Avalaible online at http://journals.ums.ac.id, Permalink/DOI: 10.23917/jep.v25i2.23854

Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan, 25 (2), 2024, 182-203

Empirical Study of Measures to Accelerate the Rural Economy: Potential for Nature Tourism in the Bukit Rimbang Bukit Baling Wildlife Reserve in Riau Province

Adrian Novendra[1], Almasdi Syahza[2], Ando Fahda Aulia[3]
[1]Postgraduate school, Riau University, Bina Widya Campus, Pekanbaru, Indonesia
[2]Institute of Research and Community Services, Indonesia.
[3]Faculty of Economics, Riau University, Bina Widya Campus, Pekanbaru, Indonesia.
Corresponding author: almasdi.syahza@lecturer.unri.ac.id

Received: May 2024 | *Revised: October 2024* | *Accepted: December 2024*

Abstract

The Bukit Rimbang Bukit Baling Wildlife Reserve has unique species and diverse animals whose populations and habitats need to be protected. The location of the reserve also serves as a source of water for the community and prevents floods, landslides, and erosion. Before designation as a wildlife reserve, the forest served as a source of livelihood in the community, which helped manage and preserve conservation areas. The selected respondents were 35 heads of families, Information was obtained using the participatory rural appraisal (PRA) approach. The PRA results were tabulated and an estimate of willingness to pay for environmental ecosystem services was calculated. The economic value was calculated by summing up all the benefits identified from the ecosystem and the commodities utilized. This study aimed to determine the valuation of use and economic value based on non-use value. The results showed that the wildlife reserve area has the potential for economic value that may benefit the surrounding community and create environmental balance through river utilization and using non-timber forest products. There is increased income level, occupation, and environmental quality. Moreover, the potential use of non-timber forest products is an economic alternative to the community. The area has the potential to develop natural tourism as a learning process for future generations.

Keywords: natural tourism, environmental services, willingness to pay, bequest value
JEL classification: F63, Q56, P25

How to Cite: Novendra A., Syahza A., Aulia A. F. (2024). Empirical Study of Measures to Accelerate the Rural Economy: Potential for Nature Tourism in the Bukit Rimbang Bukit Baling Wildlife Reserve in Riau Province, 25(2), 182-203. doi:https://doi.org/10.23917/jep.v25i2.23854

DOI: https://doi.org/10.23917/jep.v25i2.23854

1. INTRODUCTION

The Bukit Rimbang Bukit Baling Wildlife Reserve was designated as Forest Areas based on the Governor Decree of the Riau Province Number: Kpts. 149/V/1982 dated June 21, 1982. The decree concerned the Designation of Forest Areas around Bukit Rimbang Bukit

Baling District as forest covered areas/nature reserves. This stipulation was based on the Decree of the Minister of Forestry of Indonesia Number: SK. 3977/Menhut-VII/KUH/2014 dated May 23, 2014. The Minister's decree concerned the Designation of the Bukit Rimbang Bukit Baling Wildlife Reserve Forest Area of 141,226.25 hectares in Kampar and Kuantan Singingi Regency, Riau Province. Bukit Rimbang Bukit Baling is designated as a nature reserve area because the forest area around Bukit Rimbang Bukit Baling has the function of a wildlife reserve and springs that need to be fostered for its sustainability, for the purpose of regulating water management, preventing flood, landslide and erosion hazards.

The potential and existence of the Bukit Rimbang Bukit Baling Wildlife Reserve have long been used by the community. There is a biodiversity potential of non-timber forest products (NTFPs) dominated by fruits 25%, cooking ingredients or spices 21%, medicines 21%, handicraft materials 18%, economics 12%, and honey 3% (BKSDA, 2017). Furthermore, the community uses the agho wood river for electrical energy in micro-hydro power plants (PLTMH) and water tourism objects. Human behavior has a significant impact on the conservation of ecological biodiversity. For this reason, a logical understanding is needed for the surrounding community. Regeneration behavior will determine future conservation and composition changes in forest communities (Rawat et al, 2013). Location the Bukit Rimbang Bukit Baling wildlife reserve area is presented in Figure 1.

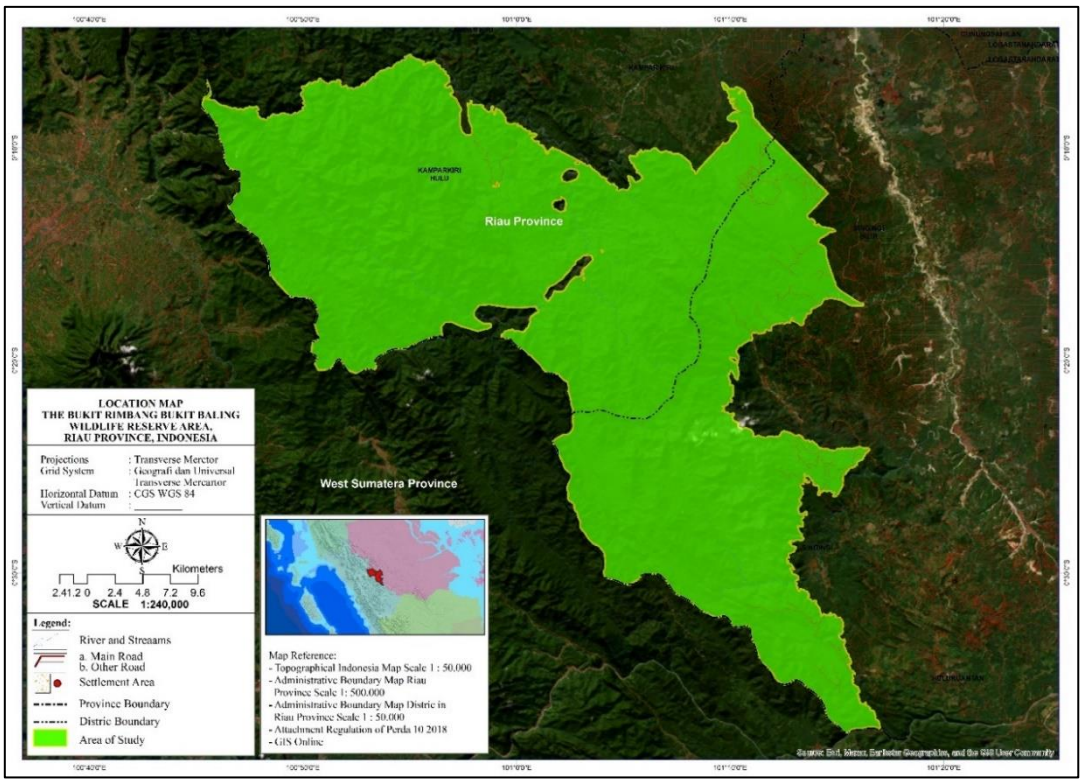

Figure 1. Location Map the Bukit Rimbang Bukit Baling Wildlife Reserve Area, Riau Province, Indonesia

Economic valuation refers to provision of a quantitative market and non-market value for goods and services from natural resources and the environment. Resource economic valuation uses certain techniques to estimate the monetary value of goods and services (Hasibuan, 2014). Management of natural resources, including forests, is closely related to the economy because using them requires money and provides economic benefits. There is need to consider ecological conditions and economic values when using natural resources to improve environmental quality. When the population needs too many goods and services, the extraction of natural resources should be increased. This should include resources that are extractive in nature and open fields, recreation areas, and clean air. The results of research by Hjerpe and Hussain (2016), forest ecosystems provide important contributions to human well-being, but due to the non-market nature of forest ecosystem services, determining the economic value of the environment is difficult to determine. The results of research by Jilkova et al (2010), the economic assessment of environmental resources is considered an important theoretical tool for decision-making on the allocation of scarce natural resources. Especially for wildlife forest areas, the surrounding community must be given knowledge of the importance of maintaining the forest environment, especially the threat of erosion.

