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Groundwater quality for clean water in gabek dua sub-district gabek district pangkalpinang city

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Abstract:

The problem of groundwater quality in Bangka Belitung is the provision of clean water for society. The area condition contains tin metals. The research purposes are: (1) the groundwater quality for clean water in Gabek Dua Village and (2) the groundwater quality for clean water in Gabek Dua Village based on Health Ministerial Regulation No. 32/2017. The research design is descriptive with a quantitative method. The research variables are groundwater quality, such as physical parameters (odor, total dissolved solids, turbidity, temperature, color) and chemical parameter (pH), and groundwater suitability for clean water. The population of research is 227 groundwater wells. The sample of research is four groundwater wells with purposive area sampling. Data collection of research is observation, laboratory tests, and documentation. Data analysis of research is analysed (1) matching groundwater quality based on Health Ministerial Regulation No. 32/2017 and (2) descriptive analysis. The research results are (1) groundwater quality for clean water in Gabek Dua Village is suitable for physical parameters (odor, total dissolved solids, temperature, color). The turbidity parameter and chemical parameter (pH) are not accurate. The turbidity in III and IV wells are 33 and 65 NTU scales. The maximum turbidity is 25 NTU Scales. The pH in I and II wells are 5.75 and 6.15. The maximum pH is 6.5 to 8.5. (2) The groundwater suitability for clean water in Gabek Dua Village based on Health Ministerial Regulation No. 32/2017 is not suitable for the physical parameter (turbidity) and chemical parameter (pH).

Keywords: *Water Quality, Groundwater, Clean Water, Gabek Dua Subdistrict*

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Introduction

Water is one of this planet's most valuable natural resources and is necessary for many people's lives (Yang et al., 2021). The characteristics of water in the number of living things, energy, chemicals, substances, and other elements in aquatic life determine water quality. Physical, chemical, and biological parameters contribute to water quality (Adjovu et al., 2023). The characteristics of water that fulfil the requirements of clean water quality can not affect, harm, or endanger human health (Chathuranika et al., 2023). As a purpose, water is essential in life needs such as bathing, washing, drinking water, irrigation water, fisheries, farming, agriculture, transportation, and recreation. Domestic and other activities influence water quality degradation, negatively impacting water quantity and quality (Nair & Nayak, 2023).

The physical environment influences life patterns, which affect the physical environment. It creates social and diverse environments. The water available is insufficient to fulfil the increasing demand (Baggio et al., 2021). The quality of domestic water worsens every year. This condition is dangerous to living things (du Plessis, 2022). The dependence of urban communities on water is increasing from year to year. As the population increases, water demand increases, water quality decreases, and wasteful behaviour causes limited access to clean water (Baggio et al., 2021).

Water Natural pollutants unintentionally enter the environment (water bodies) through floods, landslides, volcanic eruptions, and other natural disasters. Anthropogenic pollutants are contaminants that enter water bodies due to human activities such as houses, industries, and cities. Action is needed to protect the water from anthropogenic pollutants and reduce their intensity. Natural pollutants require conservation to restore and control water quality (Khotimah, 2019).

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Water recharge that is not natural is called human-made water recharge, which is defined as the addition of groundwater resources by humans. The primary purpose of constructing these water recharge wells in many developing countries is to store primary water for irrigation. Other purposes include preventing seawater intrusion in coastal areas, reducing runoff and erosion, and maintaining good groundwater quality (Purwantara, 2019).

The Gabek Dua residents use drilled and dug wells for their daily lives. Based on observations, the dug well water of the residents of the Gabek Dua Subdistrict is murky, rust-smelling, oily, and red. Former swamp land dominates in RT 5 and RT 7. The problem with water in former swamp areas is that it reduces sulfate (SO_4^{2-}) to hydrogen sulfide (H2S) under anaerobic conditions, which results in pipe corrosion and tends to smell (Rathnayake et al., 2021). The acidic water and swamp land cause crust and red-coloured rust on ceramics, plastics, and other containers. In some conditions, some well water becomes murky during the rainy season but is slightly clear during the dry season.

Based on observations, the residents of Gabek Dua Subdistrict do not consume well water, which has a sour, unpleasant taste and slightly murky water. The society assumes that the groundwater quality is not adequate for drinking water. Hence, residents buy gallons of water for drinking. However, society uses water for washing and bathing. In addition, the residents in the Gabek Dua Subdistrict do not have information on the quality of well water from laboratory tests. Laboratory tests are necessary to identify the groundwater quality for clean water (Ram et al., 2021).

The groundwater is different in some areas (Lapworth et al., 2022). Based on observations, some areas in the Gabek Dua Subdistrict have difficulty accessing clean water. In addition, the residents of Gabek Dua Subdistrict do not have access to water from the regional public water supply company (PDAM). Residents use jerry cans to collect water from public and society wells. Also, the government provides clean water to residents facing clean water shortages and affected by drought.

Water Quality Management and Water Pollution Control in Government Regulation of the Republic of Indonesia Number 82 Year 2001 states that all water above and below ground, except seawater and fossil water (Widodo et al., 2019). The new regulation of the Minister of Health of the Republic of Indonesia, Number 32 of the Year 2017, divides water quality into several groups according to its purpose (Fahimah et al., 2024; Wiyono & Adji, 2021). Water used for raw water and drinking water is included in the B group, which is a group that provides groundwater quality for clean water (Putri et al., 2023). This study took the B group for water quality. This study aims to analyse (1) Groundwater quality for clean water in Gabek Dua Subdistrict and (2) The feasibility of groundwater for clean water in Gabek Dua Subdistrict in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017.

