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COMMUNITY BASED MANAGEMENT OF SUSTAINABLE MANGROVE ECOSYSTEMS IN KENDARI CITY, SOUTHEAST SULAWESI

Walid Walyudin Rahman[1], Achmad Husen[2], Ananto Kusuma Seta[3]
[1,2,3] Universitas Negeri Jakarta, Indonesia
Email: walidwr45@gmail.com, ahusen@unj.ac.id, ananto@kemdikbud.go

ABSTRACT

Mangrove ecosystems are a form of important role in maintaining the stability of the coastal environment that has ecological, physical and economic-social functions so as to provide interaction between people who live in mangrove areas. efforts in managing sustainable mangrove ecosystems in order to provide carrying capacity to all parties so as to identify, analyze, determine the needs and potential of natural resources in mangrove ecosystems. Mangrove ecosystem damage is caused by two things, namely community activities and natural factors so as to prevent degradation, the application of sustainable mangrove ecosystem management is carried out optimally to preserve mangroves. The study aims to determine the observation of ecosystems and community concepts in sustainable mangrove management in Kendari City. This research method uses descriptive quantitative with sampling techniques using cluster sampling and direct observation data collection. The results of this study indicate that the results of observations from two areas in Kendari City, namely mangroves in the Nambo area with observations of natural / bio and physical environment score range 23 is quite fulfilling for mangrove management while mangroves in the Bungkutoko area score range 37 is very fulfilling said to be sustainable for mangrove management and the results of the questionnaire statement regarding the concept of management descriptively shows community-based sustainable ecosystem management strongly agrees to be well implemented and can be said to be sustainable in mangrove ecosystem management Kendari City Southeast Sulawesi.

KEYWORDS *Mangrove, Ecosystem, Observation.*

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INTRODUCTION

Mangrove ecosystem is a form of forest ecosystem characterized by unique and potential natural resources. The physical properties of mangroves are able to act as a wave barrier and resist marine intrusion and abrasion. Mangrove plants live on alluvial mud soil, mangroves have high economic and ecological value, but are very vulnerable to damage if less wise in maintaining, preserving and managing them. Human activities cause damage to mangrove forest ecosystems. The main problems that cause mangroves are the construction of illegal ponds, the development of tourism areas that are not environmentally friendly, land use change into plantations, then the development of residential areas on the coastal green line (mangrove zone). (Suriani, 2023).

The role of mangrove ecosystems is important in maintaining the stability of the quality of the coastal environment because it has many functions, namely ecological, economic and physical functions. The ecological function of mangrove ecosystems as a place to find coastal biota (feeding ground), nursery ground, and spawning ground for biota such as fish and shrimp and as a carbon sink (Fauzi et al., 2022). (Fauzi et al., 2022).. Protecting the coast from the waves of sea water and as a heavy metal sink. Another important function of mangrove forests is as a carbon dioxide sink to reduce the current global warming phenomenon (Ely et al., 2021). (Ely et al., 2021).

Sustainable mangrove management so that the mangrove ecosystem remains sustainable, mangrove management is related to the development and development of coastal areas. Strategies in community empowerment that reside in coastal areas with mangrove vegetation areas are able to apply efforts to obtain or provide shamanic power in individuals or communities in order to identify, analyze, determine the needs and potential and problems faced and at the same time choose alternative solutions by optimizing the resources and potential owned independently. So that people are motivated to want to plant, maintain, community service has a positive impact on mangrove conservation efforts. (Sulandjari, et al 2021).

The problem of exploitative mangroves is often carried out by community activities that reside on the coast by cutting mangrove trees to be used as firewood, materials for making traditional fishing gear, making houses, and opening ponds in the mangrove ecosystem. Currently there are still many coastal communities cutting down mangrove trees with a diameter above 30 cm to be used as poles and house boards according to the Head of the Environment Agency. Various existing problems have not been able to be handled by the community due to their limited authority and the absence of clear management by the local government, existing management is only limited to prohibiting the cutting of mangrove trees, while good management is the result of a sustainable planning, monitoring and evaluation process. (Rusdi, 2020).

