The Study of Mangrove Ecotourism at Sei Nagalawan Village, Perbaungan Sub-district, Serdang Bedagai Regency, North Sumatera Province

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ABSTRACT
The objective of the research is to analyze the mangrove ecotourism at Sei Nagalawan Village, Perbaungan Sub-district, Serdang Bedagai Regency. The research employs qualitative approach. The data are collected by conducting in-depth interviews with informants, especially with the owner and the tourists of Sei Nagalawan mangrove ecotourism, and observations on the condition of the mangrove ecotourism. The result of the research shows that Sei Nagalawan mangrove ecotourism has provided ecological, economic, and social benefits for the manager of mangrove ecotourism and the people at the village. The economic benefit is concerned with the increase in income through wages so that they could join Savings and Loan cooperative. They are also able to sell food made of mangrove such as keripik (chips), dodol (a confection made of glutinous rice with coconut milk and palm sugar), and tea in the food stalls. They are also allowed to rent their boat to the tourists. The ecological benefit is concerned with fishery and guarded off sea abrasion. The social benefit is concerned with capacity to manage mangrove forest, coastal tourism, provision of trainings for the local people about mangrove ecotourism management, helping lecturers, students, and researchers in doing researches, an increase in solidarity among members of Muara Baimbai cooperative, becoming known by many people, and having network with institutions and related people in mangrove and coastal area.

Keywords: *ecotourism, mangrove forest, economic, ecological, and social benefits*

1. INTRODUCTION

Mangrove ecosystem is becoming decreasing throughout the world due to various causes [1]; it has changed its function and has fragmented. Fragmentation of mangrove forest is different from the loss or the decrease in its area and its fragmentation has negative effect. Fragmented mangrove is the main cause of ecosystem degradation which can decrease habitat capacity in providing many important ecosystem services. Some mangrove ecosystem services which include prevention from erosion, protection for coastal line, and mitigation of climate change (through the absorption of carbon) depends on the size and the arrangement of forest sector even though many people do not know much about the area scale pattern of mangrove forest fragmentation. Mangrove fragmentation occurs everywhere, but there is the geographical difference between the loss and the fragmentation of mangrove; some countries such as Cambodia and the southern part of Caribbean have relatively little lost, but their forest has been extensively fragmented. In the Southeast Asia, the global hotspot of the loss of mangrove has caused forest to become fish culture and rice field as the biggest support of the loss (>50%) and fragmentation. Ironically, forest conversation to oil palm plantations is considered the most responsible for deforestation (15%) of mangrove forest in Southeast Asia even though, in reality, it has only weak correlation with mangrove fragmentation. Therefore, management as the trigger of different deforestation can increase

or decrease fragmentation. Our finding shows that big scale monitoring on mangrove forest should also consider fragmentation. This research finds that regional priority for conservation, based on the level of the loss of forest, can ignore fragmentation and the loss of its ecosystem function. The importance of analyzing mangrove forest fragmentation is related to the interest in its ecological, economical, and social functions.

The same thing also occurs in South Asia where mangrove forest fragmentation is connected with many mangrove areas which have lost in South Asia caused by the factors of human activities and natural pressure. [2] point out that mangrove forest in South Asia is situated along the ebb tide coastline of Bangladesh, India, Pakistan, and Sri Lanka. These forests provide ecosystem goods and services which are important for dense coastal population in those areas and support the important function of biosphere. It seems that mangrove is under the threat of natural and anthropogenic pressures, but its status and dynamics today is still not understood well. Their finding reveals that the area of mangrove forest in South Asia is about 1,187,476 hectares which represents ~ 7% of the global total. [2] point out that from 2000 to 2012, 92,135 hectares of mangrove forest have been deforested and 80,461 hectares have been reforested with the net loss of 11,673 hectares. In the three case studies, it is found that the mangrove area is steadily the same or a little bit increases, but the turnover is bigger than the net change. Both natural and anthropogenic factors are responsible for these changes and exchanges. The main cause of deforestation iin South Asia is (i) conversion to the use of other lands (for examples, conversion to agriculture, shrimp rearing ponds, building, and residential area), (ii) excessive harvest (for examples, grassland, exploration and lumbering, and fishing), (iii) pollution, (iv) decreasing in fresh water supply, (v) flood, (vi) decreasing in mud sediment, (vii) coastal erosion, and (viii) tropical cyclone and tsunami. The result of this study provides an important insight for important and threatened conservation and mangrove ecosystem management in South Asia [2].