Methods

Descriptive research explains one or more variables without comparing and connecting other variables (Aggarwal & Ranganathan, 2019). This quantitative descriptive research describes how to measure groundwater wells and laboratory tests for groundwater quality for clean water in the Gabek Dua Subdistrict. This environmental approach applies the concepts of location, morphology, and pattern to explain groundwater quality for clean water in the Gabek Dua Subdistrict.

Table 1. Tool Function

Number	Tools	Function
1.	Measuring Tape	Measure the depth and water level of the groundwater
2.	GPS Essential	Determine the location of groundwater wells
3.	Jerry Cans	Containers for groundwater samples

Data is obtained from primary and secondary data sources (Emanuelson & Egenvall, 2014). Primary data sources display data directly to researchers, while secondary data sources do not (Emanuelson & Egenvall, 2014; Ellram & Tate, 2016). This study collected data through observation, documentation, and laboratory tests. Observation is primary data, while documentation and laboratory tests are secondary data (Sauer & VanderWeele, 2013; Hajia, 2019).

Quantitative research can use data analysis after obtaining all other data sources (Lim, 2024; Kotronoulas et al., 2023). This research used matching analysis and descriptive analysis. Matching analysis is a laboratory test of data, such as groundwater quality data from the four well water samples in Gabek Dua Subdistrict, which measures the values and monitors the condition of each physical and chemical parameter. Laboratory test data matches The Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Wiyono & Adji, 2021).

The matching analysis was based on descriptive analysis. Laboratory test data was explained and analysed descriptively, both theoretically and scientifically (Gericke et al., 2023). This quantitative data is described

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descriptively (Lim, 2024). A descriptive analysis was used to define the laboratory test results of groundwater quality data based on the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017. Descriptive analysis in this research also includes the location of groundwater wells and groundwater quality (Aloui et al., 2025; A. Alshahrani et al., 2025). The data are primary and secondary, as well as the environment of the study area.

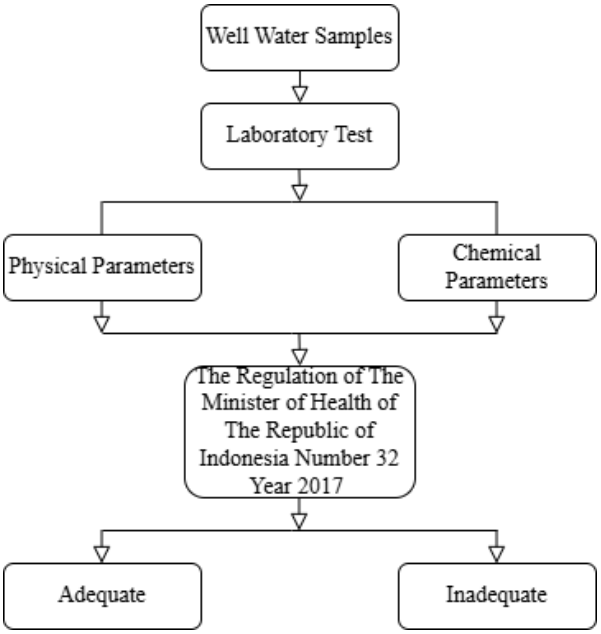

Figure 1. Research Method

The research design is descriptive quantitative research with an environmental approach. The variables of the study were groundwater quality parameters, such as physical parameters (odour, Total Dissolved Solid (TDS), turbidity, temperature, and colour) and chemical parameters, such as Potential Hydrogen (pH), as well as the feasibility of groundwater for clean water. The research population included 227 groundwater wells. This study used four groundwater wells as samples. The research data was collected through observation, laboratory tests, and documentation. This research data was analysed through (1) groundwater quality matching based on the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 and (2) descriptive analysis.

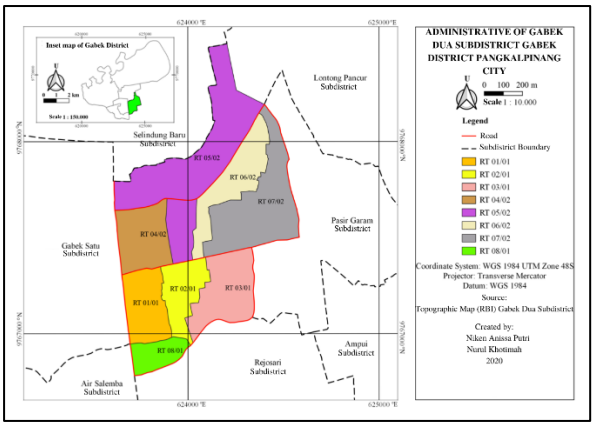

Figure 2. Administrative of Gabek Dua Subdistrict Gabek District Pangkalpinang City

The data collection time in Gabek Dua Subdistrict was 3 months from August 2020 to November 2020. The location of this research was Gabek Dua Subdistrict, Gabek District, Pangkalpinang City. The coordinates of Gabek Dua Subdistrict are 624000° - 625000°E and 9767000° - 9768000°N. Gabek Dua Subdistrict borders Selindung Baru and Lontong Pancur Subdistricts to the north, Pasir Garam Subdistrict to the east, Gabek Satu Subdistrict to the west, and Air Salemba, Rejosari, and Ampui Subdistricts to the south (Monographic Data of Gabek Dua Village, 2019). Gabek District is one of the districts in the administrative area of Pangkalpinang City. The land condition of the research area in the Gabek Dua sub-district dominates residential built-up areas, which matches the land use of residential land in the Gabek Dua sub-district (Guskarnali et al., 2021).

