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MANGROVES IN NIPAH PANJANG VILLAGE: SPATIAL DISTRIBUTION AND UTILIZATION

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Abstrak

Desa Nipah Panjang di Kabupaten Kubu Raya, Indonesia memiliki keanekaragaman jenis vegetasi hutan mangrove yang tinggi. Disisi lain hutan mangrove di Desa Nipah Panjang memiliki potensi ancaman deforestasi sehingga perlu disusun sebuah strategi pengelolaan. Sebuah arahan pengelolaan mangrove dapat disusun dengan data biofisik mangrove dan kondisi sosial masyarakat disekitarnya. Oleh karena itu penelitian ini bertujuan untuk mengkaji distribusi luasan hutan mangrove dan pemanfataannya oleh masyarakat di Desa Nipah Panjang. Metode yang digunakan antara lain adalah analisis GIS untuk mengetahui distribusi luasan hutan mangrove. Untuk mengetahui pemanfaatan hutan mangrove dilakukan observasi dan wawancara. Hasil penelitian menunjukkan bahwa dalam rentang tahun 2013 – 2018 terjadi deforestasi sekitar 3.12 Ha. Deforestasi yang terjadi jauh lebih rendah dibandingkan tahun sebelumnya, ini dikarenakan diberlakukannya kebijakan devolusi melalui pemberian izin hutan desa di Desa Nipah Panjang. Saat ini bentuk pemanfaatan hutan mangrove di Desa Nipah Panjang antara lain adalah budidaya madu kelulut, budidaya madu hutan dan budidaya kepiting dengan konsep silvofishery serta pengembangan ekowisata. Bentuk pemanfaatan ini perlu dimaksimalkan agar kesejahteraan masyarakat meningkat yang akhirnya mejadikan hutan mangrove tetap terjaga.

Abstrak

Nipah Panjang Village in Kubu Raya Regency, Indonesia, has diverse mangrove forest vegetation. Meanwhile, the mangrove forest in Nipah Panjang Village has the potential threat of deforestation, so it is necessary to develop a management strategy. A mangrove management directive can be compiled with mangrove biophysical data and the social conditions of the surrounding community. Therefore, this study aims to examine the distribution of mangrove forest areas and their utilization by the community in Nipah Panjang Village. The method used in this study was GIS analysis to determine the distribution of mangrove forest areas. In this study, observations and interviews were carried out to determine the use of mangrove forests. The study results show that from 2013 through 2018, there was around 3.12 Ha of deforestation. Deforestation that occurred was much lower than the previous year. It was due to the implementation of a devolution policy that granted village forest

permits in Nipah Panjang Village. Currently, the forms of utilization of mangrove forests in Nipah Panjang Village are the farming (apiculture) of kelulut honey, forest honey farming, and crab farming with the concept of silvofishery and the development of ecotourism. This form of utilization needs to be maximized so that the community's welfare increases, ultimately maintaining the mangrove forest.

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INTRODUCTION

Indonesia is a country with a large coastal area and a long coastline. Despite frequent deforestation, Indonesia has the largest mangrove ecosystem globally (Bunting et al., 2018; Rahadian et al., 2019). Mangrove forests have ecological functions such as providing nutrients and resisting abrasion (Adam et al., 2018; Alongi, 2018). Mangrove forests also have economic functions, such as providing wood and medicine (Fariz et al., 2024; Saprudin & Halidah, 2012; Pardede, 2013). However, in forest management, there is a threat in the form of deforestation caused by overexploitation and land use changes (Saleh et al., 2011). It makes the conservation of the mangrove forest very important.

Mangrove area located in Batu Ampar District, Kubu Raya Regency, West Kalimantan Province, is one of the largest mangroves in Indonesia. The mangrove area in this area reaches 61% of the total area of Batu Ampar District (Ritabulan et al., 2016). Even though it has a large area, the mangrove forest ecosystem in Batu Ampar District has several threats. One of these threats is deforestation caused by illegal logging and land fire (Fariz et al., 2024; Ritabulan et al., 2016; Nurdwiansyah et al., 2021). Clear policy interventions most effectively overcome this problem at multiple tiers of government (Friess et al., 2016). In addition, mangrove management policies will be more targeted if prepared based on representative data. These data include mangrove biophysics and the social conditions of the surrounding community (Ritohardoyo & Ardi, 2011).

