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Derivatif Analysis of Economic and Social Aspect of Added Value
Minapadi (Paddy-Fish Integrative Farming) a Case Study in the
Village of Sagaracipta Ciparay Sub District, Bandung
West Java Province, Indonesia.

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Abstract

Minapaddy is not something new again among farmers and fish farmers. Minapaddy cultivation taking into consideration the local wisdom in a region. Fish species cultivated in rice mina system, especially in the area of West Java, namely *Cyprinus carpio*, *Oreochromis mossambicus*, *Oreochromis niloticus*, *Osteochilus vittatus*. This research was to analyzing added value of derivative fish seed from system minapadi viewed from the socio-economic aspects. The method used feasibility analysis and described quantitatively. Based on research results of derivative value-added fish seed from the seed to the system minapadi namely freshwater aquaculture for fish seed consumption. other derivative products of salvage seeds processed into "baby fish" and the ornamental fish feeds. Minapadi can minimize the risk of losing a source of income for farmers and fish farmers.

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1. Introduction

Development of farming systems is one way to increase the income of farmers and their families, because of the technology applied in such systems have considered the importance of the interaction between components and their relation to activities outside of farming systems and the importance of the role of bio-physical, socio-cultural, institutional, and economic conditions dynamic.

Integratif farming system paddy-fish referred to minapaddy (Paddy-Cum-Fish Culture) is not something new again among farmers and fish farmers. Integratif farming system an integrated farming system to increase the productivity of paddy fields were able to produce rice and fish. Minapaddy cultivation system had long since been done by farmers, but as time went on limited natural resources, especially water resources become limiting in the production of minapaddy, is what makes the exotic in the cultivation of minapaddy taking into account local knowledge in a given area. Adiwilaga (1972) agriculture is the human activity cultivate the ground with a view to obtaining the results of plant or animal results without result in reduced ability of the land concerned to bring the next result.

The science of farming studying internal affairs of farming which includes organization, operation, financing and sales, about farming as a unit or units of production in the overall organization. Declared that the science of farming is the liaison between the agricultural engineering science and social agricultural science by constantly organizing and repairing the presence in the agricultural sciences. To be able to overcome the problem of increasing productivity and crops in agricultural development, can be done in two ways as proposed (Clayton, 1964) namely, to improve the allocation of resources owned by farmers, including land use and improvement of the combination of branches of farming, as well as introduce new resources in the form of capital, labor and new technologies.

The allocation of resources controlled by the farmers is important, because the optimal use of resources does not mean a cost to farm management. As a result, the advantages of farmers as farm manager to be not optimal. In choosing a combination of farming branch in their farming patterns, in general, farmers that aims to: (i) meet the needs of family food consumption; (ii) obtaining revenue; (iii) leveling the spread of use of family labor, and reducing the business risks that will face (Utami, 1977). In the system integration of crop farming these animals known concept LEISA (Low External Input Sustainable Agriculture), which is a sustainable agricultural systems by minimizing the influence from outside. The application of this concept is as follows: (i) optimize local resources; (ii) maximum results; (iii) results in crop diversity; (iv) by using local resources are managed properly it will create good quality, causing marketable surplus and (v) increase the independence (Suriapermana, 1994).

Agriculture including freshwater aquaculture in a region can not be separated from the characteristics of the natural resources contained therein. This characteristic is characterized by a variety of factors, among others: local topography, soil fertility traits, solum soil, rainfall and distribution of rainfall as well as a cover crop that is on it. Various aspects will determine the suitability of land which naturally will determine the level of productivity. Climate change conditions that occur at this time, rice mina is a rational choice in optimizing paddy farmland. Conditions of relatively high rainfall and the government's plan to improve the irrigation channels in order to improve food security and animal protein as well as the fulfillment of the needs of business diversification opportunities in increasing the family income.

