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Productivity and Economic Value of Fishery Commodity at Traditional Silvofishery Ponds

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Abtract:- Traditional silvofishery ponds is form of local wisdom of coastal people in use for aquaculture. Combination of forest cultivation (mangrove) with aquaculture ponds performed on a specially designed in such a way so as to allow the cultivation of forestry plants (mangrove) and fishery in the same land management unit.

The uniqueness of the traditional silvofishery ponds, in fish farming does not undertake sowing but only harvest various types of commodity that come alive and evolve naturally in the pond. This research was conducted on traditional silvofishery ponds managed by the community at the Mahakam Delta in East Kalimantan region, to know the natural fishery commodities produced include commodities, productivity and economic value.

This research was conducted through field surveys, interviews, and direct observation at the time of harvest of the commodity that is produced.

The results showed that there are three main groups of commodities produced fishery is shrimp, fish and crabs, with productivity and economic value of the four ponds with different ponds age are: [1] 2 years pond age: shrimp 58 kg/ha/yr, with the economic value Rp.2747940; fish 104 kg/ha/yr, with the economic value Rp.2061600; crab 36 kg/ha/yr, with the economic value Rp.1368000; [2] 5 years pond age: shrimp 131 kg/ha/yr, with the economic value Rp.8166912; fish 148 kg/ha/yr, with the economic value Rp.2956800; crab 13 kg/ha/yr, with the economic value Rp.292800; [3] 6 years pond age: shrimp 413 kg/ha/yr, with the economic value Rp.19881600; fish 213 kg/ha/yr, with the economic value Rp.4264320; crab 192 kg/ha/yr, with the economic value Rp.8160000; [4] 8 years pond age: shrimp 298 kg/ha/yr, with the economic value Rp.11640000; fish 197 kg/ha/yr, with the economic value Rp.3945600; crab 64 kg/ha/yr, with the economic value Rp.17456000.

Keywords:- *Economic Value, Fishery Commodity, Local Wisdom, Productivity, Traditional Silvofishery Ponds.*

I. INTRODUCTION

At the Mahakam Delta region in the province of East Kalimantan - Indonesia, has conducted various studies, including a study Zoning Plan and Rehabilitation Referral Mahakam Delta Region, has been carried out by Suhardiman (2009). Based on these results, the pattern of the region for regional rehabilitation is already shaped ponds can be done using a model Silvofishery with systems tailored to the wishes of the people.

Economic studies of Business Model Pond in the Mahakam Delta Region Kutai regency has been done by Upat (2009), with the results that kind of viable model are silvofishery pond.

Study of Public Participation in the Management of Mangroves has been done by Wardani and Djuhriansyah (2006), provides the results of the level of community participation in the management of mangrove in the village of Muara Jawa Ilir in the category is still low.

Research on productivity and economic value of mangrove stands in Silvofishery ponds by Suwarto and Sofyan Bulkis (2014), with the results the potency and economic value of forest commodities in various site conditions.

Research and recent publications Suwarto (2015) regarding ecological aspects Silvofishery ponds for aquaculture explained that the water quality silvofishey qualify for fish, shrimp and crab.

Information productivity and economic value of fishery commodities produced by traditional Silvofishery ponds is support for the development and sustainability of aquaculture enterprises with Silvofishery system. However, studies that specifically highlights the productivity and economic value of fisheries commodity in traditional silvofishery ponds not been implemented, so that the initial research is needed to meet the information for various purposes.

This study is focused on knowing the productivity and economic value of fisheries economically valuable commodity in ponds managed by traditional Silvofishery system in Mahakam Delta region, with the benefits of research to determine the types of commodities produced, the ponds productivity and economic value of fishery commodities produced per unit area.

II. METHOD

Field research activities have been carried out on the ponds with the traditional silvofishery system located in the Mahakam Delta region, in the village of Handil 8 District Muara Jawa, East Kalimantan.

The scope of this study is limited to the type of commodity that has economic value on traditional Silvofishery ponds in Mahakam Delta region. The focus of the study of these problems associated with the type, productivity and economic value of fishery commodities produced for the development and sustainability of aquaculture enterprises with Silvofishery system.

Observations of commodities: only the economically valuable commodity that is done in traditional silvofishery ponds age of 2 years, 5 years, 6 years and 8 years, including the type of commodity, number, size and weight at harvest.

Productivity fishery commodities is calculated based on the weight of each type of commodities produced at the time of harvest per unit area of the pond.

The economic value of fishery commodities: calculated based on the total weight of each type of commodities produced and the average price per kind in the local market at the time of the study.

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III. RESULTS AND DISCUSSION

➢ *Type of Fishery Commodities:*

The result of research the types of commodities economically valuable fisheries in traditional silvofishery ponds consists of three groups of commodities: shrimp, fish and crabs, are presented in Table 1.

