is often limited by various of biotic and abiotic stresses, a prolonged juvenile phase, susceptibility to diseases and complex physiological traits. Gaining insights into the molecular mechanisms underlying latex biosynthesis, stress and diseases tolerance, and developmental regulation is essential for enhancing rubber yield and improving plant resilience. Recent advances in molecular biology and next-generation sequencing (NGS) technologies have enabled comprehensive transcriptomic analyses in *H. brasiliensis*. These studies have facilitated the discovery of differentially expressed genes (DEGs), novel transcripts, and regulatory noncoding RNAs across diverse tissues and environmental conditions. This review provides a critical overview of recent developments in *H. brasiliensis* transcriptomics, covering transcriptomic methodologies, target gene identification, and key challenges faced in the field. Additionally, we explore emerging trends in multi-omics integration and functional genomics that hold promise for accelerating genetic improvement and strengthening the resilience of rubber tree cultivars.

Keyword: Differentially expressed genes, *Hevea brasiliensis*, molecular mechanisms, transcriptomic.



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ICSAE Abstract ID M-38

Evaluation of technical efficiency across different sustainable rice farming practices in Central Northeast Thailand

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Abstract. This study analyzes the impact of adopting sustainable practices on technical efficiency in rice farming in Northeastern Thailand. A Stochastic Production Frontier Analysis was employed, using data from 105 farmers in Maha Sarakham and Khon Kaen provinces collected through a multi-stage sampling technique. The results indicated that for most activities—such as organic rice cultivation, crop rotation, and bio-control—no statistically significant differences in technical efficiency were observed between adopters and non-adopters. Exceptions included reduced chemical fertilizer use, which was associated with a lower mean efficiency score (0.79) compared to non-adopters (0.83), and adoption of native rice varieties, which showed marginally lower efficiency. However, farmers that practice water-efficient strategies achieved a slightly better efficiency level but with no statistical significance. Results imply that sustainability practices may not produce efficiency improvements in the short term and may involve transitional costs which lead to a transitory decrease in performance. However, effective management technologies such as AWD and water savings still have good prospects for long-term gain by increasing water-use efficiency and lowering input costs. Reinforcing the extension service and the empowerment of farmers is crucial to reduce the learning phase and synchronize sustainability targets.

Keywords: stochastic frontier model, Cobb-Douglass production function, technical efficiency, sustainable rice



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ICSAE Abstract ID M-39

Bridging Tradition and Innovation: Local Wisdom-Based Organic Farming Development in Ngawi Regency

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Abstract. Organic farming is an important strategy for achieving sustainable food security, maintaining environmental health, and improving farmer welfare. In Ngawi Regency, organic farming development interventions are carried out through collaboration between Non-Governmental Organizations (NGOs), universities, local governments, and farming communities, while remaining grounded in local wisdom values. This study aims to analyze the types of interventions and their impact on strengthening organic farming practices. The research method used is a qualitative study with a descriptive approach, utilizing data from in-depth interviews, participant observation, and documentation. The results show that the interventions were carried out through the transfer of appropriate technology (compost processing tools, gravity-based drip irrigation systems), the development of learning modules that integrate scientific knowledge with traditional practices, training in digital marketing based on social media and e-commerce, and ethnographic and agroecological research. The impacts of these interventions include increased farmer capacity, the formation of broader marketing networks, recognition of local knowledge, and strengthening agricultural ecological resilience. The conclusion of this study confirms that the development of organic farming in Ngawi requires synergy between scientific innovation and local wisdom, thereby creating a sustainable agricultural system that is adaptive, contextual, and inclusive.

Keywords: intervention, local wisdom, organic farming, sustainable agricultural system



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ICSAE-XIII

ICSAE Abstract ID M-40

Effect of PPFD variability on the growth of kangkung microgreen under T5 LED 6000K illumination

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Abstract. Indoor farming is growing as a solution for food production in urban environments, with microgreens as one of the leading commodities. Kangkung microgreen (*Ipomoea reptans* Poir) has great potential in urban farming systems, but environmental factors, including artificial lighting, highly influence its growth. This study aims to evaluate the effect of Photosynthetic Photon Flux Density (PPFD) variations from T5 LED 6000K lights on the growth of kangkung microgreen. The study was conducted by adjusting the variation of light intensity using the Pulse Width Modulation (PWM) technique on two T5 LED lamps (2 x 10W) and measuring plant morphological parameters such as stem length, stem diameter, root length, and leaf width, and their correlation with PPFD. Based on Pearson correlation test results showed that PPFD variation had a significant effect on stem length and stem diameter with a strong positive correlation ($r = 0.77$ and $r = 0.63$, respectively). In contrast, the effect of PPFD on petiole length, leaf length, and leaf width was relatively low. This study highlights the importance of light-intensity variation in supporting the optimal growth of microgreen kangkung. These findings provide insights for developing more efficient and sustainable indoor farming systems.

Keyword: kangkung microgreen, indoor farming, T5 LED lighting, PPFD effect, plant growth



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ICSAE Abstract ID M-41

Evaluation of biogas production potential of shrimp (*Penaeus monodon* Fabricius, 1798) aquaculture sludge with cow dung inoculum

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Abstract. Shrimp aquaculture generates substantial organic waste, creating environmental and management challenges. This study evaluated the biogas production potential of shrimp aquaculture sludge (SAS) through anaerobic digestion (AD), examining the effect of substrate-to-inoculum ratios (SIR) on biogas output, methane yield, methane content, and digestate stabilization. Batch AD trials were conducted under mesophilic conditions for 30 days using cow dung as inoculum. Treatments included SIRs of 0.5:1, 1.0:1, 1.5:1, and 2.0:1 (based on volatile solids), plus an inoculum-only control. Results showed that the 1.5:1 SIR achieved the highest cumulative methane production (309.33 mL) and a peak methane content of 78.76%, with stable daily trends, highlighting its suitability for energy recovery. Conversely, the lowest SIR (0.5:1) yielded the greatest methane per unit VS (14.56 mL CH₄/g VS) and strongest solids reduction (90.12% TS and 94.03% VS), favoring waste stabilization. The 2:1 ratio produced the largest biogas volume but declined sharply, while 1:1 showed moderate yet sustained performance. These findings suggest a trade-off between energy recovery and waste stabilization, emphasizing the importance of selecting SIR based on intended outcomes. Overall, SAS is a promising substrate for AD, offering renewable energy generation and waste treatment, thereby contributing to sustainable aquaculture and environmental protection.

Keyword: anaerobic digestion, shrimp aquaculture sludge, biogas production, methane yield, waste management, renewable energy, environmental sustainability



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ICSAE-XIII

ICSAE Abstract ID M-42

Optimizing palm oil mill by-product (solid decanter) as sustainable livestock feed: A strategic analysis using SWOT-TOWS and ARETPSLE frameworks

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Abstract. This study aims to analyze farmers' perceptions, experiences, and strategies in using solid decanter as cattle feed. In-depth interviews to the farmers with a SWOT analysis to identify strengths, weaknesses, opportunities, and threats, which were subsequently formulated into a TOWS Matrix. The analysis was further enriched with the ARETPSLE framework (Aspiratio, Result, Economy, Technology, Political, Social, Legal, and Environmental) to obtain a holistic perspective. The solid decanter utilization demonstrates strengths in terms of availability, affordability, and nutritional potential. Weaknesses in high moisture content, limited storability, and quality variability. Opportunities in processing technology development, feed cost reduction, and policy support for a circular economy. And threats in regulatory issues and supply access. The TOWS formulation resulted in SO strategies involving value addition through fermentation and drying technologies. WO strategies through farmer capacity building via training and partnerships. ST strategies through feed product diversification and partnerships with palm oil mills to address regulatory challenges and market competition. And WT strategies through the implementation of internal quality standards to anticipate external threats. Overall, solid decanter utilization has the potential to serve as an alternative feed solution.

Keyword: Palm oil mill by-product, SWOT analysis, sustainable cattle feed, animal crop system



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ICSAE Abstract ID M-43

UV–Chlorine Disinfection for Deepwell water distribution system in Philippine Estate Systems: Performance, Compliance, and CFD-Guided Design

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Abstract. Residential, commercial, industrial, and agricultural estates in the Philippines rely on deep-well groundwater yet face a policy–design tension: the Philippine National Standards for Drinking Water require a measurable free-chlorine residual, while many high-value users are chlorine-sensitive. This study compares chlorine-only, ultraviolet, and hybrid ultraviolet-then-chlorine trains across disinfection performance, regulatory compliance and governance, and hydraulics guided by computational fluid dynamics. Evidence from guidance, utility practice, and operations maps organism inactivation, maintenance burdens, and distribution behavior, and distills design and policy rules: contactor baffling and injection/mixing that raise tenth-percentile contact time; reactor hydraulics that tighten ultraviolet-dose percentiles; and network placement and control that preserve minimal residuals while shielding chlorine-sensitive equipment. Where ultraviolet transmittance is adequate, the hybrid sequence delivers the strongest balance—rapid primary inactivation, moderated formation of disinfection by-products, distribution protection, and conformity with the Philippine National Standards for Drinking Water; chlorine-only remains feasible for power-constrained sites with strict materials and by-product controls. The outcome is a framework that links treatment choice to surface and groundwater resource management under PD 1067 Water Code of the Philippines, hydraulic structure design, maintenance and operation, and implementation based on standards, aligning estate governance, regulator audits, and industrial competitiveness.

Keyword: UV–chlorine; ultraviolet disinfection (UV); chlorination; groundwater; residual chlorine; UV transmittance (UVT); chlorine-sensitive equipment.



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ICSAE Abstract ID M-44

Utilization of Fruit and Vegetable Waste as Organic Liquid Fertilizer to Improve the Growth and Production of Local Shallot cultivar from Sabu Raijua

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Abstract. Shallot is a vegetable commodity highly utilized and demanded globally for culinary purposes and as a folk remedy. Increased demands for food globally have led to increased fertilizer demand to boost yields while the rising production cost and supply distribution of chemical fertilizers is a global problem impacting farmers and food security globally. the application organic fertilizers can reduce reliance on chemical fertilizers. Liquid organic fertilizer (LOF) made from fruit waste contains macro and micronutrients needed by plants so it can be applied as a complete fertilizer. This study aims to determine the dosage of LOF for the growth and yield of Local Shallot cultivar from Sabu Raijua. The designed field research was a randomized group design with 9 treatments of LOF dosage (without LOF, 50, 100, 150,200,250,300,350,400 ml for each plant) and 3 replications. The fruit waste LOF content was analyzed in accordance with SNI Kepmentan 261 of 2019. The dosage application of fruit waste LOF has a significant effect on the variables of plant height, leave number, tiller number, bulb number, diameter and weight. The optimum dose of fruit waste LOF for the growth and yield of shallot is 150ml/plant.

Keyword: fruit and vegetable waste, liquid organic fertilizer, shallot



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ICSAE Abstract ID M-45

Community Structure of Brown Planthopper Predators Due to Treatment with Several Insecticide Active Ingredients in Rice Fields

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Abstract. Brown planthopper, *Nilaparvata lugens* Stål is one of the most destructive rice pests, especially in Asian countries such as China, Vietnam, Thailand, Indonesia, etc. Intensive use of synthetic insecticides can not only cause pest resistance but also cause the loss of predatory insects as biological control agents of pests. The purpose of this study was to determine the impact of the use of synthetic insecticide active ingredients on the abundance of predatory insect *N. lugens* in rice plants. This study was conducted in local farmers' rice fields in Pandak Village, Bandung, Kediri Regency, Tabanan, Bali. Some of the active ingredients tested were: Imidacloprid 200 ml/l, Dimehypo 400 g/l, and Abamectin 36 g/l. Our results show that the use of synthetic insecticide active ingredients can disrupt the structure of predatory insect communities, reducing the number and types of predatory insect *N. lugens* in the field. Increasing the concentration of synthetic insecticides can significantly reduce the abundance of predatory *N. lugens* in rice plants. This information is very important to be used as a reference in strategic efforts to manage the use of insecticides wisely, in order to prevent the impact of pest resistance.

Keyword: Brown planthopper, Insecticide, Rice field



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ICSAE Abstract ID M-46

Information behavior of agricultural extension workers in supporting food security

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Abstract. Agricultural extension workers are crucial players in achieving food security. This study examines the level of information needs and the frequency of information searches related to their role as agents of change. Primary data obtained from a survey of 97 agricultural extension workers, taken through a census, indicates that information on pests and plant diseases is considered the most important by agricultural extension workers, followed by information on government policies and regulations, particularly policies on fertilizer prices and subsidies and their regulations. The third most important information need is information on education and training for extension workers (PPL) to improve their capacity to assist farmers. However, in terms of frequency of information searches, information on markets and information on pests and diseases, along with their control and prevention, is most frequently sought, followed by information on policies and regulations. This indicates that issues related to marketing and pest and disease control are the most frequently encountered by agricultural extension workers in the field. The information sources most frequently accessed by extension workers to meet these information needs are WhatsApp, fellow extension workers, and YouTube.

