

Analysis of the Water Quality Status of the Belalo River in Lasolo District, North Konawe Regency

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Abstract

The existence of land use around rivers can affect the quality of river water. Various land uses, such as agricultural land and residential areas, accompanied by diverse activities such as sago processing, washing, and bathing, can impact river quality and public health risks. This study aims to determine the water quality status of the Belalo River in Lasolo District, North Konawe Regency, using the pollution index method as regulated in the Decree of the Minister of Environment of the Republic of Indonesia Number 115 of 2003 concerning Guidelines for Determining Water Quality Status. This research method refers to the class II quality standards set out in the Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Administration of Environmental Protection and Management. The research was conducted in June 2025. The results of this study indicate that Station I falls into the category of meeting quality standards with a Pollution Index value of 0.51. Station II falls into the category of meeting quality standards with a Pollution Index value of 0.48, and Station III falls into the category of meeting quality standards with a Pollution Index value of 0.85. The parameter that does not meet class II quality standards is a chemical parameter, namely Biochemical Oxygen Demand (BOD), which is present at Station III.

Keyword: Belalo River, Pollution Index, Quality Status.

INTRODUCTION

Water pollution is a condition caused by the input of pollutant loads or waste in the form



of gases, dissolved materials, and particulates (Liku *et al.*, 2022). Furthermore, concerns about water quality issues in various regions have increased in recent years. Water pollution, which can originate from industrial and other human activities, has become an increasingly pressing issue. Increasing levels of water pollution threaten not only the environment but also public health. Negative impacts on ecosystems and an increase in cases of water-related diseases are major concerns (Saputra, 2019). Meanwhile, river water pollution from human activities has health impacts, one of which is diarrhea caused by household waste.

River water pollution is a serious problem caused by the direct discharge of garbage, liquid waste, and domestic waste into rivers. Rivers provide various human needs as a water source, including irrigation and transportation. However, according to Government Regulation Number 38 of 2011 concerning rivers, rivers may become more vulnerable to water pollution due to human activities. Increased industrialization can also lead to ecosystem damage, making rivers receiving waste more susceptible to contamination (Pradipta and Hendriyanto, 2024).

Based on an initial survey in the Belalo River, there is sago waste from sago processing where the river flow location smells from the residual waste disposal of sago which is unpleasant when inhaled from the sago processing activity. Based on the condition of land use there, some people use the land for agriculture and sago processing activities near the river flow. Use by the community has also begun to decrease for daily activities such as bathing and washing. The existence of sago waste pollution that still occurs until now is caused by a lack of government attention to the dangers of waste for the community, so that the waste from sago processing is dumped directly into the river flow. This is also due to the lack of IPAL (Wastewater Treatment Plant) where IPAL functions to treat wastewater, both from households and industries to make it safe before being discharged. The goal is to prevent river water pollution.

Environmental protection and management are systematic and integrated efforts undertaken to preserve environmental functions and prevent pollution and environmental damage. The environment itself must be protected and maintained to prevent damage. One form of environmental preservation is waste management. Waste is the residual material from production that cannot be reused and becomes an environmental pollutant, disrupting beauty and health (Munawir, 2020).

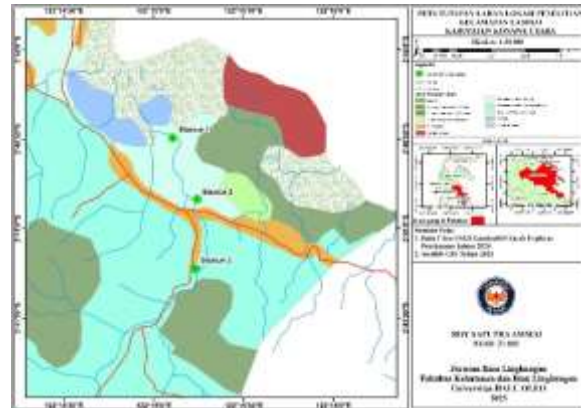
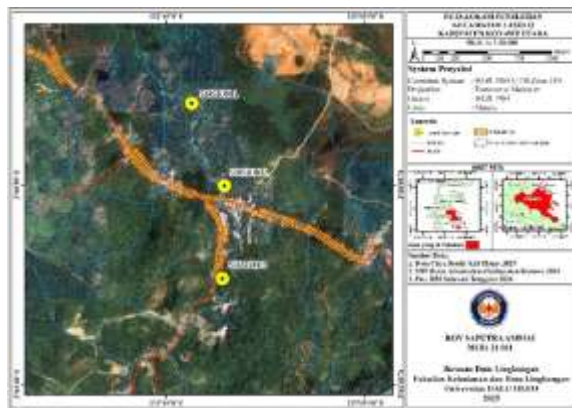
Conditions in the Belalo River area resulting from agricultural activities and sago processing have the potential to enter the Belalo River flow and have the potential to become a serious problem of pollution of the Belalo River and currently there is no solution regarding the water quality status of the Belalo River.



