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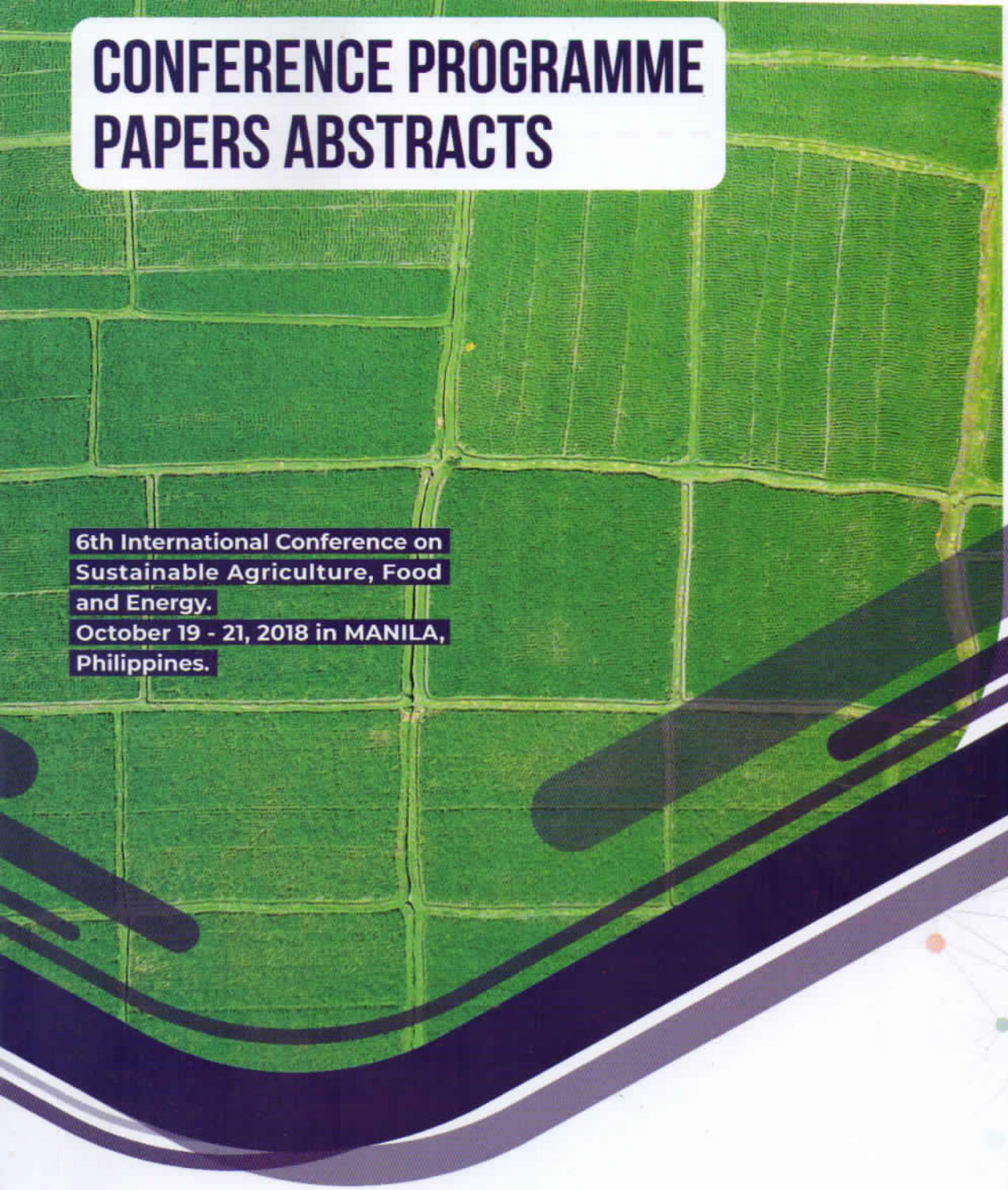

6th International Conference on Sustainable Agriculture, Food and Energy.
October 19 - 21, 2018 in MANILA, Philippines.