Mangrove ecosystem sustainability by considering the management of social, ecological and economic aspects. The sustainability of mangrove ecosystem management is an interaction between society and mangroves. The stability of mangroves can be seen from an ecological perspective as a habitat for various types of fauna and has the physical benefit of protecting the coastline from natural

disasters. (Iswahyudi et al., 2019).. Mangroves continue to decline mainly due to anthropogenic causes. Over the last 50 years, about one-third of the world's mangrove forests have been lost due to several factors such as conversion to cultivation sea level rise, urban development therefore, monitoring mangrove extent is essential to detect the historical and current distribution of mangroves affected by these threats (Alvin B. et al 2020). (Alvin B. et al 2020)

Community involvement programs in mangrove ecosystem management can be carried out in the form of community-based institutions. Communities that are directly related to the development and safeguarding of mangrove ecosystems are invited to actively participate in preserving mangrove ecosystems. The direct role of local communities in mangrove management is strengthened according to local culture. Each region has a different management system according to the culture of each region. According to (Ruddle, 1998) According to (Ruddle, 1998), there are at least several components that must be owned and run, namely authority, norms or binding regulations (rules), rights (rights), monitoring, responsibility or obligation (accountability), enforcement, and sanction.

Mangrove degradation also threatens many species that depend on mangrove habitats and their productivity however, the good news is that between 2010 and 2016, the global rate of loss slowed to about 0.13% Although degradation continues in many countries and regions, mangroves are expanding in some areas, including French Guiana, Honduras, the Red Sea's Niger Delta and the Arabian Gulf, which provides hope for the future of mangroves to meet various national and international targets especially during the UN Decade of Ecosystem Restoration 2021 to 2030. (Lovelock, 2022).

Mangroves generally grow well on muddy soils, especially in areas of accumulated silt. In Indonesia, this muddy substrate is very good for Rhizophora mucronata and Avicennia marina stand types. (Prinasti, 2020). Management of mangrove forest resources will not be realized properly without first knowing the perceptions and attitudes of the surrounding community, the perception and participation of the community will help in planning effective mangrove forest management strategies. The support and active participation of the community in preserving mangrove forests is influenced by the understanding and compliance of the community in mangrove conservation efforts (Permata et al., 2021). (Permata et al., 2021).

Mangrove forest damage is caused by two things, namely human activity and natural factors. Indonesia has the largest mangrove ecosystem, but the rate of deforestation of mangrove ecosystems also occurs, this is the problem of mangrove forest damage. Spatial mangrove inventory needs to be done to determine the level of change in the area of mangrove ecosystems from time to time, so as to facilitate the selection of appropriate steps in policy making related to the conservation of mangrove ecosystem areas. Mangrove ecosystem conservation in Indonesia can be done by knowing the changes in the area of mangrove forests in the region. (Maulani, 2021).

Characteristics of coastal communities that live on the shoreline and carry out socio-economic activities related to the resources of coastal areas and oceans. In a narrow sense, coastal communities have a fairly high dependence on the potential

and condition of coastal and marine natural resources in the form of fisheries and plants that can be managed in coastal areas (Lolowang et al., 2022). (Lolowang et al., 2022).. Coastal communities in general have become part of a pluraristic society but still have a spirit of togetherness. This means that the structure of the average coastal community is a combination of characteristics of urban and rural communities (Bayu and Rahmadina, 2022). (Bayu and Rahmadina, 2020)..

The large potential of the marine sector should be able to contribute to improving the welfare of the community, especially coastal communities with the majority of jobs are fishermen. According to Menggala (2016), most (63.47%) of the poor in Indonesia are in coastal and rural areas. This needs to be a concern of the government considering that there is a close relationship between poverty so that the management of coastal areas in terms of environmental management level is very vulnerable quality seen from the social, economic, health and educational factors experienced in the community. (Donna NP Butarbutar, et al. 2020).

2020 global data on mangrove ecosystems on density and area AGB (Aboveground Biomass) is the total mass or weight of plants above ground in an ecosystem. Mangroves at continental and national level The global total AGB for mangroves is 1.52 Pg, but the contribution per region is not uniform. Southeast Asia contributes 34.98% of AGB (0.53 Pg) and has the largest area (4,044,906.25 ha) and high AGB density (131.36 ± 45.94 Mg/ha) while West Africa contributes 8.29% of AGB (0.12 Pg) and has the largest area (949,281.25 ha) on a continental or global scale. At the national level, Indonesia has the highest AGB (0.36 Pg) due to its high AGB density (140.12±41.02 Mg/ha) and large area covered by mangroves (2,547,556.25 ha). (Hu et al., 2020).

Indonesia's mangrove forests are the largest in the world, covering 3,364,080 ha or about 23% of the world's total mangrove area. The distribution of mangroves is found throughout the Indonesian Archipelago based on data from 2021, a National Mangrove Map (PMN) has been compiled and the largest area with mangroves for the Provincial scale is Papua Province, the total area reaches 1,091,004 Ha. While Southeast Sulawesi is in 12th place which has an extensive mangrove area (Directorate of Soil and Water Conservation, Directorate General of PDASRH, 2021).. Data on mangrove ecosystems according to the Southeast Sulawesi Forestry Service and the Kendari City Environment Office convey that data on mangrove vegetation areas reach 94,607.04 Ha, while for the Kendari City area the mangrove area covers 310.26 Ha. (Southeast Sulawesi Forestry Service, 2023).