Result and Discussion

Groundwater Quality for Clean Water

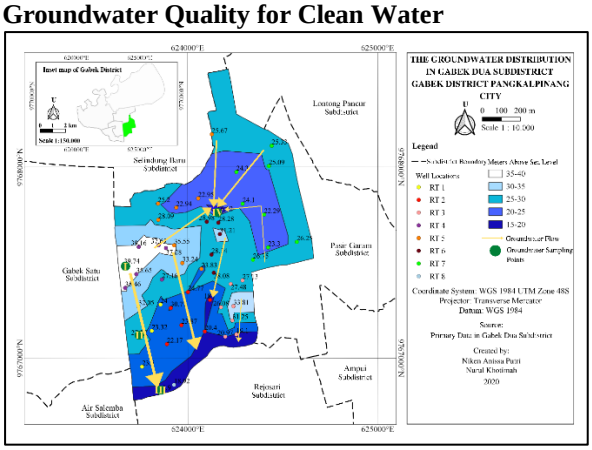

Figure 3. The Groundwater Distribution in Gabek Dua Subdistrict Gabek District Pangkalpinang City

Physical and chemical parameters can determine groundwater quality (Kumar et al., 2022). Physical

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parameters include odour, Total Dissolved Solids (TDS), turbidity, temperature, and colour, which were analysed in the Gabek Dua Subdistrict. The degree of acidity (pH) was the chemical parameter analysed in the Gabek Dua Subdistrict. Four well water samples were collected on 21 October 2020 with laboratory tests in the Health Laboratory Centre in Pangkalpinang City. The results of the groundwater quality laboratory tests of the four well water samples in the Gabek Dua Subdistrict are shown in Tables 3 to 11. The laboratory results were compared and analysed with the clean water quality guidelines in the Regulation of the Minister of Health of the Republic of Indonesia, Number 32 Year 2017 (Wiyono & Adji, 2021). The feasibility of groundwater for clean water in the Gabek Dua Subdistrict was analysed. Maps and tables of the four well water samples based on the groundwater distribution map in Gabek Dua Subdistrict are as follows:

Table 2. Location of Four Well Water Samples in Gabek Dua Subdistrict

Well Samples	Area	Groundwater Level
I	4/2	39.74 meters above sea level
II	1/1	27.27 meters above sea level
III	8/1	18.90 meters above sea level
IV	5/2	16.12 meters above sea level

Source: Research Findings, 2020

A.1 Groundwater Quality for Clean Water Based on Physical Parameters

A.1.1 Odour Parameter

Table 3. Odour Parameter

Well Samples	Odour Parameters Value	Odour Parameter Standard
I	No odour	No odour
II	No odour	
III	No odour	
IV	No odour	

Source: Research Findings, 2020

Odour is produced from many sources, including decomposing organic matter, specific microscopic organisms, and chemical compounds, that is, from organisms in the water (Pozzer et al., 2022). The quality of clean water is odourless (Wiyono & Adji, 2021). The results of four well water samples tested in the Health Laboratory Centre in Pangkalpinang City showed that the odour parameter in the Gabek Dua Subdistrict was odourless. The odour parameter value is odourless in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Wiyono & Adji, 2021). Odour is caused by organic materials or inorganic matter, such as decomposition and chemical substances, such as iron (Fe) (Li et al., 2022). The odour parameter values in wells I, II, III, and IV in the Gabek Dua Subdistrict aligned with the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017, with the clean water quality standard being odourless.

A.1.2 Total Dissolved Solids (TDS) Parameter

Table 4. Total Dissolved Solids (TDS) Parameter

Well Samples	Total Dissolved Solids (TDS) Parameter Value (mg/l)	Total Dissolved Solids (TDS) Parameter Standard (mg/l)
I	132	1000
II	130	
III	156	
IV	141	

Source: Research Findings, 2020

Total Dissolved Solid (TDS) is caused by inorganic compounds such as ions in water (B. B. Wang, 2021). The results of four well water samples tested by the Health Laboratory Centre in Pangkalpinang City showed that the total dissolved solids (TDS) in the Gabek Dua Subdistricts were 130 to 156 mg/l. Sample II's lowest Total Dissolved Solids (TDS) was 130 mg/l. The highest Total Dissolved Solids (TDS) in sample III was 156 mg/l. The maximum Total Dissolved Solid (TDS) parameter value is 1000 mg/l in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 the Year 2017 (Wiyono & Adji, 2021). Total Dissolved Solids (TDS) did not affect four well water samples. The surrounding inorganic materials did not pollute the four well water samples. The value of the Total Dissolved Solid (TDS) parameter in wells I, II, III, and IV in Gabek Dua Subdistrict is in line with the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 with the clean water quality standard of 1000 mg/l.

