Original Research Article

Cost Benefit Analysis of Bale Mangrove Agroecotourism in East Lombok Regency

ABSTRACT

Agroecotourism has a major contribution in realizing community, however it has negative impact on the environment as well. Problems that often occuris that management is often not in accordance with the principles of sustainability,resulting in over-exploitation of resources and conflicts between the interests of local communities and tourism managers. interests of local communities and tourism managers. Method used in this research is descriptive method. The unit of analysis in this study was Bale Mangrove Agroecotourism located in Poton Bako hamlet, Jerowaru village, Jerowaru sub-district, East Lombok Regency. This study used 62 respondents, which were determined by *rule of thumbs*. The data sources in this study are primary data and secondary data. Data collection using survey techniques by conducting direct interviews using data collection tools in the form of a pre-prepared list of questions. This research aims to: analyze social and economic feasibility;analyze sensitivity; analyze total economic value; analyze development strategies. The results showed: Bale Mangrove Agroecotourism in East Lombok Regency has a private price of 11,137,425 Rp/month, a profit at the social price level of 16,516,350 Rp/month and a divergence value of -5,378,925 Rpwhich means it is feasible and has the competitiveness to continue to be developed; Sensitivity analysis shows that the PCR and DCR values are still below one, which means that Bale Mangrove Agroecotourism in East Lombok Regency still has a competitive advantage and comparative advantage;The total economic value of Bale Mangrove Agroecotourism in East Lombok Regency is 1,251,996,209Rp/year; Alternative strategic priorities that can be used to develop Bale Mangrove Agroecotourism are establishing cooperation with various *stakeholders,* increasing loyalty to tourists, developing tour packages, and adding information boards about protecting the environment at various spots.

Keywords: Cost Benefit, Agroecotourism, Total Economic Value, PAM, SWOT, AHP

1. INTRODUCTION

Indonesia is the largest archipelago in the world which has around 17,508 islands with the fourth longest coastline in the world, reaching more than 81,000 km consisting of 0.8 million km^2 territorial waters and 2.3 million km^2 archipelago waters (Ministry of ESDM Indonesia, 2024) so that it has enormous natural resources, both in the form of biological and non-biological. One of the natural resources owned by Indonesia is the mangrove ecosystem area, which plays an important role for life(Johari *et.al*., 2021).Mangrove forests have many benefits that can be felt directly or indirectly (Simbala*et.al*., 2020). The variety of benefits is able to provide a large contribution to the economy of the surrounding community such as in the forestry, agriculture, fisheries,

industry, tourism, and other sectors (Suwarsih, 2018). This potential should be developed to improve the welfare of the community, such as by utilizing mangrove forests as tourist destinations (Santri*et a*l., 2020). The utilization of mangroves as a tourist attraction is in line with the interest of tourists who group and look for tourist areas that are specific, natural and rich in biodiversity (Azhari *et al*., 2023).

The utilization of mangrove ecosystems for Agroecotourism is in line with the shift in tourist interest from *old tourism*, namely tourists who only come to do tourism without any elements of education and conservation to *new tourism*, namely tourists who come to do tourism with elements of education and conservation in it (Mohammad, 2023). The development of this field is certainly expected to help economic income and support the welfare of local communities (Nurchoisudin*etal*., 2024).

East Lombok Regency is in a strategic geographical location surrounded by beaches and mountains so that it has quite a lot and diverse tourism potential ranging from natural tourism, cultural tourism, historical tourism and even artificial tourism (Istiqomah*et* al., 2014). Natural tourism is also diverse, such as marine tourism in the form of beach tourism, marine park tourism and mangrove forest tourism. One of the famous mangrove tours is Bale Mangrove Agroecotourism located in Poton Bako Jerowaru (Johari *et al*., 2021).

Bale Mangrove Agroecotourism has been developed since 2021 by the management of the Tourism Awareness Group in Poton Bako Village. Bale Mangrove Agroecotourism has a area of two hectares which was developed into an education-based tourism area. Since its establishment as an Agroecotourism area, local and foreign tourists have begun to come to enjoy the beauty of mangrove trees while learning about the importance of mangroves as protectors of the shoreline from erosion (Johari *etal*., 2021). When compared to other mangrove Agroecotourism in East Lombok Regency, Bale Mangrove has a faster development in terms of facilities and management. However, it is necessary to review the development potential of Bale Mangrove Agroecotourism which is relatively fast in order to become an illustration of how mangrove Agroecotourism in East Lombok Regency should be managed.

When viewed from a socio-economic point of view, the existence of Bale Mangrove Agroecotourism can improve the economy for the surrounding community while accelerating the distribution of community income as a result of the *multiplier effect* that occurs from relatively large tourist expenditures. In addition, the local community also has an increased awareness and understanding of the importance of preserving their natural resources so that they can be utilized to meet their needs (Istiqomah*et* al., 2014).

This research uses *Cost Benefit Analysis* to determine the impact of Bale Mangrove Agroecotourism development and provide an overview of the impacts caused using the feasibility value assessment in CBA. *Cost Benefit Analysis* research is used to analyze whether a project is feasible or not based on the social welfare of the community. As expressed by Hicks and Kaldor (in Suharyanti, 2019) the feasibility of a project is accepted if the social welfare of the community increases (*social improvement*) with some people feeling better and no one feeling harmed.

