Quest Journals
Journal of Research in Environmental and Earth Science
Volume 1 ~ Issue 4 (2014) pp: 22-26
ISSN(Online) : 2348-2532
www.questjournals.org

Research Paper

Analysis of Community Participation in the Management of Mangrove Ecosystems in Bunaken Sub-District, Manado

Swenekhe Sandra Durand[1], Keppi Sukesi[2], M. Luthfi Rayes[3], and Zetly E. Tamod[4]

[1]*PhD Student, Management of Natural Resources and the Environmental, Faculty of Agriculture, University of Brawijaya, Indonesia*
[1]*Lecturer, Agro-Business Fisheries, Faculty of Fisheries and Marine Sciences, University of Samratulangi, Indonesia*
[2]*Lecturer, Sosio-economic Agriculture, Faculty of Agriculture, University of Brawijaya, Indonesia*
[3]*Lecturer, Soil Science, Faculty of Agriculture, University of Brawijaya, Indonesia*
[4]*Lecturer, Soil Science, Faculty of Agriculture,, University of Samratulangi, Indonesia*

Received 22 December 2014; **A**ccepted 31 December 2014

ABSTRACT:- Mangrove forests are important natural resources in coastal areas and have three main functions, which are physical, biological and economic functions. Physical functions are as windbreaks, pollutant filters, breakwater, flood control and prevention of sea water intrusion to land. Biological functions are as spawning grounds, nursery grounds, and feeding grounds for fishes and other sea biota. Economic functions are as producers of wood for raw materials and building materials, foodstuff and drugs. This study aimed to identify functions and benefits of mangrove system in terms of economic, social, and cultural aspects for communities in Bunaken Sub-District, and to formulate model for increasing community participation in managing mangrove ecosystems in Bunaken region. The research method used was qualitative and quantitative methods to describe respondents' profiles in the research location. Data analysis used SWOT (Strength Weakness Opportunities Threat), identify internal factors (strengths and weaknesses) and external factors (opportunities and threats). The result show that Functions and benefits of mangroves for the community in terms of economic aspect are generally as source of livelihood such as marine and agricultural products. In terms of social aspect, potentials of using mangrove forests for tourism destination was good because tourists usually like beautiful beach sceneries and traditions of local communities. Urban villages in Bunaken Sub-district have distinctive uniqueness and beauty for tourists, such as diving, and birdwatching in mangrove forest. In terms of cultural aspect, existing and developing indigenous cultures were the cultures of ethnicities that live in the area. The presence of an ethnicity in a location is related to habits and traditions to use natural resources based on one's skills. For potential and strong factors, the strategy was progressive. For weak but potential factors, the strategy was changing strategy. For strong but challenging factors, the strategy was diversification. For weak and very challenging factors, the strategy was defensive.

Keywords:- Community Participation, Mangrove Ecosystem, Bunaken, SWOT

I. INTRODUCTION

Mangrove forests are important natural resources in coastal areas and have three main functions, which are physical, biological and economic functions (Romimotarto, 2001). Physical functions are as windbreaks, pollutant filters, breakwater, flood control and prevention of sea water intrusion to land. Biological functions are as spawning grounds, nursery grounds, and feeding grounds for fishes and other sea biota. Economic functions are as producers of wood for raw materials and building materials, foodstuff and drugs. Furthermore, there is strategic function as primary producers able to support and stabilize sea and land ecosystems.

Communities around mangrove forests have strong dependency on mangrove ecosystems because they can play a role as guardian or destroyer of mangrove forests. Therefore, efforts to improve and increase community participation and good management are required so that dual functions of mangrove forests can be implemented well and utilized optimally. Community empowerment hasn't been implemented optimally

*Corresponding Author: Swenekhe Sandra Durand
University of Brawijaya, Indonesia

because after projects are finished, when funds have run out, project implementers feel they're no longer responsible for the situation. On the other hand, people don't feel that they own the mangrove forests they have rehabilitated. People think that mangrove forests belong to the government and not them so that when they need something from mangrove forests, they take it without being monitored by the government or project implementers (Adiwijaya, 2005).

