

**MANGROVE MANAGEMENT IN DAMAS BEACH: ECONOMIC AND
INSTITUTIONAL ANALYSIS**

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ABSTRACT:

The aims of the study are: (1) conducting analysis economic valuation; (2) identifying economic behavior of household; and (3) examining the institutional management of the agro-forestry mangrove. The instruments to collect the data are mainly surveys and in-depth interviews. The results show that: (1) the value of direct use consists of the value in the field of fisheries and agriculture, while for the value of the indirect use is in the form of biological function and anchoring instruction; (2) land use conversion of the tidal area around Pancar Bang was due to the absence of agreement to the area between the management of the establishments concerned; (3) local communities still have the availability of working time in the business development of mangrove-based process, and it can be used as learning materials that the mangrove ecosystem as a receptacle of beach ecology and provide economic benefits; (4) mangrove resource management profile shows that first, the condition of the mangrove forest area has decreased, and second, coastal resource management has not made any integrated resource management system. .

Keywords: mangrove management, household economic, local politics, resource economics

1. INTRODUCTION

Agro forestry system has been developed in various forms based on the conditions of the place, social, economic, and cultural communities. Devy et al (2013) proposed some ideas related to agro forestry, of which are as follows: first, agro forestry is a solution to the decreased land in forestry and agriculture. The success of land management through agro forestry systems not only plays an important role as the foundation of economy of local community, but also plays an essential role in the improvement of environmental quality. Second, agro forestry is able to overcome the problems of the people's life, so it is necessary to influence any policy recommendations to anticipate the damage to natural resources in the future. Third, local wisdom practiced in agro forestry management in protected forests tends to be undervalued as it is different from the available provision or protection forest management policies. Fourth, one of the important factors in developing agro forestry in Indonesia is to increase the competitive value of agro forestry economy.

One of the agro forestry systems which have been developed in Indonesia is mangrove agro forestry system. Mangrove forests are group of tropical coastal vegetations, which are dominated by several species of mangrove trees that can grow and develop in the area of tidal area of muddy beaches. The vegetation communities generally grow in the intertidal and supratidal area where receive enough water supply, and protected from large and strong tidal waves. To this, there are many beaches with mangrove forests are preserved from any abrasion of the waves (Bengen, 2001, 2002). Mangrove ecosystem consists of two parts, the mainland and the water area. For water area consists of two parts, namely brackish and brine water area. Mangrove ecosystems are well-known as productive and full of resources, and the ecosystem itself is heavily subsidized with energy as the tides are beneficial in spreading the nutrient substances.

Mangrove forests are often also called coastal forests, tidal forests, brackish, or mangroves. Mangrove forest is a typical of tropical forests that grow along the coastal area or river estuary which is affected by the tides. Mangroves are found in coastal areas that are protected from the onslaught of waves and a sloping area. Mangroves grow optimally in coastal areas that have a large river estuary and deltas in which the flow of water contains a lot of mud. While in coastal areas that are not contained estuaries, the growth of mangrove forest is not optimal. Mangrove may not or it is difficult to grow in steep and large choppy coastal areas with strong tidal currents because these conditions do not allow sedimentation of the mud and the substrate required for the growth of the mangroves (Dahuri, et al., 1996).

Mangroves may even grow in poor environmental conditions; yet, each mangrove plant has different abilities to preserve themselves against the physical-chemical environmental conditions in their environment. There are four factors that determine the distribution of mangroves, namely, the frequency of the tides, soil salinity, the groundwater, and the water temperature. Besides the physical-chemical factors mentioned above, there is a more important factor in determining the life and preservation of the mangrove ecosystem, i.e. human activity (Supriharyono, 2000).

According to Saenger (1983), Salim (1986), and Naamin (1990), the functions of agroforestry mangrove ecosystem include: (1) physical functions, such as keeping the coastline in order to remain stable, protecting the coast from sea abrasion and seawater intrusion; and processing of waste materials; (2) biological functions, such as fish hatcheries, shrimps, spawning several aquatic biota; the breeding of birds; natural habitat for various types of biota; and (3) economic functions, such as a source of fuel (charcoal firewood), aquaculture, salt production site, and building materials. In addition, the mangrove ecosystem is also the producer of detritus and is an area of care (nursery grounds), areas for foraging (feeding ground), as well as spawning areas (spawning ground) for various types of fish, shrimp, and other marine life.

Based on the functions, mangrove agro forestry systems can be grouped into two categories, namely, the production function and protection functions. Similar to other management for agro forestry area, in the mangrove agro forestry, both of these functions are often a source of conflict in relation to land use. The production function is carried out by farmers in the area of mangrove agro forestry, for example, often reduces the function of protection of the region, thus indirectly giving a negative impact on the fishing production.