Inclusive Agri-food Energy Production for Community Empowerment in a Changing Climate

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WELCOME MESSAGE FROM SAFE-NETWORK

Welcome to the International Conference on Sustainable Agriculture, Food, and Energy (SAFE 2018)

We are proud to welcome you to the **International Conference on Sustainable Agriculture, Food, and Energy (SAFE2018): Inclusive Agri-food Energy Production for Community Empowerment in a Changing Climate"** which will be held from October 19-21, 2018 in MANILA, Philippine. The host institution is Pampanga State Agricultural University (PSAU), Philippines Centre for Postharvest and Mechanization (PhilMech), and Central Bicol State University of Agriculture (CBSUA), Philippines This conference is the 6th conference after the 1st International Conference on Sustainable Agriculture, Food, and Energy (**SAFE2013**) in Padang, Indonesia (12-14 May 2014), the 2nd conference **SAFE2014** in Bali, Indonesia (17-19 September 2014). The 3rd conference **SAFE2015** in Ho Chi Minh City, VIETNAM (17-19 November 2015), 4th conference **SAFE2016**, Colombo, Sri Lanka (October 20-22, 2016), and the 5th conference **SAFE2017**, Malaysia, August 22-24, 2017.

The objectives of the conference are:

1. To provide a forum for international researchers community to exchange and share the experiences, new ideas, sustainability concepts and research results on sustainable agriculture, food , and energy.
2. To promote collaboration in research on sustainable agriculture, foods, and energy production.
3. To establish a regional networking among participants on sustainable agriculture, food, and energy.
4. To increase awareness of the importance of living and working in the manner that enhances the economic, environmental and social well-being of our community through research, education, regional partnerships, and community engagement.

SAFE2018 provide resources and opportunities to interact with prominent leaders in the field of sustainability and greatly expand your global network of scholars and professionals This event aims to bring together people from different areas and interests to share ideas, explore various discussions, maintain existing connections, establish new connections and partnerships, and share the achievements of the work.

On behalf of **SAFE-Network,** we would like to convey our appreciation and thanks very much to the **Pampanga State Agricultural University (PSAU), Central Bicol State University of Agriculture (CBSUA), and Philippines Centre for Postharvest and Mechanization (PhilMech)** for co-hosting this conference.

We would like especially to thank **Prof. Dr.Tafdil Husni,** *Rector of Andalas University* for his strong support to this event, **Dr. Norman de Jesus,** *local conference coordinator* and the members of the local organizing committee who helped with all the preparations required to make the conference a success, as well as the session organizers who worked to ensure a high level of science presented at the meeting. Moreover, of course, we thank all honorable speakers and participants who have agreed to attend and discuss your work! Finally, please understand that while every effort was made to publish this book as the "final" program, we know that unavoidable withdrawals and other changes will occur.

Welcome to SAFE-2018, MANILA! Please enjoy the friendship!
True friendship and knowledgeable partnership works exceptionally.

Looking forward to welcoming you to the SAFE2019 conference in Krabi, THAILAND!

Dr. Novizar Nazir
SAFE-Network Coordinator

THE FARMING ANALYSIS OF RICE-CATTLE INTEGRATED FARMING MODEL IN LIMA PULUH KOTA REGENCY

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ABSTRACT

This study focuses on the the farming analysis of rice-cattle integrated farming model. This research is based on the new paradigm of agricultural development is the development of integrated farming. Agricultural development aims to optimize the utilization of natural resources and advanced technology is cheap, simple, and effective accompanied by the arrangement and development of agricultural institutions in rural areas. Integrated farming as a solution to problems in economic development.

The results showed that the average production amount of rice produced was 5.6 tonnes per hectare, with the total revenue obtained amounting to IDR 29,120,000 and the total cost of IDR 12,5840,000 per hectare. So that the total income earned from rice Integrated Farming System (IFS) is IDR 14,576,000. The R/C ratio of rice IFS obtained is 2.0, the R/C ratio shows that the rice farming IFS is very feasible to cultivate, because the profit level is 100% higher than the prevailing bank interest rate. The total revenue obtained from cattle farming IFS is IDR 40,610,000 with a total cost of IDR 32,850,745 per head. So the total income obtained from cattle farming IFS is IDR 7,759,255. The R/C ratio obtained is 1.24, the R/C ratio indicates that the cattle farming is feasible to be cultivated because the profit level is 24% higher than the prevailing bank interest rate.

Key word : *Model, Integrated Farming, Rice, Cattle*

INTORDUCTION

The new paradigm of agricultural development is improving the quality and professionalism of peasant human resources as active actors in integrated agricultural development. Agricultural development aims to optimize the use of natural and advanced resources that are cheap, simple, and effective accompanied by structuring and developing agricultural institutions in rural areas.