Management and utilization of coastal resources to this day are far from optimal. This is because partial management which often causes sectoral conflicts and social inequality. Additionally, management which is only based on economic consideration and tends to ignore the potentials of carrying capacity and preservation of environment often leaves remnants of development such as environmental damage and extinction of resources. Several fishery activities, such as developing cultivation areas which convert mangrove ecosystems and mine coral reefs, potentially cause degradation of coastal ecosystems and eventually threatens resources preservation. Economic development activities without planning and understanding of mangrove ecosystems causes a lot of mangrove trees to be cut down for constructions of resorts, docks and fishponds. As a result, many social, economic and environmental problems occur in coastal areas, influencing the level of public welfare. Based on the description above, a study on community participation in coastal areas, particularly in mangrove ecosystems, is required. This study aimed to identify functions and benefits of mangrove system in terms of economic, social, and cultural aspects for communities in Bunaken Sub-District, and to formulate model for increasing community participation in managing mangrove ecosystems in Bunaken region.

II. THEORETICAL BASIS

According Wazir (1999) participation can be defined as an individual's conscious involvement in social interactions in certain situations. With that definition, one can participate is s/he finds him/herself with or in groups, through the process of sharing values, traditions, feelings, loyalty, compliance, and responsibility with others.

The importance of participation is stated by Conyers (1994) as follows: *first*, community participation is a tool to get information on condition, needs, and attitudes of local communities, and without it development programs and projects will fail; *second*, people will have more confidence in development programs if they're involved in the preparation and planning processes because they will know the projects better and will have a sense of belonging to the projects; *third*, it's a democratic rights for people to be involved in the development of their own communities.

Ecosystem is coined by a British ecological expert called Tansley in 1935, although the concept wasn't new. Before the end of the 1800s, official statements on terms and concepts related to ecosystem were published in ecological literatures in America, Europe, and Russia (Odum, 1993). Based on the creation, ecosystems are categorized into natural ecosystem and artificial ecosystem: Natural ecosystem is a type of ecosystem which occurs naturally without human intervention. Examples of natural ecosystems are river, lake, sea, dessert, tundra, pasture ecosystems, etc. Artificial ecosystems are ecosystems made by human for certain purposes. Examples of artificial ecosystems are rice field, dam, reservoir, garden, production forest ecosystems, etc.

Mangrove ecosystem is a system in nature where life takes place which reflects mutual relations between living creatures and their environment and among living creatures, located in coastal areas, influenced by sea tides, and dominated unique tree or bush species and able to grow in salt/brackish water (Santoso, 2000). Functions and benefits of mangroves are well known, e.g. as fish breeding grounds in coasts, protector of land from abrasion, protector of land from winds, filter of sea water intrusion to land and dangerous heavy metal, stopovers for birds during migrations, and habitats of wild animals, as well as other benefits for human. 1,09 m-high waves in Grajagan Bay, Banyuwangi with wave energy amounting to 1.493,33 Joule was reduced by mangrove forest to 0,73 m (Pratikno, 2002). The result of Istiyanto's study (2003) which tests models in laboratory shows that clumps of mangroves (*Rhizophora sp*.) reflects, carries, and absorbs the energy of tsunami waves by changing the height of those tsunami waves. Those result show that the existence of mangroves along beaches can reduce the effects of tsunami waves which hit beaches.

III. RESEARCH METHOD

The research method used was qualitative and quantitative methods to describe respondents' profiles in the research location. This descriptive method was used to systematically describe facts or characteristics of certain populations or fields actually and carefully by emphasizing on observation and natural atmosphere (Hasan, 2002). The number of samples set based on purposive sampling technique was 109 from existing population and the sample was 40% of the population. Data analysis was performed by 1) analyzing community participation; 2) reviewing the community's efforts; 3) identifying functions and benefits of mangrove ecosystems.

Data analysis used SWOT (*Strength Weakness Opportunities Threat*) approach. Rangkuti (2005) defines SWOT analysis as an analysis to identify various factors systematically in formulating a strategy based

on logic which can maximize existing Strengths and Opportunities but at the same time minimizes Weaknesses and Threats. SWOT can identify internal factors (strengths and weaknesses) and external factors (opportunities and threats).

