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SHALLOW GROUNDWATER IN CONSUMPTION STUDY IN TAMBANG ULANG DISTRICT REGENCY OF TANAH LAUT

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ABSTRACT

Shallow groundwater is water that is below the ground surface. Shallow groundwater is often used by the community by making shallow wells to meet household water needs. With the limited distribution of PDAM water, most of the residents in the Kurau District still use shallow wells to meet household water needs. This research will analyze the amount of water use, water demand, and shallow groundwater quality in the Kurau District.

The method of collecting data in the field is by distributing questionnaires and interviewing residents in 60 RTs in the Kurau District. Then one water sample was taken in each village for further research in the laboratory using the U-50 Horiba tool.

The results of the analysis can be seen that the need for shallow groundwater in the Kurau District is 139 liters/person/day. Tested on the quality of the water if it is used as raw material for drinking water according to the value of turbidity (NTU) and the number of Dissolved Solids (TDS) which is declared to meet, while according to the value of the degree of acidity (pH) there is 1 village that does not meet, namely Srikandi Village.

Keywords: Shallow Groundwater, Water Needs, Water Quality, Kurau

1. INTRODUCTION

Kurau Sub-district is one of the sub-districts in Tanah Laut Regency, South Kalimantan Province, where most of the population still uses shallow groundwater by making dug or drill wells at their respective homes because in some areas PDAM facilities and networks have not been reached. Kurau sub-district consists of 11 villages, namely Kurau, Kali Besar, Handil Negara, Sarikandi, Tambak Sarinah, Padang Luas, Tambak Karya, Bawah Layung, Maluka Baulin, Raden, Sungai and Mangrove Rivers. Where in each village consists of 2-5 hamlets with a total of 31 hamlets. And each hamlet consists of 3-13 RT (Rukun Tetangga) with a total of 73 RT.

The main problem is that people do not know the appropriateness of the water they use daily. People only see in terms of color, and use it without knowing the appropriateness of the water used. Therefore, it is necessary toresearch the use and feasibility of water in the Kurau District, Tanah Laut Regency.

2. THEORETICAL STUDY

In principle, statistics are defined as activities to collect data, summarize/present data, analyze data with certain methods, and draw conclusions from the results of the analysis (Santoso, 2002).

Groundwater can be divided into 2 (two) based on the location of the depth, namely:

Shallow groundwater, namely groundwater that is below the ground surface and is above impermeable rocks or layers that cannot pass water. This water is an upper aquifer or often called phreatic water, which is widely used by residents to make wells. Deep groundwater, namely groundwater that is below the shallow groundwater layer, and is between the impermeable layers. This water is a bottom aquifer, widely used as a source of drinking water for urban residents, for industry, hotels and so on

Water quality can be known by performing certain tests on the water. The tests carried out are chemical, physical, biological, or appearance tests (smell and color). Water quality management is an effort to maintain water so that the desired water quality is achieved according to its designation to ensure that water conditions remain in their natural conditions (Acehpedia, 2010).

3. METHOD

Literature study is carried out by collecting information from relevant sources through the method of literature, books, journals, literature, and internet media as a reference for the titles discussed..

3.1 Primary Data Collection

Primary data is data obtained directly by conducting a survey or field survey. Direct field observations are carried out by observing and distributing questionnaires (attachments) on the following matters:

1. To find out the location and dimensions of the well.
2. To determine the depth of the well water level and the groundwater level in the area.
3. To take water samples which are then tested in the laboratory using the Horiba Water Quality Control water test equipment.
4. To take photos of documentation as research evidence.

