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Economic Value of Agricultural Land/Rice Fields as Benefits of Cultivation Media and Environmental Service Products in Sidoarjo Regency, East Java Province, Indonesia

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ABSTRACT:

The low economic value of agricultural land/rice fields because the multifunctional benefits of agricultural land have not been internalized into the calculation of farming business. On the other hand, understanding of people that agricultural land is only a direct use or benefit of cultivation medium that produces products and already has a market price is also one of the causes of the low economic value of agricultural land/rice fields. In addition to producing direct use or benefits as cultivation media that produce products and already have a market price, agricultural land/rice fields also produce benefits for environmental service products that do not yet have a market price. The research objectives were (1) to analyze the economic value of agricultural land/rice fields as media for rice cultivation; (2) to analyze the economic value of the benefits of agricultural land/rice field environmental service products as flood control; (3) comparing the economic value of agricultural land/rice fields as media for rice farming cultivation with the benefits of environmental service products as flood control. The method used in this study was an economic valuation with a replacement cost method (MBP) analysis tool and a farming profit calculation method. The results showed that (1) the economic value of agricultural land/rice fields as direct users or benefits of rice farming cultivation media is Rp. 24,500,000 per hectare per year. (2) The economic value of agricultural land/rice fields as a producer of benefits of environmental service products as flood control is Rp. 128,808,000 per hectare per year. (3) The comparison of the economic value of agricultural land/rice fields as the benefits of rice farming cultivation media with the benefits of environmental service products as flood control is (1: 5).

Keywords: Multifunctionality, Cultivation media, Environmental Services, Valuation.

1. Introduction

Background

The phenomenon of conversion of agricultural land into non-agricultural (settlement, industrial area, tourism, etc.), Is explained by economic theory, that is through analysis of land rent ratios. Based on the results of a study, there is a very significant difference between the ratio of land rent for the agricultural sector to the non-agricultural sector. The comparison of the rental value of agricultural land for farming (rice or secondary crops) with housing is 1:622; Comparison of the rental value of agricultural land for farming (rice or secondary crops) with industry is 1:500; and Comparison of the rental value of agricultural land for farming (rice or secondary crops) with tourism is 1:14 (Nasution and Winoto 1996).

However, the weakness of the economic analysis of the land rent is that it only assesses the benefits as direct use or as a cultivation medium that has a market value, even though the expanse of agricultural land in addition to having direct use benefits or as a cultivation medium that produces products that have market prices also produces environmental service products that do not yet have market prices. In addition, the analysis of the land rent has not taken into calculation of the present value of agricultural products that should always be obtained over time.

Agricultural land has both use and non-use benefits (Munasinghe 1993, Yoshida 2001). Thus, agricultural land other than as a cultivation medium or source of production that is a source of income of farmers also has other functions that produce environmental service products or have multifunctions whose benefits can be enjoyed by the wider community. In fact, some research results show that the function of agricultural land as a producer of environmental services is greater than the function of agricultural land as a cultivation medium if assessed economically.

The multifunctional approach of rice fields is an alternative to minimize the conversion of rice fields to non-rice fields (settlements, industrial areas, tourism and so on), because the multifunctional approach of rice fields does not only assess the benefits of the results from rice fields financially and in the short term. but also assesses the environmental services of rice fields socially (environmental economy) and long-term benefits. However, the question is whether the people in Indonesia, especially the people in the research location, have correctly understood about the multifunctionality of agricultural land, especially rice fields.

Economic valuation is an attempt to provide a quantitative (monetary) value for goods or services produced by natural resources and the environment, both on the basis of market value and non-market value. Therefore, the economic valuation of natural resources and the environment is an economic tool that uses certain valuation techniques to estimate the monetary value of goods or services produced by natural resources and the environment.

