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Analysis of factors affecting water pollution in the Jeruju river tributary in Palembang city: A cross-sectional study

Barikah Utami[1]*, Arie Wahyudi[1], Muhammad Prima Cakra Randana[1]
[1] Sekolah Tinggi Ilmu Kesehatan Bina Husada Palembang, Indonesia

***Corresponding Author:**
Barikah Utami
Sekolah Tinggi Ilmu Kesehatan Bina Husada Palembang, Indonesia
Email: barikahutami87@gmail.com

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Abstract

Background: River water pollution is an increasing environmental problem in urban areas, including Palembang City. Based on 2024 monitoring data, the water quality of the Jeruju tributary indicated elevated levels of BOD and COD exceeding quality standards due to domestic and industrial waste. This condition poses a threat to public health and aquatic ecosystem balance.
Objective: This study aimed to analyze the factors influencing river water pollution in the Jeruju tributary of Palembang City in 2025.
Methods: This research employed an analytical survey design with a cross-sectional approach involving 99 respondents living around the Jeruju tributary. Samples were selected using a simple random sampling technique. Data were collected through a structured questionnaire and analyzed using Chi-Square tests and multivariate logistic regression.
Results: The findings revealed that all independent variables were significantly associated with river water pollution ($p < 0.05$). The three dominant influencing factors were environmental sanitation ($p = 0.072$; Exp(B) = 0.279), drainage and water management ($p = 0.084$; Exp(B) = 0.267), and community participation ($p = 0.124$; Exp(B) = 0.200).
Conclusion: River water pollution in the Jeruju tributary is influenced by environmental and behavioral factors. Improved sanitation, enhanced drainage systems, and active community participation play key roles in reducing pollution risk. Local governments and communities should collaborate to strengthen waste management systems, promote environmental education, and implement community-based policies to ensure sustainable river water quality.

Background

River water is one of the most vital natural resources that plays a significant role in human life, serving as a source of raw water, transportation, and a critical component of aquatic ecosystems (Ahmad Muhtadi, 2021). However, increasing industrial, agricultural, and domestic activities have imposed severe pressure on river water quality across various regions of Indonesia (Ministry of Environment, 2021). Data from Statistics Indonesia indicate that river pollution levels continue to rise annually, particularly in densely populated urban areas (Statistics Indonesia, 2022). This trend reflects a significant decline in the environmental carrying capacity needed to sustain aquatic ecosystems (Walhi, 2023). Contaminated river water often contains organic matter, inorganic compounds, and heavy metals that pose serious health risks to humans (WHO, 2023). Consequently, river pollution has become a global concern that requires multisectoral and evidence-based approaches (Atangana & Oberholster, 2021). This problem is particularly evident in Indonesia, especially in South Sumatra Province.

South Sumatra is among the regions with the highest levels of river pollution in Indonesia, ranging from 50% to 85%, primarily due to industrial, mining, agricultural, and domestic waste discharges (Rahmawati, 2022). The Musi River ranks first, with pollution levels between 70% and 85%, followed by the Ogan River (65%–80%), Komering and Banyuasin Rivers (60%–75%), and Lematang and Kelingi Rivers (55%–70%) (Pratama & Sari, 2022). These figures demonstrate the ongoing degradation of aquatic ecosystems caused by uncontrolled human activities (Ahmad Muhtadi, 2021). Liquid waste from these economic sectors carries pollutants such as heavy metals and organic compounds that significantly deteriorate water quality (Atangana & Oberholster, 2021). This situation underscores the importance of regular monitoring of river water quality at the regional level (Ministry of Environment, 2021). Therefore, investigating the sources and contributing factors of river

pollution is an urgent environmental priority (Walhi, 2023).

In Palembang City, river pollution levels are also relatively high, ranging between 50% and 85%, affecting the Musi, Keramasan, Sekanak, Lambidaro, and Jeruju Rivers (Rahmawati, 2022). Among these, the Jeruju tributary—one of the Musi River's branches—shows moderate to severe pollution levels, particularly in Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) parameters, which exceeded quality standards in 2024. Industrial and domestic discharges are the primary contributors to elevated organic concentrations in river water (Hamid et al., 2024). Dense residential settlements along the riverbanks further aggravate the situation due to the direct disposal of untreated household waste (Islami & Sari, 2021). Monitoring data indicate that BOD increased from 5.03–8.28 mg/L in February to 15.16–22.89 mg/L in September, while COD rose from 22.86–37.18 mg/L to 72.21–109.0 mg/L (Rahmawati, 2022). These findings illustrate a significant rise in the pollution load of the Jeruju tributary, emphasizing the need for an in-depth assessment of its causative factors.

