

Economic Analysis of Mangrove Forest Over Land Functions Into Plantation in Damas Beach Trenggalek Regency

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ABSTRACT

Extensive coastal mangrove forests in diminishing Damas in a span of over 10 years due to the function of mangrove land into plantations. The purpose of this study is to assess the economic benefits of mangrove forests surrounding community as well as analyze the plantations of the mangrove land has shifted function. In economics, mangrove forests still have economic value that can be enjoyed by the community. Direct use value can be identified from the catch of white shrimp, crab and green shells. And indirect use values of mangrove forests can be calculated on the basis of biological functions, retaining intrusion and coastal protection. Transfer of benefits mangrove forests into plantations conflict. Moreover, management of mangrove ecosystems has not been done in a professional manner. Institutional governing mangrove forest in the Coast Damas experiencing good growth in personal and systems, and the latter is part of the Community Cluster Monitor. Yet still the violation is harvesting plants and conversion of land for agriculture. The decline in mangrove area and is caused by the opening of coconut plantations and agriculture, which is conducted by a group of people who in the name of the group PHBM (Pengelola Hutan Bersama Masyarakat). From the results of research is recommended to explore the local rule-making in the form of village rules that govern the organization of society to the mangrove deforestation could be reduced.

Keywords: over land, mangrove forests , the economy, local arrangements

INTRODUCTION

Mangrove forest is one of the natural resources in the coastal areas that function as counterweight ecosystem coastal areas and the sea. Sustainable mangrove forest will keep the survival of marine biota. According Melana et al (2000) ; Supriharyono (2000) and Bengen (2001) , among other functions of mangroves as a life different types of fish, shrimp , crab and fish do reproduction process (spawning ground) ; supply food for species live under it (feeding ground) as a protective environment and ecosystem of coastal erosion, waves and ocean currents ; produce organic biomass and absorbing pollutants beach area .

Prigi Bay area is located on the South coast of Regency East Java Surfing Competition. In the management of coastal resources, this area was carried mangroves rehabilitation. Location rehabilitation is Damas Beach, with activities COFISH Project in 2003. There are two areas of mangrove forest in Pantai Damas, that Cengkong Pancer and Pancer Bang. In the area of management, institutional management developed jointly between the government and the society, the principle of co- management. Institutional management of mangrove forest was known as Cluster Manager Mangrove, an integral part of Kelompok Pengelola Sumberdaya Perikanan (PSBK) last developed by the COFISH Project .

Government commitment to the management of mangrove forests is quite high. In addition to the mangrove forest rehabilitation through Project COFISH also set the mangrove habitat and promulgation of District Rule No. 10 of 2004 concerning the Management of Fisheries Resources in Manado. PERDA setting is intended that the mangrove rehabilitation efforts can achieve the ultimate goal that is increasingly growing mangroves as a buffer living marine biota. However, in the last 10 years occurred in the mangrove reducing debt extents Damas Beach . Based on the report Cofish Project in 2003, extensive mangrove locations in big Damas Beach 43.1 ha , consisting of mangrove forest in Bang Pancer 32.27 ha and 10.83 ha Ngrumpukan Pancer . Susilo et al study results in 2007 mangrove forest area in Bang Pancer of 1 , 022 ha in damaged condition ; mangrove area in Pancer Ngrumpukan of 0, 178 ha in damaged condition ; well as the mangrove area as large as 10,057 ha Cengkong Pancer also in a damaged condition . Over the function of the location of the mangrove tree planting rice and coconut is a common phenomenon occurs in the Prigi (Susilo et al , 2007) .

The study of the impact of the (1) economic conditions for mangroves and mangrove forest the economic benefits of mangrove forests mangrove land has shifted function . Results of the



research could be used as District XII Regional Government information in evaluating the results of the Project and bylaw COFISH set.

MATERIALS AND METHODS

Research done at Damas Coast, which suffered over the function of mangrove forest land into farming areas. The method used was a survey method that is describe in a systematic and factual about the current phenomenon (Nazir , 2003) . This study material is the institutional management of mangrove forests, mangrove forests and the economic benefits of joint analysis of mangrove forest plantations.

Field study conducted on institutional conditions governing fishery resources associated with the management of mangrove forests and the role of government in society. Institutional effectiveness of a search performed in the description of the organizational structure, work organization mechanism, incentive systems, and obstacles in running the organization, both internally and barriers external barriers .

