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The potential of forest resource management at farmer groups in the Rarung forest area

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Abstract. The conversion of land into agricultural land and the felling of trees in forest areas have an economic impact on the community. These activities if not managed properly will cause many problems. Poor management will cause many problems such as decreased soil fertility, erosion, extinction of flora and fauna, floods, droughts, and even global environmental changes. The purpose of this research is to analyze the economic valuation of agricultural commodities in the Rarung Forest Area. The population of this study are 3 groups of farmers in Pemepek Village, Pringgarata District, Central Lombok Regency with 54 farmers as respondents. Analysis of the data used to perform economic valuation is to calculate the Total Economic Valuation. The results showed that the Rarung Forest Area has a very large natural resource potential with a Total Economic Value of Rp.3.215.553.333,- which consists of an economic value of direct benefits amount Rp.2.925.868.333,- and the economic value of indirect benefits amount Rp.289.685.000,-. Seeing the potential of natural resources in the Rarung Forest Area, the stakeholders may be able to manage, secure, and monitor the area against all pressures and disturbances that occur.

1. Introduction

Forests are one of Indonesia's greatest assets. The conversion of land into agricultural land and the felling of trees in forest areas have an economic impact on the community. These activities if not managed properly will cause many problems. The function of the forest as one of the natural resources and a support for life is to be managed sustainably, so that it can provide both direct and indirect benefits. One form of forest management that is believed to meet these criteria is forest management through community empowerment as well as making it a partner in the protection and development of forest areas.

Forest Areas with Special Purposes are forest areas designated for research and development purposes, education and training as well as local religious and cultural interests [1]. Its function is important and not only for environmental aspects such as water management functions, buffer zones, and carbon stocks, but Forest Areas with Special Purposes is also a place for some people to carry out their activities, both as farmers, collectors of Non-Timber Forest Products and other activities, because the presence of the community is more important. existed before the location of the Forest Areas with Special Purposes was determined by the government. Forest Areas with Special Purposes is faced with big challenges, in the sense of the need for special handling and involving many parties from village officials to other central agencies, so that in its management Forest Areas with Special Purposes can

become a sustainable Forest Areas with Special Purposes, sustainable not only providing environmental benefits but also social benefits. If this condition can be realized, it will be able to reduce the level of pressure on Forest Areas with Special Purposes itself, because community involvement in Forest Areas with Special Purposes management will make people feel that they have Forest Areas with Special Purposes itself because they have felt the benefits both directly and indirectly.

Pemepek Village Government, Pringgarata District, Central Lombok Regency, West Nusa Tenggara Province, administratively, the government is included in the area of Forest Areas with Special Purposes Rarung. Forest Areas with Special Purposes Rarung has an area based on the administratively, it has been determined that the area of Forest Areas with Special Purposes Rarung is approximately 325.868 Ha [2].

Forest resource management is always aimed at obtaining benefits, both direct benefits (tangible benefits) and indirect benefits (intangible benefits). Determining the value of the benefits of Forest resource management is very important as a consideration in allocating the increasingly scarce Forest resource management. Where the community is expected not to maximize forest products to provide more value. If this is done with maximum utilization, it will affect the sustainability of the forest itself. The Rarung Forest area is a buffer for water needs on the island of Lombok. Poor management will cause many problems such as decreased soil fertility, erosion, extinction of flora and fauna, floods, droughts and even global environmental changes. With this research information, it will provide a good understanding to the surrounding community, especially those who are members of farmer groups to utilize the Rarung Forest Area in a sustainable and sustainable manner so that it can provide economic value for the surrounding community which affects the economic condition of the community.

From the description above, to understand the impacts that occur in the Rarung Forest Area, it is necessary to conduct research that examines the Economic Valuation of Farmers' Groups in the Rarung Forest Area. So that information can be provided regarding the utilization of the Rarung Forest Area for the surrounding community which affects the community's economy. The purpose of this research is to analyze the economic valuation of agricultural commodities in the Group of Farmers in the Rarung Forest Area.

