Community demography and perception towards mangrove exploitation in Jaring Halus village, North Sumatera

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Abstract. Biodiversity in specific to marine resources has been valuable sources for traditional and indigenous people living within coastal area. Integration of ecosystem-based development or management into rural development is needed to overcome daily economic and prolonged environmental issues. This baseline study is aimed to obtain socio-economic perception of traditional community or fishermen in Jaring halus, a coastal village located in Secanggang district, Langkat regency, North Sumatera, regarding their high dependences on mangrove resources. The study used questionnaires in which productive respondents were sampled purposively according to their exploitation activities in mangrove area. Results of this study were analyzed descriptively to present the general view of their perceptions and activities. Males were documented with higher mangrove exploitation and utilization than females in Jaring halus. Mangrove resources were harvested in raw material or timber as building material compared to other form of utilizations. According to their knowledges, natural resources must be utilized along with conservation-based management. However, deeper investigation is needed to obtain empirical evidence upon habitat degradation of mangrove areas in Secanggang district in order to evaluate the impacts of mangrove harvesting by the community.

1. Introduction

Indonesia is an archipelago country with abundant natural resources lining from terrestrial to aquatic habitat. Current environmental issue such as habitat degradation is still concerning our ecosystem and become priority in overcoming future threats to biodiversity, especially from marine habitat [1]. Marine resource in Indonesia at conventional level is utilized by local indigenous community living in coastal area which tend to apply less sustainable method [2]. Concept of ecosystem-based management is considered as an effective way to preserve biodiversity along with increase of human economic income as an integrated model. The drive from conventional to ecosystem-based utilization needs to be fostered [3]. Threats of biodiversity loss to human beings are either direct or indirectly impacting into several aspects of human welfare [4].

One of local community in North Sumatera identified with conventional utilization upon natural resources is coastal community of Jaring halus village, Langkat regency, North Sumatera. Current issue hampering their living are low catchment of fisheries, low economic income and unreported...
threats to environment caused by the anthropogenic activities. Recently, social, economic and habitat condition along mangrove coastline as natural resources to community of Jaring halus is still less reported while the efforts on increasing human welfare in that location is still happening by the governents. This is a part of comprehensive study in constructing sustainable model for sustainable utilization of mangrove resources in Jaring halus. In this study, we presented the current demographic condition of community in Jaring halus and their perception towards mangrove resources utilization.

2. Materials and Methods

2.1. Survey and study site

Quantitative survey was conducted for 2 mo from January to March 2018 in Jaring halus village, Secanggang district, Langkat regency, North Sumatera (Figure 1) [5]. The village is located at N $3°51'30''$ – $3°59'45''$ and E $98°30' – 98°42'$. Survey was performed by questionnaire administration and focus group discussion (FGD) with community elements. Total selected respondents of 54 who already lived in Jaring halus village for more than 3 years were considered as productive utilizers on mangrove.

2.2. Data analysis

Descriptive analysis was used to obtain the frequency and percentage of socio-demographic and perception of community towards mangrove resources and utilization in Jaring halus. Collected data was shown in mean as reliable unit in descriptive data.

3. Results and discussion

3.1. Demography of community in Jaring Halus village

The characteristics and demographic parameter of Jaring halus community is presented in Table 1. According to our recapitulation, 67% of productive utilizers were male and 33% were females. The contribution of women or as fisherwomen may be seen as supportive feature in coastal village. The equal role between men and women is seen as positive drive to economic development within traditional community [6]. Most utilizers were still recorded in productive age >50 years with

![Figure 1. Map location of study site](image-url)
percentage of 24% while 25% of them were within the age of 40–44 years. Majority of people hold Islamic religion (74%) followed by Christianity (25%) and were Melayu in ethnicity. Education level of respondents were mostly graduates from primary school with 38% while 7% of them were only university graduates. Traditional fisheries are often linked with the low education level of indigenous community. However, the community may cope up along with local wisdom applied to the fishery management to improve their living strategies. The rural education enhancement may be developed through various strategies in the future by introducing non formal education, i.e. practical course and workshops which directly impact on their living strategy and business diversification [7].

