

Analysis of Clean Water Service Performance of the Kotabaru Pamsimas Program

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ABSTRACT

According to data information and complaints services (LIP) Pamsimas Kotabaru district in 2019, in the scope of operation and maintenance spam woke up, found some complaints and reports from residents of home connection customers in villages far from the district for dissatisfaction with the performance of clean water services they received such as the quantity of water that tends to decrease, water becomes murky and smelly, and distribution flow is less smooth. The purpose of this study is to find out the level of customer satisfaction SR Pamsimas Kotabaru Regency, determine the priority of service, and develop a strategy to improve its performance.

Based on the results of customer satisfaction index (CSI) with questionnaire method distributed to SR customers where using 4K aspect and community participation as measurement variable obtained value of 77.19% is in the category of "satisfied" to aspects of quantity, water quality, continuity, affordability (4K) and community participation in spams management. While the results of Importance Performance Analysis (IPA) obtained 8 indicators that need to be prioritized performance, namely raw water is always available; water clarity; the events of peak hours; water smoothness for 24 hours/day; smooth flow during drought; water dues include operational, maintenance, depreciation and development costs; the community participates in maintaining and maintaining raw water facilities/sources; and the manager is open to customer suggestions/reports.

The results of this study can be considered as input and evaluation for the implementation of community-based SPAM management in rural areas

KEYWORDS: service performance; pamsimas; operation and maintenance SPAM

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I. PRELIMINARY

Every human being has the right to access clean water in sufficient quantity and quality to meet their basic needs (Gleick, 2007). In meeting the need for clean water as a basic human need, it can be done through two approaches, namely independently based on the community and through government-owned institutions/business entities such as PDAM. The community-based method involves the community playing an active role as the main actor in providing access to clean water from upstream to downstream (from raw water collection to distribution) to household customers. This community-based approach is applied to rural areas that are not covered by PDAM services (Purwanto, 2020). The Community-Based Drinking Water and Sanitation Provision Program (Pamsimas) is one of the central government policies that are concerned with providing clean water for people in rural areas, which is carried out with a community approach. This program exists because PDAM services as a clean water supply institution cannot reach people living in rural areas (Prihatin et al., 2015).

According to Pamsimas Management Information System (SIM) data for 2020, Kotabaru Regency, South Kalimantan, has participated in the Pamsimas program since 2008, when this program was first launched. Until 2020, the number of villages in Kotabaru Regency that have received program assistance is 145 villages spread across 21 sub-districts throughout the district. Based on the Information and Complaints Service (LIP) in 2019, within the scope of operation and maintenance activities as well as the development of SPAM services, several complaints and reports were found from residents of house connection customers in villages far from the district for dissatisfaction with the performance of clean water services they received. Such as the quantity of water tends to decrease (especially during the dry season), the water becomes cloudy and smells, and the flow in the pipes is not smooth.

Similar research conducted by Trenggono & Wahyono (2017) regarding the performance of Pamsimas services in Semarang City concluded that the performance of Pamsimas services in Mijen Village which has been operating since 2012 has a good reputation, Cepoko Village (operated since 2010) and Mangunharjo Village (operated since 2009) performed well. Poor service, while Kelurahan Sadeng (operated since 2009) failed in Pamsimas. In another study, Yuliani & Rahdriawan (2015) conducted an analysis of the performance of community-based clean water services in Tugurejo Village, Semarang City which has been operating since 2012 in terms of operational, financial, administrative and customer satisfaction aspects of clean water. By using the CSI calculation and the IPA method, a customer satisfaction index of 78.34% is obtained in the category of satisfied with service performance. While the results of the IPA mapped performance attributes that need to be improved by the management, namely the discipline of water distribution officers, water quantity, promptness and responsiveness to customer complaints, and officers easily contacted by customers.

In this study, aspects of quantity, quality, continuity, affordability and community participation are used as variables for measuring service performance. The determination of this operational variable is based on the 2015 Technical Guidelines for the Operation and Maintenance of SPAMS at the Community Level regarding the benchmark for the success of managing the operational and maintenance activities of SPAMS at the village level, which is the fulfillment of 4K aspects. Meanwhile, the fulfillment of customer satisfaction is emphasized in the 2016 General Guidelines on the component 10 Key Performance Indicators (KPI) regarding the performance of Pamsimas SPAM management on user satisfaction.