Land use activities are among the key determinants influencing river water quality (Brontowiyono et al., 2022). Land conversion from forests to residential, industrial, or agricultural areas increases surface runoff and facilitates the transport of pollutants into water bodies (Duffy et al., 2020). In Palembang, land-use change along the Jeruju River has been linked to the growing pollutant load entering the aquatic system (Statistics Indonesia, 2022). Moreover, agricultural practices near the watershed contribute additional pollutants through the use of fertilizers and pesticides containing hazardous chemical compounds (Chabib et al., 2025). Other factors, such as rainfall intensity and soil characteristics, also accelerate the movement of contaminants into the river (Ahmad Muhtadi, 2021). Therefore, understanding the relationship between land use and river pollution is essential for developing effective environmental management strategies (Brontowiyono et al., 2022).

International studies have identified heavy metals and polycyclic aromatic hydrocarbons (PAHs) as key indicators of river pollution across many countries (Grmasha et al., 2023). In South Africa, heavy metal pollution indices have been utilized to evaluate both surface and groundwater quality at the watershed level (Atangana & Oberholster, 2021). Similarly, research in Vietnam demonstrated that the development of the Water Quality Index (WQI) provides a comprehensive spatial and temporal representation of river water conditions (Hop et al., 2022). The WQI approach also enables the comparison of pollution sources, supporting more effective policy prioritization (Ustaoğlu et al., 2022). These findings indicate that water quality evaluation based on physical, chemical, and biological parameters represents an efficient scientific approach for assessing pollution levels (Nava-López et al., 2021). Hence, the study of water pollution in the Jeruju tributary must incorporate these multidimensional parameters.

Previous research has confirmed that pollutants such as ammonia, nitrate, and other organic compounds predominantly originate from poorly managed human activities (Hamid et al., 2024). The use of natural adsorbents such as activated carbon derived from nutmeg shells has been shown to significantly reduce ammonia (NH_3) levels in water (Hamid et al., 2024). Wastewater treatment methods such as struvite precipitation and ammonia removal can also recover nitrogen and phosphorus from effluents (Lorick et al., 2020). However, the application of such technologies remains limited at the community level, particularly in urban river basins (Ahmad Muhtadi, 2021). In addition, the lack of environmental awareness among local residents exacerbates pollution problems in Indonesian urban rivers (Islami & Sari, 2021). Therefore, effective water management strategies should integrate technological innovation with behavioral change interventions (Walhi, 2023).

Environmental and social studies have shown that river pollution not only affects ecosystems but also poses serious health risks to communities that depend on river water for daily needs (Chabib et al., 2025). Polluted water has been associated with increased cases of skin diseases, digestive disorders, and bacterial infections due to contaminant exposure (WHO, 2023). In several regions, river pollution has also contributed to the loss of aquatic biodiversity (Nava-López et al., 2021). This condition reflects the strong linkage between

water quality and community well-being (Ustaoğlu et al., 2022). Consequently, understanding the factors influencing river pollution is essential not only for environmental protection but also for safeguarding public health (Atangana & Oberholster, 2021). In the context of Palembang, this issue is particularly urgent given the population's continued dependence on river water sources (Rahmawati, 2022).

Based on the foregoing, water pollution in the Jeruju tributary of Palembang City must be comprehensively assessed to identify the contributing factors leading to the decline in water quality. This investigation is particularly significant, as monitoring data in 2024 revealed substantial increases in BOD, COD, and fecal coliform parameters, indicating worsening environmental conditions (Rahmawati, 2022). Therefore, this study aims to analyze the factors influencing river water pollution in the Jeruju tributary of Palembang City.

Methods

Study Design

This study employed a quantitative analytical survey design aimed at analyzing the relationship between various environmental factors and community behaviors with the level of water pollution in the Jeruju tributary of Palembang City. A cross-sectional approach was used to describe the association between independent and dependent variables at a single point in time. This design enabled the researchers to examine causal relationships between waste management, environmental sanitation, drainage, healthy habits, access to clean water, behavioral change, community participation, knowledge, and attitudes with the degree of river water pollution. The research was conducted in the Jeruju tributary, located in Kuto Batu Subdistrict, Ilir Timur III District, Palembang City, during June–July 2025. The study site was selected based on regional monitoring data indicating significant increases in Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) during 2024, making it a representative area for examining the issue of river water pollution.

