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Water Quality Assessment of the Ancar River, Lombok Island

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Abstract: River water quality is a parameter to determine whether the river is polluted or not. The purpose of this study is to analyze the water quality of the Ancar River located on Lombok Island, West Nusa Tenggara, based on seven main parameters, namely temperature, pH, TSS, DO, BOD, COD, and total coliform. The study employed a descriptive-qualitative approach and evaluated water quality status using the Pollution Index method, in accordance with the Decree of the Minister of Environment No. 115 of 2003. Sampling was carried out at three strategic points representing the upstream, middle, and downstream zones of the river. The data collection method used a grab sampling technique in accordance with SNI 03-7016-2004, and laboratory analysis was conducted at STTL Mataram. The test results were compared with the river water quality standards for classes I to IV under PP No. 22 of 2021. The results showed that most water quality parameters in the Ancar River remained within the quality standard thresholds, particularly temperature, pH, TSS, DO, and total coliform. However, COD values at all observation points exceeded the limits for classes I–III and only met class IV, while BOD increased from upstream to downstream. These results indicate the presence of organic pollution, primarily from domestic activities and household waste, necessitating more optimal water quality management.

Keywords: Ancar River; Pollution Index; Water Quality.

Introduction

Rivers are a vital resource crucial for the survival of humans and other living things. They provide water for various purposes, including domestic needs, agriculture, industry, and the preservation of aquatic ecosystems. However, in recent decades, river water quality in Indonesia has faced increasing pressure due to increased human activity, urbanization, and direct waste disposal into water bodies. This leads to pollution that impacts public health and environmental damage [1].

One of the rivers experiencing these problems is the Ancar River, located on Lombok Island, West Nusa Tenggara. This river stretches for approximately 26.7 km from the foot of Mount Rinjani in the Karang Anyar Village area, Lingsar District, to its estuary at Tanjung Karang Beach in the Mataram City area. Along its course, this river flows through densely populated areas and is used by the community for various purposes, including farming, bathing, washing, and the disposal of domestic and industrial waste. These activities have degraded the river ecosystem and have the potential to pollute surface water. Household waste rich in organic matter, if not properly treated, can increase pollutant levels in water, including organic compounds and pathogenic bacteria [2].

Previous research has shown that the water quality of the Ancar River has declined. The research results showed that water quality parameters such as temperature, TSS, BOD, COD, and total coliform at several observation points exceeded the water quality standards for the water quality class categories under Government Regulation No. 22 of 2021, ranging from class I to class IV. Therefore, a comparison of water quality was conducted across all classes to determine the comprehensive status of the river quality [3].

Given the importance of the Ancar River to the surrounding community and the potential risks posed by declining water quality, a comprehensive water quality analysis is necessary. This analysis includes physical, chemical, and biological parameters, and compares them to the Class II quality standards stipulated in Government Regulation No. 22 of 2021. The results of this study are expected to provide a clear picture of the Ancar River's water quality status and serve as a scientific basis for planning the sustainable management and conservation of water resources.

River water quality is a crucial factor to consider, as some river sections serve as raw water sources for processing into clean water or drinking water. Furthermore, poor water quality can detract from the river's aesthetic appeal and pose health risks to local communities, such as the generation of odors caused by pollutant decomposition under conditions of low dissolved oxygen [4].

Research conducted on the Sanga-Sanga River indicates that, based on the Pollution Index method, the river's water quality status during the first semester of 2022, the second semester of 2022, and the first semester of 2023 fell into the "lightly polluted" category, with average Pollution Index scores of 2.09, 2.71, and 2.52, respectively. This classification of "lightly polluted" is attributed to the prevalence of mining activities within the Sanga-Sanga River watershed [5].

Water quality status refers to the condition of a water source, indicating whether it is clean or polluted over a specific period, determined by comparison with established water quality standards [6].

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Similar research conducted on the Ciliwung River found that Station 3 (located at Jl. Rawajati) was "moderately polluted". The Pollution Index (PI) values indicate that the Ciliwung River in Jakarta is indeed polluted. Station 1 showed signs of "light pollution" (PI < 5), whereas Stations 2 and 3 showed "moderate pollution" (PI > 5). These PI categories indicate a decline in Ciliwung River water quality due to organic and inorganic pollutants. This deterioration is driven by various factors, primarily the behavior of communities living near the river, including domestic, industrial, and agricultural activities [7].

