

Community participation in management program in the Warangui mangrove forest

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Abstract

The results of the research showed that community participation in the management of the Warangui mangrove forest includes all elements of society (leader elements 3 respondents, interest elements 3 respondents and family heads, women and youth elements every 18 respondents) dominated by family heads, women elements, and youth elements. Community participation in the management of the Warangui mangrove forest did not include the function of management participation. The highest form of community participation was in the implementation participation function with a total of 34 respondents (56.7%). with the highest participation function in carrying out activities (implementation) and the intensity of participation in initiating activities (initiation action) with the highest level of participation was quite inactive on the element of the head of the family.

Keywords: Participation; Management; Community; Mangrove; Warangui

1. Introduction

Based on data from the Directorate of Watershed Control and Protected Forest of the Ministry of Environment and Forestry (2015) the area of Indonesia's mangrove ecosystem was 3,489,140 ha or around 21% of the world's mangroves (16,530,000 ha). This potential was spread across 257 regencies/cities covering 1.82 million ha in critical condition and 1.67 ha and 0.55 million ha in good condition consisting of 1.36 million ha of forest area and 1.32 million ha in outside the forest area. This data was lower than the previous period which reached 9,361,957.59 ha (1980), 7,758,410.60 ha (2006), 3,750,000.00 ha (2010), and 3,489,140.69 ha (2015). In fact, according to the Ministry of Environment and Forestry, according to the 2019 national mangrove map, Indonesia's mangrove forests cover approximately 3.31 million ha with a deforestation rate of 3 ha/year.

Ecologically, mangroves function as coastal protectors, erosion buffers and sediment traps, nutrient cycles, guaranteeing fishery productivity, reducing the rate of seawater intrusion, health buffers, biodiversity buffers, and reservoirs for other aquatic ecosystems ([1], [2], [3]). Therefore, proper management efforts were needed to support the preservation of the function of this ecosystem, bearing in mind that one form of utilization of forest environmental services was that it was economically viable, ecologically benign, technically feasible, and socially acceptable to society (socially acceptable) was tourism.

The Warangui mangrove forest with an area of approximately 384.9 ha was one of the mangrove areas with the status of another use area that was being planned to be managed intensively. This area was strategic in the Manokwari, South Manokwari, Bintuni Bay, and Wondama Bay transportation routes and was estimated to be rich in natural resources and had been utilized for transportation (harbor), recreation, and tourism facilities. Communities around this area mostly work as fishermen and use this area as a place to anchor their fishing fleets that were safe from wind and waves.

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Connection. On the other hand, the location of the area which was in the middle of land and sea travel routes between districts was a potential for the existence of this area. Likewise, community participation in the management of this area as a tourism destination was unknown. Therefore it was necessary to conduct research to reveal community participation in the management of the Waranggui mangrove area as one of the important ecosystems in this region

2. Material and methods

This research lasted 4 months, from October 2021 to January 2022, and was carried out in the Manokwari Manokwari Regency, South Manokwari District, the Manokwari Mangrove area. The method used in this research was the descriptive method with observation and interview techniques. Observations were directed at the potential of the Waranggui mangrove area and interviews were aimed at the community and technical supervisor representatives and supporters of tourism program development. Variables specifically observed for community participation in the Waranggui mangrove area management program include participating community elements and community involvement in the function and intensity of participation to determine the level of participation which includes leaders, interest groups, heads of families, women and youth, and the forms of activities carried out by the stakeholders. Parties related to community participation in the management of the Waranggui area.

Respondents who were sampled were determined by "Stratified Sampling" (dividing the population into several strata according to the demands of the data processing equation). Respondent stratification includes leaders, interest groups, heads of households (all households), women, and youth. The sample of the leader respondents was 3 respondents. An interest group (fishermen) 3 had respondents, 18 respondents for heads of families and 18 respondents for women and youth respectively, their respondents were 60 respondents.

Observation (collection of data carried out by direct observation in the field, so that it could describe in a factual, accurate, and detailed manner the conditions in the field, human activities, and the context in which these activities take place). Interview (collecting data by asking written questions to respondents using a previously prepared questionnaire). Documentation study (data collection to obtain written data through books, pictures, photographs, or the like to support the data obtained through observation and questionnaires).