2. MATERIALS AND METHODS

The method used in this research is descriptive method. The unit of analysis in this study was Bale Mangrove Agroecotourism located in Poton Bako hamlet, Jerowaru village, Jerowaru sub-district, East Lombok regency. This study used 62 respondents, which were determined by *rule of thumb,* consisting of two managers, 30 local people and 30 visitors. The data sources in this study are primary data and secondary data. Data collection using survey techniques by conducting direct interviews using data collection tools in the form of a list of

questions that have been prepared beforehand.

3. RESULT AND DISCUSSION

3.1 Social and Economic Feasibility Analysis

The social and economic feasibility of Bale Mangrove Agroecotourism in East Lombok Regency was analyzed and measured using the *Policy Analysis Matrix* (PAM). PAM analysis is used to identify the presence or absence of competitiveness and the impact of divergence of Bale Mangrove Agroecotourism. The calculation in the PAM table is based on the results of the calculation of private prices and social prices that apply at the research location. In the economic analysis of the output and input components, the value uses social prices or shadow prices(Septarisco&Tanjung, 2018). The shadow price used in this study is the average cost of foreign tourist travel in Indonesia in 2023, which is1,625US$(BPS Indonesia, 2023) which is then converted into rupiah. The results of the PAM analysis on Bale Mangrove ecotourism in East Lombok Regency can be seen in Table 1 below.

Table.1 Calculation Results of *Policy Analysis Matrix* Agroecotourism Bale Mangrove in East Lombok Regency

Description	Reception	Cost (Rp/Month)		Advantages
	(Rp*/Month)	Tradable	Domestic	(Rp*/Month)
Private price	28,125,000	2,337,575	14,650,000	11,137,425
Social pricing	33,503,925	2,337,575	14,650,000	16.516.350
Divergence	(5,378,925)	-	-	(5,378,925)

*Rp = Indonesian Rupiah

Source: Primary data processed (2024)

Table 1 PAM above shows that Bale Mangrove Agroecotourism in East Lombok Regency has a private profit of 11,137,425 Rp (Indonesian Rupiah)per month. The value of private revenue is obtained from the total output generated by tourism activities in Bale Mangrove Agroecotourism such as ticket sales, tour packages and rental of other tourist equipment. Tradable input costs at the private price level amounted to 2,337,575Rp. This value is obtained from the total depreciation cost of all tradable inputs used in supporting the development of Bale Mangrove Agroecotourism. While domestic factors (*non-tradable*) at the private price level amounted to 14,650,000Rp which came from maintenance costs, labor costs, conservation costs, electricity and water purchase costs, and costs for ticket printing. The social benefit of Bale Mangrove Agroecotourism based on the calculations in Table 1 above is 16,516,350 Rpper month. This value comes from the price of social revenue of 33,503,925Rpminus the social costs of tradable inputs and domestic inputs. The cost of tradable and domestic inputs at the social price is assumed to be the same as the private price because they are domestic factors. Likewise, for the price of land because it uses the high seas area and does not substitute with other businesses, the price of land is equal to zero (Shaifarahma et al., 2023). The third line is called the *effect of divergences*. Divergence is the difference between private prices and social prices, consisting of divergence of income, tradeable input costs, and domestic factors. A divergence will cause the actual price to differ from the efficient price.

Divergence arises due to government policy or market distortions. Distortive policies are government interventions that cause market prices to differ from efficient prices, such as taxes, subsidies, trade barriers or price regulations (Christhoper et al., 2023). The level of divergence in Bale Mangrove Agroecotourism in East Lombok Regency is 5,378,925Rp; this negative value is due to the value of the private revenue price is smaller than the value of the socius price or shadow price. The divergence value for tradable and non-tradable input costs is 0because the social price for inputs is estimated to be the same as the private price.

The competitiveness of Bale Mangrove Agroecotourism in East Lombok Regency was analyzed using two indicators, namely competitive advantage using the ratio of private prices or actual prices, namely the *Private Cost Ratio* (PCR) and comparative advantage using the social price ratio, namely the *Domestic Resource Cost Ratio* (DRCR). PCR is the ratio between domestic factor costs and value-added output of domestic factor costs traded at private prices. DRCR is the ratio between domestic factor costs and value-added output from input costs traded at economic prices (without government policy). An economic activity is said to be economically efficient if the ratio of PCR and DRCR is less than one (Septarisco et al., 2018).

The PCR and DRCR values of Bale Mangrove Agroecotourism in East Lombok Regency can be seen in Table 2 below.

Table 2. Competitive and Comparative Advantage Values of Bale Mangrove Agroecotourism in East Lombok Regency

No.	Description	Value
1.	Competitive Advantage (PCR)	0.57
2.	Comparative Advantage (DRCR)	0.47

Source: Primary data processed (2024)

Table 2 above shows that Bale Mangrove Agroecotourism in East Lombok Regency has a PCR value <1, namely 0.57, this condition indicates that to obtain value-added output of 1,000,000Rp requires additional domestic factor costs of Rp570,000 at actual prices. Based on the PCR value, Agroecotourism Bale Mangrove in East Lombok Regency has been efficient in using domestic factors at actual prices so that it has a competitive advantage. The PCR value shows the ability of a commodity system to finance its domestic factors at private prices. The DRC value of Bale Mangrove Agroecotourism in East Lombok Regency has a DRC value <1, namely 0.47. This condition shows that the utilization of domestic resources in producing rice is economically efficient. The DRC value of 0.47 means that to generate foreign exchange of one unit only requires domestic resource costs of around 0.47 units, or in other words, to save foreign exchange of 1 US$ with the rupiah exchange rate in August 2024 (1 US$ =15,405Rp)required domestic resource costs of 0.47 US$or 7,240Rp. The DRC value of 0.47 indicates that Bale Mangrove Agroecotourism has competitiveness. This is supported by the statement of Inayati et al. (2022) that the level of comparative advantage will increase if the DRCR value is closer to zero.