The existence of mangrove forest in Indonesia also undergoes the same thing; that is, the decrease in the number of mangrove areas. The difference lies on the types of the cultivated plants which substitute mangrove such as oil palms, shrimp rearing ponds and fish ponds, and residential areas. Concerning the mangrove ecosystem area, [3]estimate that the total area of mangrove in Indonesia is 4.25 million hectares which represent about 20% of the world's mangrove area. Of this total number, 2.94 million hectares are spread out along the coastline of Irian Jaya which is still a relatively virgin and unexploited forest. The remaining 1.31 million hectares are found in somewhat dense population areas in Indonesia such as in Java, Sumatera, and Kalimantan where the mangrove forest has been exploited for forest products, agricultural land, residential area, and cultural development [3].

The research conducted by [4], is concerned with the decrease in mangrove area in South Sulawesi. They point out that the mangrove forest in Takalar Regency, South Sulawesi, as the case area has undergone degradation and decrease in the spatial area in the previous decades. This change is especially caused by the mangrove forest clearing and conversion for cultivation which has the implication on the increase in forest degradation, coast abrasion, sea water intrusion, decrease in fishery, decrease in shrimp and *bandeng* juveniles, and shrimp disease endemic. On the other hand, mangrove forest clearing and dump for shrimp and seaweed culture has contributed to foreign exchange and employment in the research area. This indicates that not all of the mangrove changes of function cause negative effect to the local people. The change to shrimp and seaweed culture, in reality, has caused positive effect on the local people. The question is that how about the number of mangrove forests in North Sumatera. [5] points out that there has been changes in mangrove land area and coverage in North Sumatera, based on the inventory from 1997 until 2006. The area of mangrove forest in the east coastal region of North Sumatera decreased to 59.68%, from the 103.425 hectares in 1977 to 41.700 hectares in 2006. The extension of ponds and the taking of logs and firewood are an important factor of mangrove forest degradation in the area. Therefore, we need mangrove forest rehabilitation in the area, either massively or systematically. We also need to prevent the

damage of the remaining mangrove forest. One of the efforts to keep the mangrove forest in North Sumatera existing is by developing it to a mangrove ecotourism. This idea is in accordance with the result of the research conducted by [6]. Mangrove forest as a natural resource has a potential value as a natural tourism. Developing mangrove forest to become ecotourism needs analysis on the unique aspects of flora, fauna, and people's participation. The objective of the study was to analyze the potency of mangrove based on the perspective of flora and fauna ecology and socio-culture to become a natural tourism area. The objects of the research were mangrove forest and its resources. The research was conducted at Angsana Village, Angsana Sub-district, Tanah Bumbu Regency, South Kalimantan Province, Indonesia. Based on the analysis on the potency f mangrove forest, it was found that this area had the potency of being developed into a natural tourism or even into ecotourism. The area of mangrove natural tourism can be developed as a plant tourist object which has been operated from tourist destination of Pantai Angsana [6].

To make a mangrove forest as ecotourism needs serious consideration. In Malaysia, for example, a research on mangrove ecotourism reveals that the uniqueness of mangrove habitat has contributed to the economic development in some countries, including Malaysia, through the extension of ecotourism activities. Careful consideration is very important to make sure that mangrove ecosystem is maintained well and protected through ecotourism activities. A study has pointed out that unsuitable ecotourism product has caused the failure in ecotourism industry. Therefore, to support economic development and the effort to mangrove ecosystem conservation, the researchers attempted to support the establishment of ecotourism product which highly influenced mangrove ecotourism industry locally, nationally, and internationally in Malysia. The result of the research showed that ecotourism products and activities are the most influential mangrove ecotourism item. Tourists in Malaysia are very interested in its physical products and activities. Specifically, physical products are generally chosen by local tourists in encouraging them to visit while activities are mostly chosen by local and national tourists. The Malaysian are very interested in facilities and services while international tourists are interested in a set of very individual facilities and services. It was found that ecotourism products highly influenced the security of mangrove ecosystem. The finding is important for economic development and also for the conservation of mangrove ecosystem [7].