2. Research Methods

2.1. Research location and time
This research was conducted in Pemepek Village, Pringgarata District, Central Lombok Regency, West Nusa Tenggara Province on a Farmer's Group in the Rarung Forest Area. When the research is carried out in 2021

2.2. Research respondents
The population is the total number consisting of objects or subjects that have certain characteristics and qualities determined by the researcher to be studied and then drawn conclusions [3]. Based on this understanding, the population of this research are farmers who are members of 3 farmer groups totaling 120 farmers in Pemepek Village, Pringgarata District, Central Lombok Regency.
The selection of these farmer groups was done purposively, the researchers chose this farmer group with the consideration that the farmer group was a partner who utilized the Rarung Forest Area. Sampling was carried out using the Slovin formula [4]:

$$n = \frac{N}{(1 + Ne^2)} \tag{1}$$

Information:
n = Number of respondents
N = Total population
e = Percentage of allowance for inaccuracy due to tolerable sample error (10%)

From the calculation using the above formulation, the number of samples taken is 54.55 rounded up to 54 farmers. The selection of respondent farmers is proportional, so the number of respondents in each farmer group can be seen in Table 1.

Table 1. Number of respondents in each farmer group

Farmers	Number of Farmers	Number of Samples Farmer	Percentage
Mitra Tani	40	18	33.33%
Patuh Angen	40	18	33.33%
Beriuq Maju	40	18	33.33%
Total	120	54	100%

2.3. Data analysis

Economic valuation analysis, one way to do an economic valuation is to calculate the Total Economic Value. This quantification is carried out with a market value approach to benefits that have been valued in the market and the use of indirect prices for benefits that do not yet have a market price. Total Economic Value (TEV) can be written in a mathematical equation as follows: [5]

$$TEV = DUV + IUV \qquad (2)$$

Where:
TEV = Total Economic Value
DUV = Direct use value
IUV   = Indirect use value

Furthermore, it is explained that the use value is further divided into direct use value and indirect use value. Use value is related to value because respondents use it or expect to use it in the future [5]. Direct use value is the value determined by the environmental contribution to the flow of production and consumption [5].

The indicators that will be used to measure the value of direct benefits (Use Value) are as follows: firewood, coffee, bananas, beef cattle and honey. Meanwhile, the indicators that will be used to measure the indirect use value are: landslide resistance, water sources, and tourism value.

2.3.1. TEV = Where the economic value is measured in terms of willingness to pay to get the commodity. This TEV consists of Use value and Non use value.

2.3.2. UV = Use values. That is a way of assessing or quantifying goods and services of natural resources and the environment to the value of money (monetize), regardless of whether or not there is a market value for these goods and services. This Use Value can be:

2.3.2.1. Total econornic value (TEV). Where the economic value is measured in terms of willingness to pay to get the commodity. This TEV consists of Use value and Non use value.

2.3.2.2. Use values (UV). That is a way of assessing or quantifying goods and services of natural resources and the environment to the value of money (monetize), regardless of whether or not there is a market value for these goods and services. This Use Value can be:

2.3.2.3. Direct use value (DUV). That is the output (goods and services) contained in a resource that can be directly utilized. For example: firewood, coffee, bananas, beef cattle and honey. The formula used to get the total value of direct benefits is as follows:

$$DUV = DUV\ 1 + DUV\ 2 + DUV\ 3 + DUV\ 4 + DUV\ 5 \qquad (3)$$

Information:
DUV = Direct use value
DUV 1 = Immediate Benefit of wood
DUV 2 = Immediate Benefits of coffee
DUV 3 = Immediate Benefits of Bananas
DUV 4 = Direct Benefit of cattle
DUV 5 = Direct Benefits of honey

2.3.3. Indirect use value (IUV). Indirect benefits are the perceived value indirectly to goods and services produced by resources and the environment. Indirect benefits of forest as landslide barrier, water source and tourism value.

3. Results and discussion

This study used an interview method involving 54 respondents from forest farmer groups located in Pemepek Village, Pringgarata District, Central Lombok Regency whose livelihoods were directly related to the Forest Areas with Special Purposes Rarung ecosystem. The number of partner farmers who utilize Forest Areas with Special Purposes Rarung is 120 farmers. The Forest Areas with Special Purposes Rarung ecosystem which is very close to settlements makes the community feel the economic benefits of Forest Areas with Special Purposes Rarung.

