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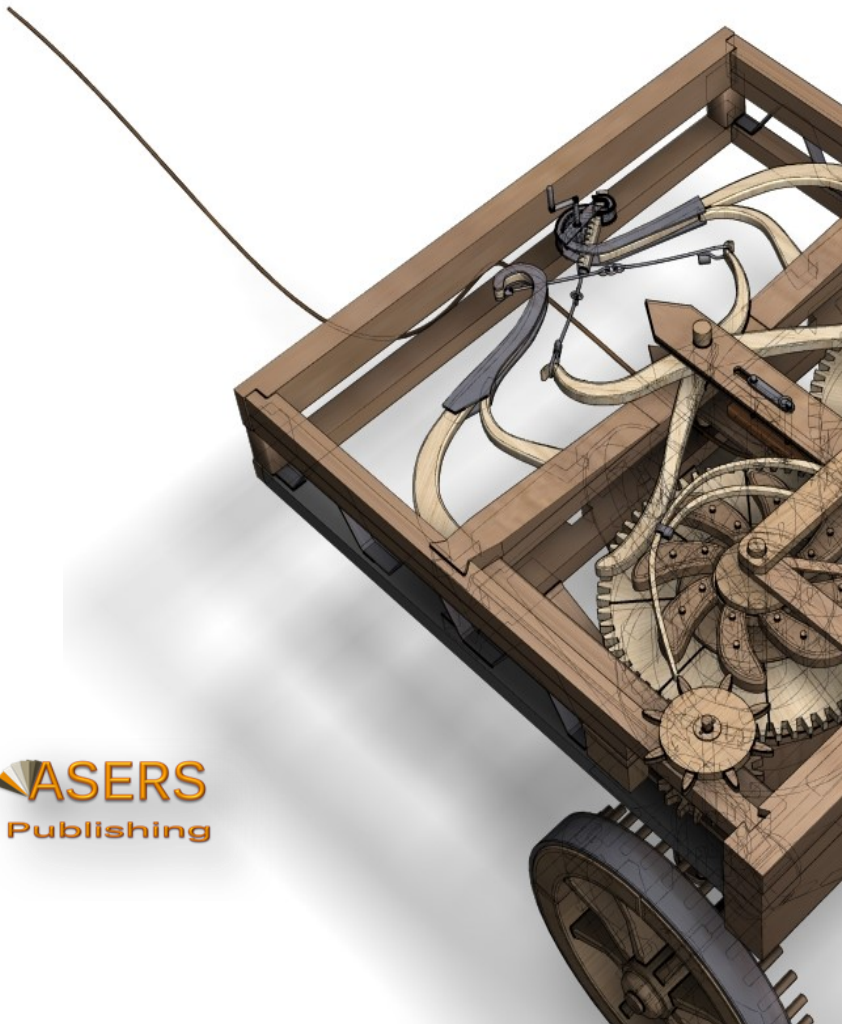

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Recovery Policy and Proper Management of Mangrove Forests to Preserve Environmental Sustainability and Ecotourism in Bangkalan Indonesia

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Abstract:

Part of the mangrove forest on the coast of Bangkalan Regency, Indonesia is part natural forest and the other part is a rehabilitation area which is used as a conservation and ecotourism area. This study aims to determine the reality and policy of changing the function of mangrove forests in Bangkalan Regency. The research was conducted using the socio legal method with a qualitative approach, which is to analyze the conversion of mangrove forest functions and policies in dealing with damage to aquatic ecosystems due to the conversion of mangrove forests in Bangkalan. The results showed that the management of mangrove forests in a sustainable manner with local wisdom is carried out by the local government in the study material that one of the coastal ecosystems, mangrove forests are good and vulnerable ecosystems to preserve environmental sustainability and ecotourism in local context.

Keywords: recovery; forestry; environmental management; ecotourism; sustainability.

JEL Classification: P48; Q01; Z32; F64.

