Analysis of Well Water Quality in Ngofabubawa Village, Malifut District, North Halmahera Regency

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Abstract. _Well water is one of the sources of clean water that is widely used by people in rural areas. However, the quality of well water can be affected by various factors, so it is necessary to monitor and evaluate it periodically. This study aims to analyze the quality of well water in Ngofabubawa Village based on physical, chemical, and microbiological parameters, and compare it with previous research. The research methods used are field surveys and laboratory analysis. Well water samples were taken from 10 points in Ngofabubawa Village, then tested to determine the values of physical parameters (turbidity, color, odor), chemical (Fe), and microbiological (total E. coli). The results showed that the average level of turbidity of well water was 5.2 NTU, exceeding the set quality standards. The average iron (Fe) content is 0.8 mg/L, still below the quality standard. However, the total E. coli averaged 120 MPN/100mL, exceeding the permissible quality standards. There is an increase in microbiological contamination of well water in Ngofabubawa Village. This indicates the need for better sanitation and water treatment efforts to maintain well water quality and public health. Overall, the quality of well water in Ngofabubawa Village has not fully met the standard standards for clean water quality, so comprehensive management and improvement are needed_

Keywords: _Quality, Well Water, Ngofabubawa Village_

1. INTRODUCTION

Water is an essential natural resource for human life. The availability of adequate clean water is one of the main indicators of community welfare in an area (Devi & Sayekti, 2020). In rural areas, well water is still the main source of water for most people to meet their daily needs, including in Ngofabubawa Village, Malifut District, North Halmahera Regency.

Ngofabubawa Village is located in a coastal area with a sandy topography. This condition allows groundwater to become a source of clean water that is easily accessible to the local community (Gunawan et al., 2018). However, the use of well water as a source of clean water in this village is not yet known for its exact quality. Various community activities, such as domestic waste disposal, the use of fertilizers and pesticides, and the entry of seawater due to saltwater intrusion, can affect the quality of well water (Setiadi et al., 2019).

Poor well water quality can have a negative impact on public health, such as the emergence of waterborne diseases (Aini & Hanifah, 2020). Therefore, it is necessary to conduct an analysis of the quality of well water in Ngofabubawa Village to determine the level of feasibility of well water as a source of clean water for the community.

This study aims to analyze the quality of well water used by the people of Ngofabubawa Village, Malifut District, North Halmahera Regency. The analysis will include the physical characteristics, chemical and microbiological parameters of the well water, and compare it with the applicable clean water quality standards.

2. RESEARCH METHODS

This study is a quantitative descriptive study to analyze the quality of well water in Ngofabubawa

Village, Malifut District, North Halmahera Regency. The data collection methods used are:

a. Field observation
- Identifying and collecting data on community wells in Ngofabubawa Village.
- Record the physical condition of the well, such as depth, construction, and distance from potential polluting sources.
b. Well water sampling
- Taking samples of well water from 10 wells spread across the village area, representing various environmental characteristics.
- Water samples are taken at the center of the well depth using sterile sample bottles.
- Water samples are stored in a cool box to maintain their quality during transportation to the laboratory.

c. Water quality analysis in the laboratory
Conducting tests on physical parameters (turbidity, color, odor), chemical (iron), and microbiological (total E. coli) in accordance with the Regulation of the Minister of Health No. 32 of 2017 concerning Standard Standards for Environmental Health Quality and Water Health Requirements for Sanitary Hygiene Purposes, Swimming Pools, Solus Per Aqua, and Public Baths using Spectrophotometry.

d. Data analysis
- The data from the test results of well water quality is compared with the applicable clean water quality standards.
- Conduct a descriptive analysis to describe the condition of well water quality in Ngofabubawa Village.
- Providing recommendations related to well water management based on the results of the analysis.

3. RESULTS AND DISCUSSION

Results of research on well water quality in Ngofabubawa Village, Malifut Sub-district, North Halmahera Regency.

Parameter	Average Measurement Results	Quality Standards*
Physical		
Turbidity (NTU)	5,2	5
Color (TCU)	15	15
Construction	Odorless	Odorless
Chemistry		
Besi (Fe) (mg/L)	0,8	1,0
Microbiological		
Total E. coli (MPN/100mL)	120	0

Source : Lab. Khairun University

The results of the research showed that the physical parameters, turbidity of the well water averaged 5.2 NTU, exceeding the set quality standards. This can be caused by the presence of suspended particles in the water, such as soil, mud, or organic matter. When compared to previous research conducted by Sari et al. (2020) in the same area, the level of turbidity of well water found had the same average, namely 5.2 NTU. However, the results of these two studies still show values that exceed the quality standards, so it is necessary to make improvement efforts to reduce the level of turbidity of well water.

The chemical parameter, the iron content (Fe) in well water averaged 0.8 mg/L, still below the set quality standards. This result is similar to a previous study by Zulfikar et al. (2021), which found that the average iron content (Fe) in well water in the same location was 0.7 mg/L. Nevertheless, monitoring and managing iron content still needs to be carried out to maintain the quality of well water. As for the microbiological parameters, the results showed that the total E. coli in the well water averaged 120 MPN/100mL, exceeding the set quality standards. This indicates the presence of microbiological contamination that can endanger public health. Compared to a previous study by Utami et al. (2019), which found a total of E. coli averaging 90 MPN/100mL, there was an increase in microbiological contamination in well water. Better sanitation and water treatment efforts need to be made to address this problem.

4. CONCLUSION

Based on the results of the research that has been discussed, it can be concluded that:

The quality of well water in Ngofabubawa Village, Malifut District, North Halmahera Regency has not fully met the clean water quality standards set by the Minister of Health Regulation No. 32 of 2017.

For physical parameters, well water has a level of turbidity that exceeds the quality standard, which can be caused by the presence of suspended particles. However, the color and smell parameters of the well water have been in accordance with the quality standards. For chemical parameters, the iron (Fe) content in well water is still below the set quality standards. Meanwhile, microbiological parameters, well water contains a total of E. coli that exceeds the quality standard, indicating the presence of microbiological contamination that can endanger public health.

Overall, efforts are needed to manage and improve the quality of well water in Ngofabubawa Village to meet clean water quality standards and maintain public health.

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