3.2 Sensitivity Analysis

Changes that occur in the operation of Bale Mangrove Agroecotourism will more or less affect its competitive advantage and comparative advantage. Projects in this field are very sensitive to changes such as changes in the rupiah exchange rate, increases in operating costs and changes in revenue.

3.2.1 Depreciation of Rupiah Exchange Rate by 10%

The weakening of the rupiah exchange rate against foreign currencies will result in inflation and the stability of the rupiah exchange rate is disrupted. High inflation can increase the cost of living and make investment in Agroecotourism less attractive. But on the other hand, rupiah depreciation can result in cheaper travel and accommodation costs for foreign tourists, so that it can increase the number of foreign tourist visits.

Table.3 Sensitivity Analysis of 10% Rupiah Exchange Rate Depreciation to Bale Mangrove Agrotourism in East Lombok Regency

No.	Description	Value Before	Value After 10% Depreciation
1	PCR	0.57	0.57
2	DCR	0.47	0.59

Source: Primary data processed (2024)

Based on Table 3. a 10% depreciation of the rupiah causes the DCR value to rise from 0.47 to 0.59, which means to save one unit of foreign exchange, domestic resources of 0.59 or 9,089 Rpare needed. The DCR value becomes higher due to the 10% depreciation of the rupiah, while other factors such as tradable and non tradable inputs are considered fixed. This condition shows that the use of domestic resources in Bale Mangrove Agroecotourism at the social price level can be said to be no more efficient than before the depreciation of the rupiah. So that the depreciation of the rupiah exchange rate by 10% can be said to have a negative impact on Bale Mangrove Agroecotourism because in these conditions, comparative advantage decreases because the DCR value is getting higher or away from zero. While the depreciation of the rupiah exchange rate by 10% has no effect on the competitive advantage of Bale Mangrove Agroecotourism. It can be seen that the PCR value remains at 0.57. This is because changes in exchange rates only affect the social price of tradable outputs and inputs in Bale Mangrove Agroecotourism.

3.2.2 10% Increase in Operating Costs

The increase in operating costs in mangrove agroecotourism generally occurs due to unforeseen factors such as an increase in operational costs to repair mangrove tracking paths damaged by seawater or sudden purchases of tourist equipment due to tourist use.

Table. 4 Sensitivity Analysis of a 10% Increase in Operating Costs for Bale Mangrove Agroecotourism in East Lombok Regency

No.	Description	Value Before	10% Cost Increase
1	PCR	0.57	0.62
2	DCR	0.47	0.52

Source: Primary data processed (2024)

Table 4. The above shows that an increase in operating costs by 10% makes the PCR value from 0.57 to 0.62, meaning that to produce one unit of added valueat private prices requires domestic input costs of 0.62 of the added value, or 9,5551Rp. This condition shows that the use of domestic resources in Bale Mangrove Agroecotourism at the private price level can be said to be no more efficient than before the 10% increase in operating costs. The increase in operating costs by 10% also affects the comparative advantage of Bale Mangrove Agroecotourism in East Lombok Regency. This is evidenced by the DCR value which was originally 0.47 increased to 0.52. The DCR value of 0.5 means that to save one unit of foreign exchange, domestic resources are needed as much as 0.52 of the one unit of foreign exchange, namely 8,011Rp. This condition shows that the use of domestic resources in

Bale Mangrove Agroecotourism at the social price level can be said to be no more efficient than before the increase in operating costs. This shows that a 10% increase in operating costs has a negative effect on the comparative and competitive advantages of Bale Mangrove Agroecotourism. Therefore, efforts need to be made to increase revenue from the output offered.

The PCR and DCR values of less than one indicate that Bale Mangrove Agroecotourism still has a comparative and competitive advantage even if there is a 10% increase in operating costs at the private and social price levels**.**

3.2.3 20% decrease in revenue

A decrease in income in an Agroecotourism is a crucial thing that is feared by investors and Agroecotourism managers, because this indicates that Agroecotourism is in a bad zone between continuing to develop or stopping. So it is necessary to analyze the sensitivity of a 20% decrease in revenue to find out whether these changes can affect the competitive advantage and competitor advantage of Bale Mangrove Agroecotourism in East Lombok Regency in the future.

Table 5. Sensitivity Analysis of a 20% Decrease in Revenue for Bale Mangrove Agroecotourism in East Lombok Regency

No.	Description	Value Before	20% Revenue Decline
1	PCR	0.57	0.73
2	DCR	0.47	0.47

Source: Primary data processed (2024)

Based on Table 5. a 20% decrease in income resulted in the PCR value from 0.57 to 0.73, which is true to produce one unit of added value at private prices, it requires a domestic input cost sacrifice of 0.73 of the added value, which is 11,246Rp. Under these conditions, the competitive advantage of Bale Mangrove Agroecotourism is getting lower because the higher PCR value is close to one or away from zero. Meanwhile, a 20% decrease in income has no effect on the comparative advantage of Bale Mangrove Agroecotourism. It can be seen that the DCR value remains at 0.47. This is because the increase in income only affects the private price of output and tradable inputs in Bale Mangrove Agroecotourism.

3.3 Total Economic Value Analysis

Total economic value is the accumulation of use value (direct and indirect use value) and non-use value (choice value, heritage value and existence value). Analysis of the economic value of goods or services contained in an Agroecotourism is an important requirement for decision making because the calculation of this analysis can provide an overview of the total economic value contained in the Bale Mangrove Agroecotourism area in East Lombok Regency.

