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Management of Kapuas River Water as a Sustainable Raw Water Source for Drinking Water Supply in Pontianak City

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Abstract
The Kapuas River in Pontianak City plays a vital role as a source of raw water for drinking water supply and various other needs. However, the quality of the river water is under increasing pressure due to the activities of surrounding communities. A sustainable management strategy is therefore necessary to maintain both water quality and availability, for human consumption as well as ecosystem sustainability. This study employed a mixed-methods approach encompassing descriptive analysis, regression analysis, and a SWOT framework. The findings indicate that the water quality of the Kapuas River is generally still within the applicable quality standards. Communities residing along the river generally collect and treat water prior to use, representing a form of adaptive response to prevailing water quality conditions. The analysis further reveals that fluctuations in basic drinking water tariffs are influenced by the rate of water loss, or Non-Revenue Water (NRW), which constitutes one of the primary challenges in the provision of clean water services. Based on the SWOT analysis, the recommended sustainable management strategy falls within the WO (Weakness–Opportunity) quadrant, signaling the need for increased funding, enhanced resource capacity, and stronger policy support to reinforce the water management system. Furthermore, regular water quality monitoring and consistent follow-up measures are essential steps to ensure that the Kapuas River remains a safe and reliable source of water for the population of Pontianak City.

INTRODUCTION

Water is an environmental component that plays a role in determining the elements of life on Earth. Water has an important function for the life of living beings, both for animals, plants and especially humans, without water life cannot function properly (Edward Alfin et al., 2022). The value of water benefits can be felt by humans because water is a *common-property resource,* so it is not surprising that water is one of the sources of exploitation that must be maintained in quality, although in practice, often the use does not pay attention to sustainable water management which can ultimately lead to a decrease in water quality.

Because water is a limited public resource, its management requires serious attention from various parties. Without integrated governance and involving the active participation of all stakeholders, this condition risks causing excessive water consumption and conflicts of interest in its use (Katusiime & Schütt, 2020; Sigalla, Tumbo, & Joseph, 2021). This imbalance not only has an impact on the availability of water, but also reduces its quality (Sangkawati & Hadihardaja, 2015).

Rivers are one of the sources of water availability. Rivers have many benefits and play a very important role, especially for people whose areas live surrounded by river

water. The existence of rivers as surface water is indispensable for the survival of human life, including as raw water for drinking, raw water for agricultural irrigation, livestock, power plants, recreation, and so on. Rivers provide water supply for irrigation, domestic needs, power generation, and support biodiversity and industrial value; ecosystem services that are the foundation of water security and community well-being (Tickner et al., 2017). Therefore, it is appropriate to pay considerable attention to rivers, especially in maintaining the quality of river water so that this resource remains suitable for various needs, such as drinking water, irrigation, and the ecosystems that depend on it (Liu et al., 2018).

The Kapuas River is the longest river in Indonesia and is part of the basic needs of the people in West Kalimantan. The river that stretches from the upstream of Kapuas Hulu to its downstream in Pontianak City, passing through 9 districts and 1 city, has a length of 1,681 km and a width ± 250 meters, (Umar et al., 2010). The Kapuas River is a aquatic ecosystem that flows in a single direction and has distinctive hydrological characteristics. The river covers a very large area, with Watersheds and Sub-watersheds reaching about 10 million hectares or about 69% of the total watershed area in West Kalimantan (Prahardana & Basyaiban, 2022).

The breadth of coverage shows that the Kapuas River is not only an important part of the ecological system in the West Kalimantan region, but also plays a vital role in supporting the survival of local communities. This river plays a multifunctional natural resource, including the provision of raw water for household and industrial needs, inter-regional transportation routes, sources of livelihood through the fisheries and agricultural sectors, and as a buffer for other economic and social activities. The strategic role of the Kapuas River is strongly felt, especially by the people living in Pontianak City, where most of their daily activities, both direct and indirect, depend on the existence and quality of river water (Ihsan et al., 2025; Sukharev, 2023; Wahyudi, Fauzi, Budiarti, & Sintawardani, 2024).