Regulations governing mangrove ecosystem management in Indonesia are described in the Presidential Regulation of the Republic of Indonesia Number 73 of 2012 concerning the National Strategy for Mangrove Ecosystem Management. (Perpres RI, 2012). Mangrove ecosystem areas are also regulated in the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number 23 of 2021 concerning the Implementation of Forest and Land Rehabilitation Article 19 and Article 44. (Permen LHK, 2021). Then this research was conducted in the administrative area of Southeast Sulawesi Province in Kendari City which has regulations governing mangrove areas based on Kendari City Regional Regulation Number 5 of 2013 concerning the Zoning Plan for Coastal Areas and

Small Islands of Kendari City in 2011-2031, in the form of Article 38 prohibition of using methods and methods that damage mangrove ecosystems, seagrass coral reefs that are not in accordance with the characteristics of coastal areas and small islands and cutting mangroves in conservation areas for industrial activities, settlements, and / or other activities. (Perda Mayor of Kendari, 2013).

This research was conducted in Kendari City is the capital city of Southeast Sulawesi Province with the largest population, with the structure of the city located in the bay position of Kendari City with an area of 271.76 km^2 has a distinctive feature because it is surrounded by forests and Kendari Bay, has a coastline of 85.6 km, so with this position the community built a residence in the seafront area. The bay area is generally dominated by various types of plants that live on the seafront but the plants that are often found are mangroves. (BPS Kendari, 2022).

This research was also previously conducted by Khaery (2022) with research on Sustainable Mangrove Ecosystem Management Efforts in Kendari Bay, Southeast Sulawesi Province explaining that as a consequence of these problems there is uncontrolled utilization of mangrove forest areas for various interests without considering its sustainability and function to the surrounding environment whereas all mangrove functions will continue if the existence of mangrove ecosystems can be maintained and utilization of its resources based on the principles of sustainability. (Khaery et al., 2023)..

The problem that is the current background for mangrove ecosystems in Kendari City is very vulnerable to massive degradation due to lack of concern without paying attention to social, ecological and economic aspects so that in the management of mangrove sustainability by coastal communities and weak local government agencies in conducting supervisory efforts as well as sustainable control as well as regulations do not run optimally. One proof of the activity of coastal communities is very severe on mangrove ecosystems by illegal logging of mangroves taken branches or trunks used as access bridges from one house to another, and the urbanization of an increase in people who live in coastal areas, then the transfer of land functions there are several community groups to make ponds in mangrove ecosystem areas as a form of economic and social value to the surrounding community.

Environmental damage due to these activities in the mangrove area also affects the life of the biota from the ecological aspect of the impact of changes in the composition of mangrove plants from the structure of plant density and affect the process of balancing the food chain in marine biota, as well as the disposal of solid and liquid waste which results in a decrease in dissolved oxygen content in water undergoing anoxic decomposition seepage of polluting materials originating from households and industry so that it can cause the death of mangrove trees Indirectly, the problem of mangrove ecosystems in Kendari can increase degradation.

RESEARCH METHOD

This research was conducted in the coastal residential area of Kendari City, Southeast Sulawesi. The planned research implementation time of the research is from December 2023 to March 2024. This research used descriptive quantitative

research. The population of this study were two community groups with a total of 52 people who live in mangrove areas in Bungkutoko Village and Nambo Village, Kendari City, Southeast Sulawesi. Techniques in sampling in this study using cluster sampling, so that 34 samples were obtained. The data used in this study consisted of primary data from direct observation or observation with interviews and secondary data from the Southeast Sulawesi Forestry Service and the Kendari City Environmental Service.