A.1.3 Turbidity Parameter

Table 5. Turbidity Parameter

Well Samples	Turbidity Parameter Value (NTU)	Turbidity Parameter Standard (NTU)
I	1	25
II	0	
III	33	
IV	65	

Source: Research Findings, 2020

The amount of light absorbed and emitted by elements in the water, such as suspended and dissolved inorganic and organic components, determines turbidity (Adjovu et al., 2023). Many fine particles and colloids are in turbidity. Turbidity indicates metals such as manganese (Mn), iron (Fe), and others that are contaminated in water (Fahimah et al., 2023). The results of four well water samples tested by The Health Laboratory Centre in Pangkalpinang City found that the turbidity of groundwater in Gabek Dua Subdistricts was between 0 and 65 NTU scale. The lowest water turbidity in sample II was 0 NTU Scale, and in sample I was 1 NTU Scale. The highest water turbidity

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in sample IV is 65 NTU Scale, and sample III is 33 NTU Scale. The maximum water turbidity parameter value is 25 NTU Scale in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Koagouw et al., 2024).

Clay, silt, organic and inorganic materials, and small suspended particles are found in turbid water (Syeed et al., 2023). All four groundwater well samples were taken during the rainy season. Water turbidity affects groundwater quality from the wall cavity of groundwater wells, the location of soak-away pits, inadequate protection of the well, lack of internal concrete linings along the walls of the wells, and insufficient protection against external influences in the Gabek Dua Subdistrict. Planning the location and size of soak-away pits is currently unregulated, leading to poor outcomes. Additionally, many groundwater wells risk contamination due to inadequate conditions of the wells. Problems such as using rope and bucket systems for water collection, the absence of concrete linings within the well walls, and poor protection from external influences contribute to this issue. As a result, the risk of groundwater contamination is increasing (Ojo et al., 2024). Furthermore, surface runoff adds to the contamination of groundwater. This runoff carries various pollutants disposed of in the environment, seeping into groundwater systems through processes of percolation and infiltration (Abanyie et al., 2023). The value of the water turbidity parameter in wells III and IV in the Gabek Dua Subdistrict is not used for clean water. It does not match the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 with the standard of clean water quality. That is 25 NTU scale maximum (Putri & Koestoer, 2023).

A.1.4 Temperature Parameter

Table 6. Temperature Parameter

Well Samples	Temperature Parameter Value (ºC)	Temperature Parameter Standard (ºC)
I	26.2	30
II	26.2	
III	26.2	
IV	25.8	

Source: Research Findings, 2020

Water temperature is influenced by cloud cover, latitude, time, season, air circulation, meters above sea level, and water flow and depth (Bachmann et al., 2019). Temperature differences between samples occur due to differences in the time of observation. Temperature changes affect water's physical, chemical, and biological factors (Lorenzo-González et al., 2023; Kazmi et al., 2022; Khaliq et al., 2024). The results of four well water samples tested by The Health Laboratory Centre in Pangkalpinang City showed that the groundwater temperature in Gabek Dua Subdistrict was between 25.8 and 26.2 ºC. The lowest water temperature in sample IV was 25.8 ºC. The highest water temperature in samples I, II, and III was 26.2 ºC. The maximum water temperature parameter value is 30 ºC in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Afriyani et al., 2025). Temperatures are not inadequate for good water quality guidelines to increase the toxicity and solubility of pollutant materials and pathogenic microorganisms that cause human diseases (Daud et al., 2017). The value of the water temperature parameter in wells I, II, III, and IV in Gabek Dua Subdistrict is in line with the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017, with the clean water quality standard being 30 ºC.

A.1.5 Colour Parameter

Table 7. Colour Parameter

Well Samples	Colour Parameter Value (TCU)	Colour Parameter Standard (TCU)
I	0.187	50
II	0.276	
III	1.557	
IV	3.823	

Source: Research Findings, 2020

Watercolour is caused by various factors, such as hummus, plankton, inorganic elements and organic matter, metal ions such as iron (Fe) and manganese (Mn), and other materials that contribute to the colour of water (Pagoray et al., 2025). Inorganic compounds such as manganese (Mn) cause brown or black water, while iron causes red water (Yu et al., 2024; Li et al., 2022). The results of four well water samples tested by The Health Laboratory Centre in Pangkalpinang City showed that the colour of groundwater in the Gabek Dua Subdistrict was between 0.187 and 3.823 TCU. The lowest water colour in sample IV was 0.187 TCU scale. The highest water colour in sample I was the 3.823 TCU Scale. The maximum water colour parameter value was 50 TCU Scale in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Wiyono & Adji, 2021). The land use of the Gabek Dua Subdistrict is residential (Guskarnali et al., 2021). Water does not contain organic materials from the water, such as decaying vegetation, such as leaves, wood, and others. If there is decaying vegetation in the water, it makes the water unclear (Pozzer et al., 2022). The value of the water colour parameter in wells I, II, III, and IV in the Gabek Dua Subdistrict matches the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017, with the clean water quality standard being 50 TCU Scale.