There is a mangrove ecotourism in Kuala Langsa, Aceh Province, Indonesia, which provides tourism activity that introduces mangrove forest resources and the condition of the local people. The research conducted by [8] is aimed to design the strategy of sustainable tourism development in the Mangrove Forest of Kuala Langsa. The objective of the tourism development strategy as the tourism activity is to improve environmental damages by planting mangrove tourism and the competition of coastal sanitation. It is recommended that all stakeholders involve in maintaining natural resources and environment in the coastal region so that tourism can continuously maintain natural resources without damaging them so that the benefits can be felt by the people today and young generation as the realization of tourism journey and education tourism. The management of mangrove ecotourism in Kuala Langsa also makes a policy on increasing and guarding off natural resources which are integrated into the sustainable development plan in national and international scales [8].

Studies on managing mangrove ecotourism in the east coastal region of North Sumatera have often been done. One of them is conducted by [9] who study on CBMM (people based-mangrove management development) through ecotourism in two locations – Lubuk Kertang (LK), Langkat and Sei Nagalawan (SN), Serdang Bedagai, North Sumatera, Indonesia. This research is focused on the linkage among mangrove ecosystem, coastal people and visitors, and stakeholders in representing the potency of mangrove ecosystem, ecological suitability, and their supporting power. The result of the research showed that there were several kinds of mangrove in LK, consisted of 15 species, dominated by *Rhizophora apiculata* and *Avicennia lanata*, and seven species were found in SN, dominated by *R. apiculata* and *A. officinalis*. Concerning the suitability level of mangrove ecosystem for ecotourism development, LK and SN respectively are categorized as suitability and

conditional suitability. Mangrove ecotourism supporting power in LK and SN was 36 and 36 people/day. The two ecotourism locations have the potency of ecotourism attraction, high mangrove biodiversity, available human resources, and people's perception on the importance of mangrove conservation, and relatively easy access. It is recommended that mangrove ecotourism be the form of using land sustainably to provide environmental protection and to give socio-economic benefit to the local people through indirect values of natural resources.

Based on the explanation above, it was concluded that the objective of the research was to analyze mangrove ecotourism at Sei Nagalawan Village, Perbaungan Sub-district, Serdang Bedagai Regency, North Sumatera Province.

2. RESEARCH METHOD

The research was located at the Mangrove Natural Tourism Area of Sei Nagalawan Village, Perbaungan Sub-district, Serdang Bedagai Regency, the east coast of North Sumatera. It used qualitative approach. The data were gathered by conducting in-depth interview with the manager, the owner of Sei Nagalawan mangrove ecotourism, the local people, and the tourists. They were also gathered by conducting observation.

3. REVIEW ON LITERATURE

3.1. Function of Mangrove Ecosystem

There are at least some benefits of mangrove forest such as economic, social, and ecological benefits. One of the benefits of mangrove forest is the increase in the local people's household economy. The research done by Ayeyarwaddy in Myanmar indicates that 43% of the total household income come from the sale of forest products gathered from mangrove forest such as firewood, fish, crabs, and shrimps while 25% and 32% of the total income come from agriculture and non-agriculture respectively. The result shows that the income from mangrove forest products specifically comes from fish, crabs, shrimps, and firewood is 36%, 28%, 9%, and 27% respectively. This research confirms that the local people's livelihood highly relies on the existence of mangrove forest [10]. A research which is almost the same as the previous one concerning the economic benefit of mangrove forest is also done in North Sulawesi. This research estimates the economic value of ecosystem service provided by the mangrove forest at Langsa, Wori Sub-district, Minahasa Utara Regency. Indonesia. In this case, the researchers describe value of use (direct and indirect values) and value of non-use (option and existence values) and emphasize the components of fish resources, ecosystem service, firewood, coastal protection, biodiversity, carbon (C) exclusion, and mangrove reservation because they directly influence human welfare. Concerning market price, they calculate fish and C exclusion value. The success in evaluating this mangrove has big potency of implication for making the policy on its ecosystem service value in the future [11]. A lot of efforts have been made to conserve mangrove forest through the management of mangrove forest in Indonesia.

