Research On The Development Of Alternative Livelihood For Palm Oil And Rubber Farmers Through Fish Farming In Bencah Village Tapung Sub-District Kampar Regency

Marnis, Fitri, Syahrul, Rovanita Rama

Abstract: The major problem that is faced by the palm oil and rubber farmers in bencah village kelubi sub-district kampar regency is that the instability of price fluctuation which causes those commodities to be adrift. This research aims to analyse the fish farming in the pond based on the potentials owned by bencah kelubi village kampar regency as the alternative job for the palm oil and rubber farmers since the tendency for both commodities' quantity and price to diminish can occur anytime, as a result, the palm oil and rubber farmers do not longer highly depend on the palm oil and rubber plantation to obtain income. The methods implemented to solve this problem were survey and experiment, and also technology transfer of fish farming. A program evaluation was done towards its process, outcome, and stakeholder. Several activities to be done include: (1) the improvement of self-potential and society potential in the area of bencah kelubi and pancuran gading village with the change of paradigm from passive human to active and creative human. (2) The enhancement of life skills to develop productive society who is able to manage the provided natural resources. (3) Intensive and integrated empowerment towards palm oil and rubber farmers and, (4) the escalation of food security. The expected major outcomes are skills and the technology transfer of fish farming in the pond for the palm oil and rubber farmers, post-harvest handling.

Index Terms: Alternative Livelihood, Palm Oil And Rubber Farmers, Fish Farming

1 INTRODUCTION

1.1 The Background Of The Study

Bencah kelubi and Pancuran gading Village Located In The Kampar Regency Is An Area Of Palm Oil And Rubber Plantation. Therefore, The Main Livelihood Of The Local Society Is As Palm Oil And Rubber Farmers. The Primary Problem That Is Faced By The Farmers In Bencah kelubi And Pancuran gading Village Is The Instability Of Price Fluctuation Which Then Causes Those Commodities To Be Adrift. This Phenomenon Affects The Economic Condition Of Palm Oil And Rubber Farmers, Mainly At A Time When The Rate Of Both Commodities Drops Sharply, Leaving The Farmers To Be Powerless.

The falling of both commodities' rate has an impact on the farmers' income because the farmers are no longer able to cover the cost of plant care and fertilizer needed to fertilize the plants since it is no longer affordable. The decline of the farmers' income makes them difficult to fulfill their daily needs, such as the cost of plant care for palm oil and rubber, payment of their credit deposits to a bank, and also their children's health and education costs. to shift to another job, the farmers still have no experience nor skill, so that they undergo a dilemma in which they want to get a job outside their area, but there is also no guarantee for their family life. This activity of society empowerment towards the palm oil and rubber farmers in the area of bencah kelubi and pancuran gading village is expected to face the problem of the farmers when both commodities' rate drops significantly or is unstable. Furthermore, the university can transfer the science and technology as the result of the university's previously conducted research to the society, it is also the implementation of one aspect of tri dharma perguruan tinggin which universities, especially lecturers, are obliged to contribute to the local community. The result of the research on science and technology which is transferred to the farmers in the area of bencah kelubi and pancuran gading village is the science and technology of fish farming in the pond since this area is supported by its potentials, including the water sources and geographical location. Based on the above argument, research is needed to support the economic condition of palm oil and rubber farmers, primarily to identify alternative livelihood through prospective business, which is fish farming in the pond.

1.2 Research Question

The major problem in bencah kelubi and pancuran gading village that becomes the focus of the research is the economic crisis caused by the drop of the price of palm oil and rubber. It has an impact on the farmers’ social economic condition which then contributes to the elevated number of poor population, poor food security, and low quality of health. Furthermore, the low life skills owned by the farmers cause them to have low ability to take advantage of the provided natural resources to elevate their own prosperity, so that such provided resources have not been well managed. From the explanation, some research questions are outlined:

1. How is the effect of the drop of the palm oil and rubber's price caused by the economic crisis towards the social economic condition of the farmers?
2. Can the fish farming in the pond be implemented as an alternative livelihood to support the economic condition of the farmers’ family when the price of palm oil and rubber drops sharply?