Assessment of economic benefits is done through the use value calculation (Use Value) refers to the calculation of the criteria put forward by Pearce and Turner (1990) and Pearce and Moran (1994) . Use Value in principle be interpreted as an individual values obtained for direct utilization of natural resources and the environment. Use Value distinguished further into the consumer directly (Direct Use Value) and the use of indirect (Indirect Use Value) and the option (Option Value) . Direct Use Value associated with the direct output can be consumed (Pearce and Moran , 1994) . In this study Direct Use Value done by calculating the entire continuum of the ecological sustainability of economic commodity based mangrove forest produced based on the fishermen catch per annual sale price multiplied by the following formula ;

$$\text{Commodity value} = (T \times H) - B$$

Where: T = capture commodity in mangrove area

H = commodity price (USD / kg)

B = operational cost (Rp)

Indirect Use Value is determined by the benefit derived from environmental merits in supporting the flow of production and consumption (Munasinghe , 1993) . In this study the value of the Indirect Use Value is calculated based on the benefits of mangrove forests from a wide range of ecological functions .Plantations financial analysis is done by calculating the R / C ratio and rent ability effort. Based on the results of the analysis will be compared to the economic value of mangrove forests and plantations financially. Made further recommendations to management based on sustainability ecosystem the mangrove forest.

RESULTS AND DISCUSSION

Coastal Mangrove Rehabilitation Nowadays

In 2003 at the coastal mangrove rehabilitation activities carried out through COFOSH Damas Project. Based mangrove rehabilitation and Project Co fish report (2003), extensive mangrove locations in Pancer Bang 32.27 ha. Very diverse mangrove growing from seed size , stakes, poles and trees . There are 10 different types of mangrove that is, *Acanthus illicifolius* , *Lumnitzera racemosa* , *Nypa fruticans* , *Ceripod descandra* , *Sonneratia Alba* , *Rhizophora mucronata* , *Aegiceras corniculatum* , *Rhizophora apiculata* , *Heritiera globosa* and *Heritiera littoralis* . The dominant species are 3 types consecutively, namely: *Nypa fruticans* , *Rhizophora mucronatadan* *Sonneratia Alba* (Susilo et al , 2007).

Based on the results of measurements of extents of mangrove forest (mangrove) , drastically reduced extents . Potential areal extents live 10 hectares, and mangrove areal extents that are good live experience and reforestation only 3.3 ha . Natural mangrove forest area of 2 ha . Analysis is also performed on a variety of plants and growth of mangrove plant community , dominant vegetation types namely stride / tinjang (Till - Stilted Mangrove) including *Rhizophora Sp.* with a thickness of about 5 cm. mangrove forest is only about estuary upstream edge with seed size and spikes (dominant) and in good condition (thrive) . While the outcome of mangrove reforestation at Pancer Bang 0,3 ha . Based on Observations, declining acreage and type of mangrove due to the encroaching palm plantations and agriculture on it, Selatan, is done by the community group called PHBM rise (Governing Joint Forest Society). Pancer status mangrove planting mangrove Bang is the result of natural and reforestation, mangrove forests where natural conditions of 2 ha , with the type of vegetation types stride / tinjang (Till - Stilted Mangrove) including *Rhizophora Sp.* e located around the upper edge of the mouth nd thrive . While the outcome of mangrove



reforestation at Pancer Bang live of 3 ha and planted in 2002 with a implementer is Mangrove Cluster Manager (GPHB) on Cofish Project cost . Pancer Bang mangroves function now is as : (1) retaining erosion , (2) habitat for fish life , with many types of fish are found mullet , shrimp , crabs and milkfish. Mangrove forest management from District XII Regional Government initiated in 2002 , to facilitate the formation of Mangrove Monitor Cluster (GPHB) . Membership of the local community GPHB is directly related to the mangrove ekosistim Damas Beach . GPHB formation is part of a group work program PSBK "Prigi Lestari" . Expected to uphold the mangrove forest rehabilitation program that was implemented in 2003 . GPHB Damas has a local consensus rule for sustainability and biodiversity of mangrove forests surrounding it. Local arrangements are agreed upon in the discussion staff are: (a) the prohibition mangle mangrove forest (b) sanctions for violation of the ban, and (c) utilization of mangrove forests. Organizing group Damas Mangrove and Coral Reefs grow well, and is part of the Community Cluster Monitor (POKMASWAS).