Based on that problem, this paper aims to examine the spatial distribution of mangrove forests and their utilization by the community in Nipah Panjang Village. Nipah Panjang Village was chosen as the study location because it is an area in Batu Ampar District with a high density of mangrove forest. In addition, the condition of the community in Nipah Panjang Village also has a very good public perception of mangrove management (Jabbar et al., 2021).

RESEARCH METHOD

The study location in this research is Nipah Panjang Village, Kubu Raya Regency, Indonesia (Figure 1). The stages of this research consist of an analysis to determine changes in land cover of mangrove forests and the use of mangrove forests by the community.

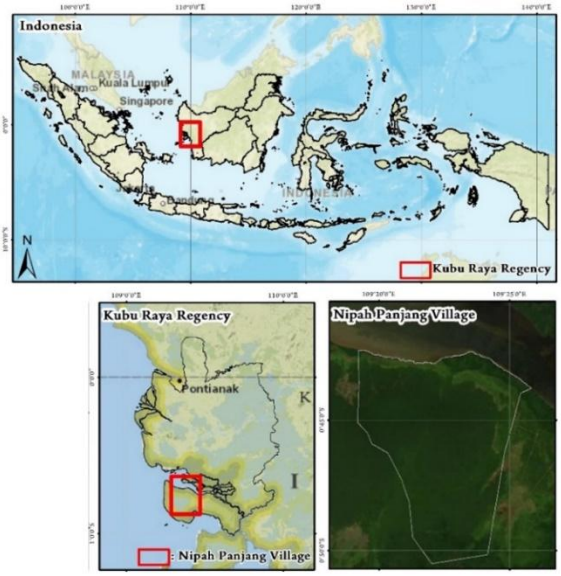

Figure 1. Study Location

Information on the spatial distribution of mangrove forests is obtained by remote sensing analysis, namely image interpretation. The satellite images used are WorldView-2 in 2013 and 2018, accessed from the World Imagery Wayback on ArcMap. The analysis of interpretation of the selected image is a visual interpretation that uses interpretation keys such as size, shape, shadow, tone, color, texture, pattern, and associated relationship. Visual interpretation is used in this study because it

has better accuracy than digital interpretation (Fariz et al., 2020; Eddy et al., 2021).

Information on the community's use of mangrove forests was obtained through observation and interviews. The interview technique used was in-depth interviews. In in-depth interviews, informants are selected based on the information they want to obtain (Sudrajat et al., 2023). This interview technique is very flexible and suitable for investigating complex issues in conservation science studies (Young et al., 2018).

RESULTS AND DISCUSSION

Spatial Distribution of Mangrove Forests in Nipah Panjang Village

There are challenges in mapping mangrove forests using remote sensing, distinguishing mangrove objects from non-mangrove vegetation. Visual interpretation is an effective approach to dealing with these challenges (Xia *et al*., 2018). Visual interpretation can distinguish objects in the image based on human judgment to better interpret complex objects. However, visual interpretation is less efficient in processing time (Lang *et al*., 2009). Visual interpretation applications with VHR imagery are very suitable for mangrove mapping. That is because the location of mangroves is generally linear with the coastline, so if recorded on medium-resolution satellite imagery (Landsat), it will become a mixed pixel (Fariz *et al*., 2021).