One of the mangrove management models is collaborative management. [12] have done a research which is aimed to formulate collaborative based-mangrove forest management model to develop marine ecotourism at Lembar Village, Lombok Barat. The result of the research, using rapid appraisal, shows that sustainable index of mangrove ecosystem management is categorized as "lack of sustainability." Meanwhile, ecological dimension is categorized as "moderate sustainability." Another result shows that social, economic, and institutional dimensions are categorized as: no sustainability". The result of AHP in each sensitive indicator shows that the mode of sustainable mangrove ecosystem management is based on the strengthening of collaborative institutional. Strengthening of collaborative institutional can be done by increasing the commitment of village and local people to respect the values of local wisdom and to increase people's capacity and participation in managing mangrove ecosystem area for ecotourism development.

The same case also occurs in the mangrove forest in Surabaya. In order to handle the decrease in mangrove forest from year to year in Wonorejo Sub-district, Surabaya, The Agriculture Agency of Surabaya attempts to develop Wonorejo Mangrove Ecotourism. The result of the research done by [13]

suggests that almost the whole mangrove ecosystem in Wonorejo be announced as the Botanical Garden of Surabaya. It is recommended that EMW be developed to multifunction and attractive ecotourism by involving people's participation. Therefore, it is necessary to have facilitative strategy which is able to handle various needs of activity. Concerning the aspect of ecotourism development, there are three zones needed to carry out people's activities – main conservation zone, main zone, and supporting zone.

3.2. Ecotourism

As an alternative tourism concept, ecotourism highly pay attention to environment as its main objective. In its management, however, it still needs carefulness in order to maintain its sustainable character. Besides that, since the concept of ecotourism is adopted from the west, it needs to be adjusted to the principle and criteria of ecotourism management according to the Indonesian national Standard (SNI-8013;2014) as follows: (i) conservation of ecosystem function, (ii) conservation of the object of natural tourism attraction, (iii) socio-cultural sustainability, (iv) visitors' satisfaction, security, and comfort, and (v) economic benefit principle. In order to evade mass ecotourism, applicable regulations should be obeyed so that negative impact on ecology can be handled. The emergence of 4.0 revolution can stimulate understanding about the importance of environment before carrying out ecotourism activities [14].

3.3. Mangrove Ecotourism

Mangrove ecotourism is highly relied on the availability of mangrove forest and its management to be a tourism area. The main requirement for mangrove ecotourism is the availability of mangrove forest which can become ecotourism. Some researches indicate the importance of mangrove conservation and people's participation. [15] point out that mangrove ecotourism is favored by people. Mangrove ecosystem at Berakit Village, Teluk Sebong Sub-district, Bintan Regency, Kepulauan Riau Province, is made ecotourism area and visited by many tourists. The result of the research shows that Tourism Suitability Index reaches 87.50% (very suitable) and the the Area Supporting Power of mangrove passed ecotourism with wood bridge is 214 people per day. Besides that, respondents' perception on mangrove ecotourism and its management is good so tha it can be potential to be developed as ecotourism activities. The strategy of ecotourism management which can be chosen is by promoting and publicizing mangrove ecotourism at Berakit Village, developing attractive ecotourism package, providing trash cans in crowded places, and cleaning up the shore polluted by spilled oil.

Other factors which cause the success in mangrove ecotourism are people's perception and local wisdom. In some regions in Indonesia, the coastal people's local wisdom becomes an important factor and even determines the initiative of conservation and mangrove based-ecotourism destination. Shrimp rearing ponds at Wringinputih, Muncar, Banyuwangi, for example, have been developed through reclamation since 1980s. The result is that many mangrove forest areas have different functions. However, shrimp rearing did not last long in these places because most of the shrimps died due to white spot syndrome at the beginning of 1990s. In consequence, most of the pond owners suffered from the financial loss and got bankrupt, abandoned the ponds, and let the environment be neglected. Therefore, in 1997 some public figures at Wringinputih were concerned about it and suggested local wisdom by creating mangrove forest which supported the location of ex-shrimp rearing ponds. The result was that the local people at Wringinputih finally restored the mangrove forest which had supported shrimp rearing ponds. This success seems to be able to be implemented in other places. Therefore, by mangrove forest restoration, other natural resources will grow up exponentially, and many mangrove based-tourism resorts can be developed. Coastal people can do recreation through various activities and employment can eventually increase their social welfare [16].

