



ANALYSIS OF CLEAN WATER NEEDS IN RANOKOMEA VILLAGE, WEST POLEANG DISTRICT, BOMBANA REGENCY

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Abstract

The background of this research is the clean water in the village of Rakomea, which is inadequate because the amount of clean water discharge is not evenly distributed to all residential residents. This study aims to determine the clean water needs of the Ranokomea village community, West Poleang district, Bombana regency, in 2020 and the projected year 2025. This research uses a quantitative descriptive research method with a sample of 81 family heads. The results showed that the needs for the net water of the people of Ranokomea village were 63,037 litres/person/day, and clean water needs in the year of 2025 projection namely 63.03 litres/person/day. Based on the feasibility standards of clean water needs issued by the UNESCO World Agency, namely 60 litres/person/day then. The needs of the people of Ranokomea village are not fulfilled because in 2020, people's clean water needed 57.11 litres/person/day and in the year 2025 projection, namely, 63.03 litres/person/day.

Keywords: Clean water, water discharge, clean water need standards

A. Introduction

Water is an crucial need that affects many aspects of the entire human life. The water of life sustains human beings if well managed (Diana et al., 2020). Population and regional development increased water needs; each region has explicit area water flow and receives rain yearly (Rahmawati, 2012). Various later problems appear related to fine things from side management, natural water sources and the side infrastructure. Development area settlement accompanied by enhancement needs to clean water service in it, so neither government nor private or Public sued to provide clean water infrastructure with the best (Hatuina, 2012).

The need for water in life is daily used for activity population like housing households (domestic), industrial water needs for industry, and agricultural water needs. Source water power with standard water quality for health for necessity increasingly domestic decrease from year to year, and too many polluted rivers and not worth again consumed (Sasongko et al., 2014).

Bombana on the northern side bordering Regency Kolaka and South Konawe Regency. Bombana Regency covers an area of $\pm 3,316.16 \text{ km}^2$ or 331,616 ha. The most extensive district area is Subdistrict Matausu, with 456.17 km^2 or 13.76% of the Bombana Regency. In contrast, the smallest area is Subdistrict Island Masaloka Raya, with an area of 2.66 km^2 or 0.08% of the large Bombana Regency (BPS Bombana, 2020). The Bombana Territory was formed due to orogenic processes composed of rocks instead, especially from greenschist and ultramafic rocks. By petrography rock called glaucophane garnet schist amphibole, peridotite, serpentinite, sandstone, limestone, and andesite. Whereas based on composition element main rock origin have composition ultra-acidic, forming rock peridotite until andesite (Setiawan, 2011).

Geohydrology of Bombana Regency that is groundwater flow like aquifer with productivity currently is groundwater aquifer with permeability medium, groundwater level free variety between 0.5-10 meters below surface soil and well water discharge in general not enough of 5 litres/sec. The rock is composed of an alluvial, sediment swamp (mud, clay, sand, gravel) unit aquifer these spreads over the western part of the Bombana Regency mainland elongated North-South coast). Moreover, aquifers with through fissures, fractures and channels, as well as enough wells and spring's widest variety of spring discharge 200 lt / s with elevated groundwater levels, vary widely. Compiled by rocks limestone, sandstone and marl with degrees karst formation spread over the western part of the Bombana Regency mainland. The aquifer gap with low productivity is plains soil step, unit aquifer scattered in mountainous areas that dominate the whole Bombana Regency and those on the Island Kabaena (PU Cipta Creation Regency Bombana, 2012). The fulfilment of clean water in the village of Ranokomea is inadequate because the amount of clean water discharge is not equal for all settlement inhabitants. Most of them make well drills or well dig; however, Inhabitants still have difficulty getting clean water so, which requires they buy water for daily needs. This study aims to know the water needs of clean people in the Ranokomea, District West Poleang, Bombana Regency, in 2020 and 2025.

