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DESIGN

ICSAE-8

The 8th International Conference on Sustainable Agriculture and Environment

Online Conference

24-25 August 2021 | Surakarta, Indonesia

Programme and Abstracts Book

This conference organized by
Research and Development Center for Biotechnology and Biodiversity (P3BB)

in collaboration with:
Indonesia Diaspora Network - United
Faculty of Agriculture, Universitas Sebelas Maret, Indonesia
Faculty of Art and Design, Universitas Sebelas Maret, Indonesia
Faculty of Politic and Social Science, Universitas Sebelas Maret, Indonesia
Faculty of Economic and Business, Universitas Sebelas Maret, Indonesia
Indonesian Agronomist Association (PERAGI)



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| Welcome Address



| Opening Remark



Conference Guide

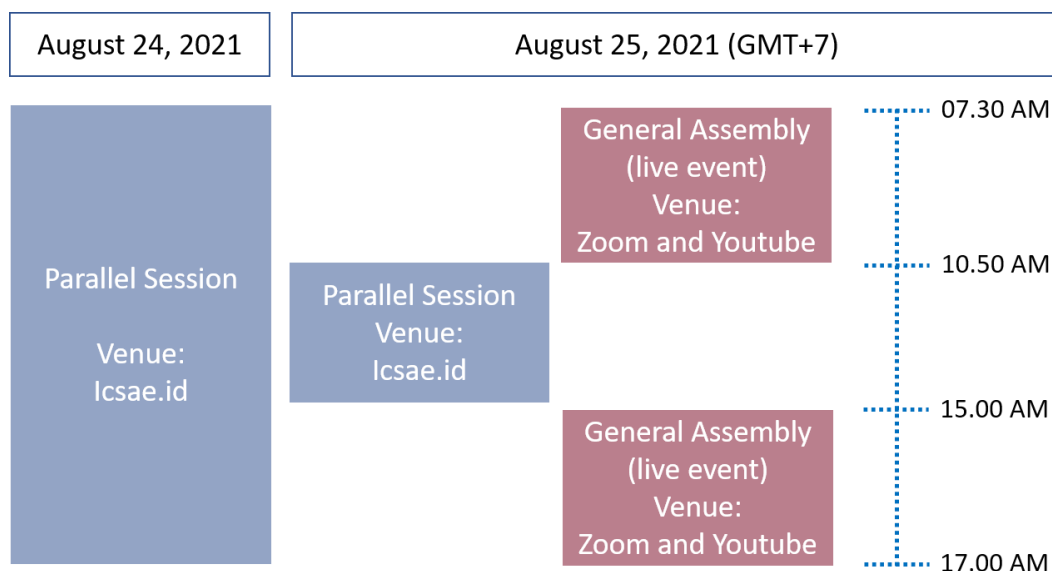
As informed, ICSAE-8 will be held by online due to current Covid-19 pandemic circumstances. Considering time constraints and to avoid various technical problems (such as lagging internet connection, different time zone, etc) during the conference, the conference is held by online.

There are two different sessions in this conference, namely parallel session and general assembly. The parallel session can be accessed through conference website (<https://icsae.id>), all the digital format of paper presentation (recorded video and poster) are listed and opened to all participants. The general assembly, invited speakers talk, will be performed through live meeting. Both stages can be enjoyed by all participants which are listed and/or invited with the following time frame:

1. Parallel session in digital venue : August 24-25, 2021

2. General assembly : August 25, 2021

ICSAE-8 Stages

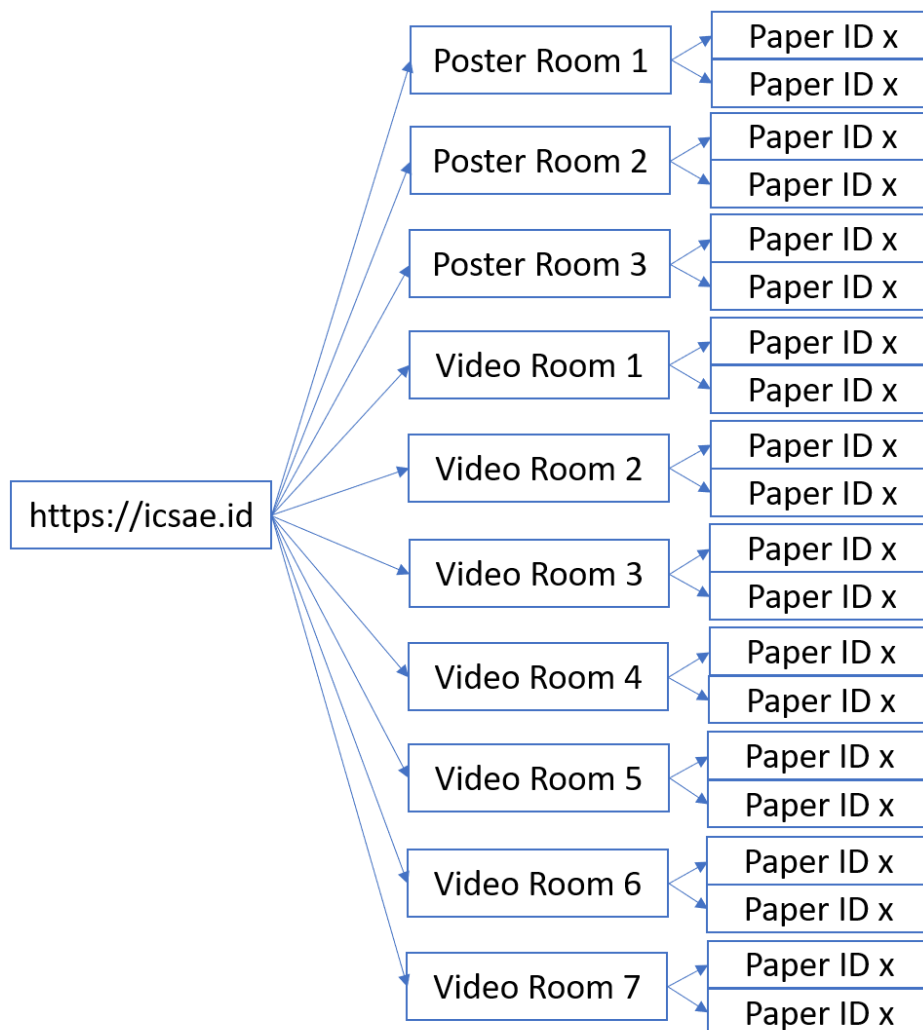


Parallel Session Guide

The following is the guide to access the digital venue for parallel session:

1. Please visit ICSAE-8 Website (<https://icsae.id>)
2. You will see '**ICSAE Parallel Session**' section, there are 3 poster rooms and 7 video rooms
3. Click on the presentation type and the preferred topic in specific room
4. Click the presentation title
5. The abstract, and presentation media can be viewed accordingly
6. Leave any comments in the form for Q & A, please write your name and email for further contact.
7. The presenter is able to reply every the comments.

Flowcart Parallel Session ICSAE-8



General Assembly Rundown

- **Pararell Show (Poster and Video) 24-25 August 2021**
- **General Assembly 25 August 2021**

Time (GMT+7; AM)	Activities	Person in Charge
07.30-08.00	Registration and preparation	Committee
08.00-08.05	Opening	MC
08.05-08.10	Indonesian National Anthem	Committee
08.10-08.20	Welcome Address	Dean Faculty of Agriculture
08.20-08.30	Opening Remarks	UNS-Rector
08.30-08.35	Preparation for Session 1 (2 Invited Speakers) Announcements	MC
08.35-09.00	Invited Speaker 1 (USA - Prof. Herry Utomo) Presentation title: <i>"Artificial Intelligence in Sustainable Agriculture & Environment"</i>	Moderator
09.00-09.25	Invited Speaker 2 (USA - Dr. Halis Simsek) Presentation title: <i>"Impact of groundwater table depth on plant growth, yield, and grain quality"</i>	
09.25-09.40	Q n A	Moderator
09.40-09.45	Preparation for Session 2 (2 Invited Speakers) Announcements	MC
09.45-10.10	Invited Speaker 3 (USA - Prof. Taifo Mahmud) Presentation title: <i>"Naturally-derived crop protectants"</i>	Moderator
10.10-10.35	Invited Speaker 4 (UNS - Prof. Ahmad Yunus) Presentation title: <i>"Growth and Secondary Metabolites Content of Ekinase (Echinacea purpurea) in Karanganyar, Central Java, Indonesia"</i>	
10.35-10.50	Q n A	Moderator
10.50 - 15.00	Pararel session Video and Poster (via website)	Committee



15.00-15.05	Preparation for Session 3 (2 Invited Speakers) Announcements	MC
15.05-15.35	Invited Speaker 5 (Singapore - Rita Padawangi, Ph.D) Presentation title: <i>"The Role of Design in Urban Space Development and Sustainability"</i>	Moderator
15.35-16.05	Invited Speaker 6 (Netherland - Abidah B. Setyowati, Ph.D) Presentation title: <i>"Towards A Socially Just Transition to Low Carbon Development in Indonesia"</i>	
16.05-16.35	Q n A	Moderator
16.35-16.45	Closing remarks	MC
16.45-17.00	Announcements	MC



Parallel Session Room

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Faculty of Economic and Business, Universitas Sebelas Maret, Indonesia
Indonesian Agronomist Association (PERAGI)



The Use of $N HNO_3$ to Determine Copper and Zinc Levels in Heavy-Metal Polluted Tropical Soils

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Abstract. This research was to study $N HNO_3$ compared to other methods to determine plant available heavy metals in heavy-metal polluted soils. Soil samples from an experimental field treated with industrial waste taken 22 years after amendment were employed to conduct the comparative and correlation study. Soil samples were analyzed for Cu using various methods and planted in a glass house with several plants and analyzed for soil and plant Cu and Zn. The relative strength of the chemical extractants followed the order of $N HNO_3 \approx N HCl > \text{Buffered DTPA} \approx \text{Unbuffered DTPA} > M CaCl_2 \approx N NH_4OAc \text{ pH } 7$. High correlation was observed for soil extracted Cu by $M CaCl_2$ or $N NH_4OAc \text{ pH } 7$ vs Buffered DTPA, $N HCl$ vs Buffered DTPA and $N HNO_3$ or $N HCl$ vs $N NH_4OAc \text{ pH } 7$, and $N HCl$ vs Buffered DTPA. High correlations of plant and soil Cu extracted by $N HNO_3$ were shown by caisim, water spinach, land spinach, and corn while of plant and soil Zn were shown by caisim, water spinach, land spinach, and lettuce.

Paper ID: 2

Allometric Equation of local Bamboo for Estimating Carbon Sequestration of Bamboo Riparian Forest

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Abstract. The cause of global warming is the increasing of carbon concentration arising from the activities of industry, burning of fossils, and land use change. The purpose of this research was to find out the allometric equation to calculate the local bamboo biomass and then to be able to calculate how much carbon sequestration at bamboo riparian forest since this area was rarely been explored. The parameters observed were the height and diameter of the bamboo stem at 1.3 m height of 6 types of local bamboo using destructive sampling, along with the measurement of bamboo weight. To complement the estimation of total carbon sequestration, the carbon content of the bamboo biomass, litter and soil were measured. The results showed that the allometric equation for estimating local bamboo biomass are $Y=0,6396x1,6162$ with $R^2=0.77$ which obtained from the relationship equations between bamboo dry weight and it's diameter. Total carbon sequestration of this system was range between 70 to 169 ton ha⁻¹.

Comparative Effect of The Combination of Biofertilizer, NPK and Mychorrhizal Application on Maize Production System

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Abstract. The use of uncontrolled an-organic fertilizer continuously will degrade soil fertility and nutrients balance. To minimizing those impact, the use of biofertilizer along with an-organic fertilizer is needed to maintain sustainable maize production system. The study was use randomized complete block design with 3 replications with different level of fertilizer application, conducted at University of Brawijaya experimental research station at Jatimulyo village. The several parameters were measured to examine those effects on soil and crops. The treatments were significantly effect on total number and mycorrhizal infection, crop height, leaf chlorofil indeks, leaf area indeks, and maize yields. The best treatment was detected under the combination of 100% biofertilizer and 100% NPK along with the addition of 100% of micro elements while the lowest was observed under mycorrhizal solely applications. There was a positive correlation between chlorofil, crop height, leaf indeks and yields.

Paper ID: 4

The Effect of VP3 Biofertilizer and Its Carrying Materials on the Germination of Six Plants

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Abstract. This study is to determine the differences in growth after application of VP3 and its respective basic ingredients (vermiwash and vermicompost) and their pathogenicity effects on the germination of soybeans, mung beans, long yard beans, kale, mustard greens, and green spinach. Research design was observed on plant height, root length, fresh weight and signs of pathogenicity. This study showed that the VP3 biofertilizer inoculation gave better results than other treatments on the parameters of high germination and fresh weight of the plants tested. However, in water spinach plants, the application of VP3 biofertilizer had a significant effect only on the height parameters of the seeds. Provision of VP3 biological fertilizer and each of its carriers did not show any signs of pathogenicity such as necrosis, wilting, root rot or stem rot. This shows that VP3 biofertilizer is potential as a seed treatment and is also known to contain soil-borne disease controlling agent bacteria.

Vaccination Strategy of Live-Attenuated *Eimeria* Sp Exhibits Earliest Protection Against Intestinal Coccidiosis for Sustainable Rabbit Husbandry

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Abstract. Since yet no commercial vaccine available, control of rabbit coccidiosis are mainly used chemical coccidiostat as drug or as substances in feed. However, this strategy induces resistance and antibiotic contamination. Coccidiosis becomes a continuous threat to rabbit husbandry since no maternal immunity is obtained. We performed pressure selection to attenuate *Eimeria coecola* and *E. magna* for fattening rabbit immunization. Our trial showed 90% protection against coccidial infection by single-dose vaccination in 28-35 days old kits. The combination of two different species of *Eimerias* provides wider protection to coccidiosis since coccidia's immunity provided specifically to each species. Vaccination strategy obviously provides the earliest preventive protection to rabbit kits.

Characterization of Acid Soluble Type I Collagen from *Decapterus macarellus* Skin

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Abstract. The growing demand on marine-based collagen is attributed to its high absorption rate and bioavailability. This study aimed at; 1) obtaining acid-soluble collagen extract from *Decapterus macarellus* skin; 2) characterizing the collagen extracted from *D. macarellus*. The skin was extracted using 0,5 M acetic acid, dialyzed, and freeze-dried to obtain sponge collagen. Molecular weight and characteristic of amide bands were evaluated using SDS PAGE and FTIR spectroscopy, respectively. The skin derived acid soluble collagen yielded 4,02%, physically white in color and odorless. Scanning electron micrographs revealed the fibrillar architecture of collagen that appears 'flaky' at higher magnification. SDS PAGE confirmed the presence of $\alpha 1$ (~ 120kDa), $\alpha 2$ (~ 100kDa), and β (~ 200kDa) chains, suggesting a typical of type I collagen as commonly found in the skin. FTIR spectra showed the presence of five typical functional groups of collagens, namely Amide A (3427.65 cm⁻¹), Amide B (2940.61 cm⁻¹), Amide I (1648.24 cm⁻¹), Amide II (1532.51 cm⁻¹) and Amide III (1238.25 cm⁻¹). The present study demonstrates for the first time, extraction, and characterization of type I collagen from *D. macarellus* skin. Being one of the most abundant fish in tropical marine area, *D. macarellus* serves as a great resource for economical collagen-based biomaterials.

The Importance of Politics on Precautionary Principles' Implementation in The Environmental Sector: Cases and Examples of Indonesia and Australia

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Abstract. The United Nations' arrangement to establish Rio Declaration on Environment and Development in 1992 can be perceived as an effort to enforce sustainability effort in the environmental sector. The declaration's main principles are about the interdependent and indivisible relations between peace, development, and environmental protection. Rio Declaration also mentions the term precautionary principle that could be implemented by the industrial actor in the countries but not limited to them. Country whose put ratification on it, directly binding to hold the mandate as one of the main actors in control of environmental protection. This research attempted to examine some countries' government's recent actions toward the formulation and implementation of environmental policy regarding the precautionary principle as the embodiment of the Rio Declaration 1992. This study will use descriptive qualitative methodology with data sample from the population consisted of some countries that ratified the Rio Declaration 1992. The findings will explain the direct and indirect correlations within the government and industrial factors about the precautionary principle in the action. In addition, the result of this study indicates how politics plays a powerful role in the implementation of the precautionary principle.

Determinants of Environmental Performance: Evidence from Agriculture Industry in Indonesian Stock Exchange

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Abstract. This study aims at examining the determinants of environmental performance of company that listed in agriculture sector of Indonesian Stock Exchange. The analysis technique of this study uses multiple regression. Sample of this study consists from firms that listed in agriculture sector in Indonesian Stock Exchange during 2016 – 2019. There are 67 firm-year observation. Independent variables of this study are return on equity (ROE), firm age, size, leverage, and audit firm; and the dependent variable for this study is environmental performance. The result of this study shows that return on equity has negative effect on environmental performance. On the other hand, firm age, size and leverage have positive effect on environmental performance. Further, audit firm has no effect on environmental performance in Indonesian Agricultural Companies. Therefore, firm with higher age, firm with bigger size and have higher leverage will likely increase the environmental performance of agricultural companies in Indonesia. On the other hand, profitability has decreased the environmental performance. It is important to consider several factors such as firm age, size, leverage and profitability to analyse environmental performance.

Paper ID: 12

Implementation of Inter-Organizational Network in Controlling Forest and Land Fires in Rokan Hilir Regency, Riau Province

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Abstract. This study aims to examine and analyze the implementation of inter-organizational networks in controlling forest and land fires in Rokan Hilir Regency. This research was carried out in Riau Province, especially in Rokan Hilir Regency. The method used is qualitative. The results showed that forest and land fires that occurred in Rokan Hilir Regency were more common in company plantations and the rest from community plantations. the implementation of the inter-organizational network in controlling forest and land fires in Rokan Hilir Regency is in the form of: standard and objectives, resources policy, interorganizational communication, disposition (characteristic of the implementing agencies). The recommendation from this research is to control forest and land fires in Rokan Hilir Regency.

Growth, carbohydrate accumulation, and productivity of local glutinous corn Bima Pulut (*Zea mays var. ceratina Kuleshov*) after seed priming and of coconut coir ash fertilizer application

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Abstract. This study aims to determine the effect of gibberellin seed priming and coconut coir ash fertilizer on growth, carbohydrate accumulation and productivity of Bima pulut corn. The research was conducted using a randomized block design. The main plot was seed priming with gibberellin concentrations of 0, 150, and 300 ppm, and as a sub plot was coconut coir ash fertilizer of 0.00; 0.75; 1.50; 3.00 g/kg. Each treatment was done in three replications. Data were analyzed using separate plot ANOVA with treatment arranged in a factorial. If the treatment is significantly different, Tukey's honestly significant difference test will be carried out. The results showed that the interaction of gibberellin (GA3) and coconut coir ash fertilizer had a significant effect on plant height, productivity without corn husks kg/ha, and amylose content but had no significant effect on leaf number, number of cobs per-plant, cob length, number of row of seeds per cob, weight of cob with and without corn husks.

Paper ID: 14

Study of Agile Governance on Strengthening Reforestation Program in West Java Indonesia

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Abstract. West Java is one of the Provinces in Indonesia that possesses the most critical land area, approximately 714.000 of 911.000 hectares (ha) in total. So that to deal with that severe issue, the Regional Forestry Office of West Java has established an eminent program named "Gerakan Tanam dan Rawat 50 Juta Pohon (The Movement of 50 Million Trees Planting and Caring)". This research aims to analyze the reforestation program in West Java Indonesia viewed from an agile governance perspective. The study employed the qualitative approach with the descriptive case study method. In addition, in-depth interviews and literature studies were utilized in collecting the data. Moreover, to ensure validity, this study uses the triangulation technique. This study showed that although the government has applied the agile governance concept, they need to reinforce how they interact in coordination and collaboration activities.

Morphological and Agroecological Study of Purwoceng Gunung (*Artemisia lactiflora* wall.) in Areas Slopes of Mount Lawu

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Abstract. Purwoceng Gunung has the potential as a medicinal plant. However, research on this plant has not been widely carried out, so that information on ecology and habitat is unknown. This study aims to determine the distribution pattern, morphological and agroecological of Purwoceng Gunung. The research location on the slopes of Mount Lawu, especially in the Grojogan Sewu, Tawangmangu sub-district, Central Java. The sample point was determined based on purposive random sampling through a pre-survey approach. Determination of sample plots and analysis of vegetation using the transect (line) method. The results showed that the morphology of the stem shape was round and segmented, smooth surface and green, oval leaf shape with serrated edges, compound leaves, pointed leaf tip, blunt leaf base, green leaf color with a length of 4 cm and a width of ± 2 cm, the location of the flowers at the end of the stem and classified as compound interest, fibrous roots with yellowish white color. The distribution pattern of Purwoceng Gunung was uniform with a low population density of 6 individuals per plot and an INP of 4.4. The agroecological conditions of the habitat have an average soil temperature of 22.8° C, soil moisture 76.9%, air temperature 26° C, air humidity 61.9%, and light intensity 1311.04 FC, climate type C (slightly wet) with soil chemistry, namely C organic 5.8%, organic matter 9.9%, N 0.27 %, P 16.04 %, K 0.27 %, pH NaF 9.02, pH H₂O 6.1, CEC 26, 9 me 100 g⁻¹, field capacity 43.9. The proportions of dust, clay and sand were 27.4%, 9.4%, 63.2%.

The Role of Organic Fertilizer from Natural Dye Waste and Mycorrhizal Inoculation on The Growth of *Indigofera tinctoria* L.

