Development of Sustainable Mangrove Areas Based on Empowerment of Coastal Communities in Cemara Beach, Pakis, Banyuwangi, East Java, Indonesia

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Abstract. One of the regencies in East Java Province which has the longest coast is Banyuwangi Regency. One of the potential area to be developed is Cemara Beach in Pakis District Banyuwangi. This Beach has natural resources in the form of pine area, turtle landing and breeding area, and mangrove forests. Mangrove on Cemara Beach were scattered along the river with 11 species. The purposes of area development are mangrove nursery and processing, managing mangrove area into ecotourism, and sustainable coastal area. The methods of area development was approaching to the community, creating activities by encouraging the people to participate and increasing their knowledge about livelihood, so they can arrange the plans for its implementation. Result of the development is that there are mangrove nurseries for three types namely Sonneratia caseolaris, Avicennia dan Rhizophora apiculata. The other results are mangrove’s leaves and fruit which are processed to be mangrove chips, tea, and syrup. Mangrove management into ecotourism by building mangrove tracks, making trash traps so the garbage from the sea does not enter the stream, vice versa when the high is tide. Sustainable coastal development namely thickening mangrove density by planting mangrove from nurseries and creating hardware on the beach in the form of a tetrapod.

1. Introduction
One of the districts in East Java Province that has the longest coastline in Banyuwangi Regency, which is 175.8 km. Potential development locations include Cemara Beach which is located in Rowo Hamlet, Pakis Village, Banyuwangi District. Natural resources that can be managed in this location are mangroves because there are 11 species of mangroves along rivers or estuaries from south to north. The results of the mangrove analysis showed that the density and diversity were below the average value, while the importance value index influenced the surrounding ecosystem. So that all elements of society, not only government agencies, communities, and educational institutions, but also private institutions such as fishpond entrepreneurs around Cemara Beach are involved, it is very necessary to expand mangroves through mangrove planting [1].

Mangrove forests have physical functions, biological functions, and socio-economic functions, so they are called productive ecosystems. This is because mangrove forests act as a natural habitat for various types of fishery resources such as fish, crab and shrimp. Mangrove forests act as a natural habitat for various types of fishery resources such as fish, crab and shrimp. In this regard, the
surrounding communities utilize mangrove forest resources with sufficient botanical and ecological knowledge about their forests [2].

Quantitative and qualitative mangrove forest fishery resources are very productive, thus supporting local fisheries and even providing natural nursery habitats and primary productivity that support wider commercial fisheries [3]. The existence of diverse mangrove species will support the diversity and abundance of aquatic biotas such as fish and shrimps. The abundance of mangrove species closely related to the biotic processes such as succession species or competition and abiotic factors, such as nutrient availability, water quality, soil composition and tidal inundation [4].

Mangrove forest ecosystems are complex and dynamic, but unstable because it is easily degraded due to interference and difficult to be restored [5].

Mangrove forest conservation needed to improve the outcome of sustainable fisheries. Biological conservation purposes, such as mangrove forests, are studying the impact from human activities on the species, communities and ecosystems, as well as approach efforts to avoid the extinction of species and restore endangered species to an ecosystem that still function [6].

The active participation of coastal communities in mangrove forest rehabilitation, the factors that influence it are low. To increase the active participation of coastal communities, it is necessary to implement effective reforms in the program and development of rehabilitation activities for mangrove forests as natural resources. The formulation of a new model is the participation of local communities in mangrove nurseries so that it can support the integrity of the coastal area ecosystem [7]. Empowerment has become a prominent issue worldwide since development relied on economic growth has been blamed to create inequality among people. People participation is important because they know local characteristics and this can further lead to better and more effective decisions and initiatives [8].

People need to be empowered because of their powerlessness. Because powerlessness has existed in social systems, empowerment intends to intervene in marginalized people and social structure within constraints and opportunities [9]. So that they can have power over livelihood and circumstance. Empowerment not only results in more authority over someone’s life but also raises social capital. Empowerment, then, supplies legalization to social changes on-site level. Empowerment aims to change three aspects of a social state, such as personal sense and abilities, community’s life and professional activities [8].

The coastal community has to be empowered because of their low capacities and reliance on mangrove ecosystem, like at the Cemara Beach. Therefore, the purposes of area development are mangrove nursery and processing, managing mangrove area into ecotourism, and sustainable coastal area.

2. Methods
The methods of area development were approaching to the community, creating activities by encouraging the people to participate and increasing their knowledge about livelihood, so they can arrange the plans for its implementation.