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A.2 Groundwater Quality for Clean Water Based on Chemical Parameters
A.2.1 pH Parameter

Table 8. pH Parameter

Well Samples	pH Parameter Value	pH Parameter Standard
I	5.75	6.5 – 8.5
II	6.15	
III	6.60	
IV	6.94	

Source: Research Findings, 2020

The water surface in Bangka is dominated by metals such as Mn, Cu, Fe, Zn, and Pb (Budianto et al., 2024). Also, the pH value of the water surface was about 6 (Natasha & Adharini, 2023). The acidic water causes a low pH value, which violates water quality standards (Wiyono & Adji, 2021). Water acidity or pH is the intensity of base or acid in solution (Sundaresan & Bohn, 2020). The results of four well water samples tested by The Health Laboratory Centre in Pangkalpinang City showed that the pH of groundwater in Gabek Dua Subdistrict was between 5.75 and 6.94. The low water pH in sample I was 5.75, and sample II was 6.15. The high pH of water in sample III was 6.94, and sample III was 6.60. The maximum water pH value is 6.5 to 8.5 in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 the Year 2017.

Water pipes corrode at pH levels less than 6.5 and more significant than 8.5 (Ahmed et al., 2021; B. Wang et al., 2024; Makisha & Chukhin, 2023). Some chemical compounds break down into toxins with a pH of less than 6.5, which is more than 9.2, which is toxic and affects and endangers the human body's health (Ahmed et al., 2021). The pH value of water in wells I and II in the Gabek Dua Subdistricts is not recommended for clean water. It does not match the 6.5 to 8.5 pH standard in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 the Year 2017 (Wiyono & Adji, 2021). The pH value of water in wells III and IV in the Gabek Dua Subdistrict matches the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017, with clean water quality standards being 6.5 to 8.5 pH.

Feasibility of Groundwater for Clean Water Based on Physical and Chemical Parameters

B.1 Feasibility of Groundwater for Clean Water Based on Physical Parameter

The laboratory test results of the Pangkalpinang City Health Laboratory Centre for groundwater in well III and Well IV samples in Gabek Dua Subdistrict showed that the turbidity parameters are 33 and 65 NTU Scale. The value of the turbidity parameter is more than 25 NTU Scale in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Koagouw et al., 2024). The impact of turbidity is not following clean water quality guidelines, and small suspended particles can cause diseases (Huang et al., 2016). The cause of well water turbidity is that the four groundwater samples were taken and tested during the rainy season. The location of soak-away pits, inadequate protection of the well, lack of internal concrete linings along the walls of the wells, and insufficient protection against external influences (Ojo et al., 2024). Water flowing from the cavity of the groundwater well walls passes through the soil pores, and the groundwater becomes turbid (Abanyie et al., 2023). That affects the quality of well water in the Gabek Dua Subdistrict.

Table 9. Turbidity Parameter

Well Samples	Turbidity Parameter Value (NTU)	Turbidity Parameter Standard (NTU)
III	33	25
IV	65	

Source: Research Findings, 2020

B.2 Feasibility of Groundwater for Clean Water Based on Chemical Parameter

The Health Laboratory Centre in Pangkalpinang City groundwater test results in the Well I and Well II samples in the Gabek Dua Subdistrict show that the pH parameters were 5.75 and 6.15. The maximum pH parameter value is 6.5 to 8.5 in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 (Wiyono & Adji, 2021). In addition, water pipelines and water machines are corroded in the Gabek Dua Subdistrict. Hence, it causes some chemical compounds in water to become toxins that harm human health (Ahmed et al., 2021). The lack of water and the impact of pH not following clean water quality guidelines cause tooth and gum disease, such as dental caries, cavities, and tooth loss (Kim, 2021).

Table 10. pH Parameter

Well Samples	pH Parameter Value	pH Parameter Standard
I	5.75	6.5 – 8.5
II	6.15	

Source: Research Findings, 2020

The four well water samples were collected during the rainy season. The surface conditions of wells I and II are covered. The surface conditions of wells III and IV are uncovered. Rainwater flows to the groundwater wells through the well surface and soil pores surrounding the well, which affect the water's pH. Rainwater increases the amount of groundwater volume and pH. Hence, groundwater quality is affected by the pH of the water (Omogbehin & Oluwatimilehin, 2022).

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Conclusion

Physical parameters (odour, Total Dissolved Solids (TDS), temperature, and colour) in wells I, II, III, and IV are suitable for groundwater quality for clean water in the Gabek Dua Subdistrict. However, the chemical and physical parameters' turbidity and pH are unsuitable in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017. Physical parameters such as turbidity in wells III and IV do not comply with the water quality requirements for clean water with turbidity of 33 and 65 NTU. The turbidity parameter standard is 25 NTU in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017. pH levels of 5.75 and 6.15 in the chemical parameters in wells I and II do not comply with the water quality standard for clean water. The pH parameter standard is 6.5 to 8.5 in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017.

Four well water samples, I, II, III, and IV of the Gabek Dua Subdistrict for groundwater feasibility, are unsuitable for clean water in the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017 with clean water quality standards of 25 NTU and 6.5 to 8.5 pH. The physical and chemical parameters, such as turbidity of 33 and 65 NTU in wells III and IV and pH of 5.75 and 6.15 in wells I and II results of the Health Laboratory Centre in Pangkalpinang City groundwater test are not feasible with the Regulation of the Minister of Health of the Republic of Indonesia Number 32 Year 2017.