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Abstract. Management of *Indigofera tinctoria* as a natural dye produces organic waste that has not been utilized. One of the proper management of organic waste is to process it into organic fertilizer. This study aims to examine the role of organic fertilizer waste *Indigofera tinctoria* and mycorrhizae on the growth and yield of *Indigofera tinctoria*. The study used a completely factorial randomized block design with two factors, namely organic waste fertilizer and mycorrhizae. The results showed that organic fertilizers and mycorrhizae had no effect on the net assimilation rate and the number of leaves. Organic fertilizer has a significant effect on the biomass and fresh weight of the crown. Mycorrhizal effect on plant fresh weight and the percentage of roots infected with mycorrhizae. Mycorrhizal inoculation 20g/plant showed 51.33% infected roots. The combination of 200 g. plant-1 organic fertilizer and 10 g. plant-1 mycorrhizal fertilizer increased 84.04% the number of root nodules. The number of root nodules was positively correlated with the percentage of roots infected with mycorrhizae.

Paper ID: 17

The Role of Foreign Ownership in the CSR Performance of Agriculture Listed Firms in Indonesia

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Abstract. This paper aims at examining the effect of ownership structure on the disclosure of corporate social responsibility of agricultural companies in Indonesia. Specifically, this study focusses on the effect of foreign ownership on the CSR disclosure. Sample of the study consists of agricultural companies that listed on the Indonesia Stock Exchange from 2017 to 2019. The data were analyzed using multiple linear regression analysis. The results of this paper shows that foreign ownership has a significant positive effect on the disclosure of corporate social responsibility. The results of this study imply that foreign ownership can increase the disclosure of corporate social responsibility, especially in agricultural industry companies in Indonesia.

Buto Character Developing with Utilization of Firewood Waste to Eco-Friendly Eco-Artworks

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Abstract. Firewood waste is a discarded item, and some people use it as a substitute for stoves or cooking utensils for both industrial and household needs. Pollution from firewood smoke affects the air ecologically, especially environmental pollution and will reduce the oxygen we breathe. The authors get creative ideas by utilizing firewood waste into ecological works of art to reduce air pollution, reduce global warming which results in climate change. Research uses a qualitative method, which aims to gain a deep understanding program directed at the creative process in response to environmental damage and educating the public in cultivating sensitivity to protecting the natural environment. Eco-art become a new concept to relevant program and one of the answers to environmental problems and at the same time reintroducing Indonesian culture, especially puppet characters to the public. Visually, the ecoart design from firewood waste is represented in the form of a buto character to the public.

Paper ID: 22

Utilization of Coconut Coir Sack Waste Become Eco-Friendly Canvas Material

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Abstract. Sack waste is found around us, like waste of sacks and sacks made from coconut coir are usually used by farmers and plantations as sacks for delivery of tobacco, cloves, coffee, tea leaves, etc. Many of us find used sacks made of coconut coir that have been damaged, torn and wasted. Using coconut fiber sacks aims to reduce waste, protect the environment and eco-friendly. This study uses a qualitative descriptive method and with an action and research model. The action model taken is to design works of art and paintings on canvas made of used sacks made of coconut coir. Requires a special technique by coating wood glue to fill the pores of the holes in the sack. The research model was observing to available for waste sacks made of coconut fiber and testing the strength of the sack into canvas and analyzing the durability and service life of coconut fiber against glue and paint.

Paper ID: 23

Co-Design as A Strategy to Improve Ecological Awareness of Communities

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Abstract. One strategy of communities to easily embrace ecological awareness is by involving directly in the improvement of their environmental quality. This paper discusses the case study research of the co-design process of the neighborhood regeneration project in Kampung Tongkol at the Ciliwung riverbank, Jakarta. This project is carried out collaboratively involving residents of the area and facilitated by ASF (Architecture Sans Frontières) Indonesia. The main important object of this regeneration project is the construction of a self-supporting sample house. This house aims as an ideal model which can be replicated by another neighborhood. Residents are directly involved in the organizing, the design process, to the construction stage. The primary purpose of regeneration is to improve the quality of the residential environment. The principles of sustainable design are employed as the main guidance from the beginning of the process. This study concludes that the final achievement of this project not only results in a higher quality environment but also raises the ecological awareness of the residents of the neighborhood.

The Growth Response and Leaf Chlorophyll in Black Rice (*Oryza Sativa* L. Indica) Are Induced by Gamma Rays to the Drought Stress Condition

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Abstrack. The aims of this research to determine response of growth and leaf chloropyll in black rice (*Oryza sativa* L. Indica) are induced by gamma ray to drought stress condition. This research was conducted in July-November 2020. The field research was carried out in the experimental field (plastic house) on Medicinae Street, UNS housing, Jati Village, Jaten District, Karanganyar Regency. The chlorophyll test was done at Plant Tissue Culture and Biotechnology Laboratory, Faculty of Agriculture, Universitas of Sebelas Maret. This research used a field trial design without repetition. The research treatments used were 24 genotypes, including 10 genotypes of 100 gray gamma ray irradiation and 2 control genotypes, 10 genotypes of 200 gray gamma ray irradiation and 2 control genotypes. The result showed that the plant height variable had a lower irradiation plant value rather than control-01. The crown root ratio showed that irradiation plant had higher mean value than control plant. The leaf chlorophyll in the irradiation plant at 100 gy showed a higher value than control plants., meanwhile at 200 gray showed that control plants had a higher value irradiation plant.

Growth Variation and Proline Accumulation of *Echinacea purpurea* Cultivated to CaCl_2 Salinity

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Abstract. Purple coneflower (*Echinacea purpurea* (L.) Moench) is classified as medicinal plant comes from North America and have been much developed in Indonesia. *E. purpurea* can be developed by utilizing suboptimal land such as saline land. This study aims to determine the effect of CaCl_2 concentration on growth and proline accumulation of three accessions *E. purpurea*. This study used a Completely Randomized Design (CRD) with 2 factors and five replications. The first factor is three accessions *E. purpurea* (accession 1; 2; and 3). The two factor is four concentrations CaCl_2 (0; 2.500; 5.000; and 10.000 ppm). The observations are plant height, number of leaves, number of branches and proline accumulation. Data were analyzed using SPSS to test difference. The results showed that highest concentration of CaCl_2 can inhibit growth and increase proline accumulation. The highest proline accumulation in accession 2 was 22,8002 $\mu\text{mol g}^{-1}$, accession 2 as an indicator of accession tolerant to salinity.

Classification Image the Quality of Clove (*Syzygium Aromaticum*) using The Deep Learning Method with The Convolutional Neural Network Algorithm

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Abstract. The objective of this research is to classify the quality of dried clove flowers using the deep learning method with the Convolutional Neural Network (CNN) algorithm and perform sensitivity analysis or CNN hyperparameters to obtain the best model form in the clove quality classification process. This research uses clove raw material which has been classified according to SNI 3392-1994 by PT. Perkebunan Nusantara XII Pancusari Plantation, Malang Regency. The number of samples used is 1600 dried clove flower image data which is divided into 4 qualities. Each clove quality has 225 training data, 75 validation data, and 100 test data. There are several stages in this research, the first is making the CNN model architecture the first model. The results were obtained from the reading accuracy of 65.25%. The second stage is to analyze the CNN sensitivity or CNN hyperparameter on the first model. By taking the model that has the best value at each stage of the CNN hyperparameter to be used in the next stage. The final result after the CNN hyperparameter was carried out, the test data reading accuracy value was 84.25%.

Natural Colors of Jolawe Fruit, Bark of *Tingi*, *Jambal*, and *Tegeran* As Batik Coloring (Dyeing)

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Abstract. The research is aimed how to apply *allium Ascanicum L.* (*jolawe*, *tingi*, *jambal*, and *tegeran*) used as textile coloring substance. To apply batik with natural color of *jolawe* fruit, barks of *tingi*, *jambal* and *tegeran* on the cotton cloth. To dye with the natural color of *jolawe* fruit, barks of *tingi*, *jambal* and *tegeran* on the silk cloth for batik. The problem solving method in this research includes the problem analysis related to the usage of natural color substances of *jolawe* waste (cesspool), *tingi*, *jambal* and *tegeran*, the strategy in making product by carrying out experiments (action research) related to the aspects supporting the data collecting and the observation result, technique trial, material and design. Based on the analysis, it can be concluded several things in design visualization in the form of batik designer with the natural color substance of *jolawe*, *tingi*, *jambal* and *tegeran*, and the obstacles and the problem solving in the whole experiment of batik cloth dyeing.

Efforts to Apply Green Behavior to The Phi Generation Through The Media of Illustration Books

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Abstract. Environmentally friendly behavior has changed between generations, this is due to the development of technology and media. The Phi generation which tends to be close to digital technology often forgets analog technology which is more environmentally friendly. This study aims to create a media that is able to introduce green behavior to the Phi generation, so that this behavior is carried out in everyday life. This study uses the ADDIE method with a prototype illustration book design product. The results of the design explained to the Phi generation with an illustrated visual approach about green behavior with analog technology, thus fostering the desire to use the technology.

Digital Comics on Social Media as Environmental Conservation Efforts in The Millennial Generation

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Abstract. Millennials are active users of social media, so they get almost all of their information on the platform. One of the content in social media is in the form of a digital comic format. This study will look at the phenomenon of Instagram social media content as an effort to support the environmental conservation movement by the millennial generation. This study uses a case study method on the comic "KOPLING" from the Instagram account @greengnrid. To examine the context of exposure and meaning in the comic, visual content analysis is used. Meanwhile, the response to the work was analyzed from the number of account followers, the number of likes, and comments. The results of this study are the effectiveness of digital comic media and the creation of opportunities for using the media to respond to environmental issues among the millennial generation.

Paper ID: 30

Campaign Video for Utilizing Black Soldier Fly (BSF) as Organic Decomposer for Organic Waste Management

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Abstract. Waste management in Boyolali Regency, Central Java is still experiencing problems. 71% of the total 167 tons of daily waste has not been managed properly, 51.88% of which is organic waste. Since early 2020, the Black Soldier Fly start-up has started organic waste management, sold larvae products, and conducted training and consultation on organic waste in various regions. However, due to the current Covid-19 pandemic, its product marketing has not been optimal. For this reason, a campaign video was designed as a medium to campaign for environmental issues, so that people are aware of waste management, especially organic waste. The campaign video was developed using Research and Development method and ADDIE model. The video result is expected to be a campaign medium for better environmental management.

Coping Strategy Relationship with Income by Households of Farmers Cultivating Dry Land (A Case Study in Food-Insecure Regency of East Sumba in East Nusa Tenggara)

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Abstract. East Sumba Regency is an area that does not grow enough food to support people's food needs in this place, although the main source of income of the people is in agricultural sector. This article aims at identifying coping strategy relationship with income which is applied in the households of farmers who cultivate dry land for their livelihood. The samples for this research included farmers in four villages situated in two sub-districts at risks of food shortage. The samples were taken using snowball sampling technique and the data were gathered using interview, observation and recording. Additional information was used to support the findings and crosschecking was carried out with related parties. Coping strategy was applied by the households of farmers cultivating dry land by managing food-crop farming with *salome* planting pattern. This pattern is one of local wisdoms in muddling through problems of meeting necessities of life. The other strategy is pig-raising, by using cattle consumption pattern which is adapted to the availability of crops resulted from land cultivation and by looking for food source in the forest. Finding this research is the more households that do the coping strategy, the more income there will be.

Eco-Friendly for Product Design: A Literature Review

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Abstract. This review focuses on the research conducted over the years on the concept and implementation of product design-based eco-friendly cues. We review the pertinent literature by constructing a comprehensive table of the empirical studies in the current area that pointed on the numerous findings linked with these investigations. Given the summary table indicates some variables include design product, concept, and results. The data shows encouraging pro-environmental design concept in various fields that human's practical behaviour such instances are kept hidden in eco friendly goals. In addition to discussing the findings and contributions of the literature stream, the present research concludes by identifying gaps in the featured literature and suggesting potential future topics for eco-friendly related product design research. Thus, we seek to explain a brief review regarding how variables in this research are connected to drive a significant eco-friendly implementation in both concept and practical value.

Morphological Characterization of 3 Potential Lines Cempo Ireng Black Rice Result of Gamma-Ray Irradiation

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Abstract. Gamma-ray irradiation at Cempo Ireng can lead to the variation of morphological characteristics so that morphological characterization is necessary to determine changes in potential lines. The aims of this research were to get descriptions of potential lines as one of the requirements for proposing plant variety release and add black rice genetic diversity information. The research was carried out in the rice fields of Pakahan Village, Jogonalan, Klaten in January-June 2020 with the arrangement of potential lines 8.13 and 44 of M6 in a row. 30 plants were selected randomly for each potential line and observed 19 morphological characters. Data analysis was carried out descriptively and qualitatively with the Chi-Square test. The results showed that gamma-ray irradiation affects the characters of leaf angle, auricle color, ligule color, leaf color, leaf surface, panicle type, grain color, apiculus color, and rice length. Potential line 8 had different characteristics compared to non-irradiated Cempo Ireng in the characters of auricle color, leaf blade color, leaf width, panicle length, grain width, rice length, and rice width, while on potential line 13 and 44 occur in the characters of leaf surface and panicle length.

Local Wisdom in the Preservation and Diversification of Medicinal Plant Use (A Case Study of the Lawu Mountainside Community on the Island of Java, Indonesia)

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Abstract. The Lawu mountainside community uses local wisdom in its preservation of medicinal plants. The goal of this research is to describe the role of local wisdom in preserving and diversifying the use of medicinal plants. The research uses a qualitative method with an explorative approach to explore local wisdom and the optimization of medicinal plants. The research results show that the Lawu mountainside community, who use a wealth of local wisdom in the preservation and optimization of the diversification of medicinal plant use, supported by the potential of natural beauty, have managed to preserve and transfer this local wisdom to the younger generation and create a tourism site to attract visitors. This has had implications on economic and social cultural aspects. In the economic aspect, it has led to a development in the local economy, while in the social cultural aspect, it has brought about an internalization of ecological values in management of the natural environment.

***Memedi Sawah*: Environmentally Friendly Scarecrows for Paddy Field**

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Abstract. Four decades ago, there were still many *memedi sawah* or scarecrows to repel rice-eating sparrows in paddy fields in Java. Currently, to repel sparrows, many farmers use plastic sheets, an environmentally unfriendly material that is tied to rows of bamboo sticks in the paddy field. *Memedi sawah* nowadays is transformed into works of art and displayed in prestigious art galleries. Using environmentally friendly design principles and theories, as well as the theory of creating Javanese cultural arts, namely the concept of *aèng* or strange, this study aims to bring back *memedi sawah* made from environmentally friendly materials to protect paddy plants and preserve the cultural values that blend with the environment and spirit of the local community.

Yield Quality and Performace of Three Strains Black Rice from Gamma Ray Irradiation

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Abstract. Black rice cempo ireng (*Oryza sativa* L.) is one of the local varieties of Indonesian rice containing high anthocyanins. Black rice has a weakness that is a high content of amylose which causes rice texture to become pera. This research is a follow-up study that aims to examine the quality of results and performance of three promising lines black rice generation M7 result gamma ray irradiation, expected to obtain a line that has superior quality results and performance. This research was conducted in December 2019 – January 2021. Cultivation is carried out on the rice fields of Ngijo Village, Tasikmadu, Karanganyar, Central Java. Laboratory testing was conducted at Chem-mix Pratama Laboratory in Jambidan Village, Banguntapan, Bantul, DIY. Testing of vigor and viability of seeds was conducted at the Greenhouse Faculty of Agriculture, Sebelas Maret University. This study used the treatment of differences in lines namely three promising lines (8, 44 and 51) resulting from gamma ray irradiation and control (without irradiation). Selection of samples in the field using simple random sampling techniques. Laboratory test samples are selected randomly per line. The observation data was analyzed descriptively to compare three promising lines of gamma ray irradiation black rice expectations with control (without irradiation). Observation variables include anthocyanin content, amylose content, protein content, fat content, vigor and seed viability, organoleptic and seed pericarp color. The results showed that the three promising lines of black rice cempo ireng gamma ray irradiation results have superior quality results and performance compared to control (without irradiation). Promising line 44 have advantages: anthocyanin content (75.11 ppm), organoleptic (3.53: like/neutral), seed pericarp color (4: dominance of black color in one seed by 100%). Promising line 51 has advantages: amylose content (8.43%), protein content (7.48%), fat content (1.59%), vigor and seed viability (80% and 64%).

Growth and Yield Response of Local Soybean in The Giving of Various Organic Fertilizers

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Abstract. Soybean is the basic material for many kinds of industrial, such as tofu and tempeh industries. Soybean cultivation will be better if use a sustainable agricultural system, that is using organic fertilizers. This research purpose to find out the effect of organic fertilizer on growth and yield of local soybean. The research used a complete randomized design, one factor that are a variety of organic fertilizers with 6 treatments. Various of organic fertilizers consist of without organic fertilizer, liquid organic, compost, cow manure, rabbit urine, chicken manure and goat manure. Each test unit consists of 4 pots (plants) and each repeated 4 times. The results showed that the highest plant height, number of leaves and leaf area were produced by application of compost and goat manure. The application of various organic fertilizers did not significantly affect to the dry weight of soybean biomass.

Development of Community-Based Agrotourism Tea Gardens for Optimization of Agricultural Resources

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Abstract. The Jamus tea plantation is located in Girikerto Village, Sine District, Ngawi Regency, East Java. The number of tourists at the Jamus Tea Garden Tourism Object has decreased due to the Covid19 pandemic. Jamus Tea Plantation can promote tourism in Ngawi Regency, namely the production of green tea and attractive natural beauty, but has not been used optimally. The purpose of this study is to examine the potential development of the Jamus Tea garden as a community-based agricultural tourism attraction as an effort to optimize agricultural resources. This research is descriptive research with a qualitative approach. Retrieval of research data with field observation methods, in-depth interviews, Focus Group Discussion, and document study. Data validity uses data source triangulation. Agrotourism potential development is needed to utilize agricultural resources without damaging the environment. The potential of the Jamus tea garden as the utilization of agricultural resources can be optimized with the role of the community in various sectors. Especially in the economic sector, without any economic benefits or benefits, tourism business actors, including the community, will not be motivated to realize the success of agrotourism. The development of Agrotourism must also be primarily based on the environment. The environment must be maintained and preserved so that it can function in a sustainable manner.

Exploring Traditional Thread-Making and Simple Weaving Used in Upcycling OPP Lamination Plastic for Ecologically Responsible Textile Craft

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Abstract. This design research explores OPP (Oriented Polypropylene) plastic waste upcycling practice using traditional thread-making mechanisms and a simple hand-weaving process that aims to create an alternative raw material for ecologically responsible textile craft while forwarding a sustainable craft/design practice that promotes environmental soundness. By combining cultural investigation into the local tradition of textile-making with the cradle-to-cradle design principle of “waste equals food/resource”, we identified the potential of traditional textile-making as an eco-friendly and low-cost production process vis-à-vis how to improve the service life of technical waste material and developed methods of upcycling that turn plastic waste into material resources for unlimited creative outputs. The specific waste being studied and used in experimentation is OPP (Oriented Polypropylene) lamination plastic gathered from local printing industry that uses the material in finishing process of book covers, packaging and others. The use of OPP is a common practice found all over the country and its waste is among the least recycled. After observing its characteristic, we looked for simple processes within the indigenous technology and ideated ways of upcycling from a traditional thread-making technique considered as endangered cultural practice whose hand-woven thread created fabric material by non-mechanical loom. This in-depth design research resulted in: (1) techniques of thread-making using a traditional tool and skill improvement that produced different sizes of thread as raw materials for making an aesthetically pleasing woven textile, (2) re-recognizing and revitalizing endangered indigenous technology of craft-making that had been a part of human-nature ecology, (3) education and implementation of eco-design practice that can be accepted by local textile craft community as well as entrepreneurial units in the region, and finally (4) development of textile craft product by a creative upcycling process that may express local identity and environmental soundness.

Paper ID: 43

The Uniqueness of Environmentally Friendly Pagerjuran Pottery Products

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Abstract. This paper aims at studying and describing the characteristics of pottery, specifically tableware products from Pagerjuran that are safe to be used as eating utensils and eco-friendly. The background of this study is the concern on the proliferating products made of plastic and its derivatives which are not friendly to nature and our environment. Pottery is a product which is able to adapt to the times development. The products have been used since prehistoric times as simple cooking and eating utensils. As the times has gone by and the increasing complexity of human needs, pottery products have also been developing their types and functions. The village producing pottery in Pagerjuran has proven its existence for more than 600 years. The pottery products from Pagerjuran have more power to be developed and strong competitiveness with the characteristics of the dark soil (earthenware soil) and from the method of the production using a tilted rotation, and the presence of highly abundant human resources and material resources. This study is conducted based on the assumptions of what materials used to produce Pagerjuran pottery? What types of products that have been produced? And what kind of products do the consumers like? Do the communities in Pagerjuran also use their products for cooking and as cutlery? What standards indicate that this pottery product is safe for health and environmentally friendly? How to introduce pottery that is safe for health to the community and make them switch to using pottery products. In this study, a general, flexible and dynamic qualitative research method will be used. Besides, the data will be obtained from interviews conducted with resource persons, and products from the artisans. This study aims to publish safe and environmentally friendly Pagerjuran originated pottery products with various kinds of design innovations and product types. Thus, people will become interested and start using environmentally friendly pottery products.

A Comparative Study of Jarak Towo Cassava Farming in The Mountainous Areas of Karanganyar Regency in Supporting the Availability of Raw Materials for Food Processing Industry

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Abstract. Cassava is a commodity that is commonly marginalized. However, jarak towo cassava is exceptional as this variety has a large market potential with a more competitive price. However, only a few farmers are aware of this business potential. This study aimed at conducting a comparative study of the cropping patterns of jarak towo cassava to investigate more thoroughly the farmers' income or profit. This study was carried out in three sub-districts, including Jatiyoso, Tawangmangu and Ngargoyoso. Samples of farmers were taken using snowball sampling, with 20 respondents from each sub-district. The results showed that farmers in Ngargoyoso Sub-district spent the highest total cost. Meanwhile, farmers in Jatiyoso Sub-district received the highest income and profit. The highest efficiency was shown by farmers in Jatiyoso, while the lowest efficiency was performed by farmers in Tawangmangu. These findings depict how farmers develop jarak towo cassava farming in meeting the market demand.