The results of the calculation of respondents from Forest Areas with Special Purposes Rarung's partner farmer groups stated that 100% knew that the KHDTK Rarung ecosystem had economic benefits. The benefits of the Rarung Forest Areas with Special Purposes ecosystem can be identified by looking at the Direct use value, the Indirect use value and the total economic value of the Rarung Forest Areas with Special Purposes. The following is the use value of the Forest Areas with Special Purposes Rarung ecosystem for partner farmer groups

3.1. Direct use value

Based on this, a calculation is needed to find out the total economic value of the direct benefit (Direct Use Value) of Forest Areas with Special Purposes Rarung, using various assumptions as an effort to approach the value or quantify the value of the direct benefits, although the value approach is still relatively far but at least there is a picture of the economic value of the potential direct benefits that exist in Forest Areas with Special Purposes Rarung partner farmer groups.

The result of the sum of various kinds of commodities or existing potentials, the direct benefit economic value (Direct Use Value) of Forest Areas with Special Purposes Rarung farmer group partners per year is Rp.2,925,868,333. Identify the direct benefits of Forest Areas with Special Purposes Rarung that are felt by partner farmer groups for now, namely the potential utilization of firewood, Honey, Vanilla, Candlenut, Banana, Avocado, Belinjo, Coffee, Durian, Cocoa, and Bamboo Shoots. According to Hairunnisa, et al. [6], forest areas can also be a provider of feed which is the greatest value from direct benefits. This can be seen in this study, the type of commodity used in the Rarung Debt Area is a food commodity that has a high selling value. The value of direct benefits can be seen in Table 2.

Table 2. Direct benefit value of utilizing forest areas with special purposes rarung ecosystems partner farmer groups

No	Commodity Type	Economic Value Per Year	Percentage
1	Honey	922,070,000	31.51%
2	Vanilla	1,301,723,333	44.49%
3	Candlenut	146,280,000	5.00%
4	Banana	79,695,000	2.72%
5	Avocado	43,393,333	1.48%
6	Belinjo	20,700,000	0.71%
7	Coffee	247,288,333	8.45%
8	Durian	47,495,000	1.62%
9	Cocoa	23,383,333	0.80%
10	Bamboo Rebung	11,040,000	0.38%
11	Bamboo	55,200,000	1.89%
12	Firewood	27,600,000	0.94%
	Total	2,925,868,333	100%

3.2. Indirect use value

The indirect benefit value is the use value that is indirectly felt by the community which is generated indirectly from the existence of the Rarung Forest Areas with Special Purposes. The indirect benefits of Forest Areas with Special Purposes Rarung are often not realized by the community so they are often not considered or ignored. However, its existence will be felt when Forest Areas with Special Purposes Rarung experiences degradation or damage and will have an impact on the lives of the surrounding community. Based on this, the assessment of indirect benefits is necessary as a value added benefit from the existence of Forest Areas with Special Purposes Rarung. The direct use value of the Rarung Forest Areas with Special Purposes ecosystem can act as a provider of clean water and flood prevention. The economic value of indirect benefits (Indirect Use Value) of Forest Areas with Special Purposes Rarung partner farmer groups is Rp. 289,685,000. The value of indirect benefits can be seen in Table 3.

Table 3. Indirect benefits forest areas with special purposes Rarung partner farmer groups

No	Commodity Type	Economic Value Per Year	Percentage
1	Value of water	133,285,000	46.01%
2	Value of flood prevention	156,400,000	53.99%
	Total	289,685,000	100.00%