| Characteristics | Criteria | Frequency (n) | Percentage (%) |
|-----------------|----------|---------------|----------------|
| Gender          | Male     | 36            | 66.67          |
|                 | Female   | 18            | 33.33          |
| Age             | > 50 yr  | 13            | 24.07          |
|                 | 45 – 50 yr| 8             | 14.81          |
|                 | 40 – 44 yr| 14            | 25.92          |
|                 | 35 – 39 yr| 10            | 18.51          |
|                 | < 34 yr  | 9             | 16.67          |
| Religions       | Islam    | 40            | 74.07          |
|                 | Christian| 14            | 25.93          |
| Ethnicity       | Jawa     | 19            | 35.19          |
|                 | Melayu   | 32            | 59.30          |
|                 | Banjar   | 3             | 5.51           |
| Education       | No formal education | 0       | 0.00           |
|                 | Primary school   | 21        | 38.89          |
|                 | Secondary school  | 12        | 22.22          |
|                 | High school       | 14        | 25.93          |
|                 | University        | 4         | 7.41           |
|                 | Drop-out          | 3         | 5.56           |

3.2. Utilization of mangrove resources by the community of Jaring Halus village

All respondents sampled in this study were productive harversters of mangrove resources with various form of utilizations. Majority of mangrove resources were harvested in raw material or timbers with percentage of 60%, followed by other resources, i.e. clams/shells, crabs, shrimps and others (Table 2). The timbers were heavily utilized as building materials for housing by the community (Figure 2). Indonesia is an important country with abundant fishery resources exposed by the existence of mangrove ecosystem. Majority of mangrove utilization is based on their shrimp or penaeids harvesting in Southeast Asia [8]. However, we obtained that most mangrove utilizers maximizing their harvesting of mangrove timbers to support their living issue. Previous study has documented several mangrove tree species such as *Avicennia* spp., *Sonneratia* spp., *Bruguiera* spp., *Rhizophora* spp., *Nipa fructicans*, *Xylocarpus granatum* and *Excoecaria agallocha* [5]. The construction of community housing near mangrove area is supported by the abundant mangrove timbers to fulfill their architectural needs [9]. Ethnobotanical aspect of Jaring halus community is needed to evaluate their integration of local wisdom and any other possible utilization from these mangrove species in the future.
Table 2. Utilization forms of mangrove resources by Jaring halus community

| Resources     | Frequency (n) | Percentage (%) |
|---------------|---------------|----------------|
| Timbers       | 37            | 68.54          |
| Clams/ Shells | 2             | 3.70           |
| Crabs         | 6             | 11.11          |
| Shrimps       | 4             | 7.40           |
| Others        | 5             | 9.25           |

Figure 2. Utilization of mangrove resources by Jaring halus community

3.3. Community perceptions on mangrove sustainability

Regarding the intensity of utilization or exploitation of mangrove ecosystem, we obtained that 77.78% of people perceived that mangrove resources may be exploited by considering its sustainability or through conservation (Table 3). In this case, we also obtained field data or witnessed some efforts like re-planting by community after harvesting. However, future threats may exist due to the prolonged time of harvesting for more than 2 decades (20 years) by the community as witnessed in the site. Collaborative conservation efforts by the community and officials may be supported by the introduction of new economic industry like example eco-tourism. In East Java, such concept has been implemented into action which showed a positive result to mangrove sustainability [10]. Other prospect like silvofishery may also be introduced due to the low utilization efforts of mangrove resources as depicted from previous figure which showed a great dependence on mangrove timbers [11].

Table 3. Perceptual statements by Jaring halus community to mangrove resources management

| Perceptual Statements                                                | Frequency (n) | Percentage (%) |
|---------------------------------------------------------------------|---------------|----------------|
| Mangrove resources may be exploited by considering its sustainability| 42            | 77.78          |
| Mangrove resources may be exploited as resource sharing             | 5             | 9.30           |
| Mangrove resources may be exploited due to its abundant nature      | 1             | 1.85           |
| Mangrove resources may be exploited unconditionally                | 6             | 11.11          |

4. Conclusion

Most respondents in this study were males corresponding to their daily life as mangrove utilizers. Majority of harvesters utilized mangrove timbers while still considering its sustainability. However,
their perceptions supported by the prolonged time of exploitation may be investigated deeper in order to obtain preliminary framework in introducing other business diversification or mangrove utilization based on sustainable mangrove ecosystem management.

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