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Community perception and participation in Silo Laut regarding mangrove management and conservation in Asahan Regency

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ABSTRACT

The mangrove ecosystem plays a vital role in maintaining the balance of coastal environments; however, pressures from human activities such as land conversion and overexploitation have led to a decline in its quality and area. This condition necessitates management and conservation efforts that actively involve coastal communities as key stakeholders. This study aims to determine the perception and participation of coastal communities in Silo Laut District, Asahan Regency, regarding the management and conservation of mangrove ecosystems. The research employed a survey method by distributing questionnaires to 276 respondents across three villages: Bangun Sari, Silo Baru, and Lubuk Palas. Data were collected through field observations, structured interviews, and questionnaires containing statements based on the Likert scale. The data were analyzed using the SMART method and Likert scale, and statistically tested with ANOVA analysis. The results showed that most community members have a good perception of the ecological functions of mangrove forests; however, the level of participation and active engagement in conservation activities remains relatively low. The ANOVA analysis revealed that education level, length of residence, and income significantly influence community perception and participation in mangrove ecosystem management, while age and occupation do not show a significant effect. This study provides empirical evidence that community-based socio-economic empowerment programs are a key strategy to support sustainable mangrove conservation in the coastal areas of North Sumatra.

Keywords: Community perception, conservation, management, mangroves, Silo Laut

INTRODUCTION

Mangroves are a collection of trees and shrubs that grow in coastal tidal environments. Although composed of various plant species, mangroves share similar morphological and physiological adaptations to habitat conditions influenced by tidal fluctuations (Syah, 2020). According to Alhaddad et al. (2019), mangrove forests are tropical coastal vegetation communities consisting of several mangrove tree species capable of surviving and thriving in tidal zones, particularly in muddy coastal areas. Throughout their life cycle, mangrove ecosystems provide habitat for a wide range of organisms, including various fish species. Additionally, mangrove areas play a vital role as spawning grounds, nursery grounds for juveniles, and feeding grounds for many marine species (Kalor et al., 2019). Several studies have also shown that mangroves serve as breeding grounds for various aquatic organisms (Mukherjee et al., 2014; Rumondang et al., 2023).

In addition to serving as a habitat for various aquatic organisms, mangrove forests play a highly important ecological role. Mangrove plants act as natural barriers against

coastal erosion and seawater intrusion, and they help filter pollutants, thereby improving water quality. This vegetation also has the ability to trap mud and sediments carried by river flows, contributing to the stability of coastal environments. Irsadi et al. (2017) state that mangroves store more carbon than any other ecosystem, a result of the complex interactions between plant species, animals, and environmental factors (Alhaddad et al., 2019). However, human activities and unsustainable natural resource management practices are considered the primary causes of mangrove ecosystem degradation. Environmentally unfriendly exploitation further threatens the sustainability of mangrove forests. Additionally, regional development patterns significantly impact the continuity of mangrove ecosystems (Rumondang et al, 2024).

In general, perception can be defined as the way an individual or group views an object, whether physical or social. Pahlevi (2007) explains that perception is the process of forming judgments or creating impressions based on stimuli captured by a person's senses. Meanwhile, attitude is defined as a readiness or tendency to respond to a particular object, and is therefore still a potential form of action (Rahayu, 2010). Attitudes play a significant role in shaping individual behavior and responses to social or environmental issues. The management and conservation of natural resources will not be successful without first understanding the community's perceptions and attitudes toward their environment (Sondakh et al., 2019).

One of the mangrove ecosystem areas in North Sumatra Province is located in Silo Laut District, Asahan Regency. This region is known for its relatively extensive mangrove forests. Understanding the perceptions and attitudes of local communities toward the utilization of natural resources is a crucial step in formulating effective management strategies to ensure the sustainability of these resources while meeting the needs of surrounding residents (Setiawan et al., 2017). If community attitudes and behaviors toward mangrove forests are negative, their level of support for management and conservation efforts is likely to be low. Therefore, an in-depth study is needed to examine how the condition of the mangrove ecosystem influences community participation, as well as how local residents perceive management and conservation efforts in the Silo Laut District, Asahan Regency. This study specifically aims to analyze the perception and participation of coastal communities in the management and conservation of mangrove ecosystems and to identify the socio-economic factors that influence the level of community involvement in mangrove conservation within the region.