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References

A. Alshahrani, M., Ahmad, M., Laiq, M., & Nabi, M. (2025). Geostatistical analysis and multivariate assessment of groundwater quality. Scientific Reports, 15(1), 7435. https://doi.org/10.1038/s41598-025-91055-3

Abanyie, S. K., Apea, O. B., Abagale, S. A., Amuah, E. E. Y., & Sunkari, E. D. (2023). Sources and factors influencing groundwater quality and associated health implications: A review. Emerging Contaminants, 9(2), 100207. https://doi.org/https://doi.org/10.1016/j.emcon.2023.100207

Adjovu, G., Stephen, H., James, D., & Ahmad, S. (2023). Measurement of total dissolved solids and total suspended solids in water systems. Remote Sensing, 15(14), 1–43.

Afriyani, M. P., Muttakin, M., Prakatiwi, A. M., & Kamil, P. A. (2025). Study of Groundwater Feasibility in Residential Settlements Near the Former Final Waste Disposal Place, Kutaraja District, Banda Aceh City. Jurnal Ilmu Lingkungan; Vol 23, No 2 (2025): March 2025DO - 10.14710/Jil.23.2.507-515 . https://ejournal.undip.ac.id/index.php/ilmulingkungan/article/view/57471

Aggarwal, R., & Ranganathan, P. (2019). Study designs: Part 2 - Descriptive studies. Perspectives in Clinical Research, 10(1), 34–36. https://doi.org/10.4103/picr.PICR_154_18

Ahmed, S., Sultan, M. W., Alam, M., Hussain, A., Qureshi, F., & Khurshid, S. (2021). Evaluation of corrosive behaviour and scaling potential of shallow water aquifer using corrosion indices and geospatial approaches in regions of the Yamuna river basin. Journal of King Saud University - Science, 33(1), 101237. https://doi.org/https://doi.org/10.1016/j.jksus.2020.101237

Aloui, S., Zghibi, A., Mazzoni, A., Abushaikha, A. S., & Elomri, A. (2025). Assessing groundwater quality and suitability in Qatar: Strategic insights for sustainable water management and environmental protection. Environmental and Sustainability Indicators, 25, 100582. https://doi.org/https://doi.org/10.1016/j.indic.2025.100582

Bachmann, R. W., Sharma, S., Canfield, D. E., & Lecours, V. (2019). The Distribution and Prediction of Summer Near-Surface Water Temperatures in Lakes of the Coterminous United States and Southern Canada. In Geosciences (Vol. 9, Issue 7). https://doi.org/10.3390/geosciences9070296

Baggio, G., Qadir, M., & Smakhtin, V. (2021). Freshwater availability status across countries for human and ecosystem needs. Science of The Total Environment, 792, 148230. https://doi.org/https://doi.org/10.1016/j.scitotenv.2021.148230

Budianto, T. H., Syafrudin, & Hartoko, A. (2024). Analysis of Heavy Metal Content of Mn, Cu, Fe, Zn, Pb in Agricultural Irrigation Water and Soil After Tin Mining. IOP Conference Series: Earth and Environmental Science, 1419(1). https://doi.org/10.1088/1755-1315/1419/1/012004

Chathuranika, I. M., Sachinthanie, E., Zam, P., Gunathilake, M. B., Denkar, D., Muttil, N., Abeynayaka, A., Kantamaneni, K., & Rathnayake, U. (2023). Assessing the water quality and status of water resources in urban and rural areas of Bhutan. Journal of Hazardous Materials Advances, 12, 100377. https://doi.org/https://doi.org/10.1016/j.hazadv.2023.100377

Daud, M. K., Nafees, M., Ali, S., Rizwan, M., Bajwa, R. A., Shakoor, M. B., Arshad, M. U., Chatha, S. A. S., Deeba, F., Murad, W., Malook, I., & Zhu, S. J. (2017). Drinking Water Quality Status and Contamination in Pakistan. BioMed Research International, 2017, 7908183. https://doi.org/10.1155/2017/7908183

du Plessis, A. (2022). Persistent degradation: Global water quality challenges and required actions. One Earth, 5(2), 129–131. https://doi.org/https://doi.org/10.1016/j.oneear.2022.01.005

Ellram, L. M., & Tate, W. L. (2016). The use of secondary data in purchasing and supply management (P/SM) research. Journal of Purchasing and Supply Management, 22(4), 250–254. https://doi.org/https://doi.org/10.1016/j.pursup.2016.08.005

Emanuelson, U., & Egenvall, A. (2014). The data – Sources and validation. Preventive Veterinary Medicine, 113(3), 298–303. https://doi.org/https://doi.org/10.1016/j.prevetmed.2013.10.002

Fahimah, N., Salami, I. R. S., Oginawati, K., & Mubiarto, H. (2024). Appraisal of pollution levels and non-carcinogenic health risks associated with the emergence of heavy metals in Indonesian community water for sanitation, hygiene, and consumption.