The Influence of Entress Length and Shade on The Success of Cashew Tree (*Anacardium Occidentale* L.) Grafting

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Abstract. Cashew tree is an industrial plant that can grow on marginal land in a dry climate. Many farmers need seeds with fast age production and good quality. Thus, the improvement of seed plants uses grafting by cutting the scion of cashew tree whose the productivity remains high and graft them with cashew rootstock. The study aims to determine the effect of the entrees length of the scion, the effect of light intensity, and the results of the interaction of the entrees length within the light intensity on the success of cashew grafting. The research was conducted on July-October 2020 in the experimental land of Faculty of Agriculture, Universitas Sebelas Maret. The research method was a split-plot research design with 2 factors, the size of entrees length are 5cm, 7,5 cm, 10cm and light intensity is 100%, 20-30%, 10-20% under the shade of paranet with 9 combination and 3 replications of treatments. The results showed that the interaction within the treatment entrees length 7,5cm and 100% light intensity was successful. The other treatment of entress length and light intensity had no effect or failed.

Yield Quality and Performance of Line 13, 46 and 52 Black Rice from Gamma Ray Irradiation

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Abstract. Black rice is a functional food plant with high fiber and anthocyanin content. It has weaknesses that is a high content of amylose which causes rice texture to become hard. The study used a different treatment of plant strain, namely three expected strains of irradiated black rice M7 (hope strain 13, 46 and 52) and strain without irradiation (control). The data were analyzed descriptively and qualitatively. The results of the research conducted showed that the three hope strains had better yield quality and performance than the control plants. The highest anthocyanin content and the best fat were found in the strain 52, which was 75.04 ppm and 1.35%. Strain 46 had the best protein content, vigor and viability of 7.88%, 88% and 67%. Strain 13 had the highest amylose content of 14.92%. Strain 52 was the best performing strain (organoleptic staining and seed pericarp) compared to the other strains, namely 3.25 and 3.

Paper ID: 47

Utilization of Natural Resources in Supporting Eco-Interior Design

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Abstract. In creating interior designs, most people do not optimize natural resources and the concept of eco-interior design. This causes a lack of comfort such as hot air, lack of light during the day, and noise entering the interior. The question is how to utilize natural resources optimally in supporting interior eco-design. To answer this, identification on several cases with similar problem solving need to be done. The findings can be used as inspirations for the community in constructing public buildings and residences, so that interior designs can be occupied comfortably. The results and discussion found several alternatives namely technical utilization of optimal but not dazzling sunlight, technical use of optimal cross-air circulation in buildings, and utilization of natural building materials that can absorb sound to overcome noise from outside.

Life Cycle Assessment (LCA) Crude Oil and Natural Gas Process Production by PT Pertamina Hulu Kalimantan Timur Daerah Operasi Bagian Utara (PHKT DOBU)

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Abstract. PT Pertamina Hulu Kalimantan Timur Daerah Operasi Bagian Utara (PHKT DOBU) is company of exploitation and production crude oil and natural gas to meet energy needs in Indonesia. Activities of exploitation and production of crude oil and natural gas will produce pollutants which become a source of pollution for the environment. Therefore, it is necessary to conduct an environmental impact study using the Life Cycle Assessment (LCA) method. LCA is a method for analyzing environmental impacts across all units of a company process to produce a product. The method used to categorize the impact on the LCA study is ReCipe 2016 at the midpoint and endpoint levels with the SimaPro application. Environmental impact assessment with LCA shows that the production process of 1 ton natural gas contributes a greater impact is 60.59 Pt than the production process of 1 ton crude oil, which is 9.18 Pt, with the most dominant environmental impact being fossil resource scarcity.

Study on Genetic Variation of Kelembak (*Rheum officinale* Baill.) Using RAPD Molecular Markers

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Abstract. Kelembak (*Rheum officinale* Baill.) is native to mainland Central China and reported as an endangered medicinal plant. This plant in Indonesia distributed in mountainous areas; the center of rhubarb cultivation is in the Dieng Plateau. Mainly this plant is grown for the roots as herbal medicine material (Kelembak Jamu) and in the industry for cigarette ingredients (kelembak Jawa). The objective of this study was to assess the genetic diversity of 9 accessions of *R. officinale*. Six selected RAPD primers were used to amplify the samples and produced 33 DNA fragments ranging from 270-2.710 bp. The Genetic similarity was ranged from 74.58% to 100% using Dice similarity index. The dendrogram divided *R. officinale* into 2 main clusters separated between kelembak Jamu and kelembak Jawa. Cluster analysis revealed that Mangli Accession (Kelembak jamu) had a closer similarity to Kelembak Jawa. The narrow genetic diversity of Kelembak is important information for future conservation and management programs in the cultivation of this species.

Risk Analysis on the Improvement of Potable Water Services in PDAM of Malang City

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Abstract. PDAM Malang has been legally and technically providing potable water through the implementation of Zona Air Minum Prima program. However, there are still some areas that do not meet the requirements of ZAMP. It created the urgency to improve water quality in the entire potable water service area. The elite housing area is considered to be able to pay more for improving the quality of potable water services. However, improving potable water services certainly has an impact or risk. The risk analysis of potable water services with KPBU concept was assessed using a risk mitigation method that referred to the drinking water sector matrix of PT. Penjaminan Infrastruktur Indonesia. Risk analysis included identification, assessment, allocation, and mitigation. Based on the analysis, risks could be managed at pre-construction, construction, and operations stages by the party that would be able to manage to implement appropriate strategies based on the identification of risks that might happen.

Community Empowerment Based on Religious Ecology Leading to Sustainable Agricultural Development (A Case Study of Isy Karima Islamic Boarding School in Karanganyar, Central Java)

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Abstract. A community is a collection of human beings whose humanity can be built through understanding, and through a progressive religious awareness of their social structure. The purpose of this research is to describe the community empowerment carried out by Isy Karima Islamic Boarding School based on religious ecology. The research method is qualitative descriptive, and the data are people's written or spoken words and observed behavior. The research approach is based on sociological and anthropological paradigms. The data analysis begins by arranging the data and organizing it into patterns, categories, and basic units of description. The data reduction is carried out using a coding analysis in the form of conceptualization or assigning new names to the explanation of informants. The results of the research show that the religious ecology developed by the Islamic boarding school is proven to be successful in inspiring members of the community to develop their self potential.

The Effect NAA and Coconut Water Combination on Garlic (*Allium sativum* L.) Tissue Culture

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Abstract. Planting garlic with tissue culture can produce more plants. One of the factors that affect plant growth is a growth regulator. The purpose of this research is to determine the effect of NAA and coconut water on garlic growth. This research used Completely Randomized Design of two factors. The treatment used is NAA with concentrations of 0 ppm, 0.5 ppm, 1 ppm, 1.5 ppm, and coconut water concentrations of 0%, 10%, 20%. The variables observed were shoot emergence time, root emergence time, number of shoots, number of roots, number of leaves, shoot height, root length, and number of plantlets. The result of the research showed that the addition of a single factor of 0.5 ppm NAA resulted in the fastest root emergence time. The combination of 0.5 ppm NAA and 20% coconut water produced the highest number of leaves. The addition of 1 ppm NAA and 20% coconut water produced the longest shoot height. The addition of 1.5 ppm NAA and 10% coconut water resulted in the highest number of plantlets.

Replacement of KCl With Organic Fertilizer on Cultivation of Porang (*Amorphophallus muelleri* Blume) Under Sonokeling Stands

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Abstract. KCl fertilization is generally done to increase the productivity of porang tubers, but the continuous use of KCl can degrade soil fertility. Based on this, KCl needs to be replaced with organic fertilizer. This research aims to determine the effect and replacement of KCl with organic fertilizer which caused the highest porang yield. The research was held in BKPH Pojok forest area on March-July 2020. The research was using RCBD one factor. This treatment was the replacement of KCl with organic fertilizer with percentage 100:0%, 75:25%, 50:50%, 25:75%, 0:100%, and control in 4 replications. Observation parameters included fresh weight, storage weight, diameter, thickness, and chip weight of tuber. The data were processed by using ANOVA 5% and DMRT 5%. The results showed that organic fertilizer was able to replace the role of KCl and the usage of KCl and organic fertilizer was selected based on the highest yield that appeared with the same percentage (50% KCl : 50% organic fertilizer).

The Impact of ZA Substitution with Organic Fertilizer Through Red Ginger's Growth and Yield in Mixed Cropping with Maize and Cassava

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Abstract. The aim of the study was to obtain partial or complete replacement of N in ZA fertilizers with organic fertilizers without reducing, and even increasing yields in the context of sustainable agriculture in mixed crops with maize and cassava. The research was held in Wonorejo Village, Karanganyar, Indonesia on March-August 2020. The research was using RCBD one factor, four treatments, six replications, namely Control, 100% ZA, 50% ZA + 50% organic fertilizer, and 100% organic fertilizer. Data analysis using ANOVA and DMRT 5%. The result showed that 100% organic fertilizer influence significantly on height of plants, number of leaves and saplings, fresh and dry straw weight, dry weight save of rhizomes, maize kernels, and cassava tubers. Mixed crops are more efficient in land use than monoculture crops ($LER > 1$), but not in time period from planting to harvest ($ATER < 1$). Subsistence farmers are suitable to apply mixed crops because its more profitable in terms of food needs fulfillment.

Subtitution of Za with Organic Fertilizer on Monoculture Red Ginger

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Abstract. This research was aims to get the role of the nitrogen and the role of substitution synthetic nitrogen with organic nitrogen on red ginger cultivation. The research was conducted from March to September 2020 at Wonorejo, Jatiyoso, Karanganyar. The research was carried out using randomized complete block design (RCBD) with 1 factor, 4 treatment, and 6 repetition namely P0 (Control), P1(30 g/m² ZA), P2(15 g/m² ZA + 199.3 g/m² organic), and P3(398.7 g/m² organic). The data will be analyzed using analysis of variance and continued with DMRT level of 5% if there is a significant difference. The result showed that the substitution of ZA fertilizer with organic fertilizer could increase the yield of red ginger cultivation and the use of organic fertilizer with 398.7 g/m² could increasing number of leaves, number of saplings, fresh and dry straw weight, weight of fresh and storage rhizomes, and the length of rhizomes.

Contribution of Bearing Capacity of Land Based on Engineering Geology in Regional Spatial Policy (A study in Semarang City)

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Abstract. The bearing capacity of land is one of the main determining factors for the bearing capacity of the environment, called the supply capacity for the allocation of space utilization, which is determined from the stability of the soil mass forming the expanse of land, namely the geological characteristics of the soil engineering. The bearing capacity of land for the use of space has been based on the land capacity for agriculture and the physical land. There are important things not included in the criteria, namely the land capability in terms of engineering geological characteristics.

Research on the bearing capacity of land based on engineering geology characteristics was carried out in Semarang City-Central Java-Indonesia, by drilling and DCP at locations scattered in the Semarang City area. Soil samples from the drill were analyzed for soil characteristic parameters in the laboratory. The data distribution of the bearing capacity of the land and the zoning of the land material was obtained, then a Map of the Distribution of the Bearing Capacity of the Environmental Land of the City of Semarang was compiled. The range of environmental land bearing capacity in Semarang City is $0.201 \text{ kg/cm}^2 - 14,248 \text{ kg/cm}^2$, the range of decline is $0 \text{ cm} - 247.728 \text{ cm}$, the range of decline is $0 \text{ years} - 5.147 \text{ years}$. This writing is intended to contribute ideas to Spatial Planning policy, especially related to the aspect of land bearing capacity based on engineering geology as a determinant of land capability, as well as an instrument for evaluating spatial use, and the basis for formulating a framework of reference for regional development policies.

Soil Fertility Index of Organic, Semi-Organic and Conventional Rice Fields on 3 Different Soil Types

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Abstract. In Indonesia, there are various types of soil. Every soil type has different properties and characteristics as a result of its forming and uses factors. The nature and characteristics of soil formed in paddy fields affect the fertility status of soil on rice fields. In Indonesia, there are three management systems, namely organic, semi-organic and conventional. The research aims to determine the fertility index of paddy fields with different management systems (Organic, Semi-organic, Conventional) on several soil types (Vertisol, Ultisol, Inceptisol). Each combination of the management system and soil type is taken 3 soil sample points as a replay so that 27 soil samples are obtained. The soil parameters analyzed were pH H₂O, N-total, available-P, available-K-, exchangeable-Ca, exchangeable-Mg, Soil Organic Carbon (SOC), Aluminum Saturation, Cation Exchange Capacity (CEC), Base Saturation (BS). The soil fertility index is determined based on an indicator of selected chemical properties called the Minimum Soil Fertility Index (MSFI). Data analysis uses Pearson's Correlation Analysis and Principal Component Analysis (PCA) to determine MSFI. MSFI values are derived from indicators that have high scores on correlation analysis and PCA. The results showed that the fertility index value of paddy fields from 3 types of soil ranged from 0.46 to 0.57. Vertisol rice fields have the highest Soil Fertility Index value (0.57) and significantly different from Ultisol and Inceptisol rice fields. The organic management system is the best management because it has a higher soil fertility index value (0.54). Vertisol rice fields with an organic management system with a soil fertility index value of 0.57 are the most ideal rice field management system.

Yield Trials of Black Rice Cempo Ireng M7 Generation of Gamma-Ray Irradiation

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Abstract. Black rice is one of the functional foods because of its high anthocyanin content. The weaknesses of black rice cultivation are long plant age (± 150 days), high habitus, and low productivity (± 5 t/ha). One way to overcome this problem is to mutate plants using gamma-ray irradiation. The research aims to produce superior mutant plants with abundant yields. The research was carried out from December 2019 to August 2020 by arranging three lines in plots. The data were analyzed descriptively and compared with the control using the T-test. The results showed that the mutant plant was superior to black rice without irradiation (control). Line 8 and line 51 are the lines that have the shortest harvest age and are relatively early. The expected line that has the highest productivity value (per hectare) is line 51, which is 8.45 tons/ha. Line 44 has the highest average anthocyanin content of 75.10 ppm.

Paper ID: 61

EIA in Developing Countries: How Does Environmental Impact Assessment (EIA)/(AMDAL) Support Neoliberal Mining? (A Case Study in Indonesia)

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Abstract. Amdal regulation on mining exploitation according to Law No. 32 of 2009 aims to protect and manage the environment properly. This research reveals the paradox of EIA at the micro level (a case study) supporting the neoliberal agenda and facilitating economic development. This study aims to explore how the practice of compensation for agricultural land at the scoping stage in the preparation of mining Amdal documents. The research was conducted in Mulawarman village, Kutai Kartanegara district, East Kalimantan province in the period 2004-2013. Historically, in the 2004-2013 period, Kutai Kartanegara Regency was the most massive in issuing mining business permits in Indonesia. The results of the study indicate that there is weak legal protection for agricultural land owners and unequal negotiation practices between companies and land owners without government supervision. The practice of compensation is a development tool rather than an environmental protection tool.

The Role of Health Cadres to Increase Housewives' Knowledge, Attitude and Intention Toward Medicinal Plant Cultivation and Usage at Kedungjati, Grobogan, Central Java

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Abstract. The communities need correct information about the use of medicinal plants. This study was conducted to analyze the role of health cadres on the increase of knowledge, attitude, and intention of housewives in cultivating and using medicinal plants. A quasi-experimental design was conducted involving 120 participants. They were selected by the purposive sampling method and divided into two groups. The treated group received counseling from cadres, and control group with no cadres involved. Comparative analysis of evaluation time carried out by repeated Anova and Friedman, and of groups by Wilcoxon and paired t-test. Each group reported significant differences of knowledge between before and after intervention ($p=0.01$; $\alpha=0.05$). The treated group showed a significant difference in intention ($p=0.01$; $\alpha=0.05$). There is a significant difference of knowledge between both of groups ($p=0.03$; $\alpha=0.05$). Cadres helped increase participant's knowledge and intention in the three-month evaluation.

Local Government Policy and Reducing the Use of Plastic Bags (a case study of Banjarmasin City Government Policy)

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Abstract. This study aims to determine the implementation of Banjarmasin city government policies in reducing the use of plastic bags in traditional markets in the city of Banjarmasin. This study uses a qualitative approach with a descriptive analysis method. The data collected through interviews with the Head of the Sanitation and Waste Management Office of the Banjarmasin City Environmental Service as a key informant. To complete the data, both sellers and buyers in the markets of Pandu and Teluk Dalam Banjarmasin City were also interviewed. The results showed that in terms of communication and transmission, the policy was implemented through a socialization program. The socialization program has been implemented in almost all markets owned by the Banjarmasin city government. Through the socialization program, it was found that the implementation of the policy was clear and consistent. The apparatus of the Banjarmasin City Environmental Service is the human resource involved in implementing the policy, while other resources in the form of budget sources are sourced from the Banjarmasin City Regional Revenue and Expenditure Budget. In terms of disposition, policy implementers are committed to carrying out their duties properly and democratically. In terms of bureaucratic structure, policy implementation is guided by the existing Standard Operating Procedures. However, implementation constraints still exist, such as public response as well as their understanding of the benefits of the policy to reduce the use of plastic bags.

Analysis of Factors Influencing the Marketing Margins of Cassava (*Manihot esculenta*): A Case Study in Wonogiri Regency, Indonesia

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Abstract. Cassava is a food crop commodity that has good prospects for increasing farmers' income and developing agro-industry as a source of foreign exchange. The objectives of the research are (1) to examine the pattern of marketing channels, (2) to analyze marketing efficiency, (3) to analyze the factors that influence the marketing margin of cassava in Wonogiri Regency. The research method was designed as a survey, one sub-district was taken proportionally with the highest production and productivity level which Ngadirojo District was selected. Respondents were taken by farmers and traders by random sampling in amounts of 60 respondents were taken. The snowball sampling method was used to determine the pattern of cassava marketing channels. The data used are primary data and secondary data. The data analysis method used econometrics with multiple linear regression models analyzed using the least squares (OLS) method. The results showed that there were 4 marketing channels for cassava. Channel IV is the channel that has the highest efficiency with a farmers' share of 46.30% and a marketing margin of 53.70%. Factors that affect the marketing margin of cassava in Wonogiri Regency are the variable marketing costs, the price of cassava at the farmer level, and the number of marketing institutions significantly at the 95% confidence level and the adjusted R² value of 62.5%. This research concludes that there are 4 marketing channels for cassava in Wonogiri Regency, the most efficient marketing channel is channel IV. The marketing margin of cassava is influenced by marketing costs, the price of cassava at the farmer level, and the number of marketing institutions with the dominant factor being the number of marketing institutions. Research suggestions are needed to establish cooperatives to reduce marketing costs while providing added value for cassava and cassava farmers' income.

Morphological Characterization of Pachira (*Pachira aquatica* Aubl.)

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Abstract. Pachira is one of the plants that has a fairly high and promising selling value. Characterization of morphological properties is important so that the pachira (*Pachira aquatica* Aubl.) germplasm is more efficient. This study aims to study and characterize diversity and kinship in order to obtain information about the characteristics of pachira groupings. Pachira characterization includes qualitative and quantitative characters. Analysis of kinship using the UPGMA method. The results showed that the level of diversity in the morphological characters of pachira 3 districts in East Java reached 0.33. The results of the kinship analysis obtained 4 clusters with a coefficient of 0.74. Group A consisted of samples P1, P3, P15, P4, and P12. Group B consisted of samples P2, P8, P7, P11, P5, P9, P18, P13. Group C consisted of samples P6, P10, and P14. Group D consisted of P16 and P17.

Online Game-Based Learning on Climate Change: Innovation in the Internationalization of Higher Education

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Abstract. Education for Sustainable Development (ESD) is essential for achieving SDG's goals, including goal 13: take urgent action to combat climate change and its impact. Game-based learning is a promising cutting edge innovation in learning methods. Nevertheless, the internationalization of higher education demanding more technology utilization to enable transnational classes. This study provides a SWOT analysis of the online game-based learning (OGBL) method on climate change issues. Based on the PRISMA guidelines, this study concludes that OGBL has more strengths and opportunities than weaknesses and threats. Strength factors namely flexible, engaging, and enhance the learning process. Opportunities such as emerging academic community and events, developing new professions, and abundance of the development areas. However, there is complexity in game development as a weakness. The varieties of technology savviness levels among facilitators and users and the digital divide are threats to OGBL.

Analysis of Chili Farming in Indonesia

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Abstract. *Horticultural crops are one of the most prominent national income supporters in Indonesia. Chili is one of the vegetable commodities that have excellent and promising business opportunities. The need for chili continues to increase every year in line with the increasing population and the development of industries that require chili raw materials. This study aimed to determine the number of costs, revenues, and profits and determine the efficiency of chili farming in Indonesia. The basic research method used in this research is descriptive and analytical. This study was carried out by using survey techniques with a simple random sampling method. The method of analysis used is the analysis of costs, revenues, income, farming profits. The results showed that the chili farming business obtained an income of Rp. 114,510,523.99. The costs incurred are Rp. 41,120,740.16 per growing season so that the income is Rp. 91,905,415.11 and a profit of Rp. 73,389,783.83. The R/C ratio of 2.78 indicates that it has been efficient.*

Hayami Method Application: A Value-Added Analysis of Rice Crackers Industry in Ex-Residency of Madiun

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Abstract. This study aims to determine the value added of rice processing into rice crackers in the Ex-Residency of Madiun, East Java. Three areas (Ponorogo Regency, Magetan Regency and Madiun City) well-known as rice crackers producers are chosen as location. The sample in this study is selected purposively. The result shows that the average value added per raw material is Rp 2,210.57/kg with raw material used is 946.67 kg/month, in average. Using the Hayami method, the average value added is Rp 14,206.33 per working hour. Rice crackers SMEs are advised to continue to improve efficiency, especially in terms of cost and the use of raw materials to further increase the value added.