3.3.1 Direct Economic Value

The value of direct benefits found in Bale Mangrove Agroecotourism in East Lombok Regency includes the utilization of fish and crabs taken around the mangrove ecosystem area. Utilization carried out by respondents, mostly sourced from fishery catches, this is because most of the people and respondents around the Bale Mangrove Agroecotourism work as fishermen.

Table 6. Direct Economic Value of Bale Mangrove Agroecotourism in East Lombok Regency

Type	Total Catch (Kg/year)	Average Catch (Kg/year)	Total Cost (Rp/Year)	Total Direct Benefit Value (Rp)	Average Direct Benefit Value (Rp)	(%)

Fish	40,515	1,351.00	21,000,000	79,875,000	26,462,500	73
Crab	12,775	425.83		292,000,000	9,733,333	27
	Total			**1,085,875,000**	**36,195,833**	**100**

Source: Primary data processed (2024)

Table 6. shows that the total fish catch around the mangrove ecosystem is 40,515 kg per year with an average of 1,351 kg per year. The total value of direct benefits obtained by the surrounding community from fish catches is 793,875,000 Rpper year with an average of 26,462,500Rp per year. Meanwhile, the number of crab catches is 12,775 kg per year, with an average catch of 425.83kg per respondent per year. The total value of direct benefits of crab catches for the surrounding community is 292,000,000 Rpper year with an average direct benefit that each respondent can feel is 9,733,333 Rpper year. So that the total value of direct benefits that can be felt by the surrounding community, especially in Poton Bako hamlet due to the existence of Bale Mangrove Agroecotourism is 1,085,875,000 Rpper year with an average of 36,195,833Rp per year.

3.3.2 Indirect Economic Value

Based on the results of identification of the existence of mangrove ecosystems in Bale Mangrove Agroecotourism, East Lombok Regency, the value of indirect benefits is the value of the benefits of abrasion and erosion resistance. The indirect benefit value of mangrove forests as abrasion protection is estimated through the *replacement cost* estimation approach. According information from PURP Office of East Lombok, Gunung Malang Village Beach Abrasion Embankment Development Planin 2020, it is estimated that building a 5,000 m long abrasion embankment will cost 30,216,277,600Rp or around 6,043,255.52Rp / 10 years of service life. The length of the coastline protected by mangrove forests in Bale Mangrove Agroecotourism based on the results of tracking using GPS is ± 93.83m. The value of the cost of making the abrasion barrier is then multiplied by the length of the coastline protected by mangrove forests, which is 93.83 m long. This is because the breakwater building can already replace the function of mangrove forests as a breakwater along the coastline in Poton Bako Hamlet. So that the indirect benefit value of mangroves as an abrasion barrier in Bale Mangrove Agroecotourism in East Lombok Regency is 56,703,866.54 Rpper year.

$$\text{MTLpa} = \frac{Rp6.043.255{,}52\ /m\ x\ 93{,}83m}{10}$$

$$= 56{,}703{,}866.54\text{Rp/year}$$

Description:
MTLpa = Indirect benefit as abrasion barrier

3.3.3 Economic Value of Preferred Benefits

The value of the benefits of mangrove ecosystem options refers to the results of research Ruitenbeek in 1992 in Bintuni Bay, West Papua, which states that the value of mangrove forest biodiversity in Indonesia is US $ 15 / ha / year (*Santoso et al*, 2019). This value can be used in all mangrove forests throughout Indonesia if the mangrove forest ecosystem is ecologically important and is maintained naturally (Tahang *et a,* 2018). The exchange rate of the US dollar against the rupiah (August 2024) is Rp 15,409, and the area of mangroves developed into Agroecotourism objects in Jerowaru village, East Lombok Regency is 2 ha. When associated with the value of mangrove forest *biodiversity* in Indonesia 15 US$/ ha / year, the value of the benefits of the choice of mangrove forest ecosystems in Agroecotourism Bale Mangrove East Lombok Regency reaches 30US $. When converted to rupiah value, the total value of the benefits of mangrove ecosystem choices in Bale Mangrove Agroecotourism is 462,270 Rpper year.

3.3.4 Economic Value of Existence Benefits

The value of existence benefits is calculated based on the *Contingent value method/CVM* approach or survey method.

The survey was conducted to determine the community's *willingness to pay* (*WTP*) for the existence and any benefits obtained from the mangrove forest ecosystem. Based on the results of a survey conducted on 32 respondents, namely the surrounding community and the manager of Bale Mangrove Agroecotourism in East Lombok Regency.

Table 7. Percentage of Benefit Value of Existence Based on Age and Education in Bale Mangrove Agroecotourism, East Lombok Regency

Age	Willingness to Pay (Rp/ha/year)					
	>Rp100,000	%	Rp100,000-Rp250,000	%	<Rp250,000	%
15-24	-	-	2	8	1	50
25-34	-	-	4	16	-	-
35-44	1	20	8	32	1	50
45-54	2	40	11	44	-	-
55-64	2	40	-	-	-	-
Total	**5**	**100**	**25**	**100**	**2**	**100**
Education						
Not in School	5	83.3	8	33.33	-	-
SD	1	16.67	14	5.33	-	-
SMP	-	-	2	8.3	-	-
HIGH SCHOOL	-	-	-	-	1	50
D3 / S1	-	-	-	-	1	50
Total	**6**	**100**	**24**	**100**	**2**	**100**

Source: Primary data processed (2024)

Table 7 shows people who are 25-54 years old have a tendency to value the existence of mangrove ecosystems higher than people who are 55-64 years old.At a productive age, people usually have more ability to work so that the results and benefits obtained from the existence of mangrove forests around their village are also more. Unlike those who are not productive, their abilities are more limited so that the results and benefits obtained are also limited. Communities with higher levels of education also appear to value the benefits of mangrove existence or existence higher when compared to people who have low education or have never taken education. This is influenced by differences in people's mindset. The higher the education, the higher the community's understanding of the existence of resources around them.