2. Theoretical Background

Multifunctionality of Rice Fields

The terminology of multifunctional agricultural land has emerged since 1994 in a discussion agenda regarding free trade. Through free trade, which country is the most efficient in producing goods and services, then that country becomes the exporter or net-exporter. Some countries agree that the concept is more of a financial economy, not a social economy. The implications of free trade on agriculture are enormous because agriculture has benefits that can not or can not yet be assessed based on market mechanisms. Namely the multifunctional benefits of agricultural land. In view of this, experts in the environment (ecology) and environmental economics, remind the country not to fully enforce free trade on its agricultural commodities. In the free market agenda, countries in Asia are expected to open their domestic markets for free trade, especially foodstuffs (agricultural products). Japan, South Korea and Taiwan are among the countries that reject the full application of free markets for agricultural products or foodstuffs.

The concept of multifunctional agriculture is also used as the basis for rejection of Japan, South Korea, and China of the global movement initiated by developed countries (OECD) to prohibit the expansion of rice fields, especially in Asia (Yabe 2005). Developed countries have outlook that rice fields are a source of pollution in global warming through methane (CH_4) gas emissions. On the other hand, Japan and its allies have outlook that the multifunctional impact of agriculture (positive externalities) is much higher than the negative impact. The argument against free trade based on the multifunctional approach to agriculture by Japan and its allies was solidified at the Ministerial Summit in Cancun (2003). According to Japan and its allies, the concerns of developed countries in terms of methane gas emissions and water pollution from agricultural land, especially rice fields are considered excessive.

The impact of soil and water pollution from agricultural activities is able to be overcome with the LEISA (low external input sustainable agriculture) farming system, or determination of maximum pesticide residues on the soil (Kurnia, 2006). The technique of perfect rice field cultivation and intermittent irrigation or "macak-macak" produces methane gas of 70-77 kg/ha/mt, while with continuous stagnant irrigation produces 164 kg/ha/mt of methane gas. The rice varieties planted also have different potential for methane gas emissions. The cultivation of rice varieties IR-64, Membramo and Way Opu Baru are able to reduce methane gas emissions by 60%, 35%, and 38%, respectively, compared to cisedane rice varieties. On the other hand, rice is able to produce oxygen (O_2 emissions) through photosynthesis 17.8 tons of O_2/ha and absorb carbon dioxide 24.4 tons of CO_2/ha (Eom & Ho-Seong 2004).

The protection of domestic rice market of Japan is also linked to the multifunctionality of agricultural land. The simplest outlook states that from a nutritional point of view, imported rice is the same as domestically produced rice, but socially, culturally and environmentally, the value of imported rice and domestically produced rice is different. The temporary shortage of rice is able to be overcome by importing rice, but the environmental benefits of the rice field system, such as a reservoir for water sources, and beautiful scenery are not able to be imported (Oshima, 2001).

The concept of multifunctionality is studied as a characteristic of economic activity. A characteristic that makes an economic activity multifunctional, including the many outputs or results or impacts. The output is either positive or negative or detrimental to society. The output is also able to be valued at market prices because there is a market, but it is also possible that the output does not or there is no market yet. This assessment approach is known as the positive concept of multifunctionality.

Another study approach is multifunctionality as a normative concept. Multifunction as a normative emphasizes more on "many roles" or multirole. As well as the role of agricultural land on farmers and the environment. The normative aspect of multifunctionality places more emphasis on policy, that is how to maintain the multifunctionality of an object. However, the emphasis on the multifunctional approach from the positive concept does not mean eliminating the normative concept, especially in examining the multifunctionality of agricultural land.

Based on the results of research in Japan (Yoshida and Goda 2001) the multifunctional value of agricultural and rural land throughout Japan, covering an area of 4,100,000 ha reaches US$

68.80 x 109, and of this amount US$ 30.33 x 109 is the economic value dry land in the form of hills and mountains, covering an area of 2,200,000 ha. At the exchange rate of Rp. 9,000/US$ the multifunctional value of agricultural land in Japan reaches 151,000,000/ha. Therefore, it is very reasonable if the Nagoya District Government in Japan provides assistance to rice farmers in the amount of US $ 3,300 or Rp. 29.7 million/ha/year (MAFF, 2001).