People living around the Kapuas River use the Kapuas River water directly for bathing, washing, toilet (MCK) activities and is also used as a source of raw water for PDAM clean water. (Anggraini et al., 2023). In addition, it is also used for agriculture, fisheries, then trade centers and community economies such as transportation, ports and industry. In other things, such as tourism activities, it is also the role brought by the Kapuas River. The Kapuas Kecil River is used by the residents of Pontianak City as a means of transportation, drinking water sources, industry, agriculture, plantations, and domestic waste and garbage disposal sites (Purnaini et al., 2019; in Junardi & Riyandi, 2023).

Although the Kapuas River has very important benefits and roles for the community around the river, the Kapuas River also faces serious problems in the form of significant pollution. The Kapuas River has a strategic role as a source of raw water, transportation facilities, and supports the social and economic activities of the community in the surrounding area (Pye, Radjawali, & Julia, 2017). However, the high intensity of utilization is not balanced with adequate environmental management, causing a

significant decline in river water quality. Pollution of the Kapuas River is mainly influenced by the domestic activities of the community on the riverbanks, industrial activities, and gold mining activities, which cumulatively increase the burden of pollutants on water bodies.

The decline in water quality in the Kapuas River is indicated by increasing physical and chemical pollutant parameters, such as Total Suspended Solid (TSS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD), which indicates high input of organic and inorganic waste into the waters. This condition has an impact on decreasing the concentration of Dissolved Oxygen (DO), which has the potential to interfere with the survival of aquatic organisms. In addition, increased concentrations of nutrients, particularly nitrates and phosphates, risk triggering eutrophication characterized by overgrowth of algae and overall deterioration of water quality.

Gold mining activities in the upstream area and its surroundings also contribute to the presence of heavy metals, especially mercury (Hg), in the waters of the Kapuas River. Mercury content in water bodies and sediments has the potential to undergo bioaccumulation and biomagnification in the food chain, thus posing ecological and health risks to communities that utilize aquatic resources. On the other hand, the disposal of domestic waste without adequate treatment leads to a high content of indicator microorganisms, such as Total Coliform and *Escherichia coli*, which indicate microbiological pollution and increase the risk of water-based diseases.

Overall, the water quality condition of the Kapuas River shows a significant level of pollution and has not met water quality standards for drinking water allocation and aquatic ecosystem protection. Therefore, the water of the Kapuas River is not suitable for direct use as a source of drinking water and requires intensive treatment before being used as raw water. These findings confirm the need for a sustainable and integrated river management strategy, including controlling pollutant sources, improving domestic waste treatment, and monitoring industrial and mining activities, in order to maintain the sustainability of the Kapuas River's function as a vital water resource.

This pollution comes from various sources, especially from community activities (domestic waste) and industrial waste generated by gold mining activities, industrial waste disposal, plantations and so on (Prahardana & Basyaiban, 2022). This pollution can interfere with the ecological function of rivers, such as disturbing the habitat of fish and various other aquatic organisms that have an important role in maintaining the balance of aquatic ecosystems. If pollution continues, the existence of species such as fish, aquatic life, and organisms that support the river ecosystem can be threatened, which has an impact on declining biodiversity in the river.

Currently, the activities of people living on the banks of rivers, such as dumping domestic waste directly into rivers, can cause a decrease in river water quality (Puspita et al., 2016). One of them is that rivers are used as a medium to dispose of household waste, both organic and inorganic, which can then cause various kinds of impacts. This results in pollution in the form of toxic materials, pesticides, garbage and other harmful materials

so that the quality of water in the river decreases. According to Febrianti (2015) research, most of *the grey water* (household wastewater derived from non-toilet activities) from settlements in North Pontianak is directly discharged into tributaries or ditches without treatment, thus increasing the pollution burden of Kapuas and reducing the quality of the water.

