Development Priority of Water Supply Facilities in Banjar Regency

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ABSTRACT : *Clean water is a basic human need that is absolutely available both in terms of quality, quantity and continuity. The largest number Banjar regency residents who have not received adequate clean water is the people who live in rural areas and in the suburbs. The community is low income people with less healthy neighborhoods.*

Banjar regency population spread over 20 districts and 290 villages / village. From20 sub-districts there are 11 districts with 74 villages are still categorized as prone to water, Decision making models of research method Analytic Hierarchy Process (AHP) AHP single criterion and multi-criteria, to determine the priority provision of clean water in Banjar district.

The questionnaire in this study is a questionnaire for the assessment criteria define the indicators used in the analysis of the priority provision of clean water in Banjar district. Indicators used to perform priority analysis covering the number / density of population, water sources, socio-economic potential, the existing condition.

Calculations using the Analytic Hierarchy Process matrix of 4 × 4 by entering the numbers pairwise comparison results obtained from the analysis of respondents into a comparison matrix to determine the level of priority issues which the raw water source becomes the largest or highest percentage that is equal to 36.37%, the number / density of 23 , 62%, social and economic potential of 20.62% and 19.39% of the existing condition.

KEYWORDS *Indicators, methods, priorities*

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I. INTRODUCTION

Clean water is a basic human need that is absolutely available both in terms of quality, quantity and continuity. The availability of clean water is one of the determinants which increase social welfare by the availability of clean water is expected to boost the productivity of society. On the other hand the availability of water in the region will boost the economy in the region.

In an effort to fulfill the national water services, the central government provides the policies and directives and programs to the region in an effort to accelerate the achievement of water services of each region. In tune with the mandate of Law No. 23 of 2004 on Regional Government, the provision of clean water is obligatory for the Government of Regency / City because it involves the basic infrastructure, so it needs to be prioritized implementation and be guided by the minimum service standards set by the central government.

Special to the Banjar district has an area of ± 4,688 km² which is ranked third largest area in South Kalimantan, with a population as many as 527 997 people, there are 11 districts with 74 villages are still categorized as prone to water by a decree Banjar about Rawan village Determination of Water Wilyah Banjar District, No. 384 2016.

Location 11 districts with 74 Rawan village in Banjar District Water Supply in Figure I, which shows a yellow color-prone villages clean water while the blue color menjukan villages which have been served with clean water.
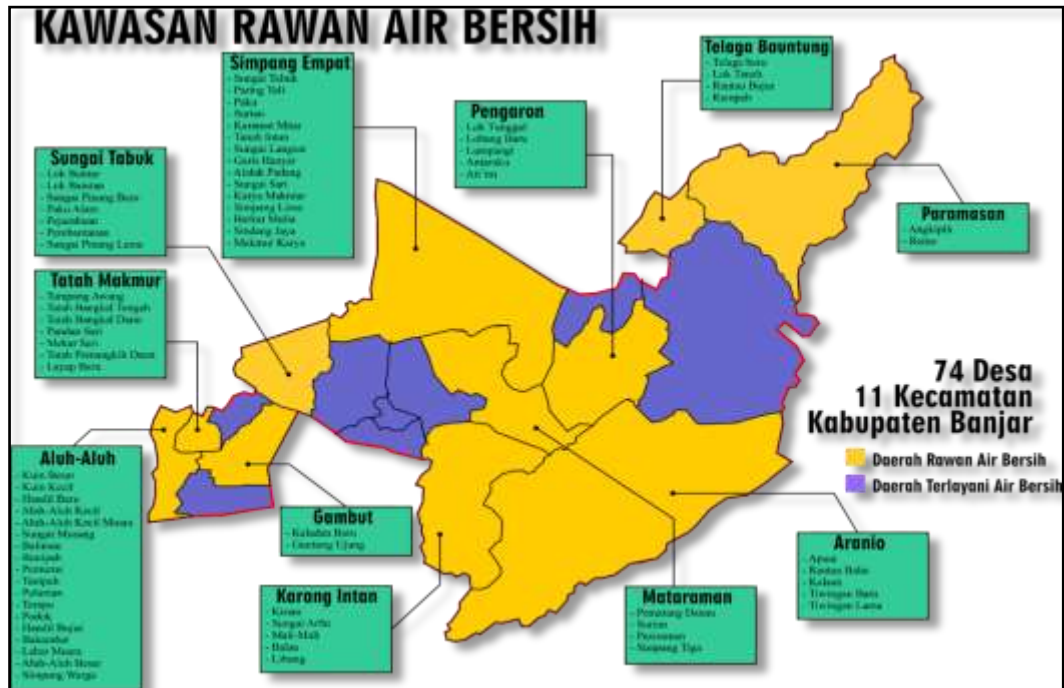
Fig.1. Location 11 districts with 74 clean water surtages village in Banjar district water supply