IV. RESULT AND DISCUSSION

Functions and benefits of mangroves are well known, e.g. as fish breeding grounds in coasts, protector of land from abrasion, protector of land from winds, filter of sea water intrusion to land and dangerous heavy metal, stopovers for birds during migrations, firewood producer, supplier of crab larvae, shells, and habitats of wild animals, as well as other benefits for human. Functions and benefits of mangrove ecosystems are the main link in supporting the balance of coastal ecosystems. Mangrove forest is used by surrounding communities and communities near Bunaken Sub-district.

4.3.1 Economic Aspect

The economy of the people in Bunaken Sub-district is mainly supported by two main occupations which are marine and agricultural products. Agricultural aspect generally includes copra, bananas, mangos, and tubers. Marine products from fishery activities include coral fishes, in certain seasons main catch is pelagic fishes such as Deho fishes, tunas and flying fishes and other fishes such as Bobara, Barongan, Goropa, etc. Generally, fishing techniques include using nets (*soma*, *landra* and *pajeko*), fishing rods (*noru, funae, tonda* and *palinggir*), fish traps (*sero* dan *bubu*). Pana (*jubi*) and catching mollusks in reefs (*nyare*). Aside from the occupations above, some people are also handymen, merchants, entrepreneurs, etc. In Bunaken Sub-District, in Molas and Meras Urban Villages to be precise, although there are shipbuilding industry using fishponds, people still planted mangrove around the area.

4.3.2 Social Aspect

The prospect of utilizing mangrove forest as tourism destination was good because generally tourists from anywhere on earth are attracted to beautiful beach sceneries and traditions of local communities. Well-managed mangrove forests can also be recreational areas and sustainable producers of various products (especially wood). This was seen in urban villages in Bunaken Sub-district which has distinctive uniqueness and beauty for tourists, e.g. diving, sea scenery, and islands in Bunaken National Park area and the view of Manado on the way from Meras Urban Village to Tongkaina, as well as bird watching in mangrove forest. Various animals and plants are associated with mangrove ecosystem. Some of these animal and plants are endemic for the region. There are also traditions of local communities related to mangrove resources.

4.3.3 Cultural Aspect

Existing and developing indigenous cultures were the cultures of ethnicities that live in the area. The presence of an ethnicity in a location is related to habits and traditions to use natural resources based on one's skills. Every ethnicity has distinct social and cultural characteristics, creating high interactions between cultures, as seen from the use of the same dialect and similar techniques in utilizing natural resources, such as traditional nets, to catch fishes. Moreover, several traditions and accommodations usually performed by a certain ethnicity are also performed by other ethnicities as a result of their interactions. This can be seen in mutual cooperation culture called Mapalus. Mapalus itself originates from Minahasa ethnicity but in its development, not only Minahasa ethnicity performs it. Other ethnicities also perform that tradition in community life.

a. Model for Increasing Community Participation in Managing Mangrove Ecosystem in Bunaken Region

SWOT analysis identified internal and external factors in the management of mangrove ecosystem in Bunaken region. These factors enabled the discovery of factors which could be developed in Bunaken Region in the future and solved existing weaknesses for the preservation of mangrove ecosystem in the region. Internal strengths and weaknesses of people in Bunaken region in the management of mangrove ecosystem were discovered. Meanwhile external opportunities and threats of the region were also discovered. After identifying the factors, strategy was formulated using SWOT diagram.

