

Potential and Opportunity to Increase Income of Integrated Farming Business Based On Swampland Area In Pampangan Sub-District Ogan Komering Ilir District

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Abstract: Paddy field with swampland character has a well potency if it is well developed in order to increase the production of crops especially for paddy on swampland field. Based on the total of paddy fields in South Sumatera, swampland dominates 34.3 percents of them (BPS, 2013.). If the land is well utilized and is followed by the control of smart technology then the productivity of crops particularly rice plants could grow faster. Integration of farming business could become a right technology to raise the efficiency and to increase the productivity of existed farming business. Other than that, the application of this integration can provide opportunities toward food security and farmers income. There are three main components inside the system of crops and livestock integration, i.e. (a) livestock farming; (b) crops cultivation; and (c) utilization of straw and compost. Pampangan Sub-District in OganKomeringIlir District has a swampy ecosystem for agricultural land and this view is supported by the amount of puddle in every land. This condition is quite potential for integrated swamped paddy and buffalo farming business. Some existed potentials used for expanding agricultural business of paddy and buffalo farms are (1) existence of potential domestic market, (2) supports by field/nature to provide cattle feed and fertilizer in a big amount and relatively inexpensive, (3) existence of human resource and institution, (4) existence of innovation of integrated technology. The system of integrated farming business in Pampangan Sub-District is more efficient than non-integrated farming business which is shown by the number of R/C as the ratio of integrated farming business 6.0820 > than total R/C of the ratio of non-integrated farming business with the total of R/C is 4.9844.

Keywords: Potency of integration, Rice plants, Buffalo farms.

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I. Introduction

South Sumatera is one of the provinces whose 58.64 percents or 1,894,756 of population working in agricultural sector by working on some types of agricultural areas (South Sumatera BPS, 2013). Among some agro-ecosystem types of lands (irrigation, rainfed, and swamp), agro-ecosystem of swampland is the largest with 559,860 hectares (72.30 percents) compared to the irrigation lands that have 117,757 hectares (15.20 percents) and the land of rainfed is 96,885 hectares (12.50 percents). The agro-ecosystem of swampland covers 285,941 hectares of swampland and 273,919 hectares of tidal land which is still planted with specific local variety of paddy on some areas (BPSPSS, 2016). According to Department of Agriculture for Crops and Horticulture (2014), applied swampland for rice plants is spread over some Sub-Districts, they are OganKomeringIlir (OKI), MusiBanyuasin (MUBA), OganKomeringUlu (OKU), MuaraEnim and Banyuasin.

Swampland in OganKomeringIlir has a potency to be the spot for farming business with high productivity if it is processed by applying the right technology of specific location and water management. OKI has one of the largest lowland potencies in South Sumatera. However, productivity of swampland in OganKomeringIlir is still categorized as low to medium. A few earlier researches claimed that the productivity of farming business at swampland in OganKomeringIlir is classified as low to medium, such as 3.3-3.6 tons per hectare (Zahri, 1994) and 3.6-4.4 tons per hectare (Noor, 2007). The low productivity of land causes low income to farmers of swampland area. This condition encourages the swampland farmers to establish the kinds of business systems such as business of buffalo farms. Typology of swampland that is dominated by water enables the farmers to build buffalo farms in order to earn more income for farmers.

Rice fields in swampy character is potential if it is well developed in terms to raise crops production especially paddy planted in swampland. Regarding to the total of paddy fields in South Sumatera, swampland dominates 34.3 percents of the area (BPS, 2013). If it is utilized well and is supported by the control of technology then the productivity of crops especially paddy could grow faster.

Integrated farming business can be a right technology in order to increase the efficiency and productivity of the existed farming business. On the other hand, implementation of this integration can create

the opportunity in food security and farmers income. Integrated farming business is one of the solutions to implement two activities in its production activity. At least, farmers can implement two activities in one equal planting location, two activities that support one another. Integrated farming business creates resource saving mode to achieve acceptable profit and high and sustainable production level, as well as to minimize negative effects from intensive agriculture and to preserving the environment (Walia and Kaur, 2013).

Model of integrated plants developed in some locations and countries orient on zero waste production system which means that all wastes from livestock and plants are going to be recycled and to be reused in production cycle. Components of this farming business involve livestock business, crops (paddy or corn), horticulture (vegetable), plantation (sugarcane), and fishery (catfish, carp, tilapia fish). Livestock waste is processed into compost and granular organic fertilizer and biogas; agricultural wastes (straw, stem, and corn leaf, cane shoots, soybean straw and peanuts) are turned into feed (DirektoratJenderalPeternakan, 2010).