Kotabaru Regency was chosen as the location for this research because it is expected to represent the program in South Kalimantan because it has the largest number of program villages. Meanwhile, the performance of clean water services studied were in villages whose facilities were built in 2017-2019 both sourced from the APBN and APBD and are still operating and functioning properly. The selection of the intermediate year is deemed appropriate in terms of sufficient time to evaluate the management of clean water services currently managed by KPSPAM.

Based on the above background, this study aims to determine the level of customer satisfaction for clean water SR Pamsimas Kotabaru, identify performance priority indicators, and develop strategies to improve service performance. The hope of the research can contribute to the development of scientific theory in the field of operational management and maintenance of SPAMS which is managed by the community and becomes an evaluation material for improving clean water services in rural areas.

II. RESEARCH METHODS

The method in this study can be explained as follows:

Determination of Variables and Performance Indicators

In this study, 5 (five) variables were used, namely water quantity, water quality, flow continuity, affordability of tariffs, and community participation. The number of indicators measured is 15 items, each of which is in the dimensions of importance and performance.

Data Collection

The data in this study were sourced from primary and secondary data. Primary data obtained from the distribution of questionnaires, observations and interviews. While secondary data comes from literature studies in the form of books, journals, documents such as general manuals, technical instructions, POB/SOP Pamsimas, LIP, SIM PAMSIMAS, and other PAMSIMAS documents.

Research Instrument Test

In research that uses a questionnaire as a data collection method, it is necessary to first ascertain the quality of the questions. It is said to have good quality if the data is valid (accurate) and reliable (Algifari, 2019).

Analysis Techniques

The data from the questionnaires were collected and grouped into a description of the respondents' perceptions of assessment, both in the interest and performance categories. Furthermore, the calculation of the customer satisfaction index Customer Satisfaction Index (CSI) and the measurement method Importance Performance Analysis to determine the level of customer satisfaction and priority indicators of the performance aspects of clean water services PAMSIMAS Kotabaru Regency

Strategy for Recommendations

The formulation of strategies for improving the performance of KPSPAMS services is carried out by conducting interviews with program policy makers, SPAM Association administrators and program actors at the Kotabaru District level on the results of the calculation of the level of satisfaction (CSI) and the results of the priority

mapping of performance indicators (from the IPA method).

III. ANALYSIS AND DISCUSSION

Questionnaire Respondents

1. Research Population

The population in this study are villagers who are household connection customers who utilize Pamsimas clean water services in the villages of Kotabaru Regency whose system has been built from 2017-2019 and the SPAM is operating/functioning well.

2. Research Sample

The sampling technique in this study used a purposive sampling method, where the village sample was selected based on certain criteria/considerations. The criteria are based on 1). The sample villages are located in the sub-district which is located farthest and intermediate from the district center, 2). The selected sub-district has a well functioning village SPAM (green status).

The determination of the farthest and middle distances is based on data from the BPS Kotabaru Regency in 2020 which the author divides into 2 (two) zones based on the distance (land or sea travel) of each sub-district to the district capital with the following details:

1. Zone 1 is a sub-district which is 150-275 Km from the district center with a sample of 4 villages, namely Betung Village, Kec. North Pamukan, Gunung Batu Besar Village, Kec. Sampanahan, Batuah Village, Kec. West Pamukan, and Sang Sang Village, Kec. Middle Claw.
2. Zone 2 is a sub-district which is 73-125 Km from the district center with a sample of 5 villages, namely North Kerayaan Village, Kec. Pulau Laut Islands, Limbungan Village, Kec. Hampang, Tanjung Pelayar Village, Kec. Tanjung Selayar Sea Island, Magalau Hulu Village, Kec. West Kelumpang, and Sumber Sari Village, Kec. West Sea Island.

3. Total of Respondents

To determine the number of samples in each village that has known population numbers, the Slovin equation (Sugiyono, 2015).

With *Slovin's* calculations obtained 186 respondents consisting of:

1. Sample of villages located in Zone 1 with a population of 123 SR obtained by 94 respondents
2. Sample of villages located in Zone 2 with a population of 120 SR obtained by 92 respondents

Test Questionnaire Instrument

1. Validity Test

The validity test was conducted to determine the extent to which the questionnaire (questionnaire) used was truly valid for measuring quantitative research variables. The validity test in this study uses the Corrected Item Correlation method. Data analysis with this method is done by correlating each item's score with the total score and correlating the overestimated correlation coefficient value. To find out the value of r_{table} is based on the value of df (degree of freedom). For $n = 186$, the value of $df = n - 2 = 184$, at a significance of 5% (95% confidence level or 5% alpha) is known $r_{Table} = 0.144$.

