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Management of water resources in the Wae Rupa Watershed in the Perception of the Community of Hukurila Village, Ambon City

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ABSTRACT

Community-based water resources management is an approach that accommodates the active role of communities in protecting and conserving water resources. This research aims to analyze the correlation between the socio-economic characteristics of the community and community-based water resource management in Hukurila village, Ambon City. The data collection method uses interviews and field observations with data analysis using Rank-Spearman correlation to analyze the correlation between research parameters. This means that every form of natural resource utilization is carried out by considering watershed sustainability aspects. The analysis results of the community perceptions (knowledge and attitudes) assessment regarding community-based water resources management show that the level of community knowledge is in the high category, and the attitude assessment is in the medium category. The results of the Spearman Rank analysis between the level of knowledge and attitudes related to water resources management obtained a Spearman coefficient of 0.446 with a significance of 0.001 at the 99% confidence level. In comparison, the active attitude of the community with community-based watershed management obtained a Spearman coefficient of 0.337 with a significance of 0.017 at the 95% confidence level. Community perception, which includes community knowledge and attitudes, has a positive and significant relationship with sustainable and sustainable watershed management.

INTRODUCTION

Water is a basic need for human survival. The human body contains 60% water and requires adequate water intake to maintain balance, including metabolic processes, digestion, and body temperature regulation. Clean and safe water is also essential for health. Consumption of polluted water can cause various diseases such as diarrhea, cholera, and other diseases, thus requiring personal hygiene and sanitation, which contribute to preventing the spread of disease (Latuamury, 2023). Rivers are likened to veins in the human body, while

the water that flows in these veins is like blood. Without veins, blood cannot deliver various nutritional substances needed by all human body elements (Latuamury, 2020). Thus, with a river or if the river has been damaged, humans will be able to get adequate water, resulting in high prices. (Santikayasa, 2018) stated that the human body needs around 70% water, and every day, humans need around 1.5 L of water to survive (Latuamury, 2013). Terrestrial ecosystems directly depend on water as an essential factor determining the structure and function of all biomes on Earth. Water is essential and is the most significant part of protoplasm, so it is argued that all life is aquatic (Latuamury, 2022).

The most vital function of forests for human life is as a water regulator. Forests and water products are two things that are closely interconnected. Water is the main element in watershed management, starting from forest management in upstream areas, primarily related to biophysical and socio-economic institutional problems (Kadri, 2005). Water utilization activities are part of efforts to realize a harmonious relationship between forests and communities through community-based watershed management harmoniously and harmoniously (Kodoatie *et al*., 2010).

Watershed management is a holistic approach to managing watershed resources by integrating forestry, agriculture, animal husbandry, and water management, which can be expanded for development closely related to local communities' livelihoods (Satriawan, 2017). Sustainable watershed management can be realized through active community participation. Community participation will show its existence in responding to every sustainable watershed management policy and program (Fikar *et al*., 2008). Perception is obtaining, interpreting, possessing, and organizing feelings-related information (Marasabessy *et al*., 2019). People's perceptions are rooted in cognitive maps (cognitive maps). How humans image their environment is stored in the brain as a spatial network. This structure connects memories/experiences with perceiving current events, ideas, and emotions. Perception is the cognitive experience experienced by each person in understanding information about their environment, either through sight, hearing, appreciation, feeling, or smell (Satriani *et al*., 2013). Perception is a person's ability to organize observations; these abilities include the ability to differentiate, the ability to group, and the ability to focus (Sukwika, 2019).

The community participation approach in watershed management is community-based natural resource management or community-based natural resources management (C.B.N.R.M.) (Adams & Moore, 2007). This approach began to develop in the late 1990s as the era of decentralization and democracy began. The success of the C.B.N.R.M. approach in supporting management on a larger scale requires several prerequisites, such as solid legal support, a developed organization, and funding that supports infrastructure (Fikar *et al*., 2008). These prerequisites are emphasized in more detail by (Hidayat *et al*., 2020), that exogenous and Indigenous factors, namely, influence the success of C.B.N.R.M.: Focus on the goals and

direction of C.B.N.R.M.; Competency, expertise, and other technical capacities of C.B.N.R.M. implementers and participants, especially the implementing organizations; A serious stance and commitment to C.B.N.R.M. Implementing C.B.N.R.M. without fulfilling these prerequisites is generally only successful in social and economic aspects or even fails altogether (Darwis *et al*., 2020). This failure causes more severe environmental damage. This condition will worsen if no efforts are made to save the upstream areas. The efforts should not only be in the government's domain but should involve local communities as the parties who best understand the conditions of their region. The Keseneng Village community has implemented one micro-scale watershed-saving initiative through community-based natural resource management or C.B.N.R.M.