RESEARCH METHOD

Place and Time of Research

This research was conducted in the Belalo River, namely Station I located in Andeo Village, Station II in Tokowuta Village, and Station III located in Belalo Village in Lasolo District, North Konawe Regency. Geographically, Lasolo District is located at coordinates 03°38'13" S and 122°09'21" E. This research was conducted from June to July 2025.



Materials and Tools

The materials used in this study were river water samples obtained from the Belalo River, Lasolo District, North Konawe Regency. The tools used in this study were a Global Positioning System (GPS), sample bottles, water quality tester, ice cool box, Ms. Excel and Arc-Gis, camera, vacuum pump, volume pipette, COD meter, BOD meter and DO meter.

Research Sample

A sample is a portion of the number and characteristics of a population, or a small portion of the population taken according to a specific procedure so that it can represent the population (Siyoto and Sodik, 2015). The sample in this study was the water of the Belalo River in the Lasolo District, North Konawe Regency.

RESULTS AND DISCUSSION

Laboratory test results at Station I indicate that all parameters meet the Class II Quality Standards stipulated in Government Regulation Number 22 of 2021 for water recreation infrastructure/facilities, freshwater fish farming, livestock farming, and water for irrigating crops. The results of the research parameter tests at Station I can be seen in Table 5.1.

Table 5.1. Research Parameters for Station I

Parameter	Unit	Class II Quality Standards of Government Regulation Number 22 of 2021	Analysis Results	Information
Physics				
Temperature	°C	3	1.47	Meet Quality Standards
TDS	mg/l	1000	150	Meet Quality Standards
TSS	mg/l	50	11	Meet Quality Standards
Chemistry				
pH	-	6-9	7.91	Meet Quality Standards
COD	mg/l	25	9.60	Meet Quality Standards
BOD	mg/l	3	2.90	Meet Quality Standards
DO	mg/l	4	5.49	Meet Quality Standards
Ammonia	mg/l	0.2	0.01	Meet Quality Standards
Nitrate	mg/l	10	1.60	Meet Quality Standards
Microbiology				
Total Coliform	MPN/ 100 ml	5000	69	Meet Quality Standards

Source: Primary data, processed 2025

Laboratory test results at Station II showed that all parameters met the Class II Quality Standards stipulated in Government Regulation Number 22 of 2021 for water recreation infrastructure/facilities, freshwater fish farming, livestock farming, and water for irrigating crops. The results of the research parameter tests at Station II can be seen in Table 5.2.



Table 5.2. Research Parameters for Station II

Parameter	Unit	Class II Quality Standards of Government Regulation Number 22 of 2021	Analysis Results	Information
Physics				
Temperature	°C	3	1.64	Meet Quality Standards
TDS	mg/l	1000	192	Meet Quality Standards
TSS	mg/l	50	9	Meet Quality Standards
Chemistry				
pH	-	6-9	6.41	Meet Quality Standards
COD	mg/l	25	10.80	Meet Quality Standards
BOD	mg/l	3	2.80	Meet Quality Standards
DO	mg/l	4	5.84	Meet Quality Standards
Ammonia	mg/l	0.2	0.012	Meet Quality Standards
Nitrate	mg/l	10	2.70	Meet Quality Standards
Microbiology				
Total Coliform	MPN/ 100 ml	5000	37	Meet Quality Standards

Source: Primary data, processed 2025

Based on the results of laboratory tests at Station III, one parameter, namely BOD, exceeded the Class II Quality Standard threshold set by Government Regulation Number 22 of 2021 for water recreation infrastructure/facilities, freshwater fish farming, livestock farming, and water for irrigating crops. The results of the research parameter tests at Station III can be seen in Table 5.3.

