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The Livelihoods of Local Communities: Evidence Success of Mangrove Conservation on the Coastal of East Lombok Indonesia

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Abstract. Mangrove ecosystems are natural resources in coastal areas that have their own ecological systems, and have contributed as a place for local people to get their daily needs. In this regard, the sustainability of mangroves is a necessity, so that people do not lose their livelihoods. The purpose of this paper is to assess the success of local scale mangrove conservation in its relationship as a place where people looking for the necessities of daily life. Data collected through direct observation, questionnaires, interviews and in-depth discussions. Furthermore, the data were analyzed using descriptive statistical analysis. Mangroves at the study location in their condition before 1980 had not yet been damaged but after that, there was conversion of mangrove land into salt fields, expansion of settlements and shrimp farms. In the early 1990s, mangrove was planted. The results show that a significant number of people who are directly dependent are those who are looking for shellfish, mangrove crabs, shrimp and fish as livelihoods. In addition, community groups that have indirect impacts are those who look for small shrimp in coastal waters as raw material for shrimp paste. In conclusion, the local scale mangrove conservation efforts can be a solution for the livelihoods of local communities. Therefore, a local scale conservation models can add or become a policy choice on a broader scale to maintain the existence of a mangrove ecological system for the environmental and economic needs of the community.

INTRODUCTION

Mangroves have a vital function for the sustainability of biodiversity and coastline protection from erosion. The evidence of mangrove ecological functions is as a breeding ground and can feed various species such as fish, shrimp, birds, mammals, and reptiles [1,2]. Specifically related to fisheries, mangroves have a vital function in terms of; life cycle, migration and fisheries potential and production [3]. This is confirmed by the strong association between mangrove species with fish and other biota, and many species are economical species with their respective economic interests. [4,5,6, 7] and fish productivity increases with an increase in the total area of mangrove forests and physical complexity [1].

The products of mangrove such as fish, shrimp and crabs are correlated with household income up to 43% of total income [8]. In this regard, several studies have stated, where ecosystems of mangrove have been contributed to the livelihoods of local communities[9,10,11,12,13,14], but the significant reduction in mangrove areas has resulted in a decrease in fish catch, reduction in shrimp and juvenile milkfish [15]. Therefore, conservation efforts are needed to maintain the remaining mangroves through a comprehensive policy including land use [16].

One of the relevant of programs the conservation of mangrove is a program that integrates livelihood local people's with the goals of conservation [17]. This is in accordance with the mangrove conservation program in Indonesia, including in several coastal areas in Lombok Island. The related to mangrove conservation programs, a reforestation program has been carried out since the early 1990s in the study area [8]. This research was conducted with the aim of assessing the conservation of mangroves and some of their products as a source of livelihood for

local communities. The results of this study can be the basis for making policies for mangrove conservation such as in the research location and West Nusa Tenggara.

MATERIALS AND METHODS

Sites Location

The study was conducted from April 2018 to November 2018 and the location is presented in (Fig. 1). The study location is the southern coastal region of East Lombok which includes two sub-districts namely Keruak and Jerowaru Sub-Districts, with geographical position $116^{\circ}27'0''-116^{\circ}30'0''$ S and $8^{\circ}48'0''-8^{\circ}51'0''$ E. The study site has two seasons, the east season in the local tradition called summer or dry season (April - November) and the west season called rainy season (December - March). Mangroves are one of the vegetation that can be found along the coast in the study area, and the area is 596.03. Furthermore, the research locations are location I (Tanjung Luar, Kedome and Lungak) location II (Poton Bakau and Jor Bay) and location III (Eks Bay) and the area is 33.81% of the total mangrove area on the southern coast of Lombok Island



FIGURE1. Research location

Data Collection and Analysis

Households are defined as the number of people who live or live in one house. The sampling technique is positive sampling and the number of samples at each location is determined. Characteristics of respondents are: 1) villagers and length of stay of more than 30 years and 2) livelihoods related to products and services from mangroves. The total number of respondents in each location was the location of one 150 households, the location of two 125 households and the location of three 100 households.