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Emerging Contaminants, 10(3), 100313. https://doi.org/https://doi.org/10.1016/j.emcon.2024.100313

Fahimah, N., Salami, I. R. S., Oginawati, K., & Thaher, Y. N. (2023). Variations of groundwater turbidity in the Bandung regency, Indonesia: From community-used water quality monitoring data. HydroResearch, 6, 216–227. https://doi.org/https://doi.org/10.1016/j.hydres.2023.06.001

Gericke, N., Per, H., & and Wallin, J. (2023). A systematic review of research on laboratory work in secondary school. Studies in Science Education, 59(2), 245–285. https://doi.org/10.1080/03057267.2022.2090125

Guskarnali, Irvani, & Taman Tono, E. P. S. B. (2021). Flood Vulnerability Study of Pangkalpinang City, Bangka Belitung Archipelago Province. IOP Conference Series: Earth and Environmental Science, 926(1). https://doi.org/10.1088/1755-1315/926/1/012076

Hajia, M. (2019). Secondary use of laboratory data: Potentialities and limitations. Iranian Journal of Pathology, 14(3), 188–192. https://doi.org/10.30699/ijp.2019.95692.1942

Huang, L.-Y., Wang, Y.-C., Wu, C.-C., Chen, Y.-C., & Huang, Y.-L. (2016). Risk of Flood-Related Diseases of Eyes, Skin and Gastrointestinal Tract in Taiwan: A Retrospective Cohort Study. PLOS ONE, 11(5), e0155166. https://doi.org/10.1371/journal.pone.0155166

Kazmi, S. S. U. H., Wang, Y. Y. L., Cai, Y.-E., & Wang, Z. (2022). Temperature effects in single or combined with chemicals to the aquatic organisms: An overview of thermo-chemical stress. Ecological Indicators, 143, 109354. https://doi.org/https://doi.org/10.1016/j.ecolind.2022.109354

Khaliq, I., Chollet Ramampiandra, E., Vorburger, C., Narwani, A., & Schuwirth, N. (2024). The effect of water temperature changes on biological water quality assessment. Ecological Indicators, 159, 111652. https://doi.org/https://doi.org/10.1016/j.ecolind.2024.111652

Kim, Y.-R. (2021). Analysis of the Effect of Daily Water Intake on Oral Health: Result from Seven Waves of a Population-Based Panel Study. In Water (Vol. 13, Issue 19). https://doi.org/10.3390/w13192716

Koagouw, W., Simanjuntak, E., Hazell, R. J., Subandi, R., & Ciocan, C. (2024). First evidence of metformin detected in Jakarta waters. Discover Environment, 2(1). https://doi.org/10.1007/s44274-024-00114-5

Kotronoulas, G., Miguel, S., Dowling, M., Fernández-Ortega, P., Colomer-Lahiguera, S., Bağçivan, G., Pape, E., Drury, A., Semple, C., Dieperink, K. B., & Papadopoulou, C. (2023). An Overview of the Fundamentals of Data Management, Analysis, and Interpretation in Quantitative Research. Seminars in Oncology Nursing, 39(2), 151398. https://doi.org/https://doi.org/10.1016/j.soncn.2023.151398

Kumar, L., Deitch, M. J., Tunio, I. A., Kumar, A., Memon, S. A., Williams, L., Tagar, U., Kumari, R., & Basheer, S. (2022). Assessment of physicochemical parameters in groundwater quality of desert area (Tharparkar) of Pakistan. Case Studies in Chemical and Environmental Engineering, 6, 100232. https://doi.org/https://doi.org/10.1016/j.cscee.2022.100232

Lapworth, D. J., Boving, T. B., Kreamer, D. K., Kebede, S., & Smedley, P. L. (2022). Groundwater quality: Global threats, opportunities and realising the potential of groundwater. Science of The Total Environment, 811, 152471. https://doi.org/https://doi.org/10.1016/j.scitotenv.2021.152471

Li, H., Ding, S., Song, W., Wang, X., Ding, J., & Lu, J. (2022). The degradation of dissolved organic matter in black and odorous water by humic substance-mediated Fe(II)/Fe(III) cycle under redox fluctuation. Journal of Environmental Management, 321, 115942. https://doi.org/https://doi.org/10.1016/j.jenvman.2022.115942

Lim, W. M. (2024). What Is Quantitative Research? An Overview and Guidelines. Australasian Marketing Journal. https://doi.org/10.1177/14413582241264622

Lorenzo-González, M. A., Quílez, D., & Isidoro, D. (2023). Factors controlling the changes in surface water temperature in the Ebro River Basin. Journal of Hydrology: Regional Studies, 47, 101379. https://doi.org/https://doi.org/10.1016/j.ejrh.2023.101379

Makisha, N., & Chukhin, V. (2023). Determination of Corrosion Rate in Galvanized Pipes in Centralized Hot Water Supply Systems. In Applied Sciences (Vol. 13, Issue 19). https://doi.org/10.3390/app131910564

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Nair, N. V, & Nayak, P. K. (2023). Exploring Water Quality as a Determinant of Small-Scale Fisheries Vulnerability. In Sustainability (Vol. 15, Issue 17). https://doi.org/10.3390/su151713238

Natasha, R. A., & Adharini, R. I. (2023). Analisis Tingkat Pencemaran Air Sungai Rangkui Kota Pangkalpinang berdasarkan Status Mutu Air. 10(4), 37–44. https://doi.org/10.14710/jil.22.6.1652-1662

Ojo, J. T., Ojo, O. M., Olabanji, T. O., & Aluko, R. T. (2024). Urbanization impact on groundwater quality of selected rural and urban areas in Ondo State, Nigeria using Water Quality Index. Discover Water, 4(1), 19. https://doi.org/10.1007/s43832-024-00061-5

