13th International Conference on Environmental and Rural Development (ICERD)

4-5 March, 2022

BOOK OF ABSTRACTS

Organized by

International Society of Environmental and Rural Development
Bohol Island State University, Philippines
Institute of Environmental Rehabilitation and Conservation, Japan

Co-Organized by

United Nations University Institute for the Advanced Study of Sustainability

The 13th International Conference on Environmental and Rural Development (ICERD)

- Online -

4-5 March, 2022

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International Society of Environmental and Rural Development
Bohol Island State University, Philippines
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Collaborated with

The University of East Sarajevo, Bosnia and Herzegovina
Royal University of Agriculture, Cambodia
Tokyo University of Agriculture, Japan
Rajamangala University of Technology Thanyaburi, Thailand
Kasetsart University, Chalermphrakiat Sakonnakhon Province Campus, Thailand
Khon Kaen University, Thailand
Sukhothai Thammathirat Open University, Thailand
Yezin Agricultural University, Myanmar
The University of Queensland, Australia
Can Tho University, Vietnam
Association of Environmental and Rural Development, Thailand

BACKGROUND:

Under this circumstance of COVID-19 Pandemic, the International Society of Environmental and Rural Development (ISERD) has to decide that the 13th International Conference on Environmental and Rural Development (ICERD) is held by online during 4-5 March, 2021. This online conference aims to discuss and develop the suitable and effective strategies for suitable agricultural and rural development taking into account of environmental aspects. Abstracts and Posters of all presentations are uploaded on the page set in the 13th ICERD of ISERD Website. Additionally, selected presentations (around 10 to 20 presentations) in each Thematic Session are invited to make online oral presentation. Scientists and facilitators of all disciplines belonging to international, governmental or nongovernmental organizations are invited to participate in and submit contributions.

VENUE: Online (Zoom)

THEME: Approaches to Sustainable Agricultural and Rural Development

AG - Agricultural Systems and Food Innovation (Organic farming, Conservation tillage, Mechanization, Irrigation and drainage, Nutrient and pest management, Agro-forestry, Indigenous technology, Animal management, Tropical feed resource, Food Science and Technology, Aquaculture, etc.)
EM - Environmental Management (Bio-diversity, Soil degradation and land conservation, Water quality conservation, Deforestation and sustainable forest management, Environmental management, etc.)
RU - Rural Development (Marketing, Partnership, Value added product, Community development, Access to technology, Gender, Cultural preservation, etc.)
ED - Education for Sustainable Development (Environmental education, Food and agricultural education, Participatory approach, Capacity building, Community empowerment, Agricultural extension, etc.)
IN - Infrastructural Systems (Water resource development, Land reclamation, Road construction, etc.)

LANGUAGE: English

PUBLICATIONS: Full manuscripts from whom participated in the 13th ICERD will be published in the International Journal of Environmental and Rural Development, IJERD after a peer reviewing process.

HOST (13th ICERD): Bohol Island State University (Philippines), Co-hosted by Research Center, Institute of Environmental Rehabilitation and Conservation (Japan)

COMMITTEES:

Organizing Committee: Prof. Dr. Regucivilla A. Pobar, Dr. Zina D. Sayson, Dr. Julian J. Torillo and Prof. Dr. Machito Mihara
Steering Committee: Dr. Takashi Ueno, Dr. Shinobu Terauchi, Mr. Ognen Onchevski, Dr. May Azael, Dr. Sarvesh Maskey and Ms. Keiko Aoki
Scientific Committee: Prof. Dr. Eiji Yamaji, Prof. Dr. Regucivilla A. Pobar, Prof. Dr. Barry N. Noller and Prof. Dr. Anan Polthanee

Regional Centres of Expertise (RCE) Special Session
-Sharing Regional Centres of Expertise (RCE) Experiences-

Disaster Management:
Community-based responses in the aftermath of devastating typhoons

The Asia-Pacific region has been regarded as most disaster-prone due to the occurrences of natural calamities, among which is the increasing frequency of stronger, more devastating typhoons. These disasters adversely impact economic activities, increase vulnerability of countries to environmental degradation and social disparities. Efforts to mitigate the aftermath of disasters entail a community-based multi-stakeholder approach.

The Regional Centres of Expertise (RCE) on Education for Sustainable Development (ESD), acknowledged by the United Nations University, are regional or local networks of formal, non-formal and informal education organisations dedicated to deliver ESD in the locality where it is situated. RCEs across many parts of the world embark on sustainability initiatives and projects that benefit regional and local communities.

This special session is on the topic of “Disaster Management: Community-based responses in the aftermath of devastating typhoons”, which delves into the important role of education, multi-stakeholder partnership, and community engagement in dealing with local problems particularly in the aftermath of devastating typhoons. It will share experiences, and discuss lessons learnt, on how RCEs in the typhoon-hit regions in the Philippines have responded and contributed to mitigating the adverse impacts in the aftermath of disasters.

*"Acknowledged by the United Nations University, a **Regional Centre of Expertise on Education for Sustainable Development (RCE)** is a network of existing formal, non-formal and informal education organisations mobilised to deliver Education for Sustainable Development in the region or locality where it is situated."*

The 13th ICERD Council Meeting (online)

[4th of March 2022]

Council Meeting

Zoom access is controlled, so please kindly show your full name

19:00-20:30 (Japan Standard Time)

19:00-20:00	**The 13th ISERD Council Meeting (online)**
20:00-20:30	**Final Organizing Committee Meeting of 13th ICERD with ISERD Councilors online**

Move to details of 13th ICERD Scientific Program

13th ICERD Scientific Program

[5th of March 2022]

Opening Ceremony

Zoom access is controlled, so please kindly show your full name

9:00-10:00 (Japan Standard Time)

9:00-9:15	**Opening Remarks**	**Professor Dr. Regucivilla A. POBAR** *ISERD Regional Vice President (the Philippines), University President at Bohol Island State University, the Philippines*
9:15-9:30	**Welcome Remarks**	**Professor Dr. Mario T. TABUCANON** *ISERD President, Professor Emeritus at Asian Institute of Technology, and Adjunct Professor at the United Nations University Institute for the Advanced Study of Sustainability*
9:30-9:45	**Message from ISERD Councilors**	**Professor Dr. Machito MIHARA** *ISERD Executive Secretary, Professor at Tokyo University of Agriculture, and President at Institute of Environmental Rehabilitation and Conservation, Japan*
9:45-10:00	**Introduction from ICERD Awards Committee**	**Professor Dr. Eiji YAMAJI** *ISERD Deputy President, Professor Emeritus at the University of Tokyo, and Director at Institute of Environmental Rehabilitation and Conservation, Japan* *On behalf of:* **Professor Dr. Eiji YAMAJI** (*Excellent Paper Awards)* **Professor Dr. Regucivilla A. POBAR** (*Poster Presentation Awards)* **Professor Dr. Barry N. NOLLER** (*Award of Sustainability Promotion)* **Professor Dr. Anan POLTHANEE** (*Award of Outstanding Scientific Achievements)*

Scientific Session

10:00-17:00 (Japan Standard Time)

10:00-17:00	**Poster Presentations**	All posters are exhibited in ISERD Website **www.iserd.net**. Please visit “Poster Presentation” located in “Conference” in the website. **Chair:** Professor Dr. Regucivilla A. POBAR **Co-Chairs:** Dr. Adoracion P. Quitoras, Dr. Amelia L. Arriesgado, Dr. Nina Shimoguchi, Dr. Deceryl Gen P. Tumampos, Dr.Yuri Yamazaki
10:30-12:00	**Oral presentations - Session 1**	Please see following pages for Oral Presentation Program
12:30-14:30	**Oral presentations - Session 2**	Please see following pages for Oral Presentation Program
15:00-17:00	**Oral presentations - Session 3**	Please see following pages for Oral Presentation Program

Move to details of Oral Presentations

Oral Presentation		Room 1		Room 2		Room 3
		Moderator: Dr. Azael May Cuevas		**Moderator :** Dr. Sarvesh Maskey		**Moderator :** Mr. Ognen Onchevski
	Chair	Dr. Zina Sayson	**Chair**	Dr. Shuki Muramatsu	**Chair**	Dr. Chuleemas Boonthai Iwai
	Co-chair	Dr. David R. Ader	**Co-chair**	Dr. Ivy Corazon Mangayaay	**Co-chair**	Dr. Maria Corazon Tatad
Japan Time	***Code***	***Title***	***Code***	***Title***	***Code***	***Title***
10:30-10:45	**AG-13-24**	**Comparison of Rice Yields under Conservation Agriculture and Conventional Tillage Farmings in Santuk District, Kampong Thom Province using APEX Model** Nareth Nut, Chansoma Phun, Sakdanuphol Chan, Machito Mihara	**RD-13-17**	**The Consideration of the Model on Operating and Accumulating Joint-Use Fund among Rice Farmers** *Yuki Toyama, Asres Elias, Kumi Yasunobu, Panatda Utaranakorn*	**RD-13-01**	**The Measurement of Operational Performance Efficiency of Savings Cooperatives in Thailand: The Evidences from Kalasin Provincial Area** *Wittayakorn-Puripunpinyoo Anucha*
10:45-11:00	**AG-13-13**	**Effect of Adding Agricultural and Organic Lime on Soil Properties and Survival Rate of Pathogenic Bacteria (Coliform and E. coli) in Farmland Soils of Kampong Cham Province, Cambodia** *Muy Leang Kim, Machito Mihara*	**RD-13-18**	**Perspective on Urban and Peri-Urban Agriculture in Cambodia's Capital: Phnom Penh** *Sophy Ches, Eiji Yamaji, Dina Thol*	**RD-13-02**	**Income Generation and Expenditure of Organic Rice Farm Households: Case Study of Preah Vihear Province, Cambodia** *Sok Chanmonny, Tomohiro Uchiyama, Nina Shimoguchi*
11:00-11:15	**AG-13-15**	**The Effect of Organic, Inorganic and the Combination of Fertilizer on Growth Rate and Yield of Maize (Zea Mays)** *Peoneti Lui, Falaniko Amosa, Machito Mihara*	**RD-13-19**	**Product and Market Diversification Trends: The Case of Horticulture Exports in Kenya** Jane Githiga,Asres Elias, Kumi Yasunobu	**RD-13-03**	**Economic Assessment of Tea Smallholder Farmers Under Contract Farming in Rungwe District, Tanzania** *Kachenje Issa Abrahaman, Nina Shimoguchi, Hatanaka Katsumori, Saville Ramadhona*
11:15-11:30	**AG-13-10**	**Benefits of applying microbial fuel cell technology in organic farming for sustainable agriculture** Narong Touch, Takahiko Nakamura	**RD-13-20**	**Empowerment of women: A comparative analysis of experiences from rural communities in Ethiopia** *Asres Eliasa, Kumi Yasunobu, Yuki Toyama*	**RD-13-07**	**Assessment of Simple Covered Lagoon Digester Performance in Large-scale Pig Farm in Cambodia** *Chan Makara Mean, Lyhour Hina, Lytour Lor, Dyna Theng, Makara Lay, Bart Frederiks*
11:30-11:45	**AG-13-06**	**Phosphate solubilizing microorganisms' activity in vermicompost from different earthworm specie**s Thanyakan Sengkhrua, Chuleemas Boonthai Iwai	**RD-13-23**	**Income Diversity of Cassava Producers in Vietnam** *Nguyen Chau Nien, Tamon Baba, Hisako Nomura, Kasumi Ito*	**RD-13-09**	**Migration Characteristics of Communities in the Forestlands in Ifugao, Philippines** *Carmelito C. Valdez, Gemma B. Dumansi*
11:45-12:00	**AG-13-07**	**Effects of vermicompost and mineral water on the growth of rice cultivars KDML 105** Duangnapa Saiyakit, Chuleemas Boonthai Iwai	**RD-13-05**	**Pesticide use in banana plantation in Laos** *Souliya Souvandouane, Chuleemas Boonthai Iwai, Phoutthasone Sibounnavong*	**RD-13-10**	**Socio-economic characteristics of cassava producers in Cambodia** *Ito Kasumi, Tamon Baba, Hisako Nomura, Tha Than*
30 minutes break						

Oral Presentation		Room 1		Room 2		Room 3
		Moderator : Dr. Azael May Cuevas		**Moderator :** Dr. Sarvesh Maskey		**Moderator :** Mr. Ognen Onchevski
	Chair	Prof. Dr. Eiji Yamaji	**Chair**	Prof. Dr. Barry Noller	**Chair**	Dr. Ping Li
	Co-chair	Dr. Wilson U. Llegunas, Jr.	**Co-chair**	Dr. Masayuki Nitta	**Co-chair**	Dr. Julian E. Torillo, Jr.
Japan Time	***Code***	***Title***	***Code***	***Title***	***Code***	***Title***
12:30-12:45	**AG-13-17**	**Sensory Qualities of Cotton Fruit (Sandoricum Koetjape) Pulp Ketchup** *Alfie Mahumot, Jean Fulguerinas Nebrea, Bernarda Rasonabe Villarojo*	***EM-13-25***	***Evaluation of Land Use and Land Cover Change and its Drivers in Battambang Province, Cambodia from 1998 to 2018*** *Taingaun Sourn, Sophak Pok, Phanith Chou, Nareth Nut, Theng Dyna, Phanna Rath, Manuel Reyes, P.V. Vara Prasad*	***RD-13-11***	***Challenges for increasing vegetable production in Cambodia*** *Ito Kasumi, Yoshida Tatsuya, Boratana Ung, Mitsuru Hamano*
12:45-13:00	**AG-13-18**	**Sensory Evaluation of Dried Fettuccine Pasta Enriched with Gotu Kola (Centella Asiatica)** *Charline Eve Saligumba, Jean Fulguerinas Nebrea, Josefina Gabisan Gentallan, Marrecil Billasencia Enot, Mary-Grace Carnice Ramada, Genelina Baja Gumanid*	***EM-13-26***	***Design and Experimental Analysis of Atmospheric Water Generator based on Philippine Climatic Conditions*** *Jerico D. Tan, Elizabeth-Edan M. Albiento*	***RD-13-15***	***Socio-demographic Profile and Cultural Management Practices of Cacao (Theobroma cacao) Farmers in Bohol, Philippines*** *Katlyn Quion, Tomas Dino Reyes Jr., Marietta Macalolot*
13:00-13:15	**AG-13-19**	**Influence of Crab (Portunus pelagicus) Shells Powder on the Quality of Crab Meatballs** *Marrecil Enot, Regucivilla Avenido Pobar, Jean Fulguerinas Nebrea, Josefina Gabisan Gentallan, Charlene-Eve Lagare Saligumba*	***EM-13-04***	***Ecosystems' Quality of the Island-Barangays of Bohol*** *Bernabe Mijares Jr.*	***ED-13-03***	***The dynamics of social interactions of children playing around rural rivers in Japan*** *Masayuki Nitta, Yoshiki Kuwabara, Masahiro Nakajima*
13:15-13:30	**AG-13-25**	**Proposal of New Pickles to Improve Food Sanitation at Wet Markets in Cambodia** *Sokly Sorm, Yoshiku Muramatsu, Daiki Oka, Yuri Tanioka, Masataka Uchino, Shuki Muramatsu, Motoe Sekido,Takahiko Nakamura, Toru Nakajima, Eiichiro Sakaguchi, Shotaro Kawakami, Mari Arimitsu, Machito Mihara*	***EM-13-09***	***Understanding the Flora Diversity in Central Visayas, Philippines: Assessment and Conservation for Sustainable Resource Management*** *Wilbert Aureo, Reizl Jose, Tomas Reyes, Danilo Tandan*	***ED-13-04***	***Disparity in Quality of Life and Education Attainment of Children within the Tea Sector: Case study in Low-country in Sri Lanka*** *Yuko Fukuda, Eiji Yamaji*
13:30-13:45	**RD-13-08**	**Sensory Evaluation of Guso (Euchema cottoni) and Banana Blossom (Musa acuminata colla) Longganisa** *Roan Sumalinog*	***EM-13-10***	***Temperature sensitivity (Q10) of Organic Carbon in Red-yellow Soils and its Conservation Strategies*** *Keiji Arostegui, Machito Mihara*	***ED-13-05***	***Cambodian traditional foods and food safety issues: an integrative aspect from literature reviews and pre-survey online*** *Kong Sothea, Kasumi Ito, Hiroyuki Hattori, Samnang Nguon*
13:45-14:00	**AG-13-14**	**Utilization and Processing of a By-Product from the Production of Coconut-Based Food Delicacies** *Maria-Donna Buates, Chona Camarago Fullido*	***EM-13-16***	***Evaluation of Deforestation Rate and Soil Erosion Risk in Cobija, Bolivian Amazonia Using RUSLE and GIS*** *Juan Uego Perez, Machito Mihara*	***ED-13-07***	***Agak (Amoma, Giya, Alayon Sa Kalampusan) for Pupils' Sustainable Development*** *Rosario A. Galorport*
14:00-14:15	**AG-13-11**	**ANSYS Analysis and Prototype Fabrication of an Onion Harvester Implement for Hand Tractor** *Rosalinda L. Abad, Zion Jemillinium S. Tam-Awen, Jessica A. Pagaduan*	***EM-13-20***	***Nursery Propagation of Apple Mangrove (Sonneratia Alba)*** *Arnie Trangia*	***ED-13-08***	***Awareness and Compliance of Corn Farmers to Good Agricultural Practices (GAPs) in Nueva Vizcaya, Philippines*** *Jane B. Bacani*
14:15-14:30	**AG-13-20**	**An evaluation of consumers' preference for the organic rice commodity in Thailand** *Nareerut Seerasarn, Servel Miller, Bodin Wongpom*	**EM-13-27**	**Selection of Suitable Sites for an Off-Stream Reservoir Along Maranding River, Lanao Del Norte** *Elizabeth Edan M. Albiento, Elgean C. Bacasnot, Asmara Sahara M. Balt, Cielo Alexis C. Varquez*	**ED-13-14**	**Educators at Risk: Numerous Meanings of Symbols among Educators as affected by the current Pandemic** *Merites M. Buot, Rona Montecalbo-Ignacio*
30 minutes break						