Data analysis was carried out through editing (re-examining the data obtained), coding (clarifying based on the respondent's source and classifying the respondents' answers according to the category), calculating the frequency (distribution of results in categories and their frequency) and tabulation (the process of compiling data in tabular form so that the data could be read easily and its meaning was easy to understand).

The assessment of the level of local community participation in the implementation of the Waranggui mangrove management program was based on multiplying the actor's index number, with the index number in terms of what and the index number how to participate, as shown in Table 1.

Table 1 Participation empowerment index

Index	Extent (who)	Function (in what)	Intensity (how)
5.	Children/youth	Management	Total Control
4.	Women	Planning	Initiation Action
3.	All households	Implementation	Decision Making
2.	Interest group	Maintenance	Consultation
1.	Leader only	Distribution/use	Informing

The highest score was 125, the lowest was 1, and the rating scale for the level of participation was from the lowest to the highest with 5 groups with categories; very inactive, inactive, moderately active, active, very active

3. Results and discussion

3.1. Community Participation in Mangrove Management Waranggui

Based on data from interviews with both the community in the three villages that were determined as research locations and with the local government, especially the Tourism Office of South Manokwari Regency, it was known that the community had participated in the Waranggui mangrove tourism management program. This participation was based on the motivation to protect the area to meet community needs. Another motivation for mangrove forests was to balance the ecosystem against the effects of natural disasters and others.

In the process, many programs or activities had been carried out, and from a management perspective, it included planning, implementation, and evaluation. These programs and activities were initiated by the community but also through existing institutions, both government and private, as well as through traditional institutions in this area. According to [4] the attitudes and perceptions of the community which were generally known through participation were variables that change easily related to community responses in collecting data, so it should be directed at programs that were community initiatives as awareness of protecting nature. Considering that and the existence of respondents who were directly related to programming management, the program of activities examined in this study was a work program from 2017 to including include planning (Preparation of management plans), protection (Prevention, control and limitation of harm caused by humans, livestock, nature, invasive species, pests, and diseases), Preservation (Ecosystem recovery), utilization (Research and development of science and technology, conservation education and awareness raising, Utilization of wild plants and animals in the context of supporting cultivation in the form of provision of germplasm traditional use by local people), and Community Empowerment and Participation (Community capacity building and Community economic empowerment

The data in the table above showed that each sampled village had similarities in the implementation of management activities, especially the Waranggui mangroves. However, there were differences regarding the implementation of community empowerment programs, especially in improving the community's economy. Furthermore, each program or activity carried out through community self-help or village funds or also through other parties certainly had a different response or participation from the community. This was both in the perspective of the administrative area and in the community itself which showed there were fundamental differences, as shown in the following table:

Table 2 The Function of Community Participation in the Waranggui Mangrove Forest Management

Form of Community Participation	Respondent Jumlah	Percent (%)
Management	-	-
Planning	3	5,0
Implementation	34	56,7
Maintenance	12	20,0
Distribution/use	11	18,3
Amount	60	100

Note: 1. Participation in providing information, consultation, decision-making, initiating action, implementation, maintenance, monitoring, and evaluation; 2. Participation in program management, especially activity planning (preparation of activity proposals); 3. Participation in the implementation of activity management activities (building facilities and infrastructure and procurement and others); 4. Participation in supporting the success of the program, especially the maintenance or rehabilitation of facilities; 5. Users of mangrove management programs, especially managed facilities, and infrastructure

All respondents participated or participated in the implementation of the Waranggui mangrove forest management program. This was because the selection of respondents was intentionally related to participation in the management of the Waranggui mangrove forest which at the same time showed a difference when compared to several other research results such as [5], [4], or [6]. According to [7] as many as 100 out of 118 respondents (84.74%) who were interviewed participated in the management of the conservation program in Bukit Soeharto education and research forest. Furthermore, [4] stated that only 41 respondents (34.7%) participated in the management of the Wosi Rendani protected forest and the remaining 77 respondents (65.3%) did not participate. The opposite was true with [6] that the community in the Sorong Nature Park participates 100% in the management program carried out by the management and partners because the status of this community was a fostered community (Matoa Forest Farmers Group) which was

directly related to the implementation of community empowerment programs in the forest. Likewise [8] stated that as many as 39 respondents (95.12%) of the 41 respondents who were sampled actively participated in managing the Gunung Meja Tourism Park, especially in activities directly related to improving the household economy

