Source of Farmers Income in the Sustainable Palm Oil Replanting in Riau Province

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Abstract. Riau Province is very identical with oil palm because almost all Regencies and Cities grow oil palm both owned by large companies, national companies and smallholder plantations. Oil palm plantations need to be sustainable because they can be a source of foreign exchange and a source of income for farmers. Oil palm production is a product raw material for other products such as cooking oil, butter and others. This study aims to find sources of income for farmers in the replanting period of oil palm for business and production sustainability. This study uses a survey method, sampling by purposive sampling, the sample is farmers who carry out integrated farming during replanting palm oil. The data obtained is used to calculate integrated farming income. Primary data obtained directly from farmers and secondary data obtained from agencies and agencies related to this study. Analysis is done by calculating the source of farmers' income. Integrated agriculture can provide solutions to farmers' income sources during the replanting period of oil palm for business sustainability.

Keywords: Replanting, Sustainable, Integrated Agriculture

I. Introduction

Riau Province is a province with the largest area of palm oil plantations in Indonesia having a large role in the economy as well as the driving force of the national economy, driving the people's economy and absorbing labor.

Riau is very identical to palm trees because almost all regencies and cities have palm oil plantations both owned by large companies, national companies and smallholder plantations. Palm oil plantations in Riau provide opportunities for employment as well as a source of income to farmers for 25 years before they have to do replanting and can provide welfare for the people in the area. Increased palm oil production means increased income of farmers.

The total area of palm plantations in Riau province is 5.7 million ha, most of the palm oil plantations in Riau are owned by the citizen, entering the replanting period is 2.4 million ha with the details of the following: citizen property 2.12 million ha, Plasma PIRBUN 153.39 thousand ha and Plasma PIR_TRANS 136.78 thousand ha.

Palm oil is not only a producer of vegetable oil but also contributes to the development in Indonesia. 40 percent of the total palm oil plantations in Indonesia are managed by the people, around 17.5 million people work in palm plantations or the palm oil industry sector. However, palm
plantations managed by the community of 2.5 million hectares have entered their technical age or have been aged 25-30 years so that it needs to be replanted.

For farmers who depend on their livelihoods to palm plantations, they must look for alternatives to other businesses that can be carried out sustainably both during replanting season and already producing palm trees by utilizing available resources. Integrated farming is a solution as a source of income. Integrated farming can be implemented as a combination of palm oil business and other commodities, such as livestock, horticulture and fish pond businesses. Integrated farming can utilize crop waste as animal feed and utilize animal manure as organic fertilizer. This study aims to find sources of palm plantations income combined with other businesses that can be carried out sustainably by utilizing existing resources.

2. Theory and Hypotheses

Integrated agriculture is agriculture that places more emphasis on the management of integrating plant commodities or mixed species on a land so as to produce benefits for farmers, their environment and consumers. While sustainable agriculture is agriculture that places more emphasis on the management of agricultural commodities and natural resources as an input for sustainable cultivation that does not damage the environment and the health of farmers and consumers of agricultural products [1] Rivai, Rdan Iwan, 2011.

Economically integrated agriculture, according to Tipraqsa et al. (2007) in [2] Suwarto,Tri Aryanto.A and Effendi.I can also create new jobs in rural areas.

Kathleen states that crop-livestock integration farming can improve soil quality, increase yields, produce diverse food and improve land use efficiency. The benefits of crop-livestock and plant-fish integration can be synthesized through [3]: (1) agronomic aspects, namely increasing the capacity of the land to produce, (2) economic aspects, namely product diversification, yields and higher quality, and costs reduction, (3) ecological aspects, namely reducing pest attacks and pesticide use, and erosion control, and (4) social aspects, such as evenly distributed income."

Sustainable development must be an integrated cross-sectoral and multi-disciplinary program that needs to be strongly coordinated from the central level to the regional level and the wider community as economic development actors [4].

From this explanation it can be said that integrated agriculture has a relationship with sustainable agriculture. Integrated Agricultural System Model (SPT) according to Preston (2000) in Nurcholis.M and Supangkat.G can be seen in Figure 1.

![Figure 1 Integrated Agricultural System](image-url)
The Integrated Agricultural System has the advantage of both ecological aspects related to sustainable and economic agriculture [5]. The intended advantages are, more adaptive to change (more stable habitat), environmentally friendly farming, energy saving, high biodiversity, more resistant ecosystem, more diversification effort (relatively low failure risk), higher product diversification, healthier products (minimization of residues hazardous compounds), better farming sustainability and better and more sustainable labor absorption. This statement is also shown by research studies: [6] (1) Siswati, L and Rizal, M (2017) which states that the integration of oil palm plantations and cattle can increase farmers income, cattle business can be a savior for farmers when palm oil prices are low, (2) Siswati, L and. Rini, N. (2013) The income of farmers in Pekanbaru city who carried out integrated farming with zero waste model increased higher than Riau Province minimum wage which is Rp. 1,350,000, - while the income of horticultural and livestock farmers is Rp 6,944,000, - per month, this is because farmers have used crop waste as animal feed, and also used faeces and urine waste as organic fertilizer which has been proven to increase crop production, and [8] Siswati and Aryanto (2012) states that the utilization of farming resources according to the optimal solution around Rumbio institutional forests generated optimal area for palm plantations 2,029 ha, rubber plantation 1,483 ha, and 6 cattle to procure optimal income.