Keyword: information need, information sources, agents of change



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ICSAE Abstract ID M-47

The Use of Social Media for Agricultural Extension to Support Local Food Supply in Magelang Regency

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Abstract. The use of social media has proven to be easy, cheap, and effective as a medium for sharing knowledge. Research on the use of social media by workers in the agricultural sector (farmers and extension workers) is still limited. This study aims to provide an overview of the use of social media by agricultural extension workers in providing local food. This study selected 100 respondents from 169 extension workers as a sample using the proportional random sampling method. Data analysis uses a quantitative approach and is presented descriptively. The study results show that the most frequently used social media by respondents is WhatsApp (78%). The consideration of most respondents for using social media is the suitability of their needs (32%). Most respondents are most active in using social media at home (48%), and the most active time to use social media is during the day (44%). Most respondents (94%) actively access social media every day of the week, and 52% of respondents spend more than 2 hours each day. Most respondents believe social media is a mandatory and routine necessity (62%). They (46%) stated they often seek information about cultivation, product processing, marketing, excellence, and local food consumption through social media. On the other hand, respondents said that they rarely use social media to share content or messages about local food cultivation (38%), local food post-harvest processing (44%), local food marketing (41%), local food excellence (40%), and local food consumption (39%). These findings are an overview and reference for efforts to increase the use of social media by agricultural extension workers to support local food supply.

Keywords: agriculture, extension worker, local food, social media



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ICSAE-XIII

ICSAE Abstract ID M-48

Types of biochar application affect soil chemical properties and growth of mung bean (*Vigna radiata* L.)

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Abstract. ICSAE abstract. Biochar as a soil amendment can be an alternative to improve soil fertility in the drylands of West Timor. This study aimed to evaluate the effect of different type biochar application on selected soil chemical properties and the growth of mung bean. The biochar types applied consisted of cow manure, chicken manure, and rice husk biochars with no biochar as the control treatment. The trial was arranged in a randomized block design with six replicates. The observed variables included soil pH, available phosphorus, organic carbon, total nitrogen, cations exchange capacity, and plant biomass. Data were analyzed using ANOVA, followed by the DMRT. The results showed that biochar application improved soil chemical properties and mung bean growth compared with control. However, the effects differed between biochar type. Rice husk biochar was the most effective in increasing soil available P and organic C, while cow manure biochar resulted in the highest increase in cation exchange capacity and dry biomass. Chicken manure biochar gave the greatest increase in soil total N but led to the largest decrease in soil pH. Overall, cow manure biochar had the most beneficial effect on mung growth. The result needs to be further confirmed in the field condition

Keyword: biochar, rice husk biochar, cow manure biochar, chicken manure biochar, soil chemical properties



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ICSAE-XIII

ICSAE Abstract ID M-49

Analysis of the utilization organic waste into liquid organic fertilizer on the growth and yield of cucumber

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Abstract. Liquid Organic fertilizer (LOF) from several organic waste was made to produce LOF which has have sufficient nutrient contents to support the production growth of cucumber. The purpose of this study, were to determine the effect of LOF from several organic waste materials and obtain the best LOF concentration effect on the growth and yield of cucumber. The research had been conducted from October to December 2024, located in Noelbaki, Kupang Regency. The design used was Randomized Block Design (RAK) consisting of 9 treatments (0; 30; 60; 90; 120; 150; 180; 210; and 240ml/l) and 3 replications. The results of the study showed that the organic waste LOF concentration had a significant effect on the number of leaves, stem diameter, length of fruit, fruit diameter, weight per fruit, and fruit weight per plant but had no significant effect on the number of fruits of cucumber plants. Furthermore, at a concentration of 240 ml/l, LOF showed the best results on variables: number of leaves 36.7 leaves (5 Week after planting/WAP); stem diameter 8.73 mm (5 WAP), fruit length 26.35 cm, fruit diameter 59.15 mm, fruit weight 565.23 g and fruit weight per plant 2,826.16 g (2.8 kg).

Keyword: cucumber, organic waste, liquid organic fertilizer



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ICSAE-XIII

ICSAE Abstract ID M-50

The Effect of Shade Levels on Growth, Biomass Production, and Nitrogen Fixation of Legume Cover Crops (LCC)

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Abstract. Legume cover crops (LCCs) are widely used in large-scale plantations to improve soil fertility, reduce erosion, and enhance sustainability. However, their growth and productivity in oil palm plantations are often constrained by shading as palm canopies expand with age, reducing the light available to understory crops. While certain LCC species tolerate low light conditions, many are shade-intolerant. This study evaluated the effects of shading on biomass production and leaf nitrogen concentration of different LCC species, and identified those capable of maintaining high productivity under shaded environments. The experiment employed a split-plot design in a randomized block framework. Shade levels (0, 55, 65, and 75%) were assigned to main plots, while LCC species (*Mucuna bracteata*, *Pueraria javanica*, *Calopogonium mucunoides*, *Mucuna pruriens*, and *Centrosema pubescens*) were assigned to subplots, with four replications, resulting in 80 experimental units. Shading significantly reduced plant height, leaf number, leaf area, leaf nitrogen concentration, chlorophyll concentration, photosynthetic rate, and biomass production. Among the five species, *Mucuna pruriens* consistently exhibited the highest biomass (21.10%) and leaf nitrogen concentration (21.42%) under shaded conditions, outperforming *Pueraria javanica*, *Centrosema pubescens*, *Mucuna bracteata*, and *Calopogonium mucunoides*. These results suggest that *M. pruriens* is the most shade-tolerant and productive species for use as a cover crop in shaded plantation systems.



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ICSAE Abstract ID M-51

Adaptation strategies of Indonesian smallholder maize farmers to climate change

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Abstract. Climate change significantly threatens maize production in Indonesia, a crucial crop for both food security and livelihoods. Understanding how smallholder farmers adapt to climate challenges is essential for developing effective support policies. This review aims to: (1) identify and categorize climate adaptation strategies used by Indonesian maize farmers, (2) analyze the determinants and barriers influencing their adoption, and (3) provide evidence-based policy recommendations for enhancing climate resilience. Using a narrative review approach, this study synthesizes findings from peer-reviewed literature and credible grey literature (2000-2025) concerning smallholder maize farmers across Indonesia's diverse agroecological zones. The analysis reveals four main adaptation categories: on-farm agronomic adjustments, technological inputs, livelihood diversification, and communal strategies. Adoption is strongly influenced by socio-economic factors, institutional support, and environmental context. Major barriers include financial constraints, limited access to climate information, and weak extension services. The effectiveness of strategies varies considerably, with integrated approaches showing the most consistent benefits. Effective adaptation requires comprehensive solutions that address both technical and institutional challenges. Policy interventions should prioritize context-specific approaches, improved resource access, and strengthened institutional support. Future research should focus on long-term impact assessments, gender-differentiated outcomes, and economic analyses of adaptation packages.

Keyword: climate adaptation, smallholder farmers, maize, Indonesia



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ICSAE Abstract ID M-52

Optimizing the Potential of Porang (*Amorphophallus muelleri*) for Export Sustainability and Economic Growth

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Abstract. Porang plants have high economic value because the productivity of porang tubers produced in the area can penetrate the export market. Areas with large porang land and productivity potential still have porang productivity that contributes significantly to regional economic growth. This study aims to determine how the porang (*Amorphophallus muelleri*) commodity affects the economy and map potential areas to increase productivity. This study uses a quantitative approach with multiple linear regression analysis and Geomap analysis with the Orange Data Mining tool. The results of the study showed that the porang harvest and the porang export value had a significant positive effect on GRDP (Gross Regional Domestic Product), while the price of porang did not have a significant effect. Geomap analysis also identified Wonoasri and Kare Districts as the largest porang production centers, contributing 78% of the total porang land area in Madiun Regency. Based on these findings, the study recommends a policy of increasing farmer capacity through training in cultivation and post-harvest technology, strengthening market access, developing supporting infrastructure, and diversifying products to increase the added value of porang commodities so that they can continue to be a mainstay in supporting regional economic growth.

Keyword: *Amorphophallus muelleri*, Economic Growth, Export, Sustainability.



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ICSAE Abstract ID M-53

Local Ecological Knowledge among the Sasak Community in Lombok: Examining Resilience and Adaptation Strategies to Climate Change

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Abstract. Climate change threatens the ecological balance and the livelihoods of local communities worldwide. This includes the Sasak people of Lombok, West Nusa Tenggara, Indonesia. This study examines the role of local ecological knowledge (LEK) in the Sasak community. The focus is on how LEK fosters resilience and adaptation strategies to climate change. The research employs qualitative methods, using an ethnographic approach that includes observation, in-depth interviews, and documentation. Findings show that Sasak ecological knowledge is rooted in a sacred cosmology. This cosmology emphasises harmony among humans, nature, and God. Such a worldview is visible in rituals like Pujawali and Perang Topat. These rituals serve as both religious expressions and ecological reminders. They reinforce collective responsibility for environmental sustainability. LEK also provides agricultural adaptation strategies, such as crop diversification and a cosmology-based seasonal calendar. These practices and rituals foster social cohesion and collective resilience in the face of environmental challenges. The Sasak tribe's LEK makes a significant contribution to climate adaptation within communities, enhancing social resilience.

Keyword: Local Ecological Knowledge (LEK), Sasak Community, Climate Change, Social Resilience, Adaptation



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ICSAE Abstract ID M-54

Biocontrol Potential of Entomopathogenic Fungus *Metarhizium* sp. against *Plutella xylostella* L.

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Abstract. *Plutella xylostella* L., a major pest of Brassicaceae crops in Indonesia, is mainly controlled with synthetic insecticides, leading to resistance, ecological issues, and health risks. Therefore, alternative control strategies that are environmentally friendly and sustainable are urgently needed. One promising approach is the use of entomopathogenic fungus as biological control agents. This study evaluated the pathogenicity of *Metarhizium* sp., a fungal isolate from the collection of the Plant Disease Laboratory, Faculty of Agriculture, Universitas Udayana, against *P. xylostella*. Five treatments were tested with different conidial concentrations: control, 10^4 , 10^5 , 10^6 , and 10^7 conidia/ml. The results showed a clear concentration-dependent effect on larval mortality. The highest concentration (10^7 conidia/ml) produced the most significant impact, achieving 100% mortality within 8 days after application. Lower concentrations also resulted in substantial mortality, although with slower rates of larval death. These findings confirm that *Metarhizium* sp. from the Plant Disease Laboratory collection exhibits strong pathogenic potential against *P. xylostella*. Its ability to cause high mortality within a relatively short period highlights its promise as a biological control agent. Incorporating this isolate into integrated pest management programs could provide an effective and environmentally friendly alternative to synthetic insecticides for controlling *P. xylostella* infestations in Brassicaceae crops.

Keyword: *Metarhizium* sp., *Plutella xylostella* L., conidial density, pathogenicity assays



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ICSAE Abstract ID M-55

Regenerative agriculture for post-war soil recovery: a case study on Ukraine

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Abstract. Regenerative Agriculture (RA) is an ecologically based farming approach that emphasizes soil conservation, biodiversity, and ecosystem services. It has demonstrated effectiveness in restoring degraded soils after natural disasters and climate stress, but its application in war-damaged lands remains underexplored. This study investigates the potential of RA for remediating conflict-affected soils in Ukraine, where more than 5 million hectares of farmland are impacted by compaction, heavy metal contamination, and hydrological disruption. To address this gap, we conducted a structured literature review (2020–2025) using Scopus, Web of Science, and institutional repositories, complemented by quality assessment through Scimago quartiles, citation counts, and institutional credibility. Evidence indicates that RA practices—such as no-till, cover cropping, and organic amendments—can sequester 0.5–1.2 Mg C ha⁻¹ yr⁻¹, reduce soil erosion by up to 50%, and restore crop yields to 90–110% of pre-damaged levels. These findings confirm RA's potential to accelerate ecological and agricultural post-war recovery in Ukraine. However, large-scale implementation requires integration with national policies, demining operations, hydrological restoration, and farmer training. RA therefore represents both an urgent necessity and a long-term strategy to combine soil remediation with sustainable production in post-conflict environments.