Paper ID: 73

Eco-Friendly Materials in Interior Design of Pecel Solo Restaurant

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Abstract. In Indonesia's major cities, as well as in Solo, the phenomenon of the growth of restaurants with concepts that present the atmosphere of the past is growing. Pecel Solo Restaurant was chosen because, in addition to being a one-of-a-kind building in Solo, it also has a touch of Javanese ethnic. A research that will be observed in the study is how to use ecologically friendly materials in the interior of the Pecel Solo Restaurant. The use of environmentally friendly materials in space-forming elements and space fillers is the focus of this research. This research uses a descriptive qualitative approach with case study methods, with analysis departures from field observation data that pertains to the appearance of the interior. The research found that using environmentally friendly materials in the interior design of Pecel Solo Restaurant is a style of sustainable interior design. The research is also intended to serve as a model for using environmentally friendly materials in restaurant interior design.

Disease Intensity of Moler and Yield Losses of *Shollot cv. Bima* Caused by *Fusarium oxysporum f.sp. cepae* in Brebes Central Java

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Abstract. Brebes Central Java is one of the central production of shallot in Indonesia. In the latest years, shallot farmers in Brebes face a new problem in their production, that is the increasing attack of *Fusarium oxysporum f.sp.cepae* (FOCe) causing moler disease. Based on previous survey to respondents farmers found data that the most common variety planted by the farmer in Brebes is cv. Bima, disease intensity can reach 60% with yield losses over 40%. The field data however are still very limited both related to disease intensity and yield losses caused by the pathogen. This paper reports the occur of disease intensity of moler and its co-relation to yield losses based on the results of direct assessment on the field of shallot planting in Brebes. The data were founded through disease assessment and yield of 30 planting samples of shallot distributed in seven subdistricts in Brebes. Yield losses were assessed by using yield of shallot plantings with no moler disease for base line. The results shows that the disease intensity of moler is vary from no diseases to 75% and significantly effect to yield losses. Same shallot plantings are still free from moler disease with zero% of disease intensity. Possibly the land where no moler disease is a disease suppressive land, so interesting to further study.

Factors Affecting the Demand of Native Chicken Eggs in Surakarta City

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Abstract. Native chicken egg is one of the animal proteins sources to meet the need for protein. This study analyzes what factors influence the demand for native chicken eggs in Surakarta City and examine the elasticity of demand for native chicken eggs in Surakarta City. The primary method of research is descriptive. This research was conducted in Harjodaksino Market, Jongke Market, Legi Market, Gede Market, dan Sangkrah Market. This study carried out the research location selection purposively and used 100 respondent end consumer of native chicken eggs. The data analysis method used is multiple linear regression. The result showed that factors that influence the demand for native chicken eggs in Surakarta City are native chicken eggs prices, purebred chicken eggs prices, duck egg prices, native chicken meat prices, purebred chicken meat prices and rice prices. Price elasticity indicates that the demand for native chicken eggs is elastic. Cross elasticity showed that purebred chicken eggs, duck eggs, and native chicken meat are substitute goods for native chicken eggs. In contrast, purebred chicken meat dan rice is the complementary goods for native chicken eggs.

Paper ID: 77

Swamp Thing Case Study as A Fictional Character Design in Popular Culture for Environmental Conservation Efforts

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Abstract. The spirit and the green movement are global issues that voice about environmental conservation efforts. Through approaches and media from popular culture, comics are used as product icons to convey the issue. Comic consumers are mostly the younger generation. Inside there is a character design that serves to represent a certain message. This research uses a case study method on Swampthing comics with a semiotic approach, the analysis used is a denotative and connotative analysis and intertextuality, especially in character design. The result of this research is the approach of a scary superhero character as a messenger of environmental conservation. The parameters of the effectiveness of character design are seen from the sustainability and development of media that raises the content of the character.

Food Security Analysis Based on The Proportion of Food Expenditure and Energy Consumption of Carrot Farm Households in Tawangmangu Karanganyar

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Abstract. Food security is reflected in two indicators, the level of energy intake and the proportion of household food expenditure (PFE). In 2015, the Tawangmangu sub-district in Karanganyar, Central Java, experienced a rice deficit, causing rice prices to hinder food access. It affects the food expenditures of carrot farm households in the Tawangmangu sub-district. The income of carrot farmers, which is highly unpredictable, affects nutrition's fulfillment to determine food security. This study analyzes PFE, energy and protein consumption, and food security of carrot farm households in Tawangmangu, Karanganyar. The number of respondents in this study was 40 carrot farm households, and the sampling method used the accidental sampling technique. The data analysis method in this study used household income and expenditures, PFE, food consumption, and food security. The results showed that the average PFE of the household was 46%. The average consumption of energy and protein is 1.718 kcal/person/day and 56 grams/person/day with 80% level energy intake and 94% protein intake. The distribution of household food security conditions are 52,2% food secure; 5% food vulnerable; 40% food less secure; and 2,5% are food insecure.

Effectivity by Adding Some Types of Organic Manure on Red Ginger (*Zingiber officinale* Rosc. var. *rubrum*)

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Abstract. Potential production of red ginger was about 22 tons Ha⁻¹ within export volume up to 3.000 tons in 2018 and completely different to production yields, which decreased every year. The aim of this study was to determine the type of organic fertilizer that is effective to increase growth and yield of red ginger. The research was conducted in the Jatiyoso, Karanganyar in March-August 2020 with one-factor RCBD and five treatments, it is T0 (Control), T1 (Marketed Manure), T2 (Cow Manure), T3 (Goat Manure), and T4 (Chicken Manure). The results showed that the growth of red ginger in terms of plant height, number of tillers, number of leaves and weight of fresh and dry straw tended to be higher in goat manure but not significantly different from chicken manure and marketed manure. The yield of fresh rhizome weight with goat manure 10.338 tons-1, and storage rhizome weight of 9.168 tons-1 was the highest yield although it was not significantly different from chicken manure and marketed manure.

Study of Manure Type and Soil Type on Moringa Seed Growth (*Moringa oleifera* L)

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Abstract. Moringa (*Moringa oleifera* L.) Is a type of plant that is easy to grow in tropical areas such as Indonesia. The use of moringa plants in Indonesia is currently still limited. The research used a completely randomized design (CRD) consisting of 2 factors arranged factorially. The first factor consists of 3 kinds of levels, namely as follows: Latosol Soil, Andosol Soil and Grumosol Soil. The second factor consists of 3 different levels, namely as follows: Cow Manure, Goat Manure and Chicken Manure Based on these two treatment factors, 9 treatment combinations were obtained which were repeated 3 times, so that 27 experimental units were added. with 3 soil control treatments. The results showed that giving soil treatment had an effect on plant height. Fertilizer treatment had an influence on plant height variables, plant shoots appeared and fresh weight of stover. The interaction between fertilizer treatment and soil has an effect on plant height variables. Latosol soil and goat manure treatment was known to get better results on the variables of plant height, stover wet weight, and stover dry weight.

Strategy of The Orchard Agro-tourism Development in Rasau Jaya Tiga, Kuburaya

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Abstract. This objective of this study was to make strategies of the orchard Agro-tourism development of Edupark RJ-3. The study was conducted in Rasau Jaya Tiga, Kuburaya. This study was important in order to develop the agro-tourism well and to make it interesting tourism object. The data were analyzed with SWOT analysis. The data were collected through interview and field survey. The samples were determined using Snowball, an approach used to identify key informants who have much information. The first contact helped to find other respondents through recommendations. The results showed that the orchard agro-tourism development was at quadrant I. This meant that the management need to utilize their whole power to seize and use the opportunities (Growth Oriented Strategy). It was recommended that the management of Edupark RJ-3 make the development based on the result of this study.

Income and Feasibility Analysis of Rice Farming in Sub Watershed Keduang, Wonogori Regency, Central Java

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Abstract. This study aimed to determine the income and feasibility of lowland rice farming in the Keduang Watershed Wonogiri. The location and respondents determination method used in this research was purposive sampling. The number of respondent farmers taken in this study was 90 respondents from 3 districts located in the Keduang Watershed, which are Sidoharjo, Jatisrono, and Jatipurno districts in Wonogiri Regency. Data collection techniques were observation, interviews, and recording. The total cost of farming is Rp. 20,773,581/Ha/Year with the average variable cost of Rp. 19,807,381/Ha/Year and the average fixed cost of Rp.966,200/Ha/Year. The average revenue is Rp.29,464,858/Ha/Year, and the average income is Rp.8,691,277/Ha/Year. R/C ratio of 1.42 indicates that lowland rice farming is feasible.

Analysis of Marketing Efficiency of Shallot (*Allium ascalonicum* L.) in Karanganyar Regency

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Abstract. Shallots are one of the high-value horticultural commodities so that many farmers cultivate them, especially in Karanganyar Regency. The research aimed to analyze the marketing efficiency of shallot. The location was chosen purposively in Karanganyar regency, Central Java. The sampling method used is the snowball sampling method, which consisted of farmers, collectors, traders, and consumers. Samples in this research are 120 shallot farmers with questionnaires. The data analysis method used in this study consists of descriptive marketing funnel analysis, marketing margin analysis using the cost, profit, and marketing margin formula calculations, marketing efficiency analysis economically using marketing margin percentage and farmer's share. The results of this study indicate that there are four marketing funnels for shallot, (1) Farmers - market traders - retailers - consumers (2) Farmers - collectors - market traders - retailers - consumers (3) Farmers - collectors - market traders outside the city - consumers outside the city (4) Farmers - collectors outside the city - consumers outside the city. Based on the farmer's share value results, the most efficient in this study was marketing funnel four. It has the highest farmer share value of 88,83% and occurs when shallot farmers sell products directly to final consumers. Farmers are better off offering shallots that are ready to be sold to the final consumer, so the price offered can be high.

Chemical Characters of Disease Suppressive and Conducive Soil of Moler on Shallot in Brebes, Central Java

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Abstract. In the latest years, a disease epidemic of Moler caused by *Fusarium oxysporum* f.sp. *cepae* have just occurred in Brebes Central Java. The disease intensity however is variation between the shallot production lands. Some lands show suppressive with disease intensity lower than 5% and some the others are conducive with disease intensity over 50%. It is interesting that in Brebes occur suppressive and conducive soil to moler disease. It is possible that the suppressiveness is determined by environmental condition including chemical soil characters. This paper reports chemical character of suppressive and conducive soil to moler disease in Brebes. The evident shows that the suppressive soil is more fertile than those conducive one. The suppressive soil is chemical characterized by significant higher organic mineral, C-organic, P-available, K-exchangeable, and Cation Exchange Capacity than those conducive one.

Dynamics of nutritional food consumption and expenditure patterns of Central Java population as welfare indicators to achieve sustainable development goals

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Abstract. This study aims to determine the dynamics of Central Java population welfare by looking at the pattern of expenditure and the nutrition and food consumption level. The data used is data on the expenditure and consumption of the Central Java population in 2016-2020. The data analysis method used is descriptive analysis. The study of expenditure patterns shows that during the period 2016-2020, the Central Java population welfare is increasing. Still, residents of rural areas are less prosperous than residents of urban areas. The welfare increasing is also shown by decreasing in the grains group consumption. The analysis of the nutritional consumption level shows that increased from 2016-2018 and decreased in 2019-2020. The level of energy consumption is categorized as sufficient and protein consumption level is categorized as good. However, energy consumption in rural areas is higher than in urban areas; conversely, protein consumption in urban areas is higher than in rural areas.

The Influence of IBA Application on Seedling Growth of 3 Types of Awar-awar (*Ficus septica*) Cuttings

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Abstract. Awar-awar (*Ficus septica*) is a medicinal plant in the Moraceae family that has a potential to be developed as an anticancer agent. This plant naturally grows scattered in all areas of Indonesia from the lowlands to an altitude of 1,500 m above sea level. Awar-awar cultivation requires technology to provide quality seeds in a fast time, because propagation due to long duration in seed formation. Research on the use of IBA at various ages of awar-awar cuttings was carried out to obtain quality awar-awar seedlings. IBA was given with concentrations of 0 (control), 100, 200 and 400 ppm on awar-awar cuttings derived from the shoots, the middle of the stems and the basal, each measuring 20 cm. A completely randomized design (RAL) is used and data were analyzed by F test (ANOVA) with a confidence level of 95%. Any significant differences among treatment followed with Duncan test at = 5%. The results showed that the growth of various awar-awar cuttings was only 65% on average, with the highest growth percentage from shoot cuttings. The highest number of shoots, longest shoots, and the largest root weight were obtained from the 200 ppm IBA treatment. This study concluded that the stem cuttings method with 200 ppm IBA was able to produce better awar-awar seedling growth than control.

AlexNet Convolutional Neural Network to Classify the Types of Indonesian Coffee Beans

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Abstract. Various types of Indonesian coffee are already popular internationally. Recently, there are still not many methods to classify the types of typical Indonesian coffee. Computer vision is a non-destructive method for classifying agricultural products. This study aimed to classify three types of Indonesian Arabica coffee beans i.e. Gayo Aceh, Kintamani Bali, and Toraja Tongkonan using computer vision. The classification method used was the AlexNet convolutional neural network with sensitivity analysis using several variations of the optimizer such as SGDm, Adam, and RMSProp, as well as the learning rate of 0.00005 and 0.0001. Each type of coffee used 500 data for training and validation with the distribution of 70% training and 30% validation. The results showed that all AlexNet models achieved a perfect validation accuracy value of 100% in 1040 iterations. This study also used 100 testing-set data on each type of coffee beans. In the testing confusion matrix, the accuracy reached 99.6%.

Comparison of The Effectiveness of Phostoxin Fumigants for Controlling Insect Pests Warehouse *Lassioderma serricorne* and *Pholcus phalangioides*

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Abstract. Insects warehouse pests contained in commodities, especially tobacco can cause a decrease in the quantity and quality of commodities. The main pest insects found in tobacco storage warehouses are *Lassioderma serricorne* and *Pholcus phalangioides*. This study aims to analyze and compare the effectiveness of the use of phostoxin fumigants to control insect pests *Lassioderma serricorne* and *Pholcus phalangioides*. Methods used in this study include preparation of test insects, application of fumigation, identification, calculation of mortality, and analysis of data. The data was analyzed using one way ANOVA test. The results showed that there was a significant difference in morphility between groups of test insects. The highest mortality in the group of test insects *Lassioderma serricorne*. This indicates that phostoxin fumigants are very effective in controlling barn insect pests especially *Lassioderma serricorne*. For the control of insect pests warehouses in the future, it is recommended to use biopesticides, in order to be safer for food.

Comparison of The Effectiveness of Fumigant Storin to Control Insect Pests Warehouse *Lassioderma serricorne* and *Pholcus phalangioides*

N Subekti*, M A Syahadan and R R Milano

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Abstract. Insects warehouse pests contained in commodities, especially tobacco can cause a decrease in the quantity and quality of commodities. The main pest insects found in tobacco storage warehouses are *Lassioderma serricorne* and *Pholcus phalangioides*. This study aims to analyze and compare the effectiveness of the use of fumigant storin to control insect pests *Lassioderma serricorne* and *Pholcus phalangioides*. Methods used in this study include preparation of test insects, application of fumigation, identification, calculation of mortality and analysis of data. The data were analyzed statistically using the One Way ANOVA test. The results showed that there was a significant difference in morphility between groups of test insects. Mortality is highest in the *Lassioderma serricorne* test insect group. This indicates that fumigant storin is very effective in controlling barn pest insects especially *Lassioderma serricorne*. For the control of insect pests warehouses in the future, it is recommended to use

Self Reliance of Ornamental Plants Agribusiness Actors during the Covid Pandemic in Surakarta

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Abstract. The government's appeal to reduce activities outside the home as an effort to prevent the transmission of Covid-19 has disrupted various sectors. However, unlike ornamental plant agribusiness actors in Surakarta, this condition has a good impact on some ornamental plant agribusiness actors in Surakarta. This study aims to describe the ornamental plant agribusiness actors and analyse the independence of ornamental plant agribusiness entrepreneurs as a result of the Covid-19 pandemic in Surakarta. Informants in this study were determined by snowball. The method of data collection is done by in-depth interviews and observation. The results showed that there were ornamental plant agribusiness actors who were able to survive in the midst of a pandemic and some even developed well, because their sales turnover increased.

Effectiveness of Giving Organic Fertilizer with Different Doses on The Growth and Yield of Red Ginger (*Zingiber officinale* var *rubrum*)

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Abstract. Red ginger has not been cultivated intensively so that there was a production decrease in 2018 of 4.24% from 2017. The increase in red ginger cultivation can be done by fertilizing organic fertilizers. This study aims to obtain an effective dose of organic fertilizer in increasing the growth and yield of red ginger. The research was carried out from March to October 2020, at the UNS experimental area in Wonorejo Village, Jatiyoso with an altitude of 778 masl. The study was conducted using a randomized complete block design (RCBD) with 1 factor and 5 treatments it is P0 (control), P1 (dose 1 kg/m²), P2 (dose 1.5 kg/m²), P3 (dose 2 kg/m²), and P4 (dose 2.5 kg/m²). The results showed that the application of organic fertilizer had an effect and the effective dose of organic fertilizer in increasing the growth and yield of red ginger was a dose of 2 kg/m².

Household Food Security of Rainfed-Rice Farmers in Sragen District to Achieve Sustainable Development Goals

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Abstract. Goal 2 of the Sustainable Development Goals is Zero Hunger or ensure food security in the world. This study aims to determine households' food security in Sragen District using descriptive and analytical methods with survey techniques. The research was conducted in Gemolong Sub-district, Sragen District. The determination of village samples is done deliberately (purposive) with consideration of the largest rainfed rice fields. The data analysis used is the analysis of energy consumption and household food security. The results showed that the energy consumption of farmers' households amounted to 6,041 kcal/day with an adequacy rate of 5,368 kcal/day, then obtained energy consumption rate of 113% and classified in the category of high level because energy consumption rate $\geq 100\%$. Household food security conditions showed that 53.33% were food resistant households and 46.67% were food vulnerable. Increasing the amount of production and household income by optimizing drill wells to ensure water availability or procurement of seeds resistant to rainfed rice field can address food vulnerable situations.

A Better Understanding of Gender Mainstreaming in Environmental Policies

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Abstract: Public policies are made to solve public problems. A problem can be said to be a public problem if reality and expectations are different. Women and men have the opportunity to participate in gender equitable development. One of the key components for the successful implementation of Gender Mainstreaming is the formulation of gender-responsive policies, namely policies that are able to respond to differences in experiences, aspirations and needs between women and men. This article discusses the importance of gender mainstreaming policies and innovations carried out by the Secretary General as a driver institution for gender mainstreaming, realizing gender equality and justice within the Ministry of Environment and Forestry (MoEF). It is a descriptive qualitative research with respondents from Policy Makers in the Secretary General of MoEF with purposive sampling. The data were collected through questionnaires, focus group discussion. Data were analyzed using a systematic literature review (SLR) model. Secretary General of MoEF has attempted to initiate gender mainstreaming into activities organized by the Ministry of Environment and Forestry. Starting from having a gender policy through the Regulation of the Minister of Environment and Forestry Number P.31/MENLHK/SETJEN/SET.1/5/2017, to the innovations carried out by driver institution, for example, Story Telling about gender mainstreaming in 2020th, and the Gender Festival held in 2021. Innovations are tangible evidence from the MoEF to realize gender equality and justice from the site level to Echelon I. Conclusion of this article is that gender mainstreaming policies are important for incorporated into the MoEF's environmental and forestry policies.

Neuro-Fuzzy Humidity Control for White Oyster Mushroom in a Closed Plant Production System

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Abstract. Oyster mushrooms grow optimally in relative humidity of 80 - 90%. Indonesia as a tropical country is very suitable for oyster mushroom cultivation, but relative humidity must be controlled. The usual effort is ineffective, by spraying water to mushroom inside kumbung (mushroom cultivation building) every morning and evening. A building called a Closed Plant Production System (CPPS) equipped with a control system needs to be developed as a solution. The purpose of this study was to design and do a performance test of a Neuro-Fuzzy-based relative humidity control system inside CPPS for white oyster mushroom (*Pleurotus ostreatus*) cultivation. The main components consist of ArduinoMega 2560 microcontroller, SHT11 sensor, and diaphragm pump connects with mist nozzle as an actuator. The performance test was carried out by running a Neuro-Fuzzy control system and giving disturbance inside the CPPS room. As a result, this control system was able to reach a steady-state condition within 5 minutes. The highest relative humidity error was 0.73% and the lowest error was 0.09%. The recovery rate of relative humidity inside CPPS when its disturbed was 2.25% per minute.

Response of A Local Rice Variety Pandanwangi to Infection of Bacterial Leaf Blight, *Xanthomonas Oryzae* Pv. *Oryzae* Strain III, IV and VIII

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Abstract. Bacterial Leaf Blight (BLB) caused by *Xanthomonas oryzae* pv. *oryzae* (*Xoo*) is one of the limiting factors in rice production. A local cultivar rice “Pandanwangi” is a superior variety much preferred and cultivated by the farmers in Cianjur, West Java, Indonesia. The information about response of “Pandanwangi” to *Xoo* is still poorly understood. This paper reports the results of evaluation of “Pandanwangi” response against BLB. This research was carried out in greenhouse with artificial inoculation using *Xoo* strains III, IV, and VIII with bacterial suspension at 10^8 cfu.mL⁻¹. The results showed that response of cv Pandanwangi to *Xoo* infection was different between the strain of *Xoo*. “Pandanwangi” cultivar was susceptible to *Xoo* strain III and VIII and very susceptible to strain IV.

Historical Study of Peat Protection Policy to Prevent Forest and Land Fires in Indonesia (1990-2020)

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Abstract. This study aims to analyse the peat ecosystem protection policy in handling forest and land fires (karhutla) in Indonesia. The qualitative research method employs a historical approach, relating to the policies of the Republic of Indonesia's government, including general policies and implementation policies. The limitation of the research is for three decades, namely 1990-2020. The primary data was collected through interviews and the secondary data was collected through library research techniques and online data retrieval. The study's findings show that, although forest and land fires have been occurring for a long time, specific protection regulations only began in the early 1990s. Following that, there was a shift in policy orientation from utilization to sustainable development. Indicators of achievement of policy implementation are seen through the area of burned land and the number of fire hotspots which decreased in the last half-decade or post-karhutla in 2015 after going through policy corrections and actions, which changed the working paradigm of forest and land fire control from extinguishing prevention.