The utilization of river water resources can alter specific ecosystems; a failure to consider ecological principles leads to environmental degradation and ecosystem damage. Continuous resource exploitation degrades aquatic environmental quality by disrupting the natural balance. Intensified human activity and the over-exploitation of river waters generate uncontrolled waste and pollution, placing the water under stress and leading to further deterioration in quality by disrupting the natural equilibrium [8].

This study aims to assess the water quality of the Ancar River and subsequently determine its water quality status using the Water Pollution Index. This research represents the first analysis of the Ancar River's water quality and is intended to provide additional information.

Research Methods

This study employs a quantitative descriptive approach. Samples were collected using the grab sampling method. Grab sampling is a technique that involves collecting a sample at a specific location and time; this method does not account for changes in conditions over an extended period. A single sample was collected at a specific time from each of the upstream, midstream, and downstream points.

Tools

Sample bottles, Petri dishes, Exchange cups, Funnels, Erlenmeyer flasks, Measuring flasks, Furnaces/hotplates, Tweezers, Beakers, Winkler bottles, Measuring pipettes, Dropper pipettes, Glass funnels, Beaker glasses, Watch glasses, Rubble bulbs, Burettes, Acid cabinets

Materials

Surface Water (River Water), Aquades, Tissue, Litmus Paper, $MnSO4$ Solution, Alkali Iodide Azide Solution, Concentrated $H2SO4$ Solution, 0.025 N Na-thiosulfate Solution, Starch Indicator Solution, 2% Brilliant Green Lactase Broth (BGLB) Medium, Cotton

Research Location

The sampling locations are at three points along the Ancar river flow, with projections: the first point in Karang Anyar Village, Lingsar District, West Lombok, at coordinates 8°33'44"S 116°10'55"E. The second point is in Mayure, Cakranegara District, with coordinates 8°35'13"S 116°08'47"E, and the third point is in Taman Sari, Ampenan District, with coordinates 8°35'15"S 116°04'22"E. The research location is located at the Environmental Laboratory of the Mataram Environmental Engineering College (STTL), JL. Bung Karno No. 60

River Water Sampling Techniques

Sampling was conducted in the Ancar Riverbank area and taken from 3 zones: Upstream, Middle, and Downstream, with 3 sampling points: Lingsar representing the upstream zone, Cakranegara representing the middle zone, and Tanjung Karang representing the downstream zone. Surface water sampling was carried out by monitoring. The steps were to prepare a sample bottle and latex gloves, then take a water sample from the river surface. Re-close the sample bottle that has been filled to ¾ of its capacity [9].

Water Temperature Check

The thermometer is immediately dipped into the river water and left for 2 to 5 minutes until it stabilises. Record the thermometer reading without first removing the thermometer from the water [10].

TSS work procedures

Remove large floating particles. Excessive residue in the filter can dry and form a crust that traps water, so limit the test sample to no more than 200 mg of residue. For test samples containing high dissolved solids, rinse the residue stuck in the filter paper to ensure that the dissolved substances have been completely removed. Avoid longer filtration times, because it prevents clogging by colloidal substances trapped in the filter

Place the filter paper on the funnel and place the funnel on the Erlenmeyer flask. Rinse the filter paper with distilled water. Transfer the filter paper from the funnel to a petri dish/goch dish. Dry in a furnace/hot plate at a temperature of 103°C to 105°C for 15-20 minutes, cool, then weigh. Repeat the steps in the previous section until a constant weight is obtained [11].

Total Suspended Solids Procedures

Prepare the filtering apparatus, then wet the filter with a little distilled water. Stir the sample until homogeneous, then transfer 50 mL into a measuring cylinder. Then insert the sample into the filtering apparatus and wait until all the solution has passed through the filter. Collect the filtered results because they will be used for the TDS test. Carefully transfer the filter paper from the filtering apparatus to a petri dish. Dry in a furnace/hot plate for 15-20 minutes at 103°C to 105°C. Then cool and weigh until a constant weight is obtained [12].

pH

Measuring pH using litmus paper is done by inserting a sufficient amount of water sample into a glass container, inserting the litmus paper into the water sample for a few moments until the litmus paper changes color, matching the color change on the litmus paper with the color indicated on the Universal Indicator, and recording the pH of the water obtained [13].