3. Methods
The study was conducted in Siak Regency with a survey method. The population in this study are farmers in replanting season who carry out integrated farming models with horticultural crops, ruminant livestock and pond fish farming. From the Regency level, the subdistrict level with the most populous integrated agriculture is selected, namely the Koto Gasib District and the Kerinci Kanan District. The sample in this study was taken purposively according to the purpose of the study. The data collected is primary data obtained directly from interviews with sample farmers and secondary data obtained from relevant agencies and other references related to the research objectives. The study was conducted for eight months. Data were analyzed through tabulation and quantitative analysis. To calculate integrated farm income, a formula is used:

\[ \Pi = TR - TC \]

Where \( \Pi \) is net income ( IDR), TR is total revenue ( IDR), and TC is total cost ( IDR).

4. Results and Discussion
The results showed that respondents conducted an integrated agricultural model with various commodities, namely:
1. Replanting palm with pond fish farming
2. Replanting palm with cattle
3. Replanting palm with goat livestock
4. Replanting palm with horticultural crops (cayenne pepper, cucumber and corn)
5. Replanting palm with processed palm oil waste to be used as brown sugar.

The amount of income for each cultivation business can be seen in the table below:

| No | Business            | Gross Income (Rp/ season) | Production Cost (Rp/ season) | Net Income (Rp/season) | RCR |
|----|---------------------|---------------------------|------------------------------|------------------------|-----|
| 1  | Pond Fish Farming   | 18.184.907                | 9.201.575                    | 8.983.332              | 1.97|
| 2  | Cattle              | 17.830.265                | 13.708.000                   | 4.122.245              | 1.3 |
| 3  | Goat                | 5.008.000                 | 4.025.000                    | 983.000                | 1.24|

Pond fish farming carried out by replanting season palm farmers at the time of the study was tilapia fish farming because fish seedlings for tilapia were easily obtained, easy on the maintenance and fast fish growth. Ponds that are cultivated in pond sizes range from 4 m x 3 to 4 m x 6 m, with the
number of seedlings stocked as many as 500 to 1,200 seedlings that are two weeks old. Maintenance is done by cleaning the pond every day to remove dry leaves and other rubbish. Fish are fed twice per day, morning and evening. Fish feed given is pellets and bran. Fish cultivation is carried out for 4 months. Within a year the production process is carried out twice. Fish that have been harvested are sold to the market or there are vendors who come to the location. The tilapia harvest that was produced at the time of the study was 450 kg and the highest was 650 kg with a selling price of Rp. 18,000 / kg. Fish is also used as a food source for farming families.

Another business carried out by replanting oil palm farmers is cattle business. The average cattle ownership is 7.35 cattle units. Cattle livestock income of Rp 4,122,245 per month is higher than the Siak Regency minimum wage in 2018 which is Rp 2,551,000 / month, meaning that raising cattle when replanting palm is one of the promising alternative sources of income. In addition to cattle business, there are also farmers who raises goats. The maintenance carried out for goats is still traditional, feeding sourced from around the house and palm plantation. Goat released with no housing. Besides being sold on certain occasions, goats are also a source of family food. The income of farmers from the goat livestock business is Rp 983,000 per month. Mean annual income of Rp 9,996,000/yr.

The replanting season palm business combination is a sustainable farming business, because both solid and liquid livestock waste can be used as fertilizer for palm oil and other farming crops cultivated by farmers, whereas palm oil waste can be processed into animal feed. In addition, livestock waste which is used as fertilizer can improve the environmental carrying capacity through improving the soil physical and chemical properties [9] Djonius Nenobesi, Mella, Soetedjo, 2017. Replanting season palm farmers, besides cultivating livestock and fish ponds, they also run cayenne peppers, cucumbers and corn farming. In addition to consumption needs, this commodity is also sold which can increase family income. The amount of income obtained from farming can be seen in table 2.

| Table 2 Income of Respondent Farmers from horticultural farming |
|---------------------------------------------------------------|
| Description | Income (Rp)       |
| Peppers     | 4,258,000,/season |
| Cucumber    | 2,365,000,/season |
| Corn        | 2,760,000,/season |

The cultivation of cayenne pepper and cucumber is carried out evenly with an area of 0.25 hectares while on average corn is carried out with an area of 0.5 hectares. Land to grow cayenne pepper, cucumber and corn by utilizing land around the house or yard and on the edge of an empty oil palm plantation can be utilized.
Another effort undertaken by sample farmers in terms of meeting food needs and increasing family income is to utilize palm oil waste processed into brown sugar with the same shape and taste as palm sugar. The selling price of palm sugar from palm stems is sold by farmers at a price of Rp. 15,000 per kilo. The average income from this business is Rp. 4,000,000 per month. With BCR 1.4.

Agricultural development is carried out with the principle of sustainable agriculture which is based on three balanced foundations, namely: oriented to the social welfare of farmers, workers and surrounding communities, environmentally friendly and creating economic added value for farmers and entrepreneurs [10].

5. Conclusion
At the time of replanting palm plants, many other agricultural businesses that can be done by farmers, by combining replanting palm season plants with pond fish farming, livestock business, growing food crops or horticulture as well as doing household industry with agricultural raw materials that can be obtained around plantation land or land around the residence. Or in other words replanting season palm farmers can conduct integrated farming that is sustainable as a source of family food and income.

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