The community around the area, namely Kenegerian Batu Sanggan, earns income from forests and fields. The residents are mostly farmers, gatherers, and sellers of rubber latex at the sub-district market. Gathering activities are carried out during the climbing period, targeting modang bark and jernang because of their high market value. Additionally, several non-timber forest products are used as commodities with significant prices, including honey, mat leaves, resin, *manau*, bamboo candles, medicines, and *petai*. Forests strengthen community relations, increase participation in management, create jobs, and maintain local wisdom and institutions (Yanti et al., 2018). The Kenegerian Batu Sanggan is flowed by the Subayang River Sub-watershed used by the community. Also, it is a venue for the Subayang Holiday organized by the Tourism and Culture Office of Kampar Regency, with around 70,143 tourist visits in 2019. Based on BKSDA data, (2017), environmental services in the Bukit Rimbang Bukit Baling area include adventure and landscape tourism (river tracking and trailing), bird watching (nest and jungle), and primate observation. Other services are the Batu Wall Waterfall tour, observation of Tiger Tracks and other forest cat species, observation of Red-White Rafflesia Flowers (Rafflesia hasseltii), and tourism objects, such as the culture of *Lubuk Larangan*.

Pearce and Moran (1994) stated that economic valuation is broadly classified into use and economic value not based on utilization. This is because economic valuation helps decision-makers to estimate the possible efficient uses of an ecosystem. According to Cai (2019), computational methods are needed to solve environmentally and resource economic analysis problems. Efficiency, stability, and accuracy are the key elements for computational methods. Johnson dan Geldner (2019) stated that the economic value of forest resources requires measurement by a contemporary approach to decision support that addresses uncertain future external forces. In this case, stakeholder information assessment systems are critical to decision-making. Nunes and Bergh (2001) stated that assessment methods

could not identify and measure passive or useless biodiversity values. Therefore, available economic valuation estimates should be considered to provide a complete perspective, especially the value of unknown biodiversity changes.

There has not been much research on willingness to pay for ecosystem services. However, related research results have been found, including that payments for forest environmental services have been adopted worldwide to address deforestation and forest degradation. Government policies should determine the certainty of paying for forest environmental services to prevent deforestation (Tien et al, 2024). Economic measurement of environmental costs for transportation activities (Denant-Boemont and Denant-Boemont, 2019). Challenges of forest environmental service payment programs in forest conservation (Ngoc et al 2021). Analysis of forest environmental transfer taxes (Suzuki et al, 2024). Economic valuation of ecosystem goods and services: a review for decision makers (Tinch et al, 2019). Global estimates of the value and change of ecosystem services: Considering uncertainty in land cover data (Song, 2018). Assessment of ecosystem functions and services: Dehdez Forest in Iran (Shami et al, 2021). Measuring the ecological value of forests around the Kushiro Marsh (Kuriyama, 2000). Cost-benefit analysis of community forestry user groups in Kaski and Syangja districts of Nepal (Parajuli et al, 2015).

Biodiversity is declining worldwide with losses increasingly recognized by economists. Assessment helps identify the economic costs of reducing biodiversity and provides arguments for devoting significant resources to corrective action (Hanley dan Perrings, 2019). The inclusion of economic criteria in conservation policy decision-making has encouraged the use of valuation techniques. Furthermore, contingent assessment methods in biodiversity conservation policies provide useful information on alternative strategies (Martín-López et al., 2008). According to Banzhaf et al. 2019, the poor are disproportionately exposed to pollution due to unfair natural resource management. This is due to profit maximization by the company, income disparities, political, economic influences, and government failures. This concept is known as Total Economic Valuation (TEV), a model for calculating economic benefits based on environmental conservation.

Forest resource management, especially in the Bukit Rimbang Bukit Baling area, is closely related to the economy and life of the community around the forest, where the utilization of natural resources requires costs and provides economic benefits. Economic valuation of resources is an economic tool that uses certain assessment techniques to estimate the monetary value of goods and services produced by natural resources and the environment. The utilization of natural resources must be planned by considering ecological conditions and not ignoring economic value so that it can improve environmental quality. The purpose of economic valuation is basically to help decision makers to estimate the economic efficiency of various possible uses. This is done to maintain long-term environmental balance. The findings of this study can provide considerations for wildlife forest managers in developing resource management plans that are consistent with maximizing the total economic value of forest ecosystem services.

2. RESEARCH METHOD

This study focused on the Bukit Rimbang Bukit Baling Wildlife Reserve, Kampar Regency, and Kuantan Singingi, Riau Province. To obtain data and information on willingness to pay, respondents were selected by purposive sampling with the criteria of people who have long lived around the wildlife forest area. The level of dependence on forests is very high because their main source of income comes from forest products. The selected respondents were 35 heads of families. This study uses qualitative and quantitative data obtained by the Participatory Rural Appraisal (PRA) approach. PRA involves the group approach and methods for obtaining local community information. The approach has participatory resources related to field studies on agricultural systems and rural assessment quickly. Moreover, it has been widely used in various countries in the agricultural and forestry sectors (Chambers, 1994; Pido, 1995; Webber and Ison, 1995; Cramb et al, 2004; Preece, 2006; Mustanir et al. 2019; Syahza et al. 2023; Bappi et al. 2023). The study location was selected because it relates to the knowledge involved directly or indirectly.

The qualitative data obtained were analyzed descriptively by prioritizing the benefits of use and non-use values. Use value was obtained from direct and indirect benefits felt by the community for goods and services from natural resources and the environment. Also, use-value was obtained from option benefits, indicating the willingness of a person or individuals to pay for resource preservation for future use. Option benefits in this study refer to the value of other uses, including recreation and environmental services. Non-use values included existence benefits, indicating an individual's willingness to pay for resource preservation for future use. Moreover, non-use values were obtained from the bequest benefits passed on to future generations.

The benefits and functions of the ecosystem are identified and qualified into rupiah values. The market value approach was used for commodities traded directly from the ecosystem under study. In general, the indirect pricing approach is used when the price mechanism fails to provide value to the ecosystem commodity being studied using the Contingent Valuation Method (CVM), an estimate of the value for almost all ecosystems or environmental services. The analytical framework in this study is presented in Figure 2.

The economic value was calculated by adding up all the benefits identified from the studied ecosystems and commodities using the formula: NMET=ML+MTL+MP+MK+MW. Where: NMET = total benefit value; ML= direct benefit; MTL= indirect benefit; MP= choice benefit; MK= existence benefit; MW= bequest benefit.

The value of the existence and bequest benefit was determined using CVM against the WTP. It shows the number of people willing to pay for environmental services based on community preferences. The CVM approach operated in several stages of processes, including creating a market hypothesis. Respondents were asked to listen to statements containing regional conditions, and their behavior is obtained in a hypothetical rather than a real situation. The second stage involved obtaining the WTP value offer through direct interviews. In this case, respondents were given a rupiah value and then asked whether they agree or disagree. The third step was calculating the estimated average WTP based on the bid value obtained in stage two. This calculation was based on the average and median values. The

fourth stage involves determining the aggregate WTP. The median supply value was converted into the total population through data summation. The fifth stage estimated the supply curve obtained by regression analysis of WTP as the dependent variable with several independent variables (Wahyuni et al., 2014). Willingness to pay is a function of several variables analyzed: WTP = f (UR, TP, PD, PK, JT, KL, εi). Description: UR = respondent's age; TP = education; PD = family income; PK = occupation; JT = number of family members; and KL = environmental quality.