Dissolved oxygen (DO)

Taking river water samples with a 250ml Winkler bottle until there are no air bubbles, Incubating for 5 days in a dark room for DO5 samples and for DO0 samples without incubation, Adding 2ml of 40% manganese sulfate (MnSO4) solution and letting the solution stand for a few minutes and homogenizing it, Adding 2ml of alkali iolide azide (NaOHKI) then letting it stand until a brown precipitate appears, Transferring a 25ml solution containing a lot of precipitate into a 250ml Erlenmeyer flask, Adding 2ml of concentrated sulfuric acid (H2SO4) until the precipitate dissolves, Titrating with 0.025 N sodium thiosulfate (NO2S2O2) solution until a light yellow color forms, Adding starch indicator until a blue color forms and continuing the titration with titration until the blue color disappears then record the titration volume [14].

Biological Oxygen Demand (BOD)

Put the river water sample into a Winkler bottle. Incubate for 3-5 days in the dark. Determine the DO5 value according to the dissolved oxygen determination. Subtract the DO0 and DO5 values [15].

Chemical Oxygen Demand

Take a sample of water using an Erlenmeyer. Take 10 mL of the sample water and transfer it to another Erlenmeyer. Add 5 ml of $K_2Cr_2O_7$, 0.025 N solution. Then, pipette 10 ml of concentrated H2SO4 solution and cover with a watch glass. Let stand for 30 minutes in a fume hood. After 30 minutes, add 7.5 ml of distilled water. Add 3 drops of ferroin indicator solution, then homogenise. Titrate with 0.1 N Ferro Ammonium Sulfate solution from a green solution to orange. Record the volume of the titration used [16].

Total Coliform

Multilevel Dilution

Prepare 9 test tubes and label each tube with a sign 10^{-3}, 10^{-4}, and 10^{-5}. Fill each test tube with 9 mL of sterile distilled water measured with a measuring cup. Add 1 ml of the river water sample to each tube using a dropper, then homogenize. Add 1 ml of the sample from dilution 10^{-3} into diluent tube 10^{-4}, then homogenise by vortexing until mixed. Add 1 ml of the sample from the 10^{-3} dilution to the 10^{-4} dilution tube, then homogenise by vortexing until mixed. Add 1 ml of the sample from the 10^{-3} dilution to the 10^{-5} dilution tube, then homogenise by vortexing until mixed.

Estimator Test

Fix the mouth of the LBDS media tube on the Bunsen flame then add 5 ml each from the 10^{-3} dilution tube into 3 LBDS media tubes, and re-fix the test tube and cover it with cotton, Fix the mouth of the LBSS tube then add 1 ml each from the 10^{-4} dilution tube into 3 LBSS media tubes, and re-fix the test tube and cover it with cotton, Fix the mouth of the LBSS tube then add 0.5 ml each from the 10^{-5} dilution tube into 3 LBSS media tubes, and re-fix the test tube and cover it with cotton, Homogenize slowly in all tubes so that the sample spreads evenly throughout the media, Incubate all tubes at 37^{OC} for 24-48 hours, Observe the presence of air bubbles in the Durham tube and record the code of the tube that positively emits gas and observe the color changes that occur, Determine the MPN Coliform value based on the MPN table.

Test of Confirmation

Take water samples from positive LBDS and LBSS tubes, which are marked by bubbles in the Durham tube and a change in the color of the media. Then insert 2 BGLB 2% into the EC media tube, and incubate the BGLB media at 37 °C for 24-48 hours. The presence of gas in the BGLB strengthens the presence of total coliform, recording the number of tubes that show a positive confirmation test [17]

Take water samples from positive LBDS and LBSS tubes, which are marked by bubbles in the Durham tube and a change in the color of the media. Then insert 2 BGLB 2% into the EC media tube, and incubate the BGLB media at 37 °C for 24-48 hours. The presence of gas in the BGLB strengthens the presence of total coliform, recording the number of tubes that show a positive confirmation test.