Introduction

Bangkalan Regency is a coastal area that has a large mangrove forest area. There are also various forests in Bangkalan and each of them has a role and function to support the life around it. Basically, the forest in Bangkalan Regency has various potentials, in fact the forest area is decreasing. According to Law No. 41 of 1999 concerning Forestry, forest is an integrated ecosystem in the form of a stretch of forest containing biological resources dominated by trees in their natural environment, which cannot be separated from one another. A forest function change is a change in the function of part or all of the forest area from its original function to another function which has a negative impact on the environment and the potential of the forest itself.

Part of the mangrove forest on the coast of is usually part natural forest and the other part is a rehabilitation area which is used as a conservation and ecotourism area (Thompson 2018; Aheto *et al.* 2016; Kairo *et al.* 2001).

Mangroves with low density are mostly scattered on the north coast of Bangkalan Regency, namely in Arosbaya, Sepulu and Klampis Districts. Bangkalan in the west is dominated by low density mangroves. Meanwhile, mangroves with moderate density are scattered in almost all coastal areas of Bangkalan Regency. Since the 1990s, the condition of mangrove forests in Bangkalan has been converted into ponds by the community. The effect of the conversion of mangrove forest land into ponds on socio-economic life is very influential, because it can produce added value for some indigenous villagers who work as fishermen. However, on the other hand, mangrove conservation could be threatened due to environmental damage if the mangrove land has been changed continuously into fish, shrimp and crab ponds.

Many of the mangrove ecosystems in Bangkalan district have also undergone a change of function for housing so that to support the survival of the biota, it cannot be maximized. The mangrove ecosystem in Bangkalan district was damaged by 60 percent of the 792.5 ha. Thus, it is necessary to map the mangrove ecosystem so that mangrove ecosystem management can be carried out in a sustainable and ecologically integrated manner and with local wisdom. In sustainable mangrove forest management, it is necessary to make efforts to rehabilitate the ecosystem, especially the mangrove ecosystem by paying attention to the integration of sector dimensions, scientific dimensions and dimensions of ecological linkages. This study aims to determine the reality and policy of changing the function of mangrove forests in Bangkalan Regency.

1. Literature Review

1.1. Transfer Policy of Natural Resources

In jurisprudence, the term policy is the basis or line of attitudes or guidelines for implementation and decision making (Prajudi 1995). Based on State Administrative Law, policy in the sense of policy should not be confused with policy as the foundation of Freies Ermessen (Basiago 1995). Talking about policy/law as a system that works in society, Lawrence M. Friedman argues that there are components contained in law, namely structural components are parts that move in a mechanism, for example in implementing policies related to reclamation. Substantial components are the actual results published by the legal system and include unwritten legal rules. Meanwhile, the culture component is the values and attitudes that bind the legal system together and produce a form of law enforcement in the culture of society as a whole.

These three components determine each other, as well as influence each other. Analysis through the systems approach examines that although the component of the legal substance has good output, it will not run well if it is not supported by other components or subsystems, in this case the structural and cultural components or legal culture. Therefore, in making a policy, it must be in line with legal objectives that can provide certainty, benefit and justice for the community.

1.2. Transfer of Forest Functions

Forests have the main function of protecting life support systems to regulate water systems, prevent flooding, control erosion, prevent seawater intrusion, and maintain soil fertility (Kurniawan 2020). Change of forest area function or forest function change is a change in part or all of the functions of a forest in one or several forest groups to become the function of another forest area. Change of land function or commonly referred to as land conversion is a change in the function of part or all of the land area from its original function, as planned to become another function that has a negative impact on the environment and the potential of the land itself.

The condition of forest conversion in several areas is currently increasing and worrying for the ecological conditions and the surrounding ecosystem, especially mountainous areas where protected forest land has become agricultural land, plantation land or converted into community housing which is legalized by the local government, central government or form of occupation due to the factor of the increasing population level (Andriansyah *et al.* 2021).