Mina paddy cultivation of rice cropping pattern consists of two patterns that can be done in a single growing season, the pattern interval time and intercrop. Interval time pattern pisciculture in the fields before the rice planting, pending the outcome of the rice seedlings to be planted so-called fish panyelang while cropping intercropping is the maintenance of fish together with rice in a paddy field. Types of fish farmed on the system mina paddy, especially in West Java, namely carp [*Cyprinus carpio* (Linnaeus, 1758)], tilapia fish [*Oreochromis mossambicus* (Peters, 1852)], tilapia [*Oreochromis niloticus* (Linnaeus, 1758)], fish nilem [*Osteochilus vittatus* ((Valenciennes, 1842))] and many more species of freshwater fish can be cultivated with rice mina system. Habits of farmers who cultivated rice mina using this type of carp carp (*Cyprinus carpio*) is currently being developed for tilapia nirwarna species to cultivated rice through the system mina paddy.

Various types of fish that are commonly grown in paddy fields (local namely is *carp*, *tawes*, *nilem*, *tilapia*) could also be developed prawns which have a higher selling price than fish. Selection of fish species is based on several factors, such as the volume of water, availability of seed, feed, market, and habits of farmers. Unlike the products in the manufacturing industry, agroindustry which include vegetable has the following specific characteristics: (i)

the products are perishable, (ii) the planting, growing and harvesting processes are highly dependent on the climate and season, (iii) the products come in various sizes, shapes and quality, and (iv) bulky, i.e. products are difficult to carry or manage because of their size and shape (Austin, 1992). As a consequence, supply chain management of vegetable becomes more difficult and complicated than of other products .

Added value may be defined as the incremental value to a commodity as it undergoes processing in the production stream defined added value as the “difference between output value and the input costs”. Added value concept is the increase in the value due to the growth of the value as functional input is affected to the commodity. Functional input is the treatment and services that causes increments in the utility and the value of the commodity . Hayami et al. (1987), tangible added value is influenced by technical factors (production capacity, amount of raw materials used and labor) and market factors (output price, wage of labor, raw materials prices, and value of other inputs) which can be formulated as follows:

$$\text{Added value} = f \{K, B, T, U, H, h, L\} \quad (1)$$

Where:

K = Production capacity

B = Raw material

T = Labor

U= Wage of labor

H= Output price

h = Input price

L = Value of other inputs than raw materials and labor

2. Material and methods

There were two types of data used in this research: primary data and secondary data. Primary data were collected by interviews and questionnaires. Secondary data were obtained from desk study and literature review. This research was done using two types of analysis: qualitative and quantitative analysis. The qualitative analysis was used to describe the. The quantitative analysis by using Hayami method (Hayami et al., 1987) was used to measure and analyse the added value for each member of supply chain quantitatively by using Hayami method.

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Tabel 1. Added value analysis of supply chain using Hayami customers' order and end with the fulfilment of the method output, input, and price formula

No	Output, input, and price formula	Value
1.	Output ($\text{kg} \cdot \text{d}^{-1}$)	(1)
2.	Raw material Input ($\text{kg} \cdot \text{d}^{-1}$)	(2)
3.	Workers/ Labor ($\text{h} \cdot \text{d}^{-1}$)	(3)
4.	Conversion Factor	(4) = (1) / (2)
5.	Workers Coefficient ($\text{h} \cdot \text{kg}^{-1}$)	(5) = (3) / (2)
6.	Price of Product ($\text{IDR} \cdot \text{kg}^{-1}$)	(6)
7.	Wages ($\text{IDR} \cdot \text{h}^{-1}$)	(7)
	Revenue and Profit	
8.	Raw material Input ($\text{IDR} \cdot \text{kg}^{-1}$)	(8)
9.	Other Inputs ($\text{IDR} \cdot \text{kg}^{-1}$)	(9)
10.	Production ($\text{IDR} \cdot \text{kg}^{-1}$)	(10) = (4) × (6)
11.	Added value ($\text{IDR} \cdot \text{kg}^{-1}$) = VA	(11a) = (10) – (8) – (9)
12.	Added value ratio (%)	(11b) = (11a) / (10) × 100
13.	Revenue of Workers ($\text{IDR} \cdot \text{kg}^{-1}$)	(12a) = (5) * (7)
14.	Workers share of VA (%)	(12b) = (12a) / (11a) × 100
15.	Profit ($\text{IDR} \cdot \text{kg}^{-1}$)	(13a) = (11a) – (12a)
16.	Rate of Profit (%)	(13b) = (13a) / (10) × 100