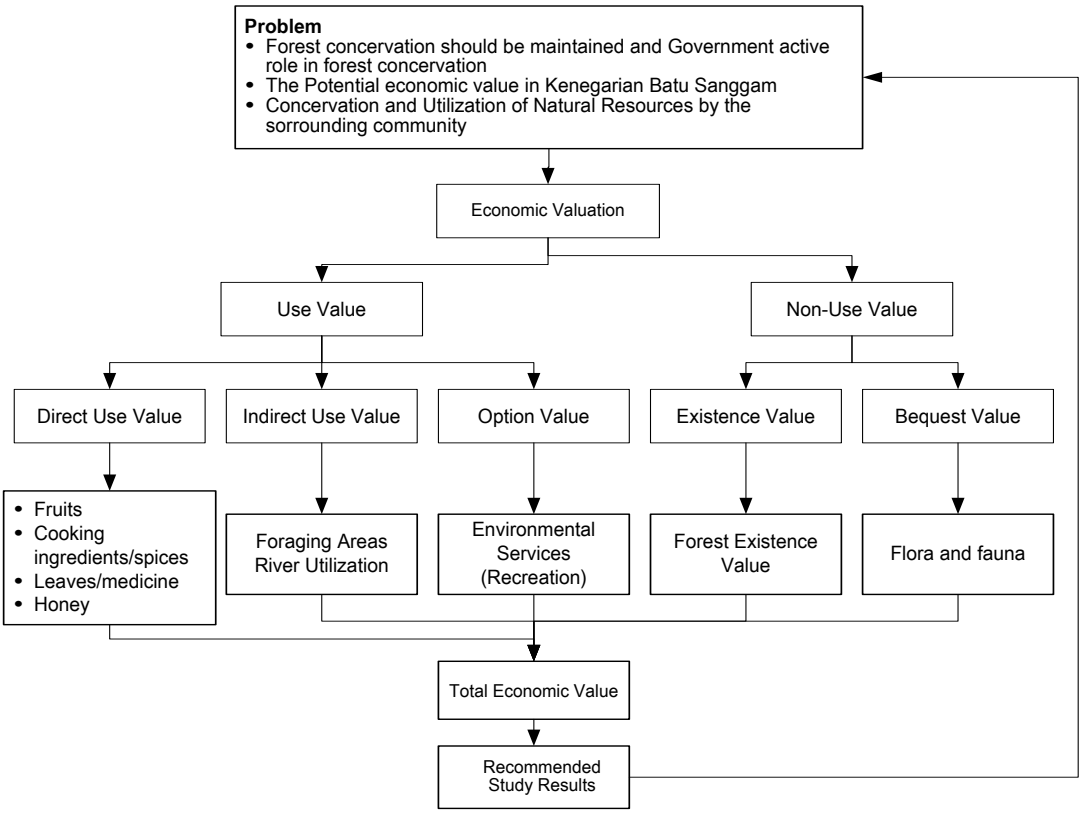

Figure 2. Thought Framework for the Economic Valuation of Wildlife Sanctuaries (modification: Pearce and Moran, 1994)

Source: Figure by author

3. RESULTS AND DISCUSSION

The Bukit Rimbang Bukit Baling Wildlife Reserve has many potentials, including nature tourism. It could be developed as an tourism location for tours along the Subayang river, *Batu Bolah* attractions, and campgrounds. The Subayang river has an important role in the surrounding community as a water transportation link between villages. Also, the river serves as a micro-hydropower plant (MHP), community-based drinking water and sanitation (Pamsimas), and utilization of non-timber forest products (NTFP). The forest area supports the community's livelihoods, including rattan, jernang, latex, fruits, resin, honey,

and medicinal plants. However, this potential has not been managed properly to provide added economic value for the community.

3.1. Economic value

The economic value of the Bukit Rimbang Bukit Baling Wildlife Reserve in the Kampar Regency Nature Reserve is the sum of the use and non-use value, which is IDR 595,350,000. Economic value is calculated by summing all identified benefits from the ecosystem and commodities studied, as presented in the methods section. The components of economic value are presented in Figure 3. According to Jilkova et al. (2010), the economic valuation of environmental resources is an important theoretical tool for decision-making concerning allocating scarce natural resources. Similarly, Tinch et al. (2019) showed an increasing interest in using the economic valuation of ecosystem goods and services for various purposes. However, policies from stakeholders, especially the government, are needed to obtain this economic value. Also, local community support determines the success of environmental management.

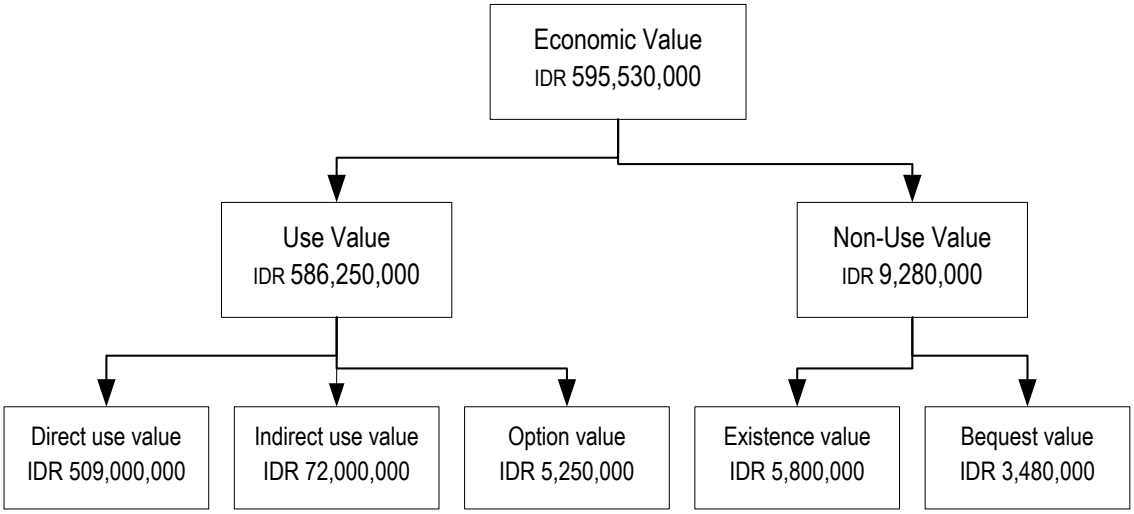

Figure 3. Components and Economic Value of Bukit Rimbang Bukit Baling Wildlife Reserve Areas, Riau Province

Source: Figure by author

Many research on the value of environmental services have been carried out, including Harrison-Atlas et al (2016). the value of ecosystem services can be in the form of exchange of land use with costs and benefits obtained. Geneletti (2011), the assessment of ecological services is comparable to land management services. Song (2018), assessing ecosystem services, there are difficulties in integrating the assessment of various other variable services and there is uncertainty about spatial management. Allan et al (2015); Chan et al (2006), examined a number of environmental services that can be paid for by beneficiaries. Comín et

al (2018), there is still a lack of an integrated approach to comprehensively assessing ecological services.

Direct Use Value

The surrounding community could benefit from the environmental services by utilizing wood forest and non-timber forest products. Communities should be wise in collecting timber and non-timber forest products optimally and fairly for mutual welfare while maintaining environmental balance. Furthermore, they must be responsible for sustaining the forest ecosystem, including the Bukit Rimbang Bukit Baling Wildlife Reserve, Riau Province. A balanced forest ecosystem is economically beneficial to the surrounding community. The Bukit Rimbang Bukit Baling Wildlife Reserve in Riau Province is one of the areas maintained by the community based on the provisions of local customary law. The maintenance has resulted in economic value for the surrounding community. Zada et al (2021), small-scale forest management has a positive impact on the economy of the surrounding community. This increase in income encourages the community to maintain the forest ecosystem. The forest product commodities with economic value are presented in Table 1. The estimated total economic value of Bukit Rimbang Bukit Baling Wildlife Reserve is in Figure 3.