B. Methodology

1. Research Design

Type study is quantitative descriptive because of the embodied data in the form of numbers and described in sentences. Study this held in Ranokomea Village, District West Poleang, Bombana Regency, Province Southeast Sulawesi. The determination location study this based on considerations of clean water needs in the Ranokomea Village, District West Poleang, Bombana Regency (Figure 1).

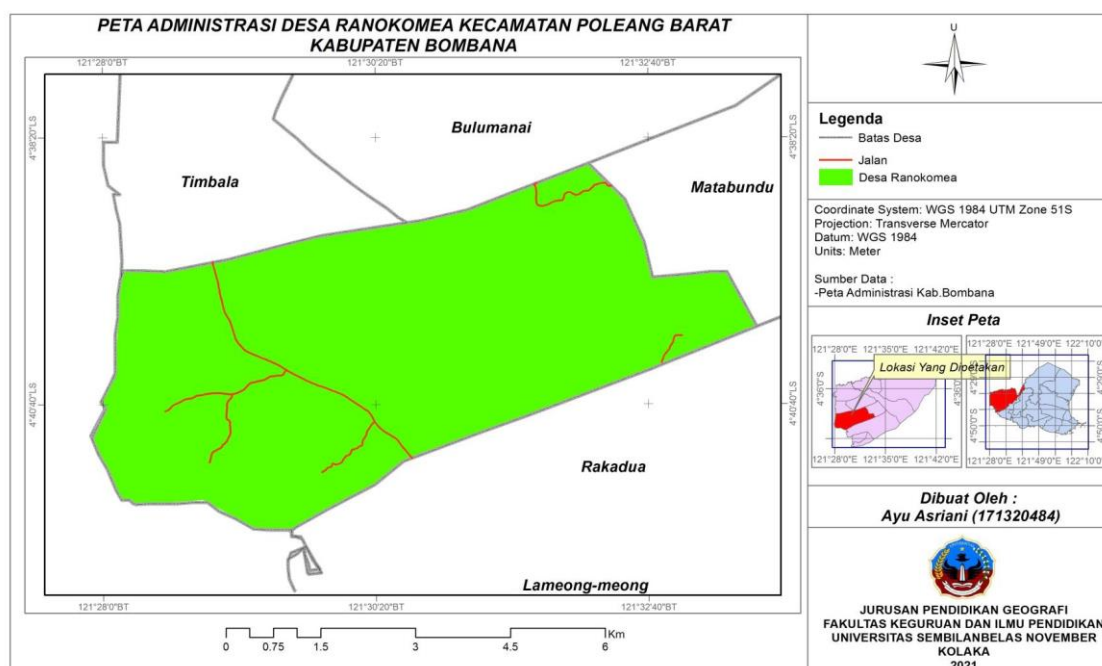


Figure 1. Research Location Map

Amount Sample Water Needs in the Ranokomea Village, District West Poleang, Bombana Regency, totalling 81 samples. Ranokomea consists of 30 samples, and Kampung Baru consists of 17 samples. Pompangi Village, namely 18 samples, and Laponu-ponu, as many as 16 samples.

2. Instruments

The instrument used in this study is the questionnaire used to provide a list of questions to resource persons in the Ranokomea Village, District West Poleang, Bombana Regency. In the questionnaire, there are nine questions.

3. Technique of Data Analysis

At stage data analysis performed calculation based on the data obtained with stages as follows:

1. Count increase population until 2025 from population data Ranokomea Village 5 Years last, and grew population in 2020 then predictable until 2025. From the predicted growth population, the analyzed needs water. Increment population could be analyzed with the use formula method geometric (Java, 2011);
2. Count water needs of 2020 with analysis from measurement data in the field use scale and stopwatch. The need for water is the amount needed for requirement per unit of consumption. Analysis of water needs to be done to the water used for domestic needs ;

According to Adioetomo and Samosir (2012), one area is used equally with a multiplication amount of population with standard water needs for getting quantity amount deep water requirement. Analysis of clean water needs based on the quantity residents will use with the assumption that the per capita water volume requirement is 60 litres/person/ day. (Directorate of Public Works Cipta Karya, 1997) as in equation 1.