Keywords: regenerative agriculture, post-war recovery, soil remediation, Ukraine, sustainable farming



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ICSAE Abstract ID M-56

Barriers and Motivations for Youth Engagement in Farming in Rural Rwanda. Case study Mimuli Sector, Nyagatare District

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Abstract. A fundamental requirement for securing food in the country and transforming rural areas is youth involvement in agriculture throughout Rwanda. The participation of young people in farming experiences multiple obstacles and reasons for involvement, specifically in the Nyagatare District, which struggles with its fertile agricultural potential and the restricted availability of land due to urban expansion. The research uses the Theory of Planned Behavior framework to investigate key barriers and motivations affecting young people's farming practices. The research adopted qualitative methods based on interviews with farming households and youth residents. The study shows that obstacles to agricultural participation stem from youth restrictions on land acquisition, difficulties in accessing credit, and insufficient know-how about contemporary farming strategies. Youth farmers find farming attractive because it offers financial gain, social elevation, and opportunities for self-development. The analysis shows the necessity of implementing policy changes to provide vocational education and educational awareness programs to boost youth involvement in agricultural practices. Resolving these hindrances will turn farming into a dependable source of income and food sustainability, supporting sustainable rural development throughout Rwanda.

Keywords: agricultural participation, food sustainability, policy reforms, rural development, youth empowerment



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ICSAE Abstract ID M-57

The Potential of *Bacillus* spp. Isolated from Sapric, Hemic, and Fibric Peat in West Kalimantan Province as a Biofilm Biofertilizer

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Abstract. Bacteria are increasingly recognized as promising biofertilizers for supporting sustainable agriculture. Peatlands in West Kalimantan, Indonesia, represent a unique reservoir of microbial diversity, characterized by extremely low pH and distinct maturity levels resulting from microbial decomposition. This study assessed the biofertilizer potential of biofilm-forming *Bacillus* spp. isolated from peat at different maturity stages. Isolates were pre-screened to ensure non-pathogenicity toward plants. Peat samples (sapric, hemic, and fibric) were collected from Teluk Bakung Village, Sungai Ambawang District, Kubu Raya Regency, and classified by fiber content and depth. All peat samples exhibited strong acidity (pH 2,26–2,57). Bacteria from more mature peat showed greater biofertilizer potential. Among the isolates, S2A (sapric peat) outperformed H5 (hemic) and F2 (fibric). All isolates were capable of nitrogen fixation and indole-3-acetic acid (IAA) production, while only S2A and H5 produced biofilm on Congo red medium. Isolate S2A also demonstrated the ability to solubilize phosphorus (P) and potassium (K). Molecular identification revealed that S2A was closely related to *Bacillus thuringiensis*, whereas H5 and F2 were closely related to *Bacillus cereus*. Bacterial isolates from West Kalimantan peatlands, particularly S2A, exhibit strong potential as biofertilizer candidates to enhance soil fertility and promote sustainable crop production.

Keywords: *Bacillus*, peat maturity, biofertilizer, biofilm



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ICSAE Abstract ID M-58

Rumah Pangan Berkemajuan (RPB) Model as a Family-Based Strategy for Strengthening Food Security and Household Economy in Rural Indonesia

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Abstract. Household food security is a strategic issue, particularly in rural areas with limited access to food. This study aims to evaluate the role of the Rumah Pangan Berkemajuan (RPB) model in strengthening food security and household economy through home garden utilization. A quantitative descriptive approach was applied to RPB partner households in Karanganyar, Central Java, using Pearson correlation analysis to examine the relationship between yard utilization and household food consumption. The results indicate that the average household energy intake reached 2,000 kcal/capita/day (95.24% of the recommended level) with a dietary diversity score of 90, although cereals and tubers remain deficient. Correlation analysis revealed that yard utilization area ($r = 0.62$) and home garden consumption ($r = 0.68$) were strongly and significantly associated with food consumption patterns, while total yard size showed no significant effect. Economically, home gardens generated an average net income of IDR 200,000/month, raising their contribution to household income from 1.96% to 17.14%. These findings highlight that the success of RPB depends not on garden size but on effective utilization and household consumption of garden products. The novelty of this study lies in integrating food security and household economic analysis through home garden-based strategies, providing implications for sustainable rural development and policy support.

Keyword: Rumah Pangan Berkemajuan, home garden, food security, household economy



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ICSAE Abstract ID M-59

Intermediation and Sustainability in Agricultural Supply Chains: A Bibliometric Exploration

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Abstract. Intermediaries in the agricultural supply chain have gained increasing attention due to their dual perception, both as essential connectors facilitating market transactions and as potential causes of inefficiency or imbalance. Recently, their presence has also been recognized for its potential contribution to enhancing supply chain sustainability. This study exhibits a bibliometric analysis to explore the research trends and emerging themes in this domain. A total of 171 articles published between 2000 and 2024 were retrieved from the Scopus database. A statistical study was applied to identify influential journals and authors contributing to this field. Furthermore, author keyword co-occurrence and overlay visualizations generated using VOS viewer revealed key thematic clusters and highlighted evolving research directions. The findings underscore the growing academic interest in topics such as smallholders' inclusion, governance mechanisms, and sustainable practices within intermediary dynamics. This bibliometric review offers valuable insights for researchers, policymakers, and practitioners aiming to progress sustainable and inclusive agricultural supply chains through a better understanding of intermediation.

Keywords: intermediaries, agriculture, sustainability, supply chain



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ICSAE Abstract ID M-60

Effect of organic material application on the growth of cowpea (*Vigna unguiculata* L.)

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Abstract. Cowpea cultivation is one of the efforts to replace soybeans. Cowpea growth needs to be improved by intensifying agriculture through the use of organic materials. The organic materials used are banana stem compost, water hyacinth biochar, and cow manure. This study aims to determine the type and dosage of organic materials suitable for improving cowpea growth. This study used a completely randomized design (CRD) with one experimental factor. The factor levels are: no organic materials (B0), 7.5 tons.ha⁻¹ of water hyacinth biochar (B1), 7.5 tons.ha⁻¹ of water hyacinth biochar (B2), 22.5 tons.ha⁻¹ of water hyacinth biochar (B3), 7.5 tons.ha⁻¹ of banana stump compost (B4), banana stump compost 15 tons.ha⁻¹ (B5), banana stump compost 22.5 tons.ha⁻¹ (B6), cow manure 7.5 tons.ha⁻¹ (B7), cow manure 15 tons.ha⁻¹ (B8), and cow manure 22.5 tons.ha⁻¹ (B9). Analysis of variance (ANOVA) followed by orthogonal contrasts at the 5% level was used in the data analysis. The results obtained showed that the application of organic matter was significant for the growth of winged beans, particularly for several observational variables. The application of 22.5 tons.ha⁻¹ of banana stump compost significantly affected plant height, number of leaves, number of branches, and fresh weight at 5 weeks after planting.

Keyword: cowpea, organic matter, growth



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ICSAE Abstract ID M-61

Analysis of Blockchain Technology Implementation for Agricultural Product Traceability in Indonesia: A Systematic Review of Opportunities, Challenges, and Strategic Recommendations

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Abstract. Blockchain technology holds transformative potential for strengthening traceability in agricultural supply chains, particularly by enhancing transparency, efficiency, and consumer trust in organic products. With rising demands for food safety, sustainability, and certification, blockchain-based tracking systems are recognized as promising solutions to persistent issues in conventional approaches, including data manipulation, limited product origin traceability, and inefficient auditing. This study systematically examines the implementation of blockchain technology for agricultural traceability in Indonesia, focusing on opportunities, challenges, and strategic recommendations. A Systematic Literature Review (SLR) was conducted under the PRISMA protocol, analyzing 42 Scopus-indexed articles published between 2017 and 2025. The findings indicate that although blockchain adoption in agriculture has progressed in both developed and developing countries, its application in Indonesia remains limited, particularly for organic products involving smallholder farmers. Key barriers include insufficient digital infrastructure, low technological literacy, and the lack of supportive policies and regulatory frameworks. Accordingly, strategies that integrate blockchain adoption with local empowerment, farmer institutional development, and multi-stakeholder collaboration are essential. This study contributes both theoretically and practically to advancing sustainable and inclusive digital agriculture and provides a basis for formulating digital transformation policies in the agricultural sector, with particular emphasis on strengthening traceability for organic products in Indonesia.

Keyword: blockchain, traceability, organic agriculture, sustainable food systems, Systematic Literature Review



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ICSAE Abstract ID M-62

The effect of cellulase enzyme, l-carnitine, and fish oil supplementation in the diet on the performance of male tegal ducks in the grower phase

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Abstract. This study evaluated the effects of cellulase enzyme, L-carnitine, and fish oil supplementation on the performance of male Tegal ducks during the grower phase. A total of one hundred day-old ducks were raised over a 90-day period, with a brooding phase from day 1 to day 14. Experimental diets were provided from day 15 to day 90. The experiment utilized a completely randomized design with five treatments and four replications, each replication consisting of five ducks. The treatments were as follows: P0: control ration, P1: P0 + 0.1% cellulase enzyme, P2: P1 + 30 ppm L-carnitine, P3: P2 + 2% tuna fish oil, P4: P2 + 2% lemuru fish oil. The variables measured in the study included feed consumption, body weight gain, feed conversion ratio, protein efficiency ratio, and energy efficiency ratio. The data obtained will be analyzed using analysis of variance, followed by orthogonal contrast tests if any treatment effects are observed. The results of the analysis of variance showed that supplementation with cellulase enzyme, L-carnitine, and fish oil in the ration had a highly significant effect ($P < 0.01$) on feed consumption, body weight gain, feed conversion ratio, protein efficiency ratio, and energy efficiency ratio. This study concludes that fish oil supplementation at a 2% level containing 0.1% cellulase enzyme and 30 ppm (0.003%) L-carnitine in the ration of male Tegal ducks in the grower phase can increase feed consumption, body weight gain, protein efficiency ratio, and energy efficiency ratio, while reducing the feed conversion ratio.

Keywords: cellulase enzyme, l-carnitine, fish oil, performance of tegal ducks.



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ICSAE Abstract ID M-63

The effect of cellulase enzyme, L-carnitine, and fish oil supplementation in the diet on the carcass quality of male tegal ducks in the grower phase

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Abstract. This study evaluated the effects of cellulase enzyme, L-carnitine, and fish oil supplementation on the carcass quality of male Tegal ducks during the grower phase. The experiment utilized a completely randomized design with five treatments and four replications, each replication consisting of five ducks. The treatments were as follows: P0: control ration, P1: P0 + 0.1% cellulase enzyme, P2: P1 + 30 ppm L-carnitine, P3: P2 + 2% tuna fish oil, P4: P2 + 2% lemuru fish oil. The variables measured in the study included slaughter weight, carcass weight, carcass percentage, abdominal fat weight, and chest weight. The data obtained will be analyzed using analysis of variance, followed by orthogonal contrast tests if any treatment effects are observed. The results of the analysis of variance showed that supplementation of cellulase enzymes, L-carnitine, and fish oil in the ration had a very significant effect ($P < 0.01$) on slaughter weight, carcass weight, carcass percentage, abdominal fat weight, and breast weight. This study concludes that fish oil supplementation with a level of 2% containing 0.1% cellulase enzymes and 30 ppm L-carnitine in the ration of male Tegal ducks in the grower phase can improve slaughter weight, carcass weight, carcass percentage, and breast weight, and reduce abdominal fat weight.

Keywords: Cellulase enzyme, l-carnitine, fish oil, carcass quality, Tegal ducks.



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ICSAE Abstract ID M-64

The Biodiversity Potential of Home Gardens: A Systematic Literature Review and Bibliometric Analysis

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Abstract. Home gardens are widely recognized as important reservoirs of biodiversity that contribute to ecological sustainability, household food security, and the preservation of traditional knowledge. However, existing studies remain fragmented, often descriptive, and lack comprehensive synthesis. This study aims to systematically analyze the scientific landscape of home garden biodiversity research and identify trends, contributors, and research gaps. A *Systematic Literature Review* (SLR) combined with bibliometric analysis was conducted using the Scopus database. The initial search on September 24, 2025, retrieved 5,520 documents, which were screened through a PRISMA protocol. After exclusions by keyword, document type, language, and access status, 151 articles were included. Data were analyzed using VOSviewer to map keyword co-occurrence, country and institutional contributions, and author networks. Results indicate a marked increase in publications after 2010, dominated by research from India and Indonesia, reflecting the central role of home gardens in tropical regions. Common themes include biodiversity, land use, ethnobotany, and medicinal plants, while topics such as urbanization, climate resilience, and management practices remain underexplored. The study concludes that home gardens play a vital role in conserving biodiversity and supporting livelihoods but require more empirical, interdisciplinary, and collaborative research to maximize their contribution to sustainability and global conservation agendas.