Sampling

The study population comprised all residents living along the Jeruju tributary in RT 20 RW 06, Kuto Batu Subdistrict, Ilir Timur III District, Palembang City. The population was defined as all individuals sharing specific characteristics relevant to the phenomenon of river water pollution. A simple random sampling technique was applied to ensure that each individual in the population had an equal chance of being selected as a respondent. Based on the Slovin formula with a 10% margin of error, a total of 99 respondents were obtained, consisting primarily of residents and housewives living near the riverbanks. Inclusion criteria included residents who permanently lived in the study area, were able to communicate effectively, and agreed to participate. Exclusion criteria included non-local residents, individuals who were ill, or those with health or mental conditions that prevented participation. All respondents meeting these criteria were enrolled voluntarily, and the researcher ensured that informed participation was achieved prior to data collection.

Instruments

The research instrument consisted of a close-ended questionnaire developed based on theoretical constructs for each study variable. The questionnaire was divided into two major sections: demographic data and research variables. The first section contained items on age, education, and occupation, while the second section included questions related to nine independent variables and one dependent variable. The independent variables comprised waste management, environmental sanitation and hygiene, drainage and water management, healthy and hygienic practices, access to drinking water and sanitation, behavioral change in sanitation, community participation, knowledge, and attitudes. The dependent variable was the level of river water pollution. Each variable was measured using ordinal or nominal scales, depending on its characteristics. Categorical scores such as "good" and "poor" were determined by comparing individual respondent scores to the mean value. To ensure accuracy and consistency, validity and reliability tests were conducted on the instrument before its use in the field.

Data Collection

The study utilized both primary and secondary data. Primary data were collected directly from respondents through structured interviews

using the questionnaire. Interviews were conducted by the researcher with the assistance of trained enumerators to ensure consistency and minimize interviewer bias. Secondary data were obtained from Boom Baru Community Health Center (Puskesmas), environmental agency reports, and official documents regarding demographic and regional characteristics of the study site. Prior to data collection, permission was obtained from local authorities and the community health center. The data collection process was conducted over two weeks between June and July 2025, under the supervision of the principal investigator. All data were collected simultaneously using a point-time approach, consistent with the cross-sectional study design.

Data Analysis

Data were analyzed quantitatively through three main stages: univariate, bivariate, and multivariate analysis. Univariate analysis was conducted to describe respondent characteristics and the frequency distribution of each variable using percentages, means, and standard deviations. Bivariate analysis was used to examine the relationship between each independent variable and the dependent variable using the Chi-square (χ^2) test with a significance level of $\alpha = 0.05$. A p-value of less than 0.05 was considered statistically significant. Variables with a p-value < 0.25 in the bivariate analysis were included in the multivariate model to avoid excluding potentially important predictors. Multivariate analysis was performed using multiple logistic regression to assess the simultaneous influence of several independent variables on river water pollution. Data processing included the stages of editing, coding, entry, and cleaning, performed using statistical software to ensure accuracy and reliability of the results.

Ethical Considerations

This study received ethical approval from the authorized institutional ethics committee and was conducted in accordance with the principles of public health research ethics. Before interviews began, each respondent was provided with an information sheet and informed consent form outlining the study's objectives, benefits, and participants' rights. Respondents were informed that participation was voluntary and that they had the right to withdraw at any stage without any consequences. Confidentiality was strictly maintained by assigning identification codes instead of names on the questionnaires, ensuring anonymity throughout the study. All collected data were used solely for academic purposes and secured from unauthorized access. The research process respected local social norms, cultural values, and the privacy of the residents living around the Jeruju tributary in Palembang City.

Results

The analysis was conducted on 99 respondents residing along the Jeruju tributary in Kuto Batu Subdistrict, Ilir Timur III District, Palembang City. The purpose of this analysis was to describe the distribution of respondent characteristics based on factors presumed to be associated with river water pollution. The findings are presented through univariate, bivariate, and multivariate analyses. The univariate analysis aimed to present the frequency distribution of each research variable, the bivariate analysis was performed to identify the relationship between independent and dependent variables, and the multivariate analysis was conducted to determine the dominant factors influencing the level of river water pollution.