Pontianak City, as one of the areas that is drained by the Kapuas River, most of the people use several tributaries/ditches as waste disposal streams, where in Pontianak still implements *an onsite system* in the sense that *black water* is directly discharged into *septic tanks* while *grey water* directly discharged into the tributaries/ditches which causes the river water or ditch to become polluted so that the water quality of the Kapuas River decreases (Febrianti et al., 2015). In addition, rapid urbanization and the development of new settlements also put pressure on the environment, especially on the quality of river water. The continuous increase in population in the area around the Kapuas River leads to an increase in the need for land, water, and sanitation facilities, which ultimately has an impact on increasing the volume of waste produced.

The increasing population in North Pontianak District also encourages increased community activities in disposing of domestic waste, either directly into the Kapuas River or through drainage channels or ditches, without going through an adequate treatment process. This waste generally comes from household activities such as bathing, washing, and kitchen activities that contain detergents, oils, and other chemicals. This condition causes significant pollution of river water bodies, as the accumulation of such waste disrupts the balance of the water ecosystem and increases the level of pollutants beyond the threshold. As a result, the water quality of the Kapuas River gradually declines and no longer meets the feasibility standards for various purposes, such as drinking raw water, fisheries, and other domestic needs (Sari, 2015).

Several previous studies have examined various aspects of the Kapuas River. Research by Febrianti et al. (2015) and Sari (2015) focused on the pollution load from household waste in North Pontianak, finding that grey water disposal without treatment is a major contributor to declining water quality. Anggraini et al. (2023) analyzed the pollution status of the Kapuas River and confirmed that domestic activities are the dominant source of pollutants. Prahardana & Basyaiban (2022) discussed the impacts and mitigation efforts of Kapuas River pollution from a historical perspective (2000-2021). Alfin et al. (2022) examined clean water quality conditions in Pontianak City and highlighted that surface water does not meet clean water quality standards. Junardi & Riyandi (2023) assessed water quality using benthic biota as bioindicators. However, most of these studies focused on either technical water quality parameters or pollution sources separately, without integrating community behavior, economic factors (water tariffs), and sustainable management strategies into a single comprehensive framework. Specifically, research that explicitly links water quality fluctuations to drinking water tariff determination and formulates management strategies using a mixed-method approach combined with SWOT analysis is still very limited in the context of the Kapuas River in Pontianak City.

The quality of surface water in Pontianak City shows conditions that do not meet clean water quality standards, so sustainable management efforts are needed to ensure the availability of safe and quality raw water for the community (Alfin et al., 2022). Therefore, it is necessary to conduct a study related to the quality of surface water on the Kapuas River in Pontianak City as well as to find out the behavior patterns of the community in utilizing Kapuas River water as raw water for drinking water, the influence of the cost of managing Kapuas River water as raw water for drinking water and the sustainability strategy of water management of the Kapuas River as raw water for drinking water. So that the results of this research are expected to be able to provide solutions in efforts to control river pollution so that river water management as raw water for drinking water can be allocated according to needs in a sustainable manner.

The novelty of this study lies in the use of a mixed-method approach that combines the analysis of water quality of the Kapuas River (physical, chemical, microbiological parameters) with the exploration of community behavior, as well as for the first time analyzing the influence of raw water quality on drinking water rates using SPSS regression and formulating a SWOT-based sustainable management strategy in Pontianak City. Based on this, this study aims to analyze the water quality status of the Kapuas River, identify community behavior patterns in treating river water, analyze the influence of water quality on drinking water rates, and formulate sustainable management strategies. The theoretical benefit of this research is to enrich the study of integrated river management, and practically provide scientific recommendations for the government, a reference for the community in safe water treatment practices, and a strategic framework for stakeholders in supporting the achievement of SDGs point 6 in Pontianak City.