One of places where mangrove agro forestry system is developed is at Gulf of Prigi. It is one region in the southern part of Jawa Timur Province, Indonesia, with an area of approximately 81,000 ha. Susilo et al (2008) state that the extent of mangrove agro forestry around Prigi has drastically reduced, the remaining potential extension was 10 hectares, and the remaining mangrove areas both natural and reforestation was

3.3 hectares. The reduced acreage and mangrove species in the mangrove agro forestry might be caused by land clearing for palm plantations, agriculture and farming, which were done by the local people in the name of the group of local communities Collaborative Forest Management (CFM). The implementation of the production functions through the CFM by converting the land of mangrove agro forestry area into plantation areas, agriculture and farming have lowered the protection function of the mangrove ecosystem.

Productions activities which are carried out in the mangrove agro forestry area have an impact on fishermen around the Prigi Beach, indicated by declining yields of their fishing activities. This condition may cause the vulnerability to land management conflict between the CFM groups and fishermen around the gulf region. The long term function of the mangrove is as the protection and survival area of marine ecosystems. Therefore, there is a need of an economic evaluation of the economic benefits of mangrove forests indirectly. This study was intended to identify to what extent the strategy and the economic behavior used by households at Gulf of Prigi in mangrove agro forestry activities in order to obtain the global description on economic activities of the household activities in the utilization of mangrove agro forestry.

2. REVIEW OF THE LITERATURE

General Description of the Gulf of Prigi Area

The area around the Gulf of Prigi Beach is located on the southern coast of Trenggalek in Jawa Timur Province which consists of three villages, namely, Tasikmadu Village, Prigi Village and Karanggandu Village. In relation to coastal resources management, particularly habitat resources, the region has built mangrove rehabilitation in Pancer Cengkong and Pancer Bang (COFISH Project, 2003). On the habitat area also has built an institution designed to manage jointly between the government and the local community, with the principle of co-management in the form of Tenure of Fisheries Jurisdiction Area.

There were seven locations of mangroves in the Gulf of Prigi region in the past. First was the easternmost part of Karanggongso Village which has now become settlements of local community. Second was in Pancer Ledong which is now damaged and a large part of the area was converted as an open area in a given time is used for the fisheries processing and drying, located just behind of Prigi Nusantara Fishery Port. Third was in Pancer Ngeemplak, which now has been rehabilitated by the District Government of Watulimo; due to frequent flooding, however, the condition now is unhealthy. Fourth was in Pancer Cengkong, which is the largest location in the Karanggandu Village which was once rehabilitated now also being damaged. Currently used by residents for boat moorings and split by South Road plan. Fifth was in the area Warurengkel Village which was once rehabilitation, the current condition is also damaged. Sixth was in Pancer Ngrumpukan in which reforestation has been carried out. In this location, shrimp farming was once conducted but it has not succeeded because the condition of the mangroves was damaged. Seventh was in Pancer Bang, which was kept through COFISH Project, but currently the condition is damaged again.

According to the report of COFISH Project in 2004, the extents of mangrove locations in Pancer Bang were 32.27 ha. According to the DKP Trenggalek, the mangrove forest area in Pancer Cengkong is amounted to 42.557 hectares, with 32.5 hectares in good condition and 10.057 hectares in damaged condition. The extent of mangrove areas in Pancer Ngrumpukan are by 2.178 hectares, where 2 hectares in good condition and 0.178 hectares in damaged condition. Moreover, the mangrove area in Pancer Bang is amounted to 6.022 hectares, 5 hectares in good condition and 1.022 hectares in damaged condition.

Household's Behaviors In Utilizing Agro Forestry

The behaviors of economic activities of the surrounding household in the utilization of mangrove agro forestry will determine the sustainability of mangrove forests in terms of protection function and production function. Through the household economy approach, the strategy by the households in meeting their needs through the production and income would be studied as well, including working hours and the household expenditures. In the discussion in relation to the economic behavior of the households in the use of agro forestry, there were four sub-fundamental analyses namely the production activities, income, household time allocation and spending.

In terms of production activities and income, the activities of the fishermen household are divided into two activities, namely (a) fishing activities, (b) plantations and agro forestry farming in mangrove areas. Both of these production activities have direct relation to the utilization of mangrove agro forestry. Some analyses employed in this study included analyzing factors of production consisting of fixed costs and variable costs, the production, price and income.

Moreover, the analysis on time allocation is intended to observe to what extent the availability of households in the use of their time to the activities on the household production, the production of the labor market, as well as their relaxing time (leisure). By studying the time allocation, a map of the use of time in the household can be obtained and the development of household production activities through sustainable mangrove agro forestry activities can be planned. Households made up of the head of the family, his wife and other family members are likely in economic activities. The total work activities are the number of days of one person's work in the household whether in the form of fishing activities, agricultural activities, and other economic activities.

The next point is that the sources of household income of the local communities in the utilization of mangrove agro forestry come from fisheries advantages, income from plantations and agriculture, and other economic activities. Total household income was the sum of the total profit and the fishing activity and other household income.

Finally, the results of fishery production and agriculture and plantation are used by household to fulfill its expenditures. There are two types of household expenditure, namely food expenditure and non-food expenditure. Food expenditure is calculated based on the amount of disposable income. It also is calculated the food consumption of the production of both production and agricultural, fisheries, and they are used directly for their own consumption.