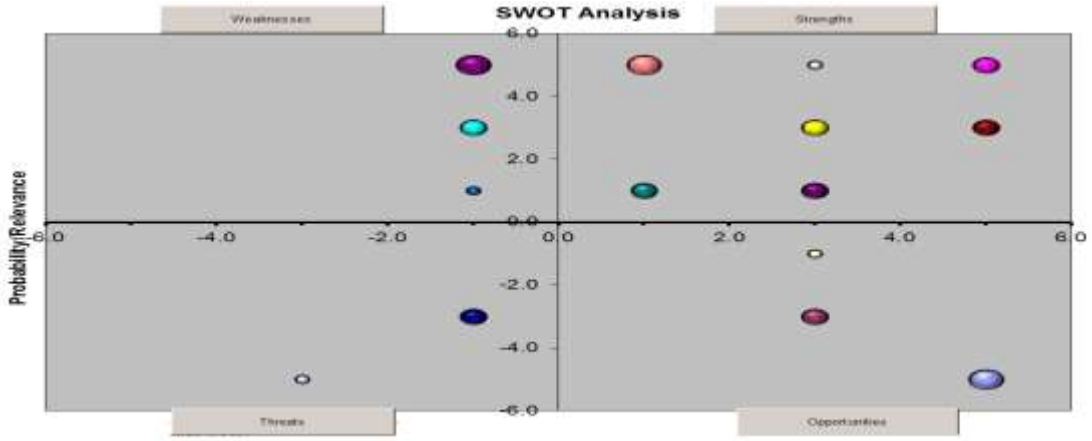

Figure 1. The Result of SWOT Analysis.

Strategy to formulate a model for increasing community participation in the management of mangrove system in Bunaken region was evaluated by 4 factors which are Strength, Weakness, Opportunity and Threat. Based on SWOT analysis, steps to develop and even improve to solve weaknesses and threats by using strengths and opportunities were discovered by assessment criteria below,

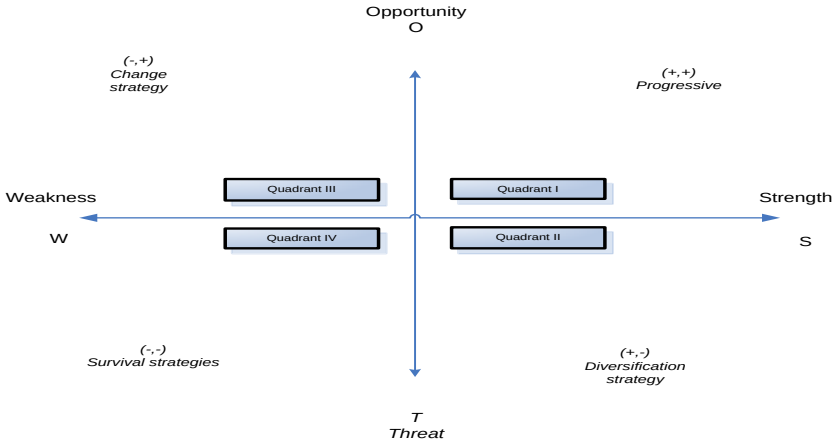

Figure 2. Criteria of SWOT analysis assessment

1. Strength

Based on SWOT analysis, factors in quadrant I are potential and strong factors. The strategy recommendation was progressive, meaning good mangrove ecosystem management was possible to be improved optimally on factors in this quadrant. Those factors included participation in meetings, participation in socialization, participation in making questions/suggestions, benefits of planting mangroves, involvement of family members in planting mangroves, community's success in planting mangroves, and community's initiative in planting mangroves.

2. Weakness

Based on SWOT analysis, factors in quadrant III are weak but potential factors. The strategy recommendation was changing strategy, meaning the management of mangrove ecosystem should change people's view or perception on the results they will get and enjoy if mangrove management goes well. Factors in this quadrant should be socialized differently such as by encouraging people's presence when planting mangroves, spirit to successfully plant mangroves, and community participation in planting mangroves.

3. Opportunity

Based on SWOT analysis, factors in quadrant II are strong but challenging factors. The strategy recommendation was diversifying strategy, meaning to manage mangrove ecosystem well, they would face great challenges which would hinder the management and it would be difficult to raise community participation in managing mangrove ecosystem. Factors in this quadrant included training by Local Government, role of consultants and involvement of private parties (NGOs). Therefore, training by Local Government for the

community should be more frequent, the role of consultants in planning management of mangrove ecosystem should be considered and involvement of private parties (NGOs) in the activity should be increased.

4. Threat

Based on SWOT analysis, factors in quadrant IV are weak and challenging factors. The strategy recommendation was defensive strategy, meaning factors in this quadrant are dilemmatic options. Therefore, it's suggested to use defensive strategy, controlling community participation and frequency of planting mangroves so they wouldn't worsen and die. This strategy was maintained while trying to improving current situation systematically. Factors in this quadrant included community's activeness in making suggestions/questions and their frequency in planting mangroves.