Oral Presentation	Room 1		Room 2		Room 3 (Special Session)	
	Moderator : Dr. Azael May Cuevas		Moderator : Dr. Sarvesh Maskey		Moderator : Mr. Ognen Onchevski	
	Chair	Dr. Jean F. Nebrea	**Chair**	Dr. Josephine Nalzaro	**Chair**	Prof. Dr. Mario T. Tabucanon
	Co-chair	Dr. Azael May Cuevas	**Co-chair**	Dr. Narong Touch	**Co-chair**	Dr. Jeeranuch Sakkhamduang
Japan Time	***Code***	***Title***	**Code**	**Title**	***Code***	**Title**
15:00-15:15	**AG-13-16**	**Comparison of Crop Surface Models and 3D Point Clouds by UAV RGB Imagery on Estimating Biomass Volume of Pasture Grass** *Ke Zang , Hiromu Okazawa, Yuri Yamazaki, Ayako Sekiyama, Kiichiro Hayashi, Tsuji Osamu*	**EM-13-13**	**Effect of Seasonal Change on Water Quality in Cheung Ek Lake, Cambodia** *Somara Oum, Machito Mihara*	**S-13-01** 15:00-15:10	***Regional Centres of Expertise on Education for Sustainable Development (RCE)*** *Miki Konishi*
15:15-15:30	**EM-13-21**	**Food loss and waste in the Western Balkans** *Hamid El Bilali, Sinisha Berjan, Tarek Ben Hassen, Junaid Memon, Zeljko Vasko, Mohammad Allahyari*	**EM-13-07**	**Some Physico-Chemical Characteristics of Surface Water in Mining Areas in the Lao PDR** *Santi Kongmanya, Vanseng Chounlamany, Phetyasone Xaypanya, Oulay Phoupasong, Bounthob Praxaysombath, Sindavan Pengthavan*	**S-13-02** 15:10-15:30	***Disaster Education and Resilience for Sustainable Development*** *Indrajit Pal*
15:30-15:45	**RD-13-21**	**Sustainability of the Implementation of Solid Waste Management: A Comparative Study** Ma. Magdalena J. Bernales, Jake C. Malon	**EM-13-05**	**Utilizing Lead Isotope Source Tracing Techniques to Examine Sustainable Agriculture Practice in the Burdekin Catchment, Queensland Australia** *Fiona Henderson, Barry Noller, Tatiana Komarova*	15:30-15:40	Q&A
15:45-16:00	**IN-13-03**	**Evaluation of Sediment Trapping Capacity by Geotextile for Erosion Control** *Sarvesh Maskey, Hiromu Okazawa, Takanori Kaneko, Antonio Fuentes Perez, Sachiko Watanabe, Kazuhiro Tazaki, Takahiro Sasaki*	**EM-13-06**	**Effects of lead and other metals from historical smelting on sustainable fruit and vegetable cultivation** *Barry Noller, Fiona Henderson*	**S-13-03** 15:40-15:55	***Attending to the Boholano Material and Psycho-emotional Needs in the Aftermath of Typhoon Rai*** *Bernabe M. Mijares Jr.*
16:00-16:15	**IN-13-04**	**Characteristics, types and qualities of the covered waterways in Tokyo** *Ivana Angelova, Davisi Boontharm*	**EM-13-23**	**Cadmium Bioaccumulation in Amaranthus spinosus Grown in Contaminated Soil of Benguet Province, Philippines** *Elizabeth T. Dom-Ogen, Romeo A. Gomez Jr.*	**S-13-04** 15:55-16:10	***Urgent Concerns Related to DRRM within the Covid Pandemic in the Philippines*** *Maria Rosario Piquero-Ballescas*
16:15-16:30					**S-13-05** 16:10-16:25	***XU GRiD Project: The Role of Academe in Building Resilience*** *Dexter S. Lo, Gina S. Itchon, Jefferson R. Vallente*
16:30-16:45					**S-13-06** 16:25-15:40	***Disaster Risk Mitigation Management Program in Ilocos Norte, Philippines: Challenges, Practices and Community Responses*** *Marlowe U. Aquino*
16:45-17:00					16:40-16:55	Q&A Discussion and wrap up

Move to Poster Presentations

13th ICERD Scientific Program

[5th of March 2022]

Poster Presentations

10:00 – 17:00
(Japanese Standard Time)

All posters are exhibited in ISERD Website **www.iserd.net**. Please visit "Poster Presentation" located in "Conference" in the website.

Chair: Professor Dr. Regucivilla A. POBAR
Co-Chairs: Dr. Adoracion P. Quitoras, Dr. Amelia L. Arriesgado, Dr. Nina Shimoguchi, Dr. Deceryl Gen P. Tumampos, Dr. Yuri Yamazaki

AG-13-02 Potential use of predatory bug Eocanthecona furcellata for biological control of Plutella xylostella in collard production
Jureeporn Sukhatiphum, Panida Kruaysawat, Nutcharee Siri, Prakaijan Nimkingrat, Ubon Tangkawanit

AG-13-21 Soil Physical and Chemical Properties on Mars Global Simulant
Toru Nakajima, Koki Suzuki

EM-13-11 Enhancement of carbon fiber electrode performance using lactic acid bacteria and steelmaking slag
Narong Touch, Tadashi Hibino

EM-13-18 Considering and Improving in water quality in biotopes, as closed environmental water areas
Kurotaki Madoka, Mihara Machito

RD-13-14 Environmental conservation activities on firefly habitat with local government and community in Kanagawa Prefecture, Japan
Kazuya Kurita, Shuto Arai

AG-13-03 Toxicity of plant essential oil from the Resources Protection Area, against storage pest, Sitophilus oryzae
Duangrat Thongphak , Prapaporn Piangsuwan

AG-13-22 On the number of seedlings for the System of Rice Intensification
Eiji Yamaji, Shuichi Sato

EM-13-12 Wind reduction efficiency of tree windbreaks – a case study of Ovche Pole, Macedonia
Ognen Onchevski, Teruaki Irie, Ivan Minchev, Machito Mihara

EM-13-19Seasonal evapotranspiration and its Sensitivity to Climatic Parameters in Cold region watershed of Fukushima, Japan
Sarvesh Maskey, Hiromu Okazawa, Shotaro Kikuchi, Makoto Oba, Shogo Nakamura, Seiji Hayashi, Sergio Azael May Ceuvas

IN-13-05 Compressive strength of limestone-based concrete hollow block
Jenny Grace T. Baral, Julian E. Torillo, Jr.

AG-13-04 DNA Fingerprinting of Selected Maize (Zea may L.) Genotypes Using SSR Markers
San Kyi, Kyaw Kyaw Win, Hla Than, Soe Wina, Nyo Mar Htwe, Aye Lae Lae Hlaing

AG-13-26 An assessment of the impact of adoption of System of Rice Intensification - Case from Madagascar
Masato Kishimoto, Eiji Yamaji, Takeshi Sakurai

EM-13-14 Estimation of runoff and snowmelt in forested area in snowy region using SWAT
Shotaro Kikuchi, Hiromu Okazawa, Sarvesh Maskey, Sergio Azael May Cuevas, Makoto Oba, Shogo Nakamura, Seiji Hayashi

EM-13-22 Evaluating Ion Exchange Capacity of Molten Slag for Hydroponic System
Antonio Fuentes, Hiromu Okazawa, Yuri Yamazaki, Tomonori Fujikawa, Sarvesh Maskey

ED-13-02 The characteristics of biological monitoring by residents in agricultural landscapes in Japan
Masayuki Nitta, Naohisa Nakashima, Mitsura Ohira, Muneykui Aoki

AG-13-05 Utilization of Pineapple Waste for Vermicompost Productio
Yaraphorn Puttakort, Chuleemas Boonthai Iwai

EM-13-01 Remediation of Salt Affected Soil by Adding Different Growing Medias to Improve Yield of Chili (Capsicum frutescens L.)
Thanyaluck Nonsatri, Mallika Srisutham, Anan Polthanee, Supranee Sritamboon

EM-13-15 Characteristics of Ion Components of Clearwater Stream Watershed in an Agricultural Area with Multivariate Analysis
Yuri Yamazaki, Toshimi Muneoka, Chie Matsuda, Masato Kimura, Osamu Tsuji

RD-13-04 Chemical characteristics of natural mineral waters from wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province
Kleawklahan Nuritta, Chuleemas Boonthai Iwai

ED-13-09 Communication, Education, Participation, and Awareness (CEPA) Program for Conservation and Sustainable Management of the Anzali Wetland, Iran
Mohammad Allahyaria, Soroush Marzbana, Elham Nazaria, Tarek Ben Hassenb, Hamid El Bilalic, Sinisha Berijand

AG-13-09 The microbial behavior of the Cambodian homemade-style pickles
Shuki Muramatsua, Sokly Sorm, Masataka Uchino, Motoe Sekido, Yoshiki Muramatsu, Daiki Oka, Yuri Tanikoka, Toru Nakajima, Mari Arimitsu, Machito Mihara

EM-13-03 Impact Analysis of Population Growth and Fertilizer Use on Nitrogen Runoff in Nam Ngum Basin, Laos
Yoshida Koshi, Azechi Issaku, Iida Toshiaki

EM-13-17 Evaluation of microbial inoculating capacity of Patinopecten yessoensis for improving water quality in biotope
Kosei Moroishi, Machito Mihara

RD-13-06 Evaluating aquatic habitats of an agricultural waterway network improved for recreational use of local residents
Masayuki Nitta, Mitsuru Ohira, Muneyuki Aoki, Masahiro Nakajima

ED-13-12Agriculture Entrepreneurship on Youth: A Systematic Literature Review
Fadhilla Izzaty Syaukat, Katsumori Hatanaka, Nina Shimoguchi, Ramadhona Saville

Move to Closing Ceremony with Announcement of Award Winners

13th ICERD Scientific Program

[5th of March 2022]

Closing Ceremony

Zoom access is controlled, so please kindly show your full name.

17:00-18:00 (Japan Standard Time)

17:00-17:30	**Announcement of Award Winners**	Excellent Paper Awards, Poster Presentation Awards, Award of Sustainability Promotion and Award of Outstanding Scientific Achievements
17:30-17:45	**Invitation to 14th ICERD**	**Dr. Borarin BUNTONG** *ISERD Regional Vice President (Cambodia), Royal University of Agriculture, Phnom Penh, Cambodia*
17:45-18:00	**Memorial Photos**	

Looking forward to meeting you at the next 14th ICERD

Regional Centers of Expertise (RCE) Special Session [S]

Agricultural Systems and Food Innovation [AG]

Regional Centres of Expertise on Education for Sustainable Development (RCE)

Miki Konishi [a]*

[a]*United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS)*
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Abstract

Our world has been facing numerous social, environmental, and economic challenges. To achieve the global vision of sustainable development, education has been playing a central role in empowering people to transform their mindsets and behaviours. The Regional Centre of Expertise on Education for Sustainable Development (RCE) is a unique and powerful mechanism that translates the global sustainable agenda into local actions, located in more than 180 regions globally. RCEs have been acknowledged by the United Nations University since 2005 and function as a platform for multi-stakeholder partnership and collaboration to tackle complex sustainability issues in the respective communities and regions. As an introduction to the Special RCE Session, this presentation will provide an overview of RCEs. It will introduce the concept and practices of RCEs and the development of the global network. Additionally, the role of UNU-IAS as the Global RCE Service Centre and the roadmap of the global RCE community towards 2030 will also be presented.

Keywords: SDGs, ESD, multi-stakeholder partnerships, community-based learning and actions

Disaster education and resilience for sustainable development

Indrajit Pal[a]*

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Abstract

Global DRR community has always put education as top priorities as articulated from the Yokohama strategy 1994 and continued so on. It was reported in the 2013 Global Assessment report that 72 % of the reporting countries had been integrated disaster education within their national education curriculum. For decades Higher Education Institution (HEIs) has played a vital role in fostering scientific and technological advancement which has supported disaster risk reduction and management at various spatial-temporal scale. Education can also be a roadmap to support the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 by developing new products services as well as promote further development and dissemination of Standard practices and operational guidance to enhance disaster preparedness. Policy introduction and implementation at various levels through multidisciplinary educational curriculum and incorporation of disaster risk knowledge in formal and nonformal education can strengthen the capacity at all level (regional, National and local) to understand disaster risk and also help for effective risk communications. Multi-institution engagements and multidisciplinary and transdisciplinary approach will not only enhance Global partnership, but it will also help to mobilize shared knowledge, Technology and financial resources towards sustainable Development Goal. The lack of conceptual clarity about disaster education in policymakers and educationalists in the Asian region is affecting the integration of disaster education in higher educational institutions of the region. The Project “Disaster Resilience and Sustainable Development Education Network in Asia” under ProSPER.Net umbrella lead by Asian Institute of Technology, Thailand has established a nexus to understand the current state of higher education linked to sustainable development and disaster resilience as well as identifying gaps in the current curriculum to build resilience in educational institutions and society. This robust regional network with the collective capacity to lead the multidisciplinary initiatives on sustainable development for the region will also help to address the integration of the Natural and Social Science towards DRR and Sustainable development.

Keywords: education, sustainable development, disaster resilience, higher education institution

Attending to the Boholano Material and Psycho-Emotional Needs in the Aftermath of Typhoon Rai

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Abstract

Typhoon Rai passed through the island of Bohol on the 16th of December 2021. Odette, as it was locally named, had a maximum sustained winds of 165 kph near the center, gustiness of 205 to 230 kph, and a central pressure of 90 hPa leaving the province with an estimated damage of 3.1 billion pesos in agriculture and 18 deaths. Survivors testified it was the worst typhoon ever experienced. Attending to the needs of the typhoon victims, Bohol Island State University (BISU) RCE Office, in collaboration with the Governor Celestino Gallares Memorial Hospital (GCGMH) and the Barangay Local Government Unit (BLGU) of Lawis, Bien Unido, conducted relief goods distribution in forms of clothes (slightly used and new), water, rice, canned goods and noodles. GCGMH in particular, had medical check-up and gave out free medicines while it was the BLGU that facilitated for the orderly management of the relief and medical operations. Additionally, BISU, in cooperation with the Provincial Government of Bohol assisted select municipalities in providing Mental Health Psychosocial Support (MHPSS) to the severely affected victims. The Psychology Instructors, Professors and Guidance Counsellors of the university were commissioned to conduct MHPSS in areas which expressed the need of the well-being intervention. To encourage communities and peoples to actively engage in development efforts is shooting arrows in the sky when the basic needs are not sufficiently addressed. Hence food, water and medicine provisions were first delivered before the Boholanos, in their own communities, can start to rebuild from the rubbles of devastation. Yet this is only one aspect of a total healing for moving on is only possible when one is fully and holistically a constituted being, hence the mental and psychosocial intervention. In all these, it was validated that effective disaster interventions should be through a collaborative and multi-stakeholder approach.

Keywords: Bohol, relief goods, mental health, psychosocial support, disaster Intervention, multi-stakeholder approach

Urgent Concerns Related to DRRM within the Covid Pandemic in the Philippines

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Abstract

Just as the year was winding up, with Filipinos looking forward to Christmas and New Year, the strongest typhoon for 2021, Category 5 super typhoon Rai (locally called Odette) hit various parts of the Philippines. It made landfall on Siargao in southeastern Philippines, December 16 at 1:30pm local time then made several other landfalls in various parts of the country before moving out to the West Philippine Sea via Palawan on December 17.Already saddled with simultaneous crises (social, economic, environmental) which were aggravated, deepened and expanded widely by the Covid pandemic, Typhoon Rai/Odette added its destructive fury across multiple locations in the country. A January 15th report the UN Office for Coordination of Humanitarian Affairs (OCHA) in https://disasterphilanthropy.org /disaster /super-typhoon-odette-rai /Feb222 noted "8 million people affected. By January 23, there were 9 million with 198,652 displaced across 5 regions, mostly in Southern Leyte, Cebu and Bohol and over 156,551 of these in evacuation centers as Typhoon Odette left many homeless. Some 514 municipalities were affected, with towns and cities with power outages, no telecommunications and damaged houses, roads, bridges, schools, health clinics, water and sanitation systems. One month on, 100 of these towns and cities still have power outages or no power at all."Our presentation will share observations and experiences related to certain private and government relief assistance initiatives/responses extended to affected residents and communities, particularly in Cebu and Bohol, to draw and call attention to certain concerns related to Disaster Risk Reduction and Management (DRRM) amid the covid pandemic.

Keywords: DRRM, pandemic, covid, simultaneous crises, initiatives and responses, concerns

XU GRiD Project: The Role of Academe in Building Resilience

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Abstract

The Web-based Geospatial Risk Database (Web-GRiD) is a decision support tool originally developed by Xavier University – Ateneo de Cagayan (XU). It was designed as a decision support tool for COVID-19 pandemic response plans and operations of the Department of Health – Northern Mindanao Office, in March 2020. Web-GRiD uses geographic-based analysis to capture the unique characteristics of a particular location at a particular time, to help local government units (LGUs) ensure more suitable and workable plans of action. Together with the National Resilience Council (NRC), XU trained seven LGUs in establishing their own COVID-19 dashboards that are problem-focused, solutions-driven, customized, accessible, and timely. These dashboards also include other hazards imminent and unique to each locality such as floods, landslides, and earthquakes – capturing a multi-hazard approach and integrated risk perspective. A risk lens is essential in understanding the underlying causes of disasters and pandemics, so that programs, projects, and activities of LGUs and other interested groups contribute to sustainable and resilient development. XU and NRC also partnered for a similar Web-GRiD training with special features on supply chain management for private business cooperatives to establish their own dashboards. Web-GRiD has been awarded by the Philippine Council for Health Research and Development as the National Champion in the 2021 Pitch to Policymakers Competition.

Keywords: risk, resilience, disaster, pandemic, GIS

Disaster Risk Mitigation Management Program in Ilocos Norte, Philippines - Challenges, Practices and Community Responses

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Abstract

The paper discusses the disaster risk mitigation management program in Ilocos Norte. It provides a description of the challenges, practices, and community responses in times of natural disasters and the localized health-related initiatives and interventions due to the Covid-19 Pandemic. Local government units (LGUs) serve as the core in drumbeating and orchestrating the delivery of support services during disasters while minimizing related risks. Strong leadership and management strategies on the ground are essential in mitigating the risks into a holistic and integrated manner. Community participation, empowerment, and responses serve as learning factors for LGUs continuous effort in developing programs that enable people and communities to be adaptive, responsive, and resilient in times of disasters and crisis. The HEI-LGU-Community Partnership (HLCP) is one functional-operating model that supports the development of appropriate disaster risk mitigation management programs adaptive and suitable for people and communities emphasizing on community resources, cultural strengths, and self-reliance. Through time, the HLCP was institutionalized as a development approach in times of crisis by the key players and stakeholders while sharing and providing support services and resources for a healthier and resilient communities in the province into a secured and stable socio-cultural, techno-economic and environmental-politically-driven entity.

Keywords: disasters, risk management program, community participation, empowerment, communities, HLC Partnership

Potential Use of Predatory Bug Eocanthecona Furcellata for Biological Control of Plutella Xylostella in Collard Production

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Abstract

Predatory bug Eocanthecona furcellata was investigated for the potential of biological control agent to Plutella xylostella in the laboratory and greenhouse condition. Predation rate of 3rd to 4th instar nymphs E. furcellata on 2nd, 3rd and 4th instar larvae P. xylostella were studied in the laboratory. The results showed that predation rate of 4th and 5th nymphal instars of E. furcellata were higher than 3rd instar. Feeding rate were greater when they feed on 2nd and 3rd instar larvae than feed on 4th instar larvae of P. xylostella. The efficiency of E. furcellata in controlling P. xylostella under greenhouse conditions was conducted. When P. xylostella population reached to economic threshold (ET), 20 of E. furcellata were released to chinese kale greenhouse (18 m3), Results showed that pest population was reduced 10.32% after 5 days of release when compared to control. Additionally, percentage of plant damage from released predatory bug greenhouse was lower than non-released greenhouse. Therefore, it is possible to release the predatory bug E. furcellata in vegetable production as a biological control agent.