Village in Banjar district belonging to a category vulnerable to water because the village is located in swampy areas such as villages in the district Peat, Simpang Empat and Sungai Tabuk source of raw water in the form of peat water-colored high exceeding 650 Ptco, this color due to decomposition of organic materials. Air peat in the area during the dry season while the dry during the rainy season the water smelled because it contains a parasite (f2s), iron, manganese and nitrite and other pathogenic bacteria, also sour taste with acidity levels of about 2.5 to 3.5, in other words its pH is low. (Jakob, 2006).

The village is located in the plateau area with sources of raw water mountain springs where the water flow is so small that only rely on water from the mount, in the District Pengaron, Karang Intan, District Aranio, District Mataraman, District Ponds Bauntung and District Paramasan, so the village residing in the district including the villages that are prone to water.

In addition to the villages located in the area of marsh and plateau there is also a village located in the coastal areas are a source of raw water brackish because of the intrusion of sea water so that the water of the river is salty and cloudy as in Sub Aluh-Aluh and District Tatah Makmur, these villages are in remote area and is located across the river is quite wide, so for the installation of piping regional water Company (PDAM) Diamond Banjar still constrained by the enormous costs while for the processing of raw water sources available require very large cost anyway.

In connection with the problems of villages which are prone to water in Banjar Regency, to achieve the goals and objectives of government Banjar district in the implementation of Water Supply System (SPAM) and in an effort to public welfare by ensuring the basic needs of clean water that meets the requirements of quality, quantity and continuity as well as affordability, perluadanya research in order to obtain concrete measures for priority provision of clean water in Banjar district.

II. RESEARCH METHODS

One important component of the study is the data collection process. Mistakes made in the data collection process will make the process of analysis to be wrong. Moreover, the results and conclusions will be confused if data collection is done is not right.

The type of data used for data collection and sources of uptake, including primary data and secondary data.

Primary data:

Primary data was collected directly from the object under study and for research to be conducted. Primary data was collected wear instruments to collect data. These two instruments were questionnaires and observation.

1. The questionnaire was to to determine the indicators that influence in determining the priority provision of clean water and determine the priority issues to be the cause of clean water prone villages in the district of Banjar.

2. Observation is the observation of all activities to take measurements. The observation data is collected element analysis to determine the condition of existing facilities and good infrastructure clean water in clean water prone villages in the district of Banjar.

Secondary Data:

Secondary data is data collected and held by previous studies or published by various agencies in the form of documentation data and official archives. The data obtained in this study include:

1. Data amount / density of occupation contained in 11 districts with 74 villages in the district of Banjar.
2. A list of names of villages by the Decree (SK) Determination of Water Rawan village in Banjar district.
3. Potential socio-economic data is the cause of the villages in the district. Banjar prone to water.

Primary data and secondary data in this study will be processed on the processing of data to get a reference for decision making in priority provision of clean water in Banjar district using Analytic Hierarchy Process modeling study (AHP) AHP single criterion and multi-criteria. (Rusdi, 2014).