The results of the calculation of validity for the dimensions of performance and importance of SPAM Pamsimas services in Kotabaru Regency with the help of the SPSS program can be seen in Table 1.

Table 1 Ouput Results Validity Test on Performance and Imporance Questionnaire

Variable	rCountingPerformance	rTabel	rCounting Importance	Description
X ₁	0,470	0,144	0,755	Valid
X ₂	0,567	0,144	0,807	Valid
X ₃	0,716	0,144	0,702	Valid
X ₄	0,471	0,144	0,604	Valid
X ₅	0,461	0,144	0,530	Valid
X ₆	0,686	0,144	0,820	Valid
X ₇	0,585	0,144	0,678	Valid
X ₈	0,709	0,144	0,770	Valid
X ₉	0,422	0,144	0,818	Valid
X ₁₀	0,491	0,144	0,772	Valid
X ₁₁	0,390	0,144	0,797	Valid
X ₁₂	0,666	0,144	0,562	Valid
X ₁₃	0,766	0,144	0,574	Valid
X ₁₄	0,513	0,144	0,559	Valid
X ₁₅	0,395	0,144	0,758	Valid

Based on Table 1 above it is seen that the 15 indicators used in the study have a value of $r_{\text{Calculate}} > 0.144$ which means all indicators both in the dimensions of performance and importance are valid.

2. Reliability Test

This test uses *Cronbach's alpha* which is a fairly consistent test. Reliability is concerned with the consistency of data that will assess the consistency of the answer of the question instrument with the data, by measuring whether the same question instrument will produce the same data (consistent). Reliability testing using the help of the SPSS Program obtained the results of calculations as in Table 2.

Table 2 Results of Performance and Importance Reliability Test

Description	Cronbach's Alpha	N of Items
Performance	0,882	15
Importance	0,941	15

Based on Table 2 above, it is seen that the value of the alpha coefficient (*Cronbach's alpha*) > 0.60 so it can be stated that the 15 questions on the performance questionnaire and importance in the study have been reliable (consistent).

Recapitulation of Average Value of Performance and Importance of SPAM Services

After the questionnaire is collected, the respondent's answer on the scale value is tabulated into the table of recapitulation of importance and performance and then calculated the average value, and categorized. The results of the calculation of the average value of each performance dimension (Xi) and the dimension of importance (Yi) can be seen in Table 3.

Table 3 Recapitulation of Average Values Dimensionsof Performance and Importance of Water Services Pamsimas Kotabaru

No.	Variable Indicator	Average (Xi)	Average (Yi)
1	Fulfillment for per-person at least 60 liters / day for bathing, drinking and cooking	4,39	4,69
2	The availability of raw water at the source is always there	3,68	4,67
3	Water received by customers is clear (colorless)	3,69	4,69
4	The water received by the customer does not smell	4,12	4,68

5	Water received by non-tasteless customers	4,26	4,45
6	Water flows smoothly peak hours (morning afternoon)	3,49	4,68
7	Water in the pipe flows 24 hours/day (non-stop)	3,74	4,72
8	The flow in the pipe is not disturbed during the dry season	3,51	4,70
9	Affordable water dues price	4,16	4,74
10	The value of the water fee includes operational, maintenance, depreciation, and development costs	3,40	4,71
11	The manager involves the community in deliberation on the determination/change of water fees	4,46	4,68
12	The manager invites the community to be willing to donate land/land if the pipe is passed	3,47	4,39
13	The manager invites the community to participate in maintaining and caring for the facilities and locations of raw water sources	3,46	4,73
14	Manager is open to suggestions/customer reports related to water conditions and service quality	3,64	4,75
15	The manager urges the community to pay water fees in an orderly manner	4,42	4,69

CSI Satisfaction Index

The calculation of consumer satisfaction rate (CSI) of 186 respondents of home connection customers was 77.19%. More CSI calculations can be seen in Table 4.

Table 4 Results of Costumer Satisfaction Index (CSI) Calculation.