Based on the table above and the analysis that has been done, the average value of the willingness to pay from the community for the existence of mangrove ecosystems is 183,813Rp / ha / year. As the mangrove area in Bale Mangrove Agoecotourism in East Lombok Regency is 2 ha, then the total benefit of the existence of the mangrove ecosystem is 367,626 Rpper year.

3.3.5 Economic Value of Inheritance Benefits

The value of mangrove ecosystem heritage benefits cannot be assessed using a market value approach. Therefore, the heritage value can be calculated with an estimated approach with a heritage value of not less than 10% of the direct benefit value of mangrove forests (Simbala et al. 2017). In connection with the total known direct benefit value of the mangrove forest ecosystem in Bale Mangrove Agroecotourism in East Lombok Regency, the estimated inheritance value of the mangrove ecosystem is 1,085,875,000Rp/year x 10% = 108,587,500Rp/year.

Based on the results of the identification of the entire value of the

benefits of the mangrove forest ecosystem in Bale Mangrove Agroecotourism in East Lombok Regency which consists of direct benefits, indirect benefits, optional benefits, existence benefits and inheritance benefits which then quantify the value into rupiah value, the Total Economic Value of all benefits can be seen in Table 8 below.

Table. 8 Total Economic Value of Bale Mangrove Agroecotourism in East Lombok Regency

No.	Benefits	Benefit Value (Rp/year)	%
1	Direct	1,085,875,000	86.73
2	Indirect	56,703,866.54	4.52
3	Options	462,270	0.04
4	Existence	367,626	0.03
5	Legacy	108.587,500	8.67
Total		**1,251,996,209**	**100**

Source: Primary data processed (2024)

Table 8. shows that the mangrove ecosystem in Bale Mangrove Agroecotourism in East Lombok Regency has an important role. It can be seen that the value of direct benefits has the largest proportion of the value of other benefits, which is 86.73% or 1,085,875,000 Rpper year. This comes from the catch of fish and crabs by the community which is used as their livelihood. As is known, one of the benefits of mangrove forest ecosystems is as a place to find food and shelter for several types of fish and other marine animals. The value of inherited benefits has a proportion of 8.67% or 108,587,500Rp per year. The inherited value of natural resources is highly dependent on how much direct benefit the community feels. According to Simbala et.al (2020), the greater the direct benefits felt by the community, the greater the value that will be passed on to their children and grandchildren in the future. The next economic value comes from the indirect benefit value of the mangrove ecosystem of 56,703,866.54 Rpper year or around 4.52%. The indirect benefit value of mangrove ecosystems in Bale Mangrove Agroecotourism in East Lombok Regency is as an abrasion and erosion barrier. The value of the cost of making the abrasion barrier embankment is then multiplied by the length of the coastline protected by the mangrove forest, which is 93.83 m long.

The next proportion is the value of existence benefits and the value of choice benefits. The benefit of choice has a percentage of 0.04% or 462,270Rp per year. Mangrove forest ecosystems as a *biodiversity* that is valued at 15 US $/ ha / year, with an area of mangrove forest in Poton Bako of 2 ha, is quite small. Although the value of mangrove ecosystem options in Bale Mangrove Agroecotourism is small, the mangrove ecosystem as a biodiversity has a lot of potential that is not yet fully known. Furthermore, the value of existence benefits has the smallest percentage of the value of other economic benefits, which is 0.03% or 367,626Rp per year obtained from the *willingness to pay* (*WTP*) for the existence and every benefit obtained from the mangrove forest ecosystem. When looking at the percentage value of direct benefits and existence benefits in Table 6 there is a much different difference because the community believes that the direct benefits felt by the community are not proportional to its existence or existence. Based on the results of interviews conducted with the surrounding community, this happens because the surrounding community feels that ecotourism does not fully benefit the local community, but rather benefits investors or outsiders who manage or have rights to the

Agroecotourism. This is also in line with the results of research by Rahmawati & Irna (2024) local communities around Bale Mangrove Agro-tourism stated that the existence of Bale Mangrove Agro-tourism in the mangrove area could not improve the community's economy at all, especially for fishermen due to limitations in management and lack of integration (refers to efforts to integrate or unite various groups, values, or norms in a particular society or organization to achieve common goals or increase cooperation in the development of Agro-tourism).

3.4 Development Strategy Analysis

3.4.1 SWOT Analysis

3.4.1.1 Internal Environmental Factor Analysis

Based on the results of analyzing the questionnaire data that has been answered by respondents, the following is the respondents' assessment of the internal factors in the Bale Mangrove Agroecotourism in East Lombok Regency. Internal factors that are strengths and weaknesses can be seen in Table 8 below.