Community participation in the management of the Waranggui mangrove forest did not cover all participation functions, it only includes planning and implementation functions. The highest form of community participation was in the implementation participation function with a total of 34 respondents (56.7%). This function could be seen in the implementation of program planning, land rehabilitation, and area security which involve many communities. The activities referred to include planting mangroves, installing prohibition boards, and activities utilizing the area. Then followed by the participation function of maintenance (maintenance) which could be seen through ecosystem restoration with 12 respondents (20.0%), the distribution participation function (distribution of information) which could be seen through providing information about the area with 11 respondents (18.33%) and the planning participation function. (planning) 3 respondents (5.0%).

The function of community participation in the management of the Waranggui mangrove forest focused on the implementation function, especially the construction of management support facilities and infrastructure (information boards and utilization of mangrove resources and others) which showed the similarity of the functions of the community participation in program management as well as community participation in the management of the Wosi Rendani protected forest which showed the concentration of respondents on distribution/use and implementation functions [4]. Likewise, the function of community participation in the management of the Bukit Soeharto education and research forest [8], the function of community participation in the Sorong Natural Tourism Park management program [6], as well as the function of community participation in the Gunung Meja Nature Park management program [8] which on average showed the presence of people who participate more in activities that were implementing activities.

The function of management participation was not identified/found in this study as was the case with the function of community participation in the management of the Bukit Soeharto education and research forest conservation program [7] or in the management of TWA Sorong [6]. This was because none of the respondents could perform management functions as an accumulation of the ability to participate in the other four functions. This function included the ability to plan programs, participate in implementing programs, participate in maintaining, and also able to use the results of participation independently.

This condition was influenced by the hopes and desires of the community for changes in village life/village progress which were expected to be more developed through development assistance in villages that were managed directly. In addition, the absence of permanent jobs for several respondents, the ability to master a job, and the existence of incentives in the form of wages for work in carrying out activities were the determining factors for the dominance of community participation in the implementation function. Several respondents mentioned that wages were a factor influencing their participation in program management, apart from the desire to be more advanced and protect the area. This was by [4] which stated that community participation tends to be higher when implementing programs or activities in which there was an increase in the household economy which directly triggers community development. planning management activities between parties related to program management. According to Sallatang (1987) in [7] in the implementation of development projects, at the implementation stage the community relatively actively participates in various forms, among others, the important ones are; following the lightbecomingome participants in the object atakingake advantage of economic benefits. But usually, the number of citizens who participate was not sufficient. On the other hand, during the planning and evaluation stages, the community generally did not participate because they were not involved.

This condition was of course different from the existence of a community formed based on the same goals in managing certain programs or work, such as the Matoa forest farmers group in Sorong nature park. According to [6] the Matoa forest farmers group in Klasaman Village was a community that was formed due to the similarity of interests in program management which was generally built from joint planning to implementation and even evaluation with the management agency.

Community characteristics were also thought to be a factor influencing participation. Community characteristics related to employment, gender, and other aspects also affect participation. The fact showed that the existence of demographic conditions, especially gender, and occupation in people's lives also influences the activeness in managing the programs carried out. In villages such as Kampung Muari, it was seen that the dominance of the local population generally comes from the Arfak tribe, which tend to have the same characteristics of natural resource management (limited to

participating in the program) or the characteristics of the population in Kampung Oransbari Pantai were also heterogeneous characteristics of the community which triggers participation.

Table 3 The intensity of Community Participation in Manokwari Manokwari Forest Management

No	Form of Community Participation	Respondent	Percent (%)
1.	Total Control	-	0
2.	Initiation Action	1	1,7
3.	Decision Making	9	15,0
4.	Consultation	18	30,0
5	Informing	32	53,3
Amount		60	100

Notes: 1. Overall control, was the participation of community elements in various forms of activity for the success of the program; 2. Initiating action, was the participation of community elements in the form of action initiatives for the implementation of management programs; 3. Decision making, was the participation of community elements in determining what should be done in the program; 4. Providing consultation, was the participation of elements of the community in solving problems that arise in connection with the management program; 5. Providing information, was the participation of elements of the community in conveying information both orally and in writing, regarding matters related to the management program;

Community participation in the management of the Waranggui mangrove forest based on the intensity of participation did not include all forms of participation, especially total control (overall control) as found in the function of community participation in the management of TWA Sorong [6]. This showed that none of the elements of the community in these three villages had managerial skills in managing this forest.