No.	Indicators	MIS	WF (%)	MSS	WS
X1	Fulfillment for per-person at least 60 liters/day for bathing, drinking, cooking	4,69	6,71	4,39	29,47
X2	The availability of raw water at the source is always there	4,67	6,68	3,68	24,59
X3	Water received by customers is clear (colorless)	4,69	6,71	3,69	24,78
X4	The water received by the customer does not smell	4,68	6,69	4,12	27,57
X5	Water received by non-tasteless customers	4,45	6,36	4,26	27,13
X6	Water flows smoothly peak hours (morning afternoon)	4,68	6,69	3,49	23,33
X7	Water in the pipe flows 24 hours/day (non-stop)	4,72	6,74	3,74	25,22
X8	The flow in the pipe is not disturbed during the dry season	4,70	6,72	3,51	23,57
X9	Affordable water dues price	4,74	6,77	4,16	28,14
X10	The value of the water fee includes operational, maintenance, depreciation, and development costs	4,71	6,73	3,40	22,91
X11	The manager involves the community in deliberation on the determination/change of water fees	4,68	6,69	4,46	29,83
X12	The manager invites the community to be willing to donate land/land if the pipe is passed	4,39	6,28	3,47	21,77
X13	The manager invites the community to participate in maintaining and caring for the facilities and locations of raw water sources	4,73	6,75	3,46	23,35
X14	Manager is open to suggestions/customer reports related to water conditions and service quality	4,75	6,79	3,64	24,70
X15	The manager urges the community to pay water fees in an orderly manner	4,69	6,70	4,42	29,61
Total		69,96		WT	385,97

CustomerSatisfactionIndex(CSI)

77,19%(Category: Satisfied)

Description:

MIS=*MeanImportanceScore*

MSS= *Mean SatisfactionScore*

WF =*WeightFactors*

WS =*Weight Score*

WT =*Weight Total*

CSI = *CustomerSatisfactionIndex*

Based on Table 4 above, it can be known that the quality of clean water services pamsimas kotabaru as a whole is in the category of **satisfied**. This indicates that home connection customers are satisfied with the performance of SPAMS managers in 9 sample villages. However, kpsam managers must always pay attention and improve the quality of their services optimally.

IPA analysis

For the analysis of the level of customer interest and clean water service performance of Pamsimas Kotabaru Regency, *importance performance analysis* (IPA) method is used. Before the data is analyzed using an IPA, the total average (*mean*) calculation of each on the dimensions of performance (Xi) and importance (Yi) such as Table 5 is carried out.

Table 5 Average Values of Performance Levels (Xi) and Importance (Yi)

No.	Questions	Xi	Yi
1	Fulfillment for per-person at least 60 liters / day for bathing, drinking and cooking	4,39	4,69
2	The availability of raw water at the source is always there	3,68	4,67
3	Water received by customers is clear (colorless)	3,69	4,69
4	The water received by the customer does not smell	4,12	4,68
5	Water received by non-tasteless customers	4,26	4,45
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11	The manager involves the community in deliberation on the determination/change of water fees	4,46	4,68
12	The manager invites the community to be willing to donate land/land if the pipe is passed	3,47	4,39
13	The manager invites the community to participate in maintaining and caring for the facilities and locations of raw water sources	3,46	4,73
14	Manager is open to suggestions/customer reports related to water conditions and service quality	3,64	4,75
15	The manager urges the community to pay water fees in an orderly manner	4,42	4,69
Total score average performance level ($\sum Xi$)		57,90	
Total score mean importance level ($\sum Yi$)			69,96
The average score of the performance level of all variables (X)		3,86	
The average score of the importance of all variables (Y)			4,66

The result of table 5 calculations obtained the total *mean* value for performance i.e. 3.86 and the total *mean* for the dimensions of importance That's 4.66. Furthermore, the average value per indicator of performance and importance, then explored into the quadrant of Cartesius. The results of the IPA diagram of aspects of performance and importance of clean water services pamsimas Kotabaru regency can be seen in Figure 1.