Results and Discussion

The research activities included an initial site survey, river water sampling, laboratory testing, and data analysis. The research was conducted on the Ancar River, which flows through West Lombok Regency and Mataram City, West Nusa Tenggara Province. This river is a vital water source for the community, but faces pollution pressures from domestic activities, agriculture, and household waste. Water sampling was conducted in three strategic zones is the upstream zone in Karang Anyar Village, Lingsar District (near the spring), with coordinates (-8°33'44"S 116°10'55"E), The middle zone in Mayure, Cakranegara District (residential area and community activity center), with coordinates (-8°35'13"S 116°08'47"E). and the downstream zone in Kali Ancar Taman Sari, Ampenan District (near the estuary), with coordinates (-8°35'15"S 116°04'22"E).

Table 1. Ancar River Water Quality

Parameter	Result			Unit
	Upstream	Middle	Downstream	-
Temperature	26.1	26.1	26.3	^{O}C
TSS	0.51	0.23	7.59	Mg/L
Ph	7.7	7.6	7.7	-
COD	46	56	60	mg/L
BOD	0.1	1.6	2.5	mg/L
Do	18.4	16.8	13.6	mg/L
Total Coliforms	62	160	190	MPN/ml

Based on Table 1, the temperature at the three observation points ranges from 26.1°C to 26.3°C. This value is still within the ±3 °C normal deviation limit stipulated in the water quality standards for class III rivers under Government Regulation No. 22 of 2021, thus meeting the criteria for a good temperature for the survival of aquatic organisms. The TSS (Total Suspended Solids) parameter shows very low values: 0.51 mg/L upstream, 0.23 mg/L in the middle, and 7.59 mg/L downstream. All of these values are far below the maximum threshold of 100 mg/L for class III, indicating that the water clarity of the Ancar River is still very good and has a minimal load of suspended particles.

For the pH parameter, the values obtained ranged from 7.6 to 7.7, indicating neutral to slightly alkaline conditions. This is also within the permissible limits (6–9) for Class III. A stable pH indicates the absence of acidic or alkaline contamination from chemical waste, thereby preventing disruption to aquatic life. The Dissolved Oxygen (DO) values were very high: 18.4 mg/L upstream, 16.8 mg/L in the middle, and 13.6 mg/L downstream. All of these values are technically excellent because the dissolved oxygen content exceeds the minimum limit for Class I (6 mg/L), indicating that the water conditions still support aquatic biota activity.

Biochemical Oxygen Demand (BOD) values increased from upstream to downstream by 0.1 mg/L, 1.6 mg/L, and 2.5 mg/L, respectively. These values remain within the Class III quality standard, which sets a threshold of 6 mg/L. However, the increasing trend in BOD from upstream to downstream indicates the accumulation of organic matter that can pollute the river, particularly from domestic activities along the river. For the Chemical Oxygen Demand (COD) parameter, all observation points exceeded the Class III threshold (40 mg/L), namely 46 mg/L upstream, 56 mg/L in the middle, and 60 mg/L downstream. These values reflect a relatively high organic pollution load and are key indicators of declining water quality.

Meanwhile, biological test results for total coliform showed very low values: 62 MPN/100 mL upstream, 160 MPN/100 mL in the middle, and 190 MPN/100 mL downstream. These values are well below the Class III quality standard, which sets a maximum of 10,000 MPN/100 mL. This means that, from a microbiological perspective, the Ancar River has not experienced severe pollution from domestic waste or faeces, although monitoring for potential increases in coliform bacteria remains necessary.

Table. Comparison of Ancar River Water Quality Test Results with Class III Quality Standards (PP No. 22 of 2021).

No	Parameter	Result			Unit	PP No. 22 of 2021 Class III Quality Standards	Information
		Upstream	Middle	Downstream			
1	Temperature	26.1	26.1	26.3	^{O}C	Dev 3	Qualify
2	TSS	0.51	0.23	7.59	Mg/L	100	Qualify
3	Ph	7.7	7.6	7.7	-	6-9	Qualify
4	COD	46	56	60	mg/L	40	Not Qualify
5	BOD	0.1	1.6	2.5	mg/L	6	Qualify
6	Do	18.4	16.8	13.6	mg/L	3	Not Qualify
7	Total Coliforms	62	160	190	MPN/ml	10000	Qualify

Based on Table 2 above, it can be concluded that almost all water quality parameters at the three observation points (upstream, middle, and downstream) of the Ancar River still meet class III quality standards. The values for temperature, pH, TSS, DO, BOD, and total coliform remain within the permitted range, indicating that the water conditions have not been seriously polluted.