METHOD

Data analysis in this study employed linear regression to examine the effect of community perceptions on participation in mangrove forest management. The strength of the model was assessed using the coefficient of determination (R^2), while significance testing was conducted at a 95% confidence level ($\alpha = 0.05$). This study was carried out in Silo Laut District, Asahan Regency, in December 2024, with data collection sites and respondent sources covering three villages, namely Bangun Sari Village, Silo Baru Village, and Lubuk Palas Village. The location map of the study area is presented in Figure 1.

Data collection technique

This study employed a survey approach, a method that collects data by sampling from a population using questionnaires as the primary instrument (Islami 2019). The purpose of this research is to evaluate the extent of community perceptions regarding mangrove forest management in the coastal area of Silo Laut District. Each variable was analyzed through a series of questions, and the results were compiled and tabulated based on the frequency and percentage of respondents' answers.

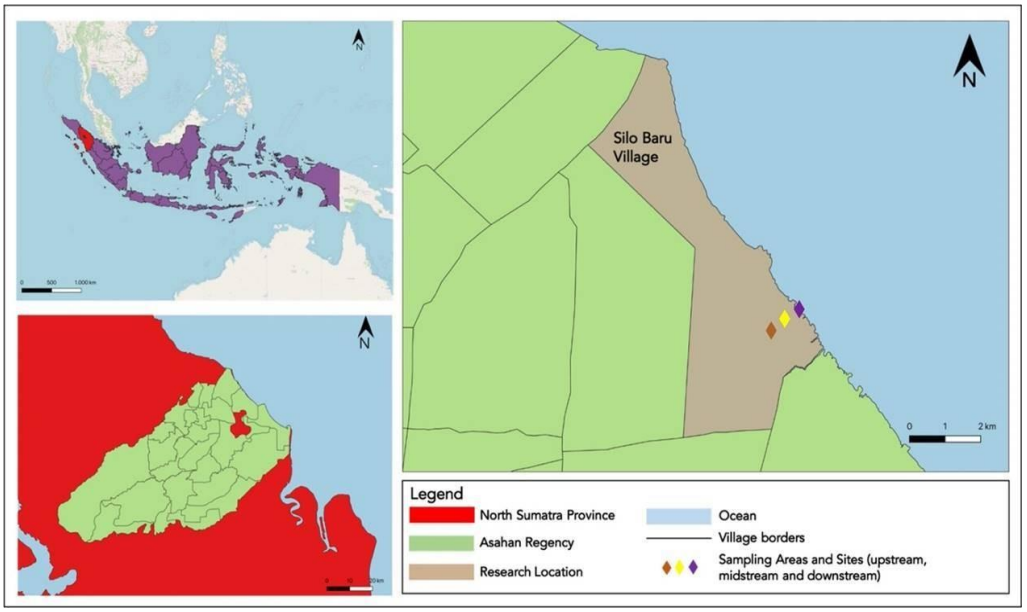

Figure 1. Map of research locations in North Sumatra (source: Batubara et al., 2024).

The data collection techniques used in this study included:

Observation

Data were collected through direct observation at the research sites, particularly in the villages of Bangun Sari, Silo Baru, and Lubuk Palas. The purpose of this observation was to obtain a real picture of the area's condition by documenting it visually and recording key field findings.

Questionnaire

To systematically gather data, questionnaires were distributed directly to selected respondents. The instrument had previously undergone validity and reliability testing. Validity testing ensured that each question item accurately represented the variable being measured, while reliability testing indicated that respondents' answers were stable and consistent over time.

Interview

In-depth interviews were also conducted to complement the information obtained from the questionnaires. This method targeted community leaders and local government officials involved in mangrove conservation management. According to Pugu *et al* (2024), such interviews are flexible and non-rigid, allowing for the formulation and delivery of questions to be adjusted based on the situation and developments during the interview process.

Types and sources of data

This study used two types of data: (1) Primary data, collected directly through interviews, observations, and questionnaire responses, and (2) Secondary data**,** obtained through literature review and documentation from relevant institutions or other sources.

