

# Review of the use of mangrove forests in supporting the socio-economic life of fishing communities

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## Review of the use of mangrove forests in supporting the socio-economic life of fishing communities

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**Abstract.** Mangrove forests have an important function in human life that cannot be replaced by other functions. The existence of mangrove forests has six main functions, namely biological, ecological, physical, social, economic and chemical functions. This article discusses the description of mangrove forest management in meeting the needs of the economic and social functions of the fishing communities on the coast of Merauke Regency, Papua Province, which were reviewed descriptively using relevant literature studies. In terms of economic function, mangrove forests provide economic value for fishing communities because mangrove forests become habitat for crabs, fish and other marine biota that are captured and sold as the main source of family income. In addition, the use of mangrove forests by fishermen on the coast is used as firewood and building materials. The high utilization of mangrove forests by coastal communities that ignores ecological sustainability causes damage to mangrove forests that threatens the sustainability of ecological functions. Damage to mangrove forests in Merauke in the period 2000-2005 was recorded as wide as 2,416 ha while in the 2005-2010 period damage reached 2,233 ha of the total area of the Merauke mangrove forest which reached 216,001.95 Ha or 6.98% of the Merauke forest area. Based on this, the management of mangrove forest utilization needs to get more attention from various parties so that the ecological function of mangrove forests as a condition of sustainable development, especially for fishing communities on the coast, can be realized in Merauke Regency.

### 1. Introduction

The total area of mangrove forests in Indonesia is 75% of the total area of Asian mangrove forests and 24-27% of the total area of mangrove forests in the world which are spread in Sumatra, Java, Kalimantan and Papua [1-5]. Mangrove forests have many functions in life such as biological, ecological, physical, as well as social [6], economic and chemical functions [1,2,7] rehabilitating land [8] which are not replaced by other ecosystem functions. Biological functions, mangrove forests



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function as a shelter, lay eggs and breed for fish [1]. As for ecological functions, mangrove forests play a role as shoreline protectors, a place to assimilate waste material, as mud aggregates and landforms, as wildlife habitats and some aquatic animals, land for various human activities such as added fish and salt, mining and landfills [2] added by [9] that mangroves as spawning ground, nursery, feeding ground and nesting sites of various species of fish, shrimp, shellfish, birds and other biota. In physical function it functions as a land stabilizer, withstand seawater abrasion, and is able to block sea water intrusion to land. For social functions, mangrove forests are used to meet the needs of people's lives as firewood, charcoal, roofing material [3]. While the economic function can be used as raw material for making charcoal because mangroves produce wood that has a high calorific value by timber companies and for fish pond businesses that are increasingly popular [1,9] affecting households and company income [10]. The last function is a chemical function that can play a role in neutralizing hazardous toxic chemical wastes [1] in water and soil management [11].

Mangroves can grow and develop in extreme conditions but are also very sensitive to environmental changes that can disrupt mangrove habitat [2] [12]. To maintain the balance of aquatic ecosystems in coastal areas, mangrove forests need to be maintained [13] through good management as a protection effort by making conservation areas and mangrove forest rehabilitation to restore ecologies that have been converted to other uses [14]. Mangrove forests have a high biodiversity and land use component that has threatened conservation potential [15]. This has become a global environmental issue because it has an ecological function for the survival of marine biota habitats [16]. Noting this, an integrated management and maintenance of mangrove forests should be carried out [2]. Sustainable management of mangrove forests is an appropriate activity in the utilization of land and forest products in coastal areas [17]. This is in line with the results of research conducted by [7] that the management of mangrove forests becomes with a priority value of 50.4% with the preservation of mangrove forests.

Management of coastal areas in Indonesia has been mandated in the 1945 Constitution that the Republic of Indonesia provides fishermen protection and empowerment, independence, usefulness, togetherness, cohesiveness, openness, efficiency-justice, sustainability, welfare, local wisdom, and preservation of environmental functions [18]. For this reason, the mangrove forest effort needs to be done to restore the ecological functions of the mangrove forest environment [19] by improving the management system. This is in line with what was stated by the Sangha (2019) that the management of coastal areas can prioritize the values embedded in indigenous peoples and local communities that have made natural resources a part of their lives [20]. But the results of Voyer's study show that there are community groups in the management of coastal areas often ignoring the role of local culture [21]. This article aims to review the management system of mangrove forests by communities in the coastal areas of Merauke Regency, Papua Province in meeting the needs of economic and social functions.