Data processing

      This research use quantitative data that will provide a priority provision of clean water in Banjar district. By paying attention to weight the relative and consistency choices which AHP is necessary also sought eigenvalues of the main (principal eigen value) called λmak, where λmak is the sum of the multiplication of each element vector eigen the number of columns of the matrix comparison of consistency index (CI) and consistency ratio (CR) in order to get a table RI. (Rusdi, 2017).

The data will be used to determine the priority provision of clean water in every district in the village prone to water in Banjar district is as follows:

- Source of raw water needs unit Liter / sec

Raw water sources in villages prone to water in Banjar district is represented needs raw water source in the village as in Table 1.

Table 1 The need for raw water sources on the basis of the raw water needs assessment difference between the two sides of the comparison

Numerical value	Importance	Basic
1	equally important	> 2
3	A little more important	2> 4
5	Obviously more important	4> 6
7	Very obviously more important	6> 8
9	Absolute is more important	8>

- Socio-economic potential of the unit unit

      The potential of the societies in villages prone to water in Banjar district is represented by House No Livable (RTLH), because the conditions RTLH were able to describe the average income of the community, so it is assumed more and more RTLH owned by the community, the lower socio-economic level of a village should receive top priority that can be seen in Table 2.

Table 2 Potential socioeconomic basis for valuation difference between the number of units either side comparison

Numerical value	Importance	Basic
1	equally important	≥ 24
3	A little more important	25-49
5	Obviously more important	50-74
7	Very obviously more important	75-99
9	Absolute is more important	≥ 100

- The existing condition of the unit: Percentage (%) condition of each village

The existing condition of the facilities and infrastructure of clean water in the village prone to water in Banjar district represented by a percentage (%) condition of each village, where existing conditions most worthy and even do not have the means to clean water, which will be the main priority as Table 3.

Table 3 Existing Condition of each village

Numerical value	Importance	Basic
1	equally important	95%
3	A little more important	75%
5	Obviously more important	50%
7	Very obviously more important	25%
9	Absolute is more important	0%

Ket.   0%:   There is no infrastructure and bad water quality
       25%:   There are facilities and infrastructure, does not function as well as the bad water quality
       50%:   There are facilities and infrastructure, partially functioning, bad water quality
       75%:   There are facilities and infrastructure, functioning, water quality is good but not the maximum quantity
       95%:   There are infrastructure, function, good water quality, quantity meets the terms of continuity does not meet

- Amount / unit population density soul

Number / population density in vulnerable villages clean water in Banjar, indicate the more dense the population of the need for clean water even greater as shown in Table 4.

Table 4 Number / overcrowding with valuation basis of population density difference between the two sides of the comparison

Numerical value	Importance	Basic
1	equally important	≥ 250
3	A little more important	$250> 500$
5	Obviously more important	$500> 750$
7	Very obviously more important	$750> 1000$
9	Absolute is more important	≤ 1000

Make Priority Scale Problems Using AHP Method

Village of data contained in the 11 districts with 74 villages prone to water in Banjar district that has been established and surveyed and identified appropriate existing condition, then the village is used as research data. Here are the steps in setting priorities provision of clean water in Banjar district:

1. In this study were taken 11 districts with each village to do the analysis of the calculation based on the candidate selection obtained primary data and secondary data, starting from district Aluh-Aluh which has 18 villages prone to water up to the District Paramasan which has 2 villages prone to water ,
2. The results of candidate selection is then inserted into the matrix comparison to then be normalized, it is done repeatedly on any clean water prone villages in 11 districts.
3. After normalization of each matrix is multiplied by the weighting of criteria in priority vector in each village and each subdistrict so didapatkanlah percentage of the final result of the biggest problems is a priority provision of clean water every district.

Conclusions and recommendations

Based on the analysis and discussion that has been done, it can be concluded that refers to the goal of this research. The analysis also provides a recommendation or suggestion to be a priority consideration in the provision of clean water in Banjar district.