However, the COD (Chemical Oxygen Demand) parameter exceeded the Class III quality standard (40 mg/L) at all points. COD reflects the concentration of organic and chemical substances that are difficult to biodegrade in water. This increase in COD indicates significant organic pollution, likely originating from domestic waste from residents along the river, particularly in densely populated areas such as the middle and lower reaches. Thus, although most parameters still meet the standards, the results of this comparison indicate that the Ancar River requires special attention, especially regarding the control of organic pollutant loads that contribute to high COD values.

Temperature

Test results showed that temperatures at all three locations were relatively stable, ranging from 26.1°C to 26.3°C. This value is within a reasonable deviation from the reference temperature and indicates that the ambient temperature has not been impacted by extreme anthropogenic activities, such as the discharge of hot wastewater. This temperature condition supports the survival of aquatic organisms, particularly aerobic microorganisms [18].

Total Suspended Solid (TSS)

The TSS test results are as follows: 0.51 mg/L upstream, 0.21 mg/L midstream, and 7.59 mg/L downstream. Compared with TSS quality standards (40–400 mg/L for classes 1–4), all these results remain well below the threshold. These findings indicate that the Ancar River has good water clarity and low suspended-solids content. The low TSS values signify a minimal presence of solid particles suspended in the water such as silt, clay, organic matter, plankton, and other fine particles. Furthermore, the low TSS values are attributed to the absence of rainwater runoff that would erode exposed soil or riverbanks, thereby preventing soil particles from being washed into the water body [19].

Research on the Sekanak River in Palembang indicates that Total Suspended Solids (TSS) values in the upstream section range from 12 to 24 mg/L. The low TSS levels are attributed to the fact that the upstream area is still dominated by natural vegetation cover and absorbent wetlands; furthermore, the minimal discharge of domestic solid waste and the absence of soil erosion from construction activities in the upstream region contribute to these low values [20]

Ph

A pH value ranging from 7.6 to 7.7 indicates neutral to slightly alkaline water conditions. This value is ideal for most aquatic organisms and reflects the absence of strong acidic or alkaline chemical waste. A stable pH also indicates that the decomposition of organic matter is proceeding normally without causing extreme fluctuations in water acidity [21].

Chemical Oxygen Demand (COD)

The results of the COD test are upstream: 46 mg/L, middle: 56 mg/L, downstream: 60 mg/L. When compared with the COD quality standards: Class 1: max. 10 mg/L, Class 2: max. 25 mg/L, Class 3: max. 40 mg/L, Class 4: max. 80 mg/L. Therefore, the COD value exceeds the quality standards for class 3. This indicates the presence of high organic and chemical pollutant content, such as from household waste (detergents, soaps, household chemicals), agricultural activities (fertilizers, pesticides), or other liquid waste. High COD indicates that water quality is starting to decline and is not suitable for clean water or fisheries purposes without processing [22].

A study on water quality in the Bedadung River in Jember revealed variations in COD levels from upstream to downstream. While COD levels in the upstream area were relatively safe (<15 mg/L), they surged to 45–78 mg/L in the downstream area. The primary contributing factors are the accumulation of agricultural waste (pesticide residues and inorganic fertilizers) and discharges from small-scale enterprises (such as home-based tofu and tempeh industries) that are released directly into the river without wastewater treatment [23].

Biochemical Oxygen Demand (BOD)

The results of the COD test are upstream: 0.1 mg/L, middle: 1.6 mg/L, downstream: 2.5 mg/L. When compared with the BOD quality standards: Class 1: max. 2 mg/L, Class 2: max. 3 mg/L, Class 3: max. 6 mg/L, Class 4: max. 12 mg/L. The BOD value still meets class 2 standards, but the downstream point (2.5 mg/L) has exceeded the class 1 threshold. BOD describes the amount of oxygen needed by microorganisms to decompose organic matter in water. The increasing value from upstream to downstream indicates an increase in the load of organic pollutants, possibly originating from domestic waste from surrounding communities, household waste, or wastewater from agricultural and livestock activities [24].