Keywords: predation, biological control, diamondback moth

Toxicity of Plant Essential Oil from Khok Phutaka Resources Protection Area, Khon Kaen Province against Storage Pest, Sitophilus Oryzae

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Abstract

Botanical insecticides may offer an alternative solution for pest control. The objective was to test on the repellant, contact, and fumigant effect of the essential oils of 10 indigenous plants from Khok Phutaka Resources Protection Area, Khon Kaen Province including Limnophila aromatica, Piper sarmentosum, Clausena harmandiana, Streptocaulon juventas, Litsea glutinosa, Thunbergia laurifolia, Eupatorium odoratum, Rothmannia wittii, Ficus altissima, Clausena harmandiana and Gymnopetalum integrifolim to control the rice weevil, S. oryzae. The essential oils of plants were extracted by using hydro-distillation method and then they were tested against rice grain weevil, S. oryzae for contact, fumigant and repellent activities in laboratory condition. Adults weevil were different tested oil at the concentrations of 0, 25, 50 75 and 100 percentage (w/v). The maximum repellency action, 80 % when L. glutinosa oil, at the concentrations of 100 % (w/v) were applied for after 72 hour follow by L. aromatica (73.33%) at the concentrations of 25 % (w/v) were applied for after 2 hour. The fumigant and contact test of all 10 essential oils resulted in all lower rate mortality (less than 50 %), at all the concentrations.

Keywords: essential oil, Sitophilus oryzae, repellency, fumigant, contact, Khok Phutaka Resources Protection Area

DNA Fingerprinting of Selected Maize (Zea may L.) Genotypes Using SSR Markers

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Abstract

Molecular marker has been used for variety identification, genetic diversity of genotypes and additional using intellectual property protection in DUS testing. DNA fingerprinting of fourteen maize genotypes has been studied at Plant Molecular Biology Laboratory, Biotechnology Research Section, DAR during 2020-2021. Nine hybrids and five inbreds were analyzed using 24 polymorphic SSR markers, resulted a total number of 101 alleles with a range from 2 to 9 alleles per locus. Polymorphism has been sufficiently detected with the average of 0.66 PIC value per SSR locus. Cluster analysis separated all the maize lines as five major groups and indicated the existence of genetic variation among the observed inbreds and hybrids. Six SSR primer pairs (dupssr12, bnlg1940, umc1248, umc1586, bnlg1518 and bnlg1028) were selected as final marker set for variety identification with the selection criteria such as detection rate of the SSR fragment, the presence of rare allele, PIC value, and reproducibility and PCR band pattern of SSR fragments. In this study, nine hybrids and five inbreds have been fingerprinted with unique profile ID to support the DNA fingerprint catalogues of Myanmar Maize Molecular DUS test guidelines.

Keywords: DNA fingerprint, DUS, maize, and SSR

Utilization of Pineapple Waste for Vermicompost Production

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Abstract

Pineapple is a common tropical fruit that can be grown throughout the year in Thailand. A lot of waste in form of leaves, residual pulp and peels is generated in the market. Without good management, it could contribute environmental pollution. This study aims to utilize the pineapple waste for vermicompost production. The study compared the efficiency of waste reduction and nutrient of vermicompost using pineapple waste via vermicomposting systems during a 45 days period. Chemical properties of compost and vermicompost from pineapple bark culture and number and growth of earthworms from pineapple peel were studied. The experiment was set up in randomization complete block design (RCBD) with 3 replications consisted of Treatment 1: 40% soil + 10% pineapple peel, no earthworms, Treatment 2: 40% soil + 10% pineapple peel + 50 earthworms, Treatment 3: 40% cow manure + 10% pineapple peel + 50 earthworms, Treatment 4: 40% soil + 30% cow manure + 20% rice husk biochar + 10% pineapple peel + 50 earthworms, Treatment 5: 40% soil + 30% cow manure + 20% coconut husk + 10% pineapple peel + 50 earthworms. The RCBD was planned for 3 replications of 5 samples. The results showed that after 45 days, the treatment of using 40% cow manure + 10% pineapple peel gave the highest growth of earthworms and increased the total weight and number of earthworms by 200%. For vermicompost quality, total nitrogen, phosphorus and potassium increased significantly higher than compost systems and pH found significantly decreased. Therefore, pineapple waste could be managed in economical way by utilization for vermicompost production.

Keywords: pineapple, agro waste management, earthworm

Phosphate Solubilizing Microorganisms' Activity in Vermicompost from Different Earthworm Species

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Abstract

The objective of this study was to investigate the Phosphate solubilizing microorganism's activity in vermicompost from different earthworm species. The vermicomposting using different bedding material and different earthworm species was conducted at Khon Kaen University, Thailand. The experiment studied of earthworm propagation in 4 varieties and suitable bedding in 4 types arranged in a completely randomized design (CRD) with 4 replications. Vermicompost from different treatments were taken to analyze for Phosphate solubilizing microorganisms activity by using A novel defined microbiological growth medium, National Botanical Research Institute's phosphate growth medium (NBRIP), the broth assay for the identification of the most efficient phosphate solubilizers. The results found that the Phosphate solubilizing microorganisms in Vermicompost from different bedding and earthworm species were difference. The Phosphate solubilizing microorganisms in the treatment of African night crawler + caw manure, African night crawler + caw manure with mushroom substrate, African night crawler + caw manure with leaf litter, Tiger worm + caw manure, Tiger worm + caw manure with mushroom substrate, Tiger worm + caw manure with leaf litter were 1.52x103, 2.41x103, 1.10x103, 7.17x103, 4.89x103, 10.72x103 CFU/g, respectively.

Keywords: phosphate solubilizing microorganisms, vermicompost, earthworm

Effects of Vermicompost and Mineral Water on the Growth of Rice Cultivars KDML 105

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Abstract

The purpose of this research aims to study the effects of vermicompost and mineral water from wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province on the growth of rice cultivars KDML 105. The rice growth experiments were conducted in a completely randomized design, including irrigation water (T0), irrigation water with vermicompost (T1), mineral water (T2) and mineral water with vermicompost (T3) under greenhouse condition. The results found that the application of vermicompost with mineral water gave the highest rice growth parameters such as plant height, panicles, grains per panicle and number of tillers per hill significantly difference ($p \leq 0.05$) compared with other treatments. The highest plant height (139.63 cm.) was found in T1 treatment. The highest number of tillers per hill and grain weight were found in T3 treatment at 7.00 and 60.95 gram per plot, respectively. Due to Vermicompost is a rich source of readily available nutrients and contains growth hormones. Although, the mineral water showed plant height lower than the irrigation water but the tillering of rice was found increasing in the number of tillers per hill and grains per panicle. The results of this experiment revealed that addition of vermicompost and mineral water had significant positive effects on plant growth parameters of rice. Therefore, utilization of mineral water from wellspring community forest with vermicompost could help farmer to increase the rice production.

Keywords: vermicompost, mineral water, rice KDML 105, growth

The Microbial Behavior of the Cambodian Homemade-Style Pickles

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Abstract

Pickles products using vegetables are popular in Cambodia. There are many types of homemade pickles sold at the wet markets. Our previous study showed that the pickles were seriously contaminated by microbes including food poisoning bacteria. It assumed that there might be several causes of the contamination. We aimed to improve the microbial quality of the homemade pickles and to suggest the problems in the method of cooking and recipe of homemade one. The objective of this study was to investigate the contamination levels of microbes and the growth behavior of pickles made according to the homemade recipe of Cambodians. Three types of pickles, cucumber pickles with/without fish sauce and bok choy pickles were made following the methods passed down among local people. Bok choy was used instead of mustard because we could not obtain it in Japan. The values of pH, salt concentration, and sugar concentration of the samples were ranged 4-5, 1.5-8 %, and 5-18 °Bx, respectively. We conducted the microbiological test of the pickles. As a result, all pickles contained 7 log10 CFU/g of general viable microbes and over 4 log10 CFU/g of coliforms. Fungi were detected from the cucumber pickles without fish sauce and the bok choy pickles. There were cases that fungi were detected from the cucumber pickles with fish sauce. All samples were contaminated by unsuitable microorganisms that could cause food spoilage. Our study showed that the process of making pickles might have the opportunities to be contaminated by microbes and the raw materials of pickles did not control the increase of them. It is concluded that the process of pasteurization is required for providing sanitary products. Using food additives which do not change the taste of pickles may allow the number of microorganisms to be low level.

Keywords: pickles, microorganisms, contamination, microbial quality

Benefits of Applying Microbial Fuel Cell Technology in Organic Farming for Sustainable Agriculture

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Abstract

Increasing the productivity of organic farming is a strategy to achieve sustainable agriculture. However, it is necessary to maintain soil redox potential (ORP) in continuously oxidized conditions and to promote bacterial metabolisms in soils to increase productivity. Previously, applying microbial fuel cell technology (MFCT) into sediment improved ORP and benthos survival in the sediment. It is thought that these positive effects of MFCT can also provide many benefits for soil cultivation in organic farming. This study aims to examine the changes in the biochemical properties of soil following MFCT application. In laboratory experiments, MFCT was applied to cow manure compost-mixed andosol. An anode (oxidation reaction) and a cathode (reduction reaction) were installed in the soil, and a 1.5-V solar cell was used to produce an electric current between the two electrodes. Three months after MFCT application, the chemical properties, such as redox conditions (pH and ORP) and nutrient concentration of the soil were measured. Adenosine triphosphate (ATP) was also measured to evaluate bacterial activation in the soil. Our results showed an increase in ORP near the electrodes. In other words, an electric potential distribution was formed, and the soil located within 20 cm of the electrode was strongly affected by the electrode reaction. This suggests that applying MFCT to soil can change the soil's redox conditions. The ATP and ammonium concentrations increased because of MFCT application, suggesting bacterial activation and enhanced organic matter decomposition in the soil. It can be concluded that applying MFCT can control soil biochemical conditions, enhance bacterial metabolism, and increase organic matter decomposition in soils, which are the most important factors in organic farming.

Keywords: microbial fuel cell, organic farming, soil reduction, soil oxidation, nitrogen release, bacteria activation

ANSYS Analysis and Prototype Fabrication of an Onion Harvester Implement for Hand Tractor

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Abstract

The need for design analysis before physical prototype fabrication to ascertain the desirable aspect of the product reduces time and cost of production. To prevent an overdesign and under-design agricultural equipment, this study of ANSYS analysis and prototype fabrication of onion harvester hand tractor implement conceptualized. The main parts of the onion harvester include the mainframe, digger blade, soil-onion separation device, power transmission system, and collection tray. Purposely for simultaneous digging, lifting, cleaning, and collecting onion bulbs in one operation. The analysis focused on the digger blade since it is the most forced part of the machine. The results of the ANSYS analysis showed that a 5 mm thick mild steel plate shovel-shaped to withstand the maximum soil working resistance of 489.27 N in the digger blade. The prototype was fabricated by a local manufacturer using standard available materials. The main parts were bolted to the mainframe for easy assembly and disassembly during repair and maintenance. It has a total weight of 50 kg with an overall dimension of 1 230 mm x 570 mm x 500 mm (l x w x h) for ease of hitching and movability during operation.

Keywords: agricultural equipment, hand tractor implement, onion harvester, digger blade, soil-onion separation device, collection tray

Effect of Adding Agricultural and Organic Lime on Soil Properties and Survival Rate of Pathogenic Bacteria (Coliform and E. coli) in Farmland Soils of Kampong Cham Province, Cambodia

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Abstract

Cow manure and compost has been applied by farmers in Kampong Cham province. The application of fresh manure or immature compost to croplands have been notified as one of the main sources that spread the pathogenic bacteria Escherichia coli (E. coli) to the soil. Escherichia coli (E. coli) is recognized as a hazardous microorganism in the environment and for public health. It is an important pathogen associated with several foodborne and waterborne outbreaks of gastrointestinal illness, which has been widely reported in Cambodia. Also, the contamination of agricultural land, surface water, irrigation water, and fresh vegetables, can become a reservoir of infections. Most of the previous study has shown that soil pH is one of the dominant factors affecting the inactivation of pathogenic bacteria. The survival rates of coliform and E. coli become remarkably low with pH higher than 9.0. Increasing pH can be achieved by adding agricultural limestone CaCO3 or quick lime CaO. Therefore, the objectives of this study were to investigate and evaluate the effects of different lime materials on soil chemical properties and the survival rates of pathogenic bacteria in farmland soils. The study was also investigating the effect on lime materials on plants germination rates. Pot experiments was conducted with CaCO3 and CaO applied to the soil. CaO obtained by burning the lime materials at 800˚C was compared with other lime materials such CaCO3 powder, eggshell, clamshell, and wood ash. The CaCO3 and CaO added to soil at the ratio of 0 g, 5 g, and 15 g with 750 g of soil in each treatment. Other chemical and biological parameters such as pH, EC, K+, Na+, NO3-, OM%, coliform and E. coli were analyzed. As the results showed that increase in soil pH due to lime addition were observed. However, there's no significant difference of soil pH responding to amounts of lime added 5 g, 10 g and 15 g and similar trends were also observed between the unburned and burned lime material. The survival rate of coliform and E. coli were decreased with unburned and burned lime added, the pathogenic bacteria can be eliminated at 7 days after addition of lime. The performance of unburned and burned lime on the survival rates of pathogenic bacteria no different. Therefore, it is recommended that farmers can use the unburned lime instead of burned materials in Kampong Cham Province.

Keywords: agricultural lime, calcium carbonate, fertilizers, shells, soil pH, microorganisms

Utilization and Processing of a By-Product from the Production of Coconut-Based Food Delicacies

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Abstract

This research aims to create healthy food product thus economical since it utilizes a so-called "scrap" of coconut as the main ingredient. Coconut pulp may be considered as residual but studies show that it contains health-affirming benefits. The coconut pulp gathered from the local delicacy vendors is submitted to the DOST Laboratory for microanalysis to test if it is safe for production. Consequently, it contains the following result: aerobic plate count-2.5 x 106 cfu/g, total coliform count -3.7 x 103 cfu/g, E. coli count - < 1.0 x 10 cfu/g, enumeration of S. aureus - 9.0 x 10 cfu/g, salmonella detection – negative, mold and yeast count - 2.5 x 105 cfu/g. The report of microanalysis reflects that the coconut pulp collected from the vendors is not safe to be processed. Therefore, the coconut pulp utilized in this study is firsthand gathered by the researcher with the observance of utmost food safety to avoid contamination of microorganisms. For the sensory attributes, the color got the highest numerical rating of 8.66 described as "like extremely", while the rest of the attributes are at the range of "like very much". The texture got the average weighted mean of 7.5, for the aroma, 7.74, for the taste, 7.56, and for the general acceptability of 7.72. This result indicates that the coco nuggets are generally acceptable to the consumers, however, 34 or 68% of the participants suggested that the coco nuggets are best served with a dipping. For the nutritional content, coco nuggets contain vital nutrients like protein, carbohydrates, dietary fiber, calcium, and potassium.

Keywords: coconut pulp, microanalysis, coco nuggets, nutritional content, residual

The Effect of Organic, Inorganic and the Combination of Fertilizer on Growth Rate and Yield of Maize (Zea Mays)

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Abstract

A study was conducted to characterize chicken manure and NPK fertilizer to evaluate the influence of organic and inorganic fertilizers and their combination on the growth and yield of maize (Zea mays) in the field experiments at University of the South Pacific Alafua, Apia, and Samoa. The treatments were studied in a randomized complete block design (RCBD) in the field experiment with five replications each. The four treatments used were T1-NPK fertilizer (inorganic), T2-Chicken manure (organic), T3-NPK+CM (combination) and T4-Control. The results were analyzed by ANOVA. There is a significant difference ($P < 0.05$) in the vegetative growth of maize for the various treatments; however, the combined treatments gave higher values of plant height, leaf area and number of leaves than organic and inorganic fertilizers used respectively. Generally vegetative growth increased rapidly in all the treatments from 28 to 56 days after planting. The field experiment showed the trends that the combined applications produced better yields, which were significantly higher than organic or inorganic alone and the control. The highest grain and stover yields of 3.5 and 4 tons ha-1 were obtained by CM+NPK at a combined application of 60 N kg ha-1 poultry manure plus 60-40-40 kg ha-1 NPK. The control obtained the lowest grain and stover yields of 1.2 and 1.3 tons ha-1 respectively.

Keywords: NPK, chicken Manure, RCBD, ANOVA, organic, inorganic, T1-NPK, T2-CM, T3-NPK+CM and T4-Control

Comparison of Crop Surface Models and 3D Point Clouds by UAV RGB Imagery on Estimating Biomass Volume of Pasture Grass

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Abstarct

Recent advances in computer vision including structure from motion (SfM) techniques, which can derive 3D data such as digital surface models (DSMs) and orthomosaic from overlapping photography taken from multiple angles have been widely used to collect vegetation data in pasture grassland. The difference between the DSMs of a planted field and the Digital Terrain Model (DTM) has been referred to as the Crop Surface Model (CSM). The method using CSMs to derive plant height and aboveground biomass has become the most explored and verified approach all over the world. However, the complexity of crop structure is thought to be not well represented in DSMs because the DSMs have only one altitude value at each 2D pixel. Besides, lacking a DTM representing the bare ground is another problem when adopting the CSM method. On the other hand, the 3D point cloud, where DSM is derived, has a better density of 3D coordinates, making it better representing the structure of both crop and the ground. Therefore, there is a possibility that point cloud can provide the structure information faster and more detailed than CSM. This research tested the capability of the 3D point cloud in estimating plant height and biomass volume of pasture grass and compared the results with CSMs, by conducting 15 times UAV photography at an experimental grassland field in Hokkaido Japan, in 2019. Plant height of the grassland has been extracted from point clouds and CSMs, respectively, and then compared with the measured value by ground survey. Results showed that both the point cloud and CSM showed a moderate accuracy on estimating plant height of grassland. Furthermore, the biomass volume estimated by CSM and point cloud has no significant difference, showing that DSM and point cloud has the same performance at estimating biomass volume of grass.