III. RESULTS AND DISCUSSION

Data processing

The indicators are used to analyze the priority provision of clean water contained in 74 villages prone 11kecamatan with clean water in Banjar district is as follows:

1. Number / overcrowding
2. Raw water source
3. Socio-economic potential
4. existing condition

References used in the preparation of importance (Preference) to find out the problems that cause water-prone village in Banjar district is as follows:

1. Equally important (Equaly Important) with a numerical value is 1
2. Slightly important (Slightly more Important) with a numerical value is 3
3. Obviously more important (more Materially Important) with a numerical value is 5
4. Very obviously more important (Significantly more Important) with the numeric value is 7
5. Absolute is more important (more Absolutely Important) with a numerical value is 9

Respondents in filling the questionnaire data in this study of a questionnaire assessment criteria in prioritizing the provision of clean water facilities in Banjar district is done in two stages:

1. Questionnaires Indicators Research Priorities Phase I

Data from respondents on the questionnaire obtained a priority indicator research aims to determine the indicators that influence in determining the priority provision of clean water contained in the 11 districts with 74 villages in the district of Banjar as shown in Table 5.

Table 5 Data Indicators Questionnaire Research Priorities Phase I

No.	respondents	Respondents answer
1.	respondents A	- Water Source - Existing condition - Number / Population Density - Socio-Economic Potential - Water Source - Existing condition
2.	respondents B	- Number / Population Density - Socio-Economic Potential - Society participation - Water Source - Existing condition
3.	respondents C	- Number / Population Density - Socio-Economic Potential - Community Resources - Distribution system
4.	respondents D	- Water Source - Existing condition - Number / Population Density - Socio-Economic Potential

Answer all four respondents in this first phase of research questionnaires, to determine indicators that are considered highly affect the priority provision of clean water in Banjar district. Indikaor that influence is the raw water source, amount / density of population, economic and social potential of the existing condition. Later in the phase II questionnaire will be included as an indicator to determine the level of interest in the form of AHP.

2. Questionnaires Importance Phase II study

AHP questionnaire data from pairwise comparisons of the data obtained in the form of results of calculations using the Multi Hierarky creteria Mattrik 4 x 4, namely:

1. respondents A

Data from the respondent A is obtained from the questionnaire are determined by BAPPELITBANG Banjar district with the calculation results can be seen in Figure 2.
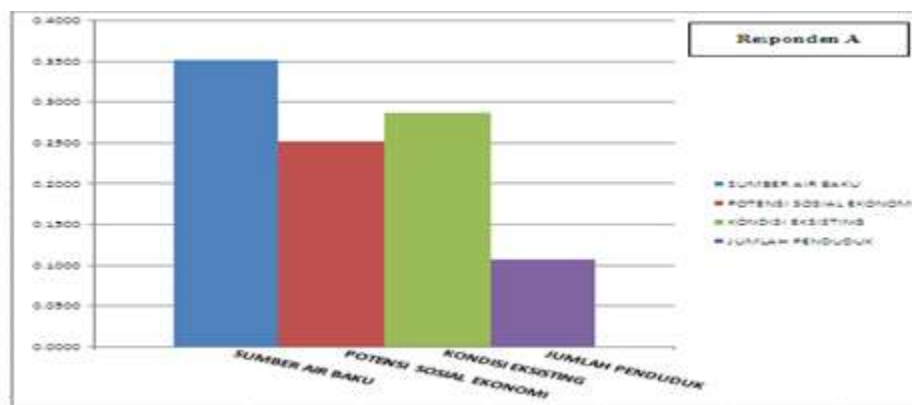

Fig. 2. Graph calculation results importance questionnaire respondent A

From the description of Figure 2 can be seen the factors a priority according to the respondent A is the problem of water sources by 35.27%, amounting to 28.78% of existing conditions, socio-economic potential of 25.23% and total / overcrowding 10.72 %. Respondents A water treatment bakulah is hoping that the priority provision of clean water in Banjar district.