The Wae Hukurila watershed has an area of 359.73 hectares, with variations in land use, including primary dry land forest, secondary dry land forest, mixed dryland agriculture, and settlement. The Wae Hukurila watershed administratively flows in Hukurila village, South Leitimur District, Ambon City (Latuamury *et al*., 2020). The socio-economic conditions of the people living in The Wae Hukurila watershed have a close relationship because they still use river water for drinking water and household needs such as washing and bathing, and they use C minerals such as sand and stone for household purposes. Apart from that, the community still has different perceptions regarding managing the Wae Hukurila watershed water resources. Based on the brief description above, the research aims to analyze the socio-economic characteristics of the community regarding water resource management and the perception of the people of Hukurila village, Ambon City.

RESEARCH METHODS

Study Area

This research was conducted in Hukurila village, South Leitimur District, Ambon City. This location was determined because the Wae Hukurila Watershed in Hukurila village has good water resource potential, and the community is relatively dependent on the water of the Wae Hukurila Watershed—deliberate sampling of respondents (purposive sampling). The research was carried out from January to March 2022. A map of the research location is presented in Figure 1.

Research Tools and Materials

The tools used in this research are a tally sheet, G.P.S., compass, meter, digital camera, and a computer. The materials used in this research are maps of the Ambon City Forest area, Administrative Maps of the research location, land cover maps, vegetation maps, soil maps, and materials related to research problems, as well as research questionnaires and socio-economic and cultural data of the community at the research location.

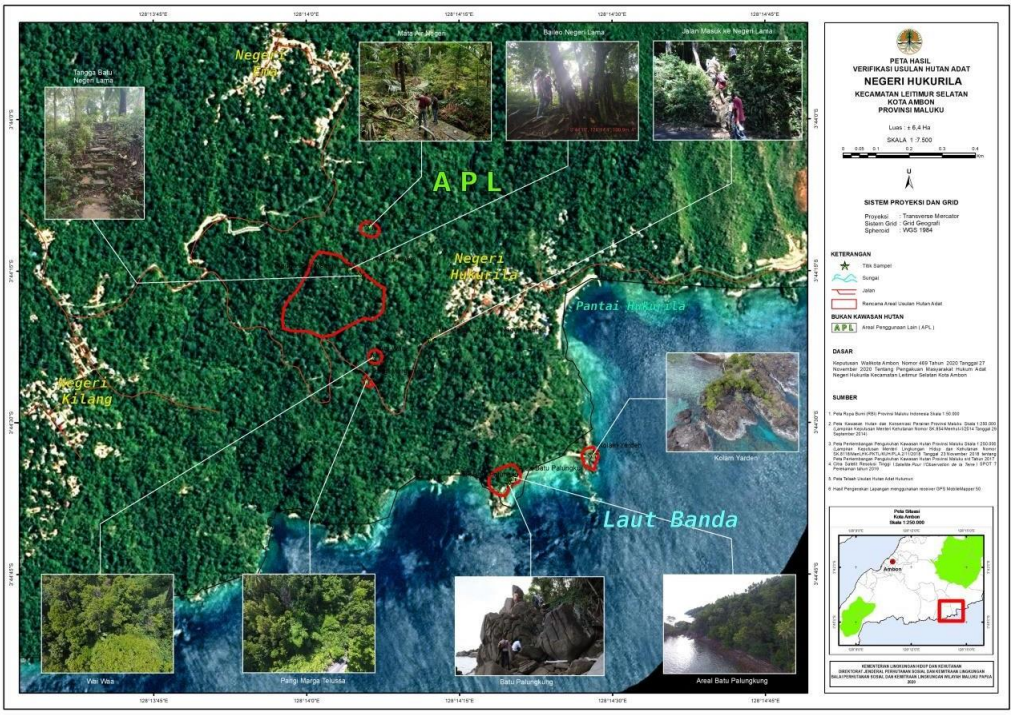

Figure 1. Map of research location SPOT 7 satellite image recording 2019 (Source: Social Forestry and Environmental Partnership Center, 2021)