Keywords: UAV, plant height, biomass volume, DSM, CSM, point cloud

Sensory Qualities of Cotton Fruit (Sandoricum Koetjape) Pulp Ketchup

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Abstract

Cotton fruits (Sandoricum koetjape) are native in tropical regions in many parts of Southeast Asia, like Philippines. It is widely found in local markets when in season. The fruits are consumed fresh with the pulp which can be used as condiments, like ketchup. The study aimed to determine the sensory qualities of cotton fruit pulp ketchup blended with the basic ingredients, sugar syrup, and chili powder. This utilized the experimental method of research employing the three treatments, namely: T-1 Original Blend, T-2 Sweet Blend, and T-3 Spicy Blend, based on sensory evaluation using descriptive and level of liking in terms of appearance, aroma, taste, and texture. In terms of appearance, Treatment 1 and 3 got the highest weighted mean of 3.06 which means, moderately appealing. Treatment 3 dominated the rating for aroma with a weighted mean of 3.1 which implied moderately pleasant and got the highest rating from among the treatments in terms of taste, with a weighted mean of 3.22 which has a moderately spicy taste. And for the texture, Treatment 3 got the highest rate with a weighted mean of 2.64, moderately refined. Findings revealed that cotton fruit pulp ketchup with spicy blend had an overall liking of “like moderately” with the average weighted mean of 2.96, describe as moderately appealing, pleasant, spicy, and refined respectively in all sensory attributes. Hence, the overall result revealed that an average satisfaction of cotton fruit ketchup was met. With this positive result, it is recommended the patronage and consumption of the spicy blend cotton fruit pulp ketchup as one of the condiments and ingredients in cooking dishes.

Keywords: sensory qualities, cotton fruit, ketchup

Sensory Evaluation of Dried Fettuccine Pasta Enriched with Gotu Kola (Centella Asiatica)

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Abstract

The use of gotu kola in food and beverages has increased over the years due to its beneficial and nutritional properties. The intent of this study is for the public utilization of the gotu kola and its improvement. The main thrust of the study was to determine the sensory evaluation of dried fettuccine pasta enriched with gotu kola (Centella asiatica) among the three treatments in terms of aroma, color, taste and texture. This study also aimed to determine if there was a significant difference among the three treatments. This study used the experimental-descriptive research design employing a self-made modified questionnaire as a main tool in gathering the data through 4-point modified Hedonic scale for the level of liking. The data gathered were tabulated using the weighted mean and ANOVA to determine the significant difference in the respondent's liking among the three treatments. There was a total of 85 respondents which composed of 55 selected food technology experts' 25 instructors handling food technology and food related subjects and 30 MATVE- Food Technology students, and 30 consumers. The findings revealed that treatment 3 was "like very much" while, treatments 1 & 2 were "like moderately". The result showed that there was no significant difference in terms of aroma of the three treatments, however, there was a significant difference in terms of color, taste and texture among the three treatments of dried fettuccine pasta enriched with gotu kola. Thus, the researcher recommended to utilize Gotu Kola as a potential ingredient to enrich the pasta for possible income generating project for extension services.

Keywords: gotu kola, sensory evaluation, fettuccine pasta

Influence of Crab (Portunus pelagicus) Shells Powder on the Quality of Crab Meatballs

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Abstract

Meatballs is a mixture of ground meat, spices, and sometimes with other ingredients like crab shells powder. The main thrust of this study was to determine the influence of crab shells powder on the quality of crab meatballs in in three treatments: T1- 30 grams, T2- 60 grams, T3- 90 grams in terms of its color, flavor, odor and texture. Further, it aimed to determine the significant difference in the respondent's level of liking in different formulations. The researcher employed the experimental design with the aid of a questionnaire. The data gathered were tabulated using the weighted mean and analysis of variance to determine the significant differences in the respondent's level of liking among the three treatments. There were seventy-five (75) respondents involved in the study, composed of Food Technology students, instructors and chef cooks. Based on the findings, Treatment 2 with 60 grams of crab shells powder was the best formulation with an average weighted mean of 7.69 which described as "like very much". Hence, crab meatballs can be a considered as the one of the choices of food to be serve in each table palate and potential income generating enterprises.

Keywords: crab shells powder, crab meatballs

AG-13-20

An Evaluation of Consumers' Preference for the Organic Rice Commodity in Thailand

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Abstract

The objective of this study was to towards the growth of the Thai Organic rice industry: An evaluation of consumers' behavior and barriers to organic rice consumption in Thailand. The questionnaire was collected from 223 rice growers using simple random sampling by using the formula of Taro Yamane with 5 % variation. The descriptive and inferential statistics were used to answer the research purpose, such as mean percentage, ANOVA statistical analysis. This research found that; confidence in the 'organic-label', cheaper price, quality, nutritional value, range of organic products, accessibility and availability are the key deciding factors to purchase organic rice by consumers. Lack of trust in the authenticity of organic products is a key barrier and farmers needs to understand the certification and quality assurance processes to help them overcome this hurdle. Price is a significant motivator to purchase, as such, initiatives to increase efficiency in production and encourage farmers to plant more pest-resistant/high yielding rice variety is critical. The government certification programme needs to be standardize and utilize innovative technologies including the creation of national 'kite-mark' which provides the ability by the consumers to trace the origin of rice products (e.g. QRcode, augmented reality) to build trust in organic rice products. The research presented underpin the relevance of understanding the extrinsic and intrinsic motivations of consumers' satisfaction to buy organic rice and how this can be used to better inform the development of Government policies.

Keywords: organic agriculture, consumer preference, quality rice

Soil Physical and Chemical Properties on Mars Global Simulant

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Abstract

Recently, people are about to reach Mars. To survive sustainably on Mars, there is need to find a way to produce food under Mars conditions such as climate, soil, water, etc. In addition, Mars Global Simulant (MGS-1) was developed based on quantitative mineralogy from the Mars Curiosity Rover NASA data, at Exolith Laboratory, University of Central Florida. MGS-1 is a simulated soil and we compared MGS-1 and Andisol which is a typical soil in Japan for possibility of food production on Mars. The results showed that the saturated hydraulic conductivity of MGS-1 was relativity lower than its Andisol. The water holding ability of MGS-1 was as same as its Andisol. The micronutrient was observed under MGS-1 compared to the same level of Andisol. We concluded that MGS-1 needs to be improved physical and chemical properties for food production, such as applying organic materials.

Keywords: food production, mars, soil physical property, soil chemical property

On the Number of Seedlings for the System of Rice Intensification

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Abstract

The System of Rice Intensification (SRI) is an environmentally-friendly and sustainable rice farming practice developed in 1980s in Madagascar. This practice can reduce resources, such as irrigation water, chemical fertilizer, number of seedlings by keeping and sometimes increasing yield of rice. It has spread to many countries in early years of 21st century. Indonesia is one of the early diffused countries and many farmers adopted this practice. The authors made experiments in Lombok island of Indonesia, measuring water consumption, rice growth, GHG emissions et al. From many results, this paper discusses appropriate number of seedlings. This experiment prepared 50 small plots and set 2 types of irrigation; intermittent and continuous, 3 types of seedlings; 0, 7, 21 days, and 3 types of number of seedlings; 1, 2, 4. At the harvest stage, number of tillers, number of panicles, grain weight, filled grain weight and root weight of 5 samples are measured from each plot. Compared in nursery stage, 0 day seedlings, meaning direct seedling and 7 days seedling gave higher yield than 21 days seedling. On the number of seedlings, 4 seedlings of 21 days achieved best yield both in intermittent irrigation and continuous irrigation. And 2 seedlings of 0 day and 7 days achieved best yield both in intermittent irrigation and continuous irrigation. In Indonesia, SRI promoters of local government and NPO basically recommend farmers to transplant One 7 days seedlings. However, this experiment shows Two 7 days seedlings achieved better. Two seedlings method needs two times cost of seedlings than one seedling method. However, this method needs about half cost compared with traditional method. Moreover, two seedlings method gives farmers peace of mind when transplant stage. So, this method is to be said as more reasonable than one seedling method.

Keywords: system of rice Intensification, number of seedlings, intermittent Irrigation, yield

Comparison of Rice Yields under Conservation Agriculture and Conventional Tillage Farmings in Santuk District, Kampong Thom Province using APEX Model

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Abstract

The study on rice yield variation between conservation and conventional farming in Santuk district, Kampong Thom province was conducted to compare the rice yield between these two crop management practices by using the APEX model. In the study, numerous data included the Digital Elevation Model (DEM), land use, soil type, climate, crop management, and some relevant observed data were collected and incorporated into the APEX model. Based on the results from APEX model simulation, it was shown that the calibration of rice yield (2011-2013) under the conservation agriculture system (CA) obtained the value of R2 = 0.40 and the value of PBIAS = -26.34%, while the validation (2014-2016) got the value of the R2 = 0.76 and the value of PBIAS = 14.29%. The traditional rice cultivation system was divided into two seasons: wet-season rice and dry-season rice. The results of the calibration of wet season rice yield for 2006-2013 obtained the value of the R2 = 0.42 and the value of PBIAS = -57.51%, while the validation for 2014-2020 received the value of the R2 = 0. 30 and PBIAS value = 11.51%. For the calibration of dry season rice yields in 2006-2013 had a coefficient of R2 = 0.50 and PBIAS = -34.60%, while the validation for 2014-2020 had a coefficient of R2 = 0.20 and PBIAS = 21.80%. For the model simulation in 2011-2016, an average rice yield under conservation agriculture (CA) was 2.30 t/ha and an average rice yield under conventional tillage (CT) was also 2.30 t/ha, while the observed rice yield under CA was 2.61 t/ha and observed rice yield under CT was 2.89 t/ha, respectively. A forecast of rice yield in 2021-2030 was 2.35 t/ha for CA and 1.22 t/ha for CT.

Keywords: conservation agriculture, conventional tillage, rice yield, biomass, APEX model, Kampong Thom

Proposal of New Pickles to Improve Food Sanitation at Wet Markets in Cambodia

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Abstract

Our previous study found that the pickles sold at wet markets in Cambodia were highly contaminated with microbes, including the bacteria that cause food poisoning. One possible factor leading to this situation is the lack of heat treatment. A heating process that sterilizes food products is effective in reducing the microbial content of pickles. We applied heat treatments to ensure that homemade pickles were safe to consume. In this study, 2 kinds of pickled young papaya, the sour and salty pickles were made to develop a new, safe processed food that effectively utilizes agricultural products. The objectives of this study were 1) to develop pickled young papaya processed with heat treatment, 2) to evaluate the acceptability of the pickles in Cambodian and Asian markets, and 3) to propose acceptable pickles that ensure food sanitation in these countries. The color, sweetness, sourness, saltiness, flavor, texture, and overall evaluation of each sample were quantified using a five-point hedonic scale (1: strongly dislike, 2: dislike, 3: neutral, 4: like, and 5: strongly like) for the sensory test (preference type). The sensory evaluation indicated that the samples were considered to be acceptable but needed further improvement. Because both pickles received mostly favorable evaluations from Cambodian and Asian panelists based on the overall evaluation scores (over 3.0), both pickles were potentially acceptable as new processed foods in Cambodia and in other Asian countries.

Keywords: young papaya, pickle, heat treatment, sensory evaluation, acceptability

An Assessment of the Impact of Adoption of System of Rice Intensification- Case from Madagascar

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Abstract

The System of Rice Intensification (SRI) is expected to improve rice yield with minimal impact on harming environment. While many studies have confirmed that the yield increases with adopting SRI by field surveys, the impact of SRI on household income is still debatable because SRI is a labor demanding method and may cause labor redistribution within a household. This study assesses the impact of SRI on the yield, household income, expenditure and caloric consumption in Madagascar, taking into account the endogeneity. The authors collect the data for small-scale rice producing households in Alaotra-Mangoro region on Madagascar central highland in 2014 and 2017. The authors find that the adoption of at least one component of SRI has no significant impact on the rice yield, income, expenditure and caloric consumption of households on average compared with them that adopt none of the SRI components, taking account of the endogeneity of technology adoption. This study applies Propensity Score Matching (PSM) to take account of the endogeneity. Then, comparing mean variables with using fertilizer by using PSM, the authors confirm the positive impact on yield by plot level. However, because households can't adopt both SRI and the use of fertilizers for all plots, no significant difference is observed in household income and expenditure. The findings suggest that a combination of SRI with fertilizer inputs may increase yield significantly, if more farmers in the area start using fertilizers in the future. Provision of technical SRI training alongside sales of fertilizers is crucial.. However, it is needed to conduct further research in our study site to explore the impact on the household adopted all four of the SRI components which is more effective, and long-term effects of SRI.

Keywords: system of rice Intensification (SRI), Madagascar, propensity score matching (PSM), impact assessment, technology adoption, small rice farmers

Remediation of Salt – Affected Soil by Adding Different Growing Medias to Improve Yield of Chili (Capsicum frutescens L.)

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Abstract

To mitigate the effect of salt stress and consequently improve crop yield. The objective of this study was to evaluate the effects of different growing media types application on growth and yield of chili grown under salt-affected soil. Application treatments consist of: (1) coarse sand, (2) coarse sand + M. calabura leaves, (3) coarse sand + polymer, (4) coarse sand + coconut shell hair and (5) no – application (control). The results revealed that chili plant death before producing an economical fruit yield in the coarse sand application alone and no – application (control) treatments. Application of coarse sand + M. calabura leaves gave the highest fruit yield in the present study.

Keywords: saline soils, organic matter, polymer, chili, yield

EM-13-03

Impact Analysis of Population Growth and Fertilizer Use on Nitrogen Runoff in Nam Ngum Basin, Laos

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Abstract

Human population growth has led to increased energy and food production, fertilizer usage and wastewater flows. Increased nitrogen availability is a worldwide cause of eutrophication of rivers, lakes and estuaries, however, quantitative evaluation the impacts of nitrogen loads has been insufficient in developing countries because of poor data availability. The Nam Ngum River basin, Laos, which supplies quality water for domestic use in the Vientiane Metropolis, was selected as the target area for this study. The Nam Ngum River basin is 415 km long with a 17,000 km2 catchment area, and the main land uses in 2000 were paddy (15.6%), forest (32.3%), shrub (40.3%) and urban (0.2%). By UN estimation, population in Laos is expected to increase 2.1 times from 2000 to 2050, and fertilizer use also will increase to produce sufficient food. Therefore, future water quality is a main concern in this river basin. Meteorological and hydrological data from 1995 to 2004, and spatial data such as topography, land use, and soil properties were collected for model simulation. A conceptual nitrogen balance model with three nitrogen pools was developed and combined with a rainfall runoff model. Simulated river discharge and nitrogen loads agreed with the observed data. Then, we investigated future nitrogen load variations in the basin under different population growth and agricultural modernization scenarios. As a result, even when population in the basin increased 2.1 times, nitrogen load did not change significantly (11,676 tons/year in 2000 and 11,822 tons/year in 2050). However, the fertilizer increase scenario, from 25 kg/ha/season to 50 kg/ha/season, showed significant increase in nitrogen loading, from 11,676 ton/year to 17,010 ton/year. Our results provide initial insight into the magnitude and spatial distribution of nitrogen loading in Nam Ngum River Basin, showing that this type of model may be useful for future impact assessments.

Keywords: nitrogen load, point sources, diffuse pollution, agricultural modernization

Ecosystems' Quality of the Island-Barangays of Bohol

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Abstract

This is a study on the quality of the ecosystems in the island-barangays of Bohol. Three hundred eighty four (384) randomly selected respondents as well as Key Informants assessed the condition of the goods and processes in the islands using rates item and open ended questions on provisioning, regulating, cultural and supporting services of the ecosystems. Data revealed that all island-barangays achieved a mean score of 55.5 which is "medium" for provisioning services; 55.0 described as "medium" for regulating services; and 73.1 and 65.1 for cultural and supporting services, respectively, both described as "fair." Overall, the 9 island-barangays had achieved a mean score of 66.0 which rendered their ecosystems quality as "fair." This implied that the island-barangays of Bohol were at a better level in their ecosystems quality. Moreover, the respondents and key informants observed that (1) there were "changes" in the quality of ecosystems products for the last 10 years; (2) biodiversity, indicated by the existence of species of plants and animals that were not planted and raised, still thrived; (3) there were "changes" in both the rainy and the dry seasons; (4) there were "changes" in the cultural services in their barangays for the last 10 years; (5) there was "increase" in the size of the "settlement area" and the "forest or mangrove area," "decrease" in the "littoral zones or seashore," and "no change" in the "fishing ground or area" but "no change" in the size of their "MPA;" and (6) there were parts of the island-barangays that "improved or developed" while there were also those that "deteriorated or were destroyed."The island residents heavily depend on their ecosystems for their well-being. This better quality as well as these changes both positive and negative are necessary for the development of sustainability intervention measures of the government and other stakeholders.

Keywords: Island-Barangays, sustainability, ecosystems quality, livelihood, development

Utilizing Lead Isotope Source Tracing Techniques to Examine Sustainable Agriculture Practice in the Burdekin Catchment, Queensland Australia

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Abstract

The Burdekin catchment (Queensland, Australia) is shaped by sugarcane, pastoral and mining activities, all of which are potential sources of heavy metal release into the environment. The Burdekin delta is the largest sugarcane producing region (area: 85,000 ha, Ayr township). Run-off from sugarcane areas, can contain heavy metals from fungicides and fertilizers, contributing to elevated heavy metal (i.e., Cd, Hg, and Pb) concentrations in waterways. Validating the efficacy of sustainable practices used in agricultural industries often proves challenging, yet it is necessary to protect future waterways from contamination. The objective of this study is to utilize Pb isotope tracing (207/206Pb and 208/206Pb) and trace elements Cd, Hg, and Pb in Burdekin River embankment soils and waters, to trace residual heavy metals from fertilizers and pesticides. This study utilizes Pb isotope tracing as an approach to examine indicators (fertilizer use) of sustainable agriculture. Pb isotope ratios in the Burdekin River soil/sediment (n=15, 0-100 mm,) and water (n=39, 2016-2020), demonstrate mixed signatures between natural soils, cane soils, (fertilizer enriched), ambient dust and historic coal ash (Collinsville power station). Lead Isotope tracing and low levels of heavy metals (soil/sediment: TCd 0.11 mg/kg, THg 0.03 mg/kg and TPb 11.02 mg/kg; estuary: THg 0.011 µg/L and TPb 4.99 µg/L) indicates that sugarcane appears to have no environmental impact and infers sustainable agriculture practice with the no indication of fertilizer overuse in the Burdekin catchment during the dry season in 2018 and 2019.

Keywords: agriculture, sustainability, sustainable practices, Pb isotopic composition, contamination

Effects of Lead and Other Metals from Historical Smelting On Sustainable Fruit and Vegetable Cultivation

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Abstract

Wollongong, located in the Illawarra region of NSW Australia, contains the industrial complex of Port Kembla. Lead in Port Kembla soils, ~2.5 km from a former copper smelter (1908-2003), have exceeded soil contamination guidelines for human health (HIL) and ecological (EIL) investigation levels. Previous studies regarding heavy metal contamination from the industrial complex, do not include comparisons to HIL and EIL guidelines, as these standards were not established at that time. This study re-examines the risk of legacy (historic) heavy metals in urban soils to residents in proximity to the Port Kembla industrial complex. This was accomplished by reviewing: (i) resolution of heavy metal dispersion data from the copper smelter, in historic soil concentration data (n=95 top soil samples) collected by Jafari (2009) and reviewed by Noller (2020a); (ii) providing a new comparison of historic percentile data to current Australian soil contamination guidelines (NEPC, 2013) and German atmospheric pollutant guidelines; and (iii) re-evaluating treatments to soil data by Jafari (2009), in the context of bioaccessibility and bioavailability to humans and plants. At 75th percentile concentrations, arsenic, cadmium, copper, lead and zinc exceeded HIL Level A guidelines. When detection limit values (52 out of 95) were removed (n=22 samples), cadmium exceeded HIL Level A guidelines at the median. Dietary exposure to cadmium, lead, zinc and copper is a risk to residents through the consumption of vegetables grown in urban gardens in proximity to the Port Kembla industrial complex. Copper in vegetables sampled from soils in the vicinity of the copper smelter at Port Kembla was greater in comparison to sampling completed at other smelter sites. Vegetables at Port Kembla showed exceedance of food guidelines for both cadmium and lead, thus highlighting the danger of growing vegetables in the vicinity of industrial areas.