Table 1. Estimated Use Value of Bukit Rimbang Bukit Baling Wildlife Reserve Forest Products

No	Commodity	Price (IDR)	Volume (kg)	Total (IDR)
1	Honey kelulut	90,000	1,000	90,000,000
2	forest coffee	30,000	100	3,000,000
3	Chestnut	15,000	500	7,500,000
4	Mangosteen	35,000	1,000	35,000,000
5	Langsat	10,000	1,000	10,000,000
6	forest bark	10,000	1.000	10,000,000
7	Petai	35,000	3,000	105,000,000
8	Kabau	12,000	500	6,000,000
9	Jengkol	8,000	1,000	8,000,000
10	Kecombrang	15,000	500	7,500,000
11	Bamboo salt	250,000	800	200,000,000
12	Sundak langit	300,000	50	15,000,000
13	Pasak bumi	100,000	100	10,000,000

Source: Research data, processed results

Local people use fruits and leaves or medicines such as S*undak Langit* (*Helminthostachys zeylanic*). The highest price of the medicine is IDR 300,000, the production value is 50 kg per year IDR 15,000,000, while *pasak bumi* has a production value of 100 kg per year IDR 10,000,000. Widiati et al. 2020) showed that forest resources contribute to an area's environment and provide value for benefits for the surrounding community. Similarly, Irianti et al (2021) found that a good agricultural system reduces environmental damage and

increases productivity and farmers' income. According to Pieter et al. (2015), there is a significant influence between non-market natural resource environmental services factors and individuals' willingness to pay for the services. The willingness to pay for environmental services is largely determined by the education and income levels of individuals. Beaumont et al. (2007) stated that the use of goods and services has a fundamental role in the ecosystem. It allows the integration of social, economic, and environmental pressures and demands into environmental management. Research by Le and Nguyen (2020), non-timber forest products contribute to the livelihoods of forest-dependent communities.

Indirect Use Value

The Subayang river natural area is protected by local customs in the form of a *lubuk larangan*. The area is opened once a year, and only fish are taken during the opening procession of the *lubuk larangan* (Cokok Ikan) for one day. The value of fish in the forbidden pit is estimated at around IDR 12,000,000 for one *lubuk larangan*. Furthermore, the Subayang River serves as a micro hydropower plant (PLTMH) and a source of clean water for 70-100 households. This is achieved through the community-based drinking water and sanitation program (Pamsimas). The results of the study by Sadikin et al 2017), the source of livelihood for communities around the forest provides responsibility for environmental balance. They are willing to pay for the value of forest benefits by maintaining the environment of the forest area. Furthermore, Ahamed et al (2021), the use of local resources available for entrepreneurship development has an impact on the implementation of sustainable agricultural development. The emergence of a sense of responsibility for local communities through the availability of paying for ecosystem services to maintain the concept of sustainable development.

Each house incurs a cost of IDR 30,000 for electricity consumption and IDR 10,000 for Pamsimas per month. The PLTMH and Pamsimas are managed by BUMDes. According to Hariyanti et al (2021), a region's economic growth depends on wealth-based development policies determined from the potential of human resources. The policies involve economic institutions (BUMDes) to promote agricultural production, supporting services, and market information resources for rural communities.

Option value

Sustainable recreational development is applied through nature tourism. This allows tourists to enjoy the natural beauty and local culture and learn the importance of the various living things. Bukit Rimbang Bukit Baling Wildlife Reserve has a high potential for development into an tourism location. An example is the Batu bolah tourist attraction and the camp area managed by a working group (POKJA) appointed by the village community. The Working Group provides a two-day 1-night tour package, including meals, travel, and lodging at IDR 350,000 per person. Also, POKJA provides homestays at IDR 100,000 per night per person for visitors that do not take the package. However, the outbreak of the COVID-19 pandemic in early 2020 caused a decrease in the number of visits. The Batu Sanggan Kingdom has high development potential in the future, with assistance from the

government and nature tourism activists. This study is in line with Asmit et al. (2020) that an area could be a source of income when developed into a well-managed, environmentally balanced tourist location.

Existence Value

The existence value cannot be marketed and is based on a survey where the willingness to pay is obtained directly from the surrounding community. The willingness to pay for Bukit Rimbang Bukit Baling Wildlife Reserve Forests was determined by asking the community about the current state of forest sustainability.

The survey results show that the value of the willingness to pay for Bukit Rimbang Bukit Baling Wildlife Reserve ranges between IDR 5,000 – IDR 20,000. The total value of WTP per month is IDR 160,000, while the WTP median value for respondents willing to pay is IDR 12,500. The total WTP per year estimates the value of the Bukit Rimbang Bukit Baling Wildlife Reserve Forest. It is obtained by multiplying the median value of WTP per year with the total population in the Kenegerian Batu Sanggan Area (464 people), giving IDR 5,800,000. According to Suprapto et al. (2015), local community awareness of the importance of environmental values increases. This is socialized through promoting environmental use-values. Highly educated people with incomes are more likely to pay for use values and environmental benefits.

Bequest Value

The bequest value of an area was determined from the interview guide and the questions prepared. The questions focused on the respondent's experience and knowledge of the existence and location of wild animals and their species. Moreover, they were asked about the willingness to pay for services according to ability and the value of the surrounding environment. The WTP figures are direct offers from respondents without any coercion. The total value of WTP per year obtained is IDR 80,000, while the median value of WTP per year is IDR 7,500. This is the median value of WTP per year of the respondents willing to pay IDR 7,500. The total WTP per year is an estimate of the environmental value in the survey area. It is obtained by multiplying the median value with the area's total population (464 people), giving IDR 3,480,000.

Attfield (1998) showed that basing decision-making on valuations in the free market fails to provide the expected value. Instead, it requires a method that more directly considers and weighs the good or future interests of humans and non-human entities. Marre et al. (2014) stated that assessing non-use values is relatively easy using the stated preference method. In contrast, the standard approach (stated decomposition) has substantial drawbacks undermining the results' robustness. Not all non-use values using the WTP method meet the definition of existence and bequest value. Therefore, it is important to assess whether this method is satisfactory in considering non-use values in practical decision-making. This is because not all intrinsic values meet the definition of a value not discovered in the future. According to O'Garra (2009), people owning and living in ancestral lands have a strong sense of ownership of the land and its resources. They maintain an economic bequest

value for the current generation because they pass on the land to posterity. Beaumont et al. (2007) established that the current generation places value on ensuring biodiversity and functioning ecosystems for posterity. This is based on one's concern that future generations should have access to resources and opportunities. Moreover, it indicates the perceived knowledge that resources and opportunities are passed on to the next generation. Allen et al. (2021) stated that bequest emerged is the highest priority in assessing ecosystem services' flow and estimating their discount rate. Natural resource management provides information that the socio-cultural bequest value is a priority compared to the benefits of other ecosystem services.

3.2. Factors Affecting the WTP Value

Factors affecting the WTP value are determined by multiple linear regression analysis of dependent variables on several independent variables. The independent variables include the respondent's age, education level, income, occupation, number of dependents, and forest quality. The results of the analysis obtained the following regression function:

WTP= -28.05806 - 0.021242UR - 1.290237TP + 5.808299PD + 0.008468PK - 0.301882JT + 0.349699KL

From the results of the analysis, it can be seen that the variables of age, income, and number of family members have a negative effect on willingness to pay. This is due to several factors, namely: the older the community around the forest, the lower the family income and the lower the ability to pay for ecosystem services. Likewise, low income has an impact on the weak ability to manage the forest environment. If the number of family dependents increases, it will become a burden for the family, so that dependence on the forest to earn a living for the family will increase, this condition can reduce the willingness to pay for forest ecosystem services. Variables that have a positive effect on the willingness to pay for ecosystem services are family income and environmental quality. Adjusted R-squared is 0.772499, this figure shows that the proportion of the influence of age, education level, income, type of work, number of dependents and forest quality on the WTP value is 77.25 percent while the remaining 22.75 percent is influenced by other variables not examined in the study.