RESULT AND DISCUSSION

Observation of sustainable mangrove management

Observations of sustainable mangrove management in Kendari City, Southeast Sulawesi were carried out in two locations, each of which has certain values and criteria, namely the Nambo and Bungkutoko areas. Observations on mangrove ecosystems aim to develop and find out from the benefits of the ecosystem and the suitability of managing and maintaining growth in local communities and the government as a consideration in sustainable management, and can assess and see the extent of the impact of mangrove ecosystem management problems. (Farhaby *et al*., 2020). The results of mangrove observations carried out in the Nambo area are carried out by determining the value and measurement in the criteria for observation indicators in the natural / biological and physical environment can be sustainable, can be presented in the form of the following table:

Table 1. Observation Results of Mangrove Management in Nambo Region

No.	Observation Indicator	Observation Results		Description
		Maximum Score	Observation Score	
1.	Nature/Biology	24	12	Meets Enough
2.	Physical Environment	19	8	
	Total	**43**	**20**	

Source: Primary data processed.2024

Table 1 shows that from the observation of mangrove management in the Nambo area, the results of the observation score are 20, after that to calculate the total observation value. The result of the value of this observation is 23 with the provision of sufficient criteria to fulfill the range of scores 12-23. While observations of mangrove management in order to be sustainable with certain values and criteria carried out in the Bungkutoko area, can be presented in the form of the following table:

Table 2. Observation Results of Mangrove Management in the Bungkutoko Region

No.	Observation Indicator	Observation Results		Description
		Maximum Score	Observation Score	
1.	Nature/Biology	24	18	Meet
2.	Physical Environment	19	14	

Total	**43**	**32**

Source: Primary data processed, 2024

Table 2 Shows that the results of observations of mangrove management in the Bungkutoko area with an observation score of 32. The results of this observation value with the provisions and criteria are very fulfilling seen from the score range of 36-43. So that with the results of the observation value of the mangrove ecosystem in the Bungkutoko area can be said to be sustainable management.

Validity Test Results

The validity test is carried out to measure a data index with the level of validity or truth that has been obtained by the researcher is valid data or not, using a measuring instrument, namely a questionnaire, it can be said to be valid if it is really appropriate and answers carefully and the statement is in accordance with the validity coefficient. (Sugiyono, 2016). The validity test in this study by measuring the validity of the questionnaire was then compiled based on the theories of the concept of mangrove ecosystem management in each variable. The validity test by measuring 18 statement items then submitted to 34 respondents or people who live in mangrove areas in the Nambo and Bungkutoko areas of Kendari City, The Validity Test results are presented in the form of the following table:

Table 3. Results of Validity Test of Mangrove Ecosystem Management Concept Instrument

Item Statement	Pearson Correlation/count	Sig.	r_{tabel}	Description
1.	0.539	0.001	0.339	Valid
2.	0.584	0.000	0.339	Valid
3.	0.642	0.000	0.339	Valid
4.	0.514	0.002	0.339	Valid
5.	0.539	0.001	0.339	Valid
6.	0.513	0.002	0.339	Valid
7.	0.669	0.000	0.339	Valid
8.	0.613	0.000	0.339	Valid
9.	0.596	0.000	0.339	Valid
10.	0.498	0.003	0.339	Valid
11.	0.750	0.000	0.339	Valid
12.	0.699	0.000	0.339	Valid
13.	0.364	0.034	0.339	Valid
14.	0.339	0.050	0.339	Valid
15.	0.657	0.000	0.339	Valid
16.	0.861	0.000	0.339	Valid
17.	0.742	0.000	0.339	Valid
18.	0.786	0.000	0.339	Valid

Source: Primary data processed by SPSS, 2024

Table 3 shows that each statement item regarding the concept of mangrove ecosystem management meets the criteria with a statement that it is valid and 18

statement items that have been filled in by 34 respondents in this study. The calculation of the validation of the table above can be seen that r count> r $_{\text{table of}}$ 0.339 with a confidence level of 0.05.

Reliability Test

Reliability test is an index that can determine the extent to which a measuring device can be trusted and relied on, this measurement remains consistent and can be done twice or more on the same symptoms. (Notoatmodjo, 2005). Before testing reliability, there must be a basis for decision making, namely *Conbrach alpha* with a value of 0.60. If the value of *Conbrach alpha is* greater than > 0.60 then it can be said to be reliable, then if the value of *Conbrach alpha is* smaller than < 0.60 it cannot be said to be reliable. The results of the reliability test can be presented in the form of the following table:

Table 4. Reliability Test Results of Mangrove Ecosystem Management Concept Instrument

No.	Variables	r $_{\text{alpha}}$	r $_{\text{critical}}$	Kerangan
1.	Mangrove Ecosystem Management Concept	0,897	0,06	Reliable

Source: Primary data processed by SPSS, 2024

Table 4 shows that the reliability test carried out on the variable is declared valid. A variable is said to be reliable or reliable if the answer to the statement is always consistent. So the results of the reliability coefficient of the sustainable mangrove management concept instrument have a *Cronbach's Alpha* value of 0.897 greater than> 0.006, so it can be said that all statement variables are reliable or qualified.