Institutional Management of Mangrove Forests

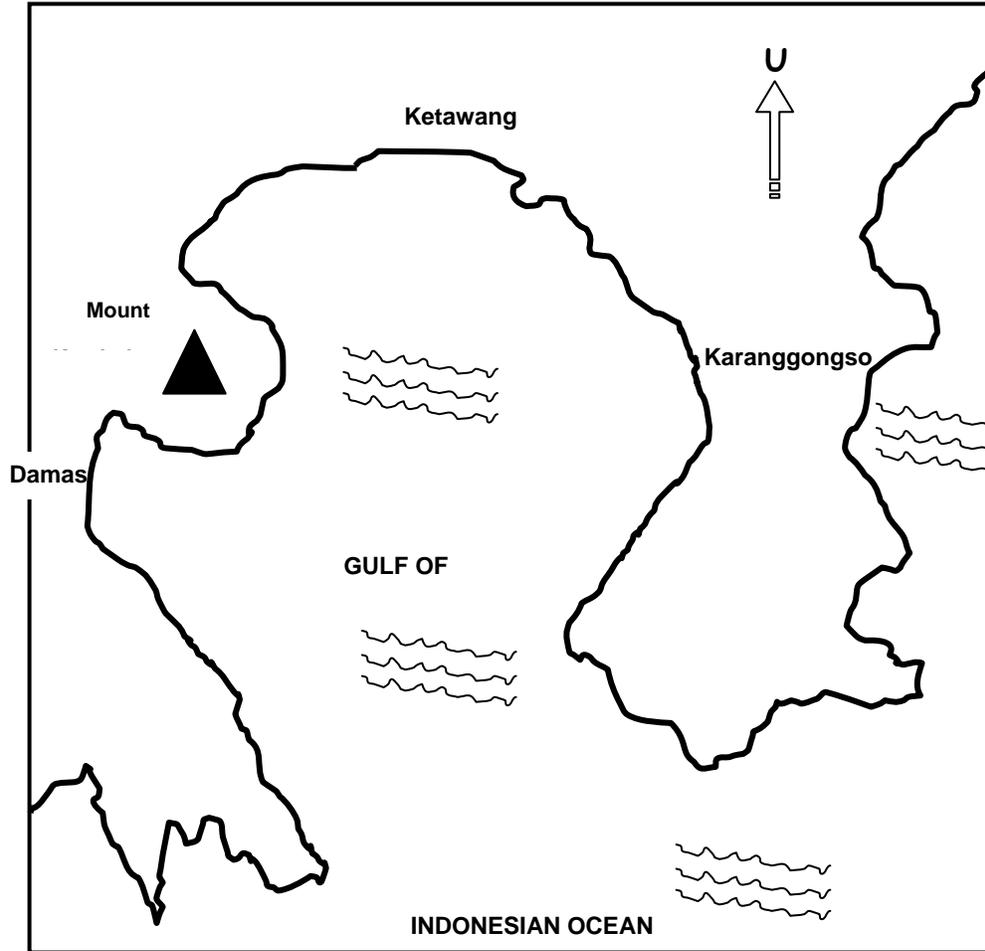
A wise management of mangrove forests is indispensable in order to maintain the balance of the ecosystem on the coastal area as well as in the sea. This management of mangrove forests will be realized if it is supported by all coastal communities. In this study, the agro forestry management activities are analyzed by studying institutional management of mangrove forests as well as the regulations which were used as the basis of the management. In terms of law and order management, product inventory was made law in the management of mangrove agro forestry, and observe violations that occur in the community, as well as sanctions for the violations.

3. RESEARCH METHOD

Study Site

The present case study was conducted at Damas around the Gulf of Prigi area in Sub-District of Watulimo, District of Trenggalek, Jawa Timur Province. The study took place in September to December 2013. Damas is the sub-gulf area of Prigi Beach. Two other sub-gulf areas are Karanggongso in the eastern part and Ketawang in the middle part (see Figure 1). Mangrove forests in Damas is divided into two locations, namely in Pancer Bang of ± 12 ha and in Ngrumpukan of ± 3.2 ha. Damas is a sub-region of Karanggandu Village. Most families in this region work as fishermen, farmers and have livestock as side jobs. The scope of this research was limited to the management of mangrove forests in these two locations.

Figure 1. Sub-Gulf of Damas in the Gulf of Prigi (Susilo, 2010)



Economic Valuation of Mangrove Agro forestry

As a protection function, the evaluation of economic benefit was performed through the use of Use Value Calculation approach (Use Value) referring to the calculation criteria proposed by Pearce and Turner (1990) and Pearce and Moran (1994). This Use Value is basically defined as the value obtained by an individual on the direct utilization of natural resources and the environment. The Use Value is distinguished into Direct Use Value, Indirect Use Value, and the Option Value. Direct Use Value is associated with an output that can be directly consumed (Pearce and Moran, 1994). In this study, Direct Use Value was done by counting all types of commodities-based economy and ecological sustainability of mangrove forests generated based on the number of fishermen catches per year multiplied by the selling price as presented in the following formula.

$$\text{The Value of Commodity} = (T \times H) - B$$

Where : T = commodity yields in the mangrove area

H = price of commodity (IDR/kg)

B = operational costs (IDR)

Indirect Use Value is determined by the benefits derived from environmental services in supporting the flow of production and consumption (Munasinghe, 1993). In this study, the value of the Indirect Use Value was calculated based on the benefits of mangrove forests from a variety of ecological functions.