RESEARCH METHODS

Time and Place of Research

The implementation time of this research lasts from March to July 2024, starting with the stage of writing a research proposal as a foundation and comprehensive planning. After the proposal is approved, it is followed by the process of taking water samples at the research site according to a predetermined schedule. This sampling process is carried out periodically and systematically to ensure that the data obtained is representative and accurate. After the sampling is completed, water quality testing is carried out in the laboratory using appropriate methods to measure the important parameters that are the focus of the research. Water quality testing is carried out in laboratories using national and international standard methods, referring to the Indonesian National Standard (SNI) and Standard Methods for the Examination of Water and Wastewater (APHA), in accordance with the analyzed water quality parameters. The final stage is the processing and analysis of test data results, which includes statistical processing and interpretation of results to provide a comprehensive picture of the water quality condition of the Kapuas River.

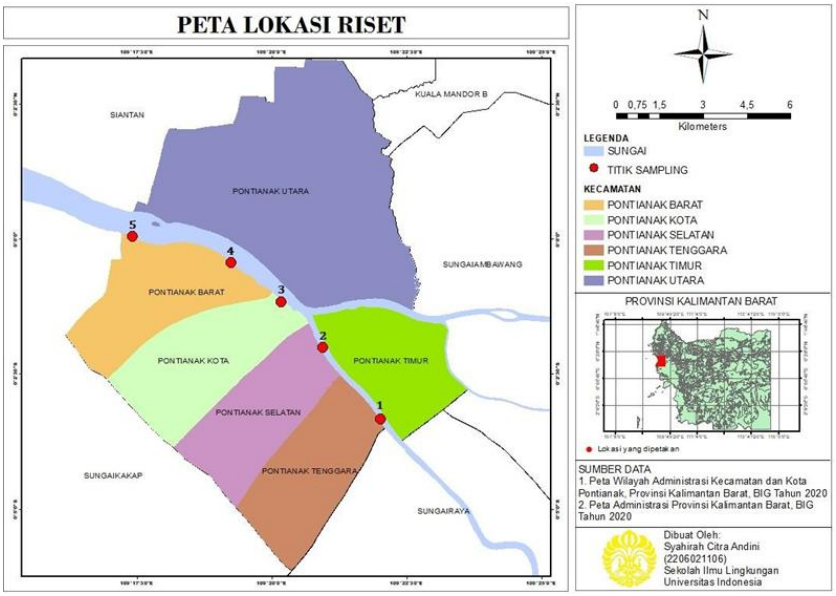

Figure 1. Map of Research Locations
Source: Data processed by the author, 2025

The research location is in Pontianak City, with sampling points spread across five strategic locations along the Kapuas River, namely: sampling point 1 at the Social Gang of Jalan Adisucipto, sampling point 2 at Gang Kuantan Jalan Imam Bonjol, sampling point 3 at Seng Hie Port, sampling point 4 at Kapuas Square Park, and sampling point 5 at the Sungai Rengas Fish Auction Site (TPI). The selection of this location is based on the consideration of the representation of community activities and diverse environmental conditions so that it can describe the variations in water quality in the Kapuas River more comprehensively.

Research Methods

This research generally uses a quantitative approach as a basis for obtaining objective and measurable data. The research method applied is a *mixed method*, which is a combination of qualitative and quantitative methods used in an integrated manner in the same study or research (Molina-Azorin, 2016). This approach allows researchers to get a more comprehensive picture. The quantitative method is used in particular to systematically measure the water quality condition of the Kapuas River, calculate the water quality status using the Pollutant Index (IP) method, and assess community behavior related to river pollution.

Meanwhile, the qualitative method in this study was carried out by collecting data through questionnaires distributed to residents living around the Kapuas River. The purpose of this data collection is to obtain information about existing sources of pollution and to understand the social factors that affect river conditions. In addition, data collection was also carried out through in-depth interviews with relevant stakeholders, such as the government, water resource managers, and the community, to get their perspectives on various efforts that can be made in controlling pollution of the Kapuas River (Sasongko, 2023).

