

## Community perception toward mangrove restoration program in Kampung Nelayan Seberang, Medan

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### ABSTRACT

Indonesia has the largest mangrove forests in the world. However, Indonesia is also listed as the largest contributor to loss of the world's mangrove forests. Good mangroves will support the lives of coastal communities and vice versa. Mangrove forests in the area of Kampung Nelayan Seberang, Medan Belawan and its surroundings were also degraded. Therefore, degraded mangrove forests need to be restored through mangrove restoration activities with the involvement of the surrounding community. This community service activity through the Assisted Village Program will carry out mangrove restoration activities with the people of Kampung Nelayan Seberang. The success of restoration activities is determined by good understanding of the mangrove ecosystem and the commitment of the community to be involved in restoring it. The objective of this study was to identify understanding related to mangrove ecosystems and community perceptions of its restoration efforts. Collecting data was carried out by interviewing respondents who represented the population. Descriptive analysis is used to describe the socio-economic conditions, understanding and perceptions of the community regarding ecosystems and mangrove restoration. Generally, respondents understand the role of mangrove forests and agree that mangrove restoration must be done together. Amount of 53 - 83% of respondents agreed and understood that mangrove restoration is important for life and has an impact on income, social and cultural life. The results showed that 60 - 90% of respondents around the restoration area need a rehabilitation program and are willing to be involved in a mangrove restoration program with the parties.

**Keyword:** Community Perception, Restoration, Mangroves, Mangrove Restoration



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## 1. Introduction

Indonesia has the largest mangrove area in the world. However, Indonesia is also the largest contributor to global mangrove forest loss and degradation [1]. The results of a recent publication [2] show that Indonesia and Malaysia are at a very high stage of mangrove forest loss and fragmentation. In the last three decades, Indonesia has lost about 1 million ha of mangroves [3]. About 60% of mangrove forests on the east coast of North Sumatra have been lost and damaged in the period 1977-2006 [4] and have reduced fish populations and reduced fishermen's income [5]. Therefore, there is a need to improve mangrove management in Indonesia including by integrating ecological, social and economic aspects in mangrove restoration activities [6].

*Kampung Nelayan*, Medan Belawan is a coastal community whose lives are highly dependent on coastal resources, namely mangroves and their waters. This village is located adjacent to a protected forest. Mangroves in the area are very potential as mangrove tourism sites, but in some areas have been damaged. Therefore, it is necessary to carry out mangrove restoration activities by making local communities the main actors. Mangrove restoration activities can also be a mangrove ecotourism attraction as has been done in Sei Nagalawan, Serdang Bedagai [7].

Mangrove restoration is currently not an activity that has received attention by the community in Kampung Nelayan, Medan Belawan. Even though these activities will greatly help restore environmental conditions and coastal biota populations, so that in the long run it can support the welfare and health of coastal communities. Therefore, one of the service activities in the Assisted Village Program is mangrove restoration with the community of Kampung Nelayan, Medan Belawan by paying attention to ecological, social and economic aspects.

Some mangrove ecosystems in the Kampung Nelayan area and its surroundings have been damaged. Therefore, it is necessary to carry out restoration activities with the local community. So that after the assisted village program is completed, the community can continue mangrove restoration activities and can also be a new source of income.

Nursery activities that produce good quality seedlings can be a new source of income for the community because of the large number of rehabilitation activities by various parties in the east coast of North Sumatra, while the availability of seedlings is limited. The east coast of North Sumatra has lost about 60% of its mangroves due to various human activities [4]. So a lot of mangrove seedlings are needed. Therefore, mangrove nurseries are a promising new source of income. The purpose of this study was to identify the understanding of the mangrove ecosystem and the community's perception of its restoration efforts..

## **2. Method**

This research is a sub-activity of the 2020 Assisted Village Service Program of the Institute for Community Service of the Universitas Sumatera Utara (LPPM USU), namely mangrove restoration in Kampung Nelayan Seberang Medan. The research was carried out in August - September 2020. The research location and restoration location can be seen in Figure 1. The restoration location is an area agreed upon in the Cooperation Agreement between the North Sumatra Forestry Agency and the Universitas Sumatera Utara No. 800/2845/Dishut/2020 and No. 697A/UN5.2.3.2.1/PPM/2020 concerning Ecotourism Development and Community Economy-Based Sustainable Mangrove Restoration on the Belawan Coast Data collection was carried out using observation, questionnaire and in-depth interview methods. The research team also conducted field surveys to prospective Mangrove Restoration sites. Access to the restoration site used a fishing boat with a capacity of 10 people. Researchers also went to the field and used drones to take documentation.