Respondent's age has no significant effect on the WTP value given in Bukit Rimbang Bukit Baling Wildlife Reserve in Kampar Regency. In this case, the age variable shows a negative direction. This means that the age of the respondent around the area does not affect WTP value. The field observation results show that WTP value is not significantly affected by age. Both young and old respondents are willing to pay for the Bukit Rimbang Bukit Baling Wildlife Reserve services. This is because the forest has existed for a long and should be maintained for the next generation.

Education level shows a significant direction towards the WTP value of the Bukit Rimbang Bukit Baling Wildlife Reserve. However, the coefficient value of the education level variable shows a negative direction towards WTP. There are two possibilities with the level

of public education regarding the existence of the Wildlife Reserve. First, maintaining and managing the forests in the area to become customary according to custom. Second, the wildlife reserve could hinder development due to the absence of road access to locations outside the village. Gumila (2019) repored that the education level greatly determines the success of environmental management and the wildlife reserve areas. Furthermore, Pieter et al. (2015) stated that the education level and individual income largely determine natural resource management. Nicosia et al. 2014) explained that the education level significantly determines the implementation of environmental management. It plays an important role in changing individual attitudes towards environmental care.

Community income significantly affects the WTP value, and the regression coefficient shows a positive direction towards Bukit Rimbang Bukit Baling Wildlife Reserve. Field data showed that the average income of the Batu Sanggan Village community ranges from one to two million per month. Although the community income is low, almost all respondents are willing to pay WTP for forest preservation. Moreover, field observations showed that the community largely depends on one income source in the form of very cheap rubber products. However, the forests could be utilized and developed by communities to produce non-timber products and other economic alternatives (Nicosia et al. 2014; Pieter et al. 2015; Gumila, 2019).

The occupation variable shows insignificant results on the WTP value of the Bukit Rimbang Bukit Baling Wildlife Reserve. The coefficient value of this variable shows a positive direction. This means that the occupation of the surrounding community positively affects the WTP value. Field observations show that area is dominated by farmers and cultivators. Also, the community uses the river as the main transportation and looks for fish in permitted locations. Limited nature tourism service is expected to provide alternative jobs and economic businesses to help the community economically. It could be carried out utilizing the Subayang River and the natural beauty around the Bukit Rimbang Bukit Baling Wildlife Reserve. Furthermore, the women could make handicrafts, such as bags and knick-knacks as gifts for tourist visitors, using non-timber forest products. Also, O'Garra (2009; Beaumont et al. (2007; Suprapto et al. 2015; and Allen et al. (2021) showed that the environmental balance around the forest is determined by the occupation of the surrounding community. Greater economic returns provided by the forest drive the community to protect the environment around the area.

The number of dependents shows a significant result on the WTP value of Bukit Rimbang Bukit Baling Wildlife Reserve in Kenegerian Batu Sanggan, Kampar Regency. However, the coefficient value of this variable shows a negative direction. This means that the number of dependents negatively affects the WTP value. Interviews with respondents show that the average number of dependents is three people, and the income sufficiently supports their daily needs. The livelihood sources for the community include fishing, planting rice, and gathering, meaning they eat whatever they get every day. Field observations show that the community in the underdeveloped Batu Sanggan Village experience economic difficulties. Until now, the main access to the village is through water and no communication

access. For information sources, the community utilizes PLTMH with a capacity of about 25 kWh supporting 70-100 houses.

Suprapto et al. (2015) showed that demographic variables are important predictors of WTP. Income, education level, marital status, and supply value are significant predictors in a single restricted CVM. Moreover, (Pham et al. 2018) stated that gender, education level, occupation, respondent participation, and attitude towards the impact of climate change are significant factors in WTP. According to Gumila (2019), education level and income have a strong partial effect on community decision-making in determining WTP value. Guo et al. (2020) stated that operational forecasts do not depend on the measurement of past conditions. On the contrary, robust models are used with traditional on-site water quality monitoring and artificial intelligence (AI) based methods. Liu, (2020) stated that individual knowledge and attitudes directly drive the number of payments and ecosystem management decisions. The geographic diversity of Ecosystem Services (ES) payments differs by socioeconomic structure. Therefore, knowledge and attitudes are the main driving forces of such geographic diversity. A bottom-up adaptive governance approach is promoted to manage shared resources in developing countries.

Environmental quality showed no significant effect on the WTP value in the existence of the Bukit Rimbang Bukit Baling Wildlife Reserve. However, the coefficient value of this variable shows a positive direction. This means that environmental quality positively affects the WTP value. The environmental quality of Bukit Rimbang Bukit Baling is maintained by the Riau Natural Resources Conservation Center. This is after the designation of Bukit Rimbang Bukit Baling as a Wildlife Reserve area. Consequently, the management, rehabilitation, utilization, special and religious, cultural, and historical blocks were restructured. According to Beaumont et al. (2007) and Pieter et al. (2015), environmental quality is largely determined by the attitude of the surrounding community and willingness to pay the management's benefit value. Another determinant factor is the integrated policies between community needs and environmental quality.

The community around the Bukit Rimbang Bukit Baling Wildlife Reserve area maintains environmental quality through forest protection and management based on applicable regulations. In this way, the community is confident in maintaining the forest by designating *imbo* (a term for the forest in the local community). It is divided into three categories, including prohibition *imbo*, a forest area protected and maintained for its sustainability. The second category is reserve *imbo*, a forest area protected and preserved for future generations and needs. The third category is exploitation *imbo*, a forest area utilized to fulfill basic community needs, especially non-timber forest products. Khan et al. (2019) established that policy development positively affects environmental management, and the preferred choice is the willingness to pay for ecosystem benefits.

Large economic value is generated from non-timber forest products in the Wildlife Reserve area with annual harvest cycles. Although the system contributes to the local community's economy, it has not been optimized. According to (Pardede et al. 2018), non-timber forest products (NTFP) significantly contribute to the community's income around the Bukit Rimbang Bukit Baling Wildlife Reserve. It contributes 43.65% and provides a fairly

large increase in the community's income. Hjerpe and Hussain (2016) showed that forest ecosystems contribute to community welfare. However, the non-market nature of goods and services produced makes markets and governments not optimize their production, affecting their economic and ecological significance. Melgar and Rossi (2012) stated that rich people are more likely to be involved in the environment, while community attitudes highly depend on the interaction effect. Therefore, government policies should change the disposition to engage in environmental management.

According to Petter et al. (2013), the application of ecosystem services is very important and necessary because it provides evidence to identify areas with the ability to provide higher service values that must be protected or managed and provide certain ecosystem functions or services. Burkhard et al. 2012, the results of ecosystem service assessments can be used to address environmental issues and guide decision-making.