Research Variables

The research variables and measurement tools used in this study are systematically compiled to facilitate understanding and analysis of data. Details about the main variables studied and the instruments or measuring instruments used to collect the data can be clearly summarized in the following table:

Table 1. Variable Operational Definition

No	Variable Name	Sub-Variable	Operational Definition	Units	Measuring Instruments
1	Water Quality	Temperature	An appliance that indicates the degree or measure of heat of an object	°C	*Water Temperature*
		TDS (*Total Dissolved Solids*)	The number of soluble substances in water	mg/l	Laboratory tests
		pH	Chemical parameters for measuring the degree of acidity of drinking water	-	pH meter
		COD (*Chemical Oxygen Demand*)	The amount of oxygen required to decompose the entire organic matter contained in water	mg/l	Laboratory tests
		BOD (*Biochemical Oxygen Demand*)	Characteristics that indicate the amount of dissolved oxygen required by microorganisms	mg/l	Laboratory tests
		Faith (Iron)	Iron content in water	mg/l	Laboratory tests
		Mn (Mangan)	Manganese content in water	mg/l	Laboratory tests
		Fecal Coliform	The group of microorganisms used as an indicator to determine whether a water source has been contaminated by pathogens or not	MPN/100 ml	Laboratory tests

No	Variable Name	Sub-Variable	Operational Definition	Units	Measuring Instruments
2	Water Utilization (Behavior)	How to Treat and Collect Water	The process of using water as well as treatment and storage for needs individual and social	-	Questionnaire
3	Management Fees	Drinking water rates and Water Loss Rates	Capital expenditure used to produce a product.	-	SPSS
4	Sustainable Management Strategy	SWOT	Special actions taken to achieve a goal and objectives	-	SWOT

RESULTS AND DISCUSSION

Kapuas River Water Quality Analysis

In this research, water quality data of the Kapuas River was collected from five strategically determined monitoring points along the river flow, as follows:

Table 2. Water Quality Table of the Kapuas River, Pontianak City in July 2024

No.	Parameter	Unit	Class Quality Standards1	Location of Monitoring Points				
				Gg. Social	Gg. Kuantan	Seng Hie Port	Garden of Eden - Uncategorized	TPI
1	Temperature	°C	Dev 3	25	25	25	25	25
2	Total dissolved solids (TDS)	mg/L	1000	17	15	11	12	15
3	Degree of acidity (pH)	mg/L	6-9	6,38	6,43	6,38	6,45	6,38
4	Biochemical oxygen (BOD) requirements	mg/L	2	2	2,5	3	<1	2
5	Chemical oxygen requirement (COD)	mg/L	10	10,995	14,581	15,966	12,82	13,472
6	Dissolved iron (Fe)	mg/L	0,3	1,2223	0,6548	0,4933	0,6373	0,6281
7	Dissolved manganese (Mn)	mg/L	0,1	<0.001	0,01	0,023	0,019	0,032
8	Total Coliform	MPN /100 mL	1000	0,024	0,0024	0,92	0,0012	0,0014

Source: Author's Primary Data, 2024

Based on the results of the research conducted by the author, using the following parameters: temperature 25 degrees Celsius, Total Dissolved Solid (TDS) is below 50 mg/L, indicating water with low levels of solute content, Color acidity degree (pH) which ranges from 5 to 7, which shows that the water conditions in these places tend to be slightly acidic to neutral, *Biochemical Oxygen Demand* (BOD) which has exceeded the quality standard of 2 mg/l) with values ranging from 2-3 mg/l, *Chemical Oxygen Demand* (COD) which fluctuates in concentration level with a concentration range of 10-12 mg/l and has exceeded the set quality standard of 10 mg/l, the concentration of Iron (Fe) and Manganese (Mn) which also fluctuates and is still relatively low and within a non-worrying limit and Total Coliform that is Still below the pollution standard, it can be concluded that the water quality of the Kapuas River is at a moderate polluted status.