Characteristics of Research Respondents

The characteristics of the respondent are a profile of the object of research that can provide answers to research on the concept of sustainable mangrove ecosystem management. The characteristics of respondents in this study were classified based on education and occupation with a research sample of 34 respondents. Respondents based on their level of education greatly influence their mindset and attitude in their own development. The characteristics of respondents based on education level can be presented in the form of the following table:

Table 4. Characteristics of Respondents Based on Education

No.	Education	Total	
		N	%
1.	S1	6	17,6
2.	HIGH SCHOOL	24	70,6
3.	SMP	4	11,8
	Total	**34**	**100**

Source: Primary data processed by SPSS, 2024

Based on table 5 that of the 34 respondents, it is known that the highest number with a high school education level was 24 respondents (70.6%), then for the S1 education level there were 6 respondents (17.6%), and the least level of education was junior high school totaling 4 respondents (11.9%).

Respondents based on their occupation are social activities that can influence, while the characteristics of respondents based on occupation can be presented in the form of the following table:

Table 5. Characteristics of Respondents Based on Occupation

No.	Jobs	Total	
		N	%
1.	Fisherman	22	64,7
2.	Farmers	7	20,6
3.	Self-employed	5	14,7
	Total	**34**	**100**

Source: Primary data processed by SPSS, 2024

Based on table 6 shows that of the 34 respondents, it is known that the largest number based on occupation is fishermen totaling 22 respondents (64.7%), then for farmer jobs totaling 7 respondents (20.6%) and the least with self-employed jobs totaling 5 respondents (14.7).

Descriptive Test

Descriptive test is a test that describes a study conducted to determine the value of one or more variables by making comparisons or connecting other variables and providing an overview of the objects studied through sample and population data (Sugiyono, 2007).

The results of the descriptive test of respondents regarding the concept of sustainable mangrove ecosystem management can be presented in tabular form as follows:

Table 6. Descriptive Test Results of Respondents on the Concept of Sustainable Mangrove Management

No.		N	Minimum	Maximum	Mean	Std. Deviation
1.	Planning	34	10	15	13.03	1.527
2.	Implementation	34	23	35	29.56	3.135
3.	Monitoring	34	11	25	20.97	2.540
4.	Evaluation	34	6	15	12.94	1.984

Source: Primary data processed by SPSS, 2024

Based on table 7 shows that the descriptive test results can be seen that the sample used is 34 respondents, the descriptive test results in this study can be explained as follows:

1. Planning in the concept of sustainable mangrove ecosystem management has a minimum value of 10 and a maximum value of 15, measured by 3 statement items with a Likert scale, has an average value of 13.03 with a standard deviation of 1.527. This means that the standard deviation value is lower than

the average value, which means that the response answers regarding the concept of sustainable mangrove ecosystem management planning are evenly distributed. If the average value of 13.03 is divided by 3 statement items, a value of 4.34 is obtained, which can be concluded that the concept of sustainable mangrove management planning agrees to be implemented properly.

2. Implementation in the concept of sustainable mangrove ecosystem management has a minimum value of 23 and a maximum value of 35, measured by 7 statement items with a Likert scale, has an average value of 29.56 with a standard deviation of 3.135. This means that the standard deviation value is lower than the average value, which means that the response answers regarding the implementation of sustainable mangrove ecosystem management are evenly distributed. If the average value of 29.56 is divided by 7 statement items, a value of 4.22 is obtained, which can be concluded that the implementation of sustainable mangrove management agrees to be well implemented.
3. Monitoring sustainable mangrove ecosystem management has a minimum value of 11 and a maximum value of 24, measured by 5 statement items with a Likert scale, has an average value of 20.97 with a standard deviation of 2.540. This means that the standard deviation value is lower than the average value, which means that the response answers regarding the implementation of sustainable mangrove ecosystem management are evenly distributed. If the average value of 20.97 is divided by 5 statement items, a value of 4.19 is obtained, which can be concluded that the implementation of sustainable mangrove management agrees to be carried out well.
4. Evaluation of sustainable mangrove ecosystem management has a minimum value of 6 and a maximum value of 15, measured by 3 statement items with a Likert scale, has an average value of 12.94 with a standard deviation of 1.984. This means that the standard deviation value is lower than the average value, which means that the response answers regarding the evaluation of sustainable mangrove ecosystem management are evenly distributed. If the average value of 12.94 is divided by 3 statement items, a value of 4.31 is obtained, which can be concluded that the implementation of sustainable mangrove management agrees to be carried out well.