At the social approach stage, everyone who is in the coastal area of Cemara Beach is the target of the approach. In the end, people realize that when they face a problem, they need to solve it. The approach used is qualitative to get an understanding of the situation developing in the field. The data used are primary and secondary. Primary data were collected by interview and observation. The secondary data obtained from the literature and data from institutions. Its main analysis is to evaluate developments and assess the impact of the current situation.

3. Result and discussion
3.1. Mangrove nurseries
The selection of mangrove seedlings is based on the easiest to the most difficult cultivation techniques, also related to their distribution on Cemara Beach. Eleven mangrove species were identified, four of which were focused on mangrove nurseries, namely Sonneratia caseolaris (Bogem), Avicennia sp. (Api-api), Rhizophora apiculata (Mangrove) and Acanthus ilicifolius L. (Deruju). Four types of mangroves were chosen for nurseries, only as a stimulus for the community so that they could continue the nurseries of other types.
The mangrove nursery at Cemara Beach is considered successful, because the community already has a location as a nursery centre, and even routinely performs nurseries. The nurseries have various objectives, including expanding the mangrove area, resisting the waves of the sea, reducing sedimentation, and building tourism and education areas. These various objectives are strongly supported by the local community who are involved in the management of the area, the community is given the right to take harvests from the mangrove area without damaging it, and is involved in regular nursery and planting programs as providers of mangrove seedlings. These various destinations are also supported by a strategic location that makes access easier. The existence of mangrove areas is expected to reduce the sedimentation rate. Mangrove ecosystem restoration efforts to revive its original function, by presenting (planting) mangrove seedlings, such as Rhizophora, Sonneratia, Avicennia, and Acanthus have been carried out by universities, the private sector, and the community.

Mangrove is a very viable ecosystem. Damaged mangrove ecosystems can restore themselves along environmental factors such as hydrological patterns, soil conditions, and the availability of propagules is supportive, but in conditions of broken resilience, it is necessary to intervene by performing artificial regeneration. Existing mangrove management techniques currently often fail to sustain this resource. For this reason, a broader approach is needed by integrating coastal area management, by incorporating important elements such as ecology, socio-economy, and socio-culture so that it can fulfil the livelihoods of many people while preserving biodiversity in a broad manner [10].

The flexibility of the approach in conserving mangroves has been carried out at Cemara Beach, Banyuwangi. By combining two important elements, namely the role of the community and the socio-economic development of the local population. Concerning the living conditions of coastal communities, one important aspect of community strengthening and mangrove conservation activities is to involve and seek local community support. The goal of restoring ecology is not a single determining factor for the success of any program, if the community, as one of the stakeholders who supports the existing natural resources, is not included, the rehabilitation program will fail.

Conservation of living natural resources is the management of resources and utilization of living natural resources that are carried out wisely to ensure their availability while maintaining and increasing the quality of diversity and value. Conservation of living natural resources and their ecosystems such as mangrove forest ecosystems is by a) preserving the diversity of plant and animal species and their ecosystems, b) protecting life support systems, c) sustainable use of living natural resources and ecosystems.

Reforestation or rehabilitation of bare mangrove swamps and coastal areas is of national concern. A mangrove nursery was established in line with the government's program on the rehabilitation of coastal and mangrove ecosystems. The nursery functions to maintain and care for the seedlings until they are ready for permanent planting. Nurseries have a very important role in every planting activity because plant stocks are needed for reforestation and other planting activities with a high percentage of survival. It also serves as a gene bank for various mangrove species. Therefore, in areas where it is difficult to grow mangroves and to ensure successful reforestation of mangroves, nurseries are a must [11].

3.2. Mangrove processed products are economically and ecologically sustainable
Mangroves do not only have functions ecologically but also economically, namely that they can be used for fruit and leaves as food. Several types of leaves and even mangrove fruit on Cemara Beach can be managed into peyek, tea and mangrove syrup. This has been done by the women's group of the Pantai Cemara community.

The rising of conservation cadres that can overcome the encountered difficulties can bring the integration of the group members so that the organization can still run as expected. They have become role models in the community because they are active and care about the organization. Vision and mission of the organization also can be transferred well due to member’s acceptance and listening to their leaders [12].