Data Collection Techniques

The appropriate research method is qualitative to study water resource management in the Wae Hukurila watershed from the community's perspective. A qualitative approach was chosen because this research aims to understand community perceptions, experiences, and views regarding water resource management. This approach allows researchers to understand how communities interact with their environment and how they view water resource management. Respondents are local people with direct experience in water resource management in the Wae Hukurila watershed. Research subjects were selected purposively using the criteria of age, gender, education, employment, and length of residence in the area (Rinaldi & Mujianto, 2017).

Data collection techniques through in-depth interviews (In-depth interviews) were conducted to explore community perceptions, experiences, and knowledge regarding water resource management. The interviews were semi-structured, where the researcher used an interview guide with critical topics but remained flexible to explore issues that emerged during the interview. The participatory observation was carried out to understand the social and environmental context in Hukurila village and to see firsthand how the community interacts with water resources. Documentation is used to collect data on the community's water use, historical records, and other documents relevant to water resource management in the Hukurila watershed.

Spearman Rank Analysis

Processing data from questionnaires distributed to the people of Hukurila village and critical informants will be analyzed further through several stages. Data processing has three stages: editing, coding, and scoring. The questionnaire format includes two, namely positive statements and negative statements. A positive statement (+) is a statement where the answer is in line with the researcher's expectations, and a negative statement (-) is a statement where the answer is not in line with the researcher's expectations. The aim of presenting positive and negative statements is to prevent the tendency of respondents to answer at one end of the scale with the highest score so that the use of these two statements is minimized. There are five scale options with a scoring format, namely: Positive Statements has five answer choices with a score of 1 to 5, where Strongly Agree (Score 5), Agree (Score 4), Disagree (Score 3), Disagree (score 2) and Disagree (Score 1). Temporary Negative Statements also include five answer choices with a score opposite to a positive statement. Strongly Disagree (Score 5), Disagree (score 4), Disagree (Score 3), Agree (Score 2), Strongly Agree (Score 1) (Hidayat, 2017).

The technical modification of the analysis is intended to obtain the results of an analysis of the role of the community in managing water resources in Hukurila village, Ambon City. Modifications to the analysis technique are described as follows:

a. Tabulation

Tabulation is carried out by presenting tabulated data in table form containing codes according to the required analysis. Accuracy during the tabulation process is necessary to minimize errors. The process begins by reviewing all data from questionnaires and interviews; then, descriptive analysis is carried out.

b. Data Percentage

This calculation compares the Number of answers given by respondents because the frequency of respondents' answers for each item is different. This descriptive percentage is processed by dividing the frequency by the Number of respondents multiplied by 100 percent (Hidayat, 2017) (Eq. 1).

$$A = \frac{f}{n} \times 100\% \quad \ldots (1)$$

Where: *A* = Percentage (Number of percentages sought); *f* = Frequency of respondents' answers; *n* = Number of respondents.

This descriptive percentage calculation has the following steps: 1) Correcting the questionnaire answers from respondents; 2) Calculate the frequency of respondents' answers; 3) Total Number of respondents; and 4) Enter into the formula.

To calculate questionnaire research using a Likert scale, first use the Rensis Likert formula: calculate the Number of respondents who choose multiplied by their score (Susetyo & Cahyono, 2017) (Eq. 2).

Formula: $T \times P_n$ … (2)

Where: T = Total Number of respondents who voted; P_n = Number choice Likert score.

To explain the correlation between socio-economic characteristics and water resource management using the Spearman Rank coefficient (*Rs*) test analysis (Eq. 3).

$$Rs = 1 - \frac{\sum_{i=1}^{n} di^2}{n(n^2-1)} \quad \ldots (3)$$

Where: *Rs* is the Spearman Rank Coefficient; di is the difference in rankings of *X* and *Y*; and n is the Number of samples.

Rank-Spearman coefficient (*Rs*) ranges from 0-1. If Rs is 0, then there is no correlation between the socio-economic characteristics of the community in managing water resources. If *Rs* is +1 and -1, the correlation between the two parameters is perfect. The greater the Rs correlation coefficient, the higher the correlation between the two at the 95% or 99% confidence level (Parera *et al*., 2021).