Keyword: home garden, biodiversity, food security, bibliometric analysis, systematic literature review



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ICSAE Abstract ID M-65

The Role of Health and Environmental Awareness on Plant-Based Milk Purchase Decisions

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Abstract. Plant-based milk is a functional plant-based beverage product that is well-known to many people. The development of the plant-based milk market in Indonesia is driven by growing public awareness of sustainable products. The purpose of this study is to analyze the influence of health awareness, environmental awareness, attitude, subjective norms, and behavioral control on plant-based milk purchasing decisions in Surakarta City. In this study, 100 plant-based milk consumers in Surakarta City were used as samples, then analyzed using Structural Equation Modeling Partial Least Square (SEM-PLS) through SmartPLS software. This study found that only attitude and behavioral control had a significant direct influence on plant-based milk purchasing decisions. In contrast, the variables of health awareness, environmental awareness, and subjective norms did not have a significant direct influence on plant-based milk purchasing decisions. In addition, health awareness and environmental awareness influenced plant-based milk purchasing decisions indirectly through attitude as a mediating variable. Based on the research findings, businesses should expand their public awareness strategies to increase awareness of the benefits of plant-based milk for public health and the environment, thereby enhancing confidence in its benefits and encouraging actual purchases.

Keyword: environmental awareness, health awareness, purchase decisions



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ICSAE Abstract ID M-66

The Effectiveness of Dark and Light Mordanting in the Ecoprint Process as an Eco-Friendly Fashion Product

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Abstract. Ecoprinting as a natural dyeing technique offers a sustainable solution for the fashion industry while reducing dependence on synthetic chemicals. An important step in this process is mordanting, which increases color absorption and durability. This study aims to examine the effectiveness of mordanting on dark and light dyes and explore the development of ecoprint fashion products based on environmentally friendly materials. An action research approach was applied through a cycle of planning, action, observation, and reflection to test and refine production practices. The research method was conducted through ecoprint experiments with variations in mordanting, accompanied by an evaluation of color results, durability, and product acceptance. The involvement of small businesses and creative communities ensured that the solutions produced were relevant to the local socio-economic context. The results show that dark dye mordanting produces more stable colors, while light dyes provide opportunities for design diversification with diverse aesthetic characteristics. From a policy perspective, the use of natural mordants is in line with regulations on reducing textile chemical waste, although its implementation requires support in the form of incentives, quality standards, and capacity building for industry players. The integration of action research and environmental policy encourages environmentally friendly technological innovation and strengthens the sustainability of ecoprint fashion products in Indonesia.

Keywords: Ecoprint; mordanting; natural dyes; action research; sustainable fashion



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ICSAE-XIII

ICSAE Abstract ID M-67

Exploration of Arbuscular Mycorrhizal Fungi in the Rhizosphere of Shrub *Chromolaena odorata* in Nusa Tenggara Timur, Indonesia

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Abstract. *Chromolaena odorata* is an invasive weed that threatens agricultural and savanna productivity in Nusa Tenggara Timur (NTT), Indonesia. Arbuscular mycorrhizal fungi (AMF) are widespread plant symbionts and may associate with *C. odorata*, influencing its ecological impact. Two parallel studies were conducted on calcareous soil in Kupang district and volcanic soil in Sikka district. At each site, soil and root samples were collected from agricultural land and savanna ecosystems across three different elevation levels. The study evaluated AMF colonization and soil fertility under *C. odorata* occupation. The results showed that AM spores were present in the rhizosphere, and root colonization was confirmed at all study sites. AM spore density and colonization were higher in savanna areas than in agricultural land, and decline slightly with elevation in both soils. Soil analyses showed that cation exchange capacity (CEC) was medium to a high level, total nitrogen was moderate, and available phosphorous (P) was medium to a very high level. The consistent presence of AMF across environments indicates that *C. odorata* maintains mycorrhizal associations under varied ecological conditions. These associations, along with favorable soil nutrient levels, suggest that this weed could contribute to soil fertility recovery during fallow periods in semi-arid landscapes of NTT.

Keyword: arbuscular mycorrhizal fungi, *Cromolaena odorata*, ecosystems



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ICSAE Abstract ID M-68

Title: Mobile Application-Based Guidance for Coconut Tree Management System – AGROGUIDE

Abstract. Coconut farming, a vital agricultural sector in tropical regions, faces numerous challenges in its day-to-day operations, including pest and disease outbreaks, inefficient irrigation practices, unpredictable weather patterns, and limited access to real-time market information. These challenges often reduce productivity and profitability for small and marginal coconut farmers. In response, this paper presents AGROGUIDE, a comprehensive mobile application designed to assist coconut farmers with intelligent, real-time guidance for effective farm management. The application combines digital agriculture, data analytics, image processing, and community-based knowledge sharing into a unified platform. The system architecture of AGROGUIDE integrates several functional modules, each targeting a key area of coconut tree management. The application collects and processes real-time data from various sources, including farmer inputs, live weather updates, and market price feeds. Through this integration, the system generates tailored insights and recommendations to help farmers make data-driven decisions. A significant component of the app is its image processing module, which enables farmers to capture images of affected plants using their smartphones. This feature uses machine learning techniques to identify diseases or pest infestations and recommend appropriate treatments or preventive measures. Another core module focuses on irrigation management, leveraging real-time weather forecasting to suggest optimal watering schedules. This weather-aware irrigation strategy ensures that water resources are utilized efficiently, reducing wastage and promoting sustainable farming practices. The fertilizer recommendation module offers personalized guidance based on soil conditions, coconut variety, and nutrient deficiencies, helping farmers apply the right type and amount of fertilizers at the right time. Additionally, the app provides tools for yield tracking and data analytics, allowing farmers to monitor their crop performance over time. This historical data enables trend analysis, helping identify productivity issues and assess the effectiveness of interventions. AGROGUIDE also includes a community platform to foster collaboration and knowledge exchange among coconut farmers, agricultural experts, and traders. This feature promotes a participatory approach where users can discuss problems, share solutions, and receive expert advice. From a usability standpoint, AGROGUIDE is developed with a user-friendly interface specifically tailored for farmers with limited technical skills. Visual aids, intuitive navigation, and local language support ensure that users can operate the app with minimal training. Timely notifications and reminders about important farming activities, such as fertilization, irrigation, or pest monitoring, further enhance engagement and ensure proactive management. The proposed mobile solution aims to bridge the technological gap in coconut farming by enabling smart agriculture practices that are accessible, affordable, and effective. By integrating image recognition, AI-driven recommendations, weather-based scheduling, and community-driven support, AGROGUIDE provides an end-to-end digital solution for improving the productivity and sustainability of coconut farming. This innovation is expected to significantly enhance decision-making, reduce crop losses, increase profitability, and contribute to the overall growth of the agricultural ecosystem.

Keywords: Coconut Farming, Smart Agriculture, Mobile Application, Image Processing, Weather Forecasting, Irrigation Scheduling, Fertilizer Recommendation, Community Platform, Yield Tracking, Market Access.



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ICSAE Abstract ID M-69

Effect of Sidoarjo Mud (LUSI) Discharge on Salinity Stratification and Sediment Transport in the Porong River

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Abstract. Sidoarjo Mudflow (LUSI) is a volcanic mudflow in East Java that has been flowing into the Porong River through the Ginonjo outfall since 2006. High-salinity minerals found in LUSI have an impact on sediment transport and water quality. Most studies have addressed chemical and water quality aspects, while information about its effects on the vertical-spatial dynamics of salinity in tropical rivers is limited. The study aims to determine the salinity distribution during Ginonjo's operation and assess its implications for sediment transport to fill this gap. Two-month field measurements were conducted at eight cross-sections (spaced ~1 km apart) along the Porong River (STA 0+154–6+978), referenced to the Ginonjo outfall. At each cross-section, salinity was sampled in three lateral positions (left, mid, right) and three depths (0.2d, 0.6d, 0.8d), yielding 72 samples per month. The results showed that when the Ginonjo was operational, salinity increased sharply, especially in the middle-lower layers ($>4\text{‰}$), equivalent to estuarine brackish water, thus triggering strong stratification. Conversely, when the Ginonjo was not operational, low salinities ($<0.3\text{‰}$) typical of freshwater dominated and were homogeneous throughout the water column. These results demonstrate that LUSI plays a significant role in determining salinity dynamics, which has substantial implications for sediment transport and water column stratification.

Keyword: Volcanic mudflow, Density stratification, Hydrodynamic conditions, Tropical river, Water column stability.



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ICSAE-XIII

ICSAE Abstract ID M-70

Effect of location and betaine supplementation on nutrient efficiency of Kedu chickens

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Abstract. This study aimed to evaluate the impact of altitude and betaine supplementation on nutrient efficiency in Kedu chickens. The study used 120 Kedu chickens, which were divided into 2×2 factorial arrangements. The first factor considered was location, specifically Temanggung and Solo, which are at different altitudes. The second factor was the supplementation of betaine at 0% and 0.1%. The observed variables include final body weight (FBW), crude protein intake (CPI), metabolizable energy intake (MEI), feed efficiency (FE), protein efficiency ratio (PER), and energy efficiency ratio (EER). The results did not show any interaction between altitude and betaine supplementation. Chicken raised in Temanggung at high altitude demonstrated higher feed FE, REP, REE ($P < 0.05$) compared to those raised in Solo at low altitude. Additionally, betaine supplementation improved all measured variables, including FBW, CPI, MEI, FE, REP, and REE ($P < 0.05$). These findings suggest that chickens raised at high altitude utilize nutrients more efficiently than those at low altitude. Moreover, betaine supplementation had a positive impact on nutrient efficiency in Kedu chickens, regardless of the location.

Keyword: betaine, Kedu chicken, nutrient efficiency, altitude, performance



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ICSAE Abstract ID M-71

Physicochemical and sensory characteristics of sugar-free chocolate formulated with fructooligosaccharides and allulose

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Abstract. The use of low-calorie alternative sweeteners to replace sucrose in chocolate without sacrificing sensory enjoyment is gaining interest, especially among groups who need to monitor their sugar intake. This study aims to determine the effects of replacing sucrose with fructooligosaccharides (FOS) and allulose as alternative sweeteners in chocolate products. Six formulations were tested for water activity, color value, blooming, melting point, rate-all-that-apply and hedonic sensory analysis. Findings revealed that higher concentrations of FOS lowered water activity and raised the melting point of chocolate, whereas greater use of allulose reduced brightness, yellowness, and redness compared to sucrose. Additionally, FOS and allulose slowed fat blooming. Sensory evaluation showed that chocolate made with 100% allulose ranked second in overall preference after the sucrose control. The most preferred samples (100% allulose) were associated with sweetness, mild aftertaste, and a smooth, glossy surface, while the least preferred (100% FOS) were dominated by bitterness, lingering aftertaste, and gritty, hard texture. Overall, the 100% allulose formulation demonstrated the most favorable balance of sensory and physicochemical properties, making it the best candidate for sucrose replacement in chocolate.

Keywords: low-calorie sweetener, allulose, fructooligosaccharides, confectionery, prebiotic sweetener.



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ICSAE Abstract ID M-72

Effects of isomalt as sucrose substitute on physicochemical and sensory characteristics of peanut candy

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Abstract. Candy has historically played a significant role in cultural traditions and celebrations, appreciated for its sweet flavor and convenient consumption. Soft candies, such as peanut candy, are made from a mixture of sugar and peanuts. However, the high level of sucrose in peanut candy may lead to several adverse health effects. This research aims to determine the effect of using isomalt as a sucrose substitute in peanut candy on physicochemical and sensory characteristics. Parameters such as water activity, hygroscopicity, and color were examined, while sensory acceptance and attributes were evaluated using hedonic and RATA (Rate-All-That-Apply) tests. The results showed that increasing isomalt concentration significantly decreased water activity and brightness value (L^*), and increased hygroscopicity, red color intensity (a^*), along with yellow color intensity (b^*) in peanut candy. RATA test showed isomalt substitution significantly affected sensory attributes in color, taste, texture, and aftertaste categories. Considering water activity and the sensory attributes of flavor, aftertaste, and overall acceptance from the hedonic test, the peanut candy with 25% isomalt substitution was identified as the most favorable formulation for sugar replacement.

Keywords: sugar substitute, low-calorie sweetener, isomalt, confectionery.



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ICSAE-XIII

ICSAE Abstract ID M-73

Microbiota Shifts in Laying Hens Supplemented with Betaine and Sodium Bicarbonate under Tropical Heat Stress

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Abstract. This study evaluated the impact of dietary betaine (1200 mg/kg) combined with sodium bicarbonate (1%) on the intestinal microbiota of 65-week-old Lohmann Brown laying hens reared under tropical conditions. Over an 8-week trial, hens were assigned to two groups: a control diet (control) and the supplemented diet (betaine + sodium bicarbonate). Microbiota composition was profiled via 16S rRNA sequencing from cecum (C) and intestine (I) samples collected from control (C0, I0) and treatment (C3, I3) groups. One-way ANOVA followed by post-hoc tests (Tukey) revealed significant shifts in community structure. *Aeriscardovia* exhibited a considerable increase in the intestine of supplemented birds (I3, $p < 0.0001$), while *Lactobacillus* and *Ligilactobacillus* were significantly enriched in both C3 and I3 relative to controls. Conversely, *Bacteroides* and *Romboutsia*, abundant in control ceca, were markedly reduced under supplementation (C3, I3; $p < 0.0001$). *Limosilactobacillus* was higher in control intestine (I0) but decreased after supplementation (I3), suggesting competitive dynamics within *Lactobacillaceae*. Collectively, these data indicate that betaine plus sodium bicarbonate promotes beneficial microbiota shifts—enhancing lactic-acid-producing genera while suppressing fermentative/proteolytic taxa—thereby potentially improving intestinal health and resilience of laying hens under tropical heat stress.