Integrated agriculture is an agricultural activity that combines two or more fields of agriculture (food crops, horticulture, plantations, forestry, livestock, and fisheries) that benefit each other with plant, livestock and fish objects that are carried out both on one land, several lands and on an area or region through the utilization of agricultural wastes in the form of leaves, fruit, flowers, stems, livestock manure, fish excrement with the aim of maintaining, increasing production and productivity so that farmers can increase income and create environmentally friendly agricultural conditions.

Integrated agriculture is very much needed in the development of regions or regions because integrated agriculture can be one solution in increasing the success of agricultural development and regional development. This is because integrated agriculture has many benefits and advantages, namely: a) the most effective and efficient food provider; b) empirically integrated agriculture is the best form of agriculture because almost no components are wasted; c) trials in various regions in Indonesia by implementing integrated farming systems have been able to increase the effectiveness and efficiency of production; d) farmers can have several sources of income; e) there is insurance or guarantee if one of the commodities fails to harvest; f) byproducts of livestock, manure, fertilizer so farmers do not need to buy fertilizer anymore; g) reduce dependence on market-determined external inputs and government subsidies; h) agricultural waste can be utilized by processing it into biomass; i) Energy efficient and cost-effective; j) there is a biological balance, the enemy is a friend so that pest attacks are not so many; k) Fish cultivated in ponds without having to buy artificial feed; l) Treating human, plant and animal waste in the same system to keep the place clean without extra expenses for the family or the government; m) reduce the need for garbage collection services by developing a more independent structure of local communities; n) developing alternative solutions for energy that cover biogas energy for household or agricultural purposes, even for agro-industry purposes; o) integrated farming of fish, livestock and plants has helped improve the supply of fertilizer and feed, plus a higher market value of fish because food and / or food have substantially increased income; and p) technically, an important addition to the second nutrient cycle of fish waste has benefited the increasing integration process, and has significantly improved the lives of many small farmers (Sulaeman, 2007).

An integrated farming system consists of a variety of resource-saving practices that aim to obtain received profits and high and sustainable levels of production, and minimize the negative effects of intensive farming and preserve the environment (Lal and Miller, 1990; Gupta et al, 2012).

The resources owned by farmers make it possible to cultivate the integration of crops and livestock. The farming model that can be applied is the integration model of rice-livestock and the cocoa-livestock integration model. The decision of farmers to choose integrated farming of crops and livestock for both rice-livestock and cacao-livestock is determined by the availability of a product market between both plant byproducts and compost. Without the support of the intermediate product market, the income that can be received from the integration model is lower than the model without integration. (Sayekti, (2009).

RESEARCH METHOD

This research was conducted in Lima Puluh Kota Regency. While the time of this study was carried out for ± 8 months, starting from April - November 2018. The selection of research areas was done by puIDRosive method or intentionally (Sugiyono, 2013). Based on the deliberate method selected 4 (four) Subdistricts namely Payakumbuh Subdistrict, Harau Subdistrict, Guguak Subdistrict and Mungka Subdistrict, based on the consideration of the selected Subdistrict there has never been a related research.

Sampling method uses the snowball sampling method. According to Rianse and Abdi (2010), the snowball sampling method is used if there is no data on population numbers so it is not possible to frame the sample. With this method, the researcher first looks for respondents who fit the criteria set, then from this respondent will appoint or invite other friends to be sampled, and so on until the number of samples considered by the researcher has represented representative to answer the research objectives.

To answer the purpose of stage 1 to conduct farming analysis using the formula for farming income (Pd). Mathematically it can be written:

$$\mathbf{Pd = TR - TC}$$

Notes : Pd = Farming Income
TR = Total Revenue
TC = Total Cost

Whereas to answer the purpose of stage 2 is done by using R/C ratio analysis and profitability. Mathematically it can be written:

1. Analysis of R/C ratio

$$\text{R/C ratio} = \frac{TR}{TC}$$

Dimana: TR = Total revenue
TC = Total cost

2. Analysis Profitability

$$\text{PR} = \frac{TR - TC}{TC} x100\%$$

RESULTS AND DISCUSSION

Analysis of Rice Farming Income

Based on the results of the analysis of the income of rice farming in the rice-cattle SPT model, it can be explained about how much the cost and income of rice farmers are. In detail, it will explain about seed costs, organic fertilizer costs, inorganic fertilizer costs, pesticide

costs, and labor costs. Then, how much revenue and income is obtained by SPT rice farmers. All costs and income of farmers are calculated in the period of 3 times the planting season, this is because to balance one season of cattle business for a long period of 16-18 months.