3.3. Adventure and Landscape Tourism Potential

The Bukit Rimbang Bukit Baling Wildlife Sanctuary, apart from functioning as a conservation area, is also an excellent natural tourist destination. The area offers adventure tourism destinations and river crossings. To reach the location of the tourist attraction using a boat (regional term: piyau) through the Subayang river. Along the river, you can see the existence of huts where local people farm and raise livestock. There you can also see the lives of local people who are active and at one with nature. Trekking is done on foot through primary forests with muddy soil conditions. During the trip, you can enjoy trees from the forest orchid family and wildlife. In the Tanjung Belit Village area, tourists find a waterfall that has a beautiful and natural panorama. The waterfall is named "Waterfall Batu Wall". Trekking, hacking, and river walking tours will be very interesting for those who like the challenges of wild and natural life, namely: 1) Bird watching; 2) Primate observation; 3) Observation of tiger tracks and other forest cat species; 4) Observation of red-and-white rafflesia (rafflesia hasseltii); and 5) Cultural tourism objects (Lubuk Larangan, Semah Rantau, and so on).

In line with the research results of Nawari et al (2021), if a protected area is managed properly, it will provide added economic value for the surrounding community. The area also has the potential to develop natural tourism as a learning process for future generations. The results of research by Syahza and Suarman (2013), the use of land around protected forests can function as a buffer for forest areas. Local communities play an important role in maintaining the balance of the surrounding forests. This can reduce the level of land erosion. Menurut Effendi et al (20210, peran masyarakat sekitar kawasan lindung sangat menentukan keberlanjutan ekosistem suatu wilayah. Untuk mendukung wisata alam diperlukan pemenuhan fasilitas, pelibatan masyarakat sekitar, pengembangan sumberdaya manusia dan promosi. Turisno et al (2021), sustainable forest management with local wisdom carried out by the local government together with the community is a strategy to maintain environmental sustainability and ecotourism in the local context. Mngumi (2021), building a socio-ecological system is closely related to diverse and innovative ecosystem

service-based income activities. The beekeeping industry and forest ecosystem-based tourism are contributing to the incomes of communities living around the forest.

4. CONCLUSIONS

The local government and the surrounding community derive economic value from the direct use values of non-timber forest products providing additional income. Integrated management of the Bukit Rimbang Bukit Baling Wildlife Reserve area in the Nature Reserve will provide utility and non-utility values estimated at IDR 595,350,000 per year. However, there is a need for guidance, counseling, assistance for plant seeds, and management involving rural business groups to maintain the natural balance. Professional tourism development includes mechanisms, management institutions, and marketing community handicrafts from forest products. The development of non-timber forest products, tourism services, and handicraft production is a better alternative economic source for the community around the Bukit Rimbang Bukit Baling Wildlife Reserve area. The results of the study show that income and environmental quality factors greatly influence the willingness to pay for forest ecosystem services. The results of this research are expected to provide input to local governments to preserve wildlife areas based on sustainable development.

The Bukit Rimbang Bukit Baling Forest area is designated as a nature reserve. It is a wildlife reserve with springs that need preservation to regulate water systems, prevent floods, landslides, and erosion. The reserve is one of 8 conservation forest areas in Riau with the potential to become natural resource-based tourism destinations. Tourism development in wildlife reserves is in line with the Ministry of Environment's efforts to shift the paradigm of forest use towards tourism. The Bukit Rimbang Bukit Baling wildlife reserve area has the potential for environmental balance and economic value for the surrounding community. The potentials are environmental services, such as adventure and landscape tourism, and observation of bird species and primates along rivers. Other potentials include primary or secondary forests, Stonewall waterfall tour, observing tiger tracks and cat species, red-and-white rafflesia (*rafflesia hasseltii*), and cultural tourism objects with prohibition pits. This study still has limitations, especially in terms of socio-economic information about the community around the forest. Therefore, further research is needed on the socio-economics of the community in the Bukit Rimbang Bukit Baling Wildlife Reserve area, both in formulating policies, regulations, and supervision.

5. ACKNOWLEDGEMENT

The team would like to thank the Riau Province Natural Resources Conservation Center (BKSDA), the Kampar Regency Government through the Environmental Service, Kampar Kiri Hulu Subdistrict, Batu Sanggan Village Government, and non-governmental organizations related to this research material. Thank you for the support and direction from the Research and Community Service Institute (LPPM) team at the University of Riau.

6. REFERENCES

Ahamed, T., Noguchi, R., Muhsin, N. *et al.* (2021). Sustainable agricultural development: a micro-level GIS-based study on women's perceptions of environmental protection and entrepreneurship in Japan and Bangladesh. *GeoJournal* 86, 2071–2103. https://doi.org/10.1007/s10708-020-10169-5

Allan, J. D., Smith, S., McIntyre, P. B., Joseph, C. A., Dickinson, C. E., Marino, A. L., et al. (2015). Using cultural ecosystem services to inform restoration priorities in the Laurentian Great Lakes. *Frontiers in Ecology and the Environment, 13*(8), 418–424. https ://doi.org/10.1890/14032 8.

Allen, S.F., Ellis, F., Mitchell, C., Wang, X., Boogert, N.J., Chun-Yin, Lin., Clokey, J., Thomas, K.C., Blount, J.D., (2021). Phthalate diversity in eggs and associations with oxidative stress in the European herring gull (*Larus argentatus*). *Marine Pollution Bulletin*, 112564. https://doi.org/10.1016/j.marpolbul.2021.112564

Asmit, B., Syahza, A ., Mahdum, Riadi, RM., 2020. Opportunities and Prospect for Tourism Development on Rupat Island, Indonesia. Folia Geographica, 62(2), 133-148. http://www.foliageographica.sk/unipo/journals/2020-62-2/572

Attfield, R. 1998. Existence value and intrinsic value, Ecological Economics, 24(2-3), 163-168. https://doi.org/10.1016/S0921-8009(97)00140-7

Banzhaf, H. S., Ma, L., Timmins, C., (2019). Environmental Justice: Establishing Causal Relationships, *Annual Review of Resource Economics*, 11, 377-398. https://doi.org/10.1146/annurev-resource-100518-094131

Bappi, U., Singh, D., & Ibrahim, A. (2023). Participatory Rural Appraisal and Community Development in Gombe State, Nigeria. *International Journal of Movement Education and Social Science*, *7*(2), 1123–1138.

Beaumont, N.J., Austen, M.C., Atkins, J.P., Burdon, D., Degraer, S., Dentinho, T.P., Derous, S., Holm, P., Horton, T., van Ierland, E., Marboe, A.H., Starkey, D.J., Townsend, M., Zarzycki, T. (2007). Identification, definition and quantification of goods and services provided by marine biodiversity: implications for the ecosystem approach. *Marine Pollution Bulletin*, 54(3), 253-265. https://doi.org/10.1016/j.marpolbul.2006.12.003

BKSDA, 2017. Suaka Margasatwa Bukit Rimbang Bukit Baling Provinsi Riau, *Balai Besar Konservasi Sumber Daya Alam Riau*, Periode 2018 s/d 2027

Burkhard, B., Kroll, F., Nedkov, S., & Muller, F. (2012). Mapping ecosystem service supply, demand and budgets. *Ecological Indicators, 21,* 17–29. https://doi.org/10.1016/j.ecolind.2011.06.019

Cai, Y., 2019. Computational Methods in Environmental and Resource Economics. *Annual Review of Resource Economics*, 11, 59-82 https://doi.org/10.1146/annurev-resource-100518-093841

Chambers, R., 1994. The origins and practice of participatory rural appraisal. World Development, 22(7), 953-969. https://doi.org/10.1016/0305-750X(94)90141-4

Chan, K. M. A., Shaw, M. R., Cameron, D. R., Underwood, E. C., & Dally, G. C. (2006). Conservation planning for ecosystem services. *PLoS Biology, 4*(11), 2138–2152. https ://doi.org/10.1371/journal.pbio.00403 79

Comín, F. A., Miranda, B., Sorando, R., Felipe-Lucia, M. R., Jimernez, J. J., & Navarro, E. (2018). Prioritizing sites for ecological restoration based on ecosystem services. *Journal of Applied Ecology, 55*(3), 1155–1163. https://doi.org/10.1111/1365-2664.13061.