1.3. Mangrove Forest, Environmental Sustainability and Ecotourism

Mangrove forest is a coastal forest ecosystem consisting of groups of trees that can live in a high salt environment. One of the characteristics of mangrove plants is that it has roots sticking out of the surface. The appearance of mangroves is like a stretch of scrub that separates land from the sea. The word mangrove comes from the word mangue (Portuguese) which means plant, with grove (English) which means shrub. The existence of mangrove forests in the coastal ecosystem is an alliance of living nature and the natural environment found in coastal areas and around river estuaries in tropical forest areas, namely forest areas that are distinctive and influenced by the tides of sea water (Adiansyah 2020). Mangrove forests, both inside and outside the forest area, are green stripes for coastal areas that have ecological and socio-economic functions that have various benefits (Farimansyah 2005).

The dominant plants living in mangrove forest areas are mangroves. Mangroves are a type of tree that grows in shallow water and intertidal areas, namely the boundary between land and sea where tidal influence still occurs. Mangrove forests grow in tropical and subtropical areas, which function as shoreline protection from direct waves. Therefore, the mangrove forest area is characterized by the presence of a layer of silt and fine sediment. The benefits of mangrove forests are to maintain coastal conditions in order to remain stable, protect coastal cliffs and river cliffs, prevent abrasion and sea water intrusion, as well as trap pollutants. The biological function of mangroves is as a habitat for fish, shrimp and crab seeds to live and forage.

Mangrove forests are related to meeting the needs of human life as a provider of food, shelter and health. According to Suwignyo *et al.* (2011), the function of mangroves is divided into 5 groups as follows:

1.Physical function: keeping the coastline stable and sturdy from sea water abrasion, protecting beaches and river cliffs from erosion or abrasion processes.

2.Chemical function: as a place for the recycling process that produces oxygen, as an absorber of carbon dioxide.

3.Biological function: as an area for protection, nesting and breeding for birds and other animals, as a spawning area and a breeding area for shrimp.

4.Economic functions: producing fish, shrimp, shellfish and crab, bird eggs and honey (nectar), producing firewood, charcoal and wood for buildings and household furniture.

5.Tourism function: as a natural coastal tourism area, as conservation land and research area.

The mangrove forest ecosystem has an important meaning because there are many people who depend on this natural resource (Sugiarto and Willy 2003). In addition, there are various components of the food chain that are interdependent on this mangrove ecosystem, namely litter from mangrove plants, the process of which is initiated by bacteria and fungi that turn the leaves into detritus which is called organic material. Furthermore, this organic material becomes food for shrimp or reborn, then detritus-eating animals become food for fish, shrimp, and crab larvae. And so on up to a higher level.

2. Methodology

The research was conducted using the socio legal method with a qualitative approach, which is expected to find hidden meanings behind the object and subject to be studied. This approach remains in the realm of law, only the perspective is different. This research looks at the fact of the conversion of mangrove forest functions and policies in dealing with damage to aquatic ecosystems due to the conversion of mangrove forests in Bangkalan.

The data in this study were obtained through observation, interviews, document (text) interpretation, and personal experience. The researcher is the main instrument because the researcher himself directly makes participatory observations in data collection. In-depth interviews were conducted with open-ended questions, especially for informants who had a lot of information.

3. Transfer of Mangrove Forest Function in Bangkalan Madura

About 3.4 million hectares of mangrove forests in Bangkalan were damaged, partly due to the flow of waste from land to sea and the impact of the property, mining, ponds and housing industry activities. Destruction of mangrove forests is weakening coastal communities' defenses against the effects of climate change, increasing their risk of losing their homes and livelihoods. The effect of the conversion of mangrove forest land into shrimp ponds on socio-economic life is very influential, because it can produce added value for some indigenous villagers. However, on the other hand, mangrove preservation can be threatened due to environmental damage and losses to the socio-economic conditions of the population if the mangrove land is continuously converted into shrimp ponds.