3. What Effort That Can Be Done To Equip The Farmers With Skills To Implement Fish Farming In The Pond?

1.3 The Aims And Objectives Of The Study
This study aims at analysing the effect of the drop of palm oil and rubber’s price as the result of the economic crisis towards the social economic condition of palm oil and rubber farmers and utilising the natural resources through fish farming in the pond as the alternative livelihood. The objectives of the study are to analyse the feasibility of fish farming as an alternative livelihood for palm oil and rubber farmers when the price of both commodities drops sharply; and to equip them with skills through technology transfer of fish farming in the pond. Further, it also analyses economic contribution towards the escalation of the farmers’ income and widens the employment opportunity for the local society.

1.4 The Advantage Of The Activity
This study is advantageous for various aspects including economic and social aspects. In terms of economic aspect, it can give additional value from the utilization of natural resources to initiate business of fish farming in the pond. Further, in terms of social aspect, it can open wider opportunity for the society to have a new job.

2 LITERATURE REVIEW

2.1 Livelihood
Livelihood refers to all activities that are done to obtain income to fulfill human’s life necessities. Thus, livelihood is human activity to achieve proper standard of living, which is indeed different from one area to another based on the economic level of the society and their surrounding environment. They usually take advantage of the natural resources in such environment. Over time, the system of livelihood changes in which the society does not only depend on the natural resources such as agriculture, livestock, and fishery, but they also have other occupations to fulfill their life needs. Furthermore, the emerging various new industries today are expected to elevate the absorption of manpower; so that the society’s mindset is more advanced. Besides, there are various more-modern professions emerging along with the escalation of the society’s education level. Therefore, certain professions such as teacher, doctor, lawyer, army, and police are in demand nowadays. In this globalisation era, many sophisticated technologies are developed since human thought about technology is more advanced than that in the past. Therefore, the transformation pattern of the society livelihood in this modern era tends to be more advanced, so that many job opportunities are based on skills and education. By using their brain, they can seek professions that need less of their energy.

2.2 Fish Farming
One type of freshwater fish that is widely cultivated is patin fish. In Indonesia, some areas that have potentials to be producer and exporter of patin fish are riau, jambi, south sumatera, west java, and west kalimantan. One type of patin fish that is highly prospective to be cultivated is patinjambal fish in which its meat is white. This type of patin fish has been cultivated in riau. Patin jambal fish (pangasiushypophthalmus) is a type of freshwater fish whose taxonomy, according to saaain (1968), belongs to pisces class, teleostei subclass, ostariophysi order, pangasidae family, pangasius genus, and pangasiussutchi and pangasiushypophthalmus species. Morphological features of patinsiam fish are: elongated and flattened body, terminal mouth (slightly below) with four moustaches, dorsal fins with additional fin (adifose fin), curved lines starting from the head to the base of the caudal fin with white edges, blackish grey and white anal fin with a black line in the middle (Sumantadinata, 1983). As elaborated previously that patinsiam fish is a type of freshwater fish that becomes the target of cultivation in Indonesia since it has superiority compared to other types of patin fish, for example it can grow fast, is easy to adapt to the environment, high egg fecundity, and the response to additional feed is quite high. Therefore, the interest of fish farmers to cultivate patin fish is similar to their interest towards the cultivation of other freshwater fish such as goldfish, nila, and catfish. Moreover, the market demand for this fish has never declined, it even tends to increase every year. The factor causing the increased public interest in cultivating patin fish is the mastery of breeding technology with a variety of methods, including induced spawning, which is the spawning technology by providing hormone stimulation to speed up the process of gonad maturation, then fertilization of egg and sperm is done by sequencing (stripping) technique towards male and female fish that have mature gonads. The hatchet larvae will be sown in an aquarium or plastic tubs of 1x4 m size and 1.2 m high for 2-3 weeks. The next nursery stage can be carried out in floating net cages. Actually, the patin fish farming is not as difficult and complicated as imagined. The raising process of patin fish not only can be done in the ordinary ponds, but it can also be done in various other media in a limited location. It can be done inside a wall-surrounded tub or fiberglass tub placed in a room or in a backyard pond covered with plastic, so that it does not leak, or in drains with barriers to prevent fish from escaping. However, maintenance of these media has to be greatly. Some areas that have potentials to be utilized as fish farming are in dem polition era, many so-called professions such as goldfish, nila, and catfish. Moreover, the market demand for this fish has never declined, it even tends to increase every year. The factor causing the increased public interest in cultivating patin fish is the mastery of breeding technology with a variety of methods, including induced spawning, which is the spawning technology by providing hormone stimulation to speed up the process of gonad maturation, then fertilization of egg and sperm is done by sequencing (stripping) technique towards male and female fish that have mature gonads. The hatchet larvae will be sown in an aquarium or plastic tubs of 1x4 m size and 1.2 m high for 2-3 weeks. The next nursery stage can be carried out in floating net cages. Actually, the patin fish farming is not as difficult and complicated as imagined. The raising process of patin fish not only can be done in the ordinary ponds, but it can also be done in various other media in a limited location. It can be done inside a wall-surrounded tub or fiberglass tub placed in a room or in a backyard pond covered with plastic, so that it does not leak, or in drains with barriers to prevent fish from escaping. However, maintenance of these media has to be greatly.