Cramb, R.A., Purcell, T., Ho, T.C.S. 2004. Participatory assessment of rural livelihoods in the Central highlands of Vietnam. *Agricultural Systems,* 81, 255-272. https://doi.org/10.1016/j.agsy.2003.11.005

Denant-Boemont, L and Hammiche, S., (2019). Economic Measurement of Environmental Costs for Transportation Activity,Editor(s): Javier Faulin, Scott E. Grasman, Angel A. Juan, Patrick Hirsch, *Sustainable Transportation and Smart Logistics*, Pages 153-167, https://doi.org/10.1016/B978-0-12-814242-4.00006-5

Effendi, Irwan et al. 2021. Potency and Development Strategy of Sungai Bersejarah Mangrove Ecotourism, Siak Regency. *Journal of Environmental Management and Tourism*, Volume 12(8), p. 2272 - 2282, Available at: https://journals.aserspublishing.eu/jemt/article/view/6670.

Geneletti, D. (2011). Reasons and options for integrating ecosystem services in strategic environmental assessment of spatial planning. *International Journal of Biodiversity Science, Ecosystem Services & Management, 7*(3), 143–149. https ://doi.org/10.1080/21513 732.2011.61771 1.

Gumila, I. 2019. Willingness To Pay Masyarakat Terhadap Sumberdaya Terumbu Karang Di Kawasan Konservasi Perairan Pulau Biawak. *Jurnal Ilmu-ilmu Sosial dan Humaniora*, 21(3), 342–348. https://doi.org/10.24198/sosiohumaniora.v21i3.21371

Guo, J., Dong, Y., Lee, J. H., (2021). A real time data driven algal bloom risk forecast system for mariculture management. *Marine Pollution Bulletin*, 161(B-111731). https://doi.org/10.1016/j.marpolbul.2020.111731.

Hanley, N and Perrings, C. (2019). The Economic Value of Biodiversity. *Annual Review of Resource Economics*, 11, 355-375. https://doi.org/10.1146/annurev-resource-100518-093946.

Hariyanti, F., Indasari, B., Syahza, A., Zulkarnain., Nofrizal., (2021). Environmental Disparity Index (EDI): The New Measurement to Assess Indonesia Environmental Conditions for Supporting Sustainable Development. *Jordan Journal of Biological Sciences*, Volume 14, Number 3. Available: http://jjbs.hu.edu.jo/files/vol14/n3/Binder14n3.pdf

Harrison-Atlas, D., Theobald, D. M., & Goldstein, J. H. (2016). A systematic review of approaches to quantify hydrologic ecosystem services to inform decision-making. *International Journal of Biodiversity Science, Ecosystem Services and Management, 12*(3), 160–171. https ://doi.org/10.1080/21513732.2016.11811 05

Hasibuan, B., (2014). Valuasi Ekonomi Lingkungan Nilai Gunaan Langsung Dan Tidak Langsung Komoditas Ekonomi. *Signifikan,* 3(2), 113-126. https://doi.org/10.15408/sigf.v3i2.2055

Hjerpe, E.E and Hussain, A., (2016). Willingness to pay for ecosystem conservation in Alaska's Tongass National Forest: a choice modeling study. *Ecology and Society* , 21(2), 1-8. http://dx.doi.org/10.5751/ES-08122-210208

Irianti, M., Nasrul, B., Syahza, A ., (2020). Erosion Control in Sustainable Plantation Development Efforts in Siak Watershed Region, Riau Province, Indonesia. *Asian Journal of Scientific Research*. Volume 13, No 4. Pages 259-269. http://doi.org/10.3923/ajsr.2020.259.269

Jilkova, J., Hollaender , R., Kochmann, L., Slavík, J., Slavikova, L., (2010). Economic Valuation of Environmental Resources and its Use in Local Policy Decision-Making: A Comparative Czech–German Border Study. Journal of Comparative Policy Analysis: Research and Practice, 12(3), 299-309. https://doi.org/10.1080/13876981003714610

Johnson, D. R and Geldner, N. B., 2019. Contemporary Decision Methods for Agricultural, Environmental, and Resource Management and Policy. *Annual Review of Resource Economics*, 11, 19-41. https://doi.org/10.1146/annurev-resource-100518-094020.

Khan, I., Lei, H., Ali, G., Ali, S., Zhao, M., (2019). Public Attitudes, Preferences and Willingness to Pay for River Ecosystem Services. *International Journal of Environmental Research and Public Health*, 16(3707), 1-17. https://doi.org/10.3390/ijerph16193707

Kuriyama, K. (2000). Measuring the Ecological Value of the Forests around the Kushiro Marsh: An Empirical Study of Choice Experiments. *Journal of Forest Research*, *5*(1), 7–11. https://doi.org/10.1007/BF02762757

Le, H.D and Nguyen, T.T. (2020). The contribution of non-timber forest products to the livelihoods of forest-dependent people: a case study in Hoa Binh province, Vietnam. *Forests, Trees and Livelihoods*, 29(3), 143-157. https://doi.org/10.1080/14728028.2020.1770131

Liu, Y., (2020). The willingness to pay for ecosystem services on the Tibetan Plateau of China. *Geography and Sustainability,* 1(2), 141-151. https://doi.org/10.1016/j.geosus.2020.06.001

Marre,J.P, Thebaud, O, Boncoeur, J, Pascoe, S, Coglan, L, Pascal, N. 2014. Non-market use and non-use values for preserving ecosystem services over time: A choice experiment application to coral reef ecosystems in New Caledonia. Ocean & Coastal Management, 105, 1-14. https://doi.org/10.1016/j.ocecoaman.2014.12.010.

Martín-López, B., Montes, C., and Benayas, J., 2008. Economic Valuation of Biodiversity Conservation: The Meaning of Numbers. *Conservation Biology*, 22(3), 624-635. https://www.jstor.org/stable/20183430.

Melgar, N and Rossi, M., (2012). Involvement in environmental causes, does the joint effect between subjective income and the performance of the country matter? *Revista de Economia del Rosario*, 15(1), 1-18. Available: https://www.researchgate.net/publication/255686219

Mngumi, L.E. (2021) Socio-ecological resilience to climate change effects in peri-urban areas: insights from the Pugu and Kazimzumbwi forest reserves of Dar es Salaam, Tanzania. *GeoJournal* 86, 339–355. https://doi.org/10.1007/s10708-019-10071-9

Mustanir, A. and Lubis, S. (2017), "Participatory Rural Appraisal in Deliberations of Development Planning", *Proceedings of the International Conference on Democracy, Accountability and Governance (ICODAG 2017)*, Atlantis Press, Paris, France, pp. 316–319, https://doi.org/10.2991/icodag-17.2017.60.

Nawari, N., Syahza, A., Siregar, Y.I., (2021). Community-Based Mangrove Forest Management as Ecosystem Services Provider for Reducing CO2 Emissions with Carbon Credit System in Bengkalis District, Riau, Indonesia. *Journal of Physics: Conference Series* 2049(012074). https://doi.org/ 10.1088/1742-6596/2049/1/012074

Ngoc, HPB, Fujiwara, T., Iwanaga, S., & Sato, N. (2021). Tantangan program Pembayaran Jasa Lingkungan Hutan (PFES) dalam konservasi hutan: studi kasus di Vietnam Tengah. *Jurnal Penelitian Kehutanan* , *26* (6), 400–409. https://doi.org/10.1080/13416979.2021.1955438

Nicosia, K., Daaram, S., Edelman, B., et al. 2014. Determining the willingness to pay for ecosystem service restoration in a degraded coastal watershed: A ninth grade investigation. *Ecological Economics*, 104, 145-151. https://doi.org/10.1016/j.ecolecon.2014.02.010

Nunes, P., Bergh, J. C., 2001. Economic valuation of biodiversity: sense or nonsense? Ecological Economics, 39(2), 203-222. https://doi.org/10.1016/S0921-8009(01)00233-6.