Sampling technique

The population in this study includes all residents living in coastal villages within the study area. A population is defined as a group of individuals with specific characteristics that become the subject of research (Winarni, 2021). The sample was selected using a purposive sampling method, based on the consideration that respondents should be adults capable of providing rational and objective answers, and possess knowledge about mangrove management activities. The sample size was determined using the Slovin formula with a 10% margin of error (Febtriko & Puspitasari, 2018), as shown in the following equation:

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

Where: n = sample size
N = population size
e = margin of error (tolerance level)

Table 1. Population sample list for questionnaire survey

No.	Village	Number of Households	Sample Size
1	Bangun Sari	1,439	93
2	Silo Baru	971	90
3	Lubuk Palas	1,439	93
Total		3,849	276

Source: Badan Pusat Statistika Kabupaten Asahan, 2024.

Based on the results of the calculation, a total of 276 respondents were obtained, consisting of coastal community members who economically utilize mangrove areas. The selection of respondents was carried out based on criteria such as education level, age, length of residence, income, and type of occupation. These respondents represented various occupational backgrounds, including civil servants, farmers, fishers, traders, entrepreneurs, and fish farmers.

Data analysis technique

Data analysis is a crucial element in scientific research, as it provides meaning to the collected data (Waruwu et al 2025). The data analysis steps in this study involved measuring the level of community perception. Community perception of mangrove ecosystem management was assessed by designing a set of questionnaire items addressed to the local residents. The data were then analyzed using the Simple Multi-Attribute Rating Technique (SMART). SMART is a multi-criteria decision-making method based on the theory that each alternative consists of several criteria with assigned values, and each criterion has a weight that reflects its relative importance compared to other criteria (Fitriani et al, 2023).

Perception and participation categories were analyzed using the Likert scale. The Likert scale is a method used to measure a person's or a group's attitudes, opinions, and perceptions toward a particular phenomenon (Febtriko & Puspitasari, 2018).

Table 2. Respondents' answers based on Likert scale

Community Perception	Value
Strongly disagree	1
Disagree	2
Neutral	3
Agree	4
Strongly agree	5

Source: Febtriko & Puspitasari, 2018.

Respondents' answers were then grouped into class intervals and categorized as shown in Table 3.

Table 3. Categories of community perception and participation based on Likert scale

No.	Score Range	Category
1	1.00 – 1.80	Poor
2	1.81 – 2.60	Fairly Poor
3	2.61 – 3.40	Moderate
4	3.41 – 4.20	Good
5	4.21 – 5.00	Very Good

Source: Febtriko & Puspitasari, 2018.

RESULTS AND DISCUSSION

Silo Laut District is a coastal area directly bordering the Strait of Malacca. It is located in the lower part of Asahan Regency, with an elevation ranging from 2 to 13 meters above sea level. The total area of Silo Laut District is 11.544,25 hectares, or approximately 115,44 km^2, divided into five villages. Among these, Lubuk Palas Village has the largest area, covering 34,70 km^2 or about 30.06% of the district's total area. In contrast, Bangun Sari Village is the smallest, with an area of 7,43 km^2 or approximately 6,44% of the total.

Geographically, Silo Laut District is bordered by Batu Bara Regency and the Strait of Malacca to the north, Air Joman District to the south, Tanjung Balai District and the Strait of Malacca to the east, and Rawang Panca Arga District to the west (Badan Pusat Statistika Kabupaten Asahan, 2024).

One of the key factors influencing how communities manage mangrove forests is the local population's social conditions. In addition to government policies and environmental circumstances, this factor plays a role in shaping community interactions with the mangrove ecosystem. In this study, a total of 276 respondents were involved, with the analysis focusing on several demographic aspects, including age, level of education, occupation, income level, and length of residence in the area. Details on these respondent characteristics will be explained in the following sections.

Respondents' education level

The education level of respondents is one of the key demographic aspects used to assess the extent of an individual's knowledge and its application in social life. Overall, the majority of respondents had relatively low education levels, with approximately 36% having only completed elementary school. This low level of education is further exacerbated by limited access to educational services, which ultimately affects the community's ability to understand the impact of various development activities around them.

Education is an important indicator that reflects an individual's attitude and knowledge within a community. Generally, the higher the level of education attained, the greater an individual's ability to adapt to change (Lestari, 2019). A lack of education and limited access to information can, from a sociological perspective, reduce community involvement in development programs. Furthermore, low educational attainment restricts people's ways of thinking and decision-making, particularly when considering the value and function of mangrove ecosystems.

According to Utomo et al. (2018), education level is one of the main indicators used to assess the extent to which a respondent can provide answers that align with their level of understanding. This study involved 276 respondents from three different villages, with varying educational backgrounds ranging from individuals with no formal education to those who completed higher education (Bachelor's degree). The majority of respondents had only completed elementary school, accounting for approximately 36%, while high school graduates made up the second-largest group at 25%.