The Quality Of Water
Low quality of water can affect the production of patin fish. Even this type of fish is categorized as the one that is resistant to the poor water quality. Hence, successful
patin fish farming requires water with high quality, in addition to the quality of water, its quantity also needs to be taken into account in the process of patin fish farming. The height of the water between 25–50 cm is good for patin fish farming since it enables plankton to grow well as the natural fish feed.

Some of the water quality parameters needed for cultivating patin fish are:

<table>
<thead>
<tr>
<th>No</th>
<th>PARAMETER</th>
<th>CONTENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oxygen (O2)</td>
<td>3-6 Ppm</td>
</tr>
<tr>
<td>2</td>
<td>Carbon Dioxide (CO2)</td>
<td>9-20 Ppm</td>
</tr>
<tr>
<td>3</td>
<td>Ph</td>
<td>5-9</td>
</tr>
<tr>
<td>4</td>
<td>Alkalinity</td>
<td>80-250</td>
</tr>
<tr>
<td>5</td>
<td>Temperature</td>
<td>28-30°C</td>
</tr>
</tbody>
</table>

Source: Seminar Proceeding Of Research Results On Freshwater Fishery (Aida, Sitinurul, 1993)

- **Soil**
  Almost all types of soil are good for patin fish farming, such as clay or sandy loam, applied soil, coarse fraction soil, and sandy soil. In this case, the most important thing is that the soil can hold high amount of water and does not leak, so that pond dike or pond wall can be built.

- **Breeding**
  Breeding is the determinant factor of the success of a fish farming business, especially for patin fish farming. By mastering the breeding technology, the business can be said as successful since this fish, specifically patinsiam fish, is difficult to spawn in the pond or a raising container and is categorised as fish that undergoes seasonal breeding. Therefore, the method of natural breeding process has not been successful yet in manipulating the environment to stimulate patinto spawn, so that artificial breeding is suitable for the business of patin fish farming. In addition to the environmental factor, patin naturally has the habit of spawning in the rainy season. This spawning season is also affected by the climate in a certain area, so that each area has different timeline for spawning season.

The breeding process through artificial breeding can be done through various ways, such as the stimulation by injecting ovaprim hormone and pituitary gland hormone. In most cases, the farmers of patin fish farming stimulate spawning by the former technique since it is more practical and efficient. Before the injection is done, the female fish is firstly selected to choose the mature ones. This can be done by checking the female fish through its habit of spawning in the rainy season. This spawning season is also affected by the climate in a certain area, so that each area has different timeline for spawning season.

2.2.1 Media For Fish Farming
Types of media that are required for patin fish farming are:

- **a. Lime**
  Lime is needed to eradicate pests and diseases that exist in the pond. Lime can also raise the level of pH of pond water. The amount of the lime that is given to a pond depends on the pond’s state, usually ranging from 20-100 grams/m2.

- **b. Fertilizer**
  Fertilizer is needed to accelerate the supply of natural food in the pond. The fertilizer needed/used is tsp fertilizer as much as 22-25 grams/m2.

- **c. Fish Seed**
  In the patin fish raising process, the density of fish seed sowing can vary, ranging from 8-15 fish per square meter for the size of 3-6 inches or 40-50 gram per fish.

- **d. Fish Feeds**
  The additional fish feeds can be given in the form of pellet (factory-manufactured) with the protein around 20-30 percent, or self-made fish feed from the raw materials of 25% of bran, 50% of groats, and 25% of fish flour (1:2:1). The amount of the additional fish feed is 2-3% of the fish’s weight per day. The frequency to fish feeding is 2 (two) times a day, in the morning and afternoon.