2. respondents B

Data from the respondent B obtained from the questionnaire as determined by the Department of Human Settlements Division PUPR Banjar Regency with the results shown in Figure 3.
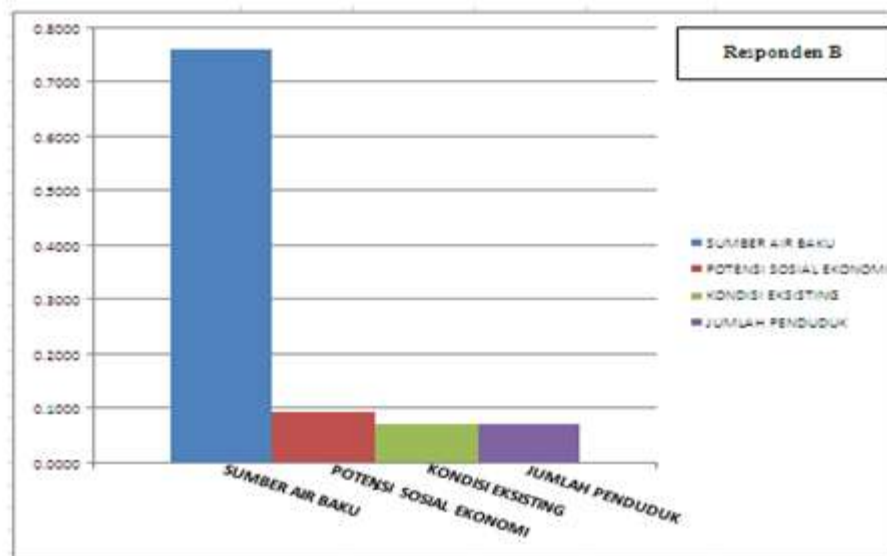
Fig. 3. Graph calculation results importance questionnaire respondents B

From the description of Figure 3 shows the priority factor according to the respondent as the respondent B A. There is the issue of raw water source for 76.18%, the socio-economic potential of 9.48%, amounting to 7.18% of existing conditions and the amount / the population density of 7.17%. Respondents B also is hoping that the source of raw water are prioritized in the provision of clean water in Banjar district.

3. respondents C

Data from the respondent C obtained from the questionnaire as determined by the Commission 3 for Infrastructure in Banjar Regency Parliament with the results shown in Figure 4.
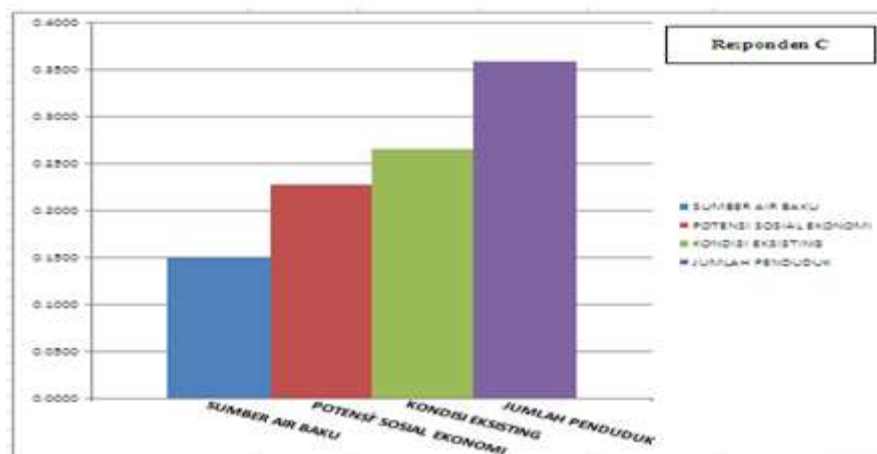

Fig. 4. Graph calculation results importance questionnaire respondents C

From the description of Figure 4 can be seen the factors a priority according to the results of respondents C is the number / density that is equal to 35.77%, amounting to 26.45% of existing conditions, socio-economic potential of 22.75% and a source of raw water at 15.03 %. The problems of population density that exceeds the regulation number of family members in each village to the needs of water per capita. This has led to problems must be the top priority in the provision of clean water facility according to the respondents C must be completed and received special attention.