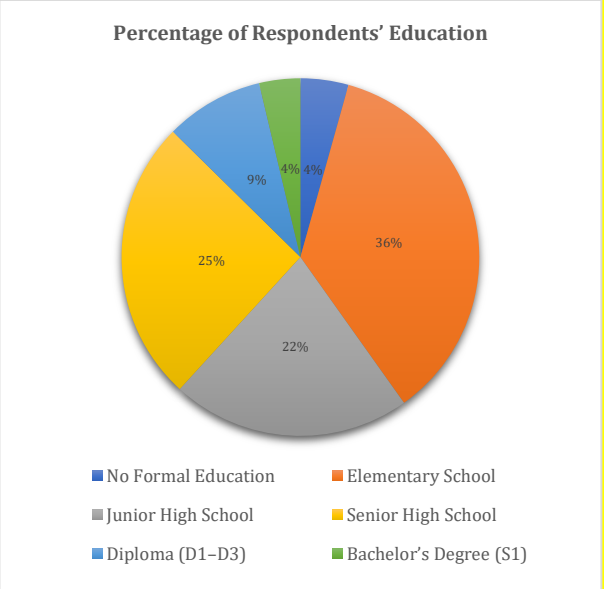

Figure 2. Respondents' education level percentage.

Respondents' age

The majority of respondents in this study were between 40 and 49 years old, indicating that they fall within the productive age category (Rahmat, 2019). This age group generally tends to be more open to new ideas and more receptive to various inputs.

The study involved a total of 276 respondents from three villages in the study area. Overall, the respondents' ages ranged from 20 to 60 years. The largest age group was 40–49 years, accounting for approximately 48% of the total, followed by the 30–39 age group at 27%. Respondents aged 20–29 made up 21%, while the smallest group was 50–59 years, with only 4%. The complete age distribution of respondents is shown in Figure 3.

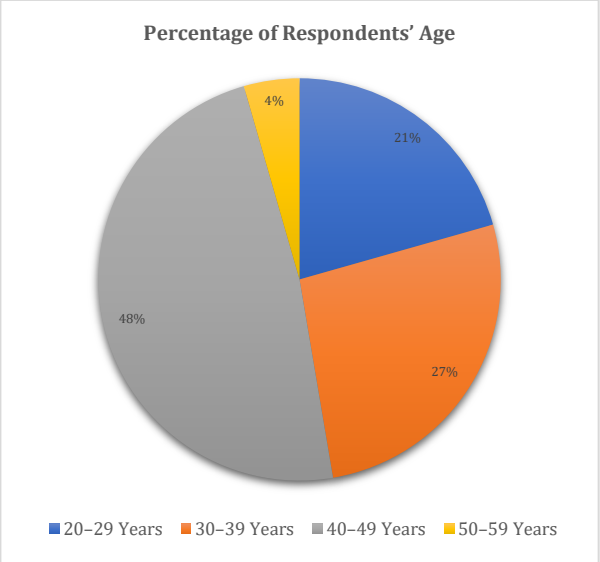

Figure 3. Respondents' age distribution percentage.

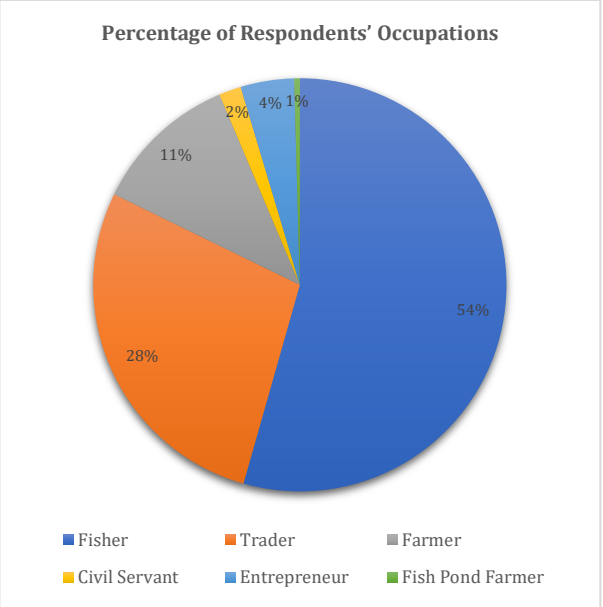

Figure 4. Percentage of respondents by occupation.