Introduction of Design Culture as Approach in Endogenous Regional Development: A Study Case in Farming Community of Sabrang Village, Central Java, Indonesia

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Abstract. Within Design Science, Design Culture is a branch focused on regional development through design principles and participatory tools designed to intrinsically understand endogenous potentials. *Designing living* is a goal/output based on recognizing regional “colour” and facilitating the community for economic sustainability, social acceptability and environmental soundness. Anthropological/ethnographic study embodied in material culture research is applied practically in *learning about life in the field* to incite curiosity and learning reflexes. In experiencing communal living, student-participants Observe-Collect-Map valuable tangible/intangible potentials (treasures), and analyse for presentations, ideate visions and co-design with local community as one of stakeholders. As an example, UNS-FSRD Design Culture Laboratory collaborates with UNS-Agriculture Faculty and GAPOKTAN Sedyo Makmur to re-develop Rojolele Delanggu Rice and community-based plantations in Sabrang Village, Delanggu.

Is Agriculture an Engine of Economic Reconstruction and Development in The Case of The Republic of Burundi?

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Abstract. Despite its importance for the economy, the agricultural sector faces many constraints that hamper its growth. Concomitantly with the increase in the world population and the demand for food production, farmers are faced with the need to produce more with less arable land. This study used the ARDL approach to model the long-term and short-term dynamics and propose examining the agricultural sector's contribution to Burundi's economic growth. Econometric estimations revealed that the gross domestic product per capita, agricultural, and exports (value-added) have long-run relationships but at different levels. The study, therefore, revealed that inflation persists in the short and long term. The consumer price of agricultural products reduces the country's economic growth. To create the conditions for sustainable agricultural development, major adjustments in agricultural, environmental and macroeconomic policy at national levels will have to be made.

The Model of Eco-Friendly Packaging Center to Increase The Competitiveness of MSMEs' Local Products

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Abstract. Packaging problem is still a weak point for Micro Small Medium Enterprises (MSMEs) This is due to the lack of understanding of MSME actors about the importance of image, quality, and packaging appearance. This research is a solution to increase the competitiveness of local MSME products in the global market with a focus on the study of identifying internal and external factors that affect environmentally friendly packaging for MSMEs, formulate a strategy to develop a packaging center, and create a model for environmentally friendly packaging development center for processed food MSME products. The Model of Eco-Friendly Packaging Center is an effort to increase the competitiveness of local MSMEs that provide services as an information center for packaging activities, a packaging material procurement center, an environmentally friendly product packaging service center, a graphic design mediator and packaging form design, and branding.

Genetic Diversity based on RAPD F2 Generation of Apple Cactus (*Cereus* spp.)

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Abstract. Apple cactus which consists of 2 types, long spines (*Cerues jamacaru*) and short spines (*C. peruvianus*) both are self-incompatible. So that only artificial crosses between species that produce fruit. But are found some fruit from natural crosses on the type of long spines. The three results of these crosses, long spines with short spines; short spines with long spines and natural crosses on long spines have produced F2 seedlings. The purpose of this study was to study genetic diversity, based on the RAPD (Random Amplified Polymorphic DNA) of the F2 seedlings. DNA isolation was carried out using Doyle and Doyle (1990) method modified on the addition of 0.045 gr Polivinilpirolidon. DNA extraction by the Doyle and Doyle method. The RAPD technique uses 3 primers: OPD-11, OPM-10 and OPN-5. Analysis of genetic diversity/similarity using Simple Mathching coefficient using NTSys 2.02 software. Based on the three primers, each F2 offspring had genetic diversity, but grouped according to the parent. Showed that the three RAPD primers were effective for markers of genetic diversity in apple cactus.

The Effect of Parental Plant and Washing Materials on Seed Germination of F2 Generation Apple Cactus (*Cereus* Spp.)

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Abstract. Apple cactus (*Cereus* sp.) is one of the genus of cactus and two species that are often crossed are long spines (*Cereus jamacaru*) and short spines (*Cereus peruvianus*). Those species have seeds with physical dormancy that is the presence of seed mucus that can inhibit the germination process. This research aims to study the effect of parental plants and washing materials on the germination of F2 apple cactus seeds. This study used two-factor RCBD using 3 parental plants of the F2 generation of apple cactus (*Cereus jamacaru* open pollination, *C. peruvianus* x *C. jamacaru*, *C. jamacaru* x *C. peruvianus*) and 5 washing materials (without washing, taps water, distilled water, pH 5, and pH 9) which was carried out in 3 repetitions. The results showed that seeds of the cross *Cereus jamacaru* as female parent (*Cereus jamacaru* open pollination and *Cereus jamacaru* x *Cereus peruvianus*) produced better germination than seeds from cross of *Cereus peruvianus* as female parent (*Cereus peruvianus* x *Cereus jamacaru*). Although the washing material didn't have a significant effect on the germination of F2 apple cactus seeds, but there was an influence of using pH 9 could minimize seed mucilage so that the extraction process was easier.

Determinants of Farmers' Willingness to Pay for Irrigation Networks Maintenance Fees: A Case Study in The Irrigation Area of The Gonggang Reservoir Magetan District

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Abstract. Participation of farmers in irrigation network maintenances is important. One of participation by farmers is in the form of regular fees. This study aims to determine the factors that affect the value of farmers' Willingness to pay for irrigation networks maintenance fees. This study was conducted in the irrigation area of the Gonggang reservoir in Magetan district. The subject is farmers that using irrigation. The sampling techniques used are purposive sampling with 114 respondents. The data collection technique used by observation, interview, questionnaire, and documentation. The data analysis technique used is multiple linear regression analysis. The result of this study showed the estimated parameter of farmer education, land area, farm production, knowledge of irrigation network maintenance fees, and land ownership are significantly affected farmer's willingness to pay.

Establishing Sustainable Habits of students in Green School Bali through Green Interior Design

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Abstract. Adopting the green concept for building as a place for human activities will be proved a sustainable environment. However, giving awareness to care about the environment through habit in the early stage of human life is more valuable. This study aims to find how green building school encourages students' behavior to be aware of their environment; and know the application of the green concept in their school. The habitus theory was used to explore how habits can be formed deliberately and how the actors in the school can create communities that are aware of the environment. It showed that the sustainable architecture and eco-environment encourage the user to be familiar with the environmental concept. Those were applying sustainable materials like bamboo as construction of the building; utilization of solar energy and biogas as electricity; recycling animal waste into fertilizer; windmills through underground tunnels as air conditioners; and organic gardening. The green concept in the school creates a green environment and encourages students to establish green concepts in their minds.

Natural Clay Dye to Develop Eco-Friendly Products Based on Regional Potential in Batik Crafts Center of Jarum Village, Bayat Subdistrict, Klaten Regency

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Abstract. This study aims to transfer technology of natural dyeing technique of tradition batik using clay extraction from Bayat, Klaten, Central Java. This is a solution to research partners' problems related to the limitations of product variation techniques to meet market preference for products with innovation or novelty elements. In detail the partners' problems include 1) Limited marketing, due to limited market access and marketing efforts for batik products, including promotion, mainly promotions for national and foreign market access. 2) Limited capital, due to low access for capital in financial institutions, especially banks, which is due to the simple management of most batik Small and Medium Enterprises/SMEs, weak guarantee to pay the debt, and business permits, 3) Prices of cloth as raw materials are getting more expensive, due to yarn price which becomes higher, 4) The variety of designs or motifs and batik dyeing are limited due to artisans' dependence on the orders from customers or batik companies, and the lack of human resources capabilities in terms of design and dyeing, particularly natural dyeing, 5) Most production equipment of batik SMEs is old, so it is risky to damage or too worn; consequently, it affects the quantity and quality of batik products. This study used experimental and trial method. The implementation of natural dyeing techniques using Bayat clay has succeeded to solve the following problems: 1) Increasing the ability of batik artisans in Bayat to easily make varied alternative natural dyes from its local natural resources to expand market share and operating profit, 2) Cost savings or efficiency for producing eco-friendly batik dyeing by utilizing abundant excellent natural resources to gain real profit for batik artisans, 3) Reduced production waste due to utilizing natural dyes by using simple Liquid Waste Final Disposal Installation for batik. The overall results of the research are expected to be the starting point for a sustainable environmentally friendly business at the Batik Craft Center in Jarum Village, Bayat, Klaten.

Food Security of Paddy Farm Households Based on The Proportion of Food Expenditure and Energy Consumption in Jogorogo Ngawi

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Abstract. Ngawi is the sixth paddy producer in Indonesia certainly has an influence on food security of paddy farmers' households. This study aims to analyze the proportion of food expenditure (PFE), energy and protein consumption, the relationship between food expenditure and energy consumption, and the condition of food security. The basic method used descriptive analytics. The number of respondents based on the slovin formula as many as 87 respondents. The sample selection used stratified random sampling. The data analysis method used correlation using SPSS 22 and cross indicator between PFE and the level of energy consumption. The results showed that average of PFE was 58.81%. The average energy consumption was 4,272.2 kcal/household/day with an energy consumption level of 81.93% while the average protein consumption was 122.1 grams/household/day lower than the average household RDA consumption. Food expenditure has a significant relationship to energy consumption with a correlation coefficient of 0.923 including a very strong and unidirectional relationship. The contribution of household food security conditions was 28.7% secure; 32.2% vulnerable; 10.3% less secure; 28.87% insecure.

Analysis of Organic Rice Contribution to Farmer Household Income in Andong Village, Boyolali Regency

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Abstract. This study aims to determine the income of organic rice farming in Andong Village, Boyolali Regency and find out how much organic rice farming contributes to household income. The method of determining the location was purposive, sampling was done by random sampling. Data analysis was carried out on farm income, non-farming income, and the contribution of organic rice farming to family income. The result of this research is that the average cost of organic rice farming is Rp. 5,989,754/ha. Revenue from organic rice farming is 29,250,441/ha. Organic rice farming income is IDR 7,900,959 per farm and 35,240,195/ha. The average income per farmer outside of organic rice farming for one season or 3 months is IDR 4,163,766 per farmer. non-farming income includes livestock, builders, as traders and others. The average farmer is Rp 12,064,725 per farmer for 3 months. The contribution of organic rice farming is 65.49%. and outside organic rice farming contributed 34.51%.

Analysis and Factors Affecting the Income of Organic Curly Red Chili (*Capsicum annum* L.) in Gedangan Village, Cepogo District, Boyolali Regency

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Abstract. This study aims to analyze the factors that affect the income of organic curly red chili farming in Cepogo District, Boyolali Regency. Sampling was done by random sampling. The results of the study are the average total cost of Rp. 5,637,058 per hectare. The average income received by farmers after the production obtained is sold per farm of Rp. 110,050,711 per hectare. The average income received by farmers per farm is Rp. 105,914,352 per hectare. Production factors that have a very significant effect on production are land area, seeds, liquid organic fertilizer and labor costs. Production factors that have a significant effect on production are land area, labor, organic fertilizer. Production factors that have a significant effect on production are pesticides.

Variation of Eurycomanone Content Within and Among Populations of *E. apiculata* A.W. Benn.

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Abstract. Information on the eurycomanone content of *E. apiculata* from natural populations in Indonesia is unknown. This study aims to assess the variation of eurycomanone content within and among populations of *E. apiculata*, to determine the correlation of eurycomanone content with environmental factors, and to determine the collections site of genetic material for the establishment of the breeding base population of *E. apiculata*. This study found that the average variation of eurycomanone content within population was 25.72%. Eurycomanone differentiation coefficient among populations of *E. apiculata* was 84.33%, indicating that the variation of eurycomanone content among populations was higher than the variation within population. Pearson correlation of eurycomanone content with population environmental factors showed no significant correlation. Based on clustering, the Rumbio population can be selected as a source of the genetic material of *E. apiculata* for breeding program in the future.

Eco-Sufism Concept in *Syair Nasihat* as an Alternative to Sustainable Development Goals (SDGs) Policy in the Environmental Sector

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Abstract. This article will examine the dimensions of Islamic spirituality (Sufism) related to sustainable environmental conservation efforts, especially those contained in the Advice (hereinafter abbreviated as *SN*). *SN* is an ancient manuscript written in Arabic script, in Malay, and contains the teachings of eco-Sufism. The eco-Sufism teachings contained in this *SN* text are more concerned with natural processes in seeking the safety of themselves and their environment. These efforts are carried out through a process of self-dynamics that is more integrative, namely humanistic-theocentric (*al-insani ar-rabbani*). The process of shifting the dynamics of this self was originally self-centered (egocentric), then slowly and gradually shifted to the community (communalistic), namely togetherness divinely, humanity, and natural. This means that all human behavior must always be directed solely to gain the pleasure of God and at the same time be oriented to provide safety and welfare for the universe, including humans and the environment in them. This is a representation of the concept of leader on earth and a real form of *amaliah* regarding the elaboration of the concept of greeting or spreading safety and welfare for the universe. Thus, the concept of eco-Sufism contained in the *SN* text is expected to be duplicated and applied in other places so that it can support the policy of Sustainable Development Goals (SDGs) in the environmental field.

Mutation Induction in The Pineapple (*Ananas comosus* L. Merr) Using Colchicine

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Abstract. Pineapple is a tropical fruit that has high economic value. Mutation is one method to increasing diversity of plant and plays an important role in plant improvement. This study aims to induce mutation in pineapple used colchicine. This study was arranged using a factorial completely randomized design, which the first factor was four pineapple genotypes, and the second factors was four colchicine concentration levels. Observation parameters included leaf shape, leaf color, plant height, number of leaves, leaf width, number of stomata, stomata length and stomata width. The results of this study showed that genotype has a significant difference on all parameters. The concentration of colchicine only had a significant effect on stomatal length. The interaction between genotype and colchicine had a significant difference on plant height and number of leaves. The conclusion of this study was that colchicine caused a decrease in plant height and an increase in leaf number and stomata length.

Philanthropic and Ecological Values in *Merti Desa Tambakbayan* Tradition of Tambakboy Village, Tawang Sari District, Sukoharjo Regency

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Abstract. The Javanese tradition is manifested in various forms, one of which is *Merti Desa Tambakbayan* tradition in Tambakboy Village, Tawang Sari District, Sukoharjo Regency. This annual tradition is a heritage to maintain culture and environmental balance. This study seeks to describe the philanthropic and ecological values in the *Merti Desa Tambakbayan* tradition. This research is a case study with objects of study in the forms of traditional events. The data sources are the *Merti Desa Tambakbayan* tradition events, documents, and interview results with informants. The obtained field facts show the existence of philanthropic and ecological attitudes in the community such as eating together and exchanging meals, as well as mutual cooperation activities to clean up the environment around the village regardless of social status. These attitudes are essentials, especially when several society members are experiencing economic difficulties due to the ongoing Covid-19 pandemic.

Urban Farming : Implementation of Prisoner Guidance in an Effort to Support Food Security Towards Rutan Boyolali Productive

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Abstract. Rutan Boyolali as an institution that organizes development activities for prisoners as a social reintegration process that aims to make them realize their mistakes, improve themselves, and not commit criminal acts again so that they can be accepted again by the community, can play an active role in development, and live naturally as good and responsible citizens. The coaching that is being carried out now leads to productive coaching. Through a productive penitentiary, prisoner can participate in national development. One of the efforts to create productive prisons can be done through agricultural activities. However, the location of the Prison which is in the middle of an urban area has the challenge of limited agricultural land. Answering these problems, the solution is to carry out the concept of urban farming. The strategy carried out by the Boyolali Rutan is to make urban farming part of the effort to create a productive prison. Through urban farming, it is hoped that prisoner can become skilled and ready to work when they are free. This concept also can be an innovation and solution in overcoming various problems in prisons. On the other hand, the benefits of urban farming are maintaining food security. The rate of urban development that eliminates agricultural land so that cities are no longer able to meet their food needs independently. Urban farming can support the availability of food and food security itself.

Mapping of Potential Soil Degradation in Nguntoronadi Sub-District Wonogiri Regency

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Abstract. Soil is the most important component in agriculture. Soil degradation caused by improper soil management, unpatterned planting and homogeneous rainfall. Mapping of potential soil degradation was a process of identifying initial conditions to determined areas that have the potential in soil physical, chemical and biological degradation. The purpose of this study to create the map of soil degradation potency. The research was conducted in Nguntoronadi sub-district, Wonogiri. The mapping method using guided qualification and assisted by Arcgis application for overlaying the maps according to standard procedures and resulting value of soil degradation potency. The results showed the soil degradation potency is slightly in 454 hectares, moderate in 5,186 hectares, and high 192 hectares. Research area was dominated by moderate to high degradation. Further research are needed to determine the actual level of soil degradation to obtain recommendations for sustainable land management.

Ethnopharmacology of *Peperomia pellucida* and Other Anti-hypercholesterolemia Medicinal Plants on Celebes Island of Indonesia

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Abstract. *Peperomia pellucida* (L.) Kunth was reported to be traditionally widely used for the treatment of gout. This study aimed to identify the utilization of *P. pellucida* and other medicinal plants used by selected traditional healers who met inclusion criteria to treat high cholesterol levels in ethnic groups of Celebes Island. Data collection was carried out through interviews, observation, and sample collection. This study revealed 67 concoction information and identified the use of 48 plant species distributed in 32 families among 39 healers in 20 ethnic groups in Celebes Island. *P. pellucida* (UV=0.21), *lamiaceae* (15.63%), and leaves (57.35%) were determined as the most prominent species, family, and plant part used. The most widely prescribed rule of use is internal administration (94.03%) with a frequency of 3x1 per day (44.78%) for a week to a month (56.72%). However, conservation efforts need to be initiated immediately since more than 50% of healers made no cultivation efforts.

The Relevancy of Law Enforcement Toward Water Quality in Kali Buntung's Downstream Area

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Abstract. Kali Buntung actually is a man-made afvoer river. However, due to city development, the location now become a strategic asset for Sidoarjo Region. Due to that reason, this river experience external forces such as rapid land conversion, social, law enforcement, upstream quality, rainfall and surrounding businesses that make the rivers' burden much heavier. This paper aims to investigate the external forces matters and the calculating the impact of those external forces towards the water quality in Kali Buntung's downstream area. Using Structural Equation Model (SEM) as the basis to produce such intended result, the indicator data will be processed using SMART PLS statistic software. The result of this research was favor law enforcement model. Eventhough facing another challenging factor such as social, upstream water quality and land conversion, law enforcement has proven to reduce the pollutant in Kali Buntung's downstream, even surpass either the rainfall or business factors.

Policy Adoption Process on Climate Change Adaptation

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Abstract. This study aims to explore the process of policy adoption related to climate change adaptation. Specifically, this paper is based on the literature review process of scientific articles to map the definition of adaptation to climate change that is developing, then the forms of the policy adoption process that have been carried out. This study is exploratory in nature with the knowledge and determination of research topics that are still open. The researcher chose 2 keywords as emphasis, such as “climate change adaptation”. AND “policy adoption”. Sources of research use secondary data from tracing and collecting scientific articles indexed by Scopus. 33 of 659 articles were filtered and analyzed. Researchers use the Scholarcy website, connected paper and VOSviewer to help analyze data. The study found that there is a knowledge gap that is the main obstacle influencing policy actions taken by a number of countries in combating climate change. The countries covered by this study experience a strong knowledge deficit related to the design, implementation, and evaluation of adaptation policies. Knowledge production and policy action in the area of climate adaptation tend not to persist over time. The process of adopting and implementing policies related to climate change adaptation tends to be project-based and technical in nature is not integrated in the long term.

Behaviour of brand switching of milk product for young children aged 1-3 years in consumers of middle to lower socioeconomic class in urban communities in malang

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Abstract. The population in Indonesia today is mostly concentrated in urban areas and urban residents reached 56.7% (BPS, 2020). More than 80% of Indonesian people belong to the middle and lower socioeconomic class and this segment is biggest part of consumer of milk product for young children aged 1-3 years. Understanding the brand and customer behaviour is significantly important. Customer needs and insight could be used in product innovation process [1]. This study aims to examine the behavior of brand switching of milk products for young children aged 1-3 years on middle to lower socioeconomic class consumers in urban communities in Malang. The research was conducted in Malang City, East Java Province, using guided interviews with questionnaires. The research respondents were 102 consumers of milk for young children aged 1-3 years are selected by proportional random method in 5 sub-districts in Malang City. The data were processed using Partial Least Squares (PLS) as an alternative to Structural Equation Modeling (SEM). The results showed that the prior experience in purchases variable had highly significantly negative effect and the consumer dissatisfaction had a significantly positive effect on the process of brand switching for consumers of GUM products in urban communities in Malang City.

Storybook Design to Solve Plastic Waste for Children

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Abstract. Indonesia is the number 2 country that produces the most waste in the world. It is recorded that there are approximately 332 tons of waste produced by Indonesia per day. In addition to the nature of plastic that is difficult to decompose, plastic waste in Indonesia is caused by a lack of awareness and knowledge about the dangers and impacts of plastic waste. The research method used is a descriptive qualitative method. The strategy used is to design a story book that is used as a story telling to explain the impact of plastic waste on children. This storybook, entitled Erika and Trash, uses interesting and imaginative stories that children love. In addition, in this book there are also games that can be done while playing with children. The primary media chosen were story books for children and the supporting media consisted of posters, keychains, acrylic stands, pins. This story book will be used as a way for parents to tell stories to children about the danger of plastic trash.

Eco-friendly Packaging Design made from Teak Leaves as the outer Packaging Layer for Brownies

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Abstract. Eco-friendly program for packaging planning concept using teak leaves is one of the goals to utilize environmentally friendly materials. There are lots of dried teak leaves, dried leaves that pollute the yard will become garbage and rot can pollute the environment. This research uses a qualitative descriptive method and is strengthened by quantitative to get the percentage and analysis results for the effectiveness of the design, eco-friendly and market interest strategy for brownies. The creative design for environmentally friendly packaging made of teak leaves is done to cover plain cardboard, the goal is to avoid chemicals, namely kerosene, thinner, printing ink, because the cardboard is not offset printed but coated with dried teak leaves. This utilization is very environmentally friendly and will attract potential consumers as well as become goodwill for eco-friendly packaging.