The highest community participation was in the intensity of participation in providing information. This showed that the community participates in providing information related to the potential of the area, including the ban on cutting mangroves, efforts to restore degraded areas, and other information for the public and visitors. Then followed by providing consultation (community participation in providing consulting services, especially for the surrounding community and visitors including researchers). The next form of participation was decision-making (community participation in decision-making, especially in preparing activity plans related to determining the type of activity to be carried out) which was more visible from the role of village heads and interest groups. The last form of participation was Initiation Action (community participation in initiating the implementation of activities including program planning, protection, utilization, and community empowerment). None of the respondents had managerial capabilities in controlling all forms of participation (total control) in the intensity aspect. Even though there were no respondents/communities who were at the intensity of total control participation, in the implementation of the management program there were already several communities, especially tribal chiefs who attempted to participate by initiating activities through participating directly in activities. Likewise in the process of decision-making and providing consultation.

This condition showed similarities with the form of community participation in the management of the Wosi Rendani protected forest [4]. On the other hand, it was different from the intensity of community participation in the Bukit Soeharto education and research forest [7] and community participation in the management of TWA Sorong [6], which tend to be the same in terms of implementing management programs when compared to program management in the Gunung Meja nature park [8]. This was influenced by the desire to maintain the existence of the mangrove area as a community kitchen in fulfilling household needs (fish, shrimp, snails/clams, firewood, and tourism).

3.2. Functions and Intensity of Participation Based on Community Elements

The function of community participation in the management of the Waranggui mangrove forest in several villages in South Manokwari Regency was not in all functions and intensity of participation, as well as the elements of the community who participate as shown in the following table:

Table 4 Functions and Intensity of Participation Based on Community Elements in Waranggui Mangrove Forest Management

Functions of Participation	Respondent					Amount
	Leader	Interest	Head of Family	Woman	Teenager	
Management	-	-	-	-	-	0
Planning	3	-	-	-	-	3
Implementation	-	3	12	13	6	34
Maintenance	-	-	3	3	6	12
Distribution	-	-	3	2	6	11
Total	3	3	18	18	18	60
Percent (%)	5.0	5.0	30.0	30.0	30.0	100
Intensity Particiaption						
Total Control		-	-	-	-	0
Initiation Action		-	1	-	-	1
Decision Making	3	1	5	-	-	9
Consultation	-	1	5	8	4	18
Informing	-	1	7	10	14	32
Total	3	3	18	18	18	60
Percent (%)	5.0	5.0	30.0	30.0	30.0	100

Participation of community elements in the management of the Waranggui mangrove forest was highest in the family, women, and youth groups (based on the representation of community elements) and the lowest was in the leader and interest groups (village secretary and Baperkam). Furthermore, based on the highest participation function in the leader group at the level of participation (Planning) planning, then the intensity of participation in the Initiation Action was reflected through the efforts of the tribal chiefs' initiatives, especially related to area protection activities.

Elements of heads of households, women, and youth were community elements that participate more in the Waranggui mangrove forest management program compared to other elements. According to [4] each element of society had different functions and roles so that it would respond differently to innovations or programs even though the general hierarchy in society had described many levels of roles and functions of elements of society.

This condition illustrated that both in terms of the participation function and the intensity of participation of the head of the family, women, and youth were the groups that participates the most in the Waranggui mangrove forest management program which showed good conditions in the management of this area. Related to the head of the family was a common condition in society in which the head of the family was the element that participates the most such as community participation in the management of the Bukit Soeharto research and education forest [7]. Likewise, community participation in the management of the Wosi Rendani protected forest [4], community participation in the management of the Sorong NTP [6], and also community participation in the management of the Gunung Meja NTP [8] showed the dominance of the head of the family. According to [9] the family group, in this case, the head of the family, was the first member of the family to receive the innovation and would then be involved in managing the innovation. According to [10] and [4] although there were differences in access to natural resources, the head of the family was the main focus of the community in accepting an innovation/program/activity which was then implemented. It was stated further that this condition became the character of the people who still depended on natural resources for their livelihood. The participation of the two elements (women and youth) as well as the element of the head of the family had a large enough number and illustrated the ideal conditions expected in participation, namely that all elements could participate (although the function and intensity were not in a higher form).