The results of research in South Korea (Suh, 2001) showed that local people are familiar with the functions of agricultural land, both positive, such as providing food and food security stability, controlling erosion and flooding, as well as negative ones, such as a source of water and soil pollution. Then Eom and Kang (2001) stated that there are 11 socio-economic cultural functions of the management/utilization of rice fields that are known to the people of South Korea. Based on the results of the study, there are 8 (eight) functions of rice fields that have received high appreciation from the community, namely: (1) as a supplier of food ingredients (2) water sources, (3) emotional binders for rural residents, (4) providers of places or media for environmental education, (5) recreation areas and natural scenery, (6) air pollution control, (7) ecosystem preservation, and (8) prevention of soil erosion. Meanwhile, the functions of rice fields that have received less appreciation are (1) as labor market controllers, (2) conventional opinion makers, (3) providers of burial sites. Then Chen (2001) examined perceptions of people of agricultural land environmental services in Taiwan and the results showed that most people are familiar with agricultural land environmental services, especially those that are very important as erosion prevention, water source providers, and flood control.

The calculation or assessment of the benefits of environmental goods and services must be assessed financially. The problem that arises in the use and management of land, including rice fields and dry lands, is the existence of environmental outputs that do not have a direct market value or have not been clearly stated how big their economic value is. This condition is called an externality, because the benefits of environmental management and the impacts are outside the system.

A comprehension of the concept of economic valuation enables policy makers to determine the effective and efficient use of natural resources and the environment. This is because the economic valuation of natural resources and the environment are able to be used to show the relationship between conservation of natural resources and the environment and economic development. so that economic valuation is able to become an important tool in efforts to increase public appreciation and awareness of natural resources and the environment. The multifunctional benefits of agricultural land have not been internalized into farming calculations, so an economic valuation approach for the multifunctional benefits of agricultural land is needed. The multifunctional agricultural land is explained in Figure 1.

Munasinghe, 1993

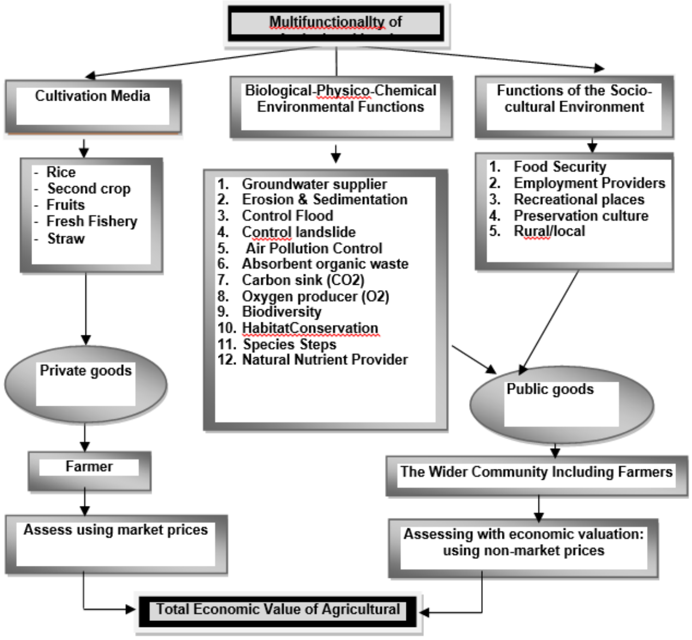

Figure1. Multifunctionality of Agricultural Land

Economic Valuation

Economic valuations use monetary units as a benchmark for calculations that are considered compatible. Although there are still doubts that the value of money is not necessarily valid for some or all things, such as the value of the human soul, in reality the choice must be decided in the context of the scarcity of natural resources and the environment. Therefore, monetary units as a benchmark for measurement are a measure of satisfaction for a decision-making action. The absence of a market does not mean that the economic benefits of a good or service do not exist, therefore preferences relating to the improvement of the welfare of society it must use monetary units. The absence of the market will indeed make the process of economic valuation of natural resources and the environment more complicated, or it must be carried out through several stages.

There are several reasons why monetary units are necessary in the economic valuation of natural resources and the environment. The three main reasons are that (1) monetary units are able to be used to assess the level of concern of a person for natural resources and the environment; (2) the monetary unit of the benefits and costs of natural resources and the environment are able to support for partiality towards the quality of the environment; and (3) monetary units are able to be used as quantitative comparison material for several alternative options in deciding a particular policy including the use of natural resources and the environment (Suparmoko, 2000).