The research of data sourced from respondents, using through questionnaires, in-depth interviews and focus group discussions. Next, data analysis using content analysis, is to obtain a set of information according to the research objectives. Content analysis is a set of methods for analyzing symbolic content of communication and the aim is to obtain information content according to the characteristics required. In addition, a detailed and conceptual analysis was carried out on each topic and sub-topic. This is done as a researcher's strategy in ascertaining the values

and attitudes of respondents in ensuring the tendency of the whole topic and sub topic. Meanwhile, the data obtained were analyzed with an Excel computer program and Statistical Package (SPSS) which was used to produce descriptive statistics in the form of tables, frequencies, graphs, and percentages.

RESULTS AND DISCUSSION

The Characteristics of Respondent and Livelihoods from Mangrove

Three parameters are access to mangroves, distance of residence from mangrove ecosystems and occupations are as indicators the characteristics of respondents in this study. The results of the assessment in location one (Tanjung Luar, Kedome and Lungkak), are 92% of respondents indirect access and 8% direct access, location two (Poton Bakau and Jor Bay), 88% direct access and 12% indirect access and location three (Bay of Ekas), 66% direct access and 34% indirect access. The number of respondents with direct access to all locations is 66% - 92% and indirect is 8% -34% can provide information about the benefits of the existence of mangrove ecosystems. In addition, especially those with direct access, they are a group that has a dependency for their livelihood from the resources available in the mangrove ecosystem.

The characteristics of respondent, the distance of residence from the mangrove ecosystem in location one 77% of respondents have a place to stay between 25 m - 50 m, 14% more than 50 m - 100 m and 9% more than 100. Furthermore, location two is 23% of respondents have a place to stay between 25 m - 50 m, 42% more than 50 m - 100 m and 35% more than 100 m, and at three locations 16% of respondents have a place to stay between 25 m - 50 m, 33% more than 50 m - 100 m and 52% more than 100 m. The next, characteristics of respondent were livelihoods and the results of the assessment in location one, 87% of small fishing respondents and 13% were jobs other than fishermen, in location two, 42% fishermen, 39% farmers and 10% collectors of mangrove-based products and 9% besides fishermen, farmers and mangrove-based product collectors, and in location three 74% of farmers, 15% mangrove-based product collectors and 11% besides farmers and mangrove-based product collectors

Furthermore, the two characteristics of respondents are access to mangrove ecosystems and livelihoods can describe the distribution of respondents related to mangrove products. In connection with this case, the results of the questionnaire and in-depth interviews, as well as the focus group discussion, were found that mangrove products (Figure 2). Distribution of respondents based on livelihoods shows, at location three is dominated the type of livelihood as mangrove crab seekers, location two and one are dominated by shrimp seekers. These differences characteristics can be explained based on the results of in-depth interviews and focus group discussions, where in each location has different based on the main livelihoods. The main characteristics in location one and two are small fishermen, and in location three are dominant farmers.

The livelihood of respondents, especially those who work as fishermen, is the value of their dependence on mangrove ecosystem services in the form of a mangrove ecosystem contributing to fish coming around the catchment area. This is explained through the comparison of catches in the time before the mangrove was damaged with the mangrove period damaged. In addition, at locations one and two 20% - 35% of respondents mainly source of income from taking crabs, shrimps and shellfish from mangroves and at location three ranges from 14% - 22%. The results of in-depth interviews and focus group discussions, respondents at locations one and two, the relationship

is more indirectly dominant than the value of the presence of mangroves. However, in locations three, 76% - 80% respondents have a direct dependency on mangrove ecosystem resources. Another result is the presence of mangroves needed for protection from dust in the dry season and sources of coolness, especially during the daytime.