2.2.2 Farming Technique
There are some factors that need to be taken into account in implementing patin fish farming, such as:

1. **The Preparation Of The Pond**
   In preparing the pond, the preparation of the base of the pond has to be done by plowing the base and flatten it. If there are leaking pond dikes, those need to be fixed by covering the leaking parts. After that, the ditch and puddle are also prepared for harvesting time, then lime at a dose between 20-200 grams/square meter (depending on the state of the pond) is sowed for the pond that contains low level of pH, the amount of lime needed is higher, and vice versa. For the soil with sufficient level of pH, the lime is only to eradicate pests and diseases that may exist in the pond.
   - Installation of filters at the water gates to prevent the fish from escaping.
   - The filling of water at a height of 1-1.5 meters, then leave it for 1 (one) week.
   - One week after that, then fertilizing with tsp of 22 grams/square meter is done.
   - One week later, the fish seeds are sowed.

Fish is a square wider than 50 m2. The depth of the pond ranges between 0.5-1.5 m. The slope of the base of the pond from the surface to the disposal is 0.5%, and the height of the dike is 1-1.5 m. In the middle of the pond base, a ditch is made, extending from the direction of the water intake towards the direction where it flows out. The width of the ditch is 30-50 cm with the depth of 10-15 cm. Similar to other fish farming ponds, the pond for patinfish raising also needs two gates for the water to flow in and out with more or less the same shape and specifications. For simple ponds, both gates are made of bamboo or polyvinyl chloride (pvc). These gates are also equipped with a filter made of wire or woven bamboo to prevent the fish from escaping.
2. Seed Sowing
The seeds that are raised in the pond should be in a similar size, which is 40-50 gram/fish with the sowing density of 8-15 fish/m².

3. Fish Feeding
The amount of the fish feed is 2-3% of the fish’s total weight per day, the frequency of fish feeding is 2 (two) times a day, in the morning and afternoon.

4. The Prevention Of Pests And Diseases
For the prevention of pests and diseases, the seeds of patinjambal fish that will be sowed should be sterilised first with kmn04 or pk (potassium permanganate) at a dose of 35 grams/m³ for 24 hours or with 25 ppm formalin for 5-10 minutes.

2.3 Framework
Food industry waste, mainly the industry of patin fish processing, can raise a problem in its management since it still contains organic substance such as protein, fat, mineral salts, and chemical remnants used in the processing and cleaning steps. The content of organic substance in food industry waste has high organic substance and can act as food source for microbial growth, so that the microbes will multiply rapidly and reduce dissolved water contained in the water. It has negative impact on the environment since its smell disturbs people’s health. Therefore, to deal with the pollution problem, the local society has to start to think how to take advantage of the industrial food processing waste as the source of value-added raw materials. Moreover, the society today tends to choose foodstuffs based on the physiological functions. Such functions are mainly directed to escalate the level of the society’s health. To fulfill this demand from the society, several food industries compete to create various functional foods that expose the physiological functions from the substances contained in the product, such as essential fatty acids, essential amino acids, and calcium. The existence of local foodstuffs (indigenous) that are rich in nutrients are highly needed in Indonesia to develop the diversification of foodstuffs and fish feeds. Therefore, the effort to seek foodstuffs as the source of indigenous nutrients is necessary to do. The patin fish waste product contains the source of indigenous nutrient which is affordable, so that its existence is highly necessary for the advancement of the food and fish farming industry. In this research, the implemented approach investigates the cause-effect relationship of the existing environmental problem of the patin fish processing industry and a method that can be employed to solve the problem. Therefore, it is expected that the solution can be input for the policy makers in managing the environment in the fish processing industry, especially patin fish processing. The environmental problem that arises is the impact of the patin fish processing activity that produces waste product, either in the form of solid, liquid, and gas, that is not well-managed. Thus, it triggers problems both in the fish processing center and its surroundings. An analysis is done based on the primary and secondary data collection to arrange environmental management planning.

3 THE IMPLEMENTATION OF METHOD

3.1 Time And Place Of The Study
This research was done in may 2017 in bencah kelubi and pancuran gading village kampar regency. The quality analysis of the resulted products was conducted in an accredited laboratory.