Respondents' occupation

The majority of residents in Silo Laut District rely on fishing as their primary livelihood, accounting for 54% of respondents. Income from this occupation is highly variable, as it depends on the amount of catch obtained. This condition indicates that the fishing profession does not yet fully guarantee economic well-being for families.

Jobs that depend on natural resources—such as agriculture, fisheries, and mining—generally carry a higher risk of loss compared to other types of occupations. This is due to their heavy reliance on external factors such as weather, climate, soil quality, and water conditions, which are beyond human control (Widiastuti et al., 2020).

Out of the 276 respondents from the three study villages, the majority—54%—work as fishers. This is closely related to the district's coastal location, which provides direct access to the sea as the primary source of livelihood. Additionally, around 28% of respondents are traders, while aquaculture farming is the least common occupation, with only 1% of respondents engaged in it. Further details on the distribution of respondents' occupations and their respective percentages are shown in Figure 4.

Length of residency of respondents

Length of residency was measured based on the number of years respondents had lived in the study area, calculated from the time they first settled there until the time of the interview. As shown in Figure 5, approximately 37% of respondents had lived in Silau Laut District for more than 20 years. This percentage suggests that many of them were likely born and raised in the area, especially considering the average respondent age ranged from 20 to 60 years.

Of the 276 respondents across the three study villages, 37% had lived in the area for more than 20 years. Additionally, around 28% had resided in the region for 11 to 20 years, while only 11% had been living there for just 1 to 5 years. These variations in length of residency reflect the diverse levels of experience among community members in understanding the area. In general, the longer a person has lived in a region, the better their understanding of the local environment tends to be—including knowledge related to mangrove ecosystem management. A detailed distribution of respondents' length of residency is presented in Figure 5.

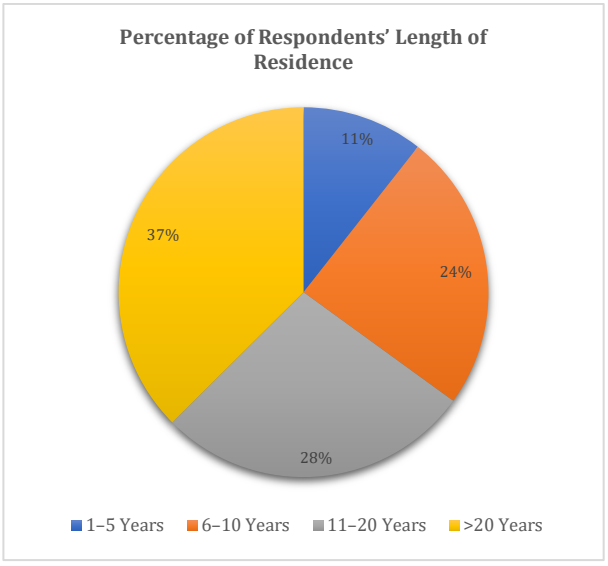

Figure 5. Respondents' length of residency.

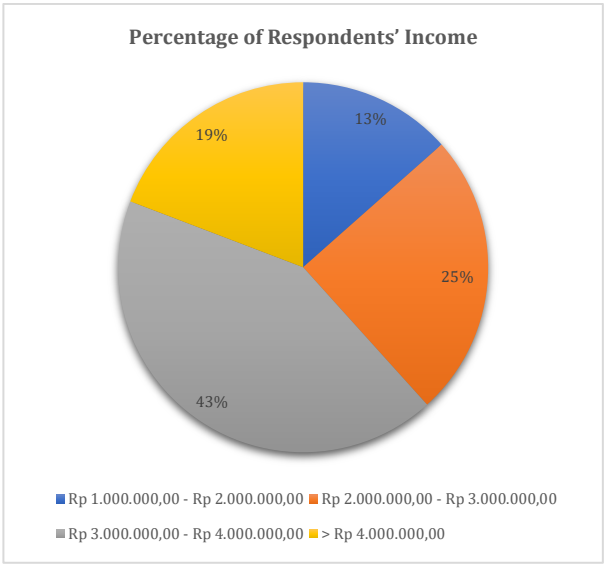

Figure 6. Respondents' income percentage.