Keywords: heavy metals, arsenic, smelting, sustainable, fruit and vegetable cultivation

Some Physico-Chemical Characteristics of Surface Water in Mining Areas in the Lao PDR

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Abstract

Lao People's Democratic Republic (the Lao PDR), is enriched with mineral and previous metal resources which have been the important potential in the country socio-economic development. It has been well known that the mining activities will bring not only benefit but also non-profit environmental problems such as deforestation due to land opening, surface water quality decline as a result of mining waste contamination. One attempt of us is to study the surface water quality of the main rivers near the two mining areas, i.e., Namkok in Sepon and Nam Mo in PhuBia. Samples of five sampling sites for each stream were tested for physical (pH, EC, temperature, turbidity, TDS, TSS) and chemical (alkalinity, COD, inorganic cations and anions, and some heavy metals) characteristics in dry (May) and rainy (July) seasons. Temperature of the two rivers was in a range of 23-32oC resulting DO concentration of 8-16 mg/L. The pH measured of all samples were 7-8 resulting in water EC characters of 83-576 µS/cm and alkalinity of 48-174 mg/L as CaCO3. In connection with EC, TDS were found between 53 and 369 mg/L as a result of dissolved minerals in the forms of cations and anions. The dominant cations were Na+, Ca2+ and Mg2+ in a concentration range of 0.5-34 mg/L. Main detectable anion were F–, Cl– and SO4 (3-9 mg/L). The content of particulate matter in the water were observed in the form of TSS which were detected in a range of 67-372 mg/L. The presence of TDS and TSS might cause the water turbidity of as low as 3 NTU or as high as 200 NTU. These chemical constituents led to water COD in a range of 1.8 mg/L in rainy season and 64 mg/L in dry season.

Keywords: physico-chemical characteristics, surface water, mining areas, the Lao PDR

Understanding the Flora Diversity in Central Visayas, Philippines: Assessment and Conservation for Sustainable Resource Management

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Abstract

A comprehensive assessment of flora diversity was conducted within three Key Biodiversity Areas (KBAs) of Central Visayas. These are the Rajah Sikatuna Protected Landscape (RSPL) in Bohol, Mt. Bandila-an Forest Reserve (MBFR) in Siquijor and Balinsasayao Twin Lakes Natural Park (BTLNP) in Negros Oriental. A total of forty-one (41) nested plots with a dimension of 20 m x 100 m were randomly established and surveyed within the three KBAs. Species diversity, composition and population trends were then analyzed to assess areas of biodiversity importance. RSPL generally had the highest species richness and diversity index followed closely by BTLNP while MBFR consistently had the lowest. When pooled. The surveyed areas resulted in a high diversity index and biodiversity value (endemicity and conservation status) with two newly discovered plant species, the Amorphophallus calcicolus and Corybas boholensis, showing the importance of multiple areas of protection. These findings not only indicate the importance of these KBAs as biodiversity reservoir, but also highlights areas with higher diversity and concentration of threatened and endemic species as a special area of concern. Furthermore, this study can be utilized to prioritize and strengthen habitat protection as well as to serve as a baseline information for future biodiversity inventories.

Keywords: conservation, flora assessment, Key biodiversity areas, Species diversity

Temperature sensitivity (Q10) of Organic Carbon in Red-yellow Soils and its Conservation Strategies

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Abstract

Soil respiration (SR) is the second largest flux of carbon in most terrestrial ecosystems after photosynthesis. Research indicates that a slight change of the climate conditions induces in a variation of the SR that could be equal to the release of CO2 by fossil fuel emissions. For this reason, it is important to study what conditions control the variation of SR. The soil temperature is an important predictor of SR where there is not severe drought stress. The estimation of SR rates by the effect of temperature has been expressed with the Q10 relationship. The aim of this study is to determine the Temperature Sensitivity (Q10) coefficient of the Red-yellow soil organic carbon, and estimate a conservation strategy in Ucayali, Peru. To analyze the temperature sensitivity, each treatment was kept under 25ºC and 35ºC, and the soil respiration ratio (SRR) was measured as well as SOC content by spectrophotometry method. Lastly, a treatment of biochar at 5% was added as part of conservation mechanisms of carbon. The experimental results showed that there were significant differences in SOC content between different temperature conditions. At the day 150, 35ºC treatment showed a significant reduction in contrast to 25º treatment (3.65 and 6.02 mg C/g respectively). The addition of biochar kept higher values of SOC at the same conditions of temperature. The Q10 value was higher in soil without biochar (1.82) while the addition of biochar reduces the coefficient at 1.12. In the same way the SRR were reduced by the addition of biochar from 1.56 to 0.63 µL-CO2/h/g at ambient conditions (25ºC). Thus, the Q10 value of the Red-yellow soil can be affected and reduced by the addition of biochar, which works as a carbon source to maintain and increase SOC content and reducing the release of CO2 in the short-term.

Keywords: soil organic carbon, soil respiration rate, temperature sensitive, biochar.

Enhancement of carbon fiber electrode performance using lactic acid bacteria and steelmaking slag

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Abstract

Microbial fuel cell technology (MFCT) provides many benefits to rural regions, such as organic waste disposal and renewable energy recovery. However, its performance is low and must be improved for practical uses. Mixing steelmaking slag (SS) and lactic acid bacteria (LAB) with sediment can enhance the MFCT performance owing to LAB and iron ions dissolved from SS attaching to the electrode surface. This study proposes a simple method for attaching LAB and iron ions on carbon fiber electrode and subsequently evaluating its performance. A carbon fiber electrode was placed in a bottle containing tap water, SS, LAB, and bamboo powder (as nutrients for bacteria) for 7 days to allow LAB and iron ions to adhere to its surface. The electrode was then used as the cathode of MFCT. Results showed a decrease in the electrode potential and a consequent reduction in MFCT performance owing to the attached LAB and iron ions. The performance improved after the electrode was oxidized, suggesting that aeration is required during attachment to prevent the decrease in electrode potential. After 1 month of electricity generation, the electrode with the attachment produced high electrical current and exhibited low decrease in MFCT performance owing to electricity generation. Therefore, attaching LAB and iron ions on the electrode surface can improve the electrode performance and prevent performance degradation owing to electricity generation.

Keywords: Microbial fuel cell, performance, electrode potential, attachment, steelmaking slag, lactic acid bacteria

EM-13-12

Wind Reduction Efficiency of Tree Windbreaks – a Case Study of Ovche Pole, Macedonia

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Abstract

Ovche Pole is an agriculture region in Macedonia with dry climatic condition characterized by low precipitation and high ambient temperatures during the growing period as well as year-round prevailing winds. During the 1950's series of projects were taken to improve the agriculture productivity in the region. One of the measures taken was the establishment of tree windbreaks (field shelterbelts) aimed to reduce wind velocity and protect shelter crops. Ever since they become important elements for the regional landscape, performing many important ecosystem functions. As far as authors' knowledge, so far there are no scientific research that investigates the performance of the tree windbreaks in Ovche Pole-research area of this study. In order to fill the gap of scientific data this study aims to: 1) analyze condition and surface area change of the tree windbreaks in the research area; 2) Relate wind reduction efficiency of tree windbreaks with optical porosity and NDVI; 3) Model the effect of tree windbreaks on local windbreak local dynamics using Airflow Analyst Software; 4) Propose plan for rehabilitation and reestablishment of tree windbreaks. Old topographic maps and satellite images were processed and analyzed with ArcPro software to determine past and current surface area status and evaluate the surface area change rates. To examine the wind reduction efficiency, this study relates wind velocity field measurements and optical porosity (OP) of the tree windbreaks. Porosity is one of the most important structural parameters that affect wind speed and is widely used in the study of wind protection provided by windbreaks. Wind velocity field measurements were done with two handheld cone anemometers and optical porosity (OP) was determined by photogrammetry method. Field measurements and optical porosity were used as inputs for the Airflow Analyst Software to model and visually present the effect of windbreaks on the local wind dynamics. The results will be presented in the final manuscript of this study

Keywords: Ovche Pole, tree windbreaks, optical porosity, wind speed reduction efficiency

Effect of Seasonal Change on Water Quality in Cheung Ek Lake, Cambodia

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Abstract

Cheung Ek Lake, being well known as the biggest wastewater lake inside the capital, has massive water and nutrient inflow. Around 70% of rain and wastewater in Phnom Penh flows into Cheung Ek Lake through three main canals: Trabek canal, Stung Meanchey canal, and Lou Pram canal before discharging into Bassac River. Since 2008, rapid urbanization of the satellite city in Phnom Penh has decreased the lake size and contributed to the lake's water quality degradation. Cheung Ek Lake performs many functions such as flood control, natural wastewater treatment and cultivation of vegetable production. Previous studies pointed out the positive and negative impact of lake's water on the local ecosystem and human livelihoods. Therefore, this study aims to monitor the current condition of the lake's water quality and the affects of seasonal change on water treatment function. As an addition to these the objectives of this study are to: (i) analyze the changes of water quality parameters in the rainy season and dry season (ii) describe daily and hourly changes of phosphate (PO43-) concentration in the lake. For that, selected chemical parameters such as pH, electroconductivity (EC), phosphate, nitrate (NO3-), iron (Fe2+), dissolved oxygen (DO) were measured in rainy and dry season. In addition, phosphate (PO43-) was analyzed hourly for a week in dry season. The water samples were collected in 3 points: inlet, middle and outlet of the lake, in depth of 0.5m. Water samples were analyzed in-situ using a spectrophotometer DR900. The decreased values of EC, NO3-, PO43- and Fe2+ from inlet to outlet show that the lake has the potential in reducing the nutrient level in both seasons. Phosphate increase at 10am, 1pm and 7pm indicate daily rush hours of household activities. This further suggested that household activities could be the main sources for the present of high concentration of PO43- in the lake.

Keywords Cheung Ek Lake, water quality, seasonal change

Estimation of Long-term River Discharge in Forested Watershed in snowy region by SWAT

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Abstract

Climate change become an urgent global issue, and rising temperatures will have a significant impact on the amount of snow melt in cold and snowy region. On the other hand, it is important to predict the hydrological cycle throughout a river basin in order to measure the impact of climate change to water resource management, flood control, and agricultural problems. Although many universities, government institutes, and private companies have developed hydrological cycle models, this article uses the SWAT (Soil and Water Assessment Tool) model, a distributed runoff model developed by USDAARS. SWAT includes processes related to water and sediment transport, crop growth, nutrient cycling, etc., and is capable of dealing with scenarios such as climate change. In this paper, the prediction of the river discharge and the validation of the accuracy of the model was conducted in small scale watershed in Mishima Town, Fukushima, Japan, which is a forested area with cold and snowy climate. In order to validate the accuracy of the flow prediction, observed data and the flow prediction were compared between 2019 February to 2020 December, and the long-term river discharge including runoff period and snowmelt period was checked. In order to improve the accuracy of the SWAT model, “the saturated hydraulic conductivity of soil layer” and “the available water capacity of soil layer” were adjusted and compared with the measured river discharge. Additionally, for the river discharge during the snowmelt period we adjusted the rate of water and snowmelt, “the temperature at which snow fall increases”, “temperature of snowmelt” were adjusted and compared with the measured river discharge. Additionally, “the time of lateral flow travel” was calibrated using the auto-calibration tool of SWAT+. From the results, some points were identified to confirm using SWAT+ in area where data acquisition is difficult.

Keywords: SWAT, Long-term river discharge, snowmelt, runoff, prediction,

Characteristics of Ion Components of Clearwater Stream Watershed in an Agricultural Area with Multivariate Analysis

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Abstract

Restoration of once existing clear stream environment in an agricultural area is one of the significant challenges for the development of sustainable agriculture. Therefore, we analyzed the ion components of Rekifune River and Satsunai River watersheds, evaluated as a clear stream watershed in the Tokachi region of Hokkaido, Japan, with the principal component analysis the cluster analysis based on the investigation in June and September 2014.The ion concentration of the tributaries, which flow on the middle and downstream side of the mainstream, increased. In contrast, more than half of the sampling points, including the mainstream and the tributaries, which flow on the upstream side of the mainstream, were relatively low ion concentrations. Significantly, the river water quality at three sampling points on the tributaries of the Satsunai River watershed deteriorated caused by agriculture. Meanwhile, one sampling point of the Rekifune River watershed had a high proportion of the urban area. As a result, Cl− and Na+ characteristically increased, the river water quality deteriorated due to the influx of domestic wastewater. Moreover, it was shown that the point source is a facility that operates seasonally and processes crops in two sampling points of the Satsunai River watershed.

Keywords: river water quality, agricultural area, principal component analysis, cluster analysis

Evaluation of Deforestation Rate and Soil Erosion Risk in Cobija, Bolivian Amazonia Using RUSLE and GIS

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Abstract

Soil erosion is a serious global problem in Amazonia this study was conducted in the municipality of Cobija Bolivian Amazonia to determinate the erosion risk in which the revised universal soil loss equation (RUSLE) Using average monthly precipitation and average annual precipitation Using a regression model based on measured annual precipitation (R) was applied, Using the experimental models based on soil properties (composition of sand–silt–clay percentages, organic matter, structure, and permeability of the soil profile) (K), and a digital elevation model (DEM) image was used to generate the topographic factor (LS). The cover management factor Land use comparison table (C) Table of P values for different conservation practices use comparison table (P) In recent years, deforestation in the region has increased considerably. To determine the increase in the range of deforestation, GIS information from the last 20 years was compared.

Keywords: RUSLE, soil loss, Amazonia, erosion

Evaluation of Microbial Inoculating Capacity of Patinopecten Yessoensis for Improving Water Quality in Biotope

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Abstract

In Japan, biotopes have been created in many places since the end of the 20th century. However, because biotopes are closed water bodies, the occurrence of blue-green algae has often been a problem. Therefore, it is necessary to improve the water quality, but chemical treatment may damage biodiversity. Therefore, Water purification is necessary to incorporate with microbial materials. In recent years, methods using porous materials are expected to be used. I focused on Patinopecten yessoensis, which are inexpensive and easily available as porous materials. In this study, the microbial inoculating capacity in Patinopecten yessoensis was evaluated quantitatively as a preliminary step to utilize Patinopecten yessoensis. The experiment was conducted using Patinopecten yessoensis from Aomori Prefecture and Lacto Bacillus. The Patinopecten yessoensis were crushed and incubated for 3 days in the following four sections (untreated, burned at 300 °C and 600 °C, burned at 600 °C and washed with water). The results showed that untreated Patinopecten yessoensis was 2.5. E+06, Patinopecten yessoensis burned at 300 °C was 3.5. E+05, Patinopecten yessoensis burned at 600°C was 1.3. E+04, Patinopecten yessoensis burned at 600 °C and washed with water was 6.6. E+05. Since Patinopecten yessoensis showed the ability to inoculate the microorganisms, the next step is to evaluate the water purification ability of Patinopecten yessoensis inoculating the microorganisms and to study the applicability of the microorganisms to actual field use.

Keywords: Microbial material

Considering and Improving in Water Quality in Biotopes, as Closed Environmental Water Areas

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Abstract

”Biotope" was coined in Germany by combining the ancient Greek word "Bios", which refers to organisms and life, and "Topos", which refers to a place. In Germany, biotopes have been attracting attention since the 1970s, when environmental problems caused by industrialization became more serious. Since the end of the 20th century, biotopes have been created in various parts of Japan, including tidal flats, wetlands, lakes, rivers, and other water bodies, as well as forests and grasslands. It is still offered as an educational opportunity in Japan. They are prone to water pollution and need to be improved because biotopes are closed environmental water bodies. In Japan, there is no set environmental level for the water quality of biotopes. In this study, we conducted water quality measurement and purification experiments in the biotope of the University of Agriculture. The biotope at the University of Agriculture had not been managed regularly for a long time. First, the filtration system installed in the biotope was not working so I fixed it. For measuring water quality, I sampled the biotope at the agricultural university twice a week in a month. And I measured TN by a spectrophotometer. In the biotope at Tokyo University of Agriculture, total nitrogen ranged from 1.14 to 3.76 ppm, which is high compared to the environmental level set by the Ministry of the Environment for lakes and marshes in Japan. It is an important issue to consider the water quality of biotopes which is closed environmental water area.

Keywords: biotope, water quality

Seasonal Evapotranspiration and its Sensitivity to Climatic Parameters in Cold region watershed of Fukushima, Japan

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Abstract

Estimation of reference evapotranspiration (ETo) is important in management of water resources, hydrological and ecological modelling, particularly in context of climate change. A possible implication of climatic parameters to ETo needs to be understood for climate change effects and maintaining ecological sustainability. The objective of this study was to estimate seasonal ETo in cold region watershed and sensitivity of climatic parameters towards it. This study was conducted in cold region watershed of Mishima, Fukushima Prefecture, Japan. The climate of this area fluctuates vastly during seasons, with winter season having high amount of snowfall. A FAO based Penman Monteith equation was used for calculation of ETo using air temperature, humidity, windspeed and radiation data. Additionally, a regression model was developed to quantify the combination of climatic parameters to the sensitivity of ETo on seasonal basis. The result showed that ETo was high in spring and summer season, having an average of 234.9 mm and 228.7 mm respectively per season. Whereas winter and autumn season had an average of 72.8 mm and 74.4 mm per season respectively. Additionally, large fluctuations were observed in daily ETo for winter and autumn seasons. The regression model developed suggested that radiation and maximum air temperature were dominant sensitivity parameters to ETo in all seasons. Whereas wind speed and minimum temperature had some sensitivity in spring and winter seasons. Furthermore, the comparison between actual observed and estimated ETo values had satisfactory R2 and RMSE values. This study found out that maximum air temperature and radiation are the most sensitive climatic parameters influencing ETo in the study area. The results are of interest in view of predicted warmer and future erratic climatic conditions.