3.2 Secondary Data Collection

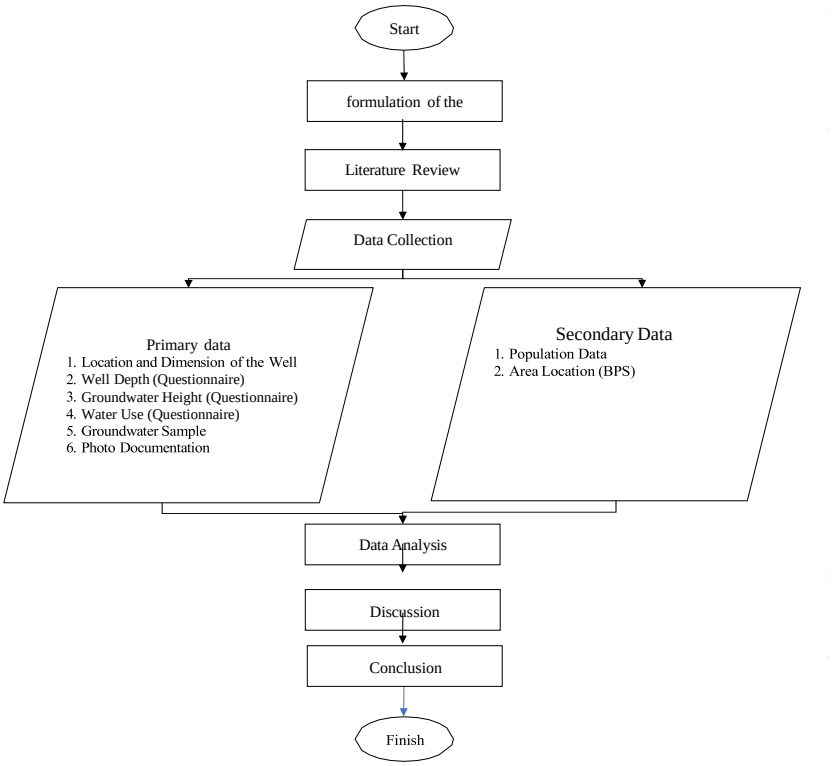
Secondary data is a source of data obtained by researchers indirectly, secondary data in the form of evidence, records, or reports that are archived. Obtained from government or non-government agencies, as well as institutions related to the title of the research. Data were obtained from the Central Bureau of Statistics for Tanah Laut Regency as well as from the Re-Tambang District Office.

3.3 Analysis and Discussion

Data analysis was carried out by using an analyst on a questionnaire in the form of water needs for residents and the use of shallow groundwater in Tambang Ulang. From the results of the analysis, it will be used as a material for discussion to draw conclusions on the use of shallow groundwater in Tambang Ulang. The analysis includes laboratory tests of shallow groundwater quality located at the Hydraulics Laboratory, Faculty of Engineering, University of Lambung Mangkurat.

3.4 Conclusions and Results

From the results of the analysis and subsequent discussion, a conclusion can be drawn that is directly related to the things that are the research objectives. Overall the research procedure can be seen in the following



Gambar 3.1

4. RESULTS AND DISCUSSION

From March 24, 2021 to March 29, 2021, surveys and questionnaire interviews were conducted to identify the use of shallow groundwater in the Kurau Subdistrict, Tanah Laut Regency. Kurau sub-district has 11 villages with 73 RT. Interviews and filling out the questionnaires took one sample of residents for one RT with a total of ±73 people for 73 RT. Water sampling takes one well water sample for one village, with a total of 10 samples for 10 villages.

Table 4.1 Statistical Analysis Results

`No	Village	Depth of Well (M)			Water Level in Rainy Season (M)		
		Minimum	Maximum	Average	Minimum	Maximum	Average
1	Sungai Bakau	5	6	5,5	3	3	3,00
2	Raden	3	4	3,60	2,5	3	2,80
3	Maluka Baulin	8	10	8,33	2	2,5	2,08
4	Bawah Layung	3	4	3,54	2	3	2,38
5	Tambak Karya	3	4	3,40	2	3	2,40
6	Padang Luas	3	4	3,14	2	3	2,29
7	Tambak Sarinah	3	4	3,67	2	3	2,67
8	Srikandi	5	7	5,50	2	3	2,33
9	Handil Negara	6	7	6,67	2	3	2,67
10	Kali Besar	6	7	6,60	2	3	2,40
Average				4,99			2,50

Continued Table 4.1 Statistical Analysis Results

No	Village	Water Level in Summer (M)		
		Minimum	Maksimum	Rata-Rata
1	Sungai Bakau	0	1	0,75
2	Raden	0	1	0,20
3	Maluka Baulin	1	1,5	1,17
4	Bawah Layung	0	1	0,77
5	Tambak Karya	0	1	0,40
6	Padang Luas	0	1	0,43
7	Tambak Sarinah	1	1	1,00
8	Srikandi	1	1	1,00
9	Handil Negara	0	1	0,67
10	Kali Besar	6,60	0,60	2,40
Average				0,88

Continued Table 4.1 Statistical Analysis Results

No	Village	Tandon Capacity		Percentage of Well Ever Dried (%)	Percentage of Well Ever Done (%)
		Minimum	Maximum		
1	Sungai Bakau	1000	1200	75,00%	0,00%
2	Raden	1000	1200	100,00%	0,00%
3	Maluka Baulin	1000	1200	0,00%	0,00%
4	Bawah Layung	1000	1200	46,15%	15,38%
5	Tambak Karya	1000	1200	80,00%	0,00%
6	Padang Luas	1000	1200	100,00%	0,00%
7	Tambak Sarinah	1000	1200	16,67%	0,00%
8	Srikandi	1000	1200	16,67%	0,00%
9	Handil Negara	1000	1200	100,00%	0,00%
10	Kali Besar	1000	1200	100,00%	0,00%
				63,45%	1,54%

Based on table 4.1, it can be seen that in the Kurau District the average well depth is 4.99 meters, the average well water level in the rainy season is 2.50 meters, the average well water level in the dry season is 0.81 meters, so that we get the difference in water level in the dry and rainy seasons is 1.69 meters on average. Residents' water storage or storage varies from not using reservoirs to several reservoir capacities used to accommodate residents' water, ranging from the smallest 1000 liters to 1200 liters.