The application of economics to policy making in natural resources and environmental management, including rice field management has high complexity and problems. Mainly problems in integrating and quantifying the benefits and impacts that are superimposed and in assessing the causal relationship.

Economic valuation of the benefits and impacts of natural resources and environmental management is indispensable in policy making and economic analysis of agricultural activities. In the economic valuation of natural resources and the environment, the benefits and impact factors that need to be considered are the determination of benefits and physical impacts and the valuations in monetary aspects. Monetary assessment of benefits and impacts must be based on a proper assessment of physical benefits and impacts and their interrelationships, as the impacts result in changes in productivity as well as changes in environmental quality. Economists have developed valuation methods to measure the value of natural resources and environmental management, especially for goods and services that have no market value. This assessment is carried out by a variety of methods and approaches (Grigalunas and Conger, 1995; Freeman III, 2003).

The value of environmental goods and services are categorized into (1) use value and (2) non-use value or intrinsic value (Pearce and Turner, 1991; Pearce and Moran, 1994).

According to the guidelines for the economic valuation of natural resources and the environment (KNLH, 2007) is the imposition of monetary value on the part or all potential of natural resources and the environment in accordance with the objectives of their use. The economic valuation of natural resources and the environment in question is the total economic value (total net value), damage/pollution recovery value and pollution/damage prevention.

Various techniques are able to be used to quantify the concept of value. But the basic concept in economic assessment that underlies all techniques is the willingness to pay from individuals for environmental or natural resource services (Munasinghe, 1993).

The role of economic valuation on the management of natural resources and the environment is very important in development policy. The decline in the quality of natural resources and the environment is an economic problem, because the ability of natural resources and the environment to provide goods and services is also decreasing, especially in some cases of natural resources and the environment that are not able to be returned to the way they were (irreversible).

Economic valuation is necessary in deciding the choice of development policies related to natural resources and the environment. Therefore, the quantification of benefits and losses (costs) must be carried out so that the decision-making process is able to run by paying attention to aspects of fairness. The purpose of economic valuation is basically to help decision makers to estimate economic efficiency from various possible uses.

Seeing the benefits of economic valuation that are so important in deciding policy options, what is important to know is that the results of economic valuation studies of natural resources and the environment are generally not definitive and are not able to be transferred to different locations and considations. That is, the economic valuation results of natural resources and the environment are generally site-specific, since they are generally based on the perception of a particular group at a place, a certain time, and are universally invalid (Perrot Maltre, 2005). Therefore, before conducting an economic valuation, it is necessary to know the purpose of the economic valuation activity and to whom the results will be intended. If the purpose of economic valuation is to convince land users (farmers) of the importance of implementing soil and water conservation techniques on the land being utilized, then economic valuation should be focused on the direct consequences on land users.For example economic gains and their impact on erosion, run off, decreased soil fertility. On the other hand, if economic valuation is aimed at wider stakeholders (government), then the economic valuation of natural resources and the environment must be carried out comprehensively by involving larger research variables, so that the data analysis becomes complex.

PROBLEMS

The economic value of agricultural land/rice fields is low because the multifunctional benefits of agricultural land have not been internalized into farming. On the other hand, the understanding of public that agricultural land is only a benefit of cultivation media or direct use that produces products and already has a market price, is also one of the causes of the low economic value of agricultural land/rice fields. An expanse of rice field in addition to producing benefits as a cultivation medium or direct use that already has a market price, also produces benefits as an environmental service product that does not yet have a market price. The benefits of rice fields as a producer of environmental service products will be assessed for their environmental economy with an economic valuation.

RESEARCH OBJECTIVES

1. Analyzing the economic value of agricultural land/rice fields as a benefit of rice farming cultivation media.
2. Analyzing the economic value of the benefits of environmental services for agriculture/rice fields as flood control.
3. Comparing the economic value of agricultural land/rice fields as benefits of rice farming cultivation media with the benefits of environmental service products as flood control.

4. Methodology

The method used in calculating the benefits of the economic value of agricultural land/rice fields as media for cultivating rice farming was rice farming income.