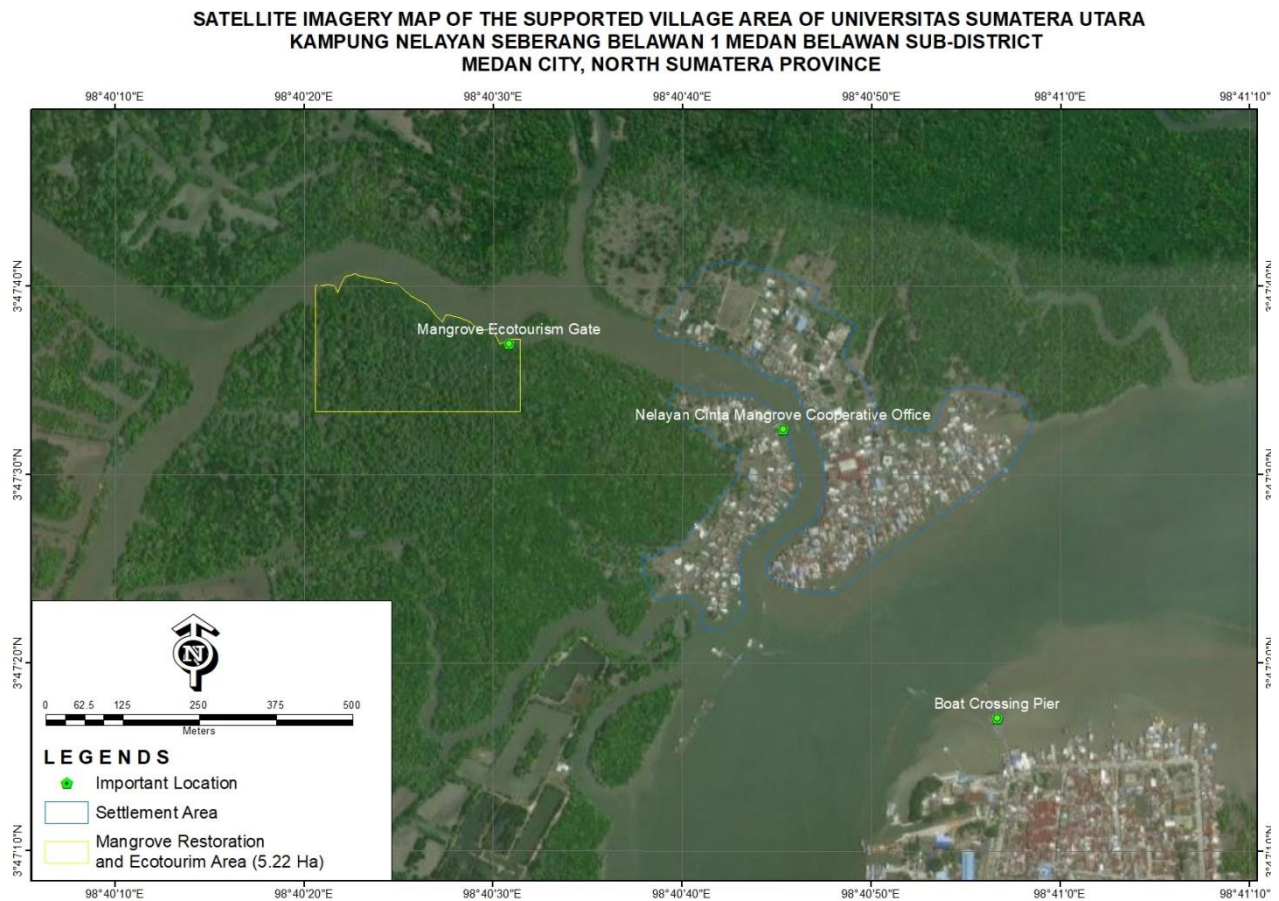


Figure 1. Location Map of Mangrove Restoration (yellow polygon) in Kampung Nelayan Seberang Medan City

Observations were made at restoration sites and villages. A total of 30 respondents were interviewed through questionnaires. Respondents were taken purposively from residents who had time and were willing to be interviewed.