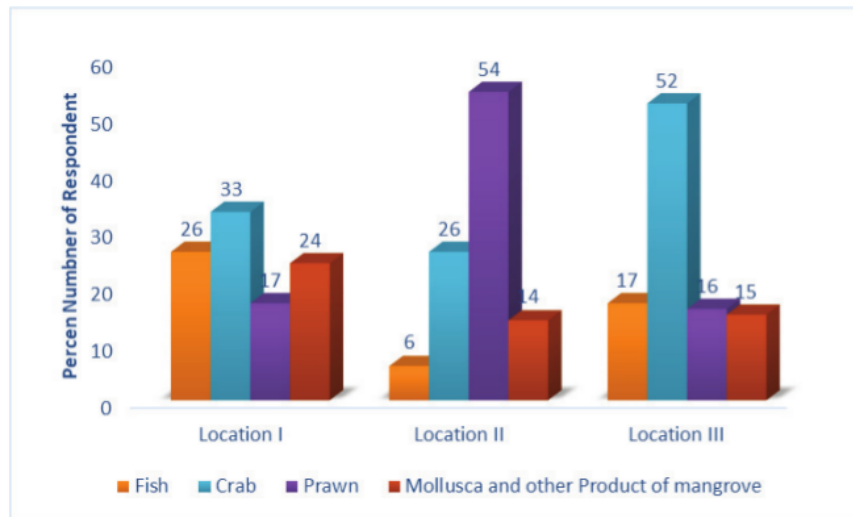


FIGURE 2. Percentage of respondents' livelihoods from mangrove products in the study location

The Conservation of Mangrove is needed by Local Communities

Mangroves in the study area had suffered significant damage in the period 1980-1990 and the source of damage was land conversion and abrasion [19]. The results of the survey and interview with respondents, mangrove conservation efforts have increased the mangrove area. Furthermore, the results of the respondent's assessment are 1). Respondents from three locations stated that mangroves that are planted and that grow naturally are the way mangroves have expanded and have become places for fishing, shrimp, crabs and molluscs, 2). 88.6% of respondents stated that mangrove conservation is an effort to protect livelihoods or restore the wealth of economic resources from the existence of mangroves before experiencing damage, 3). 78% of respondents stated that mangroves that have grown and developed through planting and growing naturally are principles that must be maintained for mangrove sustainability, and 4. 93% of respondents stated that the success of mangrove conservation is collaboration between the government and local communities

The results of the respondents' assessment described above are a form of local community response to the existence of mangroves. Besides that, this is an indicator that shows that local communities are an important component in the management of mangrove sustainability in the study sites. Meanwhile, the results of interviews, in-depth discussions, focus group discussions showed that the existence of local community institutions had not yet played an optimal role in mangrove management. Nevertheless the values of their understanding of mangroves individually are the main force in maintaining the sustainability of mangroves in the study location.

The behavior of local communities towards the existence of mangroves is a very important social capital for the success of mangrove conservation in the study location. This can be explained, that communities that live close to

resources and have a dependency on their lives can play an active role in protection from threats [20]. In addition, local communities having a symbiotic relationship with forests can be partners in forest development efforts [21]. The main thing related to this is livelihood is the main factor as motivating in their participation for mangrove restoration and management. However, those who have a low income can be given assistance so that they do not re-exploit mangrove resources [22]. Identifying and applying approaches based on local characteristics can increase the success of conservation through mangrove habitat restoration [17], and community relations with mangrove ecosystem resources can be capitalized in mangrove management policies [23,24]. Furthermore, conservation strategies by integrating traditional systems of local communities can be developed for conservation purposes [13].

Successful development of mangrove areas must be based on community opinion. In this perspective, local communities need information, especially about their livelihoods that originate from the mangrove ecosystem [25]. However, the facts about mangrove degradation trends are still difficult to stop and mangrove recovery will depend on policies that balance the priorities of social and ecological goals [26]. In addition, management changes regarding the concept of shared ownership are needed to ensure participation in conservation practices [27]. One strategy in mangrove conservation is through planting and at the same time its management is integrated with the needs of the local community [11,28].

CONCLUSIONS

Mangrove forest resources have made an important contribution to the livelihoods of local communities. Therefore, livelihood is an indicator that is a major component of mangrove conservation in the study location. In addition, to avoid deforestation and inefficient use of mangrove resources, the government needs to implement programs that can provide alternative income generators or use mangrove area in the form of environmental services such as ecotourism and education. In this case, the combination of the use of mangroves from products of goods and services is a utilization strategy to achieve the goals of mangrove conservation and diversification of the livelihoods of local communities in the study location.

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