4. respondents D

Data from the respondent D is obtained from the questionnaire as determined by the Field Evaluation of Rural Development, on BPMPD Banjar regency with the results shown in Figure 5.
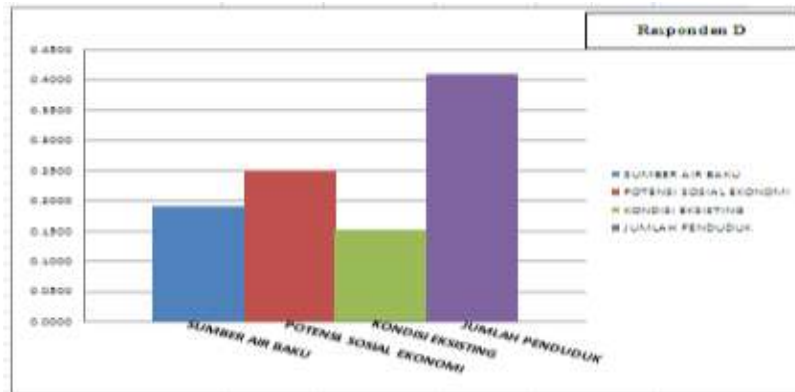
Fig. 5.Graph calculation result D questionnaire respondents importance

From the description of Figure 5 can be seen the factors a priority according to the respondent D is located on the problems of dense population in the village of 40.83%, the socio-economic potential of 25.02%, a source of raw water at 19.02% and conditions existing amounted to 15.13%. Respondents suggested that a higher priority D overcrowding problem was the one who first became the center of attention in the provision of clean water in the village.

From the results of respondent A, B, C and D The test was performed in a model AHP matrix 4×4. Each priority vector that is the culmination problems, using multiple criteria AHP method obtained final results a problem that must be handled by the Banjar district. The most important of issues that must be resolved until the issue could be dealt with later, can be seen in Figure 5.
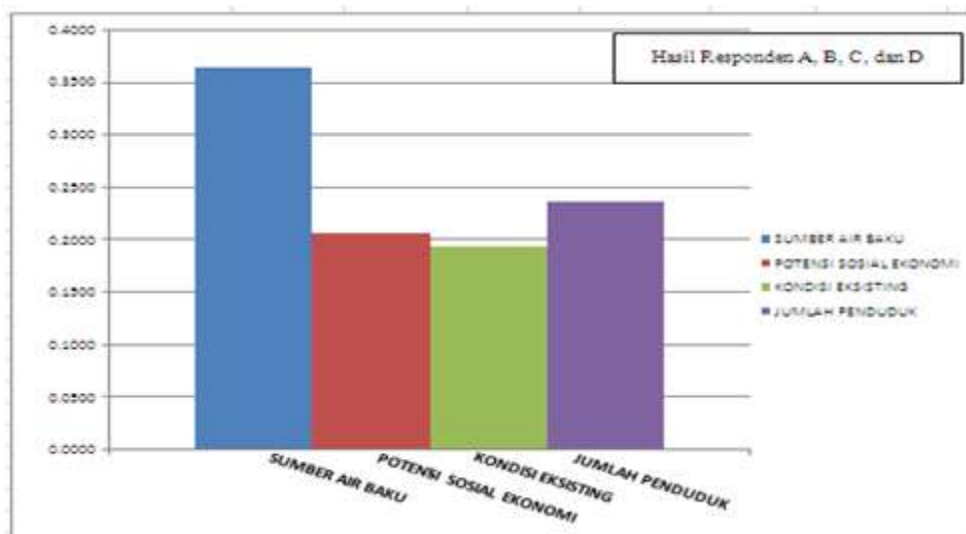