Keywords : Betaine, Sodium Bicarbonate, Intestinal Microbiota, Laying hens, Tropical Climate



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ICSAE Abstract ID M-74

In Vitro Growing Of Pomegranate (*Punica granatum*) Plants On Various Media With Cytokinin

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Abstract. In vitro propagation using various planting media combined with Plant Growth Regulators (PGR), such as BAP (Benzyl Amino Purine), provides an alternative for pomegranate seedling propagation. This study aimed to: (1) evaluate the interaction between medium type and BAP concentration on in vitro propagation of pomegranate seedlings, (2) determine the most effective medium, and (3) identify the optimal BAP concentration. The experiment was conducted at the Laboratory of Plant Physiology and Biotechnology, Faculty of Agriculture, Sebelas Maret University, from June 2024 to February 2025, using a completely randomized design with two treatment factors (medium type: MS, ½ MS, WPM; and BAP concentration: 0, 2, 4, 6 ppm) and three replications. Variables observed included time to shoot emergence, number of shoots, shoot length, time to leaf emergence, and number of leaves. Data were analyzed using ANOVA at 95% significance, followed by DMRT and regression analysis. Results showed that the interaction between medium type and BAP concentration did not significantly enhance propagation. MS medium supported greater shoot length and leaf number compared to ½ MS and WPM, though all media performed similarly in other traits. BAP at 2 ppm accelerated shoot emergence, while 6 ppm increased shoot and leaf number.

Keyword: growth regulators; Punicaceae; propagation; shoot length; tissue culture.



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ICSAE-XIII

ICSAE Abstract ID M-75

Spatial Analysis of Volcanic Ash Dispersion and Effects on Scallions (*Allium fistulosum* L.) Cultivation on the Western Slopes of Mount Marapi, West Sumatra

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Abstract. Volcanic eruptions produce ash that can significantly affect agricultural systems, both negatively and positively. This study investigates the spatial distribution of volcanic ash following the eruption of Mount Marapi and its effects on scallion (*Allium fistulosum* L.) cultivation and soil chemistry on the mountain's western slopes in West Sumatra. The research employs spatial analysis and multivariate regression to assess the dual impact of ash deposition. In the short term, direct contact between volcanic ash and plant surfaces was found to inhibit stomatal function, induce chlorosis, and cause leaf decay, resulting in reduced crop yields. Conversely, long-term observations conducted in one year after the December 2023's eruption that revealed improvements in soil fertility, particularly through increased levels of phosphorus and potassium. These findings highlight the complex nature of volcanic ash impacts, demonstrating short-term agricultural challenges but potential long-term benefits for soil nutrient enhancement.

Keyword: Eruption Ash, Soil, Agriculture, Income, Scallions



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ICSAE Abstract ID M-76

An ISM-FMEA Framework for Risk Factor Prioritization in Chili Pepper Agro-Supply Chains for Food Loss and Waste (FLW) Reduction

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Abstract. Food Loss and Waste (FLW) significantly impacts economies, societies, and environments, particularly within the vulnerable horticultural supply chain for easily damaged goods like chili peppers (cabai rawit). This study identifies and prioritizes FLW risk factors in Indonesia's chili pepper supply chain, focusing on Kabupaten Malang. The research commenced with a comprehensive Systematic Literature Review (SLR) identifying 24 key risk factors. These factors informed an integrated approach using *Interpretive Structural Modeling* (ISM) to map structural relationships and delineate drivers from dependent factors. Subsequently, *Failure Mode and Effects Analysis* (FMEA) assessed each risk factor's severity, occurrence frequency, and detectability. Aggregated ratings yielded a *Risk Priority Number* (RPN) for operational risk ranking. The ISM analysis provides a comprehensive depiction of FLW risk interconnections, while the FMEA evaluation identifies the most critical risks for mitigation based on RPN values. Prioritization is essential for directing FLW reduction efforts effectively and efficiently. This study is expected to equip stakeholders with strategic insights for appropriate policies and actions along the raw chili pepper supply chain, which will help with food security and sustainable development.

Keyword: Failure Mode and Effects Analysis (FMEA), Chili Pepper Supply Chain, Interpretive Structural Modeling (ISM), Food Loss and Waste (FLW), and Risk Prioritization



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ICSAE Abstract M-77

Biofermentor-Based Lignolytic Microorganism Cultivation for Rice Straw Degradation : A Review

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Abstract: The management of rice straw, a significant agricultural waste, is limited by its high lignin content, which slows down and complicates its natural degradation. Biofermentor-based systems, which enable the controlled cultivation of lignolytic microorganisms, offer a promising solution to accelerate this process. Given the resistant nature of lignin, focusing on the cultivation of lignolytic microorganisms is essential for developing efficient biotechnological approaches to break down complex organic compounds that are otherwise difficult to degrade. This mini review examines the role of biofermentors in optimizing the growth conditions of lignolytic fungi and bacteria, with a focus on key fermentation parameters such as temperature, pH, aeration, and substrate concentration. The review highlights the advantages of biofermentor systems in enhancing microbial efficiency, enzyme production, and the overall degradation rate of rice straw. Furthermore, it discusses the potential of biofermentor-based approaches in advancing sustainable waste management practices. Finally, the review outlines future challenges and research opportunities, particularly in system optimization and practical implementation.

Keyword: biofermentor, lignin degradation, lignolytic microorganism, rice straw, sustainable waste management



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ICSAE Abstract M-78

The Interplay of Human Development, Fiscal Governance, and Agricultural Dynamics in Shaping Environmental Quality in Indonesia

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Abstract. This study examines the complex relationships between human development, fiscal governance, and agricultural activities in shaping environmental quality across Indonesia, utilizing comprehensive panel data and composite indicators from BPS and the World Bank to analyze how the Human Development Index (HDI), fiscal decentralization levels, and ecological fiscal transfers, along with agricultural variables to influence the Environmental Quality Index. Empirical results from the Random Effect Model (REM) estimation reveal that HDI and fiscal decentralization significantly affect agricultural production, particularly rice production, which serves as a proxy for agricultural dynamics. The HDI exhibits a strong positive influence, while fiscal decentralization also makes a positive and significant contribution. The study recommends strengthening fiscal decentralization policies to enable local governments to tailor agricultural programs to regional needs. Investments in human development, particularly education and health, should be prioritized as they have a direct impact on agricultural performance. Furthermore, sustainable management of agricultural practices is essential to mitigate ecological risks associated with intensive farming. The study emphasizes the importance of integrated policy frameworks that align human development, fiscal mechanisms, and sustainable agricultural strategies to support environmental sustainability and development goals in Indonesia.

Keyword: Agricultural, Environmental quality, Human Development, Fiscal decentralization.



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ICSAE-XIII

ICSAE Abstract ID M-79

Producing DIY Video Tutorials, Recycling Patchwork Products for Interior Design Accessories as an Effort to Spread Public Awareness Regarding Climate Change.

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Abstract. The issue of fabric waste remains a significant challenge in daily life. Over the past four years, community service activities in Gulon Asri Waste Bank, Jebres, Indonesia, have primarily focused on the design of product accessories and interior furniture. These initiatives have been carried out collaboratively by lecturers, students, and members of the Gulon Asri Waste Bank. Despite the success of these efforts, previous activities have been hindered by insufficient promotion. To address this issue, the current phase of service activities will emphasize maximizing promotional efforts through social media. One particularly effective strategy identified for this purpose is the creation of Do It Yourself (DIY) video content. This approach not only serves as a promotional tool but also provides an educational purpose. Through these videos, the community can learn about crafting attractive and simple interior design products, as well as promoting environmentally friendly products.

Keywords: Recycling, Patchwork, Interior Design, Accessories, DIY tutorials, Climate Change.



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ICSAE-XIII

ICSAE Abstract ID M-80

The Application Analysis of Eco Interior Design Concepts In Shipping Container Buildings: Case Study in The Arbanat Restaurant Malang

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Abstract. Globally, more than seventeen million shipping containers are left for days in ports and keep piling up at the port since delivering empty shipping containers to their origin is considered cost-prohibitive. Therefore, shipping container building is one of the buildings that applies eco-friendly and sustainable practices in this modern era. The Arbanat Restaurant is one of the interesting buildings made out of shipping containers in Indonesia, since it was the first shipping container building in Indonesia. This research tried to scrutinize whether this building has already applied the sustainable principle. In this research, we use the descriptive qualitative methodology with data analysis using eco-interior theory. The result of this research showed that the Arbanat restaurant had applied sustainable principles, especially in eco-interior design with mild effort, which means that it was not fully optimal or ideal. It is categorized as the first: substantial effort on the part of the space organization, lighting system, ventilation system, and indoor pollution. The second is a mild effort with material selection, electromagnetic emission, and indoor waste management. The last one was a common application on the part of water and sanitation.

Keywords: Eco-Interior, Shipping Container Building, Sustainable Design, Design Concepts, Restaurant.



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ICSAE Abstract ID M-81

Assessment of microplastics pollution in selected surface water resources of Dehradun district, Uttarakhand, India

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Abstract. Owing to fast urbanization, the surface water bodies in various cities of India are getting polluted with emerging pollutants including microplastics (MPs). In this study, during Jan-Feb 2025, three important rivers in Dehradun district viz., Rispana, Tons and Asan were analysed for water quality and microplastics across various sites viz., Rispana: WS1F (rural), WS1A (semi-urban), WS1U (urban); Tons: WS2F (forest), WS2A (agriculture), WS2U (urban); and Asan: WS3F (semi-urban), WS3A (agriculture), WS3U (urban). The water quality index of rivers was found under extremely polluted category for most of the sites (>100). The concentration of MPs ranged from 7000-30000 items/litre, 8000-20000 items/litre and 12000-21000 items/litre for Rispana, Tons and Asan rivers, respectively. The morphological analysis showed the presence of fragmented, film, fiber and microbeads types of MPs in all the water and sediments samples. The FTIR analysis revealed that MPs belonged to polyvinyl alcohol (PVA), polyoxymethylene (POM), corflute, high impact polystyrene (HIPS), nylon, polystyrene (PS), polypropylene (PP) and polytetrafluoroethylene (PTFE) polymers. Site-specific cluster analysis showed similar polymer compositions in WS1U, WS2A, WS2U, while SS3A stood out with a distinct plastic profile. The conclusion is source reduction strategies like reducing plastic consumption and improving waste management and wastewater treatment are crucial for long-term solutions.

Keyword: Microplastics, Polymers, River pollution, Water Quality Index



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ICSAE Abstract ID M-82

River Hydraulic Quantification Model and Its Effect on Irrigation Water Availability for Increasing Rice Production

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Abstract. The Jorolot irrigation area has experienced water shortages for its rice fields since the water level above the dam has decreased even during the rainy season. Fluctuations in the water level in the Cisangkan River, which is the source of water, tend to decrease and changes in its hydraulic characteristics occur. The purpose of this study is to create a hydraulic quantification model of the Cisangkan River and its effect on the flow profile upstream of the Jorolot Dam. The method used is hydraulic modeling of the Cisangkan River upstream to the Jorolot Dam, river morphology simulations of various cross-sectional dimensions, the effect of changes in the runoff coefficient through land use conditions and the effect of each parameter on the flow profile characteristics. The results obtained from this study are the relationship curves between the width of the border, runoff coefficient, the depth and the flow profile. It was found that widening the cross-sectional dimensions of the Cisangkan River upstream by 20% of the discharge capacity for flood control, reduced the water level elevation in the Jorolot Dam upstream by 20 cm and results in the irrigation channels not being irrigated so that the rice fields cannot produce optimally.

