

## The Contribution of Mangrove Forest to Coastal Household Income in East Lombok, Indonesia

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**Abstract:** Mangrove forests directly and indirectly impacted local people's livelihoods in Indonesia. The research aimed to examine the contribution of mangrove forests to local livelihoods in East Lombok, Indonesia. Data were collected from 115 respondents using a questionnaire, face-to-face interviews, and group discussions. The results indicated that only 12% of people exploited the mangrove forest as their primary job area, while 88% utilized the mangrove as a side business. Furthermore, mangrove forests generated household income through fish, crabs, prawns, firewood, and tourism. The household income from the mangrove forest services for fish, crab, prawn, firewood, and tourism was notably 24%, 16%, 15%, 21%, and 32%, respectively. The mangrove forests had a positive, albeit minimal, impact on local livelihoods due to ecosystem degradation. Thus, the limited contribution caused by the reduced quality of the mangrove forest ecosystem was attributed to the low awareness of locals regarding preservation. The results implied that nature-based rehabilitation for mangroves could be recommended to create a better impact on people.

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**Keywords:** Mangrove Forest, Coastal Household Income, East Lombok.

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### A. INTRODUCTION

According to a World Bank report (2022), Indonesia accounts for 20% of the world's mangroves. According to the National Mangrove Map, formally released by the Ministry of Environment and Forestry in 2021, Indonesia's entire mangrove area is about 3,5 hectares. The mangroves in Indonesia are classified into three types based on canopy cover percentage: dense, moderate, and sparse. According to SNI 7717-2020, dense mangroves have a canopy cover of over 70%, moderate mangroves have a canopy cover of 30-70%, and sparse mangroves have a canopy cover of less than 30%.

Indonesia's total mangrove area, 2,261,921 hectares (79%) are within forest regions, with 702,798 hectares (21%) outside forest areas. According to current data, there are 586,054 hectares of dense mangroves outside forest areas, 86,834 hectares of moderate mangroves outside forest areas, and 29,910 hectares of sparse mangroves outside forest areas. Mangroves in Indonesia have significant potential in a variety of sectors. Indonesia, which has roughly 20% of the world's total mangrove area and 92 kinds of mangroves, continues to lose the impact of mangroves each year. Mangrove forests in Indonesia are being converted into other land uses such as infrastructure, agriculture, mining, logging, and other related industries [1]. Indeed, if mangrove exploitation and management are carried out efficiently, mangrove forests will bring both economic and non-economic benefits to society [2,3] [4] [5]

[6]. Mangroves are essential productive ecosystems to provide goods and services to people living in coastal areas. Mangroves create biodiversity for wood products, fisheries, ecotourism, carbon sinks, and coastal protection [7–11]. Mangroves are protecting coastal communities from disasters such as degradations, cyclones, and tsunamis [8,12,13].

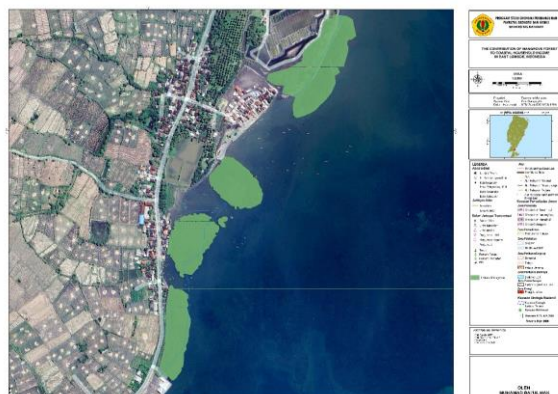
The research found that mangroves serve as carbon sinks [14,15] mangrove conservation zones can be used for tourists [2,4], mangrove trees, which are often found in coastal areas, may be used to boost the local economy [5], the preservation and usage of mangrove forests can improve the local's socioeconomic status [10,16]. Furthermore, mangrove provides ecosystem life for fish (mangrove fish) [17–21], and people living around tend to consume the mangrove-associated fish frequently [22]. This research analyzed how the mangrove forest contributes to the people of Jerowaru Village, East Lombok, Indonesia. It aims to capture the impact of mangroves on locals by classifying how many people benefit from them. Furthermore, the research analyzed how locals exploit the mangrove forests, which are then valued in Indonesian Currency (IDR). Moreover, the research identified the problems faced by mangrove forests based on locals' perceptions.

## **B. RESEARCH METHODOLOGY**

The data were collected using the semistructured interview technique with 115 respondents. The selected respondents were people living within a 2 km radius of mangrove forests, with a minimum age of 17. The data included age, sex, years of education, the number of dependents for each respondent, occupation, income, and mangrove exploitation, which identified how locals benefited from mangroves (valued in IDR). Additionally, each respondent's awareness level of mangrove preservation was measured using a Likert scale from 1 to 5, along with various mangrove-related issues. This research focused on how people benefited from mangroves, which were then calculated using the market price of those exploitations.

## **C. RESULT AND DISCUSSION**

### **a. Location of research**



**Figure 1.** Location of research at Jerowaru Village, East Lombok, Indonesia

The mangrove forest is located at Jerowaru Village, East Lombok, Indonesia. It covers an area of around 10 hectares, of which the local community exploits 10% to create mangrove ecotourism.

b. Demographic of respondents

Based on Table 1, two age groups dominate the respondents: 17-35 years old and 36-55 years old, which make up 96% of the total. The sex of respondents is 56.5% male and 43.5 female. Furthermore, the locals living around the mangrove forest have a low level of education, capturing 38.8% in a 6-year education, 30.2% finishing a 9-year education, and 25.9% completing a 12-year education. Moreover, fishermen are a dominant job of respondents (32.8%), followed by farmers (18.1%) and laborers (17.2%).