The average percentage of residents' shallow wells that have ever dried up in the Kurau District is 63.45% and the average percentage of residents' shallow wells that have been dug again to be deepened is 1.54%.

4.1 Results of Shallow Groundwater Needs Analysis in the Kurau Tanah Laut District in 2021

Table 4.2 Results of Analysis of Shallow Groundwater Demand in Re-Tambang District, Tanah Laut Regency

NO	DESA	KEBUTUHAN AIR (LITER/ORANG/HARI)		
		MINIMUM	MAKSIMUM	RATA-RATA
1	SUNGAI BAKAU	86	171	120
2	RADEN	71	171	116
3	MALUKA BAULIN	86	343	217
4	BAWAH LAYUNG	86	171	131
5	TAMBAK KARYA	107	171	130
6	PADANG LUAS	107	143	123
7	TAMBAK SARINAH	86	171	140
8	SRIKANDI	107	171	137
9	HANDIL NEGARA	107	171	139
10	KALI BESAR	107	171	137
RATA-RATA				139

From table 4.2, it can be seen that the average use of shallow groundwater in the Re-Tambang District is 270 liters/person/day.

4.2 Shallow Groundwater Quality

No	Village	Temperaature (°C)	pH	mS/cm	NTU	mg/L DO	% DO	g/L TDS	ppt	σt
1	Sungai Bakau	27,19	5,94	0,58	0,73	7,52	95,9	0,52	0,3	0,0
2	Raden	27,19	5,67	0,19	0,00	7,56	96,3	0,12	0,1	0,0
3	Maluka Baulin	27,40	5,27	0,07	0,00	7,54	96,5	0,05	0,0	0,0
4	Bawah Layung	27,15	5,93	0,34	0,03	7,54	96,0	0,22	0,2	0,0
5	Tambak Karya	27,19	5,66	0,32	1,27	7,53	96,0	0,21	0,2	0,0
6	Padang Luas	27,01	6,49	0,30	0,20	7,59	96,5	0,19	0,1	0,0
7	Tambak Sarinah	27,11	6,20	0,26	0,80	7,51	95,6	0,17	0,1	0,0
8	Srikandi	27,28	4,89	0,09	0,63	7,52	96,0	0,06	0,0	0,0
9	Handil Negara	27,07	5,35	0,13	0,25	7,53	96,1	0,12	0,0	0,0
10	Kali Besar	27,12	5,43	0,07	0,63	7,54	96,4	0,07	0,0	0,1

Table 4.3 Average Results of Water Quality Data Collection

a. Feasibility analysis of shallow well water as drinking water based on the value of the degree of acidity (pH)

Table 4.4 Feasibility Analysis of Shallow Well Water as Drinking Water based on Acidity Value (pH)

No	Village	pH	Quality Requirements of Drinking Water	
			PP RI NO 82 TAHUN 2001	PERMENKES NO.492 TAHUN 2010
1	Sungai Bakau	5,94	Including Class IV (pH 5-9	Not Eligible
2	Raden	5,67	Including Class IV (pH 5-9	Not Eligible
3	Maluka Baulin	5,27	Including Class IV (pH 5-9	Not Eligible
4	Bawah Layung	5,93	Including Class IV (pH 5-9	Not Eligible
5	Tambak Karya	5,66	Including Class IV (pH 5-9	Not Eligible
6	Padang Luas	6,49	Including Class IV (pH 5-9	Not Eligible
7	Tambak Sarinah	6,20	Including Class IV (pH 5-9	Not Eligible
8	Srikandi	4,89	Not Eligible	Not Eligible
9	Handil Negara	5,35	Including Class IV (pH 5-9	Not Eligible
10	Kali Besar	5,43	Including Class IV (pH 5-9	Not Eligible

Based on table 4.4, it can be seen that the feasibility of drinking water according to the requirements of PP RI NO 82 of 2001 based on the pH value obtained by Sungai Bakau Village, Raden, Maluka Baulin, Bawah Layung, Tambak Karya, Padang Luas, Tambak Sarinah, Handil Negara and Kali Besar have a pH value more than or equal to 5 belongs to class IV pH range between 5-9. While Srikandi Village has a pH value of less than 5 so it is not included in class I (pH 6-9), Class II (pH 6-9), Class III (pH 6-9), and IV (pH 5-9).