Respondents' income in Asahan Regency

Income level is closely related to the extent of community involvement in various activities, especially those related to environmental conservation efforts. Factors such as poverty and low levels of education often hinder active participation. Additionally, an individual's motivation to pursue certain goals is generally influenced by their family's economic condition. In other words, the better a person's financial situation, the greater their opportunity to actively engage in various activities.

This study involved 276 respondents across three villages. Respondents' income levels varied across several categories, with monthly earnings ranging from IDR 1,000,000 to over IDR 4,000,000. The majority of respondents—approximately 43%—reported a monthly income between IDR 3,000,000 and IDR 4,000,000. Meanwhile, the lowest income group, earning between IDR 1,000,000 and IDR 2,000,000, accounted for 13% of all respondents. More detailed information on income distribution percentages is presented in Figure 6.

Community perception

Perception can be understood as the way an individual views or evaluates an object, which emerges through the processing of information received by the senses (Suama et al., 2024). Community perception serves as an important indicator in assessing the extent of respondents' understanding of the mangrove ecosystem. The level of perception that develops within a community is typically influenced by various internal factors. However, perception is not always fixed—it may shift over time as education and public awareness of the ecological, social, and economic aspects of mangrove ecosystems increase.

In general, the community perceives that mangrove forests play a highly important ecological role, including maintaining biodiversity, preserving ecosystem balance, preventing coastal erosion, and helping regulate oxygen and carbon dioxide concentrations in the atmosphere. In this study, residents' perceptions were measured using 15 questions distributed to inhabitants of three villages within the Silo Laut District. The respondents' answers are presented in Table 4.

Table 4. Community perception survey results on mangrove ecosystems.

No.	Statement	Response (%)					Total
		1	2	3	4	5	
1	The management of mangrove forests is a shared responsibility between the government, companies, and local communities.	0	0	0	65	35	100

No.	Statement	Response (%)					Total
		1	2	3	4	5	
2	Coastal damage is caused by natural physical factors, such as wave currents that lead to abrasion.	0	0	13	38	49	100
3	Coastal damage is more often caused by human behavior.	0	0	0	84	16	100
4	Mangrove forest ecosystems are often converted into aquaculture ponds by nearby residents.	0	0	28	69	3	100
5	Local communities cut down mangrove trees to meet their daily needs.	0	0	68	25	7	100
6	There is widespread logging in mangrove ecosystems for industrial purposes.	0	24	72	3	1	100
7	Law enforcement in mangrove ecosystems is considered adequate.	0	12	80	7	1	100
8	Local communities actively participate in replanting damaged mangrove ecosystems.	0	0	10	57	33	100
9	Local (private) companies participate in environmental conservation.	0	0	69	27	4	100
10	Local communities utilize mangrove ecosystems while maintaining their sustainability.	0	0	17	46	37	100
11	The local government has properly carried out its environmental management duties.	0	2	73	24	1	100
12	Local communities are involved in planning the management of mangrove forest ecosystems.	0	5	73	19	3	100
13	Local communities are involved in monitoring mangrove ecosystem management.	0	0	9	87	4	100
14	Local communities form community groups or NGOs aimed at conserving mangrove forest ecosystems.	0	0	11	60	29	100
15	Local communities evaluate the mangrove ecosystem management process.	0	0	23	22	55	100

Note: 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly Agree).

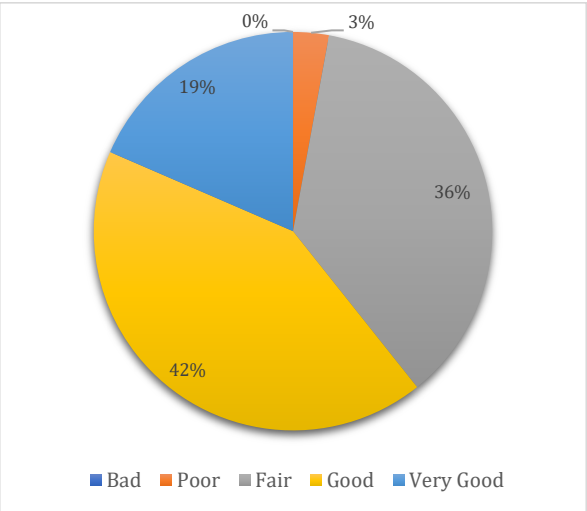

Figure 7. Percentage of community perceptions.