The analysis of economic development opportunities in the area of mangrove forest ecosystems was based on the descriptive condition of mangrove forests in the study area. Based on the results of descriptive

analysis, it was determined that several economic opportunities can be developed based on the sustainability of mangrove forest ecosystems as management incentives.

Data

The type of data in this study was both secondary and primary data. The collection of secondary data was from the local offices such as Offices of Department of Fisheries, Agriculture and Forestry, the population data from the offices of the Village, Sub-District, District, Regional Planning Agency, and other related institutions relevant to the study, both in the form of literature studies and reports from projects and programs.

Primary data collection was the analysis of economic evaluation of mangroves and household's behavior analysis through in-depth interviews using questionnaires and direct on site observation to get a clear and detailed description. The type of primary data collected included household's characteristic, data of households and production enterprises in the field of fisheries, plantations or agriculture in general, the use of income, production activities, time allocation by the households, (production) costs, sources and amount of income, and expenditures for food and non-food consumption.

The collection of primary data was in relation to the condition of institutional management of fishery resources as well as the management of mangrove forests and the role of local community in the management. The evaluation was conducted on a series of institutional effectiveness description of the organizational structure, the working mechanism of the organization, the system of incentives and constraints in running the organization, both internal and external resistance barriers.

The research was conducted by survey that systematically and factually described the phenomena that exist now and also describe the relation between the phenomena, testing hypotheses, and making interpretations and getting the interpretation of the phenomena under this study (Nazir, 2003). According to Singaribun and Effendi (1989), the purpose of survey method was by determining the sample of a population and conducted by using a questionnaire as a tool in making primary data taken from the respondents, while secondary data were drawn from relevant institutions with the research questions.

The number of samples in this study was 60 households in the Gulf of Prigi Beach involved in mangrove agroforestry and its utilization for economic activities, good fishing activities, plantation and agriculture. The determination of the samples was through purposive sampling was based on the utilization of economic activities.

In addition to the interview, it was performed with several key figures and stakeholders. Key figures was LMD as the management of mangrove forests in Damas (Pancer Bang and Ngrumpukan), who becomes a point of entry to these sites. The profession LMD is an elementary school teacher/principal. At the end of his term as School principal, he became the Head of Village. After his retirement, he became Chairman of Village Cooperation "Mina Tami Sampurna" and as a trader of agricultural production. Now he becomes chairman of the village consultative council "Hutan Argo Lestari", which manages the forest with *gopla* system (a system that allows the local community to privatization of local food crops such as rice, corn, bananas, and other.)

There were other key stakeholders in this study, namely former of Head of Village in Karanggandu, officers of Department of Fisheries of Trenggalek in Watulimo, officers of PERHUTANI in Resort Stakeholder of Forestry in Karanggandu, fishermen utilizing nets pull in Damas area as their fishing ground, and farmers who currently use the land mangrove as agricultural businesses.

4. FINDINGS AND DISCUSSION

Economic Valuation of Mangrove Forests

Mangrove is categorized into renewable fishery resource that has huge functions and benefits both economically and ecologically. The area of mangrove vegetation on the coastal area in Damas which still exists today can be beneficial to the surrounding community. Some fishermen catch more fishes and shrimps around the mangrove forests. The direct and indirect utilization of mangrove resources can be seen in Table 1.

Table 1. The value of utilization of mangrove resource in Damas

No	Value of resources	Direct utilization (per year)	Indirect utilization (per year)
1	Mudcrabs(<i>Scylla serrata</i>)	IDR 81,811,800.00	-
2	Fish, obtained by line fishing	IDR 440,000.00	-
3	Wave breakers	-	IDR 93,699,170.00
4	Abrasion breakers	-	IDR 26,364,200.00
5	Biological functions	-	IDR 116,065,005.00
	Total	IDR 82,251,800.00	IDR 236,128,375.00

Household's Social and Economical Behaviors

Social and economical behaviors of the households and alternative jobs for the local communities as well as fishermen can be described as follows. The main activities of fishermen are fishing with fishing gear drag nets, fishermen to catch lobster and crabs. Alternative job is any activities that are done as their side jobs. This type of alternative works is available for the coastal communities such as rice farmers and as pandega on purse seine. The social and economical behaviors of the households become additional income as well for the household, including the other members of the households.

Working Hours

The working hours for fishing on the Damas Beach, most of the respondents are fishermen with pull nets who spend about eight hours to work per day. Lobster catchers only take 5 hours per day. The working hours as pandega on purse seine spends approximately 11 hours per day.

The working hours of husband can be distinguished in terms of their works in fisheries and non-fisheries. Husband's profession in fisheries included fishermen with pull nets, lobster fishermen, laborers and fishermen pull nets in search of crabs. Working as fishermen with pull nets is usually carried out between August and November amounted to 102 person-days per year. Working as lobster fishermen is usually done from October to January amounted to 67 person-days per year. Crab fishermen use an average of 156 person-days per year while employment as dragging net workers is usually conducted in August to October of 102 person-days per year working hours.