Table 1. Types of Fishery Commodities on Traditional Silvofishery Ponds

Ponds Age (years)	Pond Size (hectares)	Commodity groups	Number of species	Speies
2	4	Shrimp	3	*Tiger shrimp, Spot shrimp, White shrimp*
		Fish	7	*Lundu fish, Gobi fish, Mullet, Kipar fish, Glass fish, Gulamah fish, Barracuda fish.*
		Crab	1	*Mangrove crabs*
5	2	Shrimp	2	*Tiger Shrimp, Spot shrimp*
	5	Fish	9	*Milkfish, Mullet, Sembilang fish, Lundu fish, Gobi Fish, Kipar fish, Glass Fish, Baronang fish, Mujair fish*
		Crab	1	*Mangrove crabs*
6	2	Shrimp	2	*Tiger Shrimp, Spot shrimp*
	5	Fish	11	*Lundu Fish, Kerong-Kerong fish , Gulamah fish, Sembilang fish, Otek Fish, Barukang fish, Gobi fish, Mullet, Kipar fish, Mujair fish, Glass fish.*
		Crab	1	*Mangrove crabs*
8	3	Shrimp	3	*Tiger shrimp, Spot shrimp, White shrimp*
		Fish	9	*Baronang fish, Gobi fish, Lundu fish, Trakulu fish, Glass fish, Gulamah fish, Kipar fish, Mullet, Barracuda fish*
		Crab	1	*Mangrove crabs*

Variations in the type and size of the existing natural fishery commodities in traditional Silvofishery ponds presumably due to the presence and development that takes place naturally fit environmental conditions ponds.

Three types of fishery commodities that exist in traditional silvofishery ponds, fish groups dominate the number of types of commodities produced. This can happen because of the type of fish has a higher mobility than the kinds of shrimp and crab, so it has more flexibility to move with the wider deployment area. Besides, the type of fish also has the ability to adapt to the environment is higher than the kinds of shrimp and crab, so that they can live and thrive in traditional silvofishery ponds.

Pond age does not significantly affect variation of fishery commodities, but there is a tendency to increase the number of commodities in line with the increasing age of the pond. This relates to the conditions of an increasingly pond ideal for the life of the various types of fishery commodities. Development of mangrove stands planted in silvofishery ponds and aquatic biota strongly support an increasingly diverse environmental conditions ponds making it ideal for the life of the various types of natural fishery commodities. This indicates that the stands of mangrove and aquatic biota that grows naturally in traditional silvofishery ponds can provide ecological function as expressed by Harahab (2010) which states that the ecological benefits of mangrove in relation to the life of aquatic biota is a region for shelter, nesting and breeding a variety of aquatic biota, other functions as the breeding (nursery grounds), local foraging (feeding ground) and spawning (spawning ground) for a wide variety of marine organisms, especially fish.

Bengen (2002) also states that mangrove can serve as a producer of a large amount of detritus, particularly from leaf litter and twigs of mangrove loss. Most of the detritus can be used as food for detritus eaters organisms (detritivore) and partly decomposed by bacteria decomposer into inorganic materials (nutrients) that play a role in fostering the waters and mangrove life itself.

Forest trees (mangrove) were grown on traditional silvofishery ponds also can create an ideal ecosystem for habitat of aquatic biota that live and grow naturally. This was stated by Sunarto (2008) as an ecosystem, mangrove habitat for various flora and fauna that make it both as primary habitat as well as those associated with mangrove. Some aquatic organisms of the type of fish or shellfish either occupy these ecosystems throughout its life cycle or part of their life cycle. Mangroves have high productivity and therefore capable of supplying energy in the form of organic materials for the life of the inhabitants biota.

➢ *Productivity of Fishery Commodities:*

Fishery commodities produced from traditional silvofishery ponds that have economic value consists of three groups of commodities, namely shrimp, fish and crabs.

Results of the research productivity of fishery commodities from traditional silvofishery ponds aged 2, 5, 6 and 8 years old, for three groups of commodities are presented in Table 2.

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Table 2. Productivity of Fishery Commodities Traditional Silvofishery Ponds

Ponds Age (years)	Pond Size (hectares)	Commodity groups	Productivity (Kg / Ha / year)
2	4	Shrimp	58
		Fish	104
		Crab	36
5	2.5	Shrimp	131
		Fish	148
		Crab	13
6	2.5	Shrimp	413
		Fish	213
		Crab	192
8	3	Shrimp	298
		Fish	197
		Crab	64

Productivity of fishery commodities in traditional silvofishery ponds still relatively low, because the commodity that is produced depends on the commodity that living and growing naturally in the pond, without sowing and feeding. It is as stated by Harahab (2010) that input silvofishery production on traditional ponds still rely on nature, so that the pond environmental conditions and the availability of aquatic biota as natural feed largely determine the number of types and productivity of fishery commodities produced.

The type and size of the diverse natural fishery commodities also caused harvesting is not done in total. The type and size of the harvested commodity only marketable, but those not sold on the market will be released back into the pond.