Referring to the data in Table 4, the majority of community members agreed or strongly agreed that mangrove forest management is a shared responsibility between the government, the private sector, and local communities. This view arises from their direct experience with the benefits of mangroves, particularly in addressing the major issues faced by the three villages—namely coastal abrasion and erosion.

Respondents also expressed the opinion that coastal area degradation is largely caused by human activities. The local community's use of mangrove resources generally includes harvesting wood for construction and firewood, as well as using leaves for livestock feed. In many cases, mangrove areas have also been converted into fishponds.

However, the community's knowledge of the vital ecological functions of mangroves—especially in supporting the survival of both aquatic and terrestrial life—remains relatively low. Uncontrolled destruction of mangrove ecosystems could have serious consequences for the sustainability of the fisheries sector. This aligns with the findings of Puspita (2025), who noted that the development of the fisheries sector is often not accompanied by mangrove conservation efforts, thereby negatively affecting environmental quality.

This situation also affects the welfare of fishermen living in coastal areas. The shrinking of mangrove ecosystems has led to a decline in fish populations, thereby reducing fishermen's income. This is because mangrove forests serve as crucial habitats for various aquatic species—such as small fish, shrimp, and crabs—that rely on mangrove roots for shelter and breeding grounds. When these habitats are damaged, the reproductive processes of aquatic organisms are disrupted.

Ng and Ong (2022), emphasize that the overexploitation of mangrove forests is a shared concern, as different community groups tend to seek maximum benefit from these natural resources. However, if exploitation continues without control, resource supplies will be depleted, and the impact will be felt by all.

To prevent further degradation, several measures are needed, including mangrove area stabilization efforts, the establishment of regional-level regulations, community education and outreach programs, empowerment initiatives, and management models that engage local group participation in partnerships with other stakeholders.

Unfortunately, various issues in the coastal areas of the three villages continue to persist due to the lack of implementation of the planned management measures. On the other hand, if conservation programs—such as coastal rehabilitation and regional development—can be carried out consistently, the potential of coastal resources could not only bring economic benefits but also ensure long-term ecological sustainability.

Lee and Zhang (2008) state that optimal natural resource management can only be achieved if the perceptions and attitudes of the community toward the environment are well understood. A positive community attitude toward mangroves reflects an awareness of the critical functions of these ecosystems, such as preserving biodiversity, reducing coastal erosion, and maintaining the balance of oxygen and carbon dioxide in the atmosphere. In addition, mangroves serve as wave dampeners, shoreline protectors, and barriers against sea breezes. Their root networks also help preserve groundwater availability and prevent saltwater intrusion into inland areas. Nevertheless, the questionnaire results indicate that the community still requires greater attention and more intensive assistance in achieving sustainable mangrove management.

ANOVA results on community perception

Table 5 presents the results of the Tests of Between-Subjects Effects, which were used to examine whether there are significant differences in community perceptions based on demographic variables such as education, age, occupation, length of residence, and income. These results provide answers to the research objective of identifying perception differences across demographic groups. A detailed explanation of each finding is provided in the following subsections.

Table 5. ANOVA test results on community perception of mangrove management.

Tests of Between-Subjects Effects

Dependent Variable: Perception

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	234.642[a]	19	12.350	6.427	.000
Intercept	381115.343	1	381115.343	198336.469	.000
Education	48.686	5	9.737	5.067	.000
Age	2.409	3	.803	.418	.740
Occupation	19.159	5	3.832	1.994	.080
Length of Residency	22.939	3	7.646	3.979	.009
Income	20.104	3	6.701	3.488	.016
Error	491.919	256	1.922		
Total	862347.000	276			
Corrected Total	726.562	275			

a. R Squared = 0.323

The coefficient of determination (R^2) value of 0.323 indicates that the independent variables in the model are able to explain 32.3% of the

variation in community perceptions of mangrove forest management. In the context of social research, this value can be considered moderate, as community perceptions are influenced by various complex factors that cannot be fully
captured within a single model. The remaining 67.7% of the variation is assumed to be affected by other factors, such as social norms, personal experiences, government policies, and local environmental conditions. This limitation also represents an opportunity for future studies to examine additional relevant variables.

Education

The test results show that the education variable has a significance value of 0.000 (< 0.05) with an F-value of 5.067, indicating a significant difference in perceptions among groups based on education level. This suggests that educational attainment plays a role in shaping individuals' perspectives and understanding of the topic being studied. This finding aligns with the study by Saputra et al. (2021), which revealed that educational background significantly influences public understanding of environmental issues. Individuals with higher levels of education generally exhibit more positive and critical perspectives compared to those with lower educational attainment.