Omogbehin, M. H., & Oluwatimilehin, I. A. (2022). Changes of water chemistry from rainfall to stream flow in Obagbile Catchment, Southwest Nigeria. Regional Sustainability, 3(2), 170–181. https://doi.org/https://doi.org/10.1016/j.regsus.2022.07.006

Pagoray, H., Suyatna, I., Sukarti, K., Kesuma, A. D., Butarbutar, T., Raafi, M., Suyatna, M. B. B., & Daru, T. P. (2025). Water quality and plankton diversity to support aquaculture in the middle Mahakam Watershed, East Kalimantan, Indonesia. Biodiversitas, 26(1), 233–245. https://doi.org/10.13057/biodiv/d260124

Pozzer, A. C., Gómez, P. A., & Weiss, J. (2022). Volatile organic compounds in aquatic ecosystems – Detection, origin, significance and applications. Science of The Total Environment, 838, 156155. https://doi.org/https://doi.org/10.1016/j.scitotenv.2022.156155

Purwantara, S. (2019). Optimization of Recharge Well Functions in the Campus Complex of Uny Yogyakarta. IOP Conference Series: Earth and Environmental Science, 271(1), 2–7. https://doi.org/10.1088/1755-1315/271/1/012002

Putri, N. A., & Koestoer, R. H. (2023). Water Quality Assessment of Remote Sensing Techniques: A Comparative Insight Between Yangtze of China and Porong of Indonesia. Applied Information System and Management (AISM), 6(2), 83–90. https://doi.org/10.15408/aism.v6i2.31386

Putri, N. A., Manessa, M. D. M., & Setiadi, H. (2023). the Spatio-Temporal Dynamic in Water Near Palabuhan Ratu Coal Fire Plant, Sukabumi, West Java. International Journal of Remote Sensing and Earth Sciences (IJReSES), 20(1), 01. https://doi.org/10.30536/j.ijreses.2023.v20.a3812

Ram, A., Tiwari, S. K., Pandey, H. K., Chaurasia, A. K., Singh, S., & Singh, Y. V. (2021). Groundwater quality assessment using water quality index (WQI) under GIS framework. Applied Water Science, 11(2), 46. https://doi.org/10.1007/s13201-021-01376-7

Rathnayake, D., Bal Krishna, K. C., Kastl, G., & Sathasivan, A. (2021). The role of pH on sewer corrosion processes and control methods: A review. Science of The Total Environment, 782, 146616. https://doi.org/https://doi.org/10.1016/j.scitotenv.2021.146616

Sauer, B., & VanderWeele, T. J. (2013). Use of Directed Acyclic Graphs. Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide, 177–184.

Sundaresan, V., & Bohn, P. W. (2020). Acid-base chemistry at the single ion limit. Chemical Science, 11(40), 10951–10958. https://doi.org/10.1039/d0sc03756g

Syeed, M. M. M., Hossain, M. S., Karim, M. R., Uddin, M. F., Hasan, M., & Khan, R. H. (2023). Surface water quality profiling using the water quality index, pollution index and statistical methods: A critical review. Environmental and Sustainability Indicators, 18, 100247. https://doi.org/https://doi.org/10.1016/j.indic.2023.100247

Wang, B. B. (2021). Research on drinking water purification technologies for household use by reducing total dissolved solids (TDS). PloS One, 16(9), e0257865. https://doi.org/10.1371/journal.pone.0257865

Wang, B., Zhao, L., Chen, Y., Zhu, L., Liu, C., Cheng, X., & Li, X. (2024). Intelligent corrosion analysis and life prediction of ductile iron pipe systems using machine learning and electrochemical sensors. Journal of Materials Research and Technology, 33, 725–741. https://doi.org/https://doi.org/10.1016/j.jmrt.2024.09.076

Widodo, T., Sri Budiastuti, M. T., & Komariah. (2019). Water Quality and Pollution Index in the Grenjeng River, Boyolali Regency, Indonesia. Caraka Tani: Journal of Sustainable Agriculture, 34(2), 150–161. https://doi.org/10.20961/carakatani.v34i2.29186

Wiyono, M. B., & Adji, T. N. (2021). Analysis of Groundwater Quality for Clean Water Supply in Pasaran Island, Bandar Lampung City, Indonesia. Forum Geografi, 35(1), 28–37. https://doi.org/10.23917/forgeo.v35i1.12270

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Yang, D., Yang, Y., & Xia, J. (2021). Hydrological cycle and water resources in a changing world: A review. Geography and Sustainability, 2(2), 115–122. https://doi.org/https://doi.org/10.1016/j.geosus.2021.05.003

Yu, C., Turner, S., Huotari, S., Chen, N., Shchukarev, A., Österholm, P., Lopez-Fernandez, M., Högfors-Rönnholm, E., Sachpazidou, V., Mayanna, S., Hogmalm, K. J., Virtasalo, J. J., Boily, J.-F., Dopson, M., & Åström, M. E. (2024). Manganese cycling and transport in boreal estuaries impacted by acidic Mn-rich drainage. Geochimica et Cosmochimica Acta, 365, 136–157. https://doi.org/https://doi.org/10.1016/j.gca.2023.12.004

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