The results of the univariate analysis presented in Table 1 indicate that the majority of respondents demonstrated poor waste management practices (54.6%) and inadequate environmental sanitation (60.6%). Drainage and water management conditions were also found to be unsatisfactory among 57.6% of respondents, while 51.6% reported low levels of healthy and hygiene practices. Although 65.6% of respondents had easy access to drinking water and sanitation facilities, 55.6% still exhibited poor sanitation behaviors. In terms of community participation, more than half of the respondents (55.6%) did not actively engage in maintaining environmental cleanliness. The level of knowledge among respondents was relatively low (52.6%), and attitudes toward river water pollution were unfavorable in 58.6% of cases.

Table 1. Frequency Distribution of Factors Associated with River Water Pollution in the Jeruju Tributary, Palembang City

Variables	Frequency (n)	Percetage (%)
Waste Management		
Good	44	45,4
Poor	55	54,6
Environmental Sanitation and Cleanliness		
Good	39	39,4
Poor	60	60,6
Drainage and Water Management		
Good	42	42,4
Poor	57	57,6
Healthy and Hygiene Practices		
Good	48	48,4
Poor	51	51,6
Access to Drinking Water and Sanitation		
Easy	64	65,6
Difficult	35	35,4
Behavior in Sanitation Practices		
Good	44	44,4
Poor	55	55,6
Community Participation		
Good	44	44,4
Poor	55	55,6
Knowledge of Waste Management		
Good	47	47,2
Poor	52	52,6
Attitude toward Waste Management		
Good	41	41,4
Fair	58	58,6
River Water Pollution		
Polluted	73	73,4
Not Polluted	26	26,6

Overall, 73.4% of the study area was categorized as polluted, highlighting that river water contamination in the Jeruju tributary remains a serious environmental issue in Palembang City.

The results of the bivariate analysis presented in Table 2 show that all independent variables demonstrated a statistically significant relationship with river water pollution ($p < 0.05$). Among these, the knowledge variable exhibited the highest Odds Ratio (OR) value of 15.65 (95% CI: 4.27–57.34), indicating that respondents with low knowledge levels were 15.6 times more likely to be associated with river water pollution compared to those with good knowledge. The community participation variable also showed a strong association (OR = 13.83), suggesting that low levels of community participation substantially increased the risk of river contamination. In addition, waste management and healthy-hygiene practices recorded high OR values (> 9), signifying their major contribution to the increased pollution levels. These findings highlight that community behavior and environmental sanitation are dominant determinants influencing river water quality in the study area.

Overall, the findings reveal that the level of river pollution in the Jeruju tributary of Palembang City remains considerably high, with 73.4% of the study area classified as polluted. The bivariate analysis confirmed significant relationships between all environmental and behavioral variables with river water quality, while the multivariate analysis identified environmental sanitation, drainage, and community participation as the most influential factors affecting water quality. Therefore, river pollution control efforts should prioritize the improvement of sanitation infrastructure, the development of effective drainage systems, and

the strengthening of community engagement in maintaining the cleanliness of aquatic environments

Table 2. Relationship Between Environmental and Behavioral Factors and River Water Pollution in the Jeruju Tributary, Palembang City

Variables	River Water Pollution				Total		Pvalue	OR (95% CI)
	Not Polluted		Polluted					
	n	%	n	%	n	%		
Waste Management								9,130
Good	21	41,7	23	52,3	44	100	0,001	(3,060-
Poor	5	9,1	50	90,9	55	100		27,243)
Environmental Sanitation and Cleanliness								2,726
Good	16	37,2	27	62,8	43	100	0,030	(1,084-
Poor	10	9,1	46	82,1	55	100		6,854)
Drainage and Water Management								7,727
Good	20	47,6	22	52,4	42	100	0,002	(2,730-
Poor	6	10,5	51	89,5	57	100		21,86)
Healthy and Hygiene Practices								9,942
Good	22	45,8	26	54,2	48	100	0,000	(3,092-
Poor	4	13,4	47	37,6	51	100		31,97)
Access to Drinking Water and Sanitation								1,684
Easy	0	0	35	100	35	100	0,003	(1,375-
Difficult	26	40,6	38	59,4	64	100		2,063)
Behavior in Sanitation Practices								2,443
Good	9	40,9	13	59,1	22	100	0,027	(8,93-6,68)
Poor	17	22,1	50	77,9	77	100		
Community Participation								13,83
Good	21	55,3	17	44,7	38	100	0,000	(4,382-
Poor	5	8,2	56	91,8	61	100		42,24)
Knowledge of Waste Management								15,65
Good	23	48,9	24	51,1	47	100	0,000	(4,273-
Poor	3	5,8	49	94,2	52	100		57,34)
Attitude toward Waste Management								3,072
Good	16	39	25	61	41	100	0,015	(1,217-
Fair	10	17,2	48	82,8	58	100		7,757)