Community Behavior Related to Drinking Water Treatment Practices

Community behavior related to drinking water handling and treatment practices can be measured through variables that describe how they manage river water used as a source of raw water. These variables reflect the extent of public understanding, awareness, and action in ensuring that the water they use is safe to consume. This includes the habits of filtering, boiling, or using certain treatment technologies, as well as how they store and distribute water in daily life. Through the measurement of these variables, a clear picture can be obtained of the pattern of community behavior towards the quality and safety of drinking water sourced from the Kapuas River.

As an initial picture, based on the results of the distribution of questionnaires to 170 respondents spread across five sampling locations, it was found that almost all communities around the Kapuas River use this river water for their daily needs. This applies both to those who have lived around the river for more than 10 years (30.6%) and to newcomers with a stay of less than 5 years (15.3%). This data shows how important the Kapuas River is as a main water source while emphasizing the need for proper management so that water quality is maintained for public health.

Based on the results of the questionnaire data, as many as 74.1% of respondents stated that the main source of drinking water they use daily is also used for other domestic purposes, such as washing, maintaining house cleanliness, and cooking. This condition illustrates the community's dependence on a single source of water for various household activities, which at the same time reflects the limitations of alternative sources of clean water in their environment. Meanwhile, as many as 25.9% of respondents revealed that their main source of drinking water is different from clean water sources used for other domestic needs. This difference may be an effort to raise public awareness in maintaining the quality of drinking water to keep it safe and healthy, or as a consequence of limited access to proper and adequate clean water sources. This shows that there are variations in water utilization patterns in the community that need to be considered in water resource management.

Regarding drinking water treatment practices, the results of the questionnaire distribution showed that most respondents (87.1%) first collected water before it was processed for consumption. The most common drinking water treatment is by cooking or

boiling water, which is considered effective in killing germs and keeping the water clean. The most commonly used shelter is in the form of water barrels (86.5%), because it is considered practical and easy to keep clean. In addition, some respondents also used other water treatment methods, such as holding water in a reservoir or special container and depositing water in buckets, with the aim that dirt particles settle before the water is used for daily needs. These practices show public awareness of the importance of water treatment to remain safe for consumption even though the water source still comes from the river.

Analysis of the Influence of Raw Water on Drinking Water Tariffs

The effect of raw water quality on drinking water rates was analyzed using SPSS statistical software to ensure the accuracy of the results. Through the partial influence test or T test, it was found that the pH of raw water has a significant positive influence on drinking water rates. As shown in the table below.

Table 3. Partial Influence Test Results (T Test)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2466.550	865.427		2.850	.025		
	pH	443.284	140.478	.656	3.156	.016	.998	1.002
	COD	-15.314	5.831	-.546	-2.626	.034	.998	1.002

a. Dependent Variable: Tarif Air Minum

Source : SPSS software calculation results

The results of this test were strengthened by the determination coefficient data, where the output of the R Square (R^2) value of 0.698 showed that the variation in drinking water tariff could be explained by the pH and COD variables of 69.8%. This means that changes in drinking water rates are mostly influenced by both water quality parameters. Meanwhile, 30.2% of the variation in drinking water rates was influenced by other factors that were not included in this analysis model. Details of the test results can be seen in full in the table below.

Table 4. Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836[a]	.698	.612	187.88569

a. Predictors: (Constant), COD, pH

b. Dependent Variable: Tarif Air Minum

Source : SPSS software calculation results

Based on the explanation above, it can be concluded that water quality affects drinking water rates.

Sustainability Strategy for Water Quality Management of the Kapuas River

In this research, the formulation of a sustainability strategy in the management of water quality of the Kapuas River was carried out by applying the SWOT *(Strengths, Weaknesses, Opportunities, Threats) method.* This method is used to systematically analyze and examine internal and external factors that affect water quality management. With this approach, an overview of the relationship between existing strengths, weaknesses, opportunities, and threats is obtained, which is further organized in the following table as the basis for decision-making and planning of effective and sustainable management strategies.