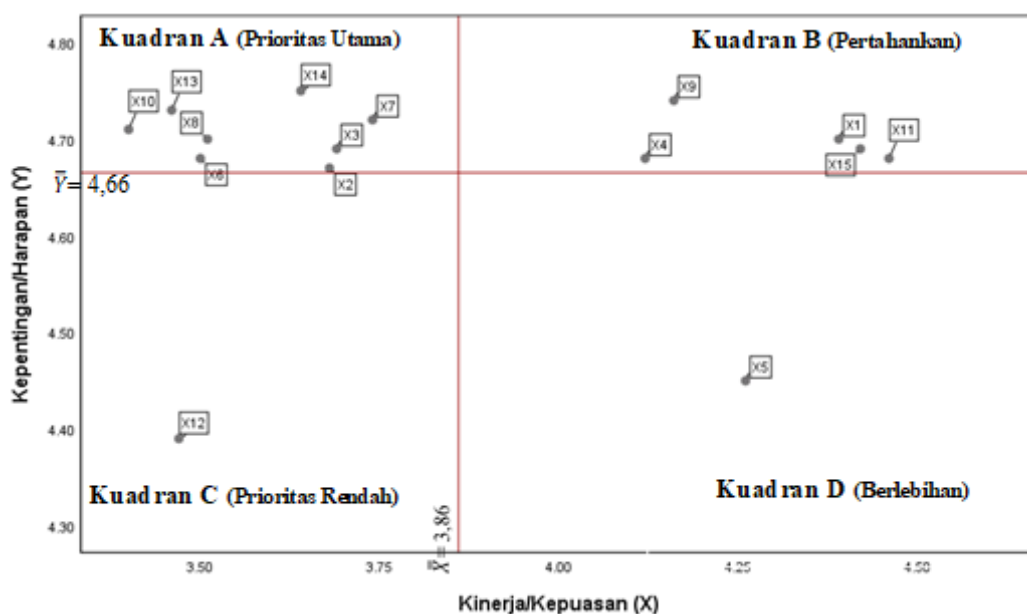


Fig. 1 Diagram of IPA performance and importance of clean water service Pamsimas Kotabaru

From the figure above can be explained each indicator of clean water service classified into quadrant A, quadrant B, quadrant C and quadrant D can be seen in table 6 below.

Table 6 Indicator Mapping Results in the IPA Quadrant

Quadrant	Indicators	Criterion
A	<ol style="list-style-type: none"> X₂ raw water always available; X₃ water clarity; X₆ smoothness at peak hours; X₇ smooth running of water for 24 hours/day; X₈ smooth flow of water in pipes during dry season; X₁₀ contributions that include depreciation and expansion OP costs; X₁₃ the community participates in maintaining and caring for raw water facilities and sources; X₁₄ maintainer is open to customer suggestions/reports. 	Main Priority Utama
B	<ol style="list-style-type: none"> X₁ the adequacy of meeting the needs of 60 liters/person/day; X₄ odor water quality; X₉ affordable fees; X₁₁ the manager involves the community in the water determination deliberation, X₁₅ The manager urges the community to pay water fees in an orderly manner. 	Keep It
C	<ol style="list-style-type: none"> X₁₂ the manager invites the community to be willing to donate land/land if the pipeline is passed 	Low Priority
D	<ol style="list-style-type: none"> X₅ Water received is tasteless 	Overkill

SPAM Service Performance Improvement Approach Strategy

The approach strategy to improve the performance of community-based SPAM services is carried out by conducting interviews with the stakeholders of the Pamsimas program of Kotabaru Regency. The interview was conducted to the program actors, the chairman of the SPAM Association "Saijaan" and the Head of Drinking Water and Environmental Health (AMPL) of the Kotabaru District PUPR Office.

The strategy below is recommended to kpspam managers to overcome / handle variable indicators that are in quadrants A and D, while quadrant B does not need to be handled but nevertheless must still be maintained and maintained performance performance.

Tabel 7 Proposed Strategy to Improve SPAM Service Performance

Quadrant	Indicators	Strategy
A	<ol style="list-style-type: none"> X₂ raw water always available; 	The management involved the village government to look for alternative new water sources that were safe during the dry season and made a proposal for the construction of a reservoir with a larger capacity. For alternative funding, it can be proposed through village fund activities, to the Pamsimas Program, and/or through DAK Water Supply activities at the Regency PUPR Service. The KPSPAM manager with TFM assistance prepares the 100% RKM and ProAksi PJM as a strategic plan document for the sustainability of clean water management at the village level and submits it to the village government so that it can be synchronized during the preparation of the RKP/Village RPJM.
	<ol style="list-style-type: none"> X₃ water clarity; 	The manager whose raw water source has unstable water quality (sometimes cloudy during the rainy season) can create a drinking water treatment unit that can be financed from the village fund, district government and through the Pamsimas program.
	<ol style="list-style-type: none"> X₆ smoothness at peak hours; 	Villages that have not used a house connection in the form of a water meter, so that the manager immediately replaces it with a water meter so that the distribution of water can be controlled according to the water use of each customer.
	<ol style="list-style-type: none"> X₇ smooth running of water for 24 hours/day; 	The flow of water for 24 hours / day is continuously influenced by the supply of raw water from the source to the reservoir tower which is placed at a location higher than the service area. Therefore, the management must always pay attention to the facilities used such as pumps. If you use PLN for energy, you must pay attention to charging vouchers and if you use a generator, you have to pay attention to the operation of diesel fuel and spare parts.
	<ol style="list-style-type: none"> X₈ smooth flow of water in pipes during dry season; 	The smooth flow during the dry season is very dependent on the supply of water from the source to the reservoir, therefore managers must always pay attention to the availability of raw water at the location of the source used.
	<ol style="list-style-type: none"> X₁₀ contributions that include depreciation and expansion OP costs; 	The management with the help of TFM, and the KPSPAM Association in each village to invite the community to return to the deliberation. The KPSPAM manager submits the organization's bookkeeping/cash reports openly so that the public can understand and agree if there will be changes/adjustments to the amount of contributions