TB = BT + BV

TB = Total Cost of Rice Farming per Hectare
BT = Fixed Cost of Rice Farming per Hectare
BV = Variable Cost of Rice Farming per Hectare

TP= Q x P

TP = Total Rice Farming Revenue per Hectare
Q = Total Rice Farming Production per Hectare
P = Rice Farming Production Price per Kilogram

π = TP – TB

π = Advantages of Rice Farming per Hectare
TP = Total Rice Farming Revenue per Hectare
TB =Total Cost of Rice Farming per Hectare.

- Meanwhile, the method used in calculating the economic value of the benefits of environmental service products for agricultural land/rice fields as flood control was the economic valuation method. The economic valuation method used in this study was the Replacement Cost Method (MBP). With the following formula:

$$NELS_sFPB = (D_p \times A \times \alpha \times P_d)$$

Where:

$NELS_SFPB$ = The Economic Value of Rice Fields as Flood Control Function.
D_p = Water rebuttal power of rice fields (m3/ha).
A = The area of rice fields that are converted to non-rice fields (ha / th).
α = The coefficient of capacity of rice fields to retain rainwater (%).
P_d = The cost of making rice fields (Rp/m3).

5. Discussion

1. The Economic Value of Agricultural Land/Rice Fields as Media for Rice Farming Cultivation.

From the results of the analysis, it was found that in one hectare of rice field used to grow rice, the total cost required is Rp. 14,250,000, - while the resulting production is 5,000 kilo grams of harvested dry grain. The price of harvested dry grain is Rp. 4,500 per kilo gram. The total revenue from rice farming is Rp. 22,500,000. so that the profit of rice farming is Rp. 8.250.000,- Because the research location is able to harvest 3 times a year, the total income of rice farming is Rp. 24,750,000 per hectare per year.

Table 1. Economic Value of Rice Fields As Media for Rice Farming Cultivation

No	Information	Units of Value	
1.	**Area of Rice Fields Converted to Non-Rice Fields**	**Ha/yr**	**300**
2.	**Cropping Index**	**%**	**300**
3.	**Average Cost of Rice ProductionMillion**	**Rp/Ha**	**14,25**
4.	**Average Rice Field Production**	**Ton/Ha/MT**	**5,0**
5.	**Average Price of Dry Grain Harvest**	**Rp/Kg**	**4.500**
6.	**The Economic Value of Rice Fields as a Function of Producing Rice Farming Production**	**Rp/Ha/Th**	**24,50**
7.	**The Economic Value of Rice Fields as a Function of Producing Rice Farming Production (300 Ha)**	**Billion (Rp/yr)**	**7,425**

Source : Analisis Data Primer, 2022

Table 1 showed that the economic value of rice fields as media of cultivation for rice farming is Rp. 24,500,000,- per hectare per year or Rp. 7.425 billion per 300 ha.

2. Economic Value of Agricultural Land/Rice Fields Benefits of Environmental Service Products as Flood Control.

Agricultural land, especially rice fields as flood control is the ability of rice fields to hold rainwater temporarily during and shortly after the rain occurs. Rice fields are able to function as natural pools in the form of small dams that are able to accommodate or hold rainwater before flowing downstream through water bodies, such as rivers, irrigation canals, and others. Rice fields will function more in areas where the intensity of rainfall is quite high, because they are able to withstand runoff water that is able to cause flooding.

The ability of rice fields to support or accommodate rainwater temporarily after the rain occurs is influenced by the existing rice field area, the difference between the height of the embankment and the height of the puddle before raining. Because the surface area of rice leaves is relatively small and the soil moisture content is relatively constant, so that the rice canopy and soil absorption capacity in rice fields are very small in retaining rainwater. So that the area and height of the rice fields play an important role here. The height of the embankment at the research site is explained in table 2.