Keywords: seasonal reference evapotranspiration, cold region watershed, climate change, Penman-Montieth, sensitivity analysis

Nursery Propagation of Apple Mangrove (Sonneratia Alba)

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Abstract

Plenty of mangrove rehabilitation conducted in seafront was failure because of little survival due to wrong species planted and zonation. Apple mangrove (Sonneratia alba) known locally as “pagatpat” is the most widely distributed mangrove throughout the world and grows well in coastal region. Study showed that Sonneratia species bears plenty of fruits, but seedlings are rarely growing in the wild. A ninety-day study using various soil media and different watering regimes in a designed concrete tank was introduced to determine the survival and growth rates of the nursery propagated apple mangrove seedlings. The results revealed that the highest average survival rate of S. alba seedlings was observed in watering regime Treatment 3 and the type of soil medium is sandy-clay. Moreover, it was observed that growth showed a significant difference in the different watering regimes but have no significant difference on the type of soil media. The average survival rate was measured at 23.70% in clay, 52.10% for sandy-clay, and 44.32% for sandy soil under watering regime and 37.41% in clay, 43.21% in sandy-clay, and 39.41% in sandy soil. The research also showed that the seedlings watered under Treatment 3 observed the highest growth gain (5.41 ± 0.68 cm) while seedling watered under Treatment 1 recorded the lowest growth gain (1.87 ± 0.23 cm) under watering regime. Seedlings planted in sandy-clay soil exhibited the highest growth gain (4.15 ± 0.52 cm) while seedlings planted in clay recorded the lowest growth gain (4.0 ± 0.50 cm) for soil media.

Keywords: apple mangrove, water regimes, soil media, survival rate, growth rate

Food Loss and Waste in the Western Balkans

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Abstract

Food losses and waste (FLW) is considered a critical issue in the ongoing debate on the sustainability of agri-food systems. However, the scholarly literature on FLW is still geographically-biased, with more attention devoted to developed countries, even in Europe. In this context, this article analyses the state of research on FLW in the Western Balkan region (viz. Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, and Serbia). A search performed in October 2021 on the Web of Science returned 34 documents, and 21 eligible ones were included in the systematic review. The topical analysis of the literature addressed causes of FLW, stages of the food supply chain, extent and magnitude of FLW, FLW and food security, economic and environmental impacts of FLW, and food waste (FW) management strategies. A central finding of the review is the scarcity of data on FW in the Western Balkans. Moreover, the literature focuses on FW at the consumer level, while food loss at other stages of the food chain is generally overlooked. There is a lack of comprehensive analyses of the economic and environmental impacts of FLW as well as its implications in terms of food and nutrition security. The quantification of FLW is generally inaccurate and based on estimates and self-reported data. The literature focuses on FW reuse and recycling (e.g. energy, compost) while other management strategies (e.g. reduction/prevention, redistribution) are rarely addressed. However, the results indicate that consumers in the Western Balkans pay attention to the FW issue, especially during the COVID-19 pandemic, which is an encouraging sign that can be exploited in awareness-raising campaigns and education activities. Meanwhile, research on FLW in the Western Balkans is highly needed to fill knowledge gaps and provide evidence to policies dealing with the transition to sustainable food systems in the region.

Keywords: food loss, food waste, sustainable food system, environment, food security, waste management.

Evaluating Ion Exchange Capacity of Molten Slag for Hydroponic System

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Abstract

Hydroponics farming promotes high efficiency use of water, fertilizers, and high productivity under controlled environment. However, use of this system needs constant application of fertilizers, increasing cost of operations. Molten Slag, a waste from metal industries has essential nutrients as fertilizer. The objective of this study was to clarify the performance of hydroponic systems using Molten Slag. For this, three varieties of Molten Slag (MS1, MS2, MS3) were used as a substrate in hydroponic system. The nutrient content, P2O5, K2O, MgO and CaO were in order of MS1, MS3 and MS2. To confirm the releasing nutrients from each one, a quantification of anion and cation in water was performed at 1, 6, 12 and 24 hours. It was observed that MS2 had the best performance due to its high ion exchange capacity, followed by MS3. In contrast, the result for leaf area of crop in the hydroponic system was larger in MS3 treatment, followed by the treatment with MS2. Although, MS1 had higher nutrient content, it was not available for the plants. According to the result of this study, it was confirmed that MS has high potential for hydroponic farming. However, for sustainable use of Molten Slag, parameters such as heavy metal and alkalinity must be analyzed in detail.

Keywords: molten slag, hydroponic system, ion exchange capacity

Cadmium Bioaccumulation in Amaranthus spinosus Grown in Contaminated Soil of Benguet Province, Philippines

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Abstract

Phytoremediation has become an alternative technology for cleaning up contaminated areas by accumulation in the root and shoot system. The present study conducted a 98-day pot experiment to determine cadmium accumulation and its morphological and physiological effects on Amaranthus spinosus Linn. grown in the non-contaminated forest and mine-contaminated soils of Benguet. Soil and plant tissue analysis were done using AAS method; quantitative descriptive method for morphological analysis; titration method for vitamin C analysis; and Kjeldahl method for protein analysis. A. spinosus L. accumulated 0.52 mg/kg Cd in the root and 0.88 mg/kg Cd in the shoot, when grown in the soil having cadmium concentration of 3.70 mg/kg at a 7.43 pH. In the soil with 0.90 mg/kg Cd at a 4.19 pH, A. spinosus had only 0.000012 mg/kg Cd taken up in the roots. Biological accumulation coefficient (BAC = 0.24) was generally weak since the equivalent is less than 1 (BAC < 1, 0.24) while translocation factor (TF = 1.69) is greater than 1 (TF > 1, 1.69). The vitamin C and protein content in A. spinosus L. were not affected in both samples. There was significantly and consistently higher biomass (22.53 gm), root (372.33 mm) and shoot (399.33 mm) of A. spinosus in non-contaminated forest soil as compared to that of mine-contaminated soil having biomass of 9.27 gm, root and shoot, 284.70 mm and 132.33mm, respectively. Therefore, A. spinosus L. can accumulate significant concentration of cadmium in its root and shoot systems. The evident phytotoxicity observed in reduced biomass and chlorosis at 98 days show that Cd affects physiological activities of A. spinosus. It is then recommended that the capability of A. spinosus L. for cadmium tolerance requires further studies.

Keywords: Amaranthus spinosus L., bioaccumulation, phytoremediation, physiological and morphological characteristics

Evaluation of Land Use and Land Cover Change and its Drivers in Battambang Province, Cambodia from 1998 to 2018

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Abstract

The main objective of this research was to evaluate land use and land cover (LULC) change in Battambang province of Cambodia over the last two decades. The LULC maps for 1998, 2003, 2008, 2013 and 2018 were produced from Landsat satellite imagery using the supervised classification technique with the maximum likelihood algorithm. Each map consisted of seven LULC classes: built-up area, water feature, grassland, shrubland, agricultural land, barren land and forest cover. The overall accuracies of the LULC maps were 93%, 82%, 94%, 93% and 83% for 1998, 2003, 2008, 2013 and 2018, respectively. The LULC change results showed a significant increase in agricultural land, and a large decrease in forest cover. Most of the changes in both LULC types occurred during 2003–2008. Overall, agricultural land, shrubland, water features, built-up areas and barren land increased by 287,600 hectares, 58,600 hectares, 8300 hectares, 4600 hectares, and 1300 hectares, respectively, while forest cover and grassland decreased by 284,500 hectares and 76,000 hectares respectively. The rate of LULC changes in the upland areas were higher than those in the lowland areas of the province. The main drivers of LULC change identified over the period of study were policy, legal framework and projects to improve economy, population growth, infrastructure development, economic growth, rising land prices, and climate and environmental change. Landmine clearance projects and land concessions resulted in a transition from forest cover and shrubland to agricultural land. Population and economic growth not only resulted in an in-crease of built-up area, but also led to increasing demand for agricultural land and rising land prices, which triggered the changes of other LULC types. This research provides a long-term and detailed analysis of LULC change together with its drivers, which is useful for decision-makers to make and implement better policies for sustainable land management.

Keywords: land use and land cover change; drivers; Cambodia; LULC; multi-temporal

Design and Experimental Analysis of Atmospheric Water Generator based on Philippine Climatic Conditions

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Abstract

Most Filipinos living in remote rural and island communities rely on unsafe drinking water sources due to lack of reliable water supply. With this, an atmospheric water generator (AWG) can become an alternative water source by condensing and collecting water vapor present in the air. However, previous researches on the design of AWG devices were conducted outside the Philippines and most studies did not thoroughly designed the longitudinal profile of the fins and intake fan component of the device. This study designed the longitudinal fin profile and intake fan speed based on the climatic conditions of Manolo Fortich, Bukidnon and analyzed the performance of the device by conducting a field experiment. The study designed the extended fins and varied the intake fan speed by conducting a parametric analysis using existing heat and mass transfer equations. The study then conducted the field experiment of the AWG device by placing the device in a secure open space. Results of the design showed that the 9 cm fin length were optimal for the device and that higher intake fan speed were more suitable for high relative humidity (RH) and high air temperature conditions. Results from the field experiment observed a maximum water production of 523 mL in a day and showed that higher water productivity was observed at higher RH levels compared the lower RH levels. The study concludes that longer length of copper fins and greater magnitude of intake fan speed does not necessarily translate to higher water productivity and that higher water production rates was observed during high RH levels.

Keywords: atmospheric water generator, thermoelectric cooler, peltier effect, water production

EM-13-27

Selection of Suitable Sites for an Off-Stream Reservoir along Maranding River, Lanao Del Norte

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Abstract

An off-stream reservoir is a flood and drought countermeasure that can help the municipalities along Maranding River, Lanao del Norte in its imbalances in water resources during wet and dry seasons. This study aims to determine suitable sites for an off-stream reservoir along the Maranding River based on the selected criteria namely: slope, soil type, distance from roads, distance to towns/settlements, and distance from agricultural activities. A multi-criteria decision analysis (MCDA) is used in the selection of suitable sites. The constraints were grouped into five (5) classes. Classes with values of 1 to 3 were all considered unsuitable and those within classes 4 and 5 were identified as suitable. Three (3) optimal sites were further selected based on the five identified criteria, location and elevation of the sub basins, and the reservoir storage capacity from the 100-yr Rainfall Return Period (RRP) flood depth map of Maranding floodplain. The three (3) suitable and optimal sites have been found along the municipalities of Kapatagan and Lala, Lanao del Norte. It was found that Site 1 was the most suitable site based on reservoir capacity of 125,295.00 m3 and Site 3 based on lowest elevation of 7.401m above sea level.

Keywords off-stream reservoir, suitable sites, optimal sites, flood depth, reservoir storage capacity

The Measurement of Operational Performance Efficiency of Savings Cooperatives in Thailand: The Evidences from Kalasin Provincial Area

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Abstract

In 1844, Rochdale, an English scholar, established the first savings cooperatives in the world, known as the Cooperatives Society. Ever since then, the philosophy of cooperatives has been spread all over the world. Evidently, Savings Cooperatives (SCs) had been established as an economic tool to help people throughout Thailand over 100 years. Its main objectives set up to promote savings and provide loans among members. The research objectives were to analyze: 1) the operational performances of savings cooperatives in Kalasin provincial area, and 2) the operational efficiency of savings cooperatives Ltd. in the Kalasin provincial area. The study population consisted of 10 SCs in the Kalasin provincial area. A purposive sampling technique was applied to determine the sample size. It turned out of 9 SCs. Secondary data of operational performances were collected from the Cooperative Auditing Department database, Ministry of Agriculture and Cooperatives, The Royal Thai Government from 2011 to 2021 while primary data were collected from in-depth interview. The data analysis was comprised of descriptive statistics, Three-stage Data Analysis Envelopment Model (Three-stage DEA Model) and content analysis. The findings were: 1) all of the 9 SCs in the Kalasin provincial area had their good shape of business operational performances and financial status, also their trends had significantly increased annually, and 2) 6 out of 9 SCs had operational efficiency, while 3 out of 9 SCs had to improve their operational performances to obtain the standard efficiency. There were some recommendations for 3 SCs to improve their operational performances such as the reduction of their expenditures, debts and the increasing of SCs operational capitals by their members. SCs members faith to the philosophy of savings cooperatives and paid their participations to SCs which own by members.

Keywords: operational performance efficiency, savings cooperatives, Kalasin provincial area.

Income Generation and Expenditure of Organic Rice Farm Households: Case Study of Preah Vihear Province, Cambodia

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Abstract

In Cambodia, organic rice farmers commonly engage in integrated farming and off-farm activities to supplement their income. To identify factors toward income optimization, this study attempted to assess the structure of income and expenditure of organic rice farm households in the Preah Vihear Province, Cambodia. Guided with a structured questionnaire, a total of 90 and 50 randomly selected farmers were interviewed in 2019 and 2021, respectively. Descriptive analysis and multiple regression analysis were utilized. Overall, farmers tended to expand their cultivation area and increase income from off-farm jobs. Particularly, large-scale farmers (5ha<) significantly expanded their farmland area and increased their livestock and off-farm activities, while small-scale farmers (5ha>) reduced their farmland area and increased their off-farm activities. Moreover, the multiple regression analysis revealed that secured spare time from combine-harvester usage opened opportunities for farmers to engage in off-farm jobs. These off-farm jobs, particularly by male farmers, boosted their respective annual income. On the other hand, existing loans gave several farmer respondents negative profit in 2020.Thus, financial management seemed to be a factor affecting farmers' incomes in rural areas. For further study, farm household employment choice behavior, particularly on labor mobility and off-farm activities, is recommended.

Keywords: expenditure, income, off-farm activities, organic rice, rural area

Economic Assessment of Tea Smallholder Farmers Under Contract Farming in Rungwe District, Tanzania

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Abstract

In Tanzania, tea is considered as one of the most exported crops. The main stakeholders of the tea industry are smallholder farmers and estates. smallholder tea farmers are required to engage in contract farming, as stipulated in the Tea Regulation of 2010. This study attempted to assess contract farming and its impact to production and income of tea smallholder farmers in Rungwe District, Tanzania. A total of 48 randomly selected smallholder farmers were interviewed using a semi-structured questionnaire in September 2020 and October 2021. Agribusiness company officials, government officials and extension officers were also interviewed to clarify the condition and issues of the contract farming scheme. Descriptive analysis and cost and return analysis were utilized. Results show that yield, income, and profitability increased from 2016-2019. These can be attributed to steady supply of inputs, easy access to technical assistance, and early adoption of new technology under contract farming scheme. Moreover, the price of smallholder green leaf has improved, with farmers receiving a second payment hence improve their overall revenue returns.

Keywords: contract farming; smallholder farmers; tea; profitability; Tanzania.

RD-13-04

Chemical characteristics of Natural mineral waters from wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province

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Abstract

The purpose of this research aims to analyze the chemical characteristics of natural mineral waters from wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province. Physico-chemical properties and minerals status is an important decisive factor for assessment of water quality for water resources utilization. Therefore, the present study was conducted to evaluate the contamination of heavy metal and some essential minerals status in mineral water from different location in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province. The water samples were collected in 2021 and then analyzed according to standard methods for heavy metal and the essential minerals viz. As, Pb, Cd, Zn, Cu, Hg, Ni,Mn, Zn, Fe, Se, Na, Si and Ca by using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) In-house method based on EPA 3015 and microbial contamination such as *E.coli* by methods of AFNOR Certificate Number 3 M 01/8-06/01 compared to ISO16649-2 And for *salmonella* spp. by ISO 6579:2017. The results found that As, Pb, Cd, Zn, Cu, Hg, Ni were not detected in all water samples. And *E.coli* and *salmonella* spp. were not found in in all water samples. The essential minerals such as Si and Ca were detected in mineral water 7.61-7.64 and 3.0-8.86 ppm, respectively. Therefore, it can be concluded that mineral water from has no heavy metal contamination and safe from pathogenic microorganisms, Escherichia coli and *salmonella* spp. Moreover, there are some mineral elements such as silicon that may be useful for others purpose such as use for agricultural production.

Keywords: natural mineral waters, heavy metals, pathogenic microorganisms

Pesticide Use in Banana Plantation in Laos

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Abstract

Pesticide usage in Laos has grown steadily in recent years as many farmers have switched from subsistence farming to commercial production of a range of agricultural commodities for export, including bananas. Commercial banana plantation for export has rapidly expanded. The Heavy agrochemical usage may cause possible environmental and human health risks. Therefore, this study aims to monitor the pesticide usage associated with bananas plantation in Laos. The survey was conducted in 2020. The results found that the pesticide used in banana plantation to control common cutworm, banana leaf roller, and fusarium wilt was Insecticide 10 %, Fungicide 60 % and Herbicide 30 %. A total of 40 pesticide active ingredients of different product names were used by farmers i.e. 22 insecticides, 12 herbicides and 6 fungicides. 36 of the pesticides recorded during the survey were unregistered pesticides and only 4 products were registered with label in Lao language. All the 36 unregistered pesticides were foreign products illegally smuggled into the country and majority of them from Thailand (27 products), Vietnam (7 products) and 2 more from other countries. This showed the use of unregistered pesticides in Lao PDR is very widespread. Among the common insecticides used were cypermethrin, avermectin, acetamiprid, chlorothalonil and chlorpyrifos. As for weedicides, top 3 most popular were glyphosate, atrazine and glufosinate-ammonium. Paraquat dichloride and methomyl were also recorded in crops surveyed, despite the fact that both pesticides have already been banned in Lao PDR for many years. This showed that the use of banned products is still a problem in the provinces. Therefore, environment risk associated with pesticide use in banana plantation in Laos should be concerned.

Keywords: banana plantation, pesticides use, environmental impact, human health

Evaluating Aquatic Habitats of an Agricultural Waterway Network Improved For Recreational Use of Local Residents

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Abstract

In rural areas, agricultural irrigation and drainage systems for paddy fields have potential to become the foundations of green infrastructure by providing ecosystem services. In order to manage agricultural waterways as green infrastructure, habitat conservation for aquatic organisms is fundamental. In this context, the authors conducted habitat evaluation of aquatic organisms in a waterway network in the town of Koura, the Shiga Prefecture, Japan, where the environmental improvement was practiced to promote recreational use of local residents. Based on the evaluation results, physical characteristics of the canals with high biodiversity were examined. The Japanese fish habitability evaluation program, which was developed for non-professional users such as local residents, was applied to sampled biological (fishes and crustaceans) and physical data. As the results, the model generated by the program showed high suitability (0.80 to fishes, 0.76 to crustaceans), thus that suggests the program is applicable to a waterway network including various types of watercourses. The characteristics of the high-scored canals by the program included 1) wider canal width, 2) deeper water depth, 3) higher water velocity for fish and lower water velocity for crustaceans, 4) higher vegetation coverage, and 5) gravel riverbed. The water parks developed by the environmental improvement and the drainage canals tended to have these characteristics. Therefore, our findings suggest that developing water parks in a waterway network and conserving the connectivity of drainage canals, which were practiced as the environmental improvement, contributes not only to promote recreational use of local residents but also to habitat conservation.