The population that is the object of research is all people who live or have settled in Kampung Nelayan Seberang Medan. The number of family heads in Kampung Nelayan Seberang is 100 family heads. The method of determining the sample as respondents in the population of people living in Kampung Nelayan Seberang based on the Slovin formula [8] with the following formula:

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

Where: n: Sample size

N: Population size

e :Limit of inaccuracy (10%)

So the number of samples/respondents taken in this study was 30 heads of families from the total population of Kampung Nelayan Seberang which is 100 family heads. Questions to respondents related to social and economic characteristics, understanding of mangrove ecosystems, perceptions of current mangrove conditions and perceptions of restoration programs that will be carried out later.

### 3. Results and Discussion

#### 3.1. Mangrove Restoration Site Condition

The restoration location is adjacent to the Mangrove Ecotourism location with the hope that the restoration can be part of the mangrove ecotourism package that will be developed later. The restoration site is within the area

designated as a mangrove ecotourism forest area in an open location. A map of the restoration area can be seen in Figure 1.

The restoration area is 300 m from Seberang Fisherman Village. The area of the restoration area for community service is 5.22 hectares. Of the land cover, 80 percent is open land so the effective area for planting is about 1 hectare. For a planting distance of 2 x 1 m, 5,000 seedlings are needed. For the initial stage, the restoration program can be implemented on an area of 1 ha with 3,000 seedlings. The field condition of the restoration site is shown in Figure 2.



Figure 2. Aerial photo of the mangrove restoration area and its surroundings

In Figure 2, some parts of the mangrove forest look open. In the upper right picture is the condition of the forest close to the boat dock / tourist gate of the Mangrove Ecotourism area. The planting location is focused on locations that are still open forest cover near the mangrove ecotourism gate/dock.

### 3.2. Respondent Characteristics

The age of respondents was studied based on the consideration that respondents have knowledge about mangrove forests and about the surrounding environment based on age, which is related to their life experience with the surrounding environment where respondents interact. Age is one of the variables that is assumed to have a major influence on the income of respondents. The age of respondents was categorized into five age classes, ranging from 11 years old as the age of the youngest respondent who is considered to know enough about his/her environment and can communicate his/her perspective to 60 years old which is estimated to represent the oldest age that can be interviewed as shown in Table.1.

Table 1. Distribution of respondents based on age

No	Age Range (years)	Amount	Percentage
1	11-20	5	16.67
2	21-30	10	33.33
3	31-40	10	33.33
4	41-50	4	13.33
5	51-60	1	3.34
Total		30	100

The respondents interviewed were mostly people from the productive group, aged 21-40 years. This also illustrates that the number of people of productive age is quite easy to find in Kampung Nelayan Seberang, In terms of occupation (Table 2), most of the respondents are fishermen (almost 50%), there are also respondents who do not work or as housewives. Respondents from this group generally come from among women.

Table 2. Type of respondent's job

No	Type of job	The Job			
		Main Job		Side Job	
		Amounts	Percentage	Amounts	Percentage
1.	Mangrove farmers	-	-	4	13.33
2.	Fisherman	14	46.67	4	13.33
3.	Teacher	1	3.33	-	-
4.	Self-employed/trader	3	10	8	26.67
5.	Housewife	12	40	-	-
6.	Not working on the side	-	-	14	46.67
	Total	30	100	30	100

### 3.3. Income Level

The income level of the people of Kampung Nelayan Seberang is directly or indirectly influenced by the amount or number of catches of marine products, especially fish. From the results of interviews as shown in Table 3, the amount of income earned is uncertain. According to Irwansyah as a resource person, the income of residents in Kampung Nelayan Seberang is influenced by weather factors, and also the reduction of mangrove forests due to land use change which results in reduced fish yields.

Table 3. Distribution of respondents (family) according to income level

No	Income (IDR)	Amount	Percentage
1	≤500,000	7	23.33
2	500,000-1,000,000	7	23.33
3	1,000,000-1,500,000	4	13.33
4	1,500,000-2,000,000	3	10
5	2,000,000-2,500,000	6	20
6	2,500,000-3,000,000	2	6.67
7	≥3,000,000	1	3.33
	Total	30	100

The family income of most respondents is in the maximum range of Rp. 1 million as much as 46.66%. This shows that almost half of the respondents are on a low income. Only 3% can get an income above IDR. 3 million.