Keyword: discharge capacity, flow profile, hydraulic quantification model, land use, river morphology



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ICSAE Abstract ID M-83

Genetic diversity of the F₂ maize inducer haploid generation based on SSR markers

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Abstract. Genetic diversity in a population obtained through the crossing of two inbred lines generally results in diverse characteristics in the offspring. This study examined thirty F₂ progenies resulting from the cross between “Mal-03” and “Ty-001” maize. The maize lines Mal-03 and Ty-001 have different agronomic characteristics and breeding programs. This study used 15 SSR primers to determine the level of genetic diversity, kinship relationships, and patterns of inheritance of essential traits in the F₂ generation. The genetic diversity of the 30 F₂ progenies resulting from the cross between Mal-03 and Ty-001 was classified as “medium,” with an average of 2.93 alleles per locus and a polymorphism level ranging from 0.24 to 0.65, averaging 0.56. The maize F₂ progenies showed the highest level of heterozygosity in primers bnlgl007, dupssr17, and bnlgl118, with an average value of 0.49. The analysis clustering revealed that the similarity coefficient varied between 0.56 and 0.89, delineating two primary clusters. The clusters with the highest similarity were found between Ty/M-2-1A-3 vs. M/Ty-1-1B-5 and Ty/M-2-4B-5 vs. Ty/M-2-4B4. SSR markers provided precise and useful insights into the F₂ generation variability by crossing tropical maize and temperate maize.

Keyword: Genetic diversity, maize, inducer haploid, SSR marker



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ICSAE-XIII

ICSAE Abstract ID M-84

SDGs-Based Merdeka Curriculum for improving students' knowledge of climate change impacts: A study at junior and senior high schools in Karimunjawa

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Abstract. The impacts of climate change are the responsibility of the global community. Climate change has resulted in a 1.1° C rise in the Earth's temperature, extreme waves, storms and floods. This is a major threat to small islands such as Karimunjawa, which are at risk of being affected by climate change. The 17 goals of the SDGs help to provide direction regarding the steps to achieve sustainable development in various fields such as social, economic, and environmental. The most effective way is through education. This research aims to further identify the role and implementation of the SDGs-based Merdeka Curriculum in schools at the junior, senior, and vocational high school in Karimunjawa. This research uses descriptive qualitative method with literature study. The results of this study show that the independent curriculum based on SDGs 4, 12, 13, and 14 has succeeded in encouraging students to be more active in carrying out actions based on environmental sustainability. These activities include environmental education, cleaning up waste on the coast and fish farming with environmental sustainability.

Keyword: Climate Change, Karimuniawa, SDGs, Merdeka Curriculum



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ICSAE Abstract ID M-85

Seeds of tomorrow: pioneering a transparent future in Indian agriculture

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Abstract. This project addresses the critical challenges in Indian agriculture by integrating advanced technologies such as Internet of Things (IoT), Artificial Intelligence (AI), and blockchain. Indian farmers often face unfair pricing due to middlemen, inefficiencies in the supply chain, and lack of reliable real-time information on weather and soil conditions. Our system ensures fair pricing for farmers by enabling direct market access, thereby removing intermediaries and increasing profitability. IoT sensors are deployed across fields to monitor soil moisture, humidity, and weather conditions, supporting automatic irrigation and resource optimization. AI-based analysis provides actionable insights on pest detection, nutrient deficiencies, and crop growth, helping farmers make data-driven decisions. Blockchain technology is used for secure data storage and transparent record keeping, allowing consumers to trace every stage of the product life cycle, from seed planting to harvesting, thereby building trust in agricultural products. The platform is web-based, accessible to farmers and buyers, and designed to be cost-effective and scalable. This solution promotes sustainability, reduces post-harvest losses, and creates a transparent, efficient, and farmer-centric agricultural ecosystem that benefits both producers and consumers.

Keywords: Smart farming, blockchain, IoT, AI, Web application, transparency, precision agriculture, Farmer Empowerment, Data-driven Farming, Agritech



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ICSAE Abstract ID M-86

Surakarta's Green Open Spaces: An Exploration of Their Biodiversity

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Abstract. Surakarta, also known as Solo, is strategically located to serve as a center of national activities. It is a key region of Central Java Province and forms part of the Joglosemar (Yogyakarta-Solo-Semarang) economic triangle. These factors have led to changes in land use for infrastructure development. As a result, green open spaces serve as a source of biodiversity in this urban area. The objective of this study is to assess the biodiversity of Surakarta's green open spaces. Conducted in November 2022, the study used sampling points in green open spaces classified as small ($0 \leq 5,000\text{m}^2$), medium ($5,000 - 10,000\text{m}^2$), and large ($\geq 10,000\text{m}^2$). The Point-Centered Quarter Method was used for flora, while the exploration method was used for fauna. The results showed 83 plant species were observed, including 4 listed in the IUCN Red List and 2 in Appendix II of CITES. There were 34 animal species, while one of them, *Chloropsis cochinchinensis*, is a protected species. The vegetation diversity index in all green open spaces is high. However, the fauna diversity index is moderate to low, consistent with the size of the green open spaces. Community involvement in biodiversity conservation in Surakarta is crucial to maintaining a balanced ecosystem and addressing broader conservation challenges.

Keyword: biodiversity, green open spaces, Solo, Surakarta



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ICSAE Abstract ID M-87

The Effect Of Using Corn Tumpi In Rations On The Performance of Local Male Sheep

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Abstract. Corn tumpi has the potential to be used as ruminant feed because of its abundant availability, no competition in its use, and its relatively low price. This study aims to determine the effect of using corn meal in rations as an alternative feed on the performance of local male sheep. The design used was a completely randomized design with an one-way pattern using 20 local male sheep divided into 4 different treatment groups consisting of P0 (elephant grass 20% + 80% concentrate + 0% corn tumpi), P1 (elephant grass 20% + 60% concentrate + 20% corn tumpi), P2 (elephant grass 20% + 40% concentrate + 40% corn tumpi), and P3 (elephant grass 20% + 20% concentrate + 60% corn tumpi). The data obtained were analyzed using ANOVA and the results of differences were further tested using DMRT. The results obtained showed that the use of tumpi up to 60% had no significant effect ($P>0.05$) on dry matter intake, while tumpi up to 60% had an effect on average daily gain, feed conversion ratio, and feed cost per gain. The use of corn tumpi up to 40% had no effect ($P>0.05$) on dry matter intake, average daily gain, feed conversion ratio, and feed cost per gain of local male sheep.

Keyword: corn tumpi, dry matter intake, average daily gain, feed conversion ratio, feed cost per gain, local male sheep.



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ICSAE Abstract ID M-88

Genetic Variation of the Beta-lactoglobulin Gene for Milk Yield Trait Selection in Indonesian Dairy Cattle Population

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Abstract. Genotype analysis of Beta-lactoglobulin (BLG) is a powerful tool for improving milk production in dairy cattle. This study aimed to identify the BLG genotypes in Friesian Holstein (FH) cattle from Indonesia's three largest milk-producing regions: West Java, Central Java, and East Java, to develop a selection strategy for high-yielding cows. DNA was extracted from 1291 blood samples and genotyped using the Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) method with the *Hae*III restriction enzyme. The analysis identified three BLG genotypes (AA, AB, and BB) and two alleles (A and B) across all populations. The heterozygous AB genotype was the most common in all locations, with an overall frequency of 0.49, while the homozygous AA genotype exhibited the lowest frequency across all regions at 0.22. Consistent with this, the B allele showed the highest frequency and the A allele the lowest frequency in all groups. Chi-square analysis confirmed that all populations were in a Hardy–Weinberg (HW) equilibrium state. In conclusion, these findings provide a genetic foundation for future breeding programs in Indonesian dairy cattle, highlighting the potential of the BLG gene to improve milk production traits.

Keyword: polymorphism, Indonesian dairy cattle, PCR-RFLP, Beta-lactoglobulin.



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ICSAE Abstract ID M-89

Effect of nitrogen balance with biofilmed biofertilizer in NPK compound fertilizer on the growth and disease intensity of basal rot of garlic.

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Abstract. Garlic (*Allium sativum* L.) is a horticultural commodity with high economic value, but its production is often hampered by basal rot disease caused by *Fusarium oxysporum* f. sp. *cepae*. This study aims to assess the effectiveness of Biofilmed Biofertilizer (BiO2) and nitrogen fertilizer dosage in reducing the intensity of basal rot disease and increasing garlic yield. This study was conducted in Pancot Village, Tawangmangu, Karanganyar, Central Java, from May to September 2024 using a Completely Randomized Design (CRD) with one factor and four treatments: P0 (100% NPK + Pesticide), P1 (0% N + 100% PK + BiO2), P2 (50% N + 100% PK + BiO2), P3 (100% N + 100% PK + BiO2) with six replications. The results showed that BiO2 application could increase the effectiveness of nitrogen in NPK compound fertilizer. This is indicated by the trend in data for all growth variables and better yields in the NPK treatment without BiO2. This improved growth is linear with a decrease in the intensity of garlic wilt and bulb rot. There is a trend that the treatment with BiO2 resulted in lower disease intensity variables compared to the control. This fact confirms that the disease intensity of basal rot can decrease with improved plant growth.

Keyword: *Fusarium oxysporum*, *Allium sativum*, plant growth



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ICSAE Abstract ID M-90

Optimizing Water Meter Installation in Philippine Utilities: A 3D CFD Investigation of Straight-Run and Elbow Configurations

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Abstract. Accurate water metering is essential for sustainable water management, revenue protection, and regulatory compliance. In the Philippines, many service line and deepwell installations lack sufficient upstream straight-run lengths and rely on tight-radius elbows, resulting in disturbed flow conditions and significant metering errors. This study applies three-dimensional Computational Fluid Dynamics (3D CFD) to evaluate the influence of upstream piping geometry—specifically straight-run length and elbow radius—on flow stability and meter accuracy. A total of 36 steady-state simulations were conducted across pipe sizes ranging from 20 to 100 mm and flow conditions typical of residential, industrial, and deepwell applications. The results show that inadequate straight runs and short-radius elbows introduce turbulence, swirl, and asymmetric velocity profiles, leading to under-registration errors up to 6%, exceeding the allowable limits of ISO 4064-2 and DPWH standards. By contrast, incorporating at least a 4D straight-run and long-radius elbows significantly improves flow development and reduces error within acceptable ranges. The findings provide CFD-supported recommendations for water meter installation practices that can minimize non-revenue water, improve billing reliability, and support the achievement of SDG 6 and SDG 11 targets in Philippine utilities.

Keyword: Computational fluid dynamics, Water metering, Sustainable water systems



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ICSAE Abstract ID M-91

Vigor and disease incidence of clubroot on cabbage seedlings using biochar, trichocompost and gliocompost media

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Abstract. Cabbage is an important horticultural commodity with high economic value. Its production heavily depends on seed quality, particularly vigor and resistance to soil-borne diseases. Farmers often use soil from previous cabbage fields as a nursery medium, which carries a high risk of pathogen contamination, such as *Plasmodiophora brassicae*, the causative agent of clubroot disease. This study aimed to determine the effect of combining biochar and biocompost in the planting medium on the vigor and disease incidence of clubroot on cabbage seedlings. The experiment employed a completely randomized design with two factors: the dose of biochar and the type of biocompost (trichocompost and gliocompost). The results indicated an interaction between biochar dosage and compost type. A biochar dose of 50% of the planting medium, combined with 100 g of trichocompost or gliocompost per 100 kg of soil, produced the best results in plant height, number of leaves, leaf length, leaf width, and stem diameter. This study concludes that the combination of biochar with biocomposts such as trichocompost and gliocompost has the potential to serve as an alternative medium to enhance cabbage seedling vigor and reduce the incidence of clubroot disease in nurseries.



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ICSAE Abstract ID M-92

AI-Driven and Cloud-Based Data Integration of Agricultural Supply Chains for the Innovative Development of Sustainable Models and Educational Tools

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Abstract. Supply chain inefficiencies, data fragmentation, and limited access to knowledge continue to hinder agricultural development, particularly in marginalized communities. This paper presents an integrated AI-driven, cloud-based framework for agricultural supply chains, designed not only to optimize logistics and production but also to generate sustainable models and educational tools. Unlike existing frameworks that focus solely on technical efficiency, this work emphasizes a holistic vision, where data collected from diverse sources feed into an AI-powered learning platform. This platform enables farmers and stakeholders to access real-time, curated information, instructional content, and best practices derived from global agricultural innovations. The framework incorporates both predictive analytics for supply chain optimization and an interactive educational system to instruct farmers on sustainable practices. A dedicated business planning module assists farmers in planning production activities, managing resources, forecasting demand and supply, and developing circular models that reduce waste and provide alternative byproduct valorization. The proposed methodology introduces a novel AI training algorithm for data acquisition and classification. Results from preliminary case studies demonstrate the capacity of the system to reduce waste, improve productivity, and foster knowledge sharing across cultural and regional boundaries. This paper argues that digital transformation must not only optimize efficiency but also empower communities, sustain ecosystems, and expand the educational horizons of farmers worldwide.