The seeds used in farming are Junjuang, A2, Kuriah, Benang pulau, bakwan, sokan, bakwan and putiah bukittinggi. In general, rice farmers use local seeds because the price is cheap, easy to obtain, the results are not much different from superior seeds and because of habits that have been passed down through generations. The amount of rice seed needs for farmers depends on the variety of seeds used, namely: 30-60 kg / hectare. Farmers get rice seeds in general by buying at their own expense at local agricultural kiosks. The price of seeds that are valid in the market is still relatively expensive, Rp. 5,200 to 6,200 per kg with a direct and cash payment system. Farmers can get rice seeds at any time easily with the quantity and quality they want. The amount of costs incurred by farmers to buy rice seeds in rice farming in the SPT model is Rp. 93,600 to 656,250.00. The average cost incurred by farmers to buy rice seeds is Rp. 846,373.11.

In this SPT rice farming, farmers always use a combination of organic fertilizer and inorganic fertilizer. Organic fertilizer in the form of manure and compost, while inorganic fertilizers in the form of UREA, SP-36, and NPK. The amount of costs incurred by farmers for cow manure is Rp. 60,000 to Rp. 1,200,000.00, with the average cost incurred by farmers amounting to Rp. 800,800.00. While the amount of costs incurred by farmers for cow compost is Rp. 600,000 to Rp. 1,371,428.57, with the average cost incurred by farmers is Rp. 512,000.00. Manure and compost are obtained from the manure of the cattle themselves and processed by themselves, but if the deficiencies are obtained by buying from other cattle farmers. Fertilizing rice plants with organic fertilizers is done by sowing fertilizer around the staple of rice plants. Manure is given once when rice plants are 7 days before planting (HST) with a salary of Rp. 50,000.00 - Rp. 80,000.00 per person working day (HKO), this is in accordance with the prevailing wages.

The amount spent by farmers to buy inorganic fertilizers is Rp. 189,000.00 to Rp. 1,035,000.00, with an average cost of Rp. 1,488,640.00. Inorganic fertilizers consist of: UREA fertilizer in the amount of Rp. 94,500.00 to Rp. 377,142.86; SP-36 fertilizer is Rp. 150,000.00 to 345,000.00; and NPK fertilizer in the amount of Rp. 75,000.00 to Rp. 462,857.14. Fertilizing inorganic fertilizers was given 2 times, namely: 1) Urea, SP-36 and NPK Phonska fertilizers were given when rice plants were aged 15-21 days with the amount of half a dose for Urea and NPK Phonska, full dose for SP-36; 2) Phonska Urea and NPK fertilizers are half the dosage when the rice plants are 45 - 75 days old with fertilizer costs of Rp 50,000 - Rp 80,000.

In the farming process farmers also use several pesticides that are used to control pests that can damage crops. Pesticides used by rice farmers use organic fertilizers in the form of herbicides and insecticides to control weeds. The pesticides used consisted of: Curacron, sidametrin, lannet, decis, propaton, pigor, alika, the amount of costs incurred by farmers to buy pesticides was Rp. 60,000.00 to Rp. 7,749,000.00, with an average cost of Rp. 275,850.00. The pesticides used consisted of: Curacron, sidametrin, lannet, decis, propaton, pigor, and alika.

The labor costs incurred by farmers are intended to finance labor at all stages of crop cultivation both male labor (TKP), female labor (TKW) and machine labor (Tractor). Stages of rice cultivation ranging from land preparation to harvest and post-harvest. The labor needed by farmers is easy to obtain every time the farmer needs it, this is because the average local community works more as a farmer so that if farmers offer jobs in rice cultivation they want especially when they are not working. The amount of labor costs incurred in rice farming model SPT is Rp. 6,720,000.00 to Rp. 741,216,000.00. The amount of TKP wages is

different from the amount of wages for migrant workers, where the amount of TKW wages is 50% of the TKP wages, the amount of TKM wages is Rp. 100 - Rp. 160 / m2.

The total costs incurred by rice farmers in the SPT model are Rp. 7,224,000.00 to Rp. 789,442,500.00, with the average total costs incurred being Rp. 61,234,610.78. The amount of grain production produced by small-scale SIPT rice farmers in the three planting seasons is 1.5 tons to 191.1 tons or 3.0 - 5.76 tons / ha. The average production of grain produced by rice farmers is 4.77 tons. The total revenue obtained is Rp. 8,400,000.00 up to Rp. 1,070,160,000.00, with an average total revenue obtained by farmers of Rp. 79,586,225.00. Thus the total income of rice farmers in the SPT model is Rp. 1,146,900.00 up to Rp. 280,717,500.00, with an average farmer's income of Rp. 18,351,614.22 / farmer / season.