Although the fishery commodities from traditional silvofishery ponds are still relatively low, but the abundance of various types of biota obtained pond at harvest time, shows that the traditional silvofishery ponds are ecologically capable of supporting for the survival and growth of various types of aquatic biota naturally. This indicates that the fishery productivity of traditional silvofishery ponds can be improved through technological innovation inputs with more intensive cultivation.

➢ *Economic Value of Fishery Commodities:*

The economic value of fishery commodities produced by traditional silvofishery ponds aged 2, 5, 6 and 8 years, for the three groups of commodities based on local market prices are presented in Table 3.

Table 3. Economic Value of Fishery Commodities Produced by Traditional Silvofishery Ponds

Ponds Age (years)	Pond Size (hectares)	Commodity groups	Productivity (Kg /Ha/year)	Average price (Rp/ kg)	Economic value (Rp.)
2	4	Shrimp	58	47500	2747940
		Fish	103	20000	2061600
		Crab	36	38000	1368000
5	2.5	Shrimp	131	62000	8166912
		Fish	148	20000	2956800
		Crab	13	22500	292800
6	2.5	Shrimp	413	48000	19881600
		Fish	213	20000	4264320
		Crab	192	42500	8160000
8	3	Shrimp	298	39000	11640000
		Fish	197	20000	3945600
		Crab	64	29500	1870400

The economic value of fishery commodities produced by traditional silvofishery ponds age of 2 years from the three main commodities are: shrimp 58 kg/ha/yr, with economic value Rp.2.747.940,-/ha/yr; fish 103 kg/ha/yr with economic value Rp.2.061.600,-/ha/yr; and crab 36 kg/ha/yr with economic value Rp.1.368.000,-/ha/yr. The total economic value of fishery commodities Rp.6.177.540, -/ha/yr.

The economic value of fishery commodities produced by traditional silvofishery ponds age of 5 years from the three main commodities are: shrimp 131 kg/ha/yr with economic value Rp.8.166.912,-/ha/yr; fish 148 kg/ha/yr with economic value Rp.2.956.800,-/ha/yr; and crab 13 kg/ha/yr with the economic value Rp.292.800,-/ha/ yr. The total economic value of fishery commodities Rp.11.416.512,-/ha/yr.

The economic value of fishery commodities produced by traditional silvofishery ponds age of 6 years from the three main commodities are: shrimp 413 kg/ha/yr, with economic value Rp.19.881.600,-/ha/yr; fish commodities 213 kg/ha/yr with economic value Rp.4.264.320,-/ha/yr; and crab 192 kg/ha/yr with economic value Rp.8.160.000,-/ha/yr. The total economic value of fishery commodities Rp.32.305.920,-/ha/yr.

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The economic value of fishery commodities produced by traditional Silvofishery pond age of 8 years from the three main commodities are: shrimp 298 kg/ha/yr, with economic value Rp.11.640.000,-/ha/yr; fish 197 kg/ha/yr with economic value Rp.3.945.600,-/ha/yr; and crab 64 kg/ha/yr with economic value Rp.1.870.400,-/ha/yr. The total economic value of fishery commodities Rp.17.456.000,-/ha/yr.

The economic value of fishery commodities produced by traditional Silvofishery ponds is very dependent on the type and size of the commodities produced, due to the type and size of the commodities produced will affect the selling price. The economic value for each group of commodities produced is calculated based on the average price in the local market at harvest.

The type and size of fishery commodities produced from traditional Silvofishery ponds are also factors that determine economic value. The type and size of economically valuable commodity that will be harvested and sold by the farmer, whereas the type and size of the commodity that has not economic value will be released back into the pond for the next harvest. This will reduce yields, but strongly support the preservation of resources and the results of traditional cultivation.

Cultivation of fishery commodities in traditional silvofishery ponds also serves for the production of commodity seed fishery (crab), so as to support the needs of seeds for further cultivation. In the traditional silvofishery pond several types of commodities can also be used as a natural feed for other fish farming, some types of shellfish and fish (trash fish) that live naturally in traditional silvofishery ponds can be used as feed soft-shelled crabs are cultured with a system of cages in silvofishery silvofishery. The presence of various types of fishery commodities can also serve as biota that can maintain the stability of the aquatic environment so that it can be an ideal environment for the cultivation of various fisheries commodities.

IV. CONCLUSION

Economically valuable fishery commodities produced by traditional silvofishery ponds are still limited to the three main commodity groups, namely shrimp, fish and crabs with diverse types and sizes.

The production process is still relying on the natural production inputs suppose to be the causative factor is still relatively low productivity of fishery commodities produced by traditional silvofishery ponds.

The diversity of the amount, type and size of fishery commodities produced by traditional silvofishery ponds correlated to the price and the total economic value of fishery commodities produced.

V. ADVICE

To increase productivity and economic value of fishery commodities produced by traditional silvofishery ponds, necessary to develop more productive cultivation systems with input silvofishery technological innovation, supported by research and development of the types of forestry and fishery commodities with high economic value.

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