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ICSAE-XIII

ICSAE Abstract ID M-93

Biodiversity and Carbon Stock Estimation in Tukad Yeh Kajang Riparianscape of Marga Village, Tabanan, Bali to Mitigate Climate Change

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Abstract. Riparian zones are vital components of green open space (GOS), providing pivotal ecological functions such as improving water quality, controlling erosion, supporting biodiversity, and storing carbon. In Bali, however, these ecosystems—particularly in urban areas—face increasing pressure from land-use change, urban development, and insufficient protection. This study aims to document plant biodiversity and estimate carbon stock in the riparian vegetation of Tukad Yeh Kajang, located in Marga District, Tabanan Regency, Bali. Field methods included direct observation, species identification, and biomass measurements using allometric equations to estimate above-ground carbon stock. The study recorded a moderate level of tree species diversity (Shannon-Wiener index $H' = 2.85$) and a total carbon stock of 52,096.02 kg within the riparian ecosystem. These results underscore the function of riparian vegetation as an important local carbon sink and provide baseline data to inform sustainable landscape management, particularly in integrating riparian zones into regional green infrastructure and climate adaptation strategies.

Keyword: biodiversity, carbon stock, riparian zone



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ICSAE Abstract ID M-94

Local Government Collaborative Strategies in Accelerating Extreme Poverty Reduction

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Abstract. This study aims to analyse collaborative governance strategies in social protection for extremely poor families in Indonesia, with a focus on the integration of the roles of local government, non-governmental organisations, and the community. Using a descriptive qualitative approach in two provinces, Central Java and East Java, this study identifies policy mechanisms, forms of collaboration, and supporting and inhibiting factors in accelerating the alleviation of extreme poverty. The results show that coordinated multi-stakeholder collaboration through social assistance programmes, income generation, and basic infrastructure strengthening is significant in reducing expenditure burdens and improving community welfare. However, challenges such as data inaccuracy, budget constraints, and suboptimal coordination hamper programme effectiveness. This study concludes that strengthening collaborative institutions and central-regional policy synergies is necessary to achieve the target of eradicating extreme poverty.

Keywords: Collaborative Governance, Extreme Poverty, Social Protection.



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ICSAE Abstract ID M-95

Between Values and Practices: Unpacking Sustainable Consumption Behavior for Sustainable Development

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Abstract. Sustainable consumption remains critical for achieving the Sustainable Development Goals, yet the gap between pro-sustainability awareness and actual behavior persists. This study introduces *Value-Based Planned Consumption* (VBPC), an integrative framework combining the Theory of Planned Behavior (TPB) and the Theory of Consumption Values (TCV). While TPB emphasizes behavioral intentions and TCV highlights underlying values, VBPC captures their interaction in shaping sustainable decisions. Using explanatory research, data from 387 Indonesian household consumers, were analyzed through Exploratory and Confirmatory Factor Analyses. Findings reveal five dimensions of VBPC—Delay Gratification, Normative Consumption Preferences, Utility Consumption, Ethical Consumption, and Sustainable Responsibility—together explaining 66.7% of the variance with strong reliability. The study contributes theoretically by addressing limitations of TPB and TCV in isolation and offering a multidimensional model of sustainable consumption. Practically, it provides insights for policymakers and businesses to design interventions aligning consumer values with sustainable practices. VBPC thus offers a pathway to narrow the intention–behavior gap and foster responsible consumption in emerging economies.

Keyword: Sustainable Consumption; Theory of Planned Behavior (TPB); Theory of Consumption Values (TCV); Value-Based Planned Consumption (VBPC); Consumer Behavior



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ICSAE Abstract ID M-96

Is the Environmental Performance Index Shaped by Climate Policy?

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Abstract. The field of Policy and Politics in Environment examines how governmental actions, political processes, and environmental challenges intersect. Although the importance of environmental governance and climate policy has grown, studies rarely integrate environmental performance indicators, such as the Environmental Performance Index (EPI), with political and policy dimensions in a comparative context. This study conducts a Systematic Literature Review (SLR) combined with bibliometric analysis using Scopus to map research connecting environmental performance, policy, and governance across developed and developing countries. The search employed terms including EPI, environmental policy, climate governance, and political economy of environment. Findings reveal significant growth in studies on climate policy, governance effectiveness, and environmental performance evaluation over the past two decades, yet with strong concentration in developed economies and limited focus on the Global South. Bibliometric clusters also highlight the emerging role of the political economy of environmental governance, underscoring how political structures shape environmental outcomes. This paper contributes by systematically mapping the intersection of policy, politics, and environmental performance, offering both academic insights and practical implications for more inclusive and effective environmental strategies.

Keyword: Environmental Performance Index, Environmental policy, Climate Policy, Developed and Developing countries, Bibliometric Analysis, Systematic Literature Review



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ICSAE-XIII

ICSAE Abstract ID M-97

Potential of Dry Land Based on Agroclimate Characteristics In Nawangan Pacitan For Cocoa (*Theobroma cacao* L.) Cultivation

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Abstract. Cocoa (*Theobroma cacao* L.) is one of the main Indonesian plantation crops and has good prospects and development opportunities. Nawangan distric is in Pacitan regency is a dry land in the karst area in the southern part of Java Island, and has several climatic zones. This study aims to find out the distribution of suitable locations for cocoa cultivation in the Nawangan District based on the climate. This research was a soil survey and evaluation, and was carried out by making land maps, land climatic characteristics, matching climatic conditions with plant growth requirements, and then mapping suitable locations for cocoa cultivation. The results showed that the suitability of the agricultural climate in Nawangan sub-district is suitable with support of the temperature and rainfall, and marginally suitable due to humidity. This research implies that dry land is suitable for Cacao growing with the improvement of the humidity.

Keywords: Agricultural Climate, Cocoa, Land, Suitability



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ICSAE Abstract ID M-98

Community-Based Sustainable Organic Household Waste Management Model in Rural Areas: A Case Study of Women's Farmer Group Mandiri Sejahtera

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Abstract. The increasing volume of household waste presents a serious environmental challenge, particularly in developing countries with suboptimal waste management systems. This study explores community-based sustainable organic household waste management practices implemented by the Mandiri Sejahtera Women's Farmer Group (KWT) in Nagari Lingkuang Aua Bandarajo, West Pasaman Regency. The research employed a descriptive qualitative approach to provide an in-depth understanding of social dynamics and organic waste management practices at the household level. Data were collected through in-depth interviews with KWT members, direct observation, and documentation of group activities. The findings reveal that organic waste management within KWT Mandiri Sejahtera is grounded in sustainability principles through composting techniques that involve active community participation. These practices contribute to reducing household waste volume and enhance the economic welfare of group members through the production of compost and environmentally friendly eco-enzymes as marketable products. The community successfully identified, analyzed, and mapped waste management challenges through participatory approaches while developing appropriate solutions. This research is expected to serve as a model for broader community-based organic waste management initiatives in other regions and contribute to developing sustainable environmental policies.

Keywords: Community-Based Waste Management, Organic Waste, Women Farmers' Groups, Sustainable Development



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ICSAE-XIII

ICSAE Abstract ID M-99

From Advocacy to Policy: Tracing the Influence of Women Leaders in Shaping Sustainable Environmental Policy

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Abstract. This paper outlines the critical role of female political leaders in transforming environmental advocacy into concrete policies. This study uses a qualitative approach with content analysis of the vision and mission of twelve female regional heads on the island of Sumatra who were elected in the 2024 regional elections. It analyses their vision and mission during their candidacy, candidate debates, and the policies and strategies they implemented at the beginning of their administration in shaping a sustainable environmental policy agenda. The results show that female leaders tend to adopt a collaborative and long-term perspective, are able to build effective cross-sector coalitions, and integrate the principles of environmental justice and inclusivity into the core of their policies. Furthermore, this study identifies that their success often stems from their ability to connect environmental issues with broader social, economic, and health values, thereby expanding their political support base. Despite facing structural challenges and gender bias, their election has been an important catalyst in transforming advocacy demands into a sustainable legal framework. Recognition and support for women's leadership is not only a matter of gender equality, but also strategic for the effectiveness and sustainability of environmental policy.

Keyword: Women's Leadership, Environmental Policy, Policy Transformation



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ICSAE Abstract ID M-100

The Role of Serotonin and Dopamine Related Protein Pathway Interactions in Equine (*Equus caballus*) Behavior: An In Silico Study

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Abstract. Serotonin and dopamine are monoamine neurotransmitters that play essential roles in regulating mood, stress response, and behavior. This study investigated protein to protein interaction (PPI) networks associated with serotonin- and dopamine-related pathways and explored their potential contributions to behavioral traits in horses (*Equus caballus*) using an *in silico* approach. A total of 33 proteins related to these pathways were used as input in the STRING database, and functional enrichment analyses of biological processes and pathway interactions were performed. Results showed that 27 proteins were retrieved, and four were identified as central hubs bridging serotonin and dopamine pathways: SLC6A4 (15 nodes), MAOA (13 nodes), COMT (10 nodes), and MAOB (8 nodes). Seventeen proteins were included in the serotonergic synapse, and ten in the dopaminergic synapse, with three proteins (DDC, MAOA, and MAOB) shared between both. Eight proteins were linked to behavioral biological processes, particularly regulation of behavior, behavioral response to cocaine, and locomotory behavior. These hub proteins highlight the molecular integration between serotonin and dopamine pathways, providing insights into the mechanisms underlying behavioral regulation in horses.

Keyword: serotonin–dopamine interaction, horse behavior, protein to protein interaction



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ICSAE Abstract ID M-101

Empowering Women's Groups (PKK) And Youth In Utilizing Waste Into Multipurpose Ecoenzymes

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Abstract. This article was summarized based on the experiences of Community Service program for women's group and youth organizations in Padang Laweh Malalo Village at Tanah Datar Regency, West Sumatra. This program was intended to increase the women's group and youth organizations understanding and awareness on the benefits of waste, which so far have only been seen as useless items and environmental polluters. This study was inspired by various conditions that indicated the powerless of the women's group and youth organizations in overcoming the problem of the waste and at the same time for preserving the environment in the village. This issue was reflected in part from the lack of understanding and awareness of the community, including women's and youth groups, in controlling and managing the waste environment. Based on this condition, various empowerment policies and programs were needed to be implemented in the form of increasing the capacity of the community in economic development through utilizing waste into multipurpose ecoenzymes, especially for the women's group and youth organization as target groups in this program and at the same time for the environment preservation. These empowerment programs needed to be conducted synergistically and collaboratively between the local government and universities.

Keyword: empowerment, waste, eco-enzymes, environment preservation



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ICSAE Abstract M-102

Environmental Law Enforcement and Food Security in Ampek Angkek: Gaps, Impacts, and a Collaborative Action Framework

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Abstract. This piece highlights the link between an environmental legal system, food security, and development in Ampek Angkek District, which suffers from erratic water supply for irrigation, flash floods, pollution, reliance on precipitation and agricultural land encroachment. Using qualitative research and descriptive techniques, this study reveals the gaps in environmental law implementation and impacts on food security of the region. The findings indicate that insufficient environmental policy enforcement coupled with low civic awareness are primary contributors to the deterioration of the environment and the exacerbation of food security risks. Reliance on rainwater coupled with land use changes further exacerbate the risk to food production stability. These gaps can be filled by enhancing law enforcement, constructing irrigation systems, reducing disaster vulnerability, enabling environmental education and preserving agricultural lands. The main argument of the article is that there is a dire need for cooperative action framework comprising the government, the public, and private actors towards environment, food safety, and industrial growth to make sure that the Ampek Angkek District will remain economically, socially, and ecologically vital region in the years to come.

Keyword: environmental law, food security, ampek angkek district



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ICSAE Abstract M-103

Morphophysiological analysis of mung bean [*Vigna radiata* (L.) R. Wilczek] under excess iron condition

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Abstract. Mung bean mungbean [*Vigna radiata* (L.) R. Wilczek] is the most important cash legume of Asia. Mung bean has been valued as important food, fodder and feed crop in agriculture. In India, the production rate of green gram is 3.09 million tonnes. Mung bean is nutritionally as well as economically very important to vegetarians and poor people worldwide. Despite the nutritional importance of mungbean [*Vigna radiata* (L.) R. Wilczek] limited research has been conducted to further improve its nutritional properties. One solution to micronutrient deficiency in the vegetarian diet could be higher consumption of pulses with enhanced levels of Fe. In some areas excess Fe concentration shows inhibitory effect on germination, morphological parameters that are shoot length, root length, seedling length, fresh weight and dry weight, specific leaf area in green gram. In this study we performed morphophysiological analysis such as relative water content, lateral root count, bronzing score and Perl's staining of four mung bean germplasms to identify most tolerant and sensitive germplasms under excess iron condition. Further, we will use those tolerant and sensitive germplasms to identify the genes responsible for iron homeostasis through RNA seq and developing excess iron tolerant mungbean with higher productivity through genome editing and marker assisted breeding.