Table 2. Height of Embankment and WaterLogging in Rice Fields at the Research Site

No.	Embankment Height (cm)	Height of Puddles Before rain (cm)	Difference Between A and B (cm)

	(A)	(B)	(A-B)
1	60	5	55
2	60	5	55
3	55	5	50
4	60	5	55
5	60	5	55
6	60	5	55
7	60	5	55
8	60	10	50
9	60	5	55
10	55	5	50
11	60	5	55
12	60	5	55
13	60	5	55
14	60	5	55
15	60	10	50
16	60	5	55
17	60	5	55
18	60	5	55
19	60	5	55
20	60	5	55
21	60	5	55
22	60	10	50
23	60	5	55
24	60	5	55
25	55	5	50
26	55	5	50
27	60	5	55
28	55	5	50
29	60	5	55
30	60	5	55
Sum	**1775**	**165**	**1610**
Average	59.17	5.5	53.67

Source Data : Primary Data Analysis, 2022

The height of the embankments at the study site ranged from 55-60 cm with an average of 53.67 cm, while the height of puddles in rice fields before the rain ranged from 5-10 cm with an average of 5.50 cm. Therefore, the water holding capacity in rice fields is 53.67 cm on average, so that one hectare of rice fields is able to support rainwater of 53.67 cm x 10,000 m2 or 5,367 m3/ha.

Therefore, the height of embankment is one of the factors that is able to be manipulated to increase rainwater buffering capacity in rice fields. The higher the rice field embankment, the greater the rainwater buffering capacity and vice versa. At the research location, because farmers are mostly engaged in rice farming, the embankment height is not a problem. It is different with farmers who can cultivate fish more concerned with the embankments or in other words the embankments must be higher.

Seeing the big role of rice fields in temporarily storing rainwater before flowing downstream, if there is a conversion of rice fields to non-rice fields (into housing, industry or others) it will result in the loss of flood control ability of rice fields equivalent to the amount of water accommodated as high as 53, 67 cm (53.67 cm – 2.0 cm) or 5.367 m3/ha (5,367 cm x 10,000 m2). The value of 2.0 cm is the water resistance on the built-up land.

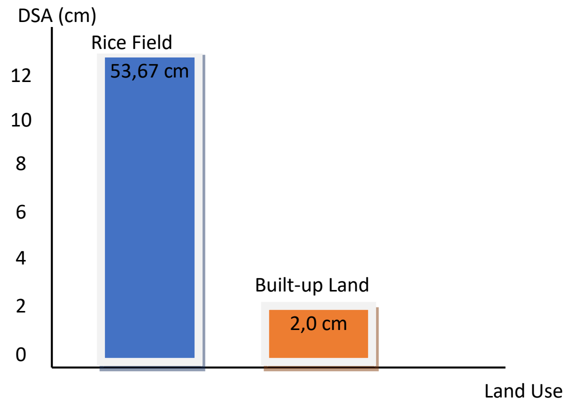

Figure 2. Water Supply of Rice Fields and Built-up Areas

Source : Analisis Data

When referring to the conversion of rice fields in Sidoarjo Regency, the average is 300 ha per year, while the area of rice fields in Sidoarjo Regency is 22,219 ha. In the extreme, if all rice fields (22,219 ha) in Sidoarjo Regency are converted to non-rice fields, while other conditions do not change (ceteris paribus), it is able to be calculated that the volume of water that is not able to be accommodated by rice fields in Sidoarjo Regency is 119,249,373 m3 (22,219 ha x 5,367 m3/ha).

From the data obtained in the research area that:

- The embankment height in rice fields ranges from 55-60 cm with an average of 59.17 cm. While the height of standing water in rice fields before the rain ranges from 5-10 cm with an average of 5.50 cm.
- The average water holding capacity in rice fields is 53.67 cm. So that one hectare of rice fields is able to support 53.67 cm x 10,000 m2 of rainwater or 5,367 m3/ha. Therefore, embankment height is one of the factors that is able to be manipulated to increase rainwater buffering capacity in rice fields. The higher the rice field embankment, the greater the rainwater buffering capacity and vice versa. Embankment height is not a problem for farmers who are mostly engaged in rice farming. It is different with farmers who cultivate fish more concerned with the embankments or in other words the embankments must be higher.
- The conversion of rice fields that occurs in Sidoarjo Regency is an average of 300 ha per year, while the area of rice fields in Sidoarjo Regency is 22,219 ha. In extreme terms, if all rice fields (22,219 ha) in Sidoarjo Regency are converted to non-rice fields, while other conditions do not change (ceteris paribus), it is able to be calculated that the volume of water that is not able to be accommodated by rice fields in Sidoarjo Regency is 119,249,373 m3 (22,219 ha x 5,367 m3/ha).
- By knowing the water capacity of rice fields of 5.367m3/ha, The area of rice fields that are converted to non-rice fields is 300 ha/year, The coefficient of the capacity of rice fields to accommodate rainwater is 80%, and the cost of making embankments at the research site by making mounds is Rp. 30.000/m3.