### 3.4. Understanding toward Mangrove Forest

The respondents' level of understanding of mangrove forests is presented in Table 4 Most respondents knew the existence and benefits of mangrove forests in their village. Most respondents also believed that mangrove forests can affect their income and social and cultural life. Based on Table 4, the percentage of respondents' understanding of mangrove forests is classified as good. There are 83.33% of respondents know / recognize mangrove forests. This is because people's daily lives are inseparable from mangrove forests, starting from finding wood and catching fish, shrimp and crabs. Respondents who understood the benefits of mangrove forests amounted to 60.67%. This shows that most respondents understand the benefits of mangrove forests.

As many as 53.33% of respondents mangrove forests affect the economy. According to an interviewee who conducted an interview stated that mangrove forests greatly support the economy of coastal communities, because it is a source of livelihood for people who work as fishermen. A good mangrove forest will produce marine products such as crabs, shrimp and fish which are quite a lot. Ecologically, mangrove forests in addition to being a habitat for marine biota, are also a spawning ground for fish that live in the open sea. The diversity of mangrove species and their uniqueness also have potential as a tourist forest vehicle that will help the community's economy [9]. Table 4 shows the effect of mangrove forest rehabilitation on social and cultural communities. The influence of mangrove forests on social as much as 70%. This is because people often interact directly with mangrove forests as people who live around the forest either utilize the forest products directly or indirectly. Generally, people who live around the forest whose lives depend on the forest.

Almost 75% of respondents stated that mangrove forests affect the culture in the local area. According to an informant, the influence on culture is related to their culture of gathering, socializing and adapting to nature so as to form a distinctive culture. Forests can be the foundation of their lives, forests are a source of meeting the needs of the community as a study by [10] states that forests are not only limited as a place to live and a source of fulfillment of life's needs but also forests as an ecological anthropology perspective have social, cultural and religiosity functions. Forests as a unity of the cultural environment become the foundation of life for forest village communities to sustain their life system. Thus, the forest is a source of fulfilling the needs of the community.

Table 4. Community understanding/knowledge of mangrove forests

No	Question	Age Range (Year)					Total	Percentage
		11-20	21-30	31-40	41-50	51-60		
1	Knowing/recognizing							
	a. Yes	4	7	9	4	1	25	83.33
	b. No	1	3	1	0	0	5	16.67
2	Understand the benefits of							
	a. Understand	4	3	8	4	1	20	66.67
	b. No	1	7	2	0	0	10	33.33
3	Impact on economy/income							
	a. Affected	3	5	5	3	0	16	53.33
	b. No effect	2	5	5	1	1	14	46.67
4	Impact on social life							
	a. Affected	3	6	8	3	1	21	70.00
	b. No effect	2	4	2	1	0	9	30.00
5	Influenced by community culture							
	a. There is	3	6	9	3	1	22	73.33
	b. No	2	4	1	1	0	8	26.67

### 3.5. Community perception to the condition of the mangrove ecosystem

From Table 5., 80% of respondents from the community of Kampung Nelayan Seberang knew that there had been environmental changes since the last five years. With these changes reducing the area of mangrove forest due to the influence of unwise utilization by people around the forest. The existence of the community around the mangrove forest directly raises the desire and motivation to utilize the mangrove forest land.

Table 5. Community perceptions of changes in mangrove conditions

No	Questions	Age Range (Year)					Total	Percentage
		11-20	21-30	31-40	41-50	51-60		
1	Knowing the changes in conditions (± 5 years later)							
	a. Available	3	8	9	4	-	24	80.00
	b. No	2	2	1	-	1	6	20.00
2	Agree to convert							
	a. Agree	1	1	1	1	-	4	13.33
	b. Disagree	4	9	9	3	1	26	86.67
3	Current condition							
	a. Good	3	8	8	4	1	24	80.00
	b. Not good	1	1	-	-	-	2	6.67
	c. Don't Know	1	1	2	-	-	4	13.33
4	Differences between past and present conditions							
	a. Getting better	3	8	8	3	1	23	76.67
	b. Getting worse	1	1	-	-	-	2	6.67
	c. Don't Know	1	1	2	1	-	5	13.33
5	Response to damaged condition							
	a. Concerned	4	8	8	4	1	25	83.33
	b. Not Concerned	1	2	1	-	-	5	16.67

The desire and motivation to utilize forest land and protected areas is triggered by awareness in addition to social factors. A total of 86.67% of respondents disagreed if mangrove forests were converted for oil palm plantations, agriculture, and others. Respondents were worried that if mangrove forests were converted, it would pose a threat to their lives, such as the threat of decreased fish catches, coastal abrasion. One of the interviewees, Mr. Hermansyah, mentioned that there has been coastal abrasion in Kampung Nelayan Seberang due to forest destruction. Their settlement land, which was originally a lot of dry land, is now partly inundated with brackish water all the time.