Key words: Mung bean, Iron homeostasis, morphophysiological



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ICSAE-XIII

ICSAE Abstract M-104

Transcriptomic Insights into Drought Tolerance of Pigeon Pea

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Abstract. Drought stress, intensified by adverse climatic conditions, poses a major threat to global crop productivity. To unravel the molecular basis of drought tolerance, we conducted a comprehensive transcriptomic analysis in two contrasting pigeon pea (*Cajanus cajan*) varieties: Pusa Arhar 16 (PA16, tolerant) and Pusa 992 (PA992, sensitive). Differential gene expression was assessed using DESeq2, followed by functional enrichment (GO, KEGG) and co-expression network analysis (WGCNA). The results highlighted an ABA-independent defense strategy, with upregulated genes associated with DNA-templated transcription, auxin response, protein dimerization, and phytohormone-mediated regulation. Members of the Late Embryogenesis Abundant (LEA) protein family were consistently implicated in drought tolerance across both varieties, while PA16 additionally exhibited a strong induction of secondary metabolites, particularly terpenoids. WGCNA identified 134 differentially expressed genes that defined the core drought response, validating LEA proteins and secondary metabolites as central regulators. This study underscores terpenoids and LEA proteins as pivotal components of pigeon pea's drought tolerance, providing insights into novel mechanisms that could be harnessed for developing climate-resilient legumes.

Keyword: Pigeonpea, Drought stress, WGCNA



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ICSAE Abstract M-105

Exploring the Role of *Rhizophagus proliferus* in Soil Carbon Dynamics and Plant Health: Implications for Agricultural and Environmental Sustainability

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Abstract. *Rhizophagus proliferus*, an arbuscular mycorrhizal fungi (AMF), exhibits notable saprophytic activities, distinguishing it as an important contributor to soil and plant health. AMF contribute to soil carbon dynamics by exerting a demand for plant carbon (C) and facilitating its distribution through below-ground hyphal biomass and spores by producing glycoproteins. Despite their substantial role in enhancing net primary productivity and augmenting the accumulation of photosynthetically fixed Carbon in soil, the potential interactions of AMF with soil and their effects on soil carbon cycling remain largely unexplored.

In this study, we investigated the beneficial impact of *Rhizophagus proliferus* on soil organic carbon and the growth of the host plant *Oryza sativa* under *in vivo* conditions. Our observations revealed a substantial enhancement in total and available nitrogen, phosphorus, potassium and organic carbon in the soil of treatment sets inoculated with *R. proliferus* compared to the control sets. Additionally, approximately a two-fold increase in both plant height and root length was observed in treatment sets than in control sets. These findings indicate the increase in carbon sequestration and soil carbon storage facilitated by the higher hyphal biomass and soil aggregates in the treated soil.

Our study offers a foundation for further exploration into the relationship between *Rhizophagus proliferus* and soil carbon dynamics and their influence on carbon assimilation and transportation. Enhanced comprehension of these relationships holds the potential to optimize our utilization of symbiotic interactions for sustainable agricultural and environmental benefits.

Keywords: Arbuscular mycorrhizal fungi (AMF), Carbon sequestration, *Rhizophagus proliferus*, Soil organic carbon, Plant development



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ICSAE Abstract M-106

Effect of Biochar as Urea Fertilizer Coating on Soil Chemical Properties and Available Nitrogen Release in Sandy Soil, Madura

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Abstract. The efficiency of urea fertilization in sandy soils of Madura can be improved through slow nitrogen release to minimize nutrient losses. This study evaluated the effects of biochar (rice husk, corn cob) and bentonite as urea coating materials on soil chemical properties and available nitrogen release. The experiment was conducted in a greenhouse at the Faculty of Agriculture, University of Trunojoyo Madura, with soil analyses performed at the Soil and Land Resources Laboratory. A non-factorial completely randomized design with six treatments and four replications (24 units) was applied: A0 (control), A1 (100% urea coated with rice husk biochar + bentonite), A2 (100% urea coated with corn cob biochar + bentonite), A3 (80% urea coated with rice husk biochar + bentonite), A4 (80% urea coated with corn cob biochar + bentonite), and A5 (100% uncoated urea, recommended rate). Sandy soils in Bangkalan exhibited very low fertility, with slightly acidic pH, low total nitrogen, organic carbon, cation exchange capacity (CEC), and available base cations. A1 was the most effective in reducing ammonium and nitrate losses while increasing pH and CEC, followed by A2. Urea coating with biochar and bentonite shows potential to improve sandy soil chemistry and fertilization efficiency.

Keyword: Slow-release urea; Biochar; Bentonite; Sandy soil; Cation exchange capacity; Nitrogen loss



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ICSAE Abstract M-107

Elucidating the efficacy of fruit peel derived biochar on arsenic accumulation and biochemical responses in rice (*Oryza sativa* L.)

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Abstract. Arsenic (As) contamination in agricultural soil poses a serious threat to food security and human health, especially in rice-growing regions. This study investigates the efficacy of three different fruit peel-derived biochar in mitigating As toxicity in rice (*Oryza sativa* L.) cultivated in As-contaminated soil. Biochar was produced at 350°C for 2 hours under limited oxygen conditions and applied at 1% (w/w) to assess their impact on As uptake, plant physiological responses, and stress tolerance. Results suggested that application of sweet lemon peel-derived biochar (SLPB) and pomegranate peel-derived biochar (PPB) in soil exhibited a positive effect on plant growth and biochemical responses in comparison to As-only conditions. Furthermore, SLPB amendments showed a reduction in As content in shoot and root by 37.21% and 27.26%, respectively. Whereas PPB amendment also decreased As content in shoots by 30.25% and in roots by 14.56%. However, banana peel-derived biochar (BPB) amendment was comparatively less effective in reducing As accumulation in root and shoot as compared to the other two biochar amendments. Whereas BPB showed no significant effects in lessening oxidative stress compared to the As-only treatment.

Keywords: Antioxidant enzymes, arsenic biochar, fruit peel



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ICSAE Abstract M-108

Agricultural System Resilience Model to Climate Anomalies: A Quantitative Study Based on Secondary Data and Its Implications for Regional Food Security

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Abstract. Climate change has triggered weather anomalies such as rising temperatures and uncertain rainfall patterns, which have a significant impact on the agricultural sector. This study aims to analyze the resilience of agricultural systems to climate anomalies in the regional area, as well as evaluate its implications for regional food security. The method used is a quantitative approach based on secondary data, with coverage of seven districts/cities Indonesia during the 2018–2024 period. The dependent variable in this study is agricultural productivity (tons/ha), while the independent variable includes rainfall and annual average temperature obtained from BMKG data. The analysis was carried out using panel data regression to test the influence of climate variables on agricultural productivity. The results show a significant relationship between climate anomalies and fluctuations in agricultural productivity, especially in areas with limited access to irrigation and low adoption of adaptive technologies. These findings indicate that agricultural resilience still vulnerable to climate pressures, so it is necessary to strengthen local adaptation systems, such as improving irrigation infrastructure, using climate-resistant varieties, and integrating climate information in agricultural planning. This research is expected to be the basis for policies in strengthening regional food security in the midst of climate change dynamics.

Keyword: Agricultural Resilience, Climate Change, Agricultural Productivity, Climate Anomalies, Panel Data Regression



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Effects of fat source and exogenous emulsifiers on growth performance, nutrient digestibility, blood profile, and carcass characteristics of broiler chickens

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Abstract. Fat sources serve as key energy sources. However, the digestibility of fats in young broilers is limited due to immature digestive systems. To address this, exogenous emulsifiers have been considered for improving lipid utilization. This study investigated the interactive effects of two fat sources (coconut oil and palm oil) and six diet types (PC, PC+Polyethylene Glycol Ricinoleate, NC, NC+Polyethylene Glycol Ricinoleate, NC+Lysophospholipid, and NC+Solergy), on nutrient digestibility, energy balance, growth performance, carcass traits, serum lipid profile, and economic efficiency of broiler chickens. PC diets were formulated with standard metabolizable energy (ME) levels, while NC diets had a 75 kcal/kg ME reduction. Study 1 involved a digestibility trial using 72 broilers in a 2×6 factorial completely randomized design (CRD), which showed that coconut oil significantly improved the apparent total tract digestibility (ATTD) of DM, CP, EE, Ash, GE, and energy values (AME and AMEn) compared to palm oil. While significant interaction was observed only for crude fiber digestibility. Emulsifier supplementation, regardless of type, did not significantly improve energy balance or digestibility. Study 2, which included 1,200 broilers in a 2×6 factorial randomized complete blocked design (RCBD), found a significant interaction between fat source and diet type on final body weight and overall feed conversion ratio (FCR). Also, adverse effects were not observed from using energy-deficient diets. Coconut oil also resulted in higher total cholesterol, HDL, and LDL levels, but still within normal physiological ranges. Economic analysis favored the coconut oil group, specifically CO-NC, over the palm oil group, reflecting a higher margin over feed cost alongside improved digestibility and production performance. In conclusion, coconut oil improved energy balance, nutrient digestibility, and economic returns. No consistent interaction between fat source and diet type was observed, and emulsifiers had no significant effect. Thus, crude coconut oil is a cost-effective fat source, even without emulsifiers in energy-reduced broiler diets.

Keywords: fat source, exogenous emulsifiers, broiler chickens, oil, nutrient digestibility



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ICSAE Abstract M-110

Biostimulant Potential of *Agave americana* Leaf Extracts on Growth and Development of Sugarcane (*Saccharum officinarum*)

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Abstract. Species of the genus *Agave* are known for producing secondary metabolites, such as steroidal saponins, which are associated with stress tolerance and plant growth promotion. This study evaluated the effects of *Agave americana* leaf extracts on sugarcane (*Saccharum officinarum*) development. Leaves were processed and subjected to liquid-liquid partitioning with butanol to obtain a saponin-enriched extract. The extract was applied to sugarcane setts and pre-sprouted seedlings via immersion or foliar spraying. Treated setts showed a 27% increase in sprouting rate, 50% greater seedling height, and 30% larger root area compared with controls. Pre-sprouted seedlings sprayed weekly for 90 days exhibited 36.5% more leaves, 23% greater stem diameter, 46.7% higher shoot dry mass, 85% increased tillering, and 107% higher root dry mass. In vitro assays also revealed antifungal activity against phytopathogens. These results demonstrate that *A. americana* extracts can enhance early sugarcane growth and suggest their potential as sustainable plant biostimulants.

Keyword: *Agave americana*; Sugarcane; Biostimulant



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Faith and waste: exploring determinant factors in liquid waste management in the Indonesian textile industry

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Abstract. This article examines the influence of environmental knowledge and religiosity on waste management through environmental ethics as intervening variables. Environmental management problems are becoming global. Environmental research has long linked the role of religion to environmental care behavior. This study uses a survey method and a questionnaire technique. The sampling technique used is a combination of purposive sampling and accidental sampling. The questionnaire was distributed online through WhatsApp. A total of 198 respondents from MSME actors filled out the questionnaire. This study uses the Smart Partial Least Squares Structural Equation Modelling (PLS-SEM) software version 4 to test the hypothesis. The analysis found that: 1) Ethical knowledge and religiosity have an effect on industrial waste management through environmental ethics, 2) Religiosity has a powerful effect on industrial waste management compared to environmental knowledge, 3) Religiosity has a significant effect on the formation of environmental ethics, 4) Ethics successfully mediate environmental knowledge and religiosity towards industrial waste management.

Keyword: environmental knowledge, environmental ethic, religiosity, waste management



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Optimizing water use in sustainable agriculture: A computational fluid dynamics (CFD) approach to drip irrigation systems

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Abstract. Efficient irrigation is essential for addressing the dual challenges of rising global food demand and growing pressure on freshwater resources. Drip irrigation is recognized as a water-saving alternative to conventional systems, yet its performance is strongly influenced by hydraulic behavior within the network. This study applies Computational Fluid Dynamics (CFD) to analyze flow distribution in a simplified drip irrigation model developed using ANSYS software. The three-dimensional model simulates water flow in mainlines and lateral pipes with emitters, incorporating pressure variations, velocity distribution, and frictional effects. Preliminary simulations, supported by existing literature, examine the influence of pipe diameter, inlet pressure, and emitter spacing on discharge uniformity. The results provide detailed visualizations of flow behavior and highlight areas of non-uniformity that may lead to crop stress and water loss. By combining targeted CFD simulations with literature-based analysis, this research develops practical design guidelines that improve irrigation efficiency and reduce the reliance on physical prototyping. Overall, the study demonstrates the potential of CFD as an accessible and effective tool for enhancing irrigation performance, conserving water, and supporting the broader goals of sustainable agricultural development.

Keyword: Fluid mechanics, Computational fluid dynamics, Drip irrigation



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