In the framework of local rules of socialization, has installed a bulletin board containing prohibitions and sanctions. Local Rule is intended to determine the economic value of mangrove forests. Fill local arrangements between whoever else take and utilize mangrove forests should pay lost value taken from mangrove forests. However, forest damage as a result of deforestation cannot be avoided. Mangrove harvesting is used for various purposes, among others for wood, building materials and conversion of mangrove forests into agricultural area . Agricultural area planted with coconut trees. Tidal areas are used for planting rice fields. In a span of 10 years after being mangrove forest rehabilitation program, was still happening reduction extents of mangrove forests. Declining acreage and type of mangrove due to the encroaching oil and agricultural plantations done by the community group called Joint Forest Community Organizing (PHBM). Institutional resource management built for mangrove rehabilitation seems to have been lost or no longer have customary laws. In practice, violations and irregularities are found even local governments have set rules. Organizing group even formed Mangrove and coral reefs in Damas and do the organization, but still a breach in the form of mangrove vegetation clearing and land conversion to agriculture. The process of mangrove forest resource damage can be prevented. Available data indicate that the mangrove forest damage caused by human activity. Some efforts to minimize harm to other mangrove forests between the rise in community based forest management in the Village Karanggandu pioneered by Forest Country Consultative Board (LMDH) " Argo Lestari " . LMDH " Argo Lestari " to introduce reforms in the system of government pattern " gopla " toward a more sustainable and economically , has two blades on mangrove forest management . System "gopla " is open woodland including mangrove forests for the benefit of the farming and agricultural land.

Ecosystem Economic Valuation of Mangrove Forests

The existence of the remaining mangrove vegetation on the beach Damas currently still entrust this mission to the community. Some fishermen do fishing around mangroves and shrimp. Served following the economic valuation of mangrove ecosystems based on the use of direct and indirect use values

a. Direct use value

(1) Value of White Shrimp (*Penaeus mergulensis*)

White shrimp (*Penaeus mergulensis*) is a type of shrimp that live in the waters , especially in the area of the lot comes down to the great river. White shrimp have white carnations and yellow until spots are brown and green on the tail end. Prawn catches in the mangrove forest average of 770 kg / week. Price of white shrimp in the study area as large as Rp.25.000/kg . Total operating costs Rp . 34,065,625, -/year. Thus total fishing income that can be enjoyed for one year from Rp white shrimp. 839 934 375, - .

(2) The value of mangrove crab (*Scylla serrata*)

Crab fishermen arrested around mangrove forests using catch "traps" made of iron. Total average production yield 1.365 kg / week. Commodity prices at the level of mud crab merchant Rp.26.000/kg big collectors. The average size of operational costs Rp.248.625.000 , -/year . Thus the total income in the year of the crab commodity after deducting operating costs Rp.1.454.895.000/year .

(3) The value of Green Mussel (*Perna viridis*)

Green Shells live in the intertidal and sub tidal, strong stick and clustering on hard objects with it string *byssus* , sheltered from strong currents and avoid high salinity fluctuations . These animals live under sandv mud and away from the influence of a mighty river. How to capture er" with a length of 50-80 cm and 5-8 cm wide.) / week. This commodities on the collectors is



sold about Rp. 15.000/box. The average size of operational costs Rp.29.355.000,-/year. Total income in a year from mangrove oyster commodity after deducting the operating costs of Rp. 625 845 000 , -/year.

b . Indirect use values

Identification result indirectly from the use of mangrove ecosystem is composed of a variety of ecological functions include: biological function and physical function (as relievers' intrusion and coastal protection)

(1) Biological Function

Based on the observation results showed that mangrove forests have a function as a nursery area (nursery ground) , district foraging (feeding ground) and spawning areas (spawning ground) . This is supported by the arrest of several kinds of fish caught in the mangrove forest habitat. The dominant types of fish caught in the waters of other mullet (*Mugil cephalus*) , snapper (*Lutjanus* sp.) , Ornamental fish (*Botia*) . Calculation of the economic value of biological functions approached through mangrove ecosystem carrying capacity calculations for fish . Value of mangrove forest ecosystems contribute to fish production in the years around 1315.93 kg of fish per hectare mangrove extents . As such, coastal mangrove forests in the province of Damas can produce 123,697.42 kg fish / year . Assuming an average price of Rp fish . 9000/kg , the value of fish production after deducting the operating costs of fishing income earned Rp.160.606.780/year Rp.52.670.000 size .