The type of husband's non-fisheries jobs included: plantation, farmers and officers of Village Institution of Forestry. The average working hours of these jobs amounted to 93 person-years per day per year for mooring on the plantation. The working hours might be different as each plant has a different harvest season. Time used to carry out activities in fields, namely on the fields such as mowing and harvesting. Mowing activities in the fields takes 1 day / week in average with 7 hours per day. Working as a corn farmer spends 66.75 person-days per year; the same do the rice farmers who spend 66.75 person-days per year. Thus, in one year, working as a farmer spends 134 person-days per year. Respondents working as a member of Village Institution of Forestry have an average working hours amounted to 113 person-days per year. The highest average number of working hours is working as farmer amounted to 134 person-days per year, while the lowest average working hours is moor amounted to 93 person-days per year.

The working hours for the wives which is usually called as home production is domestic works done every day by the housewives. These activities are not rewarded with money or goods (caring of the household, husband, and children). Meanwhile, productive activities by the wives are any activities rewarded with money or goods that make money (making sticks, making nets or making smoked fish for foods). Productive activities by the wives include helping the husband such as preparing for foods for the workers who drag the nets as the fishermen. There are also social activities done by the wives including religious activities, gathering, and family and women empowerment program. The highest average working hours is working as net pullers amounted to 134 person-days per year, while the lowest average working hours is selling fish amounted to 27 person-days per year.

Jobs for boys in Damas Beach are draining boats, fishing, lobster fishermen, farmers, workers and netting or dragging nets laborers. The average working hours for draining the boats amounted to 304 person-days per year, fishermen amounted to 351 person-days per year, lobster fishermen amounted to 67 person-days per year, farmers on the fields amounted to 281 person-days per year, netting workers amounted to 386 person-days per year and dragging-nets laborers amounted to 106 person-days per year. The highest average

working hours is netting of 386 person-days per year, while the lowest average working hours is lobster fishermen for 67 person-days per year.

Jobs for girls in Damas Beach are mainly to prepare and assist to smoke the fish. The other activities are to help the preparation for fishing activities on the sea and it requires working hours to 40 person-days per year, while working as smoking the fish requires 80 person-days per year.

Fisherman Household Income

The income earned by one fisherman family could be from fisheries and non-fishery activities, both earned by the heads or members of the families. For example, fishing activities are usually conducted in August to November, carried out 6 times a week (most of fishermen in Damas Beach take break from fishing activities on Friday). In addition to the above months, most of the fishermen have side jobs. According to the respondents manage their land in the forest. The land planted with bananas, coconuts, cloves and plants that produce fruit such as durian, chocolate and others.

Table 2. Income of Fisherman Household

No	Status in the family	Types of jobs	Income (IDR per year)
1	Husband	Lobster fishermen	156,000,000 to 208,000,000
		Dragging-net maker	47,424,000 to 572,000,000
		Dragging-net labor	2,600,000
		Crab fishermen	10,800,000 to 18,000,000
2	Wife	Smoked fish	5,200,000
		Dragging-net labors	2,600,000
		Broom maker	2,016,000

Mangrove Management Groups in Damas Beach

There is a community group supervising the fishery resources which manages mangrove across the gulf. This study, however, was only limited to Damas Beach with two locations mangrove areas namely in Pancer Bang and Ngrumpukan and one location of natural reef. This institution has developed both on personally and systematically, and the last part of the Community Group Supervisor (*Pokmaswas*), together with the Group of Fish Sanctuary Pasir Putih (FSPP). Violations in the management of mangrove plants are in the form of (illegal) logging and land conversion for agricultural activities. The group’s name in the mangrove forest management in Damas Beach is *Gugus Pengelola Hutan Bakau*(GPHB) *Jangkar Bahari* or (*Jangkar Bahari*Group of Mangrove Forest Management).

Institutional Management of Mangrove Forest Resources

The management stakeholders in Damas Beach area as a tourism area, since 2010, have been handled by PERHUTANI under the Department of Tourism. It is also related to Village Institution of Forestry Argo Lestari. The extent of land area managed by the community within the LMDH “Argo Lestari” is 4,271 hectares, divided into 13 plots and 42 sub-plots. The number of sharecroppers is 6,324 farmers spreading in 14 groups of tenants. Each group is coordinated by a group leader and is accompanied by an assistant from PERHUTANI.

Analysis of Laws on Coastal Resource Management (Mangrove Forest)

One law analysis was on the effectiveness of the law, of which one of the subjects of analysis was about the substance of the law itself. In the previous section, there has been an overlap in terms of laws or regulations, namely, the Regulation on Forestry and the Coastal regulation.