Table 5.3. Research Parameters for Station III

Parameter	Unit	Class II Quality Standards of Government Regulation Number 22 of 2021	Analysis Results	Information
Physics				
Suhu	°C	3	2.64	Meet Quality Standards
TDS	mg/l	1000	204	Meet Quality Standards
TSS	mg/l	50	16	Meet Quality Standards
Chemistry				
pH	-	6-9	7.66	Meet Quality Standards
COD	mg/l	25	12.60	Meet Quality Standards
BOD	mg/l	3	3.90	Does Not Meet Quality Standards
DO	mg/l	4	5.25	Meet Quality Standards
Ammonia	mg/l	0.2	0.02	Meet Quality Standards
Nitrate	mg/l	10	2.40	Meet Quality Standards
Microbiology				
Total Coliform	MPN/ 100 ml	5000	92	Meet Quality Standards

Source: Primary data, processed 2025

Table 5.4. Belalo River Pollution Index

Research Location Station	Pollution Index	Quality Status
Station I	0.51	Meet Quality Standards

Station II	0.48	Meet Quality Standards
Station III	0.85	Meet Quality Standards

Source: Primary data, processed 2025

Based on Table 5.4. above, it shows the water pollution index of the Belalo River at Station I, Station II and Station III, the results of comparing the pollution index value of the Belalo River and the Decree of the Minister of State for the Environment Number 115 of 2003, it can be seen that Station I, Station II and Station III are included in the category of meeting quality standards.

1. Belalo River Pollution Index

The results of the analysis of Belalo River water samples based on Physical, Chemical and Microbiological parameters were compared with the class II criteria for river water quality standards based on Government Regulation Number 22 of 2021 concerning the Implementation of Environmental Protection and Management and Decree of the Minister of Environment Number 115 of 2003 concerning Determination of Water Quality Status using the Pollution Index method.

The pollution index analysis at Station I in the Belalo River in Andeo Village yielded a value of 0.51. This indicates that Station I meets the quality standards set by the Minister of Environment Decree No. 115 of 2003. The river water condition at Station I is influenced by the decreasing vegetation. Furthermore, local residents use the area for fish ponds and dryland farming.

Based on the analysis of the pollution index measurement, Station II obtained a result of 0.48. Based on the Decree of the Minister of Environment Number 115 of 2003, Station II is included in the class that meets quality standards. Station II is located in Tokowuta Village. The conditions around the Station II river flow are still surrounded by riparian vegetation, which includes various types of agricultural plants such as trees that play an important role in maintaining the river ecosystem.

The analysis results at Station III in Belalo Village show that the Belalo River meets the quality standards with a Pollution Index value of 0.85. At Station III, this increase was influenced by various community activities in settlements such as the contribution of domestic waste, agricultural waste, and the clearing of new land by residents around the river where various types of garbage and tree trunks were simply thrown into the river body, as well as sago processing activities.



2. Belalo River Management Efforts

Based on the results of the pollution index, it can be concluded that water pollution in the Belalo River still meets class II quality standards. The pollution index is caused by the activities of residents around the river, which affect the water quality. If this continues, it is possible that pollution will occur in the Belalo River if the community continues to clear land for the plantation sector and carry out sago processing activities without considering the impacts that will be caused to the Belalo River itself. Therefore, to prevent the pollution index value from increasing, public awareness and initiative are needed from every resident who owns plantation land and sago processing facilities to maintain the water quality of the Belalo River by not clearing new land very close to the riverbank to prevent erosion caused by land clearing carried by rainwater from reaching the river flow. The government needs to coordinate with all related institutions, such as the Ministry of Environment (KLH) and the Regional Environmental Management Agency (BPLHD). The main recommendation for managing the Belalo River due to sago waste pollution is the implementation of an integrated waste treatment system using sedimentation ponds and natural filtration. Where liquid waste from sago processing should first be flowed to a holding pond for sedimentation and filtration processes before being released into the river.

CONCLUSION

Conclusion

Based on the research results, the pollution index values obtained at three sampling stations were 0.51 at Station I, 0.48 at Station II, and 0.85 at Station III. Therefore, it can be concluded that the water quality status of the Belalo River is generally classified as meeting quality standards. However, there is one chemical parameter that does not meet quality standards, namely Biochemical Oxygen Demand (BOD) at Station III with a value of 3.9 mg/L.

Recommendation

The advice that the author can give is not to clear land, especially in areas close to rivers and not to dispose of domestic waste into rivers, and not to dispose of waste from sago processing activities directly into rivers so as to maintain the sustainability of vegetation in the Belalo River area and the relevant government is expected to carry out regular supervision, especially the village government to be wiser in handling the Belalo River problem, considering that the Belalo River is a river that is a source of water for most of the people around Lasolo District, North Konawe Regency.





REFERENCE

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