V. CONCLUSION

The conclusions are as follows: Functions and benefits of mangroves for the community in terms of economic aspect are generally as source of livelihood such as marine and agricultural products. In terms of social aspect, potentials of using mangrove forests for tourism destination was good because tourists usually like beautiful beach sceneries and traditions of local communities. Urban villages in Bunaken Sub-district have distinctive uniqueness and beauty for tourists, such as diving, and bird watching in mangrove forest. In terms of cultural aspect, existing and developing indigenous cultures were the cultures of ethnicities that live in the area. The presence of an ethnicity in a location is related to habits and traditions to use natural resources based on one's skills. For potential and strong factors, the strategy was progressive. For weak but potential factors, the strategy was changing strategy. For strong but challenging factors, the strategy was diversification. For weak and very challenging factors, the strategy was defensive.

Some of the recommendations are: The community should pay more attention to the management of mangrove ecosystem by participating in protecting, maintaining, and monitoring its preservation, as well as actively planting mangroves, giving training by Local Government to the community more often, considering the role of consultants in planning the management of mangrove ecosystem and increasing the involvement of private parties (NGOs) in that activity.

REFERENCES

[1] Adiwijaya, H. 2005. Kondisi Mangrove Pantai Timur Surabaya Dan Dampaknya Terhadap Lingkungan Hidup.(In Indonesian) Jurnal Ilmiah Teknik Lingkungan. Vol 1.

[2] Conyers, Diana. (1991). Perencanaan Sosial di Dunia ketiga. .(In Indonesian) Yogyakarta: UGM Press.

[3] Bengen, Dietriech G, 2004b, Pedoman Teknis Pengenalan dan Pengelolaan Ekosistem Mangrove, .(In Indonesian) Pusat kajian Sumberdaya Pesisir dan Lautan IPB, Bogor

[4] Istiyanto, D.C., S.K. Utomo, dan Suranto. 2003. Pengaruh Rumpun Bakau terhadap Perambatan Tsunami di Pantai. .(In Indonesian) Makalah pada Seminar Nasional "Mengurangi Dampak Tsunami: Kemungkinan Penerapan Hasil Riset" di Yogyakarta, 11 Maret 2003.

[5] Khazali, M. 1998. Panduan Teknis Penanaman Mangrove Bersama Masyarakat. .(In Indonesian) Wetland International – Indonesia Programme. Bogor, Indonesia.

[6] Mikkelsen, Britha. (2003). Metode Penelitian Partisipatoris dan Upaya-upaya Pemberdayaan: sebuah buku pegangan bagi para praktisi lapangan. .(In Indonesian) Jakarta: Yayasan Obor Indonesia.

[7] Nazir, M., 2004. Metode penelitian. .(In Indonesian) Jakarta: Ghalia Indonesia.

[8] Odum. 1993. *Fundamentals of Ecology*. McGrawHill Inc. Newyork.

[9] Pratikno, W.A., Suntoyo, K. Sumbodho, Solihin, Taufik dan D. Yahya. 2002. Perencanaan Perlindungan Pantai Alami untuk Mengurangi Resiko terhadap Bahaya Tsunami. .(In Indonesian) Makalah Lokakarya Nasional Pengelolaan Ekosistem Mangrove, di Jakarta, 6-7 Agustus 2002.

[10] Romimotarto, K. 2001. Biologi Laut : Ilmu Pengetahuan Tentang Biota Laut. .(In Indonesian) Jakarta. Penerbit Djambatan.

[11] Santoso, N. 2000. Pola Pengawasan Ekosistem Mangrove. .(In Indonesian) Makalah Lokakarya Nasional Pengembangan Sistem Pengawasan Ekosistem Laut Tahun 2000. Jakarta, Indonesia.

[12] Sevilla, C. G. 1993. Research Metodologies. McGrawHill Inc. Newyork.

[13] Supriharyono. 2000. Pelestarian dan Pengelolaan Sumber Daya Alam di Wilayah Pesisir Tropis. .(In Indonesian) PT Gramedia Pustaka Utama. Jakarta, Indonesia.