This question scale uses a rating of 3 for the answer "Very Active," 2 for "Active," and 1 for "Not Active." The following is a calculation to obtain an interval class Sugiyono (2014 *in* Rusli & Sani, 2022) (Eq. 4) to determine the level of community participation in village forest management in Negeri Oma:

$$\text{Interval Class} = \frac{\text{maximum value} - \text{minimumv value}}{\text{The number of classification (classes)}} \quad \ldots (4)$$

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

The characteristics of the respondents in this study were people selected based on their proximity to the Wae Hukurila watershed area from upstream to downstream. The frequency analysis results of fifty respondents were based on age, gender, education, employment, income, number of family dependents, and length of residence. A person's age usually determines their ability to choose activities and maturity (action). The results of field observations show that the age groups of respondents are categorized into three: the age group less than 25 years, the age group between 25 and 50 years, and the age group more than 50 years, as presented in Table 1.

A person's age usually determines their ability to choose activities and maturity (action). The results of the tabulation of respondent data according to age are categorized into three age groups, namely the characteristics of respondents based on age, dominated by the productive age category in the 25-50 years age category at 52%, followed by the 50 year and over age category at 36%, and the less than 25-years age category at 12 %. The characteristics of respondents based on gender are relatively the same, namely that men dominate respondents at 52.0% and women at 48.0%. Educational characteristics are dominated by elementary

school and junior high school equivalent at 46.0%, followed by secondary education, high school and equivalent at 40.0%, and diploma/graduate/postgraduate education at 14.0%.

Table 1. Tabulation results of socio-economic characteristics

Parameter	Category	Frequency	Percent
Age	< 25 Years	6	12.0
	25-50 Years	26	52.0
	> 50 Years	18	36.0
	Total	50	100.0
Gender	Male	26	52.0
	Female	24	48.0
	Total	50	100.0
Education	Elementary and Middle School Equivalent Education	23	46.0
	High School Equivalent	20	40.0
	Diploma/Undergraduate/Postgraduate	7	14.0
	Total	50	100.0
Occupation	Farmer/fisherman/handyman/Building/ labor	35	70.0
	Private employees	10	20.0
	Civil servants/Army/Police/Retired	5	10.0
	Total	50	100.0
Income	Less than 3.000.000 per month	43	86.0
	3.000 000 to 5.000.000 per month	6	12.0
	More than 5.000.000 per month	1	2.0
	Total	50	100.0
Amount dependants	Less than 3 people	26	52.0
	3-5 people	14	28.0
	More than 5 people	10	20.0
	Total	50	100.0
Length of Domicile	<25 Years	6	12.0
	26-55 Years	26	52.0
	> 55 Years	18	36.0
	Total	50	100.0

Source: Primary data processing, 2021.

Work is vital in living life. By working, someone can earn money to meet their daily living needs. The job characteristics of respondents were dominated by farmers/fishermen/ builders/laborers at 70.0%, followed by jobs in the private sector at 20.0%, and civil servants/TNI/POLRI/retired at 10.0%. Of the 50 respondents taken in the land of the Hukurila City of Ambon, the type of work of the community is relatively farmers/ fishermen/builders/laborers, with the largest percentage being 70.0%. Respondent characteristics based on income level include three categories: income less than Rp. 3,000,000,- per month amounting to 86.0%, income level between Rp.3,000,000,- to Rp. 5,000,000,- per month at 12.0% and income of more than Rp. 5,000,000,- per month, as much as 2%. Characteristics of respondents based on the number of family dependents, namely 20.0% of respondents had less than three dependents, 28.0% had family dependents of

between 3-5 people, and 52.0% had more than five dependents. The characteristics of respondents based on length of domicile in the Wae Hukurila watershed area for the three categories were dominated by length of domicile of 26-55 years at 52.0%, followed by length of domicile of more than 55 years at 36.0% and length of domicile of less than 25 years at 12 .0%.

Perceptions and behavior regarding community-based Wae Hukurila watershed management

The level of community perception regarding the management of the Wae Hukurila watershed is assessed based on seven indicators for assessing community knowledge. Indicators to evaluate the level of community knowledge regarding the management of the Wae Hukurila watershed are based on seven assessment indicators, namely knowledge related to the benefits of the watershed, knowledge related to the function of formal rules, knowledge related to the function of unwritten rules, compliance and ability of residents to preserve river watersheds, knowledge related to the function of social relations, and willingness of residents to strengthen social ties in preserving watersheds as presented in Table 2.