Table 9 IFAS Matrix (*Internal Factor Analysis System)* Agroecotourism Bale Mangrove in East Lombok Regency in 2024

No.	SWOT Analysis Factors	Weight	Rating	Score
Strength (S)				
1.	Many types of tour packages are available	0.18	3.50	0.62
2.	Conservation education and research site	0.19	3.66	0.68
3.	Adequate facilities and infrastructure	0.18	3.63	0.67
Total		**0.55**		**1.96**
Weakness (W)				
1.	Inadequate road access	0.17	3.41	0.49
2.	Lack of availability of tour guides	0.14	2.84	0.41
3.	Limited human resources and budget	0.14	2.72	0.37
Total		**0.45**		**1.37**
Total internal factors		**1.00**		**3.33**

Source: Primary data processed, (2024)

Based on Table 9, it is known that the total IFAS score on Bale Mangrove Agroecotourism in East Lombok Regency is 3.33 with details of the strength score of 1.96 and the total weakness score of 1.37. The largest strength score is in the location factor of conservation education and research with a score of 0.68. While the largest weakness score is on the inadequate road access factor with a score of 0.49. The strength factor score is higher than the weakness score, this indicates that Bale Mangrove Agroecotourism in East Lombok Regency is in a strong internal position so that it can continue to be developed.

3.4.1.2 Analysis of External Environmental Factors

Based on the analysis of questionnaire data that has been answered by respondents, the following is the respondents' assessment of external factors on Bale Mangrove Agroecotourism in East Lombok Regency. External factors that become opportunities and threats can be seen in Table 10.

Table 10. EFAS Matrix (*External Factor Analysis System)* Agroecotourism Bale Mangrove in East Lombok Regency in 2024

No.	SWOT Analysis Factors	Weight	Rating	Score
Opportunity (O)				
1.	Government policy on Agroecotourism	0.15	3.16	0.48
2.	Shifting tourist interest to the concept of educational tourism	0.17	3.59	0.62
3.	Increased local revenue from the tourism sector	0.16	3.41	0.56
Total		**0.49**		**1.66**
Threat (T)				
1.	Competition with other natural attractions	0.18	3.78	0.48
2.	Illegal activities of the community in the area	0.17	3.44	0.57
3.	Environmental pollution (negative impact of tourists)	0.17	3.44	0.57
Total		**0.51**		**1.82**
Total internal factors		**1.00**		**3.48**

Source: Primary data processed, (2024)

Table 10shows that the total EFAS score on Bale Mangrove Agroecotourism is 3.48 with details of the total opportunity score of 1.66 and the total threat score of 1.82. The biggest opportunity score is in the factor of shifting tourist interest to the concept of ecotourism with a score of 0.62. Meanwhile, the threat factor of illegal community activities in the area and environmental pollution is the biggest factor that can threaten the development of Bale Mangrove Agroecotourism, which is 0.57. The threat score is greater than the opportunity score. When viewed from external factors, Bale Mangrove Agroecotourism in East Lombok Regency is in a weak external position so that a special strategy is needed to maximize existing opportunities so that Bale Mangrove Agroecotourism continues to exist.

From the IFAS and EFAS matrix, it can be seen that the internal and external position of Bale Mangrove Agroecotourism is in a Quadrant position. In this position, Bale Mangrove Agroecotourism is in good condition but faces a number of severe challenges so that it is estimated that its development will have difficulty continuing to compete if it only relies on the previous strategy. So that the strategy that must be applied is to use strengths to minimize threats with a diversification strategy or S-T (*Strength-Threats*) strategy.

3.4.1.3 SWOT Matrix Analysis

The SWOT matrix is a tool used to compile factors used as alternative strategies that can clearly illustrate how opportunities and threats from external factors can be adjusted to the strengths and weaknesses possessed in efforts to develop Bale Mangrove Agroecotourism. The results of the previous evaluation of internal and external factors were then analyzed using a SWOT matrix to determine alternative strategies for developing Bale Mangrove Agro-tourism in East Lombok Regency. The results of the SWOT analysis matrix can be seen in Table 11.

Table 11 SWOT Matrix Analysis of Mangrove Bale Agroecotourism in East Lombok Regency in 2024

IFAS EFAS	Strength (S) 1. Many different tour packages are available 2. Education, research and conservation site 3. Adequate facilities and infrastructure	Weakness (W) 1. Inadequate road access 2. Lack of availability of tour guides 3. Limited human resources and budget
Opportunity (O) 1. Government policy on Agroecotourism 2. Shift in tourist interest to the concept of educational tourism 3. Increased local revenue from the tourism sector	**S-O Strategy** 1. Develop promotions through various platforms (social media) to attract tourists (S1, O2) 2. Developing typical souvenirs and local culinary (S3, O3) 3. Develop mangrove and non mangrove tour packages (S1, O2, O3) 4. Develop the Bale Mangrove area into an education/conservation site, campground and outbound location (S2, S3, O2, O3) 5. Increased cooperation/synchronization of programs with local governments to help improve facilities and infrastructure (S3, O1)	**W-O Strategy** 1. Improve the quality of human resources to assist the development of Agroecotourism (W3, O1) 2. Add human resources to keep up with the number of visitors (W3, O3) 3. Collaborative management by increasing community and *stakeholder* participation (W1, W2, O1, O3)
Observation (T) 1. Competition with other natural attractions 2. Illegal activities of the community in the area 3. Environmental pollution	**S-T Strategy** 1. Develop tour packages that are attractive and different from other places so that they can attract tourists (S1, S2, T1) 2. Increase loyalty to tourists who repeatedly visit (S2, T1) 3. Cooperation with various *stakeholders* to increase public awareness so as not to carry out activities that damage the environment (S2, T2, T3) 4. Adding information boards about protecting the environment in various spots (S2, S3, T2, T3)	**W-T Strategy** 1. Increased cooperation with relevant sectors to face competition and help improve infrastructure (W1, W3, T1) 2. Conducting counseling/environmental education to the community and visitors to raise awareness about how to travel in an environmentally friendly manner (W3, T2, T3) 3. Conducting waste cleanup actions in the Agroecotourism area by involving the surrounding community and the general public (W3, T2, T3)