Table 5. Value Matrix of Relationship of Internal Factors and External Factors

NO	FAKTOR INTERNAL/EKSTERNAL	NU	BF (%)	ND	NBD	NK												NRK	NBK	TNB	FKK
						S1	S2	S3	W1	W2	W3	O1	O2	O3	T1	T2	T3				
I. Kekuatan (S)																					
1	Sumber air yang melimpah	0	0,00	4	-	x	1	1	4	2	2	1	2	4	1	4	4	2,36	-	-	**0**
2	Infrastruktur pengolahan air yang cukup memadai	2	13,33	4	0,53	1	x	5	4	4	4	2	3	2	5	1	1	2,91	0,39	0,92	**2**
3	Dukungan institusi lokal, pemerintah daerah dan lembaga terkait dalam upaya pelestarian dan pengelolaan Sungai Kapuas	2	13,33	5	0,67	1	5	x	4	3	2	2	4	5	1	4	4	3,18	0,42	1,09	**1**
	TOTAL																			**2,01**	
II. Kelemahan (W)																					
4	Kualitas air yang fluktuatif	2	13,33	4	0,53	4	4	4	x	4	3	4	2	4	1	4	4	3,45	0,46	0,99	**0**
5	Kesadaran masyarakat yang rendah akan pentingnya menjaga kebersihan	5	33,33	5	1,67	2	4	3	4	x	4	5	2	2	3	2	3	3,09	1,03	2,70	**1**
6	Keterbatasan dana dan sumber daya	4	26,67	5	1,33	2	4	2	3	4	x	4	2	2	4	1	1	2,64	0,70	2,04	**2**
	TOTAL																			**5,73**	
I. Peluang (0)					-																
7	Dukungan kebijakan pemerintah	2	13,33	4	0,53	1	2	2	4	5	4	x	3	3	1	4	4	3,00	0,40	0,93	**2**
8	Teknologi Pengolahan Air yang Inovatif	1	6,67	3	0,20	2	3	4	2	2	2	3	x	5	3	4	4	3,09	0,21	0,41	**0**
9	Kemitraan dengan sektor swasta dan LSM serta dukungan dari komunitas	5	33,33	3	1,00	4	2	5	4	2	2	3	5	x	2	4	5	3,45	1,15	2,15	**1**
	TOTAL																			**3,49**	
II. Ancaman (T)																					
10	Pencemaran limbah	0	0,00	3	-	1	5	1	1	3	4	1	3	2	x	1	1	2,09	-	-	**0**
11	Perubahan iklim, perubahan pola curah hujan dan peningkatan suhu global	4	26,67	4	1,07	4	1	4	4	2	1	4	4	4	1	x	5	3,09	0,82	1,89	**1**
12	Pertumbuhan penduduk dan urbanisasi	3	20,00	4	0,80	4	1	4	4	3	1	4	4	5	1	5	x	3,27	0,65	1,45	**2**
	TOTAL																			**3,35**	

Source : Data processed by the author, 2024

Based on the value of the relationship between internal factors and external factors as shown in the table above, it was found that, Strength (S) is at TNB: 2.01, Weakness (W) is at TNB 5.73, Opportunity (O) is at TNB: 3.49 and Ancamat (T) is at TNB 3.35, so that the position of the problem is at Quadran II or WO, which means that support for the availability of funds and resources through the policy support provided is needed. For more details, you can see the image below**.**