Table 2. Community knowledge regarding the management of the Wae Hukurila Hukurila village watershed

Indicator	Knowledge level (%)		
	Not knowing	Enough to know	Very knowing
Knowledge related to the watershed benefits	20,0	52,0	28,0
Knowledge of the function of formal rules	32,0	48,0	20,0
Knowledge of the function of unwritten rules	8,0	32,0	60,0
Knowledge of the function of social relations	28,0	46,0	26,0
Understanding Formal Rules	40,0	50,0	10,0
Understanding Customary Rules	22,0	34,0	44,0
Understanding related to internal social relations preserving river watersheds	18,0	42,0	40,0

Source**:** Primary data processing, 2022

The first assessment indicator regarding community knowledge about the benefits of the Wae Hukurila watershed states that 52% of the community is quite aware of the benefits of the watershed, followed by very knowledgeable, and 28% are not aware, 20%. Citizens' knowledge of the function of formal rules regarding the management of the Wae Hukurila watershed stated that 48% of the public knew enough, followed by not knowing 32% and very knowing 20%. Citizens' knowledge of the function of unwritten rules related to watershed management states that the community is very knowledgeable at 60.0%, followed by quite knowledgeable at 32% and not knowledgeable at 8%. Understanding formal rules related to watershed preservation states that the public is quite aware of the formal regulations at 50%, followed by not knowing at 40% and very knowing at 10%. Understanding customary rules related to watershed conservation states that people tend to be very knowledgeable about customary regulations at 44%, followed by quite knowledgeable at 34% and not knowledgeable at 22%. Finally,

understanding social relations in preserving rivers states that 42% of the community knows quite well, followed by very knowledgeable 40%, and 18% don't know.

Community attitudes related to Wae Hukurila Watershed Management Hukurila village

The level of community perception regarding the management of the Wae Hukurila watershed is assessed based on six indicators for assessing community attitudes, namely involvement in helping/helping neighbors/residents around the watershed, involvement in utilizing the water resources of the watershed for free by community members, involvement in supporting/assisting neighbors/residents about the program management of river water resources in the Wae Hukurila watershed, involvement in collaboration between communities in watershed management, watershed river conservation activities, compliance and ability of residents to conserve rivers, and finally the willingness and ability of residents to cooperate in river conservation activities as presented in Table 3.

Table 3. Community attitudes related to Wae Hukurila Watershed Management Hukurila village

Indikator	Community attitudes (%)		
	Inactive	Moderately active	Very Active
Involvement in helping/helping neighbors/residents around the watershed	36,0	42,0	22,0
Involvement in utilizing watershed water resources for free for community members	10,0	56,0	34,0
Participate in helping/assisting neighbors/residents with the Wae Hukurila watershed water resources management program.	20,0	40,0	40,0
Involvement in cooperation with fellow communities.	28,0	36,0	36,0
Watershed River Conservation Activities	22,0	46,0	32,0
Compliance and ability of residents to preserve watershed rivers	18,0	56,0	26,0
The willingness and ability of residents to cooperate in watershed river conservation activities	16,0	52,0	32,0

Source: Primary data processing, 2022

The first assessment indicator regarding involvement in helping/assisting neighbors/residents around the watershed states that the community is quite active at 42%, followed by not active at 36% and very active at 22%—community involvement in utilizing water resources free of charge. Community members stated that the community was quite actively involved at 56%, followed by very active at 34% and not active at 10%. The involvement of helping/assisting neighbors/residents about the Wae Hukurila River Water Resources Management Program stated that the community was quite actively involved at 40%, followed by very active at 40% and not active at 20%. Involvement in collaboration between communities in watershed management states that the community is quite actively involved at 36%, followed by very active at 36% and not active at 28%. River conservation activities in the Wae Hukurila watershed show that the community is quite actively involved at 46%, followed by very active at 32% and not active at 22%. The compliance and ability of residents to preserve rivers in the Wae Hukurila watershed shows that the community is quite actively involved at 56%, followed by very active at 26% and not active at 18%. Finally, the willingness and ability to cooperate

with residents in river conservation activities shows that the community is quite actively involved at 52%, followed by very active at 32% and not active at 16%.