Source: Primary data processed (2024)

Based on the results of the analysis using IFAS, EFAS, SWOT diagrams and matrices, it can be seen that the alternative strategy for developing Bale Mangrove Agroecotourism in East Lombok Regency is the S-T (*Strength-Threats*) strategy, namely:

a) Develop tour packages that are attractive and different from other places so as to attract tourists.

b) Increase loyalty to repeat travelers.

c) Cooperation with various *stakeholders* to increase public awareness so as not to carry out activities that can damage the environment.
d) Adding information boards about protecting the environment in various spots

AHP analysis helps to prioritize the development strategy of Bale Mangrove Agroecotourism in East Lombok Regency from several criteria by analyzing pairwise comparisons of several *Strength-Threat* development policy strategies generated through previous SWOT analysis.

3.4.2 *Analytical Hierarchy Process* (AHP)

Table 12: Prioritization of Mangrove Bale Agroecotourism Development Strategies in East Lombok Regency

Strategy	Weight	Priority
Develop attractive tour packages (ST1)	0.374	2
Increase loyalty to tourists (ST2)	0.134	3
Cooperation with various *stakeholders (ST3)*	0.421	1
Adding information boards (ST4)	0.071	4
CR	**0.057**	

Source: Primary data processed (2024)

Table 12. shows CR for four alternative development strategies is worth 0.057 < 1, which means that respondents' preferences are consistent. The table also shows that the main priority of alternative strategy selection criteria in the effort to develop Bale Mangrove Agroecotourism is the strategy of collaborating with various *stakeholders* to increase public awareness so as not to carry out activities that can damage the environment (ST3) with a weight of 0.421. With collaborative cooperation with various *stakeholders* such as the government, environmental forums, and local communities to hold periodic socialization and training, it will increase public awareness about the importance of protecting the environment around Bale Mangrove Agroecotourism and will also result in the division of roles and responsibilities in optimizing the management of the Bale Mangrove Agroecotourism area in East Lombok Regency, so that people's love for the mangrove ecosystem will arise.

The second alternative strategy priority is to develop attractive tour packages from other places (ST1) with a weight of 0.374. Tour packages can be combined with elements of culture and local wisdom of the community to create a different travel experience. Furthermore, the third strategic priority is to increase loyalty to tourists (ST2) with a weight of 0.134. Loyalty to consumers is a form of appreciation from the manager to tourists who repeatedly visit the Bale Mangrove Agroecotourism in East Lombok Regency. This loyalty can be in the form of free tour packages, discounts or gifts. The strategy of adding information boards about protecting the environment in various spots (ST4) is the last priority with a weight of 0.071. Information boards about the importance of maintaining cleanliness and environmental sustainability, the dangers of plastic waste to marine life, or information boards on punishment for individuals who commit acts that threaten environmental ecosystems are important to be arranged at various spots to keep visitors aware of the importance of maintaining the cleanliness and beauty of Bale Mangrove Agroecotourism.

4. CONCLUSION

Based on the results of the research and discussion, the following conclusions can be drawn**:**

1. Analysis of the social and economic feasibility of Bale Mangrove

Agroecotourism in East Lombok Regency using a *policy analysis matrix* (PAM) shows a profit at the private price level of 11,137,425 Rp/ month, a profit at the social price level of 16,516.350Rp/month, and a divergence value of -5,378,925 Rpwhich means it is feasible to develop, besides that it has a competitive advantage of 0.57 <1 and a comparative advantage of 0.47 <1, which means that Bale Mangrove Agro-tourism has the competitiveness to continue to be developed.

2. Sensitivity analysis of Bale Mangrove Agroecotourism in East Lombok Regency is sensitive to a 10% depreciation of the rupiah exchange rate, a 20% decrease in revenue and a 20% increase in operating costs obtaining the following values:
   a. If the depreciation of the rupiah exchange rate decreases by 10%, the PCR result is 0.57 and the DCR value is 0.59, indicating that Bale Mangrove Agroecotourism still has a competitive and comparative advantage because the value is below one. However, the depreciation of the rupiah exchange rate by 10% has a negative impact on Bale Mangrove Agroecotourism because in these conditions it causes the comparative advantage to decrease where the DCR value is higher or away from zero from before the variable occurs.
   b. If there is a 20% decrease in income, the PCR value is 0.73 and the DCR value is 0.47, indicating that Bale Mangrove Agroecotourism has a competitive and comparative advantage because the value is still below one. However, a 20% decrease in income has a negative impact on Bale Mangrove Agroecotourism because in these conditions it results in a decreasing competitive advantage where the PCR value is getting higher or away from zero from before the variable occurs.
   c. If there is an increase in operating costs by 10%, the PCR value of 0.62 and the DCR value of 0.52 indicate that Bale Mangrove Agroecotourism has a competitive and comparative advantage because the value is still below one. However, a 10% increase in operating costs has a negative impact on the sustainability of Bale Mangrove Agroecotourism because in these conditions it can result in a decreasing competitive
   d. and comparative advantage where the PCR and DCR values are getting higher or away from zero from before the variable occurs. So that it results in the weak competitiveness of Bale Mangrove Agroecotourism at the private and social price levels.
3. The total economic value of the mangrove ecosystem in Bale Mangrove Agroecotourism in East Lombok Regency is 1,251,996,209Rp/year which is an accumulation of direct benefit value of 1,085,875,000Rp/year, indirect benefit value of 56,703,866.54Rp/year, preferred benefit value of Rp 462,270/year, existence benefit value of 367,626Rp/year, and inheritance benefit value of 108,587,500Rp/year.
4. The results of the SWOT analysis show that Bale Mangrove Agroecotourism in East Lombok Regency is in quadrant 2, which supports a diversification strategy (S-T Strategy) optimizing strengths to overcome threats with strategies: (1) develop attractive tour packages that are different from other places so that they can attract tourists. (2) increase loyalty to tourists who repeatedly visit. (3) establish cooperation with various *stakeholders* to increase public awareness so as not to carry out activities that can damage the