Population growth has triggered the logging of mangroves for housing in the area. Plastic waste pollution threatens the survival of mangroves. Some of them have changed the function of becoming ponds and plantation land. Damage to mangrove forests reduces its function in storing carbon, preventing abrasion on the coast, and capturing organic carbon-rich sediments that come along with sea level rise. The destruction of mangrove forests has made coastal residents more vulnerable to the impact of sea level rise due to climate change. The rise in sea level due to climate change has made those living in coastal areas and small islands can lose their homes.

The coastal ecosystem consists of coral reefs, seagrass beds and mangroves. The community needs to be involved in managing and maintaining this. The involvement of local residents is important in preventing and overcoming damage to mangrove forests in coastal areas with existing local wisdom. Coastal protection efforts can be done by building local wisdom. The mangrove restoration policy is included in the village program, so that residents can be directly involved in protecting the mangrove ecosystem. The factors causing the conversion of forest land function from mangrove ecosystem to ponds which are excessive due to weak supervision, low

knowledge and awareness of the community about the importance of mangrove forests, increasing or decreasing population, socio-economic factors of the population and people who consider the economy is more dominant than the environmental considerations. The transition of forest land from a mangrove ecosystem to a pond has a positive impact on the lives of the community, especially pond farmers who live in coastal areas. This transition has an impact on the income of farmers, which has increased from before the transfer of mangrove forests. However, this also has a bad impact, especially on the balance of nature and the environment.

4. Mangrove Rehabilitation Policy in Bangkalan Madura District

Some of the mangrove forests in Bangkalan Regency have been converted into shrimp ponds. Even though the mangrove forest area is a place for animals and another biota to live. The Natural Resources Conservation Agency (BKSDA) coordinates with the district government to prevent the expansion of the conversion of the mangrove forest area with government policies and mangrove tree planting activities. Mangroves are protected areas and their existence is maintained as an ecosystem, a barrier to coastal abrasion, a habitat for various marine ecosystems. The conversion of mangrove forest functions is specifically regulated in Presidential Regulation No. 73/2012 concerning the National Strategy for Mangrove Ecosystem Management, and Law No. 27/2007 on Management of Coastal Areas and Small Islands. Related to mangrove forests, in general, it is regulated in PP 23/2021.

The Bangkalan Regency Regional Regulation Policy Number 10 of 2009 concerning the Bangkalan Regency Spatial Plan 2009-2029 regulates the prohibition of changing functions of areas that have been designated as conservation areas, as well as maintaining and developing the protection function of these areas, for example by forming mangrove forests. By planting mangrove seeds, it can increase the number of new individuals who are able to restore new mangrove life around coastal areas. So far, there is a lack of human resources who can manage mangrove trees well, resulting in a lack of economic value for the surrounding coastal communities. Whereas from one mangrove tree that can grow, reproduce and increase the number of new individuals it can affect the life of coastal and marine life. The policy of the Bangkalan local government regarding mangrove forest ecosystems has several specific characteristics in terms of the interests of natural resources, namely the location of mangrove forests is limited to certain places, the ecological role of mangrove forest ecosystems is unique, it is different from the role of other forest ecosystems because mangrove forests have valuable potential yields. economically high.

Mangroves protect the land from strong winds, big waves due to climate change. In addition, the mangrove ecosystem can increase the productivity of fisheries and crabs. Other benefits include ecotourism and derivative products such as dodol, syrup, chips, and others. Some of the coastal communities in Bangkalan Regency meet their daily needs by intervening in the mangrove ecosystem. This can be seen from the number of changes in the function of mangrove land into ponds, settlements, industry and so on as well as logging by the community for various purposes (Sadma 2021).