Other factors which cause the success in mangrove ecotourism in the increase in the local people's participation and local wisdom based-empowerment for example, Bandar Bakau mangrove ecotourism in the urban area of Dumai

becomes the attraction for local and international tourists. The uniqueness of Bandar Bakau mangrove ecotourism includes school of nature, the potency of flora and fauna with their mangrove forest. The result of the research shows that there is an alternative strategy of developing local wisdom based-mangrove ecotourism which yields some important points: first, developing mangrove conservation and rehabilitation as the potency of tourism in mangrove ecotourism at Bandar Bakau; secondly, increasing participation and wisdom based-empowerment and cultural values of the local people; thirdly, formulating regulations and policies on local wisdom based-mangrove conservation and cultra values of the Melayunese [17].

4. RESULT AND DISCUSSION

At the beginning of the opening mangrove natural tourism area at Nagalawan Village, the local people's income was only about 15%, especially the young ones. Some of them even destroyed coastal facilities such as traffic signs and gates and some of them even wanted to dominate the ownership of mangrove forest. The local people's negative response to the existence of mangrove ecotourism is because they did not understand what ecotourism was. Therefore, the opening of ecotourism area should be supported by the local people.[18] points out that the plan for mangrove forest ecotourism is through digging up the potency of landscape which consists of biophysical element and people's socio-culture. It means that ecotourism planning which consists of potency inventory, analysis, synthesis, idea planning, and mangrove forest track at Pantai Sari Ringgung needs people's good support. This explanation is the same as the previous researches [13]; [15]; [16]; [17] which show the importance of support, role, and local wisdom to manage mangrove ecotourism. The strategy of managing mangrove natural tourism at Sei Nagalawan Village is by providing training for the whole members of Muara Baimbai cooperative such as training about services for tourists, training about social entrepreneurship for the local people in making processed food made from mangrove plants. From the security point of view, security should be increased through guarding by the coast guards and promotion should be done through social media. Another aspect is by increasing hygiene through providing trash cans in every corner of the coast and bulletin boards about keeping clean, opening ad developing network as broad as possible with tourist companies, developing relationship and mutual cooperation with private companies and investors individually, and developing creativity by planting mangrove plants, and taking attractive spot photography.

The strategy done by the manager of Sei Nagalawan mangrove is nearly the same as the one done by [19] in their research at Mororejo Village which has mangrove area that has not optimally used. The result of the research showed that mangrove area at Mororejo Village was dominated by three types of mangrove: *Rhizophora mucronata*, *Rhizophora stylosa*, and *Avicennia marina*. Some fauna found in this place were birds, fish, and *krustasea*. Suitability index for mangrove tourism activities includes the required category (63.24%). Alternative strategy of managing mangrove ecotourism is prioritized, such as making local people participate in ecotourism activities (Score: 2.834), increasing the participation of related agencies (Score: 2.517), and the existence of area zone to avoid conflict with other parties (Score: 2.25). [20] point out that the strategy for increasing knowledge and technology in the resources based-community should be needed to increase the value-added ecotourism area, the supporting facility and infrastructure in ecotourism activities, the management mangrove based-ecotourism, the diversity of birdlife, and the conservation of sea turtles. Interest integration involves stakeholders at Pantai Sari, Pakis Village, Banyuwangi Sub-district, Banyuwangi Regency to develop community and natural resources based-ecotourism at Pantai Sari.