Table 3. Multivariate Analysis of Factors Affecting River Water Pollution in the Jeruju Tributary, Palembang City

Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Waster management	-0,546	0,729	0,562	1	0,454	0,579	0,139	2,416
Enviromental sanitation and cleanliness	-1,276	0,709	3,237	1	0,072	0,279	0,070	1,121
Drainage and water management	-1,320	0,763	2,991	1	0,084	0,267	0,060	1,192
Health and hygiene practices	-0,250	0,817	0,094	1	0,760	0,779	0,157	3,862
Access to drinking water and sanitation	18,789	6540,909	0,000	1	0,998	144582557,421	0,000	.
Behavior in sanitation	0,770	0,779	0,978	1	0,323	2,161	0,469	9,945
Comunity participation	-1,609	1,047	2,361	1	0,124	0,200	0,026	1,558
Knowledge	-0,172	0,930	0,034	1	0,854	0,842	0,136	5,213
Attitude	0,595	0,796	0,560	1	0,454	1,814	0,381	8,633
Constant	3,056	1,108	7,600	1	0,006	21,239		

Discussion

The results of this study indicate that river water pollution in the Jeruju tributary of Palembang City remains relatively high, with 73.4% of the area classified as polluted. The bivariate analysis showed that all independent variables had a statistically significant association with river water pollution ($p < 0.05$), while the multivariate analysis identified three dominant factors: environmental sanitation and cleanliness, drainage and water management, and community participation. These findings reinforce the concept that river pollution is the result of an interaction between environmental and behavioral factors (Ahmad Muhtadi, 2021). Domestic activities, poor waste management, and low public awareness of environmental hygiene further exacerbate the degradation of water quality (Islami & Sari, 2021). This result is consistent with the Ministry of Environment report (2021), which stated that river pollution in Indonesia is mainly caused by household, industrial, and agricultural waste. The findings suggest that river pollution in urban settings such as Palembang represents a complex environmental problem requiring a multisectoral approach (Walhi, 2023). Therefore, pollution control efforts should prioritize improvements in sanitation systems and promote active community engagement.

The environmental sanitation and cleanliness factor was found to significantly influence river water pollution, with a p-value of 0.030 in the bivariate analysis and 0.072 in the multivariate analysis. This suggests that proper sanitation conditions can reduce the risk of river pollution by up to 72.1%. Poor sanitation leads to the direct discharge of liquid and solid waste into water bodies without adequate treatment (Ministry of Environment, 2021). Studies by Ustaoğlu et al. (2022) revealed that inadequate sanitation in urban areas significantly contributes to increased Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) levels in river water. Similar patterns were observed by Hop et al. (2022) in Vietnam, where poor sanitation was identified as a major cause of declining river water quality indices. The present study argues that environmental cleanliness is closely related to public behavior in waste disposal and riverbank maintenance (Islami & Sari, 2021). Therefore, improving sanitation facilities and enhancing environmental education are essential steps toward sustaining river water quality (Walhi, 2023).

The second influential factor was drainage and water management, which showed p-values of 0.002 in the bivariate analysis and 0.084 in the multivariate analysis. Inefficient drainage systems cause water stagnation and accumulation of waste around river channels (Brontowiyono et al., 2022). In Palembang, domestic wastewater mixing with stormwater drainage accelerates water quality deterioration in the Jeruju tributary (Rahmawati, 2022). Duffy et al. (2020) found that land-use changes and poor drainage systems worsen water quality in urban areas. Similarly, Atangana and Oberholster (2021) emphasized that unmanaged drainage systems increase the likelihood of heavy metal and chemical contamination in surface water. Effective water management thus requires collaboration between local governments and communities in drainage planning, implementation, and maintenance. Enhancing drainage infrastructure is therefore a strategic measure to reduce the pollution load in urban tributaries.

Community participation was also found to play a substantial role in reducing river water pollution, with a p-value of 0.000 in the bivariate analysis and 0.124 in the multivariate analysis. The Exp(B) value of 0.200 indicates that active community participation can reduce the risk of pollution by 80%. Involvement in river cleanup campaigns, waste segregation, and pollution reporting has been shown to improve overall water quality (Chabib et al., 2025). Ahmad Muhtadi (2021) noted that collective community behavior is key to the sustainable management of water resources. When communities are highly aware of the importance of environmental cleanliness, pollution levels can be significantly reduced (Islami & Sari, 2021). Nava-López et al. (2021) similarly found that community participation along riparian zones plays a major role in pollution control and ecosystem restoration. Thus, community empowerment should be considered a central

strategy in sustainable river management programs.