There are three main components in the system of integrated crops and livestock : (a) livestock farming; (b) crops farming; and (c) utilization of straw and compost. Pampangan Sub-District in OganKomerlingIlir District has agricultural field with swampland agro-ecosystem with large amount of water in every field. This condition is very potential for farming industry with integrated swampy rice plants and buffalo farms mode. Buffalos in Pampangan Sub-District are maintained in traditional way, the buffalos are housed in groups in evening, meanwhile the buffalos are released to swampy areas in day. The population of this livestock is decreasing each year. Nowadays, the population of this livestock is estimated around 3,623.

Agricultural development activities through integrated rice plants activity have become the most developed farming business method in some areas and agro-ecosystem in Indonesia. Besides being a source of family income, this method is assumed that it can bring various impacts on integration process with more expanded program of business development. Some patterns of integrated crops-livestock development based on either commodity or agro-ecosystem have been a part of an effort to encourage national self-sufficiency business.

Research Goal

Based on the introduction, the aims of this research are

1. To understand the potency of farming business with integrated pattern of paddy-buffalo at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District.
2. To understand the potential profit using integrated system of swampy rice plant and buffalo farm at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District.

Research Method

This research was conducted at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District and was determined purposively. This region is a potential area for agriculture to implement integrated farming pattern. Populations in this research are 30 rice farmers that maintain buffalo farms in household scale.

Type and Source of Data

Data used in this research was primer data obtained from the field through interview using questionnaire and secondary data was obtained from Central Bureau of Statistics (BPS) at OganKomerlingIlir District, the results of research, journals and other official publications.

Methods of Data Analysis

Methods of analysis used in this research are:

- a) To understand the potency of farming business with the integration of rice plant-buffalo at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District which was analyzed using descriptive analysis that presented some available potentials at doing farming business with the integration of rice plant-buffalo.
- b) To know the potential of income level using farming system of integrated rice plant and buffalo farm at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District and was analyzed with R/C-ratio, with criteria of R/C; $R/C \geq 1$ for decent farming business, $R/C = 1$ BEP (equal) and $R/C < 1$ improper farming business.

II. Result and Discussion

The potency of farming business with integration pattern of rice plant and buffalo farm at PulauLayang village, Pampangan Sub-District, OganKomerlingIlir District

There are some potential ways to use in order to develop the rice plant and buffalo farming business : (1) the existence of potential domestic market, (2) support system from field/nature to provide animal feed and fertilizer in a big amount and relatively inexpensive, (3) human resource and relative institutional availability, (4) availability of integrated technology innovation.

1. Potential Market

According to consumption rate, there were around 750.90 grams of meat per capita in a week in 2018. As the population grows about 1.5 % per year and economic growth increases from 1.5 % to 5 % in 2020, it accordingly assumes that beef/buffalo meat consumption will increase from 750.90 grams/capita/week into 906.7 grams/capita/week. If this is linked with the provision of desirable dietary pattern, Indonesian citizens are supposed to consume meat around 1.1 kilograms/capita/week.

Indonesia has a quite large rice field, where all the waste from agricultural sector or biomass produced in agribusiness industry have not entirely been used as feed source to develop any other cattle. In this time, there is still rice field or moor not optimally utilized to develop the cattle. All swampland in Indonesia is around 33.43 million hectares. Among the total of swamp area belongs to agriculture, the area utilized for agricultural affair just reaches 2.27 million hectares (23.80 percents), meanwhile 76.20 percents or 7.26 million hectares has not used properly. In 1 hectare of swamp rice cultivation enables to provide feed ingredients for 2 until 3 buffalos throughout the year.

Pampangan sub-district is a potential area for agricultural business with integrated pattern where it has buffalo population around 4,523 or around 48.35 percents of all population existed in OganKomeri ngIlir district. Whilst, the total of rice production is around 8,734 tons or around 6.83 percents of all total production available in OganKomeri ngIlir district. Pampangan Sub-District has enough rice production to fulfill alternative feed for swamp buffalo in order to decrease production cost and to turn buffalo waste into fertilizer to reduce the use of chemical fertilizer.

According to Prasetyo and Muryanto (2007), rice straws giving for cattle are supposed to be in a form of a whole rice straw without getting through fermentation process in order to increase nutrition quality. This is because the farmers are not familiar with the fermentation technology. Yet, buffalo is a ruminant that has a well ability to digest high coarse fiber. Fermented rice straw can increase digestibility where the regular straw contains 78.30 % of coarse fiber and after being fermented, the content of coarse fiber drops to 33.63 % and the number of coarse protein slightly increases from 4.10 % to 6.02 % and so are the contents of P and Ca.