Research Discussion

Community-based sustainable mangrove ecosystem management is an important effort made by the community and government to maintain the growth of mangrove ecosystems and to overcome various problems that occur. Community and government involvement is fundamental to contribute to maintaining the development of mangrove ecosystem growth and it has a positive impact. Mangrove ecosystems in Kendari City, Southeast Sulawesi have not been optimal in carrying out a good management concept, there are still several areas where management can have an impact on mangrove growth, local communities and government.

Mangrove ecosystem management can be carried out properly if it is based on the principle of integrated and sustainable management. Resource utilization in mangrove ecosystems that are *open access* can lead to various conflicts of interest. So in this case management is needed that can integrate the involvement of various stakeholders, taking into account environmental, social, economic and cultural aspects. The involvement of several stakeholders such as local communities, authorities, non-governmental organizations, and so on needs to work together as partners in achieving the same goal, namely the preservation of mangrove forests and improving community welfare through the sustainable development of mangrove ecosystems. (Wahyuningsih, 2021).

This research was conducted to what extent the ecosystem management efforts made by the community and government agencies in maintaining the sustainability and growth of mangroves in their area, observation efforts and management concepts can be seen and measured, so that the results can be discussed as follows:

Observations on Sustainable Mangrove Ecosystem Management

Observations of mangrove management in the study were carried out in two areas namely Nambo and Bungkutoko from both areas have different characteristics on mangrove management, so that the results of observations have different size values. Based on the observations of this study can be described as follows:

Observation of Mangrove Management in Nambo area of Kendari City

The results of mangrove observations indicate that the condition of the mangrove ecosystem in the Nambo area is very range of problems in the function of mangrove ecosystem growth, it is an important role for local communities and local government agencies in carrying out the concept of good management. The results of the observation instrument carried out in the Nambo area with 16 assessment items based on observation indicators on the natural / bio and physical environment are carried out by observation. Observations were made directly down to the location to pay attention and review the condition of the mangrove ecosystem so as to determine the results of observational observation measurements made totaling 23 range scores, so on that score for the mangrove ecosystem of the Nambo area of Kendari City is in the criteria sufficient to be said to be sustainable.

Community-based mangrove ecosystem management for the Nambo area of Kendari City, Southeast Sulawesi is an effort that must be increased in preserving and maintaining mangrove breeding in order to be sustainable. Based on the results of observations of observations with the number of values determined, namely 23 criteria quite fulfilling, meaning that the current condition of the mangrove ecosystem of the Nambo region can be descriptive that reviewing the 16 assessment items, most of the mangrove area conditions are not natural due to illegal logging activities in coastal areas, then rarely found places for the development of wildlife living in mangrove areas such as birds, monkeys, monitor lizards, snakes and other animals due to the condition of mangroves that grow only a few branches only this is also very influential.

The mangrove vegetation area is only a small part of the habitat of marine biota that counts such as fish, crabs, shrimp and other marine biota, the condition of the accumulation of small industrial waste and unmanaged household waste along the mangrove area, there are activities of local community income sources by shifting land use to make fish, shrimp and crab ponds by cutting mangrove trees extensively without considering the risks that occur, in terms of legal policies or regulations regarding ecosystem management from the government has not implemented as a whole for its own area there are still many communities and other parties not pegged to these regulations in mangrove ecosystem management. The Nambo area also before frequent abrasion there were several former incidents this has actually become a problem due to ineffective mangrove management so this problem must be resolved to maintain the sustainability of the mangrove ecosystem area in the Nambo area.

Mangrove ecosystem management is for the common good, so factors that can damage the development of mangrove breeding for the sake of these interests must be considered from all ecological, economic and socio-cultural factors. The role of the Nambo community and government agencies need to carry out rehabilitation as soon as possible by replanting gradually in locations that are likely to occur degradation and then conduct supervision and maintenance, this is done because seeing from the results of observations of mangrove management observations are very vulnerable to problems in its management.

The results of the assessment of indicators based on the observation instrument of sustainable mangrove management for the Nambo area of Kendari City with the number of observation observation scores on the criteria are quite fulfilling, so it can be concluded that for mangrove management carried out by the community and the support of local government agencies has not been implemented properly even though it is in the criteria are quite fulfilling but management to maintain mangroves must be maximized so that management can be sustainable. The results of this study are in line with research that has been done by (Chamberland *et al.*, 2022), (Sahputra *et al.*, 2022), and (Arifanti *et al.*, 2022).