$$Jary = Yn \times SABy \dots\dots\dots \text{(Equation 1)}$$

Description :

Jary : Amount of clean water needed (litres/ person/day)

Yn : Projection of Quantity population

SABy : Average clean water needs for the population

C. Findings and Discussion

1. Findings

Ranokomea Village is located at the point coordinates 4°42'0" South Latitude - 4390" South Latitude and 121°280 East Longitude - 121°330 East Longitude. In general condition, the topography of Ranokomea Village has an area of plain low with a height between 0-25 meters above sea level and hilly with a height between 25-750 meters above sea level. Condition Geology Ranokomea Village covers alluvials associated with a nearby area composed of rock reef coral, sandstone, clay, sand gravel and gravel (Profile of Ranokomea Village, 2020). Groundwater shallow (well) average ranges from 7-18 meters, and groundwater depth range from 20-25 meters. There are sourced water potential from surface water (lake) in the Ranokomea Village in the hamlet of Laponu-ponu. The potential sourced water from Lake Laponu-ponu once became a water source for the community in 2018 until early 2019; however, because the lake water quality needed to be better, the Public decided to source a pipe network from Lake Laponu-ponu.

To determine clean water needs in the future, each zone needs a more formerly noticed state population at the time and projection of population in the future (Maulida, 2016). The population planning projection is planned until the next five years, from 2020 to 2025. Total population Ranokomea Village from 2016 to 2017 experienced an increase in the population of as many as 17 people; 2018 was 44 people in 2019, and as many as 46 people; until 2020, it experienced an increase in the population of as many as 39 people. Additional data from residents in the village of Ranokomea from 2016-2020 can be seen in table 1.

Table 1. Population data Ranokomea Village

No	Year	Population	Increase
1	2016	1.377	
2	2017	1.394	17
3	2018	1.438	44
4	2019	1.484	46
5	2020	1.523	39
Amount			146

(Source: BPS, 2021)

The increment population could be analyzed using the geometric formula method (Java, 2011). The calculated increase in residents in the Ranokomea Village for the 2025 projection is described in equation 2.

$$r = (1523/1377)^{1/5} - 1$$

$$= (1,106)^{0,2} - 1$$

$$= 1.02 - 1$$

$$= 0.02 \times 100\%$$

$$= 2\%$$

$$P_{2025} = P_{2020} (1+r)^n \dots\dots\dots \text{(Equation 2)}$$

$$P_{2025} = 1523 (1+(0.020))^5$$

$$P_{2025} = 1523 (1.02)^5$$

$$P_{2025} = 1523 (1.104)$$

$$P_{2025} = \mathbf{1681}$$

Based on the calculation of population growth above, it can be explained that the population in the projected the year 2025 is 1681 people, with an increase of the annual population is 2% or 0.02. The need for clean water for the people of Ranokomea Village is around 30-45 litres/person/day or assuming an average of 37.5 litres/person/day. The availability of clean water for the people of Ranokomea Village, sourced from the PDAM, only flows three days a week for 7 hours a day. So, the community's need for water every week is 262.5 litres/person/week. The level of clean water usage for the people of Ranokomea Village is presented in table 2.

Table 2. The level of clean water uses in the Ranokomea Village

No	Hamlet	Average water requirement (litres/person/day)	Water discharge (litres/sec)	Availability of water (litres/week)
1.	Ranokomea	30-45	0.66	49.89
2.	Kampung Baru	30-45	0.24	18.14
3.	Pompangi	30-45	0.41	30.99
4	Laponu-ponu	30-45	0.23	17.38
Average 37.5 liters / person / day				
Quantity 1.54				

(Source: Analysis results, 2021)