The role of the community in community-based management of the Hukurila village watershed

The level of active role of the community is based on six indicators for assessing the active role of the community, namely Openness of formal organizations/institutions in managing water resources and watersheds, Intensity of watershed management agencies in measuring and monitoring, Intensity of visits by formal organizations/institutions in the Wae Hukurila watershed, Intensity of meetings with members of the watershed management community, Role in collaboration with the Wae Hukurila watershed management community, Negotiations on Wae Hukurila watershed water resource management Involvement in associations/organizations related to water resources management in the Wae Hukurila watershed, as presented in Table 4.

Table 4 The role of the community in community-based management of the Wae Hukurila watershed

Indicator	Community Role Level (%)		
	Inactive	Moderately active	Very Active
Openness of formal organizations/institutions in the management of water resources and watersheds	22,0	50,0	28,0
The intensity of watershed management agencies in measurement and supervision	56,0	28,0	16,0
Intensity of visits by formal organizations/institutions in the Wae Hukurila watershed	50,0	32,0	18,0
Intensity of meeting of members of the watershed management community	50,0	28,0	22,0
Role in cooperation with the Wae Hukurila watershed management community	58,0	24,0	18,0
Negotiation of water resource management of the Wae Hukurila watershed	22,0	66,0	12,0
Involvement in associations/organizations related to the management of water resources in the Wae Hukurila watershed	40,0	54,0	6,0

Source: Primary data processing, 2022

The first assessment indicator related to community-based watershed management is the openness of formal organizations/institutions in managing water resources and watersheds. This shows that the transparency of formal organizations or institutions, according to the community, is quite active at 50%, followed by very active at 28% and not active at 22%. The intensity of watershed management agencies in measuring and monitoring, according to the community, shows that watershed management agencies are not active at 50%, followed by quite active at 32% and very active at 16%. The intensity of formal organization/institution visits in the Wae Hukurila watershed shows that formal organization visits are relatively inactive at 50%, followed by active at 32% and active at 18%. The intensity of meetings between members of the watershed management community shows that the meeting intensity is relatively active at 50%, followed by inactive at 28% and inactive at 22%. The role in collaboration with the Wae

Hukurila watershed management community shows that partnership with the community is relatively active at 58%, followed by very active at 24% and not active at 18%. Negotiations on water resource management in the Wae Hukurila watershed show that negotiations are relatively active at 66%, inactive at 22%, and active at 12%. Involvement in associations/organizations related to water resource management in the Wae Hukurila watershed shows that community involvement in Payuban or community organizations is relatively active at 54%, followed by inactive at 40% and very active at 6%.

Community-based water resource management is critical because involving the community in water resource management ensures that decisions are taken according to the needs of local conditions and that communities better understand their area's environmental characteristics and challenges. When communities are involved, they tend to be more committed to maintaining water resources and helping ensure the long-term sustainability of water resource management. Communities often have local knowledge regarding local wisdom for managing water sources against droughts and floods and preserving water springs. For example, traditions in Hukurila village are related to village cleansing rituals, including the ritual of cleaning springs and rivers upstream in Hukurila village, which is in the mountainous region of Ambon Island, when December enters regularly every year. The ritual is centered on the springs and upstream rivers, which are believed to be the center or mother of the springs around the Rupa watershed river area. The ritual begins with worship and prayer at sacred springs and upstream rivers. It is attended by traditional and Saniri leaders and religious leaders from the community along the Wae Hukurila watershed. Only now, the goal is to maintain vegetation cover along the Wae Hukurila watershed by not cutting down haphazardly. Activities to clean springs, upstream rivers, and the surrounding environment are still carried out together yearly. Another activity carried out by community members is planting trees voluntarily.

Local wisdom often offers effective and sustainable solutions for protecting and preserving community-based water resources. The people of Hukurila village preserve the springs as traditional artifacts passed down from generation to generation. As a natural mountain community, the people of Hukurila village still maintain and protect springs with rituals and customs to ensure the continuity of river flows. Indigenous communities use soil and water conservation techniques such as terracing to prevent soil erosion and reduce surface water runoff. This technique helps maintain soil quality and ensures agricultural sustainability (Latuamury, 2023). Indigenous communities also create rules to regulate water use and distribution systems, including irrigation schedules and usage limits, to ensure fair distribution and prevent over-extraction. They also plant trees around water sources for conservation and preservation. Planting trees helps maintain soil quality and reduces water pollution (Latuamury, 2020a).