One way to restore damaged mangrove forest land is by planting optimal trees with soil fertility so that the roots, leaves, and logs in one tree can be used as shelter and food for living things. Optimal tree growth will be obtained by high quality tree seeds (Sudrajat *et al.* 2011). By planting mangrove trees, it will restore new mangrove life around the coastal areas. The lack of human resources who can manage mangrove trees well, so that the lack of economic value in the surrounding coastal communities. From one mangrove tree that can grow, reproduce and increase the number of new individuals can affect coastal and marine life. Planting trees is an activity to grow tree seedlings to become woody trees that can be utilized. After the process of planting tree seedlings on the land, monitoring and caring for the tree seedlings are carried out until they grow optimally (Subagyo and Ahmad 2014). The importance of planting trees for living things is for the continuity of life which is widely used in everyday life (Oktaviyani *et al.* 2017).

The importance of planting other trees is as a contributor to the refreshing air on earth, because trees can absorb carbon dioxide gas (CO^2) and emit oxygen (O^2). Planting trees in the coastal marine environment that can be done is planting mangrove tree seedlings. The policy of the East Java Provincial Government is to encourage the mangrove forest area in Bangkalan Madura to become a Climate Village or pilot area to counteract the effects of global warming. Apart from developing the economic aspects of the community, mangroves are expected to contribute to reducing greenhouse gas emissions. The existence of the Climate Village aims to protect the coastal ecosystem from abrasion and erosion. Mangrove forests or mangrove forests can reduce greenhouse gas emissions, five percent greater than tropical forests. In addition, one of the parameters of the Climate Village is the management of waste into biogas. In terms of the capacity of human resources (HR), it is encouraged to protect the environment and cleanliness. The concept of mangrove development that is used must be adjusted to the characteristics of the land and the surrounding environment, considering that there are hundreds of mangrove

species (interview with the Head of the Environment Agency of East Java Province, Diah Susilowati, March 11, 2021). PT Pertamina Hulu Energi West Madura Offshore (PHE WMO), which supports the mangrove conservation area in Bangkalan, has contributed to the creation of a Climate Village, among others through community empowerment and building a Mangrove Education Park (TPM). It is hoped that the mangrove program will benefit not only local residents but the general public. Mangroves also not only prevent abrasion, but also have economic and tourism value.

The central government's policy for mangrove rehabilitation is to restore and protect mangroves. Of the critical land area of 637 thousand hectares, 17 thousand hectares of rehabilitation have been carried out in 2020. Meanwhile, the indicative target for rehabilitation until 2024 is 620 thousand hectares. Efforts to accelerate implementation have been carried out by the government, including through the formation of the Peat and Mangrove Restoration Agency (BRGM). BRGM together with the Ministry of Environment and Forestry, KKP, as well as mining permit holders are obliged to carry out mangrove rehabilitation, as well as corporate social responsibility. Other efforts include research and applied studies, as well as the development of modern nurseries and the World Mangrove Center. Furthermore, it is necessary to review all policies related to mangroves or to link mangroves such as settlement policies and industrial policies including village funds.

Conclusion

Mangrove forest as a natural resource whose utilization can be recovered requires proper management so as to prevent environmental pollution and guarantee its sustainability for present and future needs. The management of mangrove forests in a sustainable manner with local wisdom is carried out by the local government in the study material that one of the coastal ecosystems, mangrove forests are good and vulnerable ecosystems. This ecosystem has ecological and economic functions. The ecological function of mangrove forests is to protect the coastline, prevent seawater intrusion, habitat (place to live), a place to find food, a place for care and rearing, a place for spawning for various aquatic biota, as well as a microclimate regulator. Meanwhile, the economic function is to produce household needs, produce industrial needs, and produce seeds to be grown and developed, which can be sold.

The agricultural and forestry offices, as well as the marine and fisheries offices, are highly competent institutions in regulating mangrove management. Coordination between agencies related to mangrove management is very important in saving mangroves from damage to their ecosystems. Coastal protection efforts are carried out by building local wisdom. The mangrove restoration policy is included in the village program, so that residents can be directly involved in protecting the mangrove ecosystem. Other efforts include research and applied studies, as well as the development of modern nurseries and the World Mangrove Center. Furthermore, it is necessary to review all policies related to mangroves or to link mangroves such as settlement policies and industrial policies including village funds.