Another factor that leads to the existence of the community is because of the fair treatment to each member. Community members are given equal opportunity to improve organizational and technical skills through various training, seminars, and comparative studies. In terms of profit sharing, the leader
gives the community’s profit under the participation of each member. Such condition is following the Macionis’s opinion which stated that community will thrive when there is suitability in a group created by leaders to members that result in the strong sense of ownership of member [13]. Ecologically, the use of mangrove leaves and fruit will not damage or reduce the value of natural mangrove resources at Cemara Beach, because the method of picking mangrove leaves of the Deruju type (Acanthus ilicifolius L.) is 3 to 5 leaves so that the mangroves will not die or run out, on the contrary, they will grow more and more. The use of mangrove fruit, especially the Sonneratia caseolaris type, by taking the ripe fruit, usually the fruit will fall off by itself when it is ripe or the fruit is yellowish-green which indicates the fruit can be picked. The sustainability of the Sonneratia caseolaris type is by dividing the fruit that is processed into syrup and that is made from nursery material, considering that for this type of nursery it comes from very ripe fruit, usually, the fruit that is used as a seed is the fruit that falls from the tree.

Economically, processed mangrove products are sold to visitors who come to Cemara Beach area. The sustainability of the existence of these processed products, by selling out of the area and while it is still in the stage of introducing it to several government women's organizations. Self-reliance group is assessed based on their ability in the preparation of production plans, organizing group, implementation, and capitalization which are entirely done by the community independently. This self-reliance is obtained from the processes of maturation group since they were involved in mangrove conservation activities [12]. The self-reliance of the women group in managing mangrove food products can be assessed based on the elements. These elements are common need, the potency of local resources, local knowledge of the community, institutional and its network, social energy, and processes and mechanisms within the organization [14].

3.3. Community Based Management of Special Interest Tourism Areas (Ecotourism)
Cemara Beach is designated as one of the tourist destinations in Banyuwangi Regency. The tourism that is presented is not beach tourism in general but is more towards conservation. The conservation in question is the conservation of turtles, sea pines and mangroves. The three coastal resources are managed in an integrated manner so that there is no overlapping or fighting over management priorities. Sea turtles that land on the Cemara Beach to lay eggs require a representative area, so a core zone is established in which there are sea pine plants which are dense enough to be suitable for nesting turtles eggs. On the other hand, the core zone adjacent to the river which extends along Cemara Beach contains mangroves. Mangrove itself functions to protect the coastal area from abrasion and to maintain water absorption around the core zone, considering that pine itself is a plant that requires a lot of water. This conservation value, then directly impacts in its management as well as ecotourism. Mangrove ecotourism attractions that can be enjoyed by tourists are mangrove tracking along the river to the estuary, mangrove tracks where people can enjoy the atmosphere of the mangrove forest by knowing the types of mangroves in the area, and even taking selfies.

Ecotourism management at Cemara Beach is carried out by the community groups themselves, starting from planning, implementing to monitoring and evaluation. In doing the planning, the community itself designs and makes a mangrove track that ends at a mangrove nursery and there is a display of processed mangrove products that tourists can buy and enjoy immediately. Cemara Beach is designated as one of the tourist destinations in Banyuwangi Regency. The tourism that is presented is not beach tourism in general but is more towards conservation. The conservation in question is the conservation of turtles, sea pines and mangroves. The three coastal resources are managed in an integrated manner so that there is no overlapping or fighting over management priorities. Sea turtles that land on the Cemara Beach to lay eggs require a representative area, so a core zone is established in which there are sea pine plants which are dense enough to be suitable for nesting turtles eggs. On the other hand, the core zone adjacent to the river which extends along Cemara Beach contains mangroves. Mangrove itself functions to protect the coastal area from abrasion and to maintain water absorption around the core zone, considering that pine itself is a plant that requires a lot of water. This conservation value, then directly impacts in its management as well as ecotourism. Mangrove ecotourism attractions that can be enjoyed by tourists are mangrove tracking along the river to the estuary, mangrove tracks where people can enjoy the atmosphere of the mangrove forest by knowing the types of mangroves in the area, and even taking selfies.
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Community-based tourism management is tourism management that takes into account environmental, social and cultural preservation. Managed and owned by the community for the community, to raise awareness and learn about tourism, people and their way of life. Community-Based Tourism is not only a tourism business that aims to maximize the benefit for the investor. Community-Based Tourism comes from community development strategy by using tourism as a tool to strengthen the organization ability of villagers who manage tourism resource with local community participation. But, Community Based Tourism is far from a perfect solution and it packed for community problems. If Community Based Tourism is applied haphazardly, it can cause problems and bring disaster [15]. Community-Based Tourism can be identified as a community development strategy through self-reliance, empowerment, sustainability, and conservation, and cultural development to improve livelihoods in the community [16].