According to Adioetomo and Samosir (2012), to get the quantity amount deep water requirement, one area is used equality is a multiplication amount of occupation with the average water needs of the population. Clean water needs population Ranokomea Village for a moment now is as follows:

$$Jary = Yn \times SABy$$

$$= 1523 \text{ people} \times 37.5 \text{ liters / person / day}$$

$$= 57.11 \text{ liters /person/ day}$$

Whereas clean water needs population for year the 2025 projection is as following:

$$Jary = Yn \times SABy$$

$$= 1681 \text{ people} \times 37.5 \text{ liters / person / day}$$

$$= 63.03 \text{ liters /person/ day}$$

The projected results amount to the population for five years to the front, so the enhancement amount population is 158 people. The increasing amount of population increases the need for clean water in the Ranokomea Village. Water use in 2025 is 63.03 litres/person/day. Clean water needs for Ranokomea Village have been fulfilled and not fulfilled (Table 3).

Table 3. total clean water needs domestic

No	Year	Amount Population	Average requirement clean water (litres/person/day)	Clean water needs (litres/person/day)
1	2020	1523	37.5	57.1
2	Projection year 2025	1681	37.5	63.03

(Source: Analysis results, 2021)

Based on the results of data analysis that has been conducted, the amount of community water needed for Ranokomea Village is around 30-45 litres/person/day or with the average assumption of 37.5 litres/person/day. In comparison, clean water needs the Public for one week, which is 262.5 litres/person/per week. Community water needs Ranokomea Village far from the standard appropriateness water needs issued by the UNESCO World Agency, which is 60 litres/person/day. The water availability in the PDAM is not yet capable of fulfilling the whole community's water needs in Ranokomea Village.

Based on the results, the data analysis population in 2020 is 1523 people, whereas the projected population in 2025 totals 1681 people, with an increase in the population of 158 people. With this, there is an increasing need for clean water in the Ranokomea Village. As presented in table 3, the need for clean water in 2020 is 57.03 litres/ person/day, and the year 2025 projection is 63.11 litres/person/day. So that with existing clean water needs until 2025, PDAM can already know and plan fulfilment of clean water needs in the Ranokomea Village. To service to the max and spread to other places, residents could enjoy the service PDAM clean water network.

The fulfilment needs of clean water communities sourced in PDAM cannot fulfil public needs. The situation could be seen from the water settlement of impoverished people, where the water flow that flows in Ranokomea Hamlet, i.e., 0.66 litres/second, Kampung Baru namely 0.24 l/second, Dusun Pompangi 0.41 litres/second, Dusun Laponu-ponu, i.e., 0.23 litres/second. So, the amount of PDAM water debit in the Ranokomea Village is 1.54 litres/second. Availability of sourced water from PDAM only flows three times in one week with the amount of water in the village of Ranokomea, i.e., 49.89 litres/week, Kampung Baru Hamlet, i.e., 0.24 ltr / week, Dusun Pompangi, i.e., 30.99 litres/week, Laponu-ponu Hamlet, i.e., 17.38 litres/week. The tub water reservoir in PDAM should reach the whole Public because it is 12 meters long, 6 meters wide, 2 meters high, 72 meters wide, and has a volume of 144 m³ (PDAM, 2021). The results of this study align with the need to implement water demand planning, as it is one of the initial stages and fundamental in planning clean water supply systems to provide them as needed. Clean water demand planning activities consist of population and water demand analysis activities (Sahbar & Pujiono, 2020).

D. Conclusion

From the research that has been done, it can be concluded that the population in 2020 amounted to 1523 people, while in the Projected year of 2025 numbering 1681 people with an increased population of 158 inhabitants. Results calculation water demand in 2020 is 57.11 litres/ person/day, whereas, for yearly water demand, the 2025 projection is 63.03 litres/person/day. Fulfilment of clean water needs in the area of Ranokomea Village still needs to be fulfilled because, based on standard appropriateness, the need for clean water issued by the Agency UNESCO world is 60 litres/person/day. In contrast, clean water availability in PDAM can fulfil Ranokomea Village's needs.

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