Water quality measurements in the Brantas River (Malang City area) revealed BOD levels ranging from 12.5 mg/L to over 35 mg/L. These figures far exceed the Class II river water quality standard established by national regulations (Government Regulation No. 22 of 2021 sets the maximum BOD limit for Class II water at 3 mg/L). The high BOD levels in the Brantas River are attributed to solid and liquid domestic waste—primarily greywater (from washing, kitchens, and bathing) and organic refuse from densely populated settlements along the riverbanks as well as untreated organic waste discharges from the culinary sector, traditional markets, and small-scale industries (such as tofu and tempeh producers); furthermore, the rate of daily organic waste input exceeds the river's natural self-purification capacity [25].

Dissolved Oxygen (DO)

The DO test results are as follows: 18.4 mg/L (downstream), 16.8 mg/L (midstream), and 13.6 mg/L (downstream). Based on the DO quality standard (≥6 mg/L for Class 1), these values far exceed the minimum requirement. The high DO levels surpassing the threshold are attributed to eutrophication and algal blooms resulting from agricultural fertilizer runoff containing nitrates and phosphates. Additionally, the high DO levels are driven by intense solar radiation, which accelerates photosynthesis in aquatic plants, producing oxygen much faster than it is released from the water into the air [26].

Total Coliform

Total coliform test results were below the threshold of 10,000 MPN/100 mL (class III) at all points. Although safe, there was an increasing trend from upstream to downstream (62–190 MPN/100 mL). This indicates a small contribution from domestic waste containing human or animal waste, but it has not yet reached levels that directly endanger public health. If left uncontrolled, the potential for future increases in coliform levels remains a concern [27].

In general, water quality declines from upstream to downstream, with increasing BOD, COD, and coliform values [28]. This is in line with the increasing intensity of human activity downstream, including dense residential areas, household businesses, and the discharge of untreated domestic waste. Although most parameters still meet quality standards, the increase in COD values is a major concern, as it significantly contributes to declines in water quality and the pollution index [29].

Conclusion

Based on the results, it can be concluded that the water quality of the Ancar shows that most parameters still meet the water quality standards, especially in the upstream area. The values for temperature, pH, TSS, DO, and total coliform are classified as good across all zones and remain below the quality standard threshold. However, COD values increase from upstream to downstream. The COD parameters at all observation points do not meet class 3 quality standards. This indicates significant organic pollution, particularly from domestic waste and community activities around the Ancar River. The Ancar River, when compared with Class III river water quality standards (PP No. 22 of 2021), shows that water quality decreases from upstream to downstream. The upstream zone is generally in the Class I–II quality category, indicating that the water is still suitable for recreational purposes, freshwater fish farming, and livestock. The middle zone shows a decline to Class II–III, while the downstream zone meets only Class IV, particularly for COD parameters. Thus, the water quality status of the Ancar River is classified as good upstream, sufficient in the middle, and lightly to moderately polluted downstream, due to the influence of community activities, domestic waste, and land use along the river.

Author's Contribution

I. Maulidin: Collection of river water samples. M. Majdi: Conducting analysis of river water samples in the laboratory. T. Melinda: Compiling Laboratory test results and preparing and submitting articles.

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References

[1] A. I. Perdana, "Implementation of a comprehensive eco-riparian concept to landscape design of water source area in Macari Village, Batu City," *J. Ilmu Lingkung.*, vol. 22, no. 2, pp. 375–382, 2024, doi: 10.14710/jil.22.2.375-382.

[2] D. S. Lestari, S. Sukamta, and Y. C. Sari, "Status kualitas air DAS Sanggai di Kabupaten Penajam Paser Utara dan perumusan strategi pencegahan serta pengendalian pencemaran air," *J. Ilmu Lingkung.*, vol. 21, no. 4, pp. 914–932, 2023, doi: 10.14710/jil.21.4.914-932.

[3] F. E. Safitri, A. W. W. Ramadhan, H. Khairunnisa, T. A. Pramitasari, S. Rachmawati, and M. Sholiqin, "Dampak tingkat cemaran Sungai Jenes terhadap kualitas air tanah warga di Kelurahan Joyotakan, Kecamatan Serengan, Surakarta," *J. Ilmu Lingkung.*, vol. 21, no. 2, pp. 318–328, 2023, doi: 10.14710/jil.21.2.318-328.

[4] M. S. Yusal and A. Hasyim, "Kajian kualitas air berdasarkan keanekaragaman meiofauna dan parameter fisika-kimia di Pesisir Losari, Makassar," *J. Ilmu Lingkung.*, vol. 20, no. 1, pp. 45–57, 2022, doi: 10.14710/jil.20.1.45-57.