Keywords: habitat evaluation, environmental improvement, agricultural network, fish, recreational use

Assessment of Simple Covered Lagoon Digester Performance in Large-scale Pig Farm in Cambodia

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Abstract

Simple covered lagoons are used to treat wastewater from commercial pig farms in Cambodia into biogas. The electricity is generated from biogas using a generator. However, high level of H2S corrodes or breakdowns the generator. This study aims to desulfurize biogas with commercial ferrous oxide pellets (Fe2O3). The effects of desulfurization system on biogas production, electricity generation, and CO2 reduction are discussed. The results show that H2S was reduced from 2,000 ppm before treatment to around 50 ppm after treatment. CH4 (57.7 ± 8.76%) and CO2 (24.7 ± 2.67%) contents were not affected by desulfurization. O2 content was changed from 0.3 to 4.8%. High O2 level was a sign of pipe leakage, lowering CH4 and eventually electricity production. The increase of O2 level decreases CH4, thus lowering generator performance. Actual electrical output power produced from biogas was 368.5 ± 29.3 kW, with loading rates of 57.6 ± 4.6% and generator efficiency of 26.8 ± 1.7%. Estimated amounts of 22,818 tCO2equ were reduced by desulfurization. The desulfurization system was highly effective in H2S removal without affecting biogas quality. For the long-term biogas systems in Cambodia, local-made desulfurization systems should be tested and compared with imported products.

Keywords: biogas; CO2 reduction; simple covered lagoon; CH4; desulfurization; electricity generation

Sensory Evaluation of Guso (Euchema cottoni) and Banana Blossom (Musa acuminata colla) Longganisa

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Abstract

Longganisa is a food eaten during breakfast. It is usually made from ground pork or ground chicken. The researcher thought of making another variety of longganisa using a locally grown seaweed and banana blossoms to attract the children to eat these foods which they do not like in the usual way of cooking. Euchema Cottoni has a component of carrageenan which is used as plant-based binding and thickening agents. Banana (Musa) blossoms on the other hand are commonly grown in Bohol which is usually prepared also as salad or guisado. The researcher preferred green seaweed (Eucheuma Cottoni) and Banana blossoms for longganisa innovation because of their availability. To determine the acceptability of the euchema cottoni and banana blossom longganisa, the finished products were subjected to sensory evaluation by 75 respondents in terms of appearance, aroma, taste, and texture in three treatments; T1-Original, T2-Sweet, and T-3 Spicy. A self-modified 4-point hedonic scale was utilized for laboratory analysis. Findings revealed that in terms of appearance T-2 and T-3 got the highest rating described as “moderately appetizing”. Treatment 3 got a highest rate in terms of aroma “moderately pleasant”. Treatment 2 got the highest rate among the treatments in terms of taste which has a “moderately sweet” taste. And for the texture, treatment 2 got the highest rate and deemed “moderately tender”. On the overall liking of the product, Treatment 2 or sweet taste got the highest weighted mean, followed by treatment 3 the spicy taste, then the Treatment 1 the original flavor described as “like moderately”. The overall result revealed that average satisfaction of Guso Eucheuma and Banana Musa Longganisa was met. It can be deduced that this innovated longganisa is acceptable for food and can be used as substitute of the longganisa made out of meat sold in the market.

Keywords: Longganisa, euchema cottoni, banana blossoms, sensory evaluation

RD-13-09

Migration Characteristics of Communities in the Forestlands in Ifugao, Philippines

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Abstract

The Ifugao province as a mountainous land of indigenous people, described as a watershed framework that provides domestic and agricultural services. Greater portion of the province was declared as Forestland. Due to increase in population, communities tend to occupy and possess certain part of the forest to provide their basic needs. Understanding the migration characteristics on the Forestlands in the province of Ifugao may lead to a solution harmonizing the role of different stakeholders in maintaining the biological, physical and social aspect of the upland for a sustainable development. The study employed qualitative method of research and adopted the purposive sampling technique, in data gathering wherein, respondents are certified migrant in the forestlands of Ifugao province. It revealed that migration in the Forestlands in Ifugao province is being influenced by many combined factors and being prompted by poverty and aggravated by climate change. Socio-economic aspect is the primary reason why people tend occupy portion of the Forestland. They acquire portions of the Forestland as a source of living as they are engaged in farming as their main source of livelihood.

Keywords: indigenous people, resource management, land use system

Socio-Economic Characteristics of Cassava Producers in Cambodia

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Abstract

The production amount of cassava in Cambodia has increased rapidly since 2010, and it became the second highest after rice. Recently, cassava is envisioned to be a strategic crop for the country in line with the “Cambodian Industrial Development Policy 2015-2025” and "National Cassava Policy 2020-2025” to transform the country into a cultivation and processing hub of the crop. It is inevitable to understand the current situation of both production and producers to find out adequate, practical, and effective measures for improving cassava production in the country. This study aims to clarify the current status and characteristics of cassava producers in Cambodia, which is necessary to discuss a suitable strategy for increasing production. The survey was conducted in 6 districts in Battambang and 2 districts in Pailin provinces, major cassava production areas in Cambodia, from April to November 2017. A total of 205 cassava producers were selected randomly for structured-interview by using designated questionnaire form. The interview survey covered the status of cassava production, including planting area, sales amount, costs, and the socio-economic situation of producers, including respondents' attributes, family structure, livelihood activities, income, household expenditure.The majority of surveyed farmers started producing 5-6 years ago, and 79.5% of them answered that cassava is a primary income source. Nevertheless, cassava was the primary source of income in 26.8% of the surveyed households, and non-agricultural income, such as off-farm business and labor work, was higher than agricultural income among average household income. These results indicated that most producers have diverse income sources, including non-agricultural income, however, it still accounts for a relatively large proportion of total income and is essential for maintaining livelihoods. Strategies for increasing cassava production without disturbing the profits of individual producers will be necessary for sustainable rural development in Cambodia.

Keywords: cassava, production, producers, socio-economic characteristics, current status, Cambodia

Challenges for Increasing Vegetable Production in Cambodia

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Abstract

Introduction.Amount of vegetable production in Cambodia is very much limited and 70% of the internal consumption is depending on imported vegetables mainly from Thailand and Vietnam. In order to satisfy market needs of the country, the government is promoting vegetable production. However, current status, issues and challenges of vegetable production in the country that are important to establish detailed strategies for vegetable production is not clarified yet. Objectives. This study aims to find out the challenges of vegetable production in Cambodia by clarifying the status of vegetable cultivation, including producing amount and varieties, vegetable production business condition, and producers' socio-economic characteristics. Methods.A commune in Takeo province that is located near huge reservoir constructed during pol pot regime was selected as study area. The semi-structured interview based on questionnaire form was conducted to both vegetable producers and non-producers for comparative analysis. Producers were asked about their vegetable production from October 2016 to September 2017 and all the other income generating activities and expenditure. Non-producers were asked about all the activities for income and expenditure. The number of valid responses were 113 households (HHs) from producers and 89 HHs from non-producers. Results and discussion. The results of the survey to vegetable producers showed that 97% of them had a surplus however the average net profit (35 US dollars) was very small compare to other income sources such as factory work (160-200 US dollar). Most producers were not cultivating any vegetables during the rainy season even though they own arable upland to avoid disease risk due to unsuitable production methods. Additionally, nearly 60% of non-producers had arable upland, and they stopped production due to a lack of distribution channel. This study indicated the limitation of distribution channel and production amount as challenges for Cambodia's increasing amount of vegetable production.

Keywords: vegetable production, current status, issues, challenges, Cambodia

Environmental Conservation Activities on Firefly Habitat with Local Government and Community in Kanagawa Prefecture, Japan

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Abstract

There are 61 municipalities Cities (Shi), Towns(Machi), Village(Mura), Ward(Ku) in Kanagawa Prefecture adjacent to Tokyo Metropolis(Prefecture), where densely populated but still have natural environment to be conserved. Objective is set to clarify the current situation of conservation activities by local community, local municipality and/or those collaborations, because authors found conservation status is unknown even in Kanagawa Prefectural office. Authors conducted questionnaire survey and literature research to all 61 bodies from December 2020 to January 2021 and results are obtained as follows: 42 bodies (68.8% of 61 bodies) have activities related to firefly (hotaru), mostly genjibotaru (Luciola cruciate) and/or Heikebotaru (Aquatica lateralis). 15 bodies are conducted conservation activities and 20 bodies have local communities or volunteer groups to conserve firefly. 14 bodies are supporting for the activity including grant-in-aid (8 bodies), send experts from bodies to local community and had advised how to conserve by volunteers. On the other hand, there are only 3 bodies which have opportunity of information exchange and that might be insufficient and it might be the issue to be solved in near future.

Keywords: firefly, environmental conservation, local government, community, volunteer

Socio-demographic Profile and Cultural Management Practices of Cacao (Theobroma cacao) Farmers in Bohol, Philippines

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Abstract

The worldwide demand for cacao beans could reach 100,000 MT by 2022. The country has a strategic location and favorable soil and climatic conditions for planting and producing cacao products. In taking advantage of the comeback of the cacao industry, accurate knowledge of cacao farmers' socio-demographic profile and cultural management practices is a requisite to attain sustainable production. Unfortunately, there is no sufficient data available on the cacao industry of the province to be served as a basis in creating a database. Purposive sampling was done to identify the provinces' towns to select farmer households for an interview. Five hundred eighty-six farmer households were interviewed for socio-demographic profile and cultural management practices. Statistical analysis was carried out using frequency and percentage. Results revealed that cacao production in the province has a relatively high infestation of stem borer and infection of black pod rot. Moreover, it is also found out that control measures for pests and diseases are not being practiced by the majority of the Boholano cacao growers resulting in a yield reduction. Thus, the study results can be used in formulating a sustainable development plan for cacao growers in Bohol.

Keywords: farm profile, pest, diseases, descriptive analysis

The Consideration of the Model on Operating and Accumulating Joint-Use Fund among Rice Farmers

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Abstract

In Northeastern Thailand, many rice farmers' groups were established under the promotion of group farming policies. The groups voluntarily formed and managed joint-use funds and operated their business with them. The objective of this study is to make the model of joint-use fund management by rice farmers' groups through extracting the characteristics of successful cases in the groups established by two group farming policies: Community Rice Seed Center (CRSC) and Large Land Plot of Rice (LLPR), located in Khon Kaen province and Ubon Ratchathani province, Northeastern Thailand. The case groups were formed initial funds with the provided resources from the government. Through operating the group's business, members bring in-cash or in-kind inputs: investments and charge of services into the fund. Accumulated capital on the fund was used for providing returns to members' investments and scaling the group's business. We simulated revolving joint-use fund by rice farmers' group based on actual accounting data of one case group. As the result, the group assumed to achieve accumulating enough amount of assets to provide sufficient service for all members with the initial fund deriving from government support. Based on the actual situation of activities among the case groups, the model of joint-use fund management for the rice farmers group was described. The model will be utilized to guide rice farmers' groups in developing their business and becoming independent from government support.

Keywords: rural community, group farming, government support, Northeastern Thailand

Perspective on Urban and Peri-Urban Agriculture in Cambodia's Capital: Phnom Penh

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Abstract

Due to the population growth and urbanization over two decades, Phnom Penh Capital has been expanded almost double from 375 square kilometer in 2001 to 692.46 square kilometer in 2019. While, a number of farmers keep declining from 36.77% in 2001 to 10% in 2015. Respecting these, the government of Cambodia has prepared the Land Use Master Plan of Phnom Penh City 2035. However, no clear implementing plan and the fast growing of construction become the main concerns from international donors. Moreover, the integration of Phnom Penh with some areas of neighboring provinces will affect the agricultural activities. Therefore, this research aims to find out the detail of agricultural land use in Phnom Penh by responding to the Master Plan; and to explain the current activities of urban agriculture or peri-urban agriculture in the capital. Because of the current pandemic, this research was conducted by solely reviewing and analyzing the legal documents, reports from the government and donors, and other reliable sources. As the results, the Land use Master Plan clearly indicates the space reserved for the peri-urban agricultural activities; however, there is no detail on agricultural policy dealing with the space reserved for peri-urban agriculture in the Land Use Master Plan. The involvement of Ministry of Agriculture, Forestry and Fisheries is also not explained. Based on the reports from donors and NGOs, lack of roles and responsibilities, limited capacity and limited finance have become the main concerns for the government to implementing the Master Plan. Importantly, current rapid growth of construction does not pay any attention on the development city plan. Housing complex projects have increased from 77 in 2011 to 178 projects in 2019. Some private businesses are practicing peri-urban agriculture at the outskirts of capital by growing, selling some vegetable, and serving the space for the relaxation.

Keywords: Urban Agriculture, Peri-Urban Agriculture, Agricultural Policies, Land Use Master Plan

Product and Market Diversification Trends: The Case of Horticulture Exports in Kenya

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Abstract

One of the major successes of trade liberalization in Kenya was promotion of horticultural exports. This was aimed at reducing export earnings instability that resulted from declining commodity prices of tea and coffee. The export promotion programs put in place in the 90s paid off and horticultural exports was able to record its strongest period of growth in the 2000s. In this period the major horticulture export product was French beans in which the EU was the primarily market. However, the EU market has been changing posing new challenges of increased competition and regulatory standards which threatened the survival and sustained participation of Kenyan horticultural exports. For many developing countries diversification into new products and markets has been encouraged by development platforms to deal with trade related shocks that emanates from reliance of one market and a narrow range of products.Therefore, the objective of this study was to analyze the trends of product and market diversification of horticulture exports in the periods 2002 to 2019 in Kenya using UNComtrade data. We employed the Hirschman-Herfindahl index to measure product and market diversification. The study finds that there was no evidence of product diversification in the specified period while the index for the market diversification showed that the horticulture exports has diversified into new markets this shows that horticultural products have not diversified instead concentrated into a narrow range of products. On the other hand, the horticultural products have accessed more markets despite the EU controlling the largest share. The results highlight the need to expand the export portfolio and take advantage of untapped potential markets.

Keywords: diversification, horticulture, exports, hirschman-herfindahl index

Empowerment of women: A comparative analysis of experiences from rural communities in Ethiopia

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Abstract

Empowering women and reducing gender disparities are key challenges of 21st century. This is more pressing in rural areas in which women account quarter of the world's population and those particularly living in developing countries like Ethiopia. The problem is prevalent in intra-household relationships. Moreover, most initiatives of women empowerment have been transitory and externally imposed without considering structural causes of gender inequality hence they have been less effective. We reviewed and compared women's empowerment under widely occurring traditional systems versus community-led initiatives such as the case of the Awra Amba community in northwest Ethiopia. We compared the practices on the bases of key indicators such as division of labor, access to information, services and resources, leadership and decision-making role and gender based violence. There exist number of studies assessing gender relations in rural areas under traditional systems. The studies show that rural women have more workload involving both household and farm activities compared to men who are tasked to mainly farm related and outside home activities. Moreover, limited accesses to information, services and control over resources, low decision-making power both in household and community issues, lack of opportunities to self-development such as education and training are key challenges to rural women. However, the above observed gaps seem to have been relatively tackled in the case of the Awra Amba community. This community owns a unique self-organized system with the goal of solving socio-economic problems through the principle of egalitarianism. It is lauded as a 'model' to promote gender equality in which woman's inferior position in the community is believed to be eliminated by destroying the traditional gender roles and patriarchal gender ideology. As a result, some of the community values and principles have been replicated to other Ethiopian rural communities through own initiated exchange visits. But, the actual implementation of the community-led initiatives in Awara Amba can still not be immune from criticism. Therefore, in-depth scientific researches, and upscaling of successful community-led women empowerment practices shall be encouraged to understand how locally organized collective actions help to realize inclusive development.

Keywords: Community-led initiatives, decision-making, division of labor, women empowerment, Ethiopia

Sustainability of the Implementation of Solid Waste Management: A Comparative Study

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Abstract

This study aimed to compare the status of implementation of the Solid Waste Management (SWM) in the Municipality of Candijay, Bohol, Philippines for the year 2015 and 2020 to find ways for the sustainability of the implementation of the Town's Solid Waste Management. Wastes were collected monthly for one year from the five sampled barangays with 122 households. Field investigations, on-site waste measurements and characterizations were conducted. This is a mixed method employing QUANT-Qual approach. Descriptive statistics which includes percentages, and weighted mean were used for the quantitative approach while thematic analysis for the qualitative was used. The results revealed that from the previous data of SWM implementation found out that the average biodegradable waste generated in the year 2015 which was 46.14% decreased to 10.94% as a result of home proper waste disposal. Likewise the recyclable waste which had 27.27%, the number decreased to 26.08%. Since residual wastes should be collected, the collection increased to 59.85% from 15.42% due to acquisition of additional garbage trucks. For special waste, from 11.16% previously collected, it decreased to 3.13%. There was significant difference between the biodegradable, residual and special wastes. In the present SWM implementation, innovation played an important role in recycling waste materials. Shredded plastics and crashed glasses were converted into mixture to create concrete products. Thusly, the level of implementation was already properly practiced. Solid Waste Management had employed organizational structure for implementation and dissemination of personnel's function. Additional equipment and personnel were acquired. To sustain the proper SWM, recycling equipment, public awareness, funding, expertise of personnel, equipment and facilities, innovations and other provisions must be provided.

Keywords: Implementation, innovation, Solid waste management, waste characterization and quantification

Income Diversity of Cassava Producers in Vietnam

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Abstract

Cassava is one of Vietnam's three most important food crops. As such, improving cassava production and processing in the country is considered an important tool for livelihood improvement in rural areas of Vietnam. For having stable income, farmers cultivar multiple crops and use idle time to raise livestock and poultry and work as hired labor. However, the socio-economic status of cassava producers, which must be grasped for establishing an effective strategy, has not been fully clarified. This study aims to clarify socio-economic status and characteristics of cassava producers in Vietnam by conducting a detailed household survey. The survey was conducted from April to December, 2017, in three major cassava-producing provinces, including one district in Dong Nai Province, one district in Tay Ninh Province, and two districts in Gia Lai Province, a major cassava production area in Vietnam. The 182 cassava producers were selected for this survey through random sampling by stratified selection based on cassava plantation area. Data on the status of producers' cassava production, income status, and socio-economic situation were collected by semi-structured interviews based on the questionnaire form. The results indicate that, on average, each household has 4.5 members and 2.1 of them are responsible for cassava production. The average total household income is $7,071.29 per year, of which $3648.41 (51.59%) is from agricultural and $3422.88 (48.41%) from non-agricultural sources. Average income from cassava production is $859.81, accounting for 12.16% of the total household income and 23.57% of agricultural income. Various forms of agricultural income sources were observed in the study area, including production of seven types of crops, six types of vegetables and fruits, and operation of animal husbandry (seven types) and agro-processing businesses (three types). Further, they were engaged in off-farming work (eight types) and also hired as laborers (eight types). These results suggest that cassava producers in Vietnam do not overly rely on cassava and have diverse sources of income.