2. Potential of Human Resource and Institution

The existence of Human Resource to develop integrated rice and buffalo farm is quite large, the total population is 1,841 inhabitants with the percentage of male is 899 inhabitants (48.83 percents) and female is 942 inhabitants (51.17 percents). Whilst, PulauLayang village consists of 606 men (50 percents) and 606 women (50 percents). These two villages have similar ratio of male and female, total of male and female in PulauLayang village is equal. Most of farmers have created farmer groups to support the instructor activity or IB service and animal health. Functional officers of seed quality supervisor, instructor, animal health care are widely spread around the Sub-District especially Pampangan and PulauLayang.

According to Erni W (2007), the goal of HM planning is to ensure that the right person is living at the right place and time, the planning of HM should be adjusted to the whole organization plan to reach the goal. By doing a great plan, the integration of rice plant and buffalo farm will reach the desired goal.

3. The Existence of Integrated Innovation Technology

Integrated system of paddy-cattle brings the advantage to farmers through manure and by-product such as straw and bran. Manure that is not optimally used can be modified as organic fertilizer to manage soil fertility or to sell as source of income. The existed Agricultural waste can be managed as food source with good quality, then it can reduce the cost of food supply (Basuni et al., 2010a).

The contribution of rice farm in managing the food for cattle is in the form of agricultural waste such as rice straw that is either fermented or not. Yet, the unfermented rice straw cannot be perfectly digested by cattle because it contains lignin and hemicelluloses, as explained in the previous section. According to Prihartini et al., (2009), biodegradable lignin inside the straw aims to relieve the lignin, to increase cellulose digestibility and the total of protein in order to increase the quality of straw as cattle food. Prihartini et al., (2007) found bacterial isolate of TLiD and BOpR are able to degrade lignin and organochlorin (lignolytic) and specifically well-grown rice straw. Straw fermentation with isolate TLiD and BOpR can decrease the content of lignin of rice straw to 100 % at fermentation day 7 and increase crude protein of rice straw. Efficiency of high isolate degradation where lignin degradation is way higher than cellulose.

The contribution of farming business in managing cattle feed such as agricultural waste in the form of straw either it is fermented or not. Yet, straw that is not fermented will not be digested by cattle because it contains lignin and hemicelluloses, as explained in the previous section. According to Prihartini et al., (2009).

According to Dwiyanto (2001), this system will increase earnings of farmers up to 100% instead of applying rice-planting pattern without cattle. There are around 40% of the yields come from organic fertilizer, the rest are milk and beef. Regarding to Pamungkas and Hartati (2004), there are some advantages from the integration between cattle and crops: (1). Utilization of potential agricultural waste as feed source for cattle, (2).

Utilization of cattle waste as manure, (3). Creating new jobs in some rural areas, (4). Encouraging participation from society to realize a competitive, environmentally friendly and independent agribusiness.

Basically in the system of integrated crop-cattle, Technology covers feed technology, especially technology for waste management for organic fertilizer and composting technology or cattle waste management for organic fertilizer. Another innovation that supports successful development of this pattern is housing system and veterinary innovation (Diwyanto and Handiwirawan, 2004). The feed quality of agricultural waste, plantation or agro-industry is typically 'low' and it needs to be improved (feed enrichment), either through physical treatment (cutting, chopping, drying), chemical (ammonization by adding urea) and biological (addition of microbe or fermentation). The current technology existed enables food supply in a sufficient amount to store throughout the year. Low protein waste can be completed with protein supplement from other agricultural waste or legumes and proceed to harmonious ration. Some researches have been done to enhance the value of straw nutrition, some of them are going through ammonia process, hydroxidation and fermentation. Urea treatment of the straw can increase the content of nitrogen and digestibility at a time, while the fermentation of straw is able to be mixed with probiotics and urea. This way can enrich the protein content from 3.5 to 7 % and digestibility is growing up from 28 to 30% to 50 to 55%.

Potential Income of Agricultural System with Integrated Rice Plant and Buffalo Farm in Pampangan Sub-District.

Production Cost of Integrated Farming System and Buffalo Farm in Pampangan Sub-District.

The total production cost is the total cost spent by farmers to conduct the farming business in one year. The total production cost calculated by totaling fixed cost and variable cost. The average of total cost spent by farmers in PulauLayang village can be seen on Table 2. Here it is :

Table 2. Production Cost of Rice Plant and Buffalo Farm Business in Integrated System

Description	Fixed costs (Rp)	Variable cost (Rp)	Total cost (Rp)
Farming Business/ha/year(Rp)	105.794	4.081.582	4.187.376
Buffalo Farm/year(Rp)	914.722	902.333	1.817.055
Non Integrated (paddy + cattle) farmers /year (Rp)	1.020.516	4.983.915	6.004.431
Integrated (paddy + cattle) farmers /year (Rp)	914.722	4.006.070	4.920.792
% Ratio of integrated and Non Ingrated cost	0,8963	0,8038	0,8195

Source : Primary Data, audited 2019.