The analysis of the consistency and contradictions of the legal substances will focus on: (1) Act Number 5 of 1990 on Conservation of Biological Resources and Ecosystems (2) Act Number 23 of 1977 on Environmental Management, (3) Act Number 41 of 1999 on Forestry, (4) Act Number 31 of 2004 on Fisheries, (5) Act Number 27 of 2007 on the Management of Coastal Areas and Small Islands, and Regional Regulation of Trenggalek Number 10 of 2004 on the Management of Fisheries Resources in Trenggalek. The key terms of legal substances analyzed are which related to the management of coastal border, fish sanctuary, coral reefs and mangrove forests, with the key words namely: (1) the management system, (2) the coverage of resources, (3) conservation, (4) high-tide, (5) community participation, (6) authority, (7) supervision, (8) prohibition, and (9) sanctions for any violations.

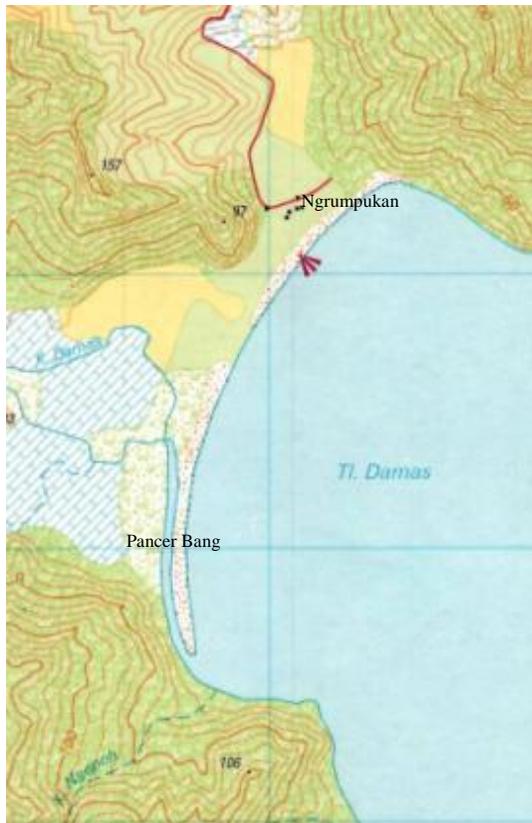
Village Regulations to be prepared would have to go through the trial process in the Village Advisory Board (BPD). The draft of the Village Regulation delivered should consist of a number of items as follows: (1) Introduction, (2) Agreements within the Locals, (3) Coverage Area Management and Resources, (4) group of business, (5) Rights and Obligations of the Community, (6) the relevant Authorities, (7) Things are Permitted and prohibited, (8) Facilities and Infrastructure Groups, (9) Sanctions and Enforcement, and (10) Closing.

Until this research was conducted in 2013, the draft of Village Regulations on the Management of Mangrove Forest in Karanggandu Village had not been discussed by the Advisory Board of the Village. The new Head of Village would be scheduled for discussion of the draft as well as the further planning.

Mangrove Forest Management in Panceng Bang and Ngrumpukan

Mangrove forests in Damas Beach can be described as follows (see Figure 2). The lack of clarity on the legal aspects on the national level between the Law on Forestry and Law on Coastal Area may cause conflicts of interests on the management of the mangrove forest area in Damas Beach in terms of its function, whether the primary is on the ecological aspect or economical needs of society.

Figure 2. Location of Pancer Bang and Ngrumpukan in Damas Beach in the Gulf of Prigi



There are two locations of mangrove forests in Damas Beach, namely, Pancer Bang with an area of ± 12 ha and Ngrumpukan about 5 ha. Forest area has changed dynamically, of which is on the one hand, it has been converted into coconut plantations and on the other hand, reforestation has been conducted by the Department of Fisheries and Forestry and Plantation. The location of Damas mangrove area is very close to the location *Gopla* Forest that reaches to 4,331.3 ha. PERHUTANI in cooperation with village consultative council "Argo Lestari" on the forest management, but mangrove forests have not been included as an integral part of the area.

Condition of Mangrove Forest after COFISH Project

COFISH Project ended in 2005. Mangrove forests in Pancer Bang and Ngrumpukan did not have good management. Group of Mangrove Forest Supervisors which was established by the project could not go well in terms of the management. The draft of Agreement on Mangrove Forest Management Workshop initiated at 2007 as not received a positive response from the Government in Karangandu village. Group of Mangrove Management in Pancer Bang named "Jangkar Bahari" chaired by JNT has not been able to manage it well. Supervisory function on the mangroves cannot be implemented due to limited availability of facilities. A boat that is supposed to be used to have supervision is not supported with operational costs.

During the interview on December 13rd, 2013, JNT explained:

In the growing season in the forest that is managed through *gopla* system, there are many farmers doing clearing of *nipah* (palm) trees in Pancer Bang. We are not authorized to prohibit it seems the authority of "Jangkar Bahari" Group is no longer respected by the farmers. "What's your position, Sir, so you can prohibit us?" statement is often asked when JNT warned the farmers not to cut the *nipah* trees.

Besides *nipa* trees growing in the area of natural mangrove forest in Pancer Bang, they also grow in the area of rehabilitation on the riverside.