Age

The significance value of 0.740 (> 0.05) indicates that there is no significant difference in perceptions based on respondents' age. This means that community perceptions regarding the issue under study tend to be consistent and are not influenced by age. This could occur when exposure to the issue or access to information is evenly distributed across all age groups. Setiawan et al. (2017) and Hakim (2014) suggest that age is not a dominant factor in shaping public perception. Instead, access to information 1and direct experience play a more influential role.

Occupation

With a significance value of 0.080 (> 0.05) and an F value of 1.994, the occupation variable does not indicate a significant difference in perceptions among respondent groups. This suggests that the type of occupation does not directly influence the community's perspective on the issue being studied and is not a primary factor in shaping perceptions. This finding aligns with Setiawan et al. (2017), who stated that occupation is not a dominant variable in influencing public attitudes, as other factors such as education level and income play a more substantial role.

Length of Residency

A significance value of 0.009 (< 0.05) and an F value of 3.979 indicate a significant difference in perceptions based on length of residency. This means that the duration a person has lived in an area influences their perspective on environmental or development issues in that region. The longer someone resides in a place, the stronger their emotional and social attachment to the surrounding environment tends to be. Furthermore, according to Rante (2021), a longer stay in a certain location may also allow individuals to attain a particular social or economic status, which in turn can affect their level of participation in community activities.

Income

The income variable shows a significance value of 0.016 (< 0.05) with an F value of 3.488, indicating a significant difference in perceptions based on income level. This suggests that income plays a role in shaping individuals' perspectives on mangrove ecosystem management. This is likely related to differences in priority needs and access to environmental information. Respondents with higher income levels tend to be more actively engaged in utilizing the potential of mangrove ecosystems, both in terms of surrounding flora and fauna (Mando et al., 2018).

Public perception differences based on combined demographic characteristics

To determine whether there are differences in public perception regarding mangrove ecosystem management across groups with different combinations of demographic characteristics, a statistical analysis was conducted using Analysis of Variance (ANOVA). The grouping was based on a combination of variables such as age, education level, occupation, income, and length of residency. The results of the ANOVA are presented in Table 6.

Table 6. ANOVA test results on differences in public perception of mangrove management based on combined demographic groups.

ANOVA					
Score	**Sum of Square**	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	2317.322	14	165.523	1006.586	.000
Within Groups	678.315	4125	.164		
Total	2995.637	4139			

Based on Table 6, the calculated F-value is 1006.586 with a significance value of 0.000. This value is much smaller than the chosen significance level ($\alpha = 0.05$), indicating that there is a statistically significant difference in public perception across groups. In other words, demographic factors such as age, education level, occupation, income, and length of residence statistically influence how people perceive the management and conservation of mangrove ecosystems.

These results support previous findings, which suggest that public perception is not uniform but shaped by individuals' socio-economic backgrounds and life experiences (Sondakh et al., 2019; Setiawan & Purwanti, 2017). Groups with higher education levels, more stable incomes, and longer residence periods tend to have a better understanding of the ecological benefits of mangrove forests and are more aware of the importance of sustainable management (Utomo et al., 2018).

CONCLUSION

This study reveals that the perceptions of coastal communities in Silo Laut District, Asahan Regency, regarding mangrove ecosystem management and conservation are influenced by various socio-economic factors, such as education level, occupation, income, age, and length of residence. The analysis indicates that education, length of residence, and income have a significant influence on differences in community perception, while age and occupation show no significant variation. Most community members understand that mangrove forests have essential ecological functions, such as protecting shorelines from erosion, providing habitats for marine biota, and maintaining the balance of coastal ecosystems. However, active participation in conservation activities remains relatively low, highlighting the need for more intensive and sustainable community empowerment approaches.

These findings emphasize the importance of involving local communities in every stage of mangrove ecosystem management and rehabilitation. Practical recommendations include strengthening community capacity through environmental-based training, empowering fishermen's groups as conservation agents, and enhancing the role of local governments in providing sustainable policy and financial support. Furthermore, future research is encouraged to explore the effectiveness of collaborative models involving communities, government agencies, and non-governmental organizations in mangrove management, in order to develop more adaptive, inclusive, and evidence-based conservation strategies.

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