Based on Table 4.27, it can be seen that the feasibility of drinking water according to the requirements of all villages in the Kurau District has a pH value below 6.5 and is declared not to meet the drinking water requirements of PERMENKES NO 490 of 2010 the pH value of potable water ranging from 6.5 to 8.5.

b. Feasibility analysis of Shallow Well Water as Drinking Water Based on Turbidity Value (NTU)

Table 4.4 Feasibility Analysis of Shallow Well Water as Drinking Water based on Turbidity Value (NTU)

No	Village	NTU	Minimum Water Quality Requirements	
			PP RI No 82 Tahun 2001	PERMENKES No.492 Tahun 2010
1	Sungai Bakau	0,7		Eligible
2	Raden	0,0		Eligible
3	Maluka Baulin	0,0		Eligible
4	Bawah Layung	0,0		Eligible
5	Tambak Karya	1,3		Eligible
6	Padang Luas	0,2		Eligible
7	Tambak Sarinah	0,8		Eligible
8	Srikandi	0,6		Eligible
9	Handil Negara	0,3		Eligible
10	Kali Besar	0,6		Eligible

Based on Table 4.5, it can be seen that the turbidity value (NTU) of all villages in the Kurau District meets the eligibility requirements for drinking water PERMENKES NO 490 of 2010 with a maximum NTU value of 5 NTU.

PP RI NO 82 of 2001 does not stipulate special requirements for the feasibility of drinking water according to the value of turbidity or (NTU)

c. Feasibility Analysis of Shallow Well Water as Drinking Water Based on the Value of Dissolved Solids (TDS)

Tabel 4.6 Feasibility Analysis of Shallow Well Water as Drinking Water based on Substance Value Dissolved Solid (TDS)

No	Village	TDS	Quality Requirements of Drinking Water	
			PP RI NO 82 TAHUN 2001	PERMENKES NO.492 TAHUN 2010
1	Sungai Bakau	515	Termasuk Kelas I,II,III	Not Eligible
2	Raden	120	Termasuk Kelas I,II,III	Not Eligible
3	Maluka Baulin	045	Termasuk Kelas I,II,III	Not Eligible
4	Bawah Layung	222	Termasuk Kelas I,II,III	Not Eligible
5	Tambak Karya	209	Termasuk Kelas I,II,III	Not Eligible
6	Padang Luas	193	Termasuk Kelas I,II,III	Not Eligible
7	Tambak Sarinah	168	Termasuk Kelas I,II,III	Not Eligible
8	Srikandi	57	Termasuk Kelas I,II,III	Not Eligible
9	Handil Negara	122	Termasuk Kelas I,II,III	Not Eligible
10	Kali Besar	73	Termasuk Kelas I,II,III	Not Eligible

Based on table 4.6, it can be seen that all villages in the Kurau District meet the requirements of PP RI NO 82 of 2001 with the condition that the maximum amount of dissolved solids (TDS) is 1000 g/l TDS and is included in class I, class II, and class III.

Based on table 4.29, it can be seen that one village in the Kurau District, namely Sungai Bakau Village, does not meet the requirements for drinking water eligibility from PERMENKES NO 490 of 2010 with a maximum amount of dissolved solids (TDS) of 500 g/l.

5. Conclusion

Conclusion

1. The average shallow groundwater demand in the Kurau Subdistrict from 10 villages is 139 liters/person/day.
2. In the Kurau Subdistrict, Tanah Laut Regency, there is a decrease in the depth of the groundwater level, the results are taken from the average of all villages. The decrease in the depth of the groundwater level that occurred was 1.69 meters.
3. The quality of shallow groundwater in the Kurau Subdistrict, Tanah Laut Regency according to the results of the Turbidity test completely meets. According to the results of the Amount of Dissolved Solids test, there are 1 out of 10 villages that do not meet the requirements of PERMENKES NO. 492 of 2010 namely Sungai Bakau Village. Meanwhile, according to the results of the acidity test, there are 1 out of 10 villages that do not meet, namely, Srikandi Village.

Suggestion

Based on the results of the tests that have been carried out, it is known that the average pH value in the Tanah Laut District Mine is 5.12 where this value is still below the minimum limit value for drinking water according to PERMENKES NO 490 of 2010 PH 6.5-8.5 it is advisable for residents not to use the water for daily drinking.

This research can be done not only with a sample of 1 RT 1 Questionnaire, but it can also be done with the population, namely taking the entire sample. If in the future a similar study will be conducted, it should use chemical and biological quality tests, so that the research results are more accurate.

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