3. Result and discussions

Some things to consider in combination branches of farming: (i) can preserve the land, (ii) will reduce the risk of crop failure and financial losses, (iii) a combination of too much would lead to inefficiency and high cost. This farming branch option according to respondents are influenced by the physical state of the land and the consideration of the benefits to be obtained by the farmer. Efforts to optimize the potential of irrigated land and increase farmers' income. Basically this strategy has long been done by farmers, but this time specifically agricultural diversification by mixing rice plants with cultivation of indigo. This pattern, he added could increase agricultural output, increase farmers' income, and increase soil fertility and water, and reduce pests and diseases in rice plants. Integration of Rice - Fish is fish farming in paddy field rice plants together. The duration of maintenance depends on the purpose of planting the fish itself, to nursery or fish ready for consumption. Data from the 80 % of respondents and 20 % of the fish nursery ready for consumption. However, a common time used normal ly until the first weeding, weeding second, or until the rice plants begin flowering.

Minapaddy cultivation techniques using *legowo*. *Legowo* is local name for row planting system to increase the population of rice plants by regulating a spacing. *Legowo* according to the Java language is derived from the word "*Lego*" which means wide and "*Dowo*" meaning long. In addition cropping systems are also manipulating the location of the plant so that the rice crop is made into the edge of the crop more. Which is located alongside a rice plant will produce higher production and better grain quality and this is because the edge of the crop will get more sunlight. Mina paddy system *legowo* an engineering plant by adjusting a spacing between the clumps and between rows, causing compaction the clumps of rice in rows and wide spacing between rows so as if clumps of rice is edge of the crop benefited as the crop edge (border effect).

Some types of *Legowo* row planting system, local namely is: (i) *Jajar legowo* 2:1 where each of the two rows of rice plants empty interspersed with wide row spacing twice in a row. plant spacing in the row that extends narrowed down to half a spacing in the row; (ii) *Jajar Legowo* 3:1. every three rows of rice plants empty interspersed with wide row spacing twice in a row. Spacing of rice plants that edge sealed twice with spacing amid; (iii) *Jajar Legowo* 4:1. every four rows of rice plants empty interspersed with wide row spacing twice in a row.

Cropping systems mina paddy by selecting the type of rice that has the following characteristics: rooting in, so that rice planted not easy to collapse and do not hinder the movement of fish, fast lambing (sprout), to avoid delays in the growth of shoots due to waterlogging, trunk strong and not easily fall down, to avoid stem growth weakened due to water up take to plant high enough, hold a puddle at the beginning of growth, erect leaves to increase sunlight can be received by the leaf surface, so that the process of photosynthesis better and rice growth will increase and resistant to pests and diseases whereas farmed fish species including *carp*, *tilapia*, *nilem* with a size of 1 cm to 2 cm. Fish reared together with the rice for 30 d to 40 d and fish seed is harvested when it reaches the size of 30 fish per kg to 40 fish per kg from the time of planting until the first or second weeding. Mina paddy land treatment system there is the making trenches have the following functions: protect the fish from drying out in the event of leakage, facilitates the harvest of fish and fish feeding.

Minapaddy can minimize the risk of losing a source of income, the successful cultivation of fish in paddy seeds is strongly influenced by the availability of food fish. Fish food can be a natural food and home-made food. Natural foods derived from organisms that live naturally in the fields such as zooplankton and phytoplankton while artificial food given in the form of food supplements in the form of pellets and bran, especially for fish.