3.2 Materials And Tools
The main raw material used in this research was the solid waste product of patinsiam (pangasiushypophthalmus) fish processing from the fish farming in koto mesjid village kampar village, riau. In addition, some substances were also used to process solid waste of patin fish processing into functional components of food and chemical substance for quality analysis (hexane, filter paper, k2s04, h2s04, hgo, naoh, h3b03, hel, and na2s203 and packaging materials). Some substances for questionnaire were also used, the tools utilised to process the solid waste product were blender, flour mill machine, oil separator, glass bottle, aluminium pan, stove, filter device, and drying oven.

3.3 Research Method
This research was conducted by implementing survey and experiment method. The former was done by conducting survey on the impact of the palm oil and rubber’s price fluctuations towards the economic condition of the farmers; while the latter was conducted by doing experiment of fish farming in the pond.

3.3.1 The Implementation Of The Research
The target of the research was the palm oil and rubber farmers in bencah kelubi and pancuran gading village kampar regency, and the fish processing business that produced solid waste (for example, marinating, fumigation, and fish fillet). Some aspects to be studied included: the general description of the research area mainly about its potential for fish farming business in the pond, the palm oil and rubber farmers’ social economic condition, and the application of fish feed raw materials from the processed fish waste product to support the business of fish farming in the pond as an alternative livelihood when the palm oil and rubber’s price declined significantly. The analysis tools implemented in this research were qualitative and quantitative descriptive statistics. Descriptive method, according to nazir (1998), is a research method that gives description of a situation or event, so that this method accumulates basic data.

1. Research Steps
This research was conducted through some steps. The process of implementation and the achieved results can be seen in table 2.

<table>
<thead>
<tr>
<th>TABLE 2. Research Step, Process, And Indicator Of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Step</td>
</tr>
</tbody>
</table>

3164
The analysis method in this research used quantitative approach in which this approach was based on the countable data to obtain strong quantitative approximation. The primary data used was nominal data that was related to the function of additional value which was obtained from the direct observation, and then analysed by using some methods:

1. Cost Analysis
   Cost analysis was used to measure the production cost allocated by the producer of industrial raw materials and to know the total cost spent. Systematically, it could be calculated by using the formula:
   \[ TC = FC + VC \]

2. Revenue Analysis
   Revenue analysis was used to know the total of revenue that was received by the producer of industrial raw materials. The total revenue could be calculated by using mathematical formula:
   \[ TR = P \times Q \]

3. Income Analysis
   Income Analysis was used to know the total of the income received by the producer of industrial raw materials. To know the total income, it could be calculated by this mathematical formula:
   \[ KP = TR – TC \]

4. Business Efficiency Analysis
   To measure the level of business efficiency in the process of producing industrial raw materials, R/C ratio analysis was used with the formula:
   \[ R/C Ratio = TR/TC \]

5. Additional Value
   Additional value was the added value due to one commodity under went some steps of processing, conveyance, and storage in one process of production (the use/giving functional

---

**3.2.3 Data Collection Method**

The data analysed was primary and secondary data. Primary data was obtained through observation and survey toward sample of respondents who were also given questionnaire. Meanwhile, secondary data was the supporting data that was obtained from the results of the interview with several related institutions. The data collection methods that were implemented involving questionnaire, interview, observation, documentation, and forum group discussion (FGD).

**3.3.1 Data Analysis**

Both primary and secondary data were arranged, simplified, and presented in the form of tabulation. The data was then analysed based on the objectives of this research. Data analysis methods that were used in this research were qualitative and quantitative methods. Qualitative method was implemented by using descriptive analysis. Meanwhile, quantitative method was conducted through financial analysis to know the total cost, income level, and criteria of income analysis, such as net benefit cost ratio (Net B/C Ratio), Payback Period (PP), And Break Even Point (BEP).
input). Such additional value was affected by technical and non-technical factors, information or outcome obtained from the results of additional value analysis was the amount of the added value, the ratio of the added value, margin, and remuneration received by the owner of the factor of production (Hayamiet.Al, 1987 In Purwaningsih, 2015, P.17). The amount of the added value due to the processing step was the result of the value of the produced products subtracted by the cost of raw materials and other inputs. Additional value was remuneration for the labour and profit for the processor (Hayamiet.Al, 1987 In Haryati, 2011, P.84) The basis of calculation of this additional value analysis was per kilogram of the product, the standard price of the raw materials and production output (conversion from the raw materials) used was the standard price at the level of processor (producer). The amount of the additional value due to the processing step was obtained from the reduction of raw materials and other inputs from the value of the product produced, except labour. In other words, the additional value described the rewards for labour, capital, and management. The calculation of the amount of the added value from the processed fish waste product was studied in this research by using hayami method. Systematically, the function of the additional value (NT), According To Hayamet.Al. In Purwaningsih (2015:17), Can Be Formulated Below:

\[ NT = F(K, B, T, U, H, L) \]

With:

- NT: Nilai tambah (Additional Value)
- K: Kapasitas produksi (Production Capacity)
- B: Jumlah bahan Baku Yang Digunakan (The Total Of The Raw Materials Used)
- T: Tenaga Kerja Yang Terlibat (The Involved Labour)
- U: Upah tenaga kerja (Labour Wage)
- H: Harga Output (Output Price)
- L: Harga bahan Baku (Raw Materials’ Price)

\[ NT = \frac{H_p - (K + B + T + U + H + L)}{H_p} \times 100 \]

From the results of this calculation, some information would be generated namely:

- A. Estimated additional value (in rupiah)
- B. Ratio of the added value to the value of the product (in percentage)
- C. Reward for employees (in rupiah)
- D. Reward for capital and management (in rupiah).

4 RESULT AND DISCUSSION

4.1 The Identification Of Palm Oil And Rubber Farmers

Based on the results of observation in the field, it was identified that the majority of farmers in tapung sub-district had plantation with fairly good condition and generally the level of farmers' income was above the average of plantation productivity. The rubber and palm oil lifespans owned by the farmer respondents were different, the former takes 10 years, while the latter takes 8 years. It meant that it was the time for both plants to be in their productive period. Based on the results of the observation in the field, the categorization of farmer respondents based on their income (Rp/Ha/Month) is presented in Table 3.

<table>
<thead>
<tr>
<th>No.</th>
<th>Income</th>
<th>Rubber</th>
<th>Palm Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T</td>
<td>%</td>
<td>T</td>
</tr>
<tr>
<td>1</td>
<td>&lt; 2 Million</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>2 – 3 Million</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>&gt; 3 Million</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

It was shown that the income of the majority of rubber farmers was between rp 2.000.000, - to rp 3.000.000, -, while the palm oil farmers’ was below rp 2.000.000, -. However, the total number of the palm oil farmers who had income above rp 3.000.000, - was more dominant compared to the rubber farmers. It meant that the income of palm oil farmers was better than that of rubber farmers. This was because the average size of palm oil plantation area owned by the farmer respondents was wider compared to the rubber plantation area. This income of palm oil and rubber farmers was received when the selling price of both commodities was normal. However, the price of rubber and palm oil decreased significantly lately, in which the rubber commodity showed sharp decline by rp 5.000, - from the normal price of rp 18.000, - per kg; while the palm oil’s price decreased by rp 800, - from the normal price of rp 2.000, -. Such fluctuation underlies this research to be conducted since there is a dilemma among the palm oil and rubber farmers for such a big loss.

4.2 Fish Farming Analysis

Based on the results of the research focusing on the additional value and the business feasibility of fish farming, the researchers describe the results as follows:

1. Revenue

Revenue is the total number of the products in the process of production multiplied by the selling price of the product. With the selling price per kg is rp 25.000, - and production capacity of 1.260 kg in one production (4 months), the revenue of rp 31.500.000, - is obtained.

2. Income / Profit

Income from the sales calculated after knowing the value of cost and the value of revenue, then profit is obtained. the total of income or net profit of the fish farming is rp 18.625.000, - (59%) in one production for 4 months, so the income per month is rp 4.656.250, -.

3. R/C Ratio Analysis

RC ratio analysis is used to know the level of business efficiency of fishery waste treatment in terms of financial aspect. The efficiency of fishery waste treatment in the scale of home industry is determined by calculating per cost ratio, in which the revenue of a business is divided by the total cost of production. It is presented in table 4.