Observation of mangrove management in Bungkutoko area of Kendari City

The results of mangrove observation show that the condition of mangrove ecosystem management in the Bungkutoko area of Kendari City is optimal in processing between the community and local government agencies. This observation was carried out by direct observation down to the mangrove ecosystem area. The results of research with observations of sustainable mangrove ecosystem management observations with 16 indicators of assessment of the natural / biological and physical environment of the results of observational observations of 37 values are very fulfilling to be said to be sustainable.

In general, the Bungkutoko area is a good level of ecosystem management for Kendari City, the involvement of all parties from the Community, LMS, government agencies, local communities, participate in helping and maintaining the sustainability of mangrove ecosystem management. So that from the results of observations of management observations show that the condition of the mangrove area is still natural, there is a lot of biodiversity that lives, has more than one type

of mangrove, there is wildlife that lives and breeds, there is mangrove ecotourism that is well managed with the local community, the temperature and humidity of the air is still comfortable because the location of the mangrove area is far from factories / companies, the government and the community are nursery and replanting mangroves in areas that are exploited by logging former ponds and areas that are still empty dominant for replanting.

Observation of observations made is an effort to see and review mangrove management in the Bungkutoko area of Kendari City with very fulfilling results, meaning that all activities carried out by the community in maintaining are very optimal and there also needs to be regulations governing mangrove management areas made by local government agencies. The sustainability of mangrove management in the Bungkutoko area is a reference for other areas in mangrove ecosystem management.

Mangrove ecosystem management in the Bungkutoko area of Kendari City with a rating value of 37 criteria is very fulfilling for sustainable management, this can be seen from the results of observational observations thus to achieve natural resource management which states that the involvement of local communities in management provides positive benefits, namely being able to encourage *equity* in the management of natural resources themselves, able to reflect the specific needs of local communities, responsive and adaptive to variations in local social and environmental conditions and local communities are motivated to manage resources in a sustainable manner (Utomo et al., 2018). (Utomo *et al*., 2018).

The results of observations of observations of sustainable mangrove management in the Bungkutoko area of Kendari City based on the assessment indicator instrument with the criteria are very fulfilling this indicates that the condition of ecosystem management at this location has implemented the concept of good management because the natural / biological and physical environment of mangroves is very possible for the sustainability of mangrove ecosystems in Kendari City, Southeast Sulawesi. The results of this study are in line with research conducted by (Wulandari *et al*., 2023), (Paembonan *et al*., 2020).

Concept of Community-based Sustainable Mangrove Management in Kendari City, Southeast Sulawesi

Mangrove ecosystem management is a form of community interest in maintaining the sustainability of mangrove breeding. In this research conducted in Kendari City with mangrove areas located in the Nambo and Bungkutoko areas so as to provide an overview of the concept of mangrove ecosystem management carried out by the community so that it can be said to be sustainable.

The concept of mangrove ecosystem management carried out by the people of Kendari City has not gone well for sustainable development in coastal areas, therefore this study looks at the concept of mangrove ecosystem management to what extent it is running, as for the concept of sustainable development, namely planning, implementation, monitoring and evaluation. In the research a questionnaire was made based on the concepts and theories of mangrove ecosystem management. The questionnaire was made in the validity test with the test results of all questionnaire items declared valid, then the reliability test results showed that

the reliability of each questionnaire statement item. Regarding the concept of sustainable mangrove ecosystem management, 18 statement items with Likert scale measurements will be distributed to people or communities living in the Nambo and Bungkutoko areas of Kendari City, the distribution of this questionnaire is done directly down to the location with the community.

The results of this questionnaire in the descriptive test explain the description of the concept of community-based ecosystem management shows that the concept of planning, implementation, monitoring and evaluation of the results of the community statement is agreed to do the concept of mangrove ecosystem management towards community-based sustainable development. The test results of the statement with the results of the mean / average value higher than the questionnaire statement distributed to the community means that this provides an overview of the concept of sustainable mangrove management starting from the concept of planning to identify problems and analyze programs applied to mangrove management, the concept of implementation of implementation activities from planning carried out in management, the concept of monitoring and evaluation of activities by measuring / assessing the level of progress or success in mangrove management.

The concept of sustainable mangrove ecosystem management needs community involvement in planning to evaluate this so that the community is directly involved in sustainable development so that it has the responsibility to maintain and preserve the mangrove ecosystem. The success of mangrove management can be optimized through the concept of planning, implementation, monitoring and evaluation in direct community involvement in managing natural resources. Mangrove management in Kendari City needs an important role directly from the community and government agencies, seeing from the results of questionnaires filled in by the community that the concept of community-based sustainable mangrove ecosystem management agrees to be carried out in accordance with programs and problems of mangrove ecosystem management and overexploitation of mangroves as well as anticipating the impact of non-optimal management. The results of this study are in line with research conducted by (Eddy *et al*., 2019) and *(Kiolol et al*., 2017).