Spearman Rank Correlation of Community Perception with the Management of the Hukurila Village Watershed

The results of the Spearman Rank correlation analysis were carried out to see the strength of the relationship between public perceptions, including the level of knowledge and attitudes regarding resource management. The results of the Spearman Rank analysis between community perceptions, including the level of knowledge and attitudes related to water resource management, are presented in Table 5.

Table 5. Results of Spearman Rank correlation analysis related to community perception and watershed management

Rank Spearman's Correlation		Level of community knowledge	The level of public attitudes	The level of community-based watershed management
Level of community knowledge	Correlation Coefficient	1.000	0.353*	**0.446****
	Sig. (2-tailed)	.	0.012	**0.001**
	N	50	50	50
The level of public attitudes	Correlation Coefficient	0.353*	1.000	**0.337***
	Sig. (2-tailed)	0.012	.	**0.017**
	N	50	50	50
The level of community-based watershed management	Correlation Coefficient	0.446**	0.337*	1.000
	Sig. (2-tailed)	0.001	0.017	.
	N	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 5 shows the results of the Spearman Rank analysis between community perceptions, including the level of knowledge and attitudes related to water resource management. The Spearman rank correlation between community knowledge levels and community-based watershed management in Hukurila village obtained a Spearman coefficient of 0.446 with a significance of 0.001 at the 99% confidence level. Meanwhile, the Spearman rank correlation between active community attitudes and community-based watershed management obtained a Spearman coefficient of 0.337 with a significance of 0.017 at the 95% confidence level. Community perception, which includes the level of knowledge and attitudes of the community, has a positive and significant relationship with the sustainable and sustainable management of the Wae Hukurila Hukurila village watershed. The people of Hukurila village have rich traditional knowledge about water resources, passed down from generation to generation. This knowledge includes traditional ways of conserving water sources, recognizing natural signs related to water availability, and sustainable water management practices. Local communities also assess water quality based on parameters obtained and directly observed, such as clarity, taste, and smell. Communities also use local biological indicators, such as the

presence of certain types of fish or plants, to assess the health of water resources. Communities are often aware of changes in weather patterns that affect water availability, such as longer dry seasons or erratic rainfall. People attribute water problems to natural events such as floods or landslides that disrupt water flow. The community is also aware that human activities such as deforestation, intensive agriculture, and infrastructure development contribute to the degradation of water resources. There is awareness that practices that are not environmentally friendly can reduce the quality and quantity of water (Latuamury, 2020b).

CONCLUSION

The results of the analysis of community perception assessments, including the level of knowledge and attitudes regarding community-based management of the Wae Rupa watershed, show that the level of community knowledge based on seven assessment indicators is in the high category. In comparison, the results of the assessment of six attitude assessment indicators are included in the medium category. These results show that the people of Hukurila State know the importance of managing the Wae Rupa watershed and understand the attitude taken in watershed management. The results of the Spearman Rank analysis between community perceptions, including the level of knowledge and attitudes related to water resource management, obtained a Spearman coefficient of 0.446 with a significance of 0.001 at the 99% confidence level. Meanwhile, the Spearman rank correlation between active community attitudes and community-based watershed management obtained a Spearman coefficient of 0.337 with a significance of 0.017 at the 95% confidence level. Community perception, which includes community knowledge and attitudes, has a positive and significant relationship with sustainable and sustainable watershed management. The research results show that people's perceptions include essential knowledge and attitudes in managing water resources and that cultural, social, and economic conditions influence people's perceptions. Effective water management requires an approach that respects local knowledge and actively involves communities..

REFERENCES

Adams, M., & Moore, G. (2007). Participatory action research and researcher safety. In *Participatory Action Research Approaches and Methods: Connecting People, Participation and Place*. https://doi.org/10.4324/9780203933671-17

Darwis, R.S., Resnawaty, R., & Nuriyah, E. (2020). Peningkatan sensitivitas kepemimpinan lokal dalam pengelolaan Sungai Citarum melalui teknik Participatory Rural Appraisal (PRA) di Desa Rancamanyar. *Kumawula: Jurnal Pengabdian Kepada Masyarakat*, *3*(1). https://doi.org/10.24198/kumawula.v3i1.24820

Fikar, Z., Masduqi, A., Masduqi, A., Endah, N., & Soedjono, E. S. (2008). Sistem penyediaan air bersih perdesaan berbasis masyarakat. *Jurnal Seminar Pascasarjana*, 1–6.