The clearing of mangrove forests psychologically occurred since in 1999 there was destruction of forests in the region thoroughly. The story was stated by DJS as follows:

The destruction of mangroves was primarily done by community in 1999. In addition, the majority of coastal plants such as hibiscus tree and *ketapang* tree were cut by the community, and they were replaced with coconut trees; according to them, coconut trees are more profitable. But this time (2013) the coastal area are now planted with hibiscus and *ketapang* trees again, especially the area around the hospice group Udang Jaya II, which is located near Pancer Ngrumpukan.

The destruction of mangrove forests and land use conversion was explained by JNT, as follows:

Looting of the mangrove forests was conducted by the community around 1999 to 2001. Many mangrove woods were cut and used as a pole of building houses and fuel (charcoal). Mangrove variety of *bogem* was cut down and used as a bottle cap. In 2005, most of Pancer Bang of 0.5 hectare was converted into paddy fields and cultivated with rice and corn by village cooperation. Most of Pancer Bang area was also converted and planted with coconut trees. Information related to mangrove forests land conversion has been reported to the Department of Marine and Fisheries.

Management Plan

The management plan in the future related to this research activity will be with the following steps: (a) Negotiating with public figures and heads of villages, (b) Sharing Role with Village consultative council for forestry, (c) Planning the discussion on draft of Management of Coastal Resource in Karanggandu Village.

The latest information in 2013 about the draft of Local Agreement has not yet been discussed by the Village Advisory Board (BPD). The new Head of Village (period of 2013-2018) was expected to review the draft of Local Agreements as stated at 2007. Discussion related to the draft is an important part in the second year of this study.

The discussion of the draft will be conducted gradually. At the level of the commission will be discussed separately: (a) The discussion on the commission of Village consultative council for forestry, (b) discussion with the Commission and the Village Advisory Board (BPD), (c) Discussion at community level in Damas, and (d) Plenary discussion. After the plenary discussion, the draft will be submitted to the Head of Village in order to conduct deliberations with BPD, Village consultative council for forestry, and community representatives in Damas.

Negotiation with Public Figures and Head of Village

The negotiations with public figures and an interview with the Head of Karanggandu Village was dated back on October 19, 2013. The information obtained were as follows:

The village consultative council (LMD) did not mind upon the restoration of mangrove forest in Damas. Coconut plants must be removed from the mangrove forest area. But he said that Damas is spacious. Described by researcher that it was only of ± 10 hectare in Pancer Bang and about ± 2 hectare in Ngrumpukan; if that is the number then it was not a big deal.

This year (2013) there will be rehabilitation of mangrove forests by the Department of Forestry. Head of Karanggandu Village not mind to have comparative study to Wonorejo, Rungkut Surabaya, in relation to the utilization of mangrove fruits. He suggested involving *Pokmaswas* (Group of Mangrove Business Management).

Damas beach will also be developed as destination for eco tourism.

Goplasystem conducted by Village Institution for Forestry "Argo Lestary" legally is not in accordance with the Regulations on Forestry and Coastal, but it is factually close to the concept by McNeelly, namely farmers do "conservation" to obtain economic incentives, e.g. from crops of fruits, such as durian and petai. Farmers also planted crops such as cloves and coconut for production.

The Head of Village is also interested in the information that on the draft of Regulation concerning the village compiled by researchers in 2007. The draft of Village Regulation is intended to protect the mangrove forests in Damas, but the Village Advisory Board (BPD) have not held discussions to date.

LMD itself is a local political party which is politically affiliated with Golkar, PPP and PDI, depending on the political changes in the county. Currently the political affiliation with the District

Mayor, and he also helps the data collection at the Mayor (MYD) who is writing dissertation on LMDH "Argo Lestari".

Advanced negotiations were held on November 23, 2013, to submit the draft of agreement to the Head of Karanggandu Village and Head of Village consultative council for forestry "Argo Lestari". The Village Government of Karanggandu generally gave approval to conduct restoration of mangrove forest ecology in Damas. The restoration of mangrove forests was limited to locations in Pancer Bang and Ngrumpukan. The restoration of mangrove forests in Damas will give long-term ecological benefits to the mangrove forests as a "guarantor" of the sustainability of fish resources, and the economic benefits of the utilization of mangrove fruits and ecological tourism business opportunities could be managed by the village government.

Head of Karanggandu Village (period of 2013-2018) explained that the Draft of Local Agreement has not been discussed by the Advisory Board Desa (BPD). The new Head of Village is expected to review the draft of local agreements as stated by Susilo et al (2007) (Appendix 1). Discussion related to the draft is an important part in the second year of this study. The discussion of the draft will be conducted gradually. At the level of the commission will be discussed separately: (a) The discussion on the commission of Village Institution for Forestry, (b) discussion with the Commission and the Village Advisory Board (BPD), (c) Discussion at community level in Damas, and (d) Plenary discussion. After the plenary discussion, the draft will be submitted to the Head of Village in order to conduct deliberations with BPD, Village Institution for Forestry, and community representatives in Damas.