Researcher Limitations

There are several aspects that are limitations in this study, this needs to be considered by researchers. The research limitations are as follows:

1. The research was conducted in coastal locations, limitations when observing observations of ecosystem areas, namely some access roads and bridges to mangrove ecosystem areas, the quality of the road cannot be passed by two-wheeled vehicles but on foot or using rafts due to excavations and mud, other obstacles when heading to the mangrove area must depend on weather conditions rainfall and tides greatly affect access.
2. Local government agencies such as the lurah (village head), his staff and staff were largely unaware of the mangrove growth area, causing researchers to lack accurate information and effective discussions about mangroves.

3. Inaccuracies in mangrove area maps made by government agencies and still referring to the previous year show the location of mangrove breeding there are changes every year so there must be an update map every year so that researchers or the public can see and know the location of mangrove growth so that it can also be a reference for management.

CONCLUSION

Based on the results of research on observations of sustainable mangrove ecosystem management and the concept of community-based mangrove management in Kendari City, Southeast Sulawesi, it can be concluded as follows: 1. The results of observations of observations of mangrove ecosystem management carried out by Kendari City in two locations, namely the Nambo and Bungkutoko areas of these two areas which are mangrove ecosystem areas that have different characteristics and measurement of observation observation values. In the Nambo area, the results of observation observations based on natural/bio-biological indicators and the physical environment with an observation score of 23 are quite fulfilling, while in the Bungkutoko area the results of observation observations based on natural/bio-biological indicators and the physical environment with a result of 37 are very fulfilling for sustainability in mangrove ecosystem management. Therefore, mangrove ecosystem management in the Bungkutoko area is very fulfilling the sustainability of management compared to the Nambo area, there is a need for area rehabilitation and efforts to implement good management by the community and local government agencies. 2. The concept of community-based sustainable mangrove ecosystem management, reviewed from filling out a questionnaire with 18 statement items regarding the concepts of planning, implementation, monitoring and evaluation, which were tested for validity and reliability with valid and reliable results then tested descriptively to explain the description of the concept of sustainable mangrove ecosystem management. The results of the descriptive test showed that the questionnaire was filled in by the community based on the most high school education level 70% and based on the most occupation in fishermen 64.7% then the answer to the statement with an average value more than the standard deviation, so that the concept of community-based sustainable ecosystem management strongly agrees to be implemented properly and can be said to be sustainable in the management of mangrove ecosystems in Kendari City, Southeast Sulawesi.

From the results of research conducted by researchers can provide recommendations regarding community-based sustainable mangrove ecosystem management Kendari City Southeast Sulawesi as follows: 1. The government should have a commitment in maintaining and preserving mangrove growth, as a form of Kendari City government efforts in mangrove conservation in the form of sustainable management, empowerment of coastal communities, making mangrove program activities and making regulations on mangroves, this has not been implemented optimally by the government. Kendari City mangrove ecosystem area every year there is a very significant change because the government must discuss with Forkopimda so that all parties participate and know the mangrove ecosystem in Kendari City.

The government must also conduct direct monitoring with a scaled time on mangrove growth areas, so that it becomes a consideration and government efforts in conducting management programs. There are several mangrove areas in Kendari City that have been well managed, and the government should be able to maintain and provide references for other areas in managing mangrove ecosystems in their own areas. Efforts in community and government involvement in implementing management programs, one of which is nursery and reforestation of the area is a very effective effort,

The most important mangrove ecosystem management recommendation for the Kendari City government is now to replant and nursery in problem areas and immediately release new regulations regarding sustainable mangrove ecosystem management. 2. Community-based mangrove management is one form of effort in preserving mangroves, because mangrove breeding depends on the community in managing it. This research is in two locations from these results can be seen that community involvement greatly affects the condition of mangrove growth so indirectly that the attitude of awareness and knowledge of the community in managing mangroves varies depending on each region.

One of the recommendations to the people of Kendari City in sustainable mangrove management, with the formation of community groups in each region to pay attention to the condition of mangrove growth, not to carry out illegal activities on the coast of mangrove areas for the benefit of personal economic income, collaborate with the government to provide socialization guidance on mangrove management, conducting mangrove nurseries for each family head who lives on the coast and replanting in exploited areas, inviting the community and all elements of agencies in the fields of education, companies, NGOs, and government to work together collectively to protect the coastline in the mangrove area in order to carry out community-based sustainable mangrove ecosystem management.

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