environment, and (4) add information boards about protecting the environment at various spots. The order of the S-T strategy which is the top priority based on the results of the analysis using the *Analytical Hierarchy Process (AHP)* is to establish cooperation with various *stakeholders* to increase public awareness so as not to carry out activities that can damage the environment.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

REFERENCES

1. Azhari L.R., Fathurrahim., Lalu Y. 2023. Mangrove Ecotourism Development Strategy in Bale Mangrove Tourism Village with SWOT Analysis in Poton Bako Hamlet, Jerowaru Village, Jerowaru District, East Lombok Regency. *Responsible Tourism.* 2(3):725-736
2. BPS Indonesia. 2023. Average Spending of Foreign Tourists per Visit 2022-2023. https://www.bps.go.id/id/statistics-table/2/MjcyIzI=/rata-rata-pengeluaran-wisatawan-mancanegara-per-kunjungan-menurut-negara-tempat-tinggal.html. Accessed January 05, 2025.
3. Christhoper M G., Yudhari I D A S., Dewi I A L. 2023. Analysis of Competitiveness Data of Red Onion Commodities in Songan B Village, Kintamani District, Bangli Regency. *Journal of Agribusiness and Agritourism*. 12(1):609-618.
4. Inayati A., Suhartini, Condro P N. 2022. Comparative and Competitive Advantage of Rice Farming in Ponorogo Regency, East Java. *Journal of Agricultural Economics Agribusiness (JEPA)*. 6(2):559-567.
5. Istiqomah N., Aini N., Eva D. 2014. Analysis of Magrove Forest Ecotourism in SebubusPaoh District. Social Economic of Agriculture. 1(2):45-52.
6. Johari H I., Sukuryadi, Mas'ad, Ibrahim. 2021. Valuation of Direct and Indirect Benefits of Mangroves in Jerowaru District, East Lombok Regency, West Nusa Tenggara. *Journal of Economic and Social of Fisheries and Marine.*1:55-72.
7. Ministry of ESDM Indonesia. 2025. Geomarin III Survey Ship as an Answer. https://www.deepl.com/id/translator#id/en/us/Kapal%20Survei%20Geomarin%20III%20Sebagai%20Sebuah%20Jawaban. Accessed January18, 2025.
8. Mohammad. 2023. Community Participation in Mangrove Forest Rehabilitation in Muara Badak Ulu Village, Muara Badak District, Kutai Kartanegara Regency. *Forest Management.* 15(3): 156-170
9. Nurcholisudin T. M., Utami S., Fuad M. 2024. Analysis of Suitability Index andMangrove Ecotourism Potential in GampongBaroSayeung, Aceh Jaya. Journal of Environmental Science. 22(6):1477-1486.
10. Rahmawati, Irna N A R. 2024. Community Perceptions of Bale Mangrove Ecotourism Development in Jerowaru Village, Jerowaru District, East Lombok Regency. *Silva Samalas Journal*. 7(1). 54-64
11. Santoso N., Rikzi P N., and R A. 2019. Economic Value of Total Mangrove DebtPangkahKulon and PangkahWetan Village Areas, Subdistrict ofUjungpangkah Gresik Regency, East Java Province. Media Konservas. 24(2). 152-162.
12. Santri B., Rudhi P., Irwani. 2020. Economic Valuation of Mangrove Ecosystems in Betahwalang Village, Bonag District, Demak Regency, Central

Java, Journal of Marine Research. 9(4): 355-361.
13. Septarisco Y K N J., Tanjung M P. 2018. Competitiveness of Rice Farming in Susukan District, Semarang Regency Using the PAM (*Policy Analysis Matrix*) Method. *Agrineca Journal*. 3(1). 55-67
14. Septarisco Y K N J., Tanjung M P. 2018. Competitiveness of Rice Farming in Susukan District, Semarang Regency Using the PAM (Policy Analysis Matri) Method. Agrineca Journal. 3(1). 55-67.
15. Shaifarahma D T., Yusuf M., Nursan M. 2023. Competitiveness Analysis of Seaweed Farming in Central Lombok Regency. *Agroteksos.* 33(1):139-147
16. Simbala R W., Hengki D W., Charles K. 2020. Economic Valuation of Mangrove Forest in Tanjung Dudepo, Bolaang Uki District, South Bolaang Mongondow Regency. *Journal of Agri-SocioEconomics*. 13(3): 87-96
17. Suharyanti D. 2019. Cost Benefit Analysis of the Development of Ngeden Beach Gunung Kidul, Yogyakarta Special Region. 23(3): 84-92.
18. Suwarsih. 2018. Ecological and economic utilization of mangrove rehabilitation program in coastal areas of Jenu Village, Jenu Subdistrict, Tuban Regency. Techno-fish Journal. 2 (1): 12-18.
19. Tahang H., Amiluddin, Faisal A., Firman. Economic Valuation of Mangrove DistrictSinjaiTorani:JFMarSci. 1(2).71-80.