Forest Areas with Special Purposes Rarung also plays a role in providing benefits in providing clean water where as water control and water cycle (water yield). Therefore, the benefits of water in Forest Areas with Special Purposes Rarung partner farmer groups can be calculated using a productivity approach by calculating the debit of water used by partner farmer groups around Forest Areas with Special Purposes Rarung with the substitution of the actual market price of water from PDAM Tirta Ardhia Rinjani. Based on data from partner farmer groups around Forest Areas with Special Purposes Rarung in total there are 120 members living around areas that depend on irrigation in Forest Areas with Special Purposes Rarung, although if it is broadly drawn all people living around Forest Areas with Special Purposes Rarung as well as districts and cities on the island of Lombok also depend on water. from Forest Areas with Special Purposes Rarung. However, the limitation of this research is only the

number of partner farmer groups that are directly in Forest Areas with Special Purposes Rarung, namely 120 members represented by 54 respondents. The average use of water in 1 household is 145 m^3 of water per year or 12.08 m3 per month which is used for drinking, bathing, washing and latrines. The economic value of Forest Areas with Special Purposes Rarung water for Partner Farmer Groups is Rp. 133,285,000. Apart from being a source of clean water, the value of water also has the benefit of supporting tourism objects in the Rarung Forest Area (ie: waterfalls and lakes). The importance of a good vegetation composition can help maintain the availability of water in the soil. The beauty and stability of the water discharge are the main potentials of the forest area as a local tourism area [7].

Forest Areas with Special Purposes Rarung has a function as a flood controller, this is one of the functions of the forest. Thus, the value of the benefits of flood control can be calculated through the Contingen Value Method (CVM) value approach in the form of Willingness to pay from the community based on the benefits they feel, which is Rp. 156,400,000. The value of this flood control benefit will increase when the Forest Areas with Special Purposes Rarung is maintained and will decrease if the damage continues to occur. The awareness of the community in providing Willingness To Pay (WTP) is due to the direct impact of losses they feel, even though the value is not maximized. The level of concern for the environment to preserve the environment in the Farmer Group Partnership in the Rarung Forest Area is in the high category, so that it supports the business activities that run well [8].

3.3.   Total economic value

The total economic value is the sum of all the economic values contained in the natural resources (Forest Areas with Special Purposes Rarung ecosystem) that have been identified and quantified. The total economic value that exists is an approach to determine the potential of natural resources in Forest Areas with Special Purposes Rarung with a value of Rp.3,215,553,333. The total economic value of Forest Areas with Special Purposes Rarung partner farmer groups can be seen in Table 4.

The existence of Partner Farmer Groups should be seen as a potential for developing Rarung Forest Areas with Special Purposes by activating the participation of Partner Farmer Groups around and within the area, by providing sufficient knowledge and also creating a system the development of strengthening the community's economy so that their dependence on the forest is reduced due to the increase in their welfare, thus the sustainability of the Rarung Forest Areas with Special Purposes will be maintained in a sustainable manner. Assessment of the role of forest ecosystem conservation for community welfare is a very complex task, because it involves various interrelated factors. Not only technical factors but also social and political factors. According to Munasinghe and McNeely [9], the value of forest conservation activities is highly dependent on the management model. In other words, the value of forest conservation is not only determined by abiotic, biotic and economic factors, but also by the institutions built to manage it [10]. The potential value of natural resources obtained can still be increased considering that Forest areas have great potential, but their use must be properly monitored by the relevant institutions [11].

Table 4. Total economic value of forest areas with special purposes Rarung partner farmer groups

No	Benefit	Value
1	Total Direct Use Value	2,925,868,333
2	Total Indirect Use Value	289,685,000
	Total Economic Value	3,215,553,333

4. Conclusions and recommendations

4.1. Conclusions

Identify the direct benefits of Forest Areas with Special Purposes Rarung that are felt by partner farmer groups for now, namely the potential utilization of firewood, Honey, Vanilla, Candlenut, Banana, Avocado, Belinjo, Coffee, Durian, Cocoa, and Bamboo Shoots. Indirect use value Forest Areas with

Special Purposes Rarung ecosystem can act as a provider of clean water and flood prevention. The Rarung Forest area has a very large natural resource potential with a Total Economic Value of Rp. 3,215,553,333 which consists of Direct Use Value of Rp. 2,925,868,333 Indirect Use Value of Rp. 289,685,000.

4.2. Recommendations

Suggestions that can be given by looking at the potential of natural resources in the Rarung Forest Area to stakeholders may be to manage, secure and monitor the area against all pressures and disturbances that occur in this area. So that the potential that exists in the Rarung Forest Area will remain sustainable and its existence is maintained, thus the functions that exist in the Rarung Forest Area will not be lost.

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