- The cost of making this embankment is the market price. Thus, to determine the economic value of rice fields as a flood control function, it is able to be calculated by referring to the equation formula:

NELSₛFPB = (D$_p$x A x αx P$_d$)
= 5.367 m^2x 300 ha x 0,8 x Rp. 30.000/m^2
= Rp. 38.642.400.000/yr or
= Rp. 128.808.000/ha/yr

The environmental economic value of agricultural land, especially rice fields as a flood control function in the research area, is Rp. 38.64 billion/ 300 ha/yr, or Rp. 128,808,000/ha/yr. If the conversion of rice fields in the research site continues with the same proportions, the potential for lost water holding capacity of rice fields will be even greater and this will result in the high cost of flood control required.

Table 3. Economic Value of Agricultural Land/Rice Fields Benefits of Environmental Service Products as Flood Control.

No	Information	Units of Value	
1.	**Area of Rice Fields Converted to Non-Rice Fields**	**Ha/yr**	**300**
2.	**Water Rebuttal Power of Rice Fields**	**m^3/Ha**	**5.367**
3.	**Coefficient of Capacity of Rice fields to Collect Rainwater**	**%**	**80**
4.	**The Cost of Making a Snag By Making Mounds**	**Rp/m^3**	**30.000**
5.	**Average Economic Value of rice Fields Producing Benefits Environmental Service Products as Flood Control**	**Million (Rp/yr)**	**128,81**
6.	**Average** Economic Value of Rice Fields Producing Benefits of Environmental Service Products as Flood Control (300ha)	**Billion (Rp/yr)**	**38.64**

Source : Primary Data Analysis, 2022

3. Comparison of the Economic Value of Agricultural Land/Rice Fields as media for Cultivating Rice Farming with Environmental Service Products as Flood Control.

Comparison of the economic value of agricultural land/rice fields as the benefits of rice farming cultivation media compared to those using the economic value of environmental service products as flood control is Rp. 24,500,000 per hectare/year compared to Rp.128,808,000 per hectare per year (1 : 5).

Table 4. Economic Value of rice Fields

No	Information	Units of Value	
A	As a Producer of Rice Production Cultivation Media Products		
1.	**Area of Rice Fields Converted to Non-Rice Fields**	**Ha/yr**	**300**
2.	**Cropping Index**	**%**	**300**
3.	**Average Cost of Rice Productionmillion**	**Rp/Ha**	

			14,25
4.	**Average Rice Field Production**	**Ton/Ha/MT**	**5,0**
5.	**Average Price of Dry Grain Harvest**	**Rp/Kg**	**4.500**
6.	**The Economic Value of Rice Fields as a Function of Producing Rice Farming Production**	**Million Rp/yr**	**24,50**
7.	**Economic Value of Rice Fields as a Function of Producing Rice Farming Production (300 Ha)**	**Billion (Rp/yr)**	**7,425**
	B. Producer of Environmental Service Products as Flood Control		
1.	**Area of Rice Fields Converted to Non-Rice Fields**	**Ha/yr**	**300**
2.	**Water Rebuttal Power of Rice Fields**	**m^3/Ha**	**2.725**
3.	**Coefficient of Capacity of Rice Fields to Collect Rainwater**	**%**	**80**
4.	**The Cost of Making a Snag By Making Mounds**	**Rp/m^3**	**30.000**
5.	**The Average Economic Value of Rice Fields Produces benefits of environmental service products as flood control**	**Million (Rp/yr)**	**128,81**
8.	**Average Economic Value of Rice Fields Producing Benefits of Environmental Service Products as Flood Control (300ha)**	**Billion (Rp/yr)**	**38,64**