Fig. 6. Priority vector graphics problems

From the description of Figure 6 can be seen final calculation results comparison matrix 4×4 with AHP. This method is used to deduce which of the problem is a top priority in the provision of clean water in Banjar district. The result of the above calculation can be seen from the respondent A, B, C and D in which the main issue is a matter of priority sources of raw water with a percentage of 36.37% value. This shows that the existing raw water source does not meet the criteria both in quality, quantity and continuity. Then the second treatment for problems related to the number / percentage of population density with a value of 23.62% problems.

Further treatment for problems related to socio-economic potential problems with a percentage of 20.62%. It shows the level of welfare of vulnerable rural communities to clean water should also be given special attention to help reduce public expenditure in terms of getting clean water. Existing condition of facilities and infrastructure with problems percentage value of 19.39%. This condition is considered to have not been able to meet the needs of a decent clean water for the community.

IV. DATA ANALYSIS

After getting the priority issues of water supply facilities located in 11 districts and 74 villages prone to water in Banjar district. Research with a similar concept was made by Magna, et al. (2017), Analysis of the structure bore pile construction risks on the project to determine the final decision terhadapa alternative risk factors in the form of criteria. This is the exact method used AHP to determine Which villages in each district which will be the top priority in making the provision of clean water facilities in Banjar district. So from the results AHP pairwise comparison of data obtained in the form of candidate selection as needed / raw water source, amount / density of population, social and economic potential / RTLH and existing conditions as a basis for assessment of each district.

With attention to selection of candidates each district that becomes the basis for an assessment to determine which villages a priority handling in these districts. Data in the form of calculation of final results obtained from the calculation of the normalized matrix. The final result of the conclusion of each each district, which will menajdi main priority in the provision of clean water is a village that has the highest percentage of weight.

The final result shows the priority provision of clean water in each district contained prone villages clean water in Banjar Regency, can be seen in Table 6.

Table 6 List of Priority Rural Water Supply Facilities in Banjar

No.	name of the District	Village name	Percentage Priority Handling
1.	District. Aluh-Aluh	Village Pemurus	9.64%
2.	District. turf	New Keladan village	50.00%
		Village blunt tip	50.00%
3.	District. Sungai Tabuk	Sungai Pinang Lama	19.79%
		Village Penjambuan	19.13%
4.	District. chisel Makmur	The village Looks Awang	21.18%
5.	District. Pengaron	Lok village Stumps	27.97%
6.	District. Karang Intan	Sei. Arfat	26.19%
7.	District. 4-way intersection	Paring village Ropes	12.79%
8.	District. Aranio	Tiwingan village of Lama	37.18%
9.	District. Mataraman	Causeway Village Lake	45.21%
10.	District. Talaga Bauntung	Rantau Longitude	32.17%
11.	District. Paramasan	Village Angkipih	55.66%

V. CONCLUSION

Based on The research results have been described and discussed, indicators that influence in determining the priority problem is the source of raw water with a weight percentage of 36.37%, the number / percentage of population density, with a weight of 23.62%, the socio-economic potential with a weight percentage of 20, 62% and the existing condition with a weight percentage of 19.39%.

Priority provision of clean water in every district located in the village prone to water in Banjar, which in terms of weight percentage of the biggest problems, in the District of Aluh-Aluh is Village Pemurus, District Peat is Village Keladan New and Rural blunt tip, Sungai Tabuk is Sungai Pinang Lama and Village Penjambuan, District Tatah Makmur is the village Tampang Awang, District Pengaron is the village of Lok stumps, Karang Intan is Sungai Arfat, District Simpang Empat is the village of Paring Rope for Sub Aranio is Village Tiwingan Lama, District Mataraman is Lake Causeway Village, District Ponds Bauntung is Rantau longitude and District Paramasan is Angkipih village.

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