**Table 1.** Respondents' Demographic

Variable	Responses	Frequency	Percentage (%)
Age	17-35	58	50.4
	36-55	53	46.1
	> 55	4	3.5
Sex	Male	65	56.5
	Female	50	43.5
Education (Year)	6	45	38.8
	9	35	30.2
	12	30	25.9
	16	5	4.3
Occupation	Farmer	21	18.1
	Fisherman	38	32.8
	Labor	20	17.2
	Retail	13	11.2
	Entrepreneur	10	8.6
	Housewife	4	3.4
	Others	9	7.8
Awareness Level	Very Important	81	70.4
	Important	32	27.8
	Neutral	2	1.7
	Total	115	100.0

Locals' intention to preserve the mangrove forest is valuable. 70.4% of respondents said protecting mangroves is essential, 27.8% stated important, and only 1.7% picked neutral. On the other hand, their intention is not followed by real action. Most locals are willing to pay money to preserve the mangrove if they significantly impact the mangrove. Table 2 shows that 77.2% of respondents would participate in less than IDR 10,000 for a mangrove preservation program in a month. Moreover, around 13% would give IDR 15,000-20,000 per month, and only 9.6% would take apart to pay

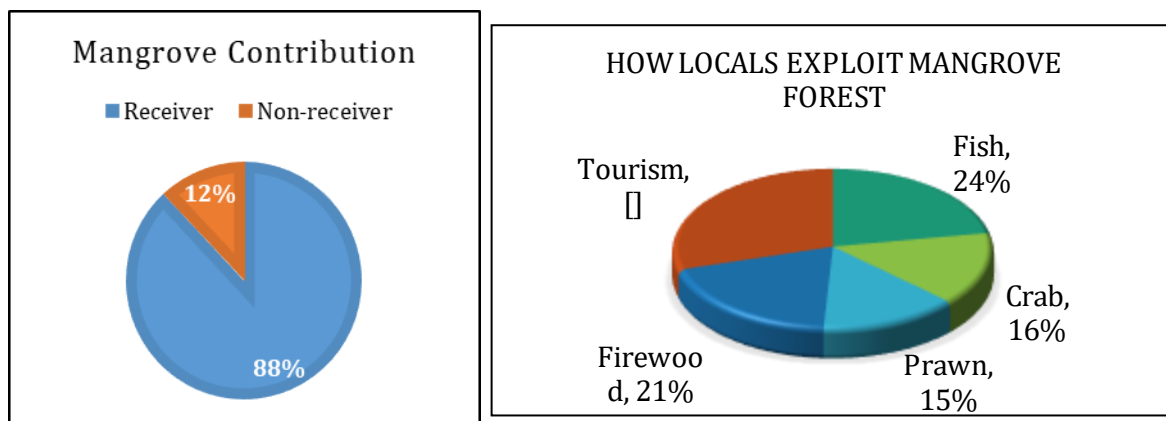
more than IDR 20,000. This willingness to pay locals indicates that locals believe they get almost nothing from mangroves, while a low local income level supports it.

**Table 2.** Respondents' Willingness to Pay (Per Month)

Amount of Money (IDR)	Frequency	Percentage (%)
< 5,000	36	31.1
5,000 - 10,000	53	46.1
15,000 - 20,000	15	13.0
> 20,000	11	9.6
Total	115	100.0

c. The contribution of mangrove on income

Figure 2 explains that 88% of respondents exploit mangroves through tourism activities, firewood, and fishing for fish, crab, and prawn. On the other hand, 12% of respondents receive no benefits from mangrove forests.



**Figure 2.** How Locals Exploit the Mangrove Forest

Respondents exploit mangroves in various ways, such as for tourism activities at about 32%, livelihood feeding for fish at 24%, prawns at 15%, and crabbing at 16%. On the other hand, the locals tend to exploit the mangrove as their firewood of 21%. While the majority of respondents (88%) benefit from the mangroves, 12% do not gain any benefits. Hence, we would calculate how mangroves contribute to locals in currency indicator.

**Table 3.** The contribution of mangrove to locals (IDR/month)

Value of Mangrove Contribution (IDR)	Frequency	Percentage (%)
0	14	12.2
100,000 -250,000	65	56.5
251,000-500,000	27	23.5
> 500,000	9	7.8
Total	115	100.0

Based on Table 3, the respondents (88%) benefit from mangroves in various amounts, between IDR 100,000 to more than 500,000. Only 14 respondents gain nothing from mangroves.

d. Issues

Based on the interviews with locals, they proposed various problems regarding mangrove forest management. Since locals believe that mangroves have an insignificant impact on their income, the locals tend to ignore the issues attacking the mangroves. High exploitation, unmanageable waste, low government spending, and lack of collaboration are obstacles faced by locals.

## D. CONCLUSION

Most respondents (88%) benefited from the mangroves through various activities such as tourism, firewood collection, and catching fish, crabs, and prawns, while 12% did not gain any benefits. Regarding Indonesian Currency (IDR), 88% of respondents received benefits, with the value of mangrove exploitation varying from 100,000 to more than 500,000 per month. This value of mangrove benefits would increase if the issues affecting the mangroves were reduced. Given the uncertain damage to mangrove forests, implementing nature-based rehabilitation could be a viable solution to preserve the mangroves.

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