Source : Primary Data Analysis, 2022

Calculating just one multifunction of the benefits of rice fields as a producer of environmental service products, which is as a flood controller, is already able to provide an assessment of the theory of agricultural land rental values. The comparison of the rental value of agricultural land for farming (rice or secondary crops) with tourism is 1:14 (Nasution and Winoto 1996). From the results of the analysis by including the economic value of the function of agricultural land/rice field environmental service products as flood control, the comparison of the rental value of agricultural land/rice field with tourism is (1:4), before counting all of the multifunctional rice fields as benefits of environmental service products. If the entire multifunctional economic value of agricultural land/rice field products of environmental services is calculated, it will give a much larger total economic value of agricultural land.

The results of a study in Japan (Yoshida and Goda 2001) showed that the multifunctional value of agricultural and rural land throughout Japan, covering an area of 4,100,000 ha reaches US$ 68.80 x 109, and of this amount US$ 30.33 x 109 is the economic value of the land. dry land in the form of hills and mountains, covering an area of 2,200,000 ha. At the exchange rate of Rp. 9,000/US$ the multifunctional value of agricultural land in Japan reaches 151,000,000/ha. The biggest benefit of the economic value (90%) is the value of the benefits of environmental service products as flood control, supplier of groundwater sources, recreation and comfort. Therefore, it is very reasonable if the Nagoya District Government in

Japan provides assistance to farmers in the amount of US $ 3,300 or Rp. 29.7 million/ha/year as long as farmers maintain their agricultural land/rice fields (MAFF, 2001).

The results of research in South Korea (Suh, 2001) showed that local people are familiar with the functions of agricultural land, both positive, such as providing food and food security stability, controlling erosion and flooding, as well as negative ones, such as a source of water and soil pollution. Then Eom and Kang (2001) stated that there are 11 socio-economic cultural functions of the management/utilization of agricultural land known to the South Korean community. Based on the results of the study, there are 8 (eight) functions of agricultural land that have received high appreciation from the community, namely: (1) as a supplier of food ingredients (food), (2) water sources, (3) emotional binders for rural residents, (4) providers of places or media for environmental education, (5) recreation areas and natural scenery, (6) air pollution control, (7) ecosystem preservation, and (8) prevention of soil erosion. Meanwhile, the functions of agricultural land that have not received appreciation include (1) as a labor market controller, (2) forming or conventional opinions, (3) burial site provider. Then Chen (2001) examined perceptions of people of agricultural land environmental services in Taiwan and the results showed that most people are familiar with agricultural land environmental services, especially those that are very important as erosion prevention, water source providers, and flood control.

When the conversion of agricultural land to non-agriculture continues to increase, for various reasons, it actually shows the low understanding and knowledge of the community about the multifunctionality of agricultural land. So that research on the benefits of agricultural land is relatively low. As a result, farmers are only valued on the basis of the market value of the commodities produced from the agricultural land, while the value of the benefits of environmental services produced has not been calculated.

The comprehension of the concept of economic valuation enables policy makers to determine the effective and efficient use of natural resources and the environment. This is because the economic valuation of natural resources and the environment are able to be used to show the relationship between conservation of natural resources and the environment and economic development, so that economic valuation is able to become an important tool in efforts to increase public appreciation and awareness of natural resources and the environment.

4. Conclusion

1. The economic value of agricultural land/rice fields as media for cultivating rice crops is Rp. 24,500,000 per hectare/year.
2. The economic value of environmental service products of agricultural land/rice fields as flood control is Rp. 128,808,000/ha/yr
3. The comparison of the economic value of agricultural land/rice fields as benefits of rice farming cultivation media with the benefits of environmental service products as flood control is 1:5.

Recommendations

For further researchers, it is expected to calculate the multifunctionality of agricultural land/rice fields as users of environmental service products such as groundwater suppliers, erosion and sedimentation control, landslide control, air pollution control, absorption of organic waste, carbon sequestration (CO2), producer of oxygen (O2), biodiversity, rare species, and natural nutrient providers so that in the end the total economic value of agricultural land is able to be calculated.

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