Based on the results of the pilot project carried out in groups mina paddy mighty located in the village Sagaracipta Ciparay District of Bandung, mina paddy farming system can decreasing insecticide and growth of the grass. This occurs because the creation of the symbiotic relationship mutualism between rice, fish, water, and soil in order to reach the condition of ecological balance. Component costs used for the maintenance of relatively inexpensive fish in rice fields, because the costs incurred for the provision of land, water and soil tillage already included in the cost of rice cultivation. Land and water are used to cultivate fish fry together with land used to grow rice. Mina rice gives a promising business opportunities if followed by the creativity of each product, as well as products derived from rice mina results, ie fish salvage seeds can be processed into "baby fish" that is ready to be marketed.

Based on the results of interviews with the respondents can be seen several variables into perspective rice fish integration into local farmers hope to increase food security and family proteins as well as the final destination for

farmers. Revenue increase can be seen in Figure.1. Suitability of land is a depiction of a plot of land suitability for particular uses. Differences in the level of suitability is determined by the relationship, actual or potential, between benefits and costs required associated with a land use. national varieties in one year and three times the harvest, sometimes this causes rice farmers switch to commercialize national varieties.

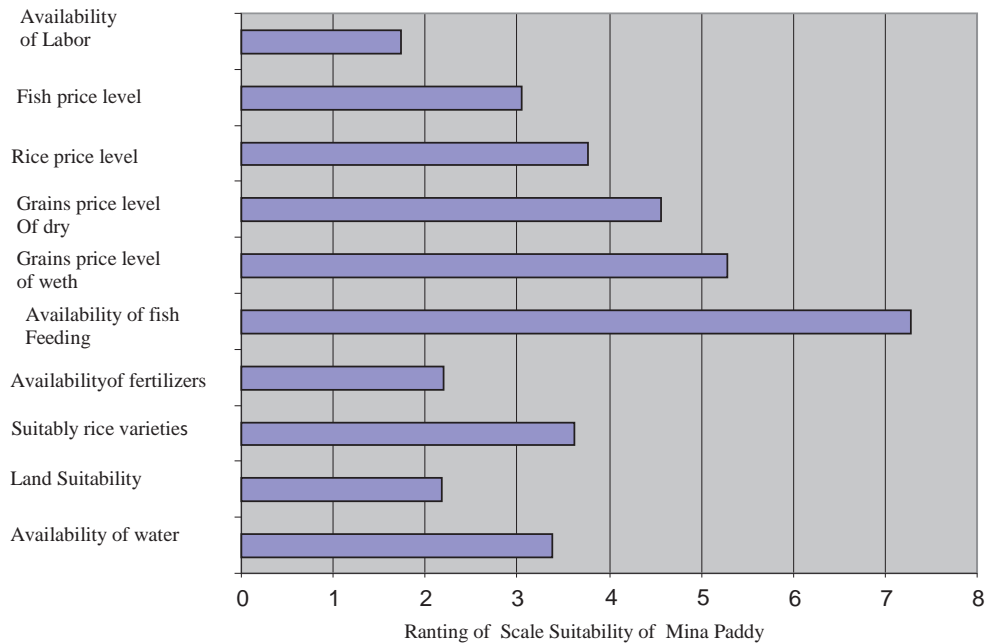


Figure 1. Suitability of mina paddy

Figure 1 can be showed the availability of fish feed is a decisive factor in the implementation of the integrated rice fish, followed by a of wet grain price level, the price level of milled rice and rice price levels, this shows the economic value of rice cultivated by farmers. Integration of Rice - Fish can reduce the use of insecticides and growth of the grass. It happens because in the creation of a harmonious relationship between the rice, fish, water, and soil in order to reach good ecological equilibrium conditions, thus pests and grass to be reduced, and lossing production costs in the growth of rice.