According to the results of interviews with respondents, from the last five years of environmental changes from the past to the present as many as 76.67% of respondents see the condition of mangrove forests getting better, respondents see conditions getting worse only 6.67%, and respondents who do not know as much as 13.33%. People who realize that conditions are getting worse are dominated by fishermen because they often interact directly with mangrove forests.

The number of changes in mangrove forests since the last five years of respondents who felt concerned about changes in mangrove forests amounted to 83.33%. This is because if the condition of the mangrove forest is damaged then their livelihoods are drastically reduced, and the abrasion rate will be higher. While respondents who did not care about changes in mangrove forests amounted to 16.67%, they thought that mangrove forests were not directly beneficial to them as selling or farming.

Despite respondents' perception that mangrove conditions are getting better, they need more access to the forest through various assistance programs including mangrove restoration. The good condition of the ecosystem is not in line with the increase in their income so they hope that the restoration program gives hope. The existence of mangrove restoration programs in addition to maintaining good forest conditions can also increase their income from planting and maintenance activities and capacity building.

### 3.6. Community Perceptions of Restoration Activities

In Table 6, the knowledge of respondents on how to plant or maintain mangroves is 76.67%. Respondents who think mangrove forests need to be restored as much as 90%, who agree to be rehabilitated as much as 86.67%.

Table 6. Community perception of rehabilitation activities

No	Questions	Age Range (Year)					Total	Percentage
		11-20	21-30	31-40	41-50	51-60		
1	Planting/maintenance knowledge							
	a. Know	3	8	7	4	1	23	76.67
	b. Don't know	2	2	3	0	0	7	23.33
2	Need/not to be restored							
	a. Need	4	8	10	4	1	27	90.00
	b. Not necessary	1	2	0	0	0	3	10.00
3	Agree that mangrove forests should be restored							
	a. Agree	4	8	9	4	1	26	86.67
	b. Disagree	1	2	1	0	0	4	13.33
4	Who should be involved in rehabilitation							
	a. Government only	-	2	-	1	-	3	10.00
	b. Community only	2	4	2	-	1	9	30.00
	c. Institutions	-	-	-	-	-	-	-
	d. all parties a, b, and c	3	4	8	3	-	18	60.00
5	Responses to students/agencies							
	a. Very supportive	5	8	8	4	1	26	86.67
	b. Not supportive	0	2	2	0	0	4	13.33
6	Participation in rehabilitation activities							
	a. Willing to be involved	4	8	9	4	1	26	86.67
	b. Do not want to be involved	1	2	1	0	0	4	13.33

The respondents chose the involvement of all parties for rehabilitation activities (government, community, institutions) by 60%, while the involvement of the government alone as much as 10% and the community alone 30%. Amount of 86.67% of respondents strongly supported students when involved in restoration activities in the Seberang Fisherman Village area. Only a few respondents did not support student activities, namely 13.33%. Then respondents who want to be involved in the rehabilitation program are 86.67% and those who do not want to be involved are 13.33%. Respondents who answered that they did not want to be involved due to ignorance about restoration activities and the benefits later if they were involved.

Research by [11] in Lubuk Kertang Village, Langkat North Sumatra found that people understand that mangrove restoration will improve their income and social life. In this study also found that people around mangrove forests agree that mangroves must be restored and are willing to participate in efforts to restore mangrove ecosystems.

#### 4. Conclusion

In general, respondents understood the role of mangrove forests and agreed that mangrove conservation must be done together. Most respondents understood that mangrove ecosystems affect income, social and cultural life. Respondents understood that the current condition of the mangrove ecosystem requires restoration and disagreed that mangroves should be converted. Most respondents around mangrove restoration areas agree that mangroves should be restored and are willing to be involved in mangrove restoration programs.

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