(2) Retaining intrusion

Possible substitute cost method to calculate the mangrove forests function as retaining the entry of sea water into land . This approach is one of the economic valuation method based on production potential and is used to assess an ecosystem that has suffered damage . Ecosystem damage will cause society to accept a loss and have to pay a certain amount to recover the goods or services that have been lost . Total production to recover the goods and services referred to herein cost replacement.

This calculation is based on the findings in the field that the community around the coast would be threatened depletion of fresh water when there is no mangrove forests . Thus the calculation of the economic value of this function is approximated on the use of water based on the needs of each family . Karanggandu total village population is 6461 souls and consists of 2195 heads . The need for fresh water for drinking and cooking their average family 3 gallons / day , with pricing Rp.3.000/galon . So necessary to the average per year for each family size of 1.095 gallons / year, so your cost for big freshwater Rp.7.210.575.000/year .

Analysis of Mangrove Land Farming Efforts Have Shifted Function

Most people become worker at forestry land through Joint Forest Management Society (PHBM) . Some kind of a lot of corn, coconut, banana, petai and durian . Some household current from pioneering plant trees in line with the improvement in the price of clove market. Land road to self- administer land agro forestry can be removed in others. High land prices adapted to the low land in mountain location . Higher locations with wide 1.5 - 2 ha , has a price of Rp 3.000.000 , - to Rp . 5.000.000 , - . However, if a strategic location , the higher the land value . Price vast patch of land with little more around 0.25 ha per box Rp . 10.000.000 , - but could be more if the land is already mature rice crop management . Taxes that must be paid to the forestry Rp . 80,000 , - /ha/year. Additionally, Agro forestry also earn revenues from some commodity crop grown worker based systems of the result. For the forestry revenue received for oil Rp . 1000 , -/tree/month . As for the result clove Rp. 60.000 , -/kwintal . From forestry land worker effort , fisherman household average revenue of Rp. 1,924,523.00 / year . Some part of the harvest is used for own consumption.

Two major challenges in the management of mangroves in Damas is as follows . First , is the availability of choice for short-term economic logic , direct and real, the economic logic of long-term resources and simply cannot be enjoyed . This moment of necessity to chop food for planting mangrove trees, fields and farm it as , is a very potential strength of the functions of mangrove forests. Second, the existence of overlapping legal rules about managing coastal resources were responsible for unclear mangrove forest management system .In the future management of mangroves in Coastal Damas need a operational arrangements and can be carried out by GPHB Damas . Similar to FSPP management plan , then a good time with cravings Karanggandu village government , mangrove forest management systems and coral reefs in Damas will be reinforced



CONCLUSION AND SUGGESTION

Conclusion

1) Group of Governors Damas Mangrove Coast , take over management of mangrove around the bay. Institutional experienced good growth in personal and systems , and the latter is part of the Monitor community groups . Organising groups were formed even in Damas Mangrove and take over management , but still a breach in the form of mangrove vegetation clearing and land conversion to agriculture. Declining acreage and type of mangrove due to the encroaching palm plantations and agriculture on it, which is done by the community group called PHBM (Governing Joint Forest Society) .

2) On the economy, mangrove forests still have economic value that can be enjoyed by the community. Direct use value can be identified from the catch of white shrimp , crab and green shells . Is the indirect use of mangrove forests can be calculated based on the biological function , retaining intrusion and coastal protection .

3) There is a choice of short-term economic logic , direct and real, the economic logic of long-term resources and simply cannot be enjoyed . This moment of necessity to chop food for planting mangrove trees, fields and farm it as , is a very potential strength of the functions of mangrove forests.

Suggestion

1) To review more mangrove forest management that have other economic value through the development of mangrove forests tourism spot . More enhanced role of community through training and mentoring in tourism spot organizing efforts , as well as mangrove seed processing into a variety of food and beverage use mangrove based economic development efforts .

2) Required in the form of a local rule that regulates the organization of village mangrove forests for society to mangrove deforestation could be reduced .

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