The low use of fertilizers by farmers because of the ecological correlation between the cultivation of fish and food that is not consumed will become fertilizer for the soil and water naturally. Component costs used for the maintenance of relatively inexpensive fish in rice fields, because the costs incurred for the provision of land, water and soil tillage already included in the cost of rice cultivation. Land and water used to keep the fish together with the land used to grow rice. Similarly, the processing cost of land already included in the cost of land preparation for planting rice. In addition, fish farming in rice fields can provide employment opportunities to members of the family, providing animal protein needed by the community, the balance of income, this system is a system of sustainable agriculture.

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Tabel 2. Hayami metode value added derivatif of mina pady

No	Output, input, and price	Value of paddy	Value of paddy (dried mild grain)	Value of fish seed	Value of fish crispy
1.	Output (kg per season)	7 000	6. 410	5 000	5 000
2.	Raw material Input (kg per season)	30	30	250	250
3.	Workers/ Labor (h · d ⁻¹)	4	4	4	4
4.	Conversion Factor	233	214	20	20
5.	Workers Coefficient (h · kg ⁻¹)	0	0	0	0
6.	Price of Product (IDR · kg ⁻¹)	4 150	5 500	23 000	55 000
7.	Wages (IDR · h ⁻¹)	50 000	50 000	50 000	50 000
	Revenue and Profit				
8.	Raw material Input (IDR · kg ⁻¹)	2 014	2 200	13 000	13 000
9.	Other Inputs (IDR · kg ⁻¹)	15 000	15 000	5 500	5 500
10.	Production (IDR · kg ⁻¹)	968 333.33	1 175 166.67	460 000.00	1 100 000.00
11.	Added value (IDR · kg ⁻¹) = VA	951 319.05	1 157 966.98	441 500.00	1 081 500.00
12.	Added value ratio (%)	98.24	98.54	95.98	98.32
13.	Revenue of Workers (IDR · kg ⁻¹)	6 666.67	6 666.67	800.00	800.00
14.	Workers share of VA (%)	0.70	0.58	0.18	0.07
15.	Profit (IDR · kg ⁻¹)	944 652.38	1 151 300.31	440 700.00	1 080 700.00
16.	Rate of Profit (%)	97.55	97.97	95.80	98.25

With this mina paddy farming pattern can minimize the risk of losing a source of income, because of this system does not rely on a single source, so that failure of one type of business will not affect the income of farmers. The success of aquaculture in the field is strongly influenced by the availability of food fish. Fish food can be a natural food and home-made food. Natural foods derived from organisms that live naturally in the fields, while the artificial food given in the form of additional food from outside, in the form of pellets, bran, or the remains of food from the kitchen. Feeding from the outside is quite troublesome, because this fish farming only as a sideline, whereas the main business is the rice plant. That's why farmers often do not provide additional food. It is actually still be done on the still fertile rice fields and many contain biota profit as fish food. However paddy infertile and less available biota as fish food, supplementary food needs to be done. Understanding life here is all kinds of animals and plants that are large and small who live in the fields. minapaddy derivative of which is as follows: biota than rice and fish, both were deemed beneficial or detrimental. The fish farmed as a sideline of rice cultivation. The seed of culled fish processed into fish chips.

Source of revenue for farmers mostly derived from the production of grain and fish. Farmers in the form of cash receipts from sales of grain and fish, while the reception is not cash in the form of grain and fish are intended for family consumption. The amount of grain or fish consumed is much smaller than those sold. R / C on the cash cost of the respondents in the system integration of 2.63 indicates fish rice IDR 100 costs, farmers will gain acceptance IDR 2.63. Added Value of Derivatif Mina paddy can be know about: (i) Paddy have value added 98.24 % , (ii) Rice : 98.54 % , (iii) fish seed : 95.98 % and (iv) baby fish 98.32 % .

4. Conclusion

Minapaddy provide economic and social value for the community in order to optimize the use of land. Mina paddy has the business feasibility and value of fish farming minapaddy pattern aims to: support increased land productivity, increase farmers' income, improve the quality of food for the rural population.

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