O'Garra, T. (2009). Bequest Values for Marine Resources: How Important for Indigenous Communities in Less-Developed Economies? Environmental and Resource Economics, 44(179). https://doi.org/10.1007/s10640-009-9279-3

Parajuli, R., Lamichhane, D., & Joshi, O. (2015). Apakah program kehutanan masyarakat Nepal meningkatkan ekonomi rumah tangga pedesaan? Analisis biaya-manfaat kelompok pengguna kehutanan masyarakat di distrik Kaski dan Syangja di Nepal. *Jurnal Penelitian Kehutanan* , *20* (6), 475–483. https://doi.org/10.1007/s10310-015-0501-6

Pearce, D., and Moran, D. 1994. the Economic Value of Biodiversity IUCN — the World Conservation Union. *Diversity*. *Earthscan Publications Ltd*, London, 1-105. Record updated: 2021. Available: https://portals.iucn.org/library/node/6796.

Petter, M., Monney, S., Maynard, S. M., Davidson, A., Cox, M., & Horosak, I. (2013). A methodology to map ecosystem functions to support ecosystem services assessments. *Ecology and Society*. 18(1), 31. https://doi.org/10.5751/ES-05260 -18013 1.

Pham, T.D, Kaida, N, Yoshino, K, Nguyen, X.H, Nguyen, H.T, Bui, D.T. 2018. Willingness to pay for mangrove restoration in the context of climate change in the Cat Ba biosphere reserve, Vietnam. Ocean & Coastal Management, 163(1), 269-277. https://doi.org/10.1016/j.ocecoaman.2018.07.005.

Pido, M. D. 1995. The application of rapid Rural Appraisal techniques in coastal resource planning: Experience in Malampaya Sound, Philippines. *Ocean and Coastal Management,* 26(1), 57-72. https://doi.org/10.1016/0964-5691(95)00011-P

Pieter, J., Benu,F., Kaho, M.R., (2015*).* Valuasi Ekonomi Ekowisata Terhadap Pengembangan Objek Wisata Kawasan Pesisir Pantai. *Jurnal Ilmu Lingkungan*, 13(1), 55-64. https://doi.org/10.14710/jil.13.1.55-64

Preece, J. 2006. Participatory Rural Appraisal: Lessons for Countries in the North? *International Journal of Action Research*, 2(2), 198-221. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-379558.

Rawat, B., Negi, V.S., Mishra Rawat, J. *et al.* The potential contribution of wildlife sanctuary to forest conservation: A case study from binsar wildlife s Hjerpe anctuary. *J. Mt. Sci.* 10, 854–865 (2013). https://doi.org/10.1007/s11629-013-2514-y

Sadikin, P.N., Mulatsih, S., Noorachmat, B. P., Arifin, H.S., (2017). Analysis Of Willingness To Pay On Ecotourism In Mount Rinjani National Park. *Jurnal Analisis Kebijakan Kehutanan*, 14(1), 31-46. http://dx.doi.org/10.20886/jakk.2017.14.1.31-46

Shami, A, S., Yarali, N., Gholami, D. M., & Adeli, K. (2021). Valuation of ecosystem functions and services: Dehdez forest in Iran. *Journal of Forest Research*, *26*(5), 358–366. https://doi.org/10.1080/13416979.2021.1939921

Song, X. P. (2018). Global estimates of ecosystem service value and change: Taking into account uncertainties in satellite-based land cover data. *Ecological Economics., 143,* 227–235. https://doi.org/10.1016/j.ecole con.2017.07.019.

Suprapto, D., Kirana, M., Susilowati, I., Fauzi, A., (2015). Economic Valuation of Mangrove Restoration in Indonesia. *Jurnal Ekonomi Pembangunan*, 16(2), 121-130. https://doi.org/10.23917/jep.v16i2.1457

Suzuki, Y., Uchiyama, Y., Tachibana, S., Miwa, K., & Kohsaka, R. (2024). Analysis of forest environment transfer tax and prefectural policies: typology of prefectural support to municipalities in the initial phase from 2019 to 2021 in Japan. *Journal of Forest Research*, *29*(4), 246–259. https://doi.org/10.1080/13416979.2024.2314551

Syahza, A., Tampubolon, D., Irianti, M., Meiwanda, G., Asmit, B. (2023). The impact of small-scale oil palm plantation development on the economy multiplier effect and rural communities welfare. International Journal of Sustainable Development and Planning, Vol. 18, No. 5, pp. 1407-1415. https://doi.org/10.18280/ijsdp.180511

Syahza, A., Suarman., (2013). Strategi Pengembangan Daerah Tertinggal Dalam Upaya Percepatan Pembangunan Ekonomi Pedesaan. *Jurnal Ekonomi Pembangunan*, Volume 14, Nomor 1, hlm. 126-139. https://doi.org/10.23917/jep.v14i1.166

Tien, ND, Duyen, TNL, Huyen, NTT, Thuy, PT, Dat, LQ, Oanh, NT, … Lee, K. (2024). Kesediaan membayar jasa lingkungan hutan: tinjauan pustaka sistematis untuk faktor penentu. *Jurnal Penelitian Kehutanan* , *29* (5), 327–342. https://doi.org/10.1080/13416979.2024.2358257

Tinch, R., Beaumont, N., Sunderland, T., Ozdemiroglu, E., et al (2019). Economic valuation of ecosystem goods and services: a review for decision makers. Journal of Environmental Economics and Policy, 8(4), 359-378. https://doi.org/10.1080/21606544.2019.1623083.

Turisno, Bambang Eko et al (2021). Recovery Policy and Proper Management of Mangrove Forests to Preserve Environmental Sustainability and Ecotourism in Bangkalan Indonesia. *Journal of Environmental Management and Tourism*, Volume 12(8), p. 2188–2193. Available at: https://journals.aserspublishing.eu/jemt/article/view/6662

Wahyuni, Y., Kumala Putri, E. I., & Simanjuntak, S. M. 2014. Valuasi Total Ekonomi Hutan Mangrove di Kawasan Delta Mahakam Kabupaten Kutai Kartanegara Kalimantan Timur. *Jurnal Penelitian Kehutanan Wallacea,* 3(1), 1 – 12. http://dx.doi.org/10.18330/jwallacea.2014.vol3iss1pp1-12

Webber, L.M. & Ison, R.L.1995. Participatory rural appraisal design: Conceptual and process issues. *Agricultural Systems,* 47, 107-131. https://doi.org/10.1016/0308-521X(94)P3278-3

Widiati, W., Mulyadi, A., Syahza, A ., Mubarak, M., (2020), Analysis of Plantation Management Achievement Based on Sustainable Development, *International Journal of Sustainable Development and Planning*, Volume 15, Nomer 4, Pages 575-584. https://doi.org/10.18280/ijsdp.150418

Yanti, R., Syahza, A., Hidir, A. and Suwondo, S. (2018), "The communication model of forest management based on environmental awareness", *Management of Environmental Quality,* 29(6), 1093-1109. https://doi.org/10.1108/MEQ-02-2018-0028

Zada, M., Yukun, C. & Zada, S. (2021). Effect of financial management practices on the development of small-to-medium size forest enterprises: insight from Pakistan. *GeoJournal* 86, 1073–1088. https://doi.org/10.1007/s10708-019-10111-4