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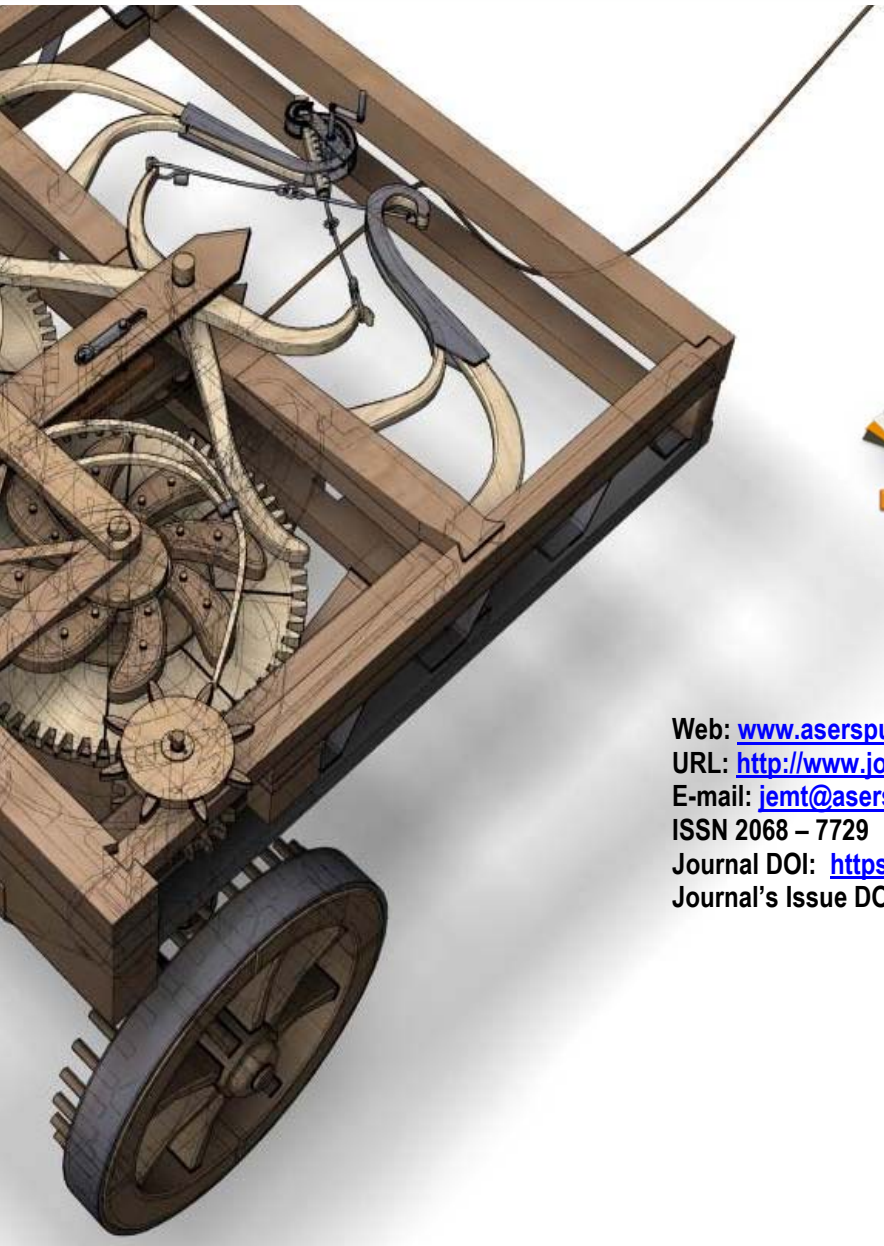

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