Hidayat, A. (2017). Metode Penelitian: Pengertian, Tujuan, Jenis - Uji Statistik.

www.statistikian.com.

Kadri, T. (2005). Menelaah strategi pengelolaan DAS di Indonesia (Sebuah Kritik). *Sipil*, *5*(1), 32-40.

Kodoatie, Robert J. & Syarief, R. (2010). Tata Ruang Air Tanah. *Yogyakarta: Andi Press*, *7*.

Latuamury, B., Aponno, H.S.E.S., Marasabessy, H., Hadijah, M.H., & Imlabla, W. (2020). The spatial dynamics of land cover change along the Wallacea corridor in the key biodiversity area 'Buano Island', Maluku, Indonesia. *Journal of Degraded and Mining Lands Management*, *7*(4), 2241-2251. https://doi.org/10.15243/JDMLM.2020.074.2241

Latuamury, Bokiraiya. (2013). Hubungan antara indeks vegetasi NDVI (*Normalized Difference Vegetation Index*) dan koefisien resesi baseflow pada beberapa Subdas Propinsi Jawa Tengah dan Daerah Istimewa Yogyakarta. *Jurnal Teknosains*, *2*(2), 71–92. https://doi.org/10.22146/teknosains.5998

Latuamury, B. (2020a). *Manajemen DAS Pulau-Pulau Kecil*. Deepublish.

Latuamury, B. (2020b). *Pemodelan Perubahan Penggunaan Lahan dan Karaketristik Resesi Aliran dasar Sungai*. Deepublish.

Latuamury, B. (2022). *Buku Ajar Hidrologi Pulau Kecil* (p. 313). Deepublish.

Latuamury, B. (2023). *Buku Ajar Konservasi Tanah Dan Air* (p. 286). Deepublish.

Marasabessy, S., Latuamury, B., Iskar, I., & Suhendy, C.C.V. (2019). Persepsi masyarakat mengenai peranan vegetasi kawasan sabuk hijau di Sempadan Sungai DAS Wae Batu Gajah. *MAKILA*, *13*(1), 14-28. https://doi.org/10.30598/makila.v13i1.2317

Parera, A.A., Kastanya, A., & Tjoa, M. (2021). Hubungan modal sosial kognitif terhadap performansi dusung di Desa Murnaten Kecamatan Taniwel. *Makila*, *15*(1), 70–79. https://doi.org/10.30598/makila.v15i1.3266

Rinaldi, S. F., & Mujianto, B. (2017). Metode Penelitian Dan Statistik. *Pusat Pendidikan Sumber Daya Manusia Kesehatan*.

Santikayasa, I.P. (2018). Pengelolaan Sumberdaya Air Pada Berbagai Skenario Perubahan Iklim Menggunakan WEAP. *Seminar Nasional Geomatika*, *2*. https://doi.org/10.24895/sng.2017.2-0.432

Satriani, G., & Ihsan, M. (2013). Persepsi dan sikap masyarakat terhadap penerapan program pemberdayaan di sekitar Sub Daerah Aliran Sungai MIU (Kasus program SCBFWM di Desa Simoro Kecamatan Gumbasa Kabupaten Sigi). *Jurnal Warta Rimba*, *1*(1), 1–10.

Satriawan, H. (2017). Strategi pengelolaan Daerah Aliran Sungai (DAS) dalam rangka optimalisasi kelestarian sumberdaya air (Studi kasus DAS Peusangan Aceh). *Majalah Ilmiah Universitas Almuslim*, *9*.

Sukwika, T. (2019). Partisipasi masyarakat menyediakan jasa lingkungan hidrologis di kawasan daerah aliran sungai. *Sustainable Environmental and Optimizing Industry Journal*, *1*, 49–58.

Susetyo, D.I.N., & Cahyono. (2017). Analisis faktor-faktor yang mempengaruhi pengembangan kawasan pariwisata bahari di Gili Labak, Kabupaten Sumenep. *Jurnal Teknik ITS*, *6*(1).