Based on the result of data processing written on Table 2, it can be concluded that the total cost average of farming business in 1 ha per year is Rp. 4,187,378 and the average cost of buffalo farm is Rp. 1,817, 055 per farmer per year. If farmers manage the business with integrated system between rice plant and buffalo farm, the total average of cost spent by farmers is Rp. 4,920,792 each year and if the farmers manage the farming in non-integrated way, the farmers will spend about Rp. 6, 004,431 each year for rice farming and cattle business in a household scale. This means that farming business that involves integrated system within can save the production cost each year which is showed by ratio of cost between integrated and non-integrated business around 0.8195.

Revenue, Farmers Income and Efficiency of Rice Plant and Buffalo Farm Business in Integrated System

Soekartawi (2006) stated that revenue is the total of production cost calculated by business activity multiplied by price. Revenue of farmers depends on total of production and selling price. Farmers income is the result of subtraction between revenue and cost of production factor by farmers (Sofyan, 2007). Efficiency of farming business is an attempt to reach the aim by using minimum business production factor. Efficiency is a comparison of revenue and production cost. If the revenue is bigger than the cost then it refers to good ratio and if the score is higher then the more efficient this business is.

Based on the result of data analysis, it is known that revenue, farmers income and efficiency level of rice plant business and buffalo farm in integrated system in PulauLayang village, Pampangan Sub-District on Table 3.

Table 3. Revenue, Farmers Income and Efficiency of Rice Plant Business and Buffalo Farm in Integrated System in pampangan Sub-District.

Description	Revenue (Rp)	Total Cost (Rp)	Income (Rp)	R/C Ratio
Rice Farm Business	14.564.286	4.187.376	10.376.910	3,4781
Buffalo Farm	15.364.333	1.817.055	13.547.278	8,4556
Integration of Rice and Buffalo Farm	29.928.619	4.920.792	25.007.827	6,0820
Non -integrated (Rice Plant + Buffalo Farm)	29.928.619	6.004.431	23.924.188	4,9844

Source: Primary Data, audited 2019.

Based on the result of data analysis as shown on Table 3, it is known that the average income of farmers from rice farming business is Rp. 10,376,910 per ha/year with R/C ratio is 3.4781. Seen from total of R/C>1 then rice farming business is definitely efficient to do. Income of buffalo farming business is Rp. 13,547,278 with R/C ratio is 8.4556. The ratio number is quite big because total production cost each year is Rp. 1,817, 055, in terms of buffalo farming business, this cost is not relatively expensive. It is because maintenance of swamp buffalo is not intensive and it takes the food source from nature and it causes less cost. Therefore, if it refers to ratio of R/C, it is stated that buffalo farming business is more efficient than rice farming business, as shown by R/C of buffalo farming business is 8.4556> R/C of rice farming business about 3.4781.

Introduction of integrated technology towards cattle and rice plant could increase income of farmers around Rp. 25, 007,827,- with R/C ratio is 6. 0820 higher than traditional technology which is only Rp. 23,924,188,- with R/C ratio is 4.9844. it is according to the result of data processing as shown on Table 3 which shows that integrated system of rice plant and buffalo farm in Pampangan Sub-District is more efficient than non-integrated farming business. As described by R/C of integrated farming business of rice plant and buffalo is around 6. 0820 > than R/C of non-integrated farming business with total of ratio is 4.9844.

III. Conclusions and Suggestions

Conclusions

According to the results of data analysis and discussion done, we can conclude that :

1. There are some available potentials ready to use to develop rice farming business and buffalo farm, such as : (1) existence of potential domestic market, (2) support from the field/nature to provide cattle food and fertilizer in a big amount and relatively inexpensive, (3) existence of human resource and relative institution, (4) existence of integrated pattern of technology innovation.
2. Integration system of rice and buffalo farming business in Pampangan Sub-District is more efficient than non-integrated one, as shown by R/C ratio of integrated rice plant and buffalo farm is 6. 0820 > than R/C ratio of non-integrated farming business with R/C ratio around 4.9844.

Suggestions

Based on the result of data processing and the discussion then it is suggested to :

1. Government in Pampangan Sub-District must give training and to encourage the labor along with the ability to manage farming business especially if it is related to the integration of rice plant and buffalo farm in order to make farmers can handle and increase their farming business to make a good impact of their incomes and area development.
2. Government in Pampangan Sub-District needs to be productive to provide rice seeds and buffalo farm with high quality but it is still affordable.
3. Government should optimize training program for farmers about farming steps in efficient ways.
4. Government in Pampangan Sub-District should assist the farmers to earn modal for more flexible farming business and government should position themselves to protect the cost stability of agricultural yield to get farmers motivated to increase their production yield.

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