### TABLE 4.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Value (Rp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Total Of Revenue From Fish Salein 4 Months</td>
<td>Rp. 31.500.000, -</td>
</tr>
<tr>
<td>2</td>
<td>The Total Of Production Cost For 1 Production Period</td>
<td>Rp. 11.875.000, -</td>
</tr>
</tbody>
</table>

### TABLE 3.

The Categorization Of Respondents Based On Their Income (Rp/Ha/Month)
5.1 Conclusions
Based on the results of the additional value analysis in this research, the researchers outline some conclusions:

1. If the normal price does not fluctuate, the rubber farmers' income is at the range of rp 2,000,000 – rp 3,000,000, while the palm oil farmers' income is above rp 3,000,000, meaning that the income of the palm oil farmers is higher than that of the rubber farmers.

2. However, the price of rubber and palm oil drops dramatically recently in which the former shows a dramatic decrease by rp 5,000 per kg from the normal price of rp 18,000 per kg; while the latter commodity's normal price is rp 2,000 per kg and currently it is rp 1,200 per kg. This fluctuation underlies this research to be conducted, in which there is a dilemma among the palm oil and rubber farmers due to the considerably high loss.

3. Based on the analysis of fish farming in the pond, with the experiment of nila fish farming, it is obtained: r/c ratio value of nila fish farming is 2.65, or r/c ratio > 1, which means that this business is efficient and profitable. To conclude, the fish farming in the pond can be implemented as an alternative livelihood in addition to palm oil and rubber plantation.

5.1 Conclusions
in the fish farming in the pond, fish feed pellet requires significantly high cost, so that new qualified and relatively affordable fish feed is needed. The results of the research show that solid waste of patin fish processing in the form of offal, bones, and fish oil can be used as raw materials for pellet fish feed since those are affordable and have high nutritional value.

REFERENCES


[4.] Series. World Bank, Washington DC.


Source: The processed primary data, 2017From table 4, the total of revenue in this research is the results of product sale multiplied by the selling price, while the cost spent is only for labour wage. From the results of the value of revenue and the value of cost, r/c ratio can be calculated as follows: R/C Ratio= Rp 31.500.000,- / Rp 11.875.000, = 2.65R/C Ratio Of The Business Of Fish Farming, in this case nila fish farming, Is 2.65, Or R/C Ratio > 1, which means that the business is efficient and profitable. The value Of R/C ratio Of 2.65 Means That By Spending Cost Of 1 Unit, The Revenue Of 2.65 Units Are Obtained. In This Research, By Spending Cost Of Rp 11.875.000,-, It Is Obtained The Revenue Of Rp 31.500.000,-.

4. The Analysis Of Additional Value
The analysis of additional value in this research is intended to measure how much the added value to the raw materials of 4,000 nila fish. by implementing fish farming for 4 months, 59% of additional value or rp 18.625,000,- is obtained. The additional value obtained is relatively high, so that the fish farming business in the pond by using cage net plays a role in providing income for the palm oil and rubber farmers.

5 CONCLUSION AND SUGGESTIONS
5.1 Conclusions
Based on the results of the additional value analysis in this research, the researchers outline some conclusions:

1. If the normal price does not fluctuate, the rubber farmers' income is at the range of rp 2,000,000 – rp 3,000,000, while the palm oil farmers' income is above rp 3,000,000, meaning that the income of the palm oil farmers is higher than that of the rubber farmers.

2. However, the price of rubber and palm oil drops dramatically recently in which the former shows a dramatic decrease by rp 5,000 per kg from the normal price of rp 18,000 per kg; while the latter commodity's normal price is rp 2,000 per kg and currently it is rp 1,200 per kg. This fluctuation underlies this research to be conducted, in which there is a dilemma among the palm oil and rubber farmers due to the considerably high loss.

3. Based on the analysis of fish farming in the pond, with the experiment of nila fish farming, it is obtained: r/c ratio value of nila fish farming is 2.65, or r/c ratio > 1, which means that this business is efficient and profitable. To conclude, the fish farming in the pond can be implemented as an alternative livelihood in addition to palm oil and rubber plantation.
[17.] Rommy Rosyana, 2019, Pegawai Pemda Dominasi Daftar Koruptor 2018, Beritagar.id, merawat Indonesia
[23.] Peraturan Pemerintah Republik Indonesia No. 60 Tahun 2008, Tentang Sistem Pengendalian Intern Pemerintah