Some benefits obtained by the management of mangrove ecotourism andthe local people at Sei Nagalawan Village are ecological, economic, and social benefits. Ecological benefit obtained by the local people with the existence of Sei Nagalawan mangrove ecotourism is the increasing sea products obtained by the fishermen surrounding Sei Nagalawan. Another ecological benefit is the decrease in sea abrasion surrounding Sei Nagalawan Village. Economic benefit obtained by the local people at Sei Nagalawan with the

existence of Sei Nagalawan mangrove tourist attraction is the making of food stuffs made of mangrove plants such as *keripik* (chips), *dodol* (a confection made of glutinous rice with coconut milk and palm sugar), and tea which can be sold. The local people can sell their merchandise on the beach even though they are not allowed to build stalls; they can also rent their boats to the visitors. Besides that, the management of the cooperative will get payment from the management of the Sei Nagalawan mangrove natural area. Social benefits obtained by the local people at Sei Nagalawan Village with the existence of Sei Nagalawan mangrove ecotourism are increasing experience in managing mangrove coast, managing and participating in training about tourism by either Muara Bambai group or other institutions toward mangrove ecosystem. Other social benefits are that the mangrove ecotourism becomes famous, there is a work network and relation with those who are interested in mangrove ecosystem, and it can help students, lecturers, and researchers do their researches in mangrove ecotourism at Sei Nagalawan. The findings in this research is almost the same as the result of the research conducted by [21] on economic value of direct benefits, indirect benefits, chosen benefits, and total economic value of mangrove ecosystem. The economic values of direct benefits of mangrove ecosystem at Kandang Panjang Village include (a) ecotourism, (b) catching fish, and (c) cultivation with the total of IDR.6,824,069,600 per year. Economic values of indirect benefits of mangrove ecosystem at Kandang Panjang Village include (a) abrasion resistance and (b) feeding ground, nursery ground, and spawning ground with the total of IDR.886,842,900 per year. The economic chosen benefit value of mangrove ecosystem at Kandang Panjang Village includes the value of biodiversity with the total of IDR.224,084,000 per year. The total economic value of the use of mangrove ecosystem at Kandang Panjang Village is in the total of IDR.7,934,996,50 per year.

Economic benefit obtained by the management of Sei Nagalawan mangrove ecotourism is the increase in the income of the management by getting a kind of remuneration or unfixed salary. Other benefits are being able to do savings and loan, getting earnings from selling merchandise in the canteen of Sei Nagalawan mangrove natural area, and getting more fish with the existence of mangrove ecosystem. Its social benefit is the increase in solidarity among the members of Sei Nagalawan mangrove management.

The factor which causes the success in managing Sei Nagalawan mangrove tourism is as the existence of social capital such as the sense of togetherness, discipline, mutual assistance, and the application of SGC (smile, greeting, and courtesy). Another research shows that the factors which influence the level of participation of fostered group members in tourism management are internal factors (age, living duration, level of income, membership duration, and the level of group desire) and external factors (level of support from Perhutani), the level of support from facility and infrastructure, the level of support from groups. The result of this research at least adds input that people's participation is an important point in developing mangrove ecotourism in Indonesia.

5. CONCLUSION

The strategy done by the management of mangrove ecotourism at Sei Nagalawan Village is by providing training about courtesy and social entrepreneurship for the group members of Muara Baimbai, keeping ecotourism secure and hygienic, and developing network as broad as possible with private companies;

2. Ecological benefits obtained by the local people and the management of mangrove ecotourism at Sei Nagalawan Village are the increasing number of marine products obtained by the fishermen and the decrease in sea abrasion surrounding Sei Nagalawan Village;

3. Economic benefits obtained by the local people and the management of the mangrove ecotourism at Sei Nagalawan Village are the making of food stuffs made of mangrove plants such as *kripik*, *dodol*, and mangrove tea which can be sold, getting income from renting boats by the local people to the visitors, and numeration for the management of Koperasi Nelayan Bimbai;

4. Social benefits obtained by the local people at Sei Nagalawan Village and the management of mangrove ecotourism are increasing their

experience in managing mangrove beach tourism, managing and participating in training about tourism, becoming known by many people, getting networking and relation with stakeholders in mangrove ecosystem, and being able to help students, lecturers, and researchers do their researches in the mangrove ecotourism at Sei Nagalawan Village.

6. SUGGESTION

It is recommended that tourist attraction deal with natural mangrove beach such as banana boats, fishing competition on the sea, and the addition of tracking in mangrove forest.

AUTHORS' CONTRIBUTIONS

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