Social Responsibility in Smoke-Free Air Policy

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Abstract. This article aims to identify the social responsibility of local government and business actor in the implementation of smoke-free air policy in Surakarta City. The research employed a literature review method. The dimensions of Social Responsibility are identified from several references and the criteria developed by The United Nations Guiding Principles on Business and Human Rights, the Global Impact of the United Nation and ISO 26000. The results of the research conclude that there are interrelated political and economic interests between the city government and cigarette companies which cause the fulfillment of children's rights to smoke-free areas to be not prioritized.

Current Condition of Agroindustrial Supply Chain Management of Publik Sago Product: A Case Survey of Kepulauan Meranti District, Indonesia

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Abstract. Sago-based agroindustry is a mainstay to be able to improve the economy of Meranti islands. Leak of data and weak communication and market information related to price, quality, quantity, and the type of product the market wants cause sago agroindustry to rely on information from intermediary traders. This study aims to identify and analyze the sago agro-industrial supply chain management. Data was collected by interviews and discussions with stakeholders who have competence in the sago industrial supply chain management. The data was analyzed qualitatively. The results showed that the supply chain management of sago agroindustry consist of sago farmers, tual traders (toke) and sago refinery owners, Harmonis Cooperatives, Individual Distributors, Companies (PD) in Cerebon and Medan. Owners of sago processed household industries, local collecting traders. The Sago agroindustry supply chain system in Meranti Island has not been efficient.

Pasting Properties of Jack Bean (*Canavalia Ensiformis*) Modified Starch with Heat Moisture Treatment

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Abstract. Jack bean is a local legume that can grow in suboptimal land and has a good prospect to be developed in Indonesia. Jack bean seed has 33.32% of protein and 61.15% of carbohydrate, so it can be the source of starch for food industry. Native starch has a limited application on food products because of its weak characteristics such as unstable to heat and shear. Heat Moisture Treatment (HMT) starch modification is needed to overcome the weaknesses. HMT is a natural modification because does not leave a chemical residue. The objective of this research is to investigate the effects of heat moisture treatment (HMT) with various moisture content and time on the pasting properties (peak viscosity, trough viscosity, breakdown viscosity, final viscosity, setback viscosity, peak time, and peak temperature) of jack bean modified starch. This research used Factorial Completely Randomized Design (FCRD) with two factors, varying moisture content (27%, 30%, 33%) and time (10 h, 13 h, 16 h). The results show that the various moisture content leads to increase peak-time, pasting temperature and decrease peak viscosity, trough viscosity, breakdown, final and setback viscosity. In addition, higher HMT time could increase peak time, pasting temperature but decrease peak viscosity, trough viscosity, breakdown, final and setback viscosity.

The Policy of the Surakarta City Parks and Hygiene Service in Environmental Management

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Abstract. Final Disposal Site or abbreviated as TPA is a place to pile up waste and is a form of waste. In essence, based on Law Number 18 of 2008 concerning Waste Management, TPA should be an abbreviation of Final Processing Site and accept residual waste that has been previously processed. The goal is to process and return waste to environmental media in a safe manner for humans and the surrounding environment. The problems seen in the Putri Cempo TPA are seen from the worrying condition of the land in accommodating waste, environmental pollution conditions, and poor management which must be noted by the City Government, because this has an impact on the people living in the Putri Cempo TPA area. This has resulted in many complaints from a number of people living around the Putri Cempo TPA. The purpose of this study was to analyze the role of the Department of Parks and Hygiene in Waste Management in Surakarta City. In this study, the researcher used a descriptive qualitative research method with 15 informants, namely 1) TPA Management Section 2) Waste Management and Hazardous Waste Sector 3) TPA Coordinator 4) TPA Supervisor 5) Head of Environment 6) Communities around the TPA 5 people and community users cleaning service 5 people. The results showed that the management of the Putri Cempo TPA was not adequate, as seen from the many obstacles that occurred in Putri Cempo, such as several damaged vehicles and waste transportation equipment, as well as the operational system in waste management that determined the volume of waste transported or disposed of to landfills, as well as waste operational activities depending on the operational patterns used, namely the method of sweeping, collection, transportation, and final disposal.

Paper ID: 139

Art Activist: Nature, Culture and Art-Based Environmental Movement

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Abstract. This article discusses the environmental movement carried out by art activists. This environmental movement is important given the increasingly massive and worrying ecological crisis. Environmental damage triggered by the pace of industry that erodes the natural environment. Ecological spaces that should support common life are turned into economic spaces on a large scale which in the process creates environmental degradation. But without us realizing it, most environmental problems also stem from our lifestyle, our political choices, and our role as consumers. In this condition, art actors and designers take a cultural role to be involved in the environmental movement. This cultural role is important considering that environmental issues are close and intertwined with cultural issues. The cultural roles of these art activists can be the starting point for responding to environmental problems by offering creative solutions. Creative solutions that can open up discussion space about the environmental movement as a practice of knowledge, ideology, resistance, and a mirror to look back at the relationship between humans and nature.

Paper ID: 140

Environmental and Hydroponics Education for Children through Story Book Design

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Abstract. Children need education of Hydroponics and Environmental and the problems raised in this design are to how to design the appropriate eco-friendly story book media about Introduction of Hydroponics and Environmental and climate change related to agriculture. The purpose of this design is to create a picture story book as an effort to introduce hydroponics to children. The research method used is descriptive qualitative with data collection techniques are questionnaire, literature study, and interviews. The media that is considered capable of providing a solution to this problem is a picture story book that contains information about hydroponics and environmental introduction with simple hydroponic planting procedures for children.

The Effect of Dietary Forages in Tetanus Hyper Immunized Equine Serum Production

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Abstract. The determination of local forage in meeting the nutritional requirement of horses and has effect on the antibody titer production is necessary to be conducted. The aim of the study was to determine the effect of different types of dietary forage to antibody titer production of Anti-Tetanus Serum. All procedures performed in this study were approved by the Institutional Animal Care and Use Committee (Ethical Approval No: 01/IACUC-BF/VI/20). A total of 12 Sandalwood horse aged 3-6 years with body weight ranged at 268.4 - 365.8 kg were used in this study. Horses were randomly assigned into four dietary treatment groups for ten weeks (100% Elephant grass; 100% Mott elephant grass, 67% Elephant grass: 33% Kikuyu grass, and 67% Mott elephant grass: 33% Kikuyu grass) which allowed 7.24; 11.45; 11.12; 12.62% crude protein respectively. The titer measurement was carried out once a week during the production period. The data obtained was analyzed using correlation analysis. The results showed that 100% Mott elephant grass group produced the highest titer but the correlation between crude proteins levels in the diets and titer were weak (0.44). Thus, it can be concluded that the high protein forage given has not potential to increase the serum antibody titer.

Paper ID: 142

Generation Z's preference for environmental animation films: Case Study of generation Z in Surakarta City

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Abstract. Many new media are presented to increase public awareness of the importance of understanding green issues. Animation as a communication medium has the ability to reveal many hidden and invisible things that other mass communication media cannot do. This research focuses on Generation Z who enjoys some form of environmental animation as a new communication medium on the YouTube platform. This study uses the convenience sampling method to determine the effectiveness of messages about green issues conveyed by environmental animation shows to generation Z. In this research, it will be known that environmental animation on the YouTube platform is able to become an alternative media to attract generation Z to understand green issues.

Collaborative Governance in Solving Problem Air Pollution in Indonesia: A Systematic Literature Review

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Abstract. This research is explaining a problem in environmental management that needs more attention because the impact of environmental problems involves all elements of the government, private sector, and society. The purpose of this paper is to review which one is the best practice for environmental problems related to air pollution in the government's efforts. This research focuses on the issue of environmental pollution on air pollution in Indonesia. The theory used is the Collaborative Governance model of Ansell and Gash and De Seve. The research uses a qualitative approach with a Systematic Literature Review and secondary data. Perspective in Collaborative Governance. The Literature approach is applied to scientific journals published in the database. The author found that several policies related to environmental problems have been implemented. But not running optimally. The government needs to use its authority to solve existing problems, including the problem of poor air quality.

Paper ID: 145

Shifting Waste Policy Issues at the Local Level: A Case Study in Banyumas

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Abstract. Waste management in Banyumas Regency entered a new history when waste management changed which was originally managed by the government, into waste management with the community. This is a new breakthrough in the Governance Era and stimulates a greater public role in waste management. However, the issue of policy issues regarding waste has widened, and this study tries to explain it. Qualitative research has been carried out by tracing the issue of waste problems in online mass media, observations, and interviews. The data analysis technique was carried out with interactive analysis techniques. The results showed that the issue of waste problems widened into several: the issue of transferring the burden of local government to the public, the issue of the destruction of the face of the city, the issue of bureaucratic egocentrism, the issue of the inability of non-governmental groups, and the issue of the government's inability to manage waste.

Growth and P Absorption of *Fibraurea tinctoria* Lour in Peat Soil with an Amendment

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Abstract. One of the ways to maintain and increase immunity during the COVID-19 pandemic is to consume the medicinal plant. Indonesia has many medicinal plants, one of which is 'akar kuning' (yellow root, *Fibraurea tinctoria* Lour). *F. tinctoria* is a wild plant commonly found in Kalimantan and has not been widely cultivated. Therefore, efforts to develop need to be made, especially in peat soil. One approach to address the problem in peat soils is to add zeolite amendments and increase the growth by adding NPK fertilizer. Therefore, preliminary research was conducted to determine the growth and P absorption of *F. tinctoria* in peat soil. The study used zeolite (0 and 2.5 g/polybag) and NPK fertilizer with three levels (3, 6, 9 g/plant). **The combination treatments were arranged factorially on Randomized Complete Block Design. The study shows different responses to the leaf number, volume and weight of the roots. Tendril length and absorption of P increased along with the increase of zeolite and NPK.**

Soil Fertility Status in Tidal Land of Tirtomarto Reservoir, Central Java, Indonesia

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Abstract. Reservoir tidal land used for agriculture is generally done when the reservoir water level begins to shrink. This land is used as a moor in dryland or lowland rice field in the wetland. The purpose of the study was to determine the soil fertility status of the tidal land of the Tirtomarto Reservoir, Central Java. Parameters tested include cation exchange capacity (CEC); base saturation (BS); C-Organic; total soil P and K levels according to the technical instructions for evaluating soil fertility. Soil samples were taken from three location points by the purposive sampling method. The results showed that most of the soil samples contained low to very low nutrients, except for the total P content which had a high value. Therefore, the fertility status in the tidal land of the Tirtomarto reservoir, Central Java, can be categorized as low. The low fertility status of the soil at the study site was due to the limiting factors, namely the low C-organic content of the soil, low K total soil, and low cation exchange capacity and base saturation.

***Ficus septica*, an Ecosystem Keystone Species Induced ROS-Mediated Cytotoxicity in Hepg2 Hepatocarcinoma Cells**

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Abstract. *Ficus septica* grows in all around Indonesia, as one of the key species in various ecosystem types. This plant is a food resource and habitat for some animals. This study aimed to examine cytotoxic activity of *F. septica* extract in HepG2 cells. The leaves powder was macerated using ethanol 96%. Cytotoxic activity was evaluated by MTT assay. The determination of cell cycle profile and reactive oxygen species (ROS) were done by flow cytometry. The extract inhibited the growth of HepG2 and Vero cells with an IC₅₀ of 31 and 286 µg/mL, while doxorubicin 0.8 and 117 µg/mL. The selectivity index of the extract and doxorubicin was 9 and 146 respectively. The extract triggered cell cycle arrest in HepG2 at the G0/G1 phase, whereas doxorubicin in the S phase. Both extracts and doxorubicin significantly increased intracellular ROS in HepG2, but not in normal Vero cells. In conclusion, our findings suggest that *F. septica* induced cytotoxicity in HepG2 cells are mediated by oxidative stress.

Paper ID: 149

Reducing Wood Waste into Eco-Friendly Mix Media Artwork

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Abstract. Wood waste is found all around us and is used as household fuel. Burning smoke pollutes the air around us, while reducing oxygen intake and possibly climate change, a solution will be using wood waste can be reduce this pollution. This study uses action and research, the research conducted is how woods is used in household needs and daily wood needs. The action taken is to create mix media artwork by utilizing the wood waste with the concept and goal of reducing wood waste from industry. This research is expected to maintain ecofriendly and climate change programs.

Distribution and Mapping Pulasan (*Nephelium ramboutan*-Ake Bill. Liinh) in Riau Ecosystem Zone Area

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Abstract. Pulasan (*Nephelium ramboutan*-ake Bill. Linh.) is a genetic source of tropical fruits originating from Indonesia and Malaysia. The benefits of outward appearance as a processed material for the food industry and as a raw material for traditional and modern medicines. Currently, the existence of outward appearances has experienced scarcity and is even threatened with extinction, so it is necessary to conserve and develop these genetic resources. Before carrying out conservation, it is necessary to conduct an initial study of the presence and distribution of the germplasm. This study aims to determine the map of outward distribution in Riau on mineral soil ecosystems and peat soil ecosystems. This study uses a survey method. The technique for getting the germplasm distribution point is by tracking it using the Garmin 76csx Global Positioning System (GPS). The data obtained were processed using the ArcGIS 10 software system. The basic map used was a map of the administrative boundaries of four districts (Kampar, Kuantan Singingi, Siak, and Bengkalis) and a map of soil types. The results showed that the outward distribution in the mineral soil ecosystem area was more than that in the peat soil ecosystem area. In the mineral soil ecosystem zone, the outward appearance is spread as many as 387 trees. Meanwhile, in the peat soil ecosystem, the number of outward trees is less, namely 108 trees. A total of 495 trees have been successfully explored in total. The distribution of this tree is found in the four districts in Riau which are spread over eight sub-districts and 12 villages. Soil type maps are used to display the outward distribution in each distribution area.

Policy Innovation on Environment and Forestry Development for Supporting Gender Equality in Indonesia

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Abstract. *This article discusses how policy innovation was developed for supporting gender equality in the environment and forestry development. The data were collected through focus group discussions, documentation studies, and in-depth interviews with deliberately selected informants. The data were qualitatively analyzed with Miles and Huberman's model. Policy innovation in environmental and forestry development is carried out through a combination of Design Thinking and Systemic Thinking approaches. Design thinking is carried out through gender-responsive policy innovations that regulate forests to be managed sustainably for the welfare of women, men, and people with disabilities. Moreover, there were also innovative activities called GLEADS (Gender Leader Summit) and TEACH (Training for Ecogender Activation Hub) embodying the National-regional Eco-forestry Hub, where each Hub cooperated with each other to develop innovations for improving gender equality. Respectively, **Systemic Thinking** is performed through **the internal and external** collaboration for producing and developing a digital gender learning system managed by the Gender Mainstreaming Work Group. GLEADS and TEACH members continuously create and encourage the contents of the digital gender learning system. This study provides an insight that Design Thinking and Systemic Thinking approaches in policy innovation contribute to the transformation of gender-neutral policies, programs, and activities into natural gender.*

Paper ID: 154

Towards Collective Action in Conflict Resolution on Environmental Impacts Due to Coal Mining in Indonesia

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Abstract. The Indonesian government has formally determined large-scale coal production to meet economic initiatives. This study uses the documentary method. The study found that coal mining activity has both positive and negative impacts. Coal mining creates environmental damage resulting in conflicts, and advantaged and disadvantaged groups. The conflict resolution approach tends to be partial and has not resolved the problems associated with coal mining because the community tends to be victimized. Taking a participatory and inclusive collective action approach is essential to mitigate challenges coal mining entails because environmental problems require diverse stakeholders' involvement. The commitment of coal mining entrepreneurs and the government's concrete actions to minimize the negative impacts of coal mining cannot be further delayed which are to ensure the sustainability of Indonesia's resources, human life, and the natural environment.

Trends in Governance Research and The Gender Perspective for Reducing Deforestation: A Bibliometric Analysis

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Abstract. Governance with a gender perspective is very crucial in reducing deforestation. The existing policy is insufficient for addressing increasingly complex issues in forestry. In order to promote studies on Deforestation in relation to Gender and Governance (DGG), it is important to have comprehensive review that has the ability to provide an overview of the current research and identify future research. This article is a bibliometric analysis using VOSviewer application to identify and explore DGG research with data sources from Scopus. A total of 467 publications from 1995 to 2021 were obtained for analysis. The findings showed that there had been an increase in DGG research, and about 84 countries were involved in this study. There shifts in themes and diversity themes in research in each country, indicating that DGG research has changed with the scale of research that is developing gradually. Deforestation, gender and governance issues have captured the attention of world leaders especially since the SDGs were established in 2015, so it can be concluded that DGG research has high potential to be developed in the future. We suggest further DGG research, for example by conducting an in-depth literature review of whether DGG research have used gender analysis tools. This is one of the campaigns in reducing deforestation and realizing sustainable forests.

Combined Supplementation of Betaine and Vitamin C Improves the Performance of Quails Raised in The Tropics with Reduced Floor Space

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Abstract. This study investigated how combined betaine and vitamin C supplementation affect the productive performance of quails raised in a reduced floor space. In total, 256 laying quails aged 23 weeks (average body weight of 154.6 ± 5.0 g) were arranged in a completely randomized design of factorial 2×2 with 4 replicates. The birds were allocated to 16 cages with two floor spaces consisted of 250 cm², 222 cm². They were fed a diet without (Control) or with supplementation of 0.12% betaine in combination with 250 mg/kg vitamin C (BV). The data were subjected to analysis of variance and continued to Duncan's test. Interactions were found on egg production and egg mass. The lower floor space without BV supplementation produced decreased the egg production, but lower floor space with BV supplementation enhances the egg production ($p < 0.05$). Supplementing BV enhanced egg mass in each floor space ($P < 0.05$). Reducing floor space did not affect feed intake, egg weight and protein as well as energy efficiency ratio. BV enhance feed intake egg production, egg weight, protein and energy efficiency ratio and reduce the feed conversion ($p < 0.01$). It is concluded that combined supplementation of betaine and vitamin C improves quails' performance in reduced floor space.

Environmental Issues on Covid-19 Medical Waste: Review from Policy Perspective

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Abstract. Covid-19 pandemic brings two sides to the environment. On one side it reduces the air pollution due to travel and work limitation but on the other hand the medical waste increases. This contradictory situation on environment has been studied by research all around the world. This study trying to map the concern of experts on environmental issues during Covid-19. This paper conducts a systematic literature review from various prominent database to portray the environment issues that emerged during Covid-19 Pandemic. Unique combination of keywords such as “environmental issue and Covid-19”; “pollution and Covid-19”; “medical waste and Covid-19” are used to filter the research that has been published. No less than sixty-four literature discuss about the environmental issues and Covid-19. The anticipated result indicated that issues of environment in recent studies ranging from pollution concern, sustainability issues and government policy. Further findings are discussed in the full paper.

The Challenge of Reducing Non-Revenue Water (NRW): A case study of Tirta Patria Water Supply Company of Blitar City

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Abstract. Reducing water losses in a water supply company is one of the efforts to support sustainable water management so that the quantity of water produced can have a greater benefit value and ensure the quality of piped drinking water is free from contamination due to leakage. The method to collect water loss problems is to make a detailed water balance so that the challenges and the NRW value can be seen. The challenges faced by Tirta Patria water supply company are the low level of accuracy in the tools used to record the volume of the input system, the lack of data on the speed coefficient of water loss repair, and no searching activity for illegal connections. The efforts that can be conducted to reduce NRW are to increase the activity of the calibration and replace the house connection water meter, making performance coefficients of aged water meters, and performing a minimum night flow analysis. The estimated value of water losses from water balance was 58.91%, with physical losses was 45.59% and commercial losses was 13,32%.

The Effect of Application of Control Techniques to the Population, Damage Intensity of Onion Caterpillar (*Spodoptera exigua* Hubner) and Yield of Shallots

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Abstract. Shallot is an important cash crop in Indonesia. However, its productivity is relatively low, due to the attack of the onion caterpillar (*Spodoptera exigua* Hubner). Insecticide application is a method that is widely used by farmers but has not been effective in controlling caterpillars. This study aims to identify the effect of the application of control techniques on the population, damage intensity and shallots yield. This research was conducted by field experiment. Control treatment consisted of covering shallots by using gauze/net and insecticide treatment with active ingredients of profenofos, metomil, and carbosulfan. The research variables consisted of the population and the damage intensity of *S. exigua*, as well as the yield of shallots. The results showed that the caterpillars population of *S. exigua* was found at 16 DAP and increased until before harvest at 44 DAP. Covering shallots with gauze effectively suppressed the population of *S. exigua* (0.0 per hills), followed by treatment with profenofos (0.14 per hills), carbosulfan (0.15 per hills), and methomyl 0.32 per hills). The damage intensity of *S. exigua* in the plot gauze covered was 0%, lower than 32%, 25%, 12%, 10%, respectively, in the control plot, treatment of methomyl, carbosulfan, and profenofos. Covering shallots with gauze also increased the weight of wet-harvested tubers (50.83 g per hills) significantly higher than those treated with profenofos, carbosulfan, and methomyl.

Instagrammable Tourism: Local Government Policies in Sustainable Environmental Management

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Abstract. Tourism development using social media or known as *Instagrammable Tourism* is favored by policy-makers due to its assumed effects on destination image, social and infrastructure developments and economic benefits. However, the dynamics of making a tourism destination instagrammable sometimes bring up conditions that ignores the aspects of sustainable environmental management. Tourism business actors who process natural lands into artificial instagrammable tourist attractions and consumer behavior that damages the aesthetic value of tourist destinations are few operational examples of outcomes caused by local policies related to instagrammable tourism. The purpose of this paper is to present description and implementation of local government policies in instagrammable tourism management from two different areas of Kaliurang in Sleman regency and Tawangmangu in Karanganyar Regency. Data in the forms of local tourism development policy, spatial plans, and land use in tourist destinations were analyzed using descriptive qualitative, descriptive statistics and policy analysis methods. The analysis results show that the two tourist areas have been regulated and managed based on local regulations. The local regulation interpretations can be seen in the different directions of the two tourism area developments. The different emphasis on the orientations of tourism area managements bear implications on the implementation of sustainable environmental management concept.

