

REVIEW ARTICLE

River water quality analysis and pollution control strategy

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Abstract

The increase in population and the development of a city along with human activities in meeting their needs from agriculture, industry and household activities produce waste as a cause of the decline in river water quality. Method: The data used in this study were obtained from previous studies, river water sampling was carried out directly using the grab sampling method. Results: Analysis of the Metro River water obtained the results of the examination that the quality of water quality from good conditions to mild pollution. The Malang Regency Environmental Agency on the quality of the Metro River periodically from 2012 to March 2015 showed that it had exceeded the water quality standards and was polluted. The Ngringo River exceeded the water quality standards. Conclusion: The condition of the river water that exceeded the water quality standards was due to increased domestic, agricultural and industrial activities. The river water pollution control strategy uses a Progressive Strategy with aggressive water pollution control efforts.

Keywords: River Water, Pollution, Waste, Control Strategies.

INTRODUCTION

The increase in population and the development of a city also results in a pattern of changes in people's consumption which is quite high from year to year, with a land area that remains the same, which will result in increasingly heavy pressure on the environment (Adnan and Setiawan, 2021). Human activities in meeting their life needs from agriculture, industry and household activities will produce waste that contributes to the decline in river water quality. Increasing human activities, changes in land use and the increasingly diverse lifestyles of urban communities that produce domestic waste make the burden of pollution in rivers increasingly greater over time (Haji et al., 2021).

The decline in water quality occurs due to uncontrolled waste disposal from development activities along the river so that it does not match the river's carrying capacity (Mahyudin et al., 2015). Rivers are utilized by the community as a place to dispose of wastewater from household activities

such as toilets, industry and runoff from agricultural activities. The utilization of rivers as a place to dispose of wastewater carried out by the community can cause a decrease in the quality of river water (Hanisa et al., 2017). Based on these problems, the researcher wants to know the optimization of river water pollution control strategies.

MATERIALS AND METHODS

The data used in this study were obtained from previous studies. This study uses a quantitative descriptive approach to describe the condition of river water quality due to activities such as settlements, agriculture, and industry that cause river water pollution and find strategies for controlling river water pollution. The method of taking river water samples directly uses the grab sampling method, which is a momentary sampling method that shows the characteristics of the water only at that time (Effendi, 2003). By using a water sampler tool in accordance with SNI 6989.59:2008. Before the analysis is carried out in the laboratory, preservation is carried out so that no physical or chemical changes occur. Data analysis used in formulating river water pollution control strategies is based on water quality analysis, pollution load levels, and literature studies.

RESULTS AND DISCUSSION

In this study, data analysis was conducted on several previous studies aimed at obtaining study results so as to be able to find facts that can be used as scientific evidence on the optimization of river water pollution control strategies. The industrial process and the production of waste that is not managed properly due to limited funds and lack of concern from industrial entrepreneurs, the waste will sooner or later cause environmental pollution problems, especially river water, because industrial waste is generally dumped into rivers (Widiyanto et al., 2015).

Factors that affect river water quality include distance from pollution sources and industrial and domestic activities. Water sampling of the Metro Kepanjen Malang River, then analyzed river water samples with parameters PH, TSS, DO, BOD, COD, Phosphate, Nitrate, Nitrite, Ammonia and total Coliform. The results of the study based on the calculation of the Pollution Index (IP) showed that the water quality status of the Metro River from upstream to downstream had experienced a decline in water quality status from good conditions to mild pollution conditions (Mahyudin et al., 2015).

Monitoring was also carried out by the Malang Regency Environmental Agency on the water quality in the Metro Kepanjen River periodically from 2012 to March 2015, showing that the concentration of BOD, Phosphate and Nitrite had exceeded the water quality standards, so it was indicated that the Metro River water had been polluted, mainly due to domestic, industrial and agricultural wastewater.

Then in the research Yuliasuti, 2011 also shows that the water quality in the Ngringo Karanganyar river has decreased in quality as indicated by the presence of parameters (TSS, DO, BOD, COD, N, P, and Fe) that exceed the water quality standards. Increasing domestic, agricultural and industrial activities will affect the quality of river water, especially domestic waste (Anwariani, 2019).

This makes the quality of river water unable to be utilized according to its intended use, namely for use as a household resource, freshwater fish farming, livestock farming, water for irrigating crops, or other uses that require the same water quality as these uses (Nursaini and Harahap, 2022). So it is necessary to control river water pollution so that it can be utilized and be able to maintain the quality of river water according to water quality standards. The strategy for controlling river water pollution is formulated based on the results of water quality analysis with the parameters used, and literature studies. So that river water pollution control factors can be identified. The main strategy that can be applied in controlling Metro river pollution so that there is no decline in river water quality according to the designated designation and can be utilized sustainably is by using existing strengths and opportunities to overcome threats and weaknesses by using a Progressive strategy with

the implementation of aggressive water pollution control efforts.

River pollution control strategies that can be used based on this analysis are as follows:

1. Maintaining local protection zones along rivers by involving environmental cadres and green communities in monitoring and supervising water pollution control along rivers.
2. Improve monitoring of river water quality and supervision of wastewater discharge into rivers that has the potential to pollute rivers.
3. Granting of permits for the discharge of wastewater into rivers by taking into account the conditions of the River's Water Pollution Load Capacity.
4. Carrying out law enforcement against business actors who violate the established Environmental Quality Standards.

To optimize river water pollution control strategies, collaboration between various stakeholders is essential. Government, industry and communities must work together to formulate policies and practices that can reduce the negative impacts of pollution. One step that can be taken is to establish a communication forum between local governments and industries to openly discuss pollution issues. By involving all parties in the dialog, a mutually beneficial and sustainable solution is expected to be found. In addition, increasing public awareness about the importance of maintaining river water quality also needs to be done through educational campaigns that target various levels of society.

Furthermore, the use of modern technology in water quality monitoring can also be an effective solution to control pollution. The implementation of sensor-based monitoring systems integrated with analytical data can provide real-time information on river water quality conditions. Thus, preventive measures can be taken more quickly and on target. Further research is also needed to develop new technologies that can help in managing industrial and domestic waste more efficiently. With this comprehensive approach, it is hoped that river water quality can be maintained and used as intended without compromising ecosystem health.

CONCLUSIONS

The condition of river water quality exceeds the standard of water quality due to increasing domestic, agricultural and industrial activities. Based on the results of river water examination analysis with appropriate parameters, the recommendation for river water pollution control strategy is a Progressive Strategy with aggressive water pollution control efforts.

Author contributions

Ahmad Jazuly Nabil: Conceptualization, writing draft, writing review, formal analysis and editing.

Conflict of Interest

There is no conflict of interest in this study.

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Data availability

Data related to the findings of this study are available at the corresponding author.

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