Keywords: Cassava, production, producers, socio-economic status, income, Vietnam

Evaluation of Sediment Trapping Capacity by Geotextile for Erosion Control

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Abstract

Heavy rainfall events induce sediment transport resulting in soil loss, aggravating erosion. Geotextile for erosion control, offers environmentally friendly benefits and have lower costs than other physical structures. In this study, evaluation was made to investigate the capacity of geotextile in sediment trapping. Two commercially available geotextiles 6A31AD and VEG(B)-301, manufactured by Toyobo Corporation, Japan, were used. The function of these geotextiles is weed controlling. A runoff experiment was conducted, using a runoff plot having 100 cm length and 10 cm breadth. Slope was created by raising the end of the plot by 1.5 cm. Four treatments, for each geotextile were made. The treatments were, 1) no folds, 2) folds for 25 cm of the runoff plot, 3) folds for 50 cm of runoff plot, 4) folds for 100 cm of the runoff plot. Muddy water suspension having Suspended Solid (SS) of 25000 mg/L was discharged on the treatments. SS of runoff and infiltered suspension were analyzed. According to the results, both geotextiles were effective in sediment trapping. For geotextile 6A31AD, SS decreased by 88.1%, 97.16%, 99.14% and 99.15% in no folds, 25 cm fold, 50 cm fold and 100 cm fold treatment respectively from the initial SS of the muddy water suspension. Whereas, for geotextile VEG(B)-301, SS decreased by 87.3%, 91.87%, 98.74% and 98.34% in no folds, 25 cm fold, 50 cm fold and 100 cm fold treatments respectively. Additionally, SS significantly decreased in folded treatments for both geotextiles. Accordingly, it was established that geotextile can function for erosion controlling. However, further research is required to understand the intensity of discharge on various geotextiles for sediment trapping capacity for future applications.

Keywords: Geotextile, Sediment Trap, Erosion Control, Suspended Solid.

Characteristics, Types and Qualities of the Covered Waterways in Tokyo

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Abstract

Rationale: Edo (old name for Tokyo) was once a city of water and everyday life was intertwined with its rich water network. Unfortunately, the connection with water was lost due to the rapid urban growth of the city and now most of the 100 water streams in Tokyo are culverted. They have turned into streets landscaped like parks and their tributaries into narrow pathways. The route of most of those ancient streams is accompanied by endless kilometres of pedestrian and cycling paths regarded as "green ways". They bear specific social, ecological and time conditions. Today they represent a phenomenon in the city fabric, a common sight for locals and take a significant part of the city's natural infrastructure grid. Objective: The objective of this paper is to investigate the origin of the phenomena and to address the meaning of this linear infrastructure in the Japanese context of shrinking population, the increased risk to natural disasters and now the pandemic-increased need for public spaces. Therefore, this paper examines the potentials of those overlooked elements in order to balance the effects of future urban challenges. Analysis is done on the legacy of the urban streams from Edo to Tokyo and their categorization into types and functions.Methods: Both quantitative and qualitative approaches are used to understanding the meaning that hidden waterways have for the residents. Primary data is being collected through extended and systematized fieldwork. Secondary data comes from official documents and maps, paper review and social media. A research design was developed in an integrated manner to guide each phase of the research showing source of data and analysis technique. Conclusion: The hidden waterways serve as corridors of information and connection between different “machi”(small towns). In terms of the social dimension, the network of the covered waterways plays a vital role in strengthening communities.

Keywords: covered waterways, Tokyo, typology, quality

IN-13-05

Compressive Strength of Limestone-Based Concrete Hollow Block

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Abstract

The Province of Bohol is one of the islands in the Philippines lying on the earthquake and tropical cyclone-prone region. Damage to properties particularly on infrastructures is at the most expensive that is second to agricultural crops. These were experienced during the magnitude 7.2 earthquake in 2013 and the super typhoon in 2021. In this connection, local consumers are more of concern about the durability of construction materials available in the locale that can withstand such calamities. Concrete Hollow Blocks (CHB) is one of the most extensively used for walling materials in the Philippines while in Bohol, concrete hollow blocks made from limestone are now common. However, its durability is not yet assessed based on the amount of mixture and curing period. Therefore, this study has been proposed to evaluate the compressive strength of concrete hollow blocks using limestone as a partial replacement for sand. The mixtures of limestone in this study were 0%, 60%, 70%, and 80% with curing periods of 7, 14, 21, and 28 days. The data were analyzed using Analysis of Variance (ANOVA) in Complete Randomized Design (CRD) and for further analysis of its significance, Tukey's Honest Significant Difference test was used. Based on the results of the study, a concrete hollow block with 60% limestone and a curing period of 28 days had the highest compressive strength showing a significant difference at $p<0.01$. In conclusion, the optimum amount of limestone as partial replacement of aggregates for the CHB is 60% with the recommended curing period at 28 days.

Keywords: limestone, compressive strength, concrete hollow block, earthquake, tropical cyclone

The Characteristics of Biological Monitoring By Residents in Agricultural Landscapes in Japan

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Abstract

In some rural regions, biological monitoring in agricultural landscapes are conducted as part of local residential activities. Such activities are expected to have social effects such as environmental education and community empowerment, in addition to biodiversity monitoring. However, it remains unclear how residents conduct the biological surveys, the sustainability, and the potential effects on local communities. This study aims to clarify the social characteristics of biological surveys by residents and examine the sustainability of activities. The survey reports of 37 local activities in aquatic habitats of rice-farming landscapes in the city of Utsunomiya, in the Tochigi Prefecture, Japan, were collected. By using the reports, the basic activity features of the surveys, such as the number of participants and affiliations, the contents of activities, and the number of pictures and location maps, were examined, and the local groups were clustered based on the similarities of the features. Finally, the number of detected species by the biological surveys and the contents of group discussions, which were held after the surveys, in each cluster were compared. The results showed that the number of participants of the biological monitoring ranged from 11 to 235, and the participation rate of children was high at 86.5%, while the participation rate of experts was low at 18.9%. Our main findings are as follows: (1) the local groups that conducted surveys more than twice tended to have a large number of species and specifically discuss the future prospects of local ecosystems. (2) The number of species was the highest in the cluster in which experts always participated. (3) the cluster with no children tended to have no discussion. In conclusion, our findings imply that expert participation is vital for finding species and that child participation is essential for sustainability of this biological monitoring.

Keywords: biological survey by residents, citizen science, agricultural environments, paddy fields

The Dynamics of Social Interactions of Children Playing Around Rural Rivers in Japan

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Abstract

In Monsoon Asia countries, rivers have intimate bonds with rural communities, which create diverse social interactions regarding community building such as recreation, education, and tourism. Especially, children tend to play around rivers, and which is considered as one of the foundations of community building since playing fosters children's place-attachment to the local rivers. However, the number of children playing around rivers has been decreasing owing to expanding urbanization. This study aims to reveal 1) the influences of river use by family members and neighborhoods on children's river play, 2) the dynamics of children's social interactions in playing around rivers, and 3) the emergence mechanisms of children's social interactions in the play places. Questionnaire survey (127 local children from 9 to 11 years old), participatory observation and hiring survey (49 local children from 9 to 11 years old) were conducted in the town of Gujohachiman, the Gifu Prefecture, Japan. Social network analysis (SNA) was applied to the observation data to examine the dynamics of social interactions in playing. As the results, water play frequency and preference of children were positively related with the frequency of daily use of rivers by their family members and neighborhoods. SNA showed that the interaction density of children in playing around the river gradually increased while repeatedly fluctuating up and down. This dynamical change of interactions attracted the interest of urban tourists and caused interactions with the children. The three factors for emergence of children's social interactions were identified: introducing by the peers, finding natural creatures and playing with caregivers. These results imply that rural rivers have the function for children to expand their local interpersonal relationships through playing, which are supported by local communities. Furthermore, children's play places around rivers have potential to become the social interface for rural and urban communities.

Keywords: rural rivers, children, play places, social interactions, social network analysis, environmental education

Disparity in Quality of Life and Education Attainment of Children within the Tea Sector: Case study in Low-country in Sri Lanka

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Abstract

The purpose of this paper is to identify the disparity in quality of life and education attainment of children and to describe the structure of the differences behind these disparities, by focusing on the three management styles* of the tea sector in the low-country of Sri Lanka. Past studies mentioned that income and living standards in the estate sector are lower than in other sectors, but other studies pointed out that the structure of the tea sector has changed, with an increase of smallholders and an improvement of living conditions. Qualitative methods are applied for analysis. To consider the well-being of children, capability approach is also applied. Data in the study relied on 302 households' primary data obtained between 2013 and 2015. Six indicators of environment surrounding children used in this paper are "Household income, Education of house-head, Housing condition, Environmental safety, children's Economic activity and Housework activity". Two indices used as education attainment are "Attendance status" and "Repeated years/drop-out". Results in comparison of children's livelihood within three management styles indicate that children on private estates are more likely to face the disadvantages than in RPCs and IFs. Their house-heads are less likely to have better education, and living space is less likely to be safe and sanitary. Furthermore, children are more likely engaged in economic and housework activities for long hours. Regarding education attainment, although all children of IFs attended school and some had experience of repeated years/drop-out, children in RPCs had lower attendance and more repeated years/drop-out experience, meanwhile, children on PEs fared the worst.

*Regional Plantation Company (RPC), Private Estate (PE), and Individual Farmer (IFs)

Keywords: children, disparity, quality of life, education, tea sector

Cambodian traditional foods and food safety issues: an integrative aspect from literature reviews and pre-survey online

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Abstract

In Cambodia, many potential fermented foods are classified into fermented vegetables including Chaipovbrey (salty-dried fermented radish), Chaipovpaem (Dried-sweet fermented radish), Trasorkchav (dried-fermented melon), Speychrouk (fermented mustard), Paorklahong (fermented papaya), Trasorkchrouk (fermented cucumber), Kataemchrouk (fermented scallion), Chaitavchrouk (Sweet-fermented radish), Tompaingchrouk (sour-fermented bamboo), Seingpaem (sweet-fermented soybean paste) and Seingbrey (salty-fermented soybean paste) and fermented meat such as Paorkbongkea (saltywater shrimp paste), Toektrey (fish sauce), Prohoc (fish paste), Paorkchav (fermented small-fish), Paorkchou (sour fermented fish), Paorktrey (salty fermented fish), Paorksachchrouk (salty fermented pork), Sangvac (sour fermented fish), Sachkrokchrouk (fermented pork) and Sachkrokkor (fermented beef). The document history of them has completely devastated by Pol Pot regime 1975-1979, and currently the fermented foods are causing big concerns to local health consumers because of food poisoning and food-borne diseases. Therefore, the study objectives aim to provide Khmer traditional food definition and to overview existing fermented food issues by emerging the aspects from review findings and pre-online survey. For this study, the designed-online questionnaire, snowball approach and literature reviews were used. And 23 respondents were interviewed by the online-questionnaire. The results indicate that 78.26% of the respondents held food skills while 21.74% were non-food skills. According to their judgment, 91.3% of the respondents perceived the fermented foods as Khmer traditional foods because of learning processing method from generation to generation, recording long history at Angkor Wat temple, calling in Khmer-name products, using traditional processing method and local recipes, and having special taste properties. For the food safety concerns, both results show that micro-organism contamination, unpermitted food preservatives, chemical residues and food mislabeling were the most concerns. Overall, the fermented foods are considered as Khmer traditional foods, but those deal with microbial risk and chemical remaining, threatening to human health. For food safety, microbial and chemical risks and consumer attitudes should be a next main study target.

Keywords: traditional foods, hazardous microbial, food preservatives and chemical residues

Agak (Amoma, Giya, Alayon Sa Kalampusan) for Pupils' Sustainable Development

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Abstract

The DepEd, Division of Bohol fully believes that education can help everyone sustain in life and so with this, it is implementing the Amoma, Giya, Alayon sa Kalampusan (AGAK) which means Nurture, Guide, Advocate towards Success (NGATS) program to help the education of Boholano children needs immediate attention: the learners who are at risk of dropping out and in consistent to the Education For All Program of the Department of Education. It is a Child Nurture Program that envisions a 100 percent completion of all learners in Basic Education. Through the collective effort of all DepEd-Bohol Teachers and School Heads to provide sponsorship to indigent students and are at risk of dropping out whereby beneficiaries of the program are helped with their financial, material needs in school and are given moral and spiritual support by their adopters. Before AGAK was implemented, the drop-out rate was 10.8%. Which hinders the DepEd Program on Zero Drop-Out Rate in every school for not meeting the 0% standard drop-out level. After the first year of AGAK implementation, the drop-out rate lowered to 7%. Indeed, AGAK had made a difference in the performance of the school and in the academic performance and attitudes of all AGAK beneficiaries. The study employed the descriptive-documentary research design, where the effectiveness of the AGAK program to every adopted child's academic performance was obtained from teachers' pertinent academic records. A questionnaire was used to determine the effectiveness of AGAK program as a reference point for the analysis, interpretation and evaluation. The findings show that Financial Assistance and Spiritual support were rated "often", Moral support was rated as always and materials support as sometimes. It can be concluded that the AGAK program is effective in encouraging the pupils in finishing basic education and in changing pupils' attitude towards their studies.

Keywords: AGAK, learners, support, achievements, attitude

Awareness and Compliance of Corn Farmers to Good Agricultural Practices (GAPs) in Nueva Vizcaya, Philippines

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Abstract

This study investigated the level of awareness and extent of compliance to certification of corn farmers with Good Agricultural Practices (GAPs) in corn development projects in the cluster municipalities of Nueva Vizcaya. The study sought to determine the following: a) demographic characteristics of the respondents; b) level of the respondents' awareness in GAP corn compliance requirements; and c) extent of the respondents' compliance in GAP corn certification. Descriptive method of research was used in obtaining answers to the problem. One hundred sixty (160) corn farmers who have undergone GAP trainings with 5-years' experience in corn farming, at least 0.5 hectares or more area of corn farm and an active participant in GAP corn project were randomly selected. Descriptive statistics such as frequency counts, percentages, and mean was used in describing the demographic characteristics of the respondents. A four-point Likert-type scale was used to analyze the level of awareness and extent of compliance. The result revealed that there are older corn farmers, most have formal education, more experience in farming and members in farmers' organization. Active involvement of men and women in farming improve their compliance. Likewise, the study indicates a high awareness of the respondents in GAP corn certification requirements gained through their participation to various GAP and GAP-related trainings and activities. Demographic profile such as sex, education and trainings have significantly affected the respondents' awareness, however, there is no significant effect on their compliance.

Keywords: good agricultural practices, awareness, compliance, certification requirements

Communication, Education, Participation, and Awareness (CEPA) Program for Conservation and Sustainable Management of the Anzali Wetland, Iran

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Abstract

Wetlands are vital to human wellbeing, inclusive economic growth, and climate change mitigation and adaptation. However, some 64% of the world's wetlands have disappeared during the last century. To address this severe loss, the Programme on Communication, Capacity Building, Education, Participation, and Awareness (CEPA) of the Convention on Wetlands was approved at COP12 in 2015. Covering more than 19,000 hectares, the Anzali Wetland is located in Gilan Province, north part of Iran, along the southern coast of the Caspian Sea. In this respect, the Guilan Department of Environment developed and implemented the CEPA program for international Anzali Wetland. Based on the initial survey results, the CEPA Program Development Committee identified the key stakeholders. Then, ten workshops, based on in-depth discussion among participants using the brainstorming technique, were held in three counties in Iran: Rasht, Bandar Anzali, and Sowme'eh Sara. According to the importance and influence matrix, the Anzali Wetland Management Committee, Agriculture Organization, the Guilan Department of Environment, and the Department of Natural Resources and Watershed Management were identified as the stakeholders with high importance in protecting the wetland. Based on the results of the participatory workshops, the Anzali Wetland functions were divided into eight main categories: ecological, agriculture-fisheries-animal husbandry, education-research, economic, cultural-sports-social industrial-pharmaceutical, tourism, and political-military. Then, 64 challenges and issues of the wetland were identified by content analysis and classified into four main areas: pollution and sedimentation, misbehavior and public unawareness, poor intersectional relationships, and consequences of construction projects. In total, 30 actions were listed, out of which 37% had communicational nature, 27% had educational nature, 20% had synergistic nature, and 16% had public participation nature. Based on the prioritization of these actions, training officials for changing their attitude and building capacity, and increasing social commitment and responsibility through training were the most critical measures.

Keywords: wetland, conservation, participation, local community, communication.

Agriculture Entrepreneurship on Youth: A Systematic Literature Review

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Abstract

Past studies have found that boosting agriculture entrepreneurship education for the youth is a critical solution to the aging of the agriculture human resource. In order to develop more agribusiness opportunities and strengthen entrepreneurship competencies, entrepreneurship education, and training programs should be applied at an early age. This paper aims to provide an overview of the development of agriculture entrepreneurship research in the context of youth can become a basis for researchers to conduct future studies on the related topic. This paper reveals the general trend of the subject studied, objectives, methodologies, and research finding through an extensive systematic literature review of past studies on this topic conducted between 2000 to 2021. Out of the total of 1,492 papers found using a combination of the words "Agriculture," "Entrepreneurship," and "Youth," 62 articles passed the screening criteria and are further analyzed for this research. This study found that 27% of the reviewed studies focus on university and college students. More than 32% of the studies' objective was to identify the factors influencing youth inclination and intention towards agripreneurship. Subjective norms (external factors) are the determining factors that affect the intention in agripreneurship. Around 39% of the studies used Likert scale questionnaires to obtain data, and more than 55% analyzed the data using qualitative descriptive analysis, 24% used multiple linear regression, and 15% used TPB. This paper highlights the need for agripreneurship studies on young farmers using more variative analysis methods to obtain a broader understanding.

Keywords: agripreneurship, Youth, Agribusiness, Systematic Literature Review (SLR), Youth Inclination

Educators at Risk: Numerous Meanings of Symbols among Educators as Affected by the Current Pandemic

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Abstarct

The COVID-19 pandemic has changed the world and affected all sectors, most especially that of education. Although almost all have survived these past years but some facets of learning and teaching perhaps may have been compromised. Education as the means to improve humanity not only economically but most especially on improving sanity of humanity has always been the object of arguments from ancient period until the present time. But with the current scenario of our country and the world, this kind of perspective may have changed drastically. This paper would like to determine the prevailing thinking of educators having been affected by the pandemic and examine the themes of the different cognitive reasoning in order to come up with a therapeutic program relevant for our teachers. Using the framework of Kinetic Family Drawing developed by Burns and Kaufman in 1970, an original painting was shown to 150 research participants during the zoom meetings/webinars. Each respondent identified three images they have observed from the painting. Interestingly, the participants saw some animals, parts of a human being, a child, and other symbols representing emotions. The feeling of being loved and feeling of security were very evident in the narratives which might have been intensified due to our present dilemma. Was it influenced by each role? Did the current scenario strongly affect its meanings? The way we perceive the extent of how much our mindset have an impact on our life will determine our stepping stones towards it. In a nutshell, the actions will follow if our minds establish them as goals.

Keywords: emotional wellbeing, pandemic, therapy