[5] R. Wijayanto, R. Adeko, and M. Gazali, "Pemantauan kualitas air dan status mutu air Sungai Bengkulu," *JNPH*, vol. 13, no. 1, pp. 401–409, 2025, doi: 10.37676/jnph.v13i1.8938.

[6] N. Salsabila, F. Raharjo, and T. Joko, "Indeks pencemaran air sungai dan persebaran penyakit yang ditularkan air (*waterborne diseases*): Suatu kajian sistematis," *Environ. Occup. Health Saf. J.*, vol. 4, no. 1, pp. 24–34, 2023, doi: 10.24853/eohjs.4.1.24-34.

[7] L. Fitrianah and A. S. Fawaid, "Analisis kualitas air di Sungai Banjarkemantren area industri menggunakan metode indeks pencemaran," *G-Tech J. Teknol. Terap.*, vol. 7, no. 3, pp. 1292–1297, 2023, doi: 10.33379/gtech.v7i3.2915.

[8] I. Suswanti, R. Sutamihardja, and D. Arrisujaya, "Potensi senyawaan nitrogen dan fosfat pada pencemaran Sungai Ciliwung Hulu Kota Bogor," *J. Sains Nat.*, vol. 9, no. 1, pp. 11–21, 2019, doi: 10.31938/jsn.v9i1.186.

[9] R. Fadhil, E. Yuliani, and T. B. Prayogo, "Analisis kualitas air menggunakan metode indeks pencemaran, CCME-WQI, dan QUAL2Kw pada Sungai Metro, Kabupaten Malang, Jawa Timur," *JTRESDA*, vol. 5, no. 1, pp. 37–48, 2025, doi: 10.21776/ub.jtresda.2025.005.01.005.

[10] A. F. Anggraini, "Analisis kualitas air dan sumber pencemaran sungai di Kota Surabaya," *Jejak Digit.*, vol. 1, no. 4, pp. 1456–1464, 2025, doi: 10.63822/v8wedc16.

[11] F. Bary, Y. Yunandar, and D. Sofarini, "Analisis kualitas air sungai berdasarkan parameter fisika dan kimia di Perairan Sungai Jingah, Kabupaten Tabalong, Kalimantan Selatan," *Aquatic*, vol. 7, no. 1, pp. 1–36, 2025, doi: 10.20527/aquatic.v7i1.3136.

[12] R. Rosa, M. Rahman, and A. Rahman, "Analysis of nitrate, phosphate, and phytoplankton abundance as indicators of pollution and water fertility in the Martapura Sub-watershed (Coral Diamond Irrigation case study, South Kalimantan)," *Aquatic*, vol. 7, no. 2, pp. 1–89, 2024, doi: 10.20527/aquatic.v7i2.3140.

[13] D. Mahendra Putra, A. Rahman, and D. Dharmaji, "Water quality analysis of the Riam Kanan sub-watershed, Banjar District, South Kalimantan Province," *Aquatic*, vol. 6, no. 2, pp. 1–221, 2023, doi: 10.20527/aquatic.v6i2.2815.

[14] G. C. A. Mangalik, S. Asmawi, and D. Sofarini, "Analysis of heavy metals iron (Fe), manganese (Mn), and copper (Cu) in Negara River waters, Hulu Sungai Selatan Regency, South Kalimantan Province," *Aquatic*, vol. 6, no. 1, pp. 24–45, 2023, doi: 10.20527/aquatic.v6i1.2077.

[15] S. S. Hanura, R. Yunita, and S. Asmawi, "Analysis of heavy metal content of lead (Pb) and cadmium (Cd) in sediment and water at the estuary of the Barito River, Aluh-Aluh District, Banjar Regency, South Kalimantan Province," *Aquatic*, vol. 4, no. 2, pp. 108–116, 2021, doi: 10.20527/aquatic.v4i2.1409.

[16] S. S. Laraseti, M. Rahman, and P. Arifin, "Water quality status around the Gunung Baru River in Bati-Bati District, Tanah Laut Regency, South Kalimantan Province," *Aquatic*, vol. 2, no. 1, pp. 4–11, 2022, doi: 10.20527/aquatic.v2i1.1156.