The existence of Cemara Beach is currently quite supported by the Banyuwangi Regency Government, it is evident that the area filled with prawn cypresses and mangroves has been designated as the urban forest area of Banyuwangi Regency, and is currently still waiting for the issuance of a Banyuwangi Regent Decree. In the future, the community of the Cemara Beach management group can live in peace because with the Regent's Decree the area will not be transferred to land functions, because the urban forest is a requirement in city management towards a smart city in managing the environment.

The management of special interest areas on Cemara Beach, apart from prioritizing conservation values, is also related to ecotourism, where some of the ecotourism attractions presented are packed so that many tourists come with the hope that the economic impact can increase the income of the coastal community of Cemara Beach as a whole. For this reason, a promotion that can be national and global is needed, so one of them is through a website managed by a member of the partner group with the url address is pantaicemara.com.

3.4. Sustainable Coastal Management

The Cemara Beach area has a fairly long coast, where its use is not only related to ecotourism, but fishing is also the main livelihood for coastal communities. In this case, the coastal area must also be managed in an integrated manner and not focus on just one area.

Management of the coastal area, not all beaches are planted with sea pine trees, but some are given space for fishing activities, especially fishing boats to rest. It's just that when a storm occurred due to extreme weather around April - June 2020, the trees that were planted were damaged, only those that were more than 3 years older and more than 2 meters high survived the storm. As a result, if there is a high tide, recently seawater has entered the coastal area. Fortunately, the Cemara Beach area also has mangroves so that are maintaining the height of the land and seawater does not cover the area, especially in the tourism use zone.

In this regard, the community is given an understanding of sustainable coastal management, especially overcoming natural problems. Planting spruce and mangroves must still be done regularly, if pine and mangrove seedlings can be planted then planting must be done immediately in empty spots. In addition, so that at high tide the water does not continue to enter the area considering that currently, the area of the coast has also decreased due to abrasion some time ago due to extreme weather, then hardware is made to break the waves, namely the tetrapot. In this case, the community is trained in making a breakwater from a tetrapot, so that in addition to preventing abrasion, it can also be used as marine tourism by taking selfies.

Development of a coastal area, first is considered economically sustainable (economic growth) if the area is capable of producing goods and services on an ongoing basis; second, it is considered ecologically sustainable (ecological sustainability) when the base of natural resource availability can be maintained stably, there is no overexploitation of renewable natural resources, there is no disposal of waste beyond the capacity of environmental assimilation which can result in polluted conditions, and the utilization of resources that cannot be which is accompanied by adequate development of
substitute materials, and third, it is considered to be socially sustainable if the basic needs of the entire population are met; there is a fair distribution of income and business opportunities [17].

The community is given an understanding of sustainable coastal management not only related to making breakwaters or nurseries and planting coastal plants and conservation plants, but the community also gives an understanding of the main priority in protecting the coastal environment and its surroundings, which is to maintain cleanliness. Even though the mainland area is quite clean, even the Environmental Service Office also assists in the form of a garbage processing facility, but in the river area, it is still dirty even if the tide rises it will be followed by rubbish entering the river. For this reason, the community also gives an understanding of making trash traps that are installed near the estuary. So that garbage does not enter the river but is blocked by the garbage trap, and then members of the community group who regularly collect trash trapped in the trash trap. To realize the development of coastal areas sustainable, integrated coastal zone management is needed. This choice is based on 1) Coastal areas is a multiple-use zone where there are more than two kinds of natural resources and environmental services and there are more than two types of utilization of the coastal area; 2) Characteristics and natural dynamics of the nature of coastal and marine resources which are ecologically interrelated with one another, including the upper land ecosystem; 3) The coastal area is inhabited by more than one ethnic group that has different livelihood preferences [17].

4. Conclusion
Communities are capable of entrepreneurship based on mangrove potential on the pine beach, with the emergence of processed mangrove products into peyek, tea and mangrove syrup. The community can deal with changes in technology innovation and overcome the negative impacts of developing special interest tourism with the emergence of ecotourism attractions, namely mangrove tracks, mangrove nursery education, and mangrove tracking. The community can plan integrated and sustainable management of areas that will be used as the basis for implementing physical development, spatial facilities and special interest tourism infrastructure.

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