Straw as a rice crop waste which is abundant during the harvest season, is available throughout the year and is easily available. Rice straw can be a solution during the dry season where the availability of forage is very limited, so farmers have the courage to raise large numbers of cattle because of the guarantee of fulfilling the need for feed for cows during the dry season. Fermented straw can be a solution for the continuity of long-lasting feed so that it can overcome the limited availability of forage feed during the dry season.

Analysis of Cattle Farming Income

The types of cattle cultivated in integrated farming systems in the study area are Simmental Breeds, Pearanakan Ongole (PO), Brahman, Bali and Coastal Cows. Ownership status: self-owned, owned by investors and government assistance. Breeders / cattle prices paid by farmers are Rp. 4,000,000 - 12,000,000 / head, with the average costs incurred by farmers to buy broods for Rp. 12,000,000 to 770,000,000 / season.

Cattle feed provided by farmers in the form of forages or grass, straw and concentrated feed consisting of bran, oil palm cake, cassava, minerals and vitamins. The costs incurred by farmers to buy cattle feed are Rp. 6,075,000.00 to Rp. 194,119,200.00 / season, with an average cost of Rp. 30,387,458.67 / season.

The medicines provided by farmers during cattle farming consist of worm medicine, vitamins, wound medicine, and flea medicine. The use of drugs is an easy and effective way in beef cattle business, with the use of drugs it is expected that cattle growth will be better so that it will provide satisfactory performance of cattle and meat production. The costs incurred by farmers for medicines are Rp. 14,000.00 per Rp. 3,300,000.00 / season, with the average cost of medicines for cattle being Rp. 211,915.56 /head.

The ingredients needed in the utilization of cattle waste to be used as organic fertilizer in the form of manure and compost, namely: cow feces, trichoderma, agricultural lime / dolomite, sawdust, and husk ash. The amount of costs incurred to purchase these materials is Rp. 30,167.00 per Rp. 42,774,480.00 / season, with an average cost of Rp. 953,948.52 / season. The ingredients needed in making fermented straw feed are: Urea, starbio, and rice straw. The amount of the cost to purchase these materials is Rp. 258,048.00 s / d Rp. 125,611,200.00 / season, with an average cost of Rp. 4,787,704.00 / season.

The cost of the tools needed in SPT cattle farming consists of: the cost of cages and cage equipment, the cost of compost houses and equipment as well as the cost of straw houses and equipment. The tools needed include: Shovels, carts, garbage bins, water pump machines (sanyo), water machines (sachin), knapsack sprayers, water tanks and brooms. Costs incurred for cages and cage equipment are Rp 40,5000 to Rp. 18,626,023.12/season, with an average cost of Rp. 1,060,385.03 / season. The costs incurred for the compost house and its equipment are Rp. 46,524.18 to Rp. 22,136,818.75/season, with an average cost of Rp. 575,338.35/season. While the costs incurred for fermented straw houses and equipment are Rp. 5,769.23 to Rp. 843,408.12/season, with an average cost of Rp. 21,126.25/season.

Workers in SPT cattle farming are skilled and productive workers in raising cattle and are able to make fermented hay feed and are able to utilize cow feces waste to be processed into organic fertilizer. So that cattle grow healthy and well. The labor costs incurred in raising cattle are Rp. 2,057,142.86 to Rp. 139,392,000.00/season, with the average cost of labor being Rp. 9,731,434.29.

Revenue obtained from cattle farming in the SPT model consist of cattle in the form of broodstock and tillers and manure and compost. The total average income obtained from rice-cattle SPT cattle farming is Rp 165,014,288.89/season. The total average cost incurred by farmers is Rp. 134,873,755.11/season. So that the income earned from rice-cattle SPT farming is Rp. 30,268,486.16/season.

CONCLUSION

The revenue of rice farming in the rice-cattle SPT model is IDR 79,586,225/season, at a cost of IDR 61,634,610.78. The income earned is Rp. 19,531,430.43.

The income from cattle farming in the rice-cattle SPT model is Rp. 165,014,288.89/season, with a total cost of Rp. 134,873,755.11 / season. The income earned is Rp. 30,268,486.16 / season.

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