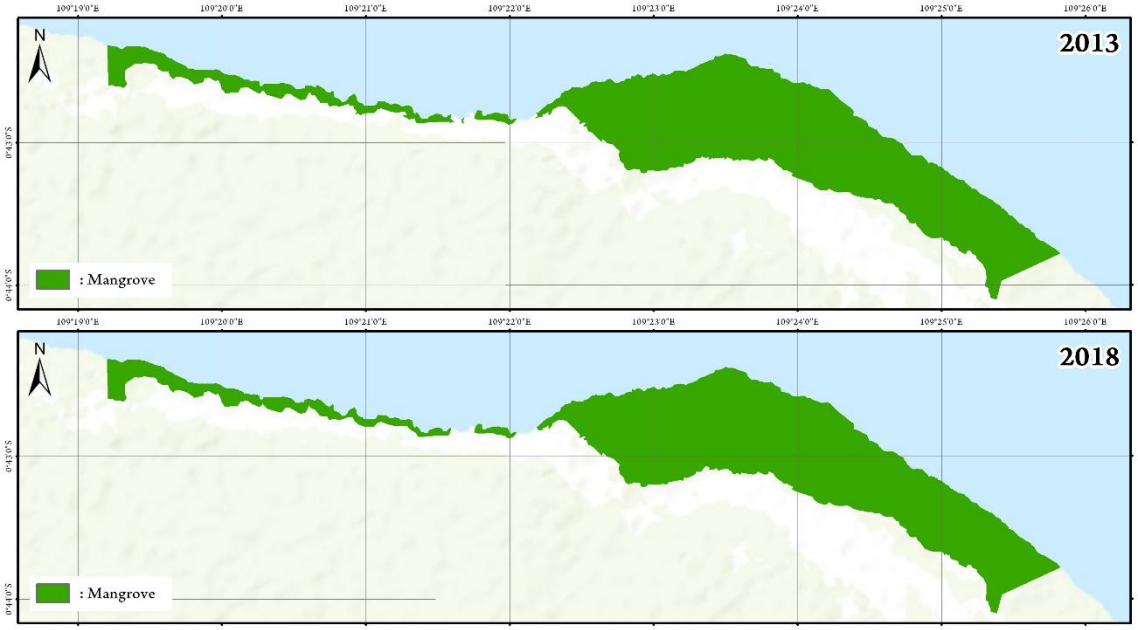

Figure 2. Map of Mangrove Forest in Nipah Panjang Village.

In mapping changes in the mangrove, distinguishing between mangrove and non-mangrove objects is still quite difficult. In our opinion, the interpretation process is straightforward because we already understand the conditions in the field. Our mapping results show that the spatial distribution of mangrove forests in Nipah Panjang Village is dominated by areas directly adjacent to the waters. In the southern part of the village of Nipah Panjang is a peat forest that is almost similar to a mangrove forest at first glance. The mapping results also show that the area of mangrove forest in Nipah Panjang Village in 2013 was 710.78 Ha, while in 2018, it was 707.66 Ha.

From 2013 through 2018, there was a reduction in the area of mangrove forests or deforestation of around 3.12 Ha. Deforestation that occurred in general was much lower than the previous year; this was due to the implementation of a devolution policy through the granting of village forest permits through the concept of social forestry in Nipah Panjang Village (Nurdwiansyah *et al*., 2021). Before implementing this policy, mangroves in Nipah Panjang Village were reduced due to illegal logging for charcoal production. Despite taking mangroves located in Nipah Panjang Village, the reality is that the people of Nipah Panjang Village do not experience economic benefits from mangrove deforestation because the people of Nipah Panjang Village do not carry out charcoal production. Through this policy, the people of Nipah Panjang Village have the authority to manage their forest, including patrols to prevent illegal logging. This concept has been proven to reduce deforestation rates

in an area, although not significantly (Nurdwiansyah *et al.*, 2021; Shi *et al*., 2016).

Utilization of Mangrove Forests In Nipah Panjang Village

Mangrove forests and peat soils dominate Nipah Panjang Village, which makes the potential unique. Various potentials exist in agriculture, plantations, fisheries, and forest products. On land other than mangrove forest, it is used by the community as wallet bird nests and coconut plantations. The result of coconut plantations is *copra*, a coconut fruit dried to process oil and its derivatives. Meanwhile, the community uses the mangrove forest land for the farming (apiculture) of kelulut honey, forest honey, and crab farming.

1. Farming of Kelulut Honey

Kelulut honey is a honey produced by a stingless bee (Trigona sp). The name kelulut is the local name for mentioning the stingless bee. Kelulut farming is done using a box called *stup,* which functions as a nest for stingless bees. The shape and size of the box determine the amount of honey obtained; if the size of the box is too small, then the honey produced is small. If the box size is too large, it will produce less honey because a too-large box will be easy for ants to enter (Lukman *et al*., 2020).

The location of the box placement is in the yard or on the home page. Later, they will look for flower powder nectar on trees around the houseyard, including flower powder nectar for mangrove trees. Occasionally, kelulut nests are monitored and checked for breeding until honey is produced. After the honey is collected, the following process is harvested. The process of harvesting honey is carried out traditionally using a suction device, such as an injection, which takes a long time. Like honey from bees, honey from kelulut also has many health benefits. Kelulut honey can be used in medicine because it contains phenolic substances that increase antioxidant content and reduce oxidative stress-related diseases (Duarte *et al*., 2012; Yaacob *et al*., 2018).

Figure 3. Farming of Kelulut Honey (Apiculture).

2. Mangrove forest honey farming

In Nipah Pajang Village, there is a mangrove forest honey farming group that was initiated independently by the community. This group was named Family Bersatu, which later changed its name to Padang Tikar Coastal Independent Enterprises in 2013. Initially, there were only 15 members of this group, but it grew to 35 yearly.

Figure 4. Mangrove Forest Honey.