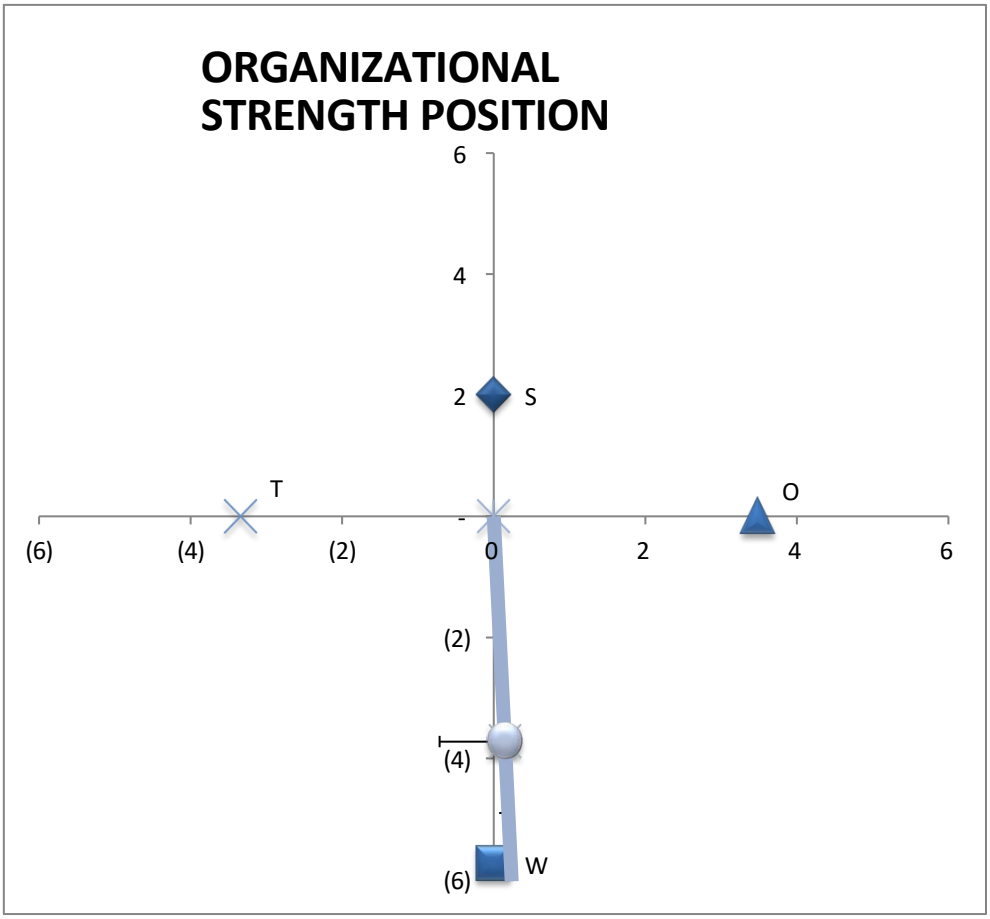

Figure 2. Quadran Matrix
(Source: Data processed by the author, 2025)

In this context, the right strategy to overcome problems in the position of Quadrant II or WO is to establish cooperation with various parties who have a strategic role in water resource management. These parties include legislators, business actors, and non-governmental organizations, which can contribute both in the form of policy support and funding, one of which is through the use of *Corporate Social Responsibility* (CSR) funds. This support is needed to strengthen institutional and technical capacity in managing the water of the Kapuas River in a sustainable manner.

CONCLUSION

Based on the analysis, results, and discussion of this study, it can be concluded that by using parameters: temperature, Total Dissolved Solid (TDS), degree of acidity (pH), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Iron (Fe) and Manganese (Mn) concentrations and Total Coliform it was found that the water quality of the Kapuas River was at a moderate polluted status. Despite fluctuations, the water quality in several sample locations shows signs of improvement and in general the water quality of the Kapuas River as a drinking water raw water is in accordance with the Class 1 Quality Standard Parameters based on Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management.

Monitoring and further action are still needed to keep water quality safe. Regarding the management of Kapuas River water as a sustainable source of drinking raw water, people on the riverbanks usually collect water first before processing it, such as by cooking or boiling. In addition, water quality also affects the applicable drinking water tariff, as the tariff is adjusted to the treatment cost and the condition of the water source. Maintaining water quality is essential for the sustainability of an affordable and safe drinking water supply for the community around the river. Based on policy analysis with the SWOT method, the right management strategy is to increase the availability of funds and resources through effective policy support. This effort is very important to ensure that water management takes place in a sustainable manner, so that it can meet the needs of the community with safe and affordable water quality. Strong policy support will also strengthen management capacity and maintain the sustainability of water resources for the welfare of the community.

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