[17] Y. S. Pandingan, S. Z. W. Warto, and S. Yudo, "Status of Ciliwung River water quality based on online monitoring in the DKI Jakarta area in terms of temperature, pH, TDS, DO, DHL, and turbidity parameters," *J. Teknol. Lingkung.*, vol. 24, no. 2, pp. 176–182, 2023, doi: 10.55981/jtl.2023.1003.

[18] U. Y. Syafarida, D. R. Jati, and A. Sulastri, "Analisis hubungan konstruksi sumur gali dan sanitasi lingkungan terhadap jumlah bakteri coliform dalam air sumur gali (studi kasus: Desa PAL IX, Kecamatan Sungai Kakap)," *J. Ilmu Lingkung.*, vol. 20, no. 3, pp. 437–444, 2022, doi: 10.14710/jil.20.3.437-444.

[19] F. Yahya, E. Yuliani, and M. Sholichin, "Analisis kualitas air menggunakan metode indeks pencemaran, CCME-WQI, dan QUAL2Kw pada Sungai Bango-Sari, Kota Malang, Jawa Timur," *JTRESDA*, vol. 5, no. 2, pp. 1155–1165, 2025, doi: 10.21776/ub.jtresda.2025.005.02.0110.

[20] A. Widada and A. Marwanto, "Efektivitas pengolahan limbah cair laundry dengan metode biofilter aerob," *J. Nurs. Public Health*, vol. 11, no. 1, pp. 1–5, 2023, doi: 10.37676/jnph.v11i1.4002.
[21] M. Riastika, "Pengelolaan air tanah berbasis konservasi di *recharge area* Boyolali (studi kasus *recharge area* Cepogo, Boyolali, Jawa Tengah)," *J. Ilmu Lingkung.*, vol. 9, no. 2, pp. 86–97, 2012, doi: 10.14710/jil.9.2.86-97.
[22] A. P. Syarifuddin and R. Indriani, "Analisis kualitas air dan status mutu air Sungai Sekanak Kota Palembang," *J. Pengelolaan Lingkung. Berkelanjutan*, vol. 5, no. 1, pp. 12–20, 2021, doi: 10.36813/jplb.v5i1.245.
[23] B. Hamuna, R. H. Tanjung, S. Suwito, H. K. Maury, and A. Alianto, "Kajian kualitas air laut dan indeks pencemaran berdasarkan parameter fisika-kimia di Perairan Distrik Depapre, Jayapura," *J. Ilmu Lingkung.*, vol. 16, no. 1, pp. 35–43, 2018.
[24] D. A. S. Pohan, B. Budiyono, and S. Syafrudin, "Analisis kualitas air sungai guna menentukan peruntukan ditinjau dari aspek lingkungan," *J. Ilmu Lingkung.*, vol. 14, no. 2, pp. 63–71, 2017, doi: 10.14710/jil.14.2.63-71.
[25] A. Kharisma, Y. T. Syafi'i, and R. B. A. Lestari, "Analisis status pencemaran air Sungai Bedadung berbasis parameter COD dan BOD di Kabupaten Jember," *J. Ilmu Lingkung.*, vol. 20, no. 3, pp. 512–520, 2022, doi: 10.14710/jil.20.3.512-520.
[26] B. Priadie, "Teknik bioremediasi sebagai alternatif dalam upaya pengendalian pencemaran air," *J. Ilmu Lingkung.*, vol. 10, no. 1, pp. 38–48, 2012, doi: 10.14710/jil.10.1.38-48.
[27] H. Widiatmono and H. Luthfiyana, "Beban pencemaran BOD dan karakteristik oksigen terlarut di Sungai Brantas Kota Malang," *J. Ilmu Lingkung.*, vol. 18, no. 2, pp. 354–366, 2020, doi: 10.14710/jil.18.2.354-366.
[28] A. Pramono, M. R. Rosariastuti, N. Ngadiman, and I. D. Prijambada, "Bacterial Cr(VI) reduction and its impact in bioremediation," *J. Ilmu Lingkung.*, vol. 11, no. 2, pp. 120–131, 2014.
[29] S. Arlinda, S. Suksmerri, M. Mukhlis, and M. Mahaza, "Risk analysis of community water quality in Alahan Panjang agricultural area, Solok Regency, West Sumatra, Indonesia," *J. Kesehat. Lingkung.*, vol. 14, no. 3, pp. 193–200, 2022, doi: 10.20473/jkl.v14i3.2022.