This farming process is different from the farming of kelulut honey, which is done at home. Farming forest honey is by utilizing beehives scattered in the mangrove forest. The mangrove area can be estimated to have a potential of 6000 ha. Still, the land area actively sought and has honey to be harvested is approximately 100 Ha.

The harvesting of forest honey is carried out conservatively by harvesting it three times in each harvest season. The repeated harvesting process without leaving the slightest beehive will create a nesting colony. It will also indirectly damage the bee population. Apart from the forest honey harvesting process, the mangrove forest honey farmer group also conducts patrols in the mangrove forest. Patrols are carried out to monitor post-harvest mangrove honeycombs and maintain mangrove honey habitat.

3. Crab farming

Community groups in Nipah Panjang Village also take advantage of the mangrove forest environment by fishing and crab farming, although still in the development stage. The crab fishing uses a tool called a *bubu* (crab trap). The crabs caught are usually still small, so they are unsuitable for sale. Therefore, the crabs are farmed largely using the silvofishery model, shown in Figure 4. Silvofishery is a sustainable aquaculture system that combines fisheries with mangrove planting (Perwitasari *et al*., 2020; Hastuti & Budihastuti, 2016).

Figure 5. Crab farming with Silvofishery System.

The community considers the farming process of crab enlargement using the silvofishery model very effective because the crab growth process will be faster and minimize the potential for crab death due to stress. That is because ecologically silvofishery-patterned ponds get a high supply of organic matter from mangrove forests (Poedjirahajoe, 2015; Sulistyorini *et al*., 2018).

The forms of utilization of mangrove forests in Nipah Panjang Village include kelulut honey, forest honey, and crab farming. It is considered that most of the flora in mangrove forests have flowers containing nectar and pollen that bees need as a food source. Besides that, this mangrove is planted on the edge of ponds because it has a vital role in triggering high phytoplankton growth (Basyuni *et al*., 2018; Adalina & Heryati, 2019). Using mangrove forests in Nipah Panjang Village is sustainable, but that does not mean mangrove forests are free from deforestation. Nipah Panjang Village is a village that has been released from forest areas, where the community has rights to land management in the mangrove forest area. Socialization needs to be carried out in the community, especially among people who do not get the positive impact of mangrove forests' existence in terms of ecology and economy.

Figure 6. The Appearance of The Mangrove Forest in Nipah Panjang Village From an Aerial Photo.

Utilizing this form can maximize ecotourism's function in preserving the Nipah Panjang Village's mangrove forest. The mangrove forest area in Nipah Panjang Village is unique. It has a high canopy density, so it becomes a natural habitat for proboscis monkeys (*Nasalis larvatus*) (Yokassye *et al*., 2019; Asy'Ari & Putra, 2021). In addition, the community in Nipah Panjang Village has a high perception of mangrove ecosystems and ecotourism (Jabbar *et al*., 2021). Turning the mangrove forest area in Nipah Panjang Village into ecotourism encourages local economic growth that improves community welfare and preserves natural resources (Sisriany *et al*., 2021).

Figure 7. Mangrove Ecotourism in Nipah Panjang Village and Packaged Kelulut Honey.

The local government is also developing various products, such as kelulut honey and forest honey, to utilize the potential of the mangrove forest area and support forest preservation. This development takes the form of packaging and marketing products to be sold outside the village of Nipah Panjang or become a typical souvenir of mangrove ecotourism in the village of Nipah Panjang (Figure 7). In addition to maximizing the potential of ecotourism in Nipah Panjang Village, we believe it is also necessary to consider the environmental impacts if mangrove ecotourism succeeds. Therefore, ecotourism must be appropriately implemented to minimize the adverse impact of tourists on local habitats (Friess, 2017).

CONCLUSIONS

The spatial distribution of mangrove forests in Nipah Panjang Village is dominated by areas directly adjacent to the waters. In the southern part of the village of Nipah Panjang is a peat forest that is almost similar to a mangrove forest at first glance. The mapping results also show that from 2013 through 2018, there was deforestation of around 3.12 Ha. The amount of deforestation that occurred was much lower than the previous year due to the implementation of a devolution policy by granting village forest permits in Nipah Panjang Village.

This policy allows the local communities of Nipah Panjang Village to manage and utilize their forests independently. Currently, the forms of utilization of mangrove forests in Nipah Panjang Village include kelulut honey, forest honey farming, and crab farming with the concept of silvofishery and the development of ecotourism. This form of utilization needs to be maximized so that the community's welfare increases, ultimately maintaining the mangrove forest.

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