## 2. Methods

The method used in writing the results of this study is to use a qualitative constructivism approach [22]. This research is a literature study about management in the utilization of mangrove forests in fulfilling economic and social functions by the communities around the coast of Merauke Regency, Papua Province. Based on data and information in secondary data about the condition of mangrove coastal areas presented descriptively to instruct the behavior of people who live in coastal areas to describe the role of mangrove forests in community life in terms of economic and social functions.

## 3. Result and discussion

Damage to mangrove forests in the coastal areas of Merauke Regency has threatened the ecology of the coastal environment in Merauke Regency which has an impact on the ecosystem of waterside areas and affects the social and economic aspects of fishermen in the future. Where at this time the Regency of Merauke which was an area that had wide enough water area was 5,089.71 Km<sup>2</sup> where the length of the coastal garis reached 677.97 km and river length of 770 km and swamp area of 1,425,000 ha [23]. The extent of mangrove forests is because Merauke has good potential for the survival of mangrove ecosystems. The area of Merauke's mangrove forest is 216,196 hectares based on satellite imagery [24]

while according to Bakorsurtanal 2009 data the Merauke Regency has 293,061,159 hectares of mangrove land. Meanwhile, according to the 2011 Spatial Plan Spatial Data data contained in the land use planning book supporting the low emission development of the Merauke district in 2017 that the Merauke mangrove forest area is 216,001.95 Ha or 6.98% of the Merauke forest area. Meanwhile, according to the land use planning unit of Merauke Regency, it has 242,348.01 Ha mangrove forested coastal areas, which based on the definition of the planning unit Mangrove forest area is a coastal coastal area which is a natural habitat for mangrove forests and a breeding ground for various marine biota that functions as coastal protectors and erosion of sea water and protect the cultivation business behind it.

Data analysis of major land use changes in the Merauke Regency planning unit from different time periods that each period of mangrove forest experienced a change in land cover from primary mangrove forest to eucalyptus forest in the period 2000-2005 covering an area of 2,416 ha, in the period 2005-2010 covering an area of 2,233 Ha [25]. Damage to mangrove forests is dominated by mangroves that are close to settlements because the community uses mangrove forests as a source of fuel wood and building materials so that natural mangrove ecosystems are disturbed such as mangrove crabs and other aquatic biota [26,27] which causes low income of traditional fishermen on the coast i.e. the average is only Rp. 366,540 per month [28]. If the mangrove forest management system in Merauke is managed properly it can provide environmental services to the community in the form of utilization of wood and aquatic biota that lives around Rp. 8.6 million / head of family [29].

Data of changes in the area of mangroves that are always experiencing a decline and the potential economic value of mangrove forests from the use of wood and the ecosystems that live in them are causing poverty levels in the coastal areas of Merauke Regency. This is in line with the results of the 2016 Adrianto study that some of the communities in the coastal areas are on the poverty line due to the low level of income caused by the low level of community knowledge about the use of non-timber forest products from forests [30], in addition to the management regulation system that is not planned and unstructured can be the cause of the declining role of mangrove forests for the environment and community life around the forest [3], for that we need a strategy that supports the growth of mangrove forest management policies by involving relevant stakeholders for the sustainability of mangrove forest management by increasing knowledge and technology development appropriate in the management of mangrove forests [2,17] because so far there is still a dualism of government policies, where on one side of the policy seeks to protect mangrove forests but on the other hand provides opportunities for exploitation utan mangrove for the benefit of the regional economy and the community and there is an inconsistency of national policies and regional policies on protected forest management systems such as mangrove forests [31]. For this reason, efforts to improve management by restoring mangrove forests must be considered for several reasons, namely to enhance the ecological and environmental values of mangrove forests, the high subsystem dependence on mangrove forests and to prevent coastal erosion, decrease in fishery resources and other fisheries biota [19].

#### **4. Conclusion**

Improvement of mangrove forest management systems on the coast of Merauke Regency must absolutely be improved because there has been a decline in mangrove forests caused by human activities in utilizing mangrove wood for economic and social needs. Efforts that can be done are increasing the capacity of the community in managing mangrove forests that pay attention to the sustainability of ecological functions, making policy regulations on mangrove forest management systems, involving stakeholders such as local governments, universities, research institutions, Merauke fisheries and marine agencies, non-governmental organizations, and communities around the forest that are directly affected by the existence of mangrove forests.

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