The commitment of Head of the village consultative council for forestry (LMDH) "Argo Lestari" was to make improvements in the management of mangrove forests in Ngrumpukan and Pancer Bang, and it can be done in several ways, such as (1) the willingness to participate in the discussion process with the Village Advisory Board (PPD) and the Village aparatur as well as the local community living in Damas; (2) To manufacture a dike to protect the mangroves in Pancer Bang from sea waves bringing the sand, which is feared to hoard relatively young mangrove trees. Dike is built of sand dredging on the river that flows in Pancer Bang.

Shared Role with LMDH "Argo Lestari"

Village consultative council for forestry (LMDH) "Argo Lestari" was established on July 18th, 2005, and it was the development of the Communication Forum for Collaborative Forest Management (CBFM), which was established on June 30th, 2003. LMDH was established as the official forum for the community as forest cultivators in Karanggandu Village in order to optimize the ecological and economic functions of the forests. LMDH "Argo Lestari" has cooperated with PERHUTANI. Plants which were included in the agreement are coconut, ketapang, mahogany, durian, heron, cloves, petai, teak, pine. The incorporated forest area was 4,311.3 hectares, with details of protected forest area of 3,374.5 hectares and production forest area of 936.8 hectares.

Mangroves were excluded as the protected plants in the agreement. LMDH "Argo Lestari" has an equal chance whether to protect or not to protect the mangroves, which in the beginning of ± 12 hectares. The indication of the utilization and conversion of mangrove plants to the current coconut trees has been running for a long time. Although LMDH has been working on creating the dike to save mangrove planted through reforestation, but there were some tidal areas where mangrove plantations tend to be replaced by palm trees.

The power of LMDH in determining forest management system in the area of PERHUTANI as Lap Forest Village in Desa Karanggandu is likely to determine the mangrove management system in Damas Beach as well. The transfer of the management of Damas Beach from Department Fisheries and Marine Resources and the Department of Tourism to PERHUTANI gives room for the LMDH to have more opportunity to intervene mangrove forest management.

Planning Discussion of Draft of Coastal Resource Management in Karanggandu Village

According to on site observation on December 13th, 2013, in Pancer Cengkong, the management has been conducted very well. Replanting the mangrove seedlings is one of the strategies conducted by Kejung Samodra. One 2.5 km-long bridge has been built over the mangrove area by local people referred to as "the bridge upset" for the local tourism destination.

The draft of Local Agreement on Resource Management that has been compiled since 2007 has not been discussed by the BPD of Karanggandu Village, and it will be addressed gradually. The plan of discussion will be adjusted in two ways. First, it was adapted to the type of resource and territory management, namely mangrove forest resources that exist in Damas area, consisting of two locations: Pancer Bang and

Ngrumpukan. Second, the discussion would be carried out gradually starting from LMDH then continued the discussion with BPD and the Village aparatur, followed by a discussion with local community living in Damas, and the latter in the form of plenary LMDH, BPD, the Village aparatur and community in Damas.

5. CONCLUSIONS AND SUGGESTIONS

Conclusions

Several conclusions based on the findings of the study can be made as follows:

- The mangrove forest in Pancer Bang has shrank dramatically, from 12 hectares at the beginning, and it is now (2013) becoming only 30% of the total (\pm 3.6 ha). The immediate benefits of mangrove forests is to catching mudcrabs and fishing, while the indirect benefits as waves breaker and abrasion prevention: biologically serves as a spawning ground and the area in search of food for the fish.
- The issue related to land use conversion in tidal areas around Pancer Bang was to plant coconut trees, plantations and settlements); around the river of Damas was for settlements and plantations and coconut plantations, around River of Gilang was planted with coconut trees. People planted coconut because it could provide immediate results economically. The occupation of the tidal area occurred because there is no any agreement on management of the area among the relevant parties.
- The working time was also spent by the fishermen households for productive activities other than fishing as fishing and farming. 50% of wives of the fishermen have activities as pull nets labors, fish sellers, smoking the fish, farmers, broom makers and helping their husband for the preparation of fishing activities. Households still have availability to work in the development of mangrove-based processing, and it could be concluded that mangrove ecosystems were as support to the coastal community and provide economic benefits.
- Institutional management has not been effective for the mangrove agroforestry resource management. LMDH has not utilized mangrove areas as an integral part in the management, so that land use conversion cannot be avoided. Potential conflicts of mangrove management occurred between those who give priority to short-term economic needs with the economic interests of long-term resources.

Suggestions

Some suggestions can be proposed according to the results of this study.

- [1]. Mangrove forest management in Damas, both in Pancer Bang and in Ngrumpukan, should be an integral part of forest management by LMDH "Argo Lestari". Therefore, the discussion of Draft of Agreement Local on Coastal Resource Management in Damas needs to be done immediately to provide for the legal aspects of the management of mangrove forests in Damas Beach.
- [2]. The restoration of mangrove ecology in Damas should get priority for the Village Government Karanggandu as Lap Forest Village in Damas area. The sustainability of mangrove forest will provide positive economic impact for the community, for the fruit of mangrove could be manufactured into cakes and syrup. Training and socialization to the local community upon the manufacture of cakes and syrup can be done through comparative study to Wonorejo Surabaya to encourage the people to preserve the mangrove forests.

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