3.3. Level of Community Participation

Based on the tabulated data as shown in Table 3, it was known that the community leaders who participated in mangrove forest management were 3 respondents in the "planning" participation function, with the intensity of participation of 3 respondents in the "decision-making" form of participation. If tabulated in the "Participation Empowerment Index" table, the level of participation of the leaders was $1 \times 4 \times 3 = 12$ which indicated that the participation of leaders in the Waranggui mangrove forest management program was in the "very inactive" category (in the range of values 1 - 25).

The community participation function of interest group elements in the Waranggui mangrove forest management program was 3 respondents in the "program implementer" participation function. Furthermore, the intensity of community participation for the element of interest was 1 respondent for the intensity of participation in "decision making", 1 respondent for the intensity of participation in "providing consulting services, especially in program planning" and 1 respondent for the intensity of participation "providing information services". If tabulated in the "Participation Empowerment Index" table, the participation level of interest group elements was $2 \times 3 \times 3 = 18$, $2 \times 3 \times 2 = 12$, and $2 \times 3 \times 1 = 6$ which indicates that community participation was an element of interest in forest management programs Waranggui mangroves were included in the category of "very inactive" (in the range of 1 - 25).

The participation function of the community head of the family in the village development fund management program, especially the Waranggui mangrove forest, was 12 respondents in the "implementation of activities" participation function, 3 respondents in the "maintenance" participation function, and 3 respondents in the "distribution" participation function. Furthermore, the intensity of participation of the head of the family 1 respondent the intensity of participation in "initiating the implementation of activities", 5 respondents the intensity of participation in "decision making, 5 respondents the intensity of participation in "providing consulting services, and 7 respondents on the intensity of participation of "providing information services". If tabulated in the "Participation Empowerment Index" table, it was found that the level of participation of the community head of the household was $3 \times 3 \times 4 = 36$, $3 \times 3 \times 3 = 27$, $3 \times 3 \times 2 = 18$, $3 \times 3 \times 1 = 18$ so that the participation of the group of heads of households in the Waranggui mangrove forest management program was included in the category of "inactive" (in the range of values 26 - 50) and "very inactive" (in the range of values 1 - 25).

The participation of women's elements in the Waranggui mangrove forest management program was 13 respondents in the "implementation of activities" participation function, 3 respondents in the "activity maintenance" participation function, and 2 respondents in the "providing service distribution" participation function, with an intensity of participation of 8 respondents in the intensity of participation "providing consulting services and 10 respondents on the intensity of participation "providing information services". If tabulated in the "Participation Empowerment Index" table, the participation rate of women's elements was $4 \times 3 \times 2 = 24$ and $4 \times 3 \times 1 = 12$ so that the level of participation of women's elements in the Waranggui mangrove forest management program was in the "very inactive" category." (in the range of values 1 - 25).

The participation of youth community elements in the village development management program, especially the Waranggui mangrove forest, was 6 respondents in the participation function "implementation of activities", 6 respondents in the participation function "maintaining activities", and 6 respondents in the participation function "providing distribution services", with a participation intensity of 4 respondents on the intensity of participation "providing consulting services and 14 respondents on the intensity of participation "providing information services". If tabulated in the "Participation Empowerment Index" table, it was found that the level of participation of youth community elements was $5 \times 3 \times 2 = 30$ and $5 \times 3 \times 1 = 15$ so that the participation of youth community elements in the Waranggui mangrove forest management program was included in the "inactive" category." (in the range of values 26 - 50)" and very inactive (in the range of values 1 - 55).

4. Conclusion

Community participation in the management of the Waranggui mangrove forest included all elements of society which were dominated by the head of the family, the female element, and the youth element with the highest participation function in carrying out activities (implementation) and the intensity of participation in initiating activities (initiation action) with the highest level of participation being quite inactive for the head of the family element.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest regarding the publication of this paper.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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