Implementation of the Suroboyo Bus Transportation Policy Paying with Plastic Bottle Waste

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Abstract. The Department of Transportation in collaboration with the Department of Cleanlines and Green Open Space of the City of Surabaya launched a new means of transportation, namely the Suroboyo Bus. Uniquely, the Suroboyo Bus is paid for with plastic bottle waste. The purpose of this Suroboyo Bus is to reduce plastic waste and congestion in the city of Surabaya. The type of research is descriptive with qualitative approach. The focus of this research uses policy implementation according to Edward G. III namely, communication, resources, disposition and bureaucratic structure. The results of this study are that in implementing the Suroboyo Bus it is considered quite good, there is support from the public and also has a real impact. On the other hand, there are still obstacles in implementing the Suroboyo Bus, which has not been properly integrated in terms of the waste contribution procedures.

Investment Policy and Environmental Conservation: A Systematic Literature Review on The Form of Investment Policy and Stakeholder Role

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Abstract. This research aims to analyze the forms of investment policy that can disrupt environmental conservation and the role of stakeholder in maintaining environmental conservation. The research method used was systematic literature review with the following procedures: using keywords in database to find relevant journal articles, eliminating journals irrelevant with some criteria, and analyzing the findings of journals selected. The result of research shows that investment policy damaging the environmental conservation is dominated by investment in energy sector. In addition to energy sector, another investment policy that can disrupt environmental conservation is investment in tourism sector; micro-, small-, and medium-scale enterprise (MSME); infrastructure; and plantation sectors. The role of stakeholders participating in environmental conservation effort due to investment policy builds on the role of local government, central government, and Non-Government Organization.

Policy Issues on Covid-19 Waste: Comparing Indonesia and Taiwan

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Abstract. During covid-19 pandemic, the medical waste has been a concern to the sustainability issues. Comparing government awareness is critical to portray the government policy on combating Covid-19 and maintaining environment sustainability at the same time. This paper discuss about how the Covid-19 waste are managed between two countries: Indonesia and Taiwan. The two countries are chosen because of their contrasting condition where the prior has high rate of infection while on the other hand the later have relatively low rate of infection. This study focusses on literature analysis that is available on the Internet using search engine and research database. Specific keyword search such as “environmental policy and Covid-19 and Indonesia and Taiwan” is used in the search engine The anticipated results indicated the significant different on both countries in managing Covid-19 waste. Further results are discussed in the paper.

Morphology and Total Flavonoid Content of *Clitoria ternatea* L. at Different Altitudes

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Abstract. *Clitoria ternatea* L. is one of the Leguminosae plants that have a variety of pharmacological potentials, but this plant has not been widely cultivated and most of its harvesting is still derived from nature. Therefore, it is necessary to hold specific research related to morphology and flavonoid content of *C.ternatea* in various habitats. The purpose of this study is to examine the morphological character and content of secondary metabolites (flavonoids) of *C.ternatea* in various habitats. Surveys and observations were conducted in different locations, namely the lowlands (Laweyan, Jeyengan, and Samratulangi) and the highland (Ngargoyoso). The survey location is chosen by a purpose random sampling method. The research method for testing flavonoid levels is nonfactorial RAL with place height factor namely lowland (K1) and highland (K2), then analyzed by the analysis of variance (ANOVA) and followed by LSD 5%. The results showed the morphology of *C.ternatea* plants that grow in the lowlands is different from in the highlands. Different morphological characteristics are found in leaf length, leaf width, pod length, and the number of seeds per pod. Flavonoid content is higher in the lowlands (0.493%) compared to the highlands (0.458%).

Effect of Lignocellulolytic Microorganisms Isolated from The Peel of Cassava, Rice Straw and Sawdust for The Composting Process of Rice Straw

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Abstract. The composting process will take a long time if only rely on indigenous decomposing microorganisms. This study explored the source of the isolates as bioactivator of composting. The purpose of the present study was to isolate lignocellulolytic microorganisms from the peel of cassava, rice straw (RS), and sawdust and to investigate the effect of the lignocellulolytic microorganisms for the composting process of RS. The research was conducted by two steps. The first step was isolation of bacteria and fungi from the peel of cassava, RS, and sawdust by using media of CMC, Lignolitic and Omeliansky, and isolation general bacteria and Actinobacteria from the one week old RS compost by using media of NA and SCA. The second step was application of the mixture culture obtained from the first step as bioactivator for the composting of RS. As the control treatment, the other composting RS compost was also set up with no addition of bioactivator. After 70 days composting, the results showed that RS compost product from the composting using bioactivator indicated higher quality with C/N ratio, total N, available P and available K namely 15,2, 1,44%, 1,40%, and 1,86% comparing with control that were 23,2, 1,12%, 1,19%, and 1,63%, respectively.

Collaborative Governance in Managing Plastic Waste in Bali

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Abstract. Collaborative governance is a concept that is considered to be able to give a big contribution in solving various problems in society, including waste management. Waste management is an urgent matter today because more than 400 thousand tons of waste is generated every year with only ten percent being recycled and the rest ends up in the ocean. This condition is added by a report from the International Coastal Cleanup which states that 9 out of 10 items of waste in the ocean are plastic. Indonesia, as one of the countries with the largest population in the world, also has the largest contribution in producing plastic waste. Bali is one of the provinces in Indonesia that contributes the largest plastic waste. To answer these problems, this paper uses a qualitative approach with a library study data collection method, to analyze how collaborative governance processes proceed for a sustainable environment. The results obtained show that collaborative governance in the management of plastic waste in Bali's sea and its legal basis have been running well but community participation and compliance are still lacking. The conditions that occur are a common goal between actors that have not yet been formed-- to achieve the preservation of the marine environment that is free from plastic waste pollution. The high amount of plastic waste in Bali's sea is also caused by weak law enforcement and a lack of public awareness and mutual understanding.

Analysis of the Role of Plant Canopy on Hydrological Systems

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Abstract. High rainfall intensity significantly affects Indonesia's climate and causes high erosion rates. Land cover conditions greatly determine water degradation in the hydrological cycle. The shape and type of the plant canopy have a significant effect on soil structure and water absorption. This study aimed to examine the role of the plant canopy on the value of the rainwater canopy escape as a supporter of the hydrological cycle. Tree species were determined based on the level of dominance at the study site using the transect method. The dominant trees are Sea Sengon Tree (*Paraserianthes falcataria*), Teak Tree (*Tectona grandis*), Suren Tree (*Toona sinensis*) and Durian Tree (*Durio zibethinus*). The results showed that high rainfall intensity with a long rain period affected the amount of canopy escape. Suren tree (*Toona sinensis*) has the highest canopy density with a canopy density value of 0.22, and the Sengon Laut tree has the lowest with a canopy density value of 0.014. The value of passing the canopy of the Suren Tree is lower than that of other tree species. The shape of the canopy of the Suren tree, which is round and oval, also affects the lower pass value of the canopy compared to other tree species. The higher the value of canopy density can reduce the value of canopy escape to support the hydrological cycle.

Analysis of Metal Accumulation and Phytochelatin Synthase (PCS) Gene Expression in *Saccharum spontaneum* L. as Regards Its Function for Remediation of Lead (Pb) Contamination

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Abstract. Pollution, especially that caused by heavy metals, has become a serious problem around the world. Adverse effects arising from the increased use of heavy metals in a variety of human activities lead to any environmental degradation. Lead (Pb) is one of the most common heavy metal contaminants in the environment and is highly toxic. Pb is less mobile so its compound tends to accumulate in soil and sediments. Definitely, efforts are needed to remove this contaminant in the environment. *Saccharum spontaneum* L. is a perennial grass which has the potential to be used as an accumulator plant to clean up pollutants in the environment. The ability of this plant as metal accumulator was tested in this study. *S. spontaneum* plants were treated by using lead (Pb) in the concentrations of 0 ppm (control), 100 ppm, 200 ppm, and 300 ppm for a period of 8 weeks. The results pointed out that there was an increase in the percentage of relative accumulation of Pb in the treated plants. This also indicated that plant roots accumulated more Pb than shoots. Meanwhile, the expression of Phytochelatin synthase (PCS) gene increased 1.3 to 3.5 fold inductions in the roots by increasing the concentration of Pb treatments for 24 h. PCS gene expression showed the higher induction in the roots than in the shoots of *S. spontaneum* plant under Pb treatments.

Assessment of Hygiene and Sanitation Practices Related to Milking Activity Among Dairy Farmers, Indonesia

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Abstract. This study aims to identify the behavior of milking hygiene and sanitation carried out by farmers. The behavior is divided into three categories, before, during, and after milking with a total of 17 hygiene and sanitation activities. The data is secondary data obtained from Australia Indonesia Partnership for Promoting Rural Incomes through Support for Markets in Agriculture (AIP-PRISMA). Data were collected in 2019 by involving 318 rural dairy farmers as respondents from Central and East Java Provinces. The data were, then, analyzed by using multiple regression to determine the factors affected the behavior. The results showed that 54.50% farmers were categorized as having poor hygiene and sanitation, followed by 20.75% of farmers considered as very poor, 19.81% good and 5.03% farmers as very good. Variables of age, sex, water availability, and main income affect the implementation of hygiene and sanitation in milking. The study indicated that women have important role in these practices.

Paper ID: 181

Water-Soluble Plastic Utilize as A Medium for The Polyester Patchwork Embroidery Craft Application

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Abstract. This study aims to describe polyester fabric waste processing as an alternative material for interior textiles. The characteristics of polyester fabric waste meet the qualities needed to be used as the material of interior textile. The problem trying to be solved and described in this study is the effectiveness of using water soluble film paper as a medium for the application of manual embroidery techniques for processing polyester patchwork. This study used experimental and implementation methods on textile crafts. The results of this study show that water soluble film paper can be used as a medium for applying manual embroidery techniques on polyester patchwork which is favorable and does not leave any residual waste or environmentally friendly. This method can be applied to bring out the element of craftsmanship based on the scope of textile craft research. Functional products made using this method are also expected to be able to provide aesthetic value in a room. This study is essential and useful to provide an overview to the community about alternative resources of convection waste from the local area that can be created into new higher value products.

Ethnobotanical Study of Medicinal Plants Used for Treating Urinary Tract Problems in Eastern Indonesia

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Abstract. Indonesia is one of the wealthiest countries in biological resources that have potential as medicinal plants. Medicinal plants can be an alternative in treating diseases such as urinary tract problems by the people of eastern Indonesia. The study aims to evaluate the use of medicinal plants for various urinary tract problems in east Indonesia, including their efficacy and safety based on the literature review. This research was conducted by interview method and field survey. The data were collected from traditional health practitioners in eastern Indonesia. Subsequently, the review study evaluates the efficacy and toxicity of the most cited plants. Data were analyzed using a quantitative tool such as Frequency of citation (FC), the Use value (UV), and Choice value (CV) which were carried out descriptively. The results showed a total of 222 plants species belonging to 78 families were identified for treating urinary tract problems in east Indonesia. The most prevalent of these was the *Euphorbiaceae* family. The species which had the highest value were *Orthosiphon aristatus* (FC 12.52%, UV 0.31), *Sericocalyx crispus* (FC 7.80%, UV 0.19), *Phyllanthus niruri* (FC 6.35%, UV 0.16) were the vast majority commonly used plant species in the treatment of urinary tract problems. The most common parts used were leaves (44,87%) and herbs (10,66%). The ethnomedicinal flora in east Indonesia is quite diverse for treating urinary tract problems. The findings still have to lack scientific evidence. It still needs further investigation for analyzing phytochemical and other biological components for future drug discovery.

The Effect of Climate Change Damages on Agriculture, Forestry and Fisheries in Asean Countries

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Abstract. Countries in the ASEAN region have a significant potential for the impact of climate change disruption and disasters such as El Nino, La Nina, earthquakes, tsunamis, volcanic eruptions, hurricanes, floods, tropical storms, landslides and CO2 emissions. The ASEAN Secretariat (2017) recorded a progressive increase in CO2 emission levels of around 61% from 2014 to 2025, more than 90% of transboundary haze from the expansion of large-scale commercial plantations, accumulation of plastic waste and household waste that cannot be properly recycled. The contribution of agriculture, forestry and fisheries is also relatively varied. Geographical conditions, policy orientations of each government, structure of production inputs including human resource competence and technology are thought to determine the adverse effects of climate change on the agriculture, forestry and fisheries sectors. This study focuses on the impact of climate change on the agriculture, fisheries and forestry sectors in the ASEAN region. The analytical framework is adapted to the ASEAN Vision 2020 and ASEAN Vision 2021. In addition, a deeper analysis of several climate change impact control instruments such as polluter pays, agricultural insurance, agri-environment climate schemes and payments for environmental services will also be studied. These instruments are directed to achieve environmental sustainability in the ASEAN region.

The Effect of Biofilm Biofertilizer Formula and Organic Fertilizer Dosage to Phosphorus Uptake and Yield of Shallot on Vertisols

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Abstract. The research aims to find out the effect of biofilm biofertilizer formula and dose of organic fertilizer on phosphorus uptake and yield of shallot on Vertisols. The research was arranged in a completely randomized block design with two factors; dosage of organic fertilizer (0, 10, 20 ton ha⁻¹) and the formula of biofilm biofertilizer (without BiO₂, BiO₂ 1, BiO₂ 2, BiO₂ 3) and repeated three times. Variables observed included available-P, P-uptake, bulb number, and bulb weight. Data analyzed with an F test followed by DMRT at a 5% level of significance. The result shows that 20 ton ha⁻¹ organic fertilizer decomposed with biofilm biofertilizer gives the highest P-uptake and plant dry weight which increases 322 % and 216 % to control treatment (0.50 and 1,26 g plant⁻¹). The use of 10 ton ha⁻¹ of organic fertilizer gives the highest bulb number and weight i.e 5,58 bulbs plant⁻¹ and 116 g plant⁻¹ increase 27% and 172% compared to control treatment. The influence of BiO₂ formula only on plant height where the use of formula 1 increase plant height 13,5% (28.01 cm) compared to control treatment (24.65 cm).

Millennial and Gen Z Perspective towards Eco-Office Campaign Implementation in Public Sector

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Abstract. This study explains millennial and Gen-Z attitudes, perspectives, and behaviors in implementing the eco-office concept. As a qualitative method study, the study uses primary data through semi-structured interviews and secondary data collected from reports, public/private publications, and census results, using the Yin case study model as data analysis. The study results reveal that the biggest challenge in implementing new policies is self-thinking. Leaders, as change agents, play an essential role in penetrating messages that make them act pro-environment. The reward system will be very effective, especially providing satisfaction for self-actualization. The findings of this study have implications for policymakers as input. For example, the results show that social media plays a crucial role in increasing environmental awareness. In addition, simple shifts such as electronic media use at work will cut the file chain, making it more effective and favored by young people. They understand the environmental consequences of their actions and have education, motivation, and social awareness to participate in the green movement. However, the beliefs and actions didn't fully integrate, by investigating and understanding their behavior and the distinct needs they have in the workplace will lead to better integration of the employees and mutual success to support the environment.

Horizontalism in The Implementation of Land Reform Policy in Cipari Cilacap Indonesia

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Abstract. Horizontalism in the policy process is a situation when non-state actors are involved in the policy process. In Indonesia, the involvement of non-state actors in the policy process increases significantly upon the era of reform. In the policy process of the land sector, if the involvement of the society in the policy process includes complying with decisions, arguing demands, mass mobilization, or social movements, the horizontalism in Indonesia's agrarian sector has been going on for a long time. This field research using a case study approach in the policy implementation of land redistribution in Cipari District Cilacap Regency Central Java. The key informants are the state actors (state apparatus and the low-level bureaucrats), the non-state actors (local farmer organizations and other advocate organizations influencing the area where land redistribution activities are primarily implemented), and the beneficiaries. This study aims to describe the involvement of non-state actors in the policy process. The findings show that the role of the state actor is dominant, as the only responsible party for the whole activities related to the land redistribution. The practice of horizontalism is identified when the non-state actor is "giving up". The horizontalism in the implementation process of the land redistribution in Cipari Cilacap is a negotiation relation between the state and non-state actors.

Evaluation of Implementation about Covid-19 Medical Waste Management Policies in Health Care Facilities

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Abstract. This paper is an evaluation study of policy implementation that discusses the management of medical waste in health care facilities. The government establishes a waste management policy with the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/537/2020 concerning Guidelines for the Management of Medical Waste for Health Service Facilities and Waste from Isolation Activities or Independent Quarantine in the Community in Handling (Covid-19) to prevent transmission and controlling the spread of Covid-19 and protecting health workers, non-health workers, and the public from the impact of waste in handling Covid-19. Although regulations related to the management of Covid-19 waste have been set, in their implementation there are still problems in some areas. Literature study was conducted to evaluate the implementation of medical waste management policies in health care facilities. Evaluation is seen based on socialization, implementation, and policy results. Based on the results of the literature study, it was found that at the socialization of the policy had done well, this was evidenced by the implementation of socialization about medical waste in health care facilities. At the implementation, it encountered several obstacles, such as limited shelters, shortage of waste destruction equipment, and medical waste transportation and processing services that had not yet reached all areas in Indonesia.

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Batik Stamp *Canting* from Waste Paper Material as A Frugal Innovation in Batik

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Abstract. This article discusses the innovation of batik stamp *canting* equipment using waste paper material. The first focus is on the emergence and the background of the innovation of batik stamp *canting* made of waste paper material. The second elaborates the concept of stamp batik *canting* innovation with waste paper material. The method applied to discuss these problems was qualitative approach in the form of case studies using informants' data sources, artifacts, events and documents. The results of this study indicate that the innovation of stamp *canting* using paper material has occurred since 2014 which was carried out by Subekhi in Pekalongan, Central Java Province, and it began to be widely used in batik production process in 2016. The background of stamp *canting* innovation made of waste paper was triggered by the high price of stamp canting from copper which is commonly used in the production process of stamped batik. The concept of the innovation applied in the development of this stamp *canting* is frugal innovation. The value of knowledge gained from this study is that innovation is not always carried out to improve the quality of processes or products. Instead, innovation is more significantly needed to solve the problems corresponding to the context.

Analysis of the Effect of CO and PM 2.5 Parameters on Vegetation Conditions in the Red Brick Industrial Area, Srimulyo Village, Sragen

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Abstract. The activity of the red brick industry that is currently developing in the Srimulyo Village area indeed generates several pros and cons related to CO gas emissions and the particulate matter that is produced. Sragen Regency is one of the destinations with abundant flora diversity. This study aims to identify the analysis of flora and fauna biodiversity in the red brick industrial area and then analyze the effect of the emission value of CO and Particulate Matter (PM) 2.5 on vegetation in the red brick industrial area of Srimulyo Village, Sragen. The study was conducted at 4 point locations for sampling. The method used to determine the value of the biodiversity index is the Shannon-Wiener formula. Based on the calculations, the results of the low vegetation diversity index and low stability were obtained with an average index value of 1.91. The results of this low vegetation diversity index have a correlation with the results of measurements of CO and PM 2.5 gases which exceed the standard thresholds that have been set. Where the average range of CO gas levels is 353.3-844.7 ppm and the average range of PM 2.5 levels is 1928.7-9517.7 $\mu\text{g}/\text{m}^3$. Therefore, this study shows that the influence of particulates and CO gas makes the flora diversity index into a low cluster in the red brick industrial area of Srimulyo Village, Sragen Regency.

The Role of Farmer Groups in The Development of Dryland Farming in Ketos Village, Paranggupito Subdistrict, Wonogiri Regency

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Abstract. Farmer groups play a role in solving farmers' problems, especially their farming activities. This study aims to find out the role of farmer groups in the development of dry land farming in Ketos Village using qualitative descriptive methods. The results showed that Ketos Village farmer groups conducted activities such as farmer deliberation, agricultural counseling, and *gotong-royong*. Based on these activities, Ketos Village farmer group is able to act as a learning class, production unit, and cooperation. Farmer group as a learning class is a farmer group to be a place that provides information needed by its members related to the issue of farming activities. Farmer group as a production unit means that farmer groups play a role in the provision of agricultural facilities and tools, especially subsidized seeds and fertilizers. Farmer groups as a medium of cooperation not only between internal groups but also externally. This role is able to help farmers' activities in solving problems in dry land.

Private Participation in Establishing a Product Certification Body of Seed and Breeding Stock Poultry in Indonesia

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Abstract. The era of global trade is a political system based on international rules and agreements that encourage and stabilize economic exchanges between countries. One of the impacts is the demand for a shift in the role of the government to the private sector. The poultry sector plays an important role in meeting 65% of the need for animal protein consumption in Indonesia. The existence of a product certification body of seed and breeding stock poultry is a tool used in global trade to increase product competitiveness in the global market. Through the application of standards in trade, it is expected to improve the performance of producers so that they can produce quality products, fair competition in trade, and provide protection to the public and consumers. Unfortunately, the existing seed and livestock certification institutions are still fully initiated by the government. Meanwhile, private participation in the establishment of a seed and poultry seed product certification body through *public-private partnerships* (PPPs) is still far from expectations.

In Vitro Anticancer Screening of Selected Indonesian Medicinal Plants

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Abstract. Cancer is the second most common disease causing death in the world. The development of proper cancer treatment management is still a challenge today. The discovery of an abundance and variety of anti-cancer bioactive compounds from Indonesian plants is one of the potential strategies to be implemented. This research was conducted on RISTOJA's research plants. The cytotoxic activity test of the extract was carried out on the HeLa cervical cancer cell model, WiDr colon cancer cell, and T47D breast cancer cell using the MTT assay method. The IC₅₀ value was determined based on the percentage of cell viability after dichormethane and methanol extract treatment. The extract concentrations used were 15, 30, 60, 120, 240, and 480 µg/mL. The test results showed that 6 dichlormetan extracts had strong potential (IC₅₀ <100 µg / mL) against 3 types of cancer cells.