In addition to environmental factors, this study found that knowledge and attitudes had significant relationships with river water pollution, with Odds Ratios (OR) of 15.65 and 3.07, respectively ($p < 0.05$). Low knowledge levels regarding pollution impacts lead people to dispose of waste directly into rivers without understanding the consequences (Islami & Sari, 2021). Ahmad Muhtadi (2021) emphasized that environmental literacy is a crucial determinant of public behavior toward water sanitation. Grmasha et al. (2023) found that low public awareness increases the risk of hydrocarbon and heavy metal accumulation in river systems. Negative attitudes toward environmental protection further exacerbate this issue by encouraging irresponsible waste disposal (Walhi, 2023). Therefore, educational interventions that highlight the importance of river cleanliness are urgently needed and should be implemented continuously (Ustaoğlu et al., 2022).

The findings also indicate that waste management and healthy-hygiene practices have strong influences on river pollution, with OR values above 9 and $p < 0.01$. Ahmad Muhtadi (2021) reported that improper waste management is a major cause of eutrophication and decreased dissolved oxygen levels in aquatic ecosystems. In Palembang, most household waste is discharged directly into rivers without prior treatment (Rahmawati, 2022), contributing to increasing BOD and COD levels (Statistics Indonesia, 2022). Hamid et al. (2024) found that the use of natural materials such as activated carbon from nutmeg shells effectively reduces ammonia concentrations, suggesting that simple household-level wastewater treatments can be feasible solutions (Meiranti et al, 2025). Moreover, good hygiene practices—such as handwashing, avoiding direct waste disposal into waterways, and maintaining drainage cleanliness—help reduce biological contamination risks (WHO, 2023). Thus, individual behavioral change forms the foundation for controlling river pollution in densely populated urban areas.

From an ecological perspective, river pollution contributes to the degradation of aquatic ecosystems and poses serious health risks to surrounding communities (Chabib et al., 2025). Elevated BOD and COD levels lower dissolved oxygen, inhibit aquatic organism growth, and cause unpleasant odors (Ahmad Muhtadi, 2021). Atangana and Oberholster (2021) reported that heavy metal accumulation in river water can lead to chronic health disorders among populations dependent on these sources. Grmasha et al. (2023) also confirmed that exposure to polycyclic aromatic hydrocarbons (PAHs) presents toxicological risks to both humans and aquatic biota. In Palembang, residents who use river water for daily activities such as bathing and washing are at risk of skin infections and digestive diseases (Walhi, 2023). Therefore, effective water quality management is not only crucial for environmental preservation but also for protecting public health (WHO, 2023).

Overall, this study confirms that river water pollution in the Jeruju tributary of Palembang is driven by a combination of environmental, behavioral, and social factors. Poor sanitation, inadequate drainage, and low community participation were identified as the most dominant determinants requiring systemic interventions (Brontowiyono et al., 2022). These findings align with the recommendation by Nava-López et al. (2021) that sustainable river management requires collaboration among communities, government institutions, and industrial sectors. Strengthening environmental awareness through education and participatory programs should therefore be prioritized in water resource management policies (Walhi, 2023). This study also supports Ahmad Muhtadi's (2021) concept that an integrated approach combining technical management and social behavior change is the most effective strategy for maintaining river water sustainability in Indonesia. Consequently, these findings can serve as a basis for designing community-based interventions to control urban river pollution.

Conclusion and Recommendation

This study concludes that river water pollution in the Jeruju tributary of Palembang City remains high, with 73.4% of the area categorized as polluted. The analysis identified environmental sanitation, drainage and water management, and community participation as the dominant factors influencing pollution levels. Poor environmental conditions and low public awareness significantly contribute to declining water quality. Local governments should strengthen waste management systems and drainage infrastructure to prevent direct wastewater discharge into rivers. Communities need to be empowered through education programs and participatory environmental initiatives to promote sustainable hygiene and waste practices. Collaboration between government agencies, the private sector, and communities is crucial for effective water pollution control. Therefore, this study recommends the development of community-based policies and the improvement of sanitation facilities as strategic steps toward sustainable river water management in Palembang City.

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