Potential Medicinal Plants in Sumatra for Haemorrhoids Treatment

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Abstract. Indonesia is known as a country with numerous medicinal plants used for helping the treatment of diseases, including haemorrhoids. However, most of the ingredients are still taken from nature. An ethnographic study of medicinal plants (RISTOJA) showed many plants in several formulas used by traditional healers to treat haemorrhoids. According to RISTOJAs' data, the study aimed to find potential medicinal plants in Sumatra to be developed and cultivated for haemorrhoid treatment. Several important medicinal plants frequently used by traditional healers were defined using the frequency of citation (FC) and the utility value (UV). We conducted a literature review about its commonly used part, empirical use, benefit, toxicity and cultivation using the electronic search engines including Pubmed, DOAJ, Scopus, and Google Scholar. There were 49 species of plants in 27 families used in herbal formula for haemorrhoids. Based on FC and UV, 11 plants were categorized as important and frequently used plants. Literature review results confirmed *Cocos nucifera* L., *Vitex pinnata* L., *Psidium guajava* L., *Areca catechu* L., *Curcuma longa* L., and *Kaempferia galanga* L. have enough scientific evidence. The parts used from those plants are easy to regenerate and also easy to cultivate. For haemorrhoid treatment, these six plants are potential to be developed and cultivated.

The Effectiveness of Biduri in Combination with Indigenous Bacteria in Absorbing Mercury

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Abstract. Environmental pollution by heavy metals, especially Mercury (Hg), is one of the most serious environmental problems. The presence of excessive Mercury in the soil will cause soil degradation and threaten the life of the ecosystem in the soil, therefore remediation is necessary. Biduri is known to be able to absorb heavy metals, but there is no research on the ability of biduri to absorb Mercury. The use of bacteria, especially indigenous bacteria, is expected to increase the absorption of mercury by Biduri. Indigenous bacteria have a higher level of effectiveness in remediating soil contaminated with heavy metals. This indigenous bacteria was isolated from community gold mining in Jendi Village, Wonogiri. The purpose of the study was to determine the potential of biduri combined with indigenous bacteria and *Agrobacterium* sp I37 in absorbing mercury in the soil. The experimental design was factorial with a completely randomized design as the basic design, consisting of 2 factors: Bioremediation agent (A0: without bioremediation agent, A1: with indigenous bacteria, A3: *Agrobacterium* sp I37) and Mercury Dosage (D0: without Mercury, D1: Mercury 0.3 $\mu\text{g.g}^{-1}$, D2: Mercury 0.51 $\mu\text{g.g}^{-1}$). The data were analyzed by statistical analysis using ANOVA 95% significance level followed by Duncan Multiple Range Test 95% significance level, and correlation test. The results showed that the combination of Biduri with bacteria can increase the absorption of mercury by biduri, but indigenous bacteria with a dose of mercury 0.3mg/kg (A1D1) has the highest absorption of Hg 57.19 μg (27 times higher than control) biduri plants are able to translocate mercury from roots to shoots, and was able to reduce soil Hg levels by 0.09 $\mu\text{g.g}^{-1}$ or 30.76% higher than the initial soil Hg content. Treatment of AID1 has a bioremediation effectiveness value of 79.07%, or 2 times less higher than the control. Bioremediation using indigenous bacteria was able to increase the total absorption compared to the control. Biduri as hyperaccumulator is 57.19 μg (higher than 10 $\mu\text{g.g}^{-1}$)

Impact of CO2 Emissions on GDP per Capita, FDI, Forest Area and Government Spending on Education in Indonesia 1991-200: The GMM Methods

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Abstract. The economy is considered an efficient way to materialize, but the relationship between CO2 emissions and economic growth has not been systematically explained. We will build a model that formalizes the interaction between CO2 emissions and GDP per Capita, FDI, Forest Area and Government Spending on Education used to revisit the trade-off between economic growth and the environment or a green economy. The model captures an essential feature of the continuous innovation process, which is path dependencies. First, this research will create a data analysis using the System GMM Estimation. Second, we will evaluate GDP per Capita, FDI, Forest Area and Government Spending on Education spending on green growth. The results of this study are expected to be a government policy to increase green economic growth.

Nano Silica Application for Inducing Rice Resistance and the Possibility for Ytterbium Rare Earth Elements Green Mining

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Abstract. There is a growing body of literature that recognizes the importance and usage of Silicon (Si) in plants to increase growth and productivity as well as plant resistance. Si in the form of Nano Silica particle recently becomes more frequently prescribed for inducing plant resistance and is essential for a range of technologies. This research examines the role of Nano Silica in rice for plant-induced resistance. This study set out to assess the effect of hydrophilic fumed Nano Silica application with the frequency of 1x, 2x, 3x, and 4x application respectively, through Randomized Block Design with three replications. SEM-EDX and XRF analysis were also used to identify the rice microanalysis appearance and microelement contents. Based on the observations, the Nano Silica frequencies showed a distinctive decrease of damage intensity at the 3x and 4x applications. The research also shows that the rice husk increase of metal-like surface appearance as more Nano Silica frequency was applied. Based on the finding it is proposed that Nano Silica induced plant resistance through the modification of surface layer or stronger physical barrier against pathogens or pests and stronger plant tolerance against environmental stress. The most unexpected observation to emerge from the data was that the emergence of Ytterbium (Yb), known as a Rare Earth Elements (REE) at the 3x and 4x Nano Silica applications. This indicates that the result of the Nano Silica application provides important insights and opportunities to advance the understanding of the Nano Silica application on Rice for the purpose of acquiring Ytterbium from farmland. Nano Silica can play an important role as a new method in addressing the Ytterbium green mining, which would be very advantageous to support renewable energy resources.

An ISM Approach for Identifying and Analyzing the Complexity of Beef Cattle Farming Problems in Central Java

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Abstract. The complexity of the problems in the beef cattle farming system in Central Java is a major challenge in determining policy strategies. Identification and mapping of problems is an important part of the process of determining the policy strategy. The research objectives were to identify and map the problem structure in the beef cattle farming system in Central Java. Interpretive Structural Modeling (ISM) was used to analyze the relationship between problems in the beef cattle farming system in Central Java. Data collection was carried out through literature review and in-depth interviews with several stakeholders consisting of academics, practitioners, and local governments. The results showed that the problems of beef cattle farming in Central Java were still related to the availability of feed, the socio-economic conditions of the farmers, and the production and reproduction of livestock. Problems related to the availability of animal feed were a leverage point in solving livestock problems in Central Java. The feed strengthening strategy was expected to become a priority in the context of developing beef cattle farms in Central Java.

Strategies to Enhance the Community Capacity to Reduce Landslides Risk in Ngargoyoso District, Karanganyar Regency

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Abstract. Characteristics of the Ngargoyoso District in Karanganyar Regency are categorized as vulnerable area for landslides. It has a high slope and the texture and structure of the soil is easily eroded and landslides. The purpose of this study is to formulate a strategy to increase community capacity to reduce regional and morphological risks of development in accordance with area functions, landslide susceptibility and soil erosion hazard level. The data used in this study is primary data, the data obtained through interviews with farmers and agricultural extension workers. Respondents were selected purposively with certain criteria. Data analysis used a qualitative descriptive approach and SWOT analysis. Strategies that can be formulated are: 1) the community needs to increase knowledge to understand environmental risks; 2) the community motivation needs to be increased to create a sustainable environment; 3) the importance of environmentally friendly tourism management. The expected implementation of the research results is that the community can continue to depend on the sustainable agricultural sector for their livelihood. Communities can reduce the risk of landslides that can harm materially and non-materially

Socio-economic Study on Empowering Women Farmers to Support the SDGs

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Abstract. SDGs number 5 is a goal for women to increase their participation in the country's economic development. There are many sectors where women can develop and have an impact on a country's development. Among the many existing development sectors, agriculture is one of the sectors with the most contribution to Indonesia's GDP. It is from the fact that Indonesia is a country that is rich in natural resources. However, there are still many Indonesian farmers, especially women, who live in poverty. Therefore, empowerment is an alternative to improve their standard of living. This study will examine the empowerment model among women farmers, at least in the agricultural sector in the area where they live. The research method used is a literature study. The results will show the pattern of empowerment formed among groups of women farmers in several regions in Indonesia. This pattern will explain how empowerment developed so that the participation of women farmers in economic development can increase in the future.

Social Media Interconnection between People: Greta Thunberg's Influence on Climate Movement

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Abstract. The increasing rate of climate change has been staggering over the past couple of years. It causes a lot of changes in the earth's biosphere. The earth's temperature has been increasing in an unprecedented phase, causing the seawater to expand and ice over land to melt, both of which can cause a rise in sea level. Given this problematic issue, the world leaders somehow do not put enough action to tackle this. When world leaders are failing our future by not taking the climate change issue seriously, a young girl from Sweden named Greta Thunberg is about to set a global spark of global movement concerning global warming. Since she began to strike outside the Swedish parliament, she gained the public's attention, especially among the youth. This study aims to analyze how Greta Thunberg influences the youth around the world to take action against climate change using social media. This article uses social activism theory and Collaborative Internet Utilities to analyze the global phenomenon. This Journal uses qualitative research methodology. The data and relevant information are being analyzed to explain Greta's influence on global youth regarding the climate change issue and its effects on global politics.

Infographic for the Dangers of Using Plastic Packaging and Cutlery as a Campaign Effort to Save the Environment in Surakarta Region

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Abstract. The Surakarta City Environmental Service noted that the volume of waste in 2021 reached 92,436 tons. Plastic waste accounts for 13.39 percent of the total waste generated in Surakarta City. This can threaten nature sustainability and bear negative impacts on human health. Using infographic media, the Visual Communication Design Study Program held a campaign about the dangers of using plastic packaging and cutlery as an effort to save the environment, especially in Surakarta area. Research and Development method and ADDIE model were used in developing the media. The creation of infographics was carried out in five steps; analysis, design, development, implementation, and evaluation. The achieved results are positive attention and response through social media from the younger generation and the emergence of community-based movements that participate in environmental conservation programs.

Potential effect of Some Essential Oils on Rumen Methane Reduction and Digestibility by In Vitro Incubation Technique

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Abstract. Since excessive use of in-feed antibiotics, hormones, and some chemical feed supplements can potentially affect health risks and environmental problems, organic feed supplement is an alternative save material. Organic material such as essential oils (EO) is potential for feed additive in the livestock industry because of their main activity as rumen manipulator. Their potential as rumen manipulators has not enough for type and doses of essential oils experiment. Therefore, The objective of this study was to evaluate 6 essential oils/EO's (garlic/, thyme, clove, orange peel, mint and cinnamon) with different doses (100, 200 and 300 ppm) on in vitro rumen methane reduction and in vitro digestibility using in vitro gas production technique. The experiment resulted highest level in in-vitro methane reduction potential (MRP, %) 72.83% at orange peel oils 300 ppm after 6 h incubation, while using clove oils 300 ppm had highest in vitro true digestibility of dry matter (IVTDDM) 81.41% after 30 hour incubation. Using Cinnamon oils had high value both of MRP level and IVTDDM (48.91 and 79,12 %). In Conclusion, all essentials oils reduced in vitro rumen methane production at 6 h incubation compared to control at 300 ppm and there was no negative effect on In Vitro Digestibility.

Morphological Characterization of Natural Orchids *Dendrobium* Spp

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Abstract. *Dendrobium* is composed of 1600 kinds of sympodial epiphytic orchids. The genus is characterized by long pseudobulbs or canes with soft leaves over the entire length, or in some species, short or swollen pseudobulbs, ending in two leathery leaves. The inflorescence is terminal or near terminal, arranged into one to dozens of flowers with extremely different sizes, sizes and color ranges. The research purposes to identify the quantitative morphological character of five species of *Dendrobium*. *D. mirbelianum* and *D. bracteosum* from Papua, *D. lamellatum* from Java, *D. anosmum* from South Kalimantan, and *D. purpureum* from North Sumatera were used as the materials on this study. The dendrogram results based on the similarity matrix are divided into two clusters, five species have 1.50 value of similarity coefficient. The first cluster is composed of *D. mirbelianum* only, the second cluster is composed of *D. lamellatum*, *D. purpureum*, *D. bracteosum* and *D. anosmum* which have more distant relationship with other three orchids on the second cluster. *D. lamellatum* and *D. purpureum* have the closest similarity coefficient with 0.81 value which have bigger chance to use the parents in hybridization. Many *Dendrobium* spp. is based on the relationship of the distribution area. In addition to quantitative traits, it also needs to expand through traits, from qualitative, anatomical, cytological, and molecular levels to get more comprehensive data.

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Does Corporate Environmental Responsibility Affect Investor Future Goal in the Energy Sector Firms?

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Abstract. This study investigates the relationship between corporate environmental responsibility and firm's financial performance by using a sample set of 2,241 firm-year observations representing 470 unique energy firms from 30 countries from 2013–2020. Supporting stakeholder theory, we find that firms with better environmental responsibility actions are associated with higher Tobins'q, suggesting that the investors react positively to the firm's environmental initiatives. Overall, our findings suggest that firms in the energy sector should pay attention to corporate environmental responsibility practices to obtain a good response from the investors and achieve the firm's long-term financial goals.

Illegal Land Clearing and Green Economy Campaign in Indonesia

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Abstract. Indonesia's total area of forest and waters is around 130.68 million hectares, but it consistently decreases yearly. The illegal land clearing for agricultural activity is considered as the main cause of the forest reduction, as around 5.6 million hectares of land burned between 2015 and 201 and it costs of hundreds of trillions to the country. In order to lessen the negative impacts of land clearing, Indonesian government indeed has started to promote a green economy campaign, known as sustainable development with an environmental perspective. This study aims to examine the relationship between illegal land clearing and its effect on the Indonesian economy and its relationship with the green economy campaign initiated by the Indonesian government. We use the data from the Indonesian Ministry of Environment and Forestry, Central Bureau of Statistics, Greenpeace Indonesia, and World Bank to analyze this issue. We find that the governments' poor regulation and monitoring have caused forest and land fires almost every year and it has huge economic and environmental costs that should be paid by the government. Therefore, a strong law enforcement is needed so that the green economy campaign in Indonesia can be executed properly.

Electricity Machinery, Renewable Energy and Green Economy

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Abstract. The increase in industrial activities is followed by an increase in complex environmental problems, such as air pollution due to factories exhaust fumes that are mostly produced in industrial areas such as in Surabaya city, Indonesia. Based on data from iqair.com, three industrial areas in Surabaya belong to the moderate to unhealthy category of sensitive groups. The Tandes industrial area is in the unhealthy category for sensitive groups with an AQI US index of 104. Meanwhile, the Kertajaya and Benowo are in the moderate category with an AQI US index of 61 and 86, respectively. It is necessary to handle it through the implementation of a green economy program. The existing renewable energy power plants in Indonesia will support the industry to switch to the use of electricity-based machines from renewable energy which will reduce air pollution that causes greenhouse gas emissions. The purpose of this study is to analyze the factory as quickly as possible on the environment and analyze the application of the green economy through the use of electricity-based machines. Qualitative method is employed in this study. Result show that applying of electricity-based machines can reduce the level of air pollution in Surabaya and potentially increase renewable energy in Indonesia.

Communicating Sustainable Environment and Pro Poor Policy in Tourism in Indonesia: A Discourse Network Analysis

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Abstract. The paper is based on the previous studies findings that the economic development programs are sometime counterproductive with the endeavours in sustainable environmental preservation. The development of tourism to increase the regional economy sometime becomes a source of environmental damages. The problem that is addressed in this paper is: how can tourism development support the sustainable environment policy and at the same time increasing the economy. This study aims to analyse how the values of sustainable environment and economy development are represented and discussed in the tourism policy of Geopark Karangsambung-Karangbolong (GKK), Kebumen, Central Java, Indonesia. This study employs quantitative approach with Discourse Network Analysis as the main technique. The data is taken from the news stories published on the geopark.kebumenkab.go.id before the Covid-19 pandemic (January 2019 – 15 March 2020) and during the pandemic (16 March 2020 – 30 June 2021). The unit of analysis is words or phrases in the news story which represent: (1) discourses on preserving the healthy environment; (2) discourses on improving the economic welfare and reducing the poverty; and (3) network of actors related to the discourse. This study finds that the communication of GKK sustainable environment policy contains discourses on sustainable tourism, affirmative actions to poverty reduction in the region, and the involvement of the pentahelix elements. This study also suggests further studies by expanding the variety of tourism policies, the scope of regions, and the variety of media in order to map the actors' profiles and the network of supporters of the sustainable environment and pro poor tourism.

Agri-Environmental Policies in the Indonesian and Thailand: A Comparison

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Abstract. Environmental issues in the agricultural sector became an interesting topic after the introduction of the Green Revolution in Indonesia and the Integrated Farming System in Thailand. This article discusses the efforts of the Governments of Indonesia and Thailand in implementing Agri-environmental policies (AEPs). The implementation of Agri-environmental policies has become a discourse that in the last few decades has played an increasingly vital role for the government to encourage the Environmental Performance Index (EPI) and the Sustainable Nitrogen Management Index (SNMI). Indonesia and Thailand can be regarded as 2 (two) developing countries in the Asia Pacific that have high attention in implementing Agri-environmental policies. Therefore, this research has 2 (two) main objectives: 1) Analyzing the determinants of successful implementation of Agri-environmental policies in the two countries; and 2) Analyzing the role of Agri-environmental policies in each country in improving the Environmental Performance Index and Sustainable Nitrogen Management Index. The method used in this research is comparative descriptive with a qualitative approach. Meanwhile, the data collection technique was carried out by studying documentation from various sources related to Agri-environmental policies. The results show that Indonesia's Agri-environmental policies, in this case, the Green Revolution, are superior in improving the Sustainable Nitrogen Management Index indicators. Meanwhile, the determinant of the success of the Agri-environmental policies, namely the Integrated Farming System in Thailand, is in optimizing the Environmental Performance Index.

Variant of Flowers and Plants as An Abstraction Javatic Batik Motif from Classic to Contemporary Era

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Abstract. Batik is one of the works of art of the old Javanese people who continue to live and develop until now. In the 18th Century, it became a special type of clothing for the nobility, and even became a prohibition for batik clothing for certain types of motifs. The basic substance is not the type of fabric or the shape of the clothing design, but the ornamental images made on the fabric. A piece of cloth can change its position and value only because of the difference in decoration. Batik as a visual aesthetic is the work of Javanese creators in abstracting the surrounding natural environment, especially various flora and fauna. Until 1912, there were more than 100 names of flowers and plants that were abstracted into classical motifs. Now, although batik is increasingly popular in the community, only a few of these classic motifs are preserved. Entering the contemporary era, where batik is increasingly accepted as clothing for the general public, flora-based motifs are no longer the result of abstraction from certain flowers or plants, but are more considered in their ornamental aesthetics. The aesthetic value of contemporary batik motifs is no longer what kind of flowers or plants are abstracted, but how to represent them for the beauty of dress.

Paper ID: 224

Batik Grajen: Eco-Friendly Batik Utilizing Wood Waste for Batik Dye

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Abstract. Batik Grajen is batik which in its coloring process uses natural dyes from *grajen* waste (wood powder). Batik Grajen was developed by batik craftsmen in the Bulakan area, Sukoharjo, Central Java. The development of Batik Grajen is ecologically interesting because the people of Bulakan process wood waste from the sawmill industry into environmentally friendly batik dyes. Wood waste in the form of sawdust (*grajen*) is used as batik dye because of the pigment content in it. The dyes produced are safer and more environmentally friendly than synthetic dyes. What the Bulakan people do through Batik Grajen products is a creative solution to respond to environmental problems, especially the problem of waste that can be recycled into creative products with economic value.

The Appearance of DNA Bands Pattern Based on The Result of Primary Selection of RAPD Orchid *Phaius* spp.

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Abstract. This study aims to examine the appearance of the DNA banding pattern resulting from the selection of RAPD primers on *Phaius* spp. namely *Phaius tankervilleae*, *Phaius montanus* *Phaius collasus* and *Phaius amboinensis*, the research material was taken from the orchid collection in the Bogor Botanical Gardens. The analysis was carried out at the Laboratory of the Center for Horticultural and Tropical Studies IPB using RAPD. 2 primers RAPD OPA 13 and OPB 18 can be used for DNA amplification of orchids *Phaius* spp (*Phaius tankervilleae*, *Phaius montanus* *Phaius collasus* and *Phaius amboinensis*) because they produce clear DNA bands, these primers can produce clear DNA bands and amplify as many as 10 DNA bands with 100% polymorphism.

miRNA Target Prediction of Avian Z-Linked DMRT1 Gene During Sex Determination in Chicken (*G. Gallus*)

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Abstract. Sex determination in dimorphic animal, such as chicken (*G. Gallus*), is controlled by the expression of doublesex and mab-3 related transcription factor 1 (DMRT1) gene. This gene act as sex determination switch by critically needed for testis differentiation and as antagonist of ovarian development. miRNA, is belongs to short noncoding RNA which modulate gene expression in specific or board targeted genes. This study was aimed to predict miRNA(s) candidate targeted to DMRT1 expression in chicken. In silico method was employed to mine miRNA targeted to DMRT1 using three online databases namely miRDB, TargetScan, and microT-CDS. Following prediction, clustering was performed to select common miRNA(s) in minimal two databases for gene ontology (GO) analysis. Totally 78 miRNAs were targeted to DMRT1 3'UTR, and eight miRNA(s) were found in minimal two databases. The GO analysis found seven distinct biological functions in membrane, cytoplasm, protein binding, nucleus, integral component of membrane and molecular function, and all are related to the cell growth namely cell proliferation. According to the result, it shows the possibility to use selected candidate of miRNA(s) targeted to DMRT1 to reveal the sex determination mechanism at early stage of chicken development.



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