	7.	X13 the community participates in maintaining and caring for raw water facilities and sources;	Managers must always provide socialization and invite the community in mutual cooperation activities such as cleaning the location of water sources, draining boreholes, and checking water meters.
	8.	X14 maintainer is open to customer suggestions/reports.	SPAM managers create media for delivering information, suggestions, complaints or customer complaints regarding the condition of water quality and service quality, for example, if there is 4G internet access in the village, they can create groups such as WhatsApp, Facebook, and others, via SMS.
D	1.	X ₅ Water received is tasteless)	Managers still have the obligation to educate the public that fresh water is a natural thing to be accepted by the community. The management can bring Sanitarian officers or STBM Facilitators (Community-Based Total Sanitation) as officers to monitor rural drinking water health by carrying out socialization, counseling, and advocacy activities related to public understanding of the quality of water consumed. So that if the community receives water distribution through the SR that feels salty or brackish, they can submit a complaint to the management. Knowledge about the consumption of drinking water with a taste of chelate or brackish can have a bad impact on human health so it must be socialized to the public. This is an obligation that must be carried out by the manager in terms of fulfilling water quality in terms of clarity, odor and taste, which refers to the provisions on the health of drinking water.

IV. CONCLUSION

Based on the discussions that have been done obtained some conclusions as follows:

1. The value of the customer satisfaction index (CSI) is 77.19% in the 'satisfied' category, meaning that house connection customers are satisfied with almost all performance indicators of Pamsimas clean water services in Kotabaru Regency, although not all of them meet customer expectations.
2. The indicators that need to be prioritized are the variable indicators included in quadrant A and indicators that need to be maintained in quadrant B.
3. The proposed strategy is derived from the mapping of variable indicators that are in quadrants A and D of the IPA diagram.

BIBLIOGRAPHY

- [1]. Algifari. 2019. Mengukur Kualitas Layanan Dengan Indeks Kepuasan, Metode Importance-Performance Analysis (IPA) dan Model Kano. Yogyakarta: Penerbit BPFE-Yogyakarta.
- [2]. BPS Kotabaru. 2020. Kotabaru dalam Angka 2020. Kotabaru: Badan Pusat Statistik. <https://kotabarukab.bps.go.id>
- [3]. Gleick, P. H. 2007. The Human Right to Water Is there a "human right" to water? *Water Policy*, 1(5), 487–503. http://smtp.wecalc.org/reports/human_right_may_07.pdf
- [4]. Prihatin, R. B., Suryani, A. S., Qodriyatun, S. N., Prasetiawan, T., Winurini, S., & Prayitno, U. S. 2015. Penyediaan Air Bersih di Indonesia: Peran Pemerintah, Pemerintah Daerah, Swasta, dan Masyarakat. *Penyediaan Air Bersih Di Indonesia: Peran Pemerintah, Pemerintah Daerah, Swasta, Dan Masyarakat*, 178.
- [5]. Purwanto, E. W. 2020. Pembangunan Akses Air Bersih Pasca Krisis Covid-19. *Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning*, 4(2), 207–214. <https://doi.org/10.36574/jpp.v4i2.111>
- [6]. Pamsimas Kotabaru. 2019. Layanan Informasi dan Pengaduan (LIP) Kabupaten Kotabaru Tahun 2019.
- [7]. Sekretariat Pamsimas. 2016 Buku Pedoman Umum Pamsimas. Jakarta.
- [8]. Sekretariat Pamsimas. 2015. Buku Petunjuk Teknis Pengoperasian dan Pemeliharaan di Tingkat Masyarakat. Jakarta.
- [9]. Sistem Informasi Manajemen Pamsimas. 2020, Laporan Kinerja KP-SPAMS Perdesaan Kabupaten Kotabaru Tahun 2008-2020. http://sim3.pamsimas.org/imisdev/public/?m=modul_73
- [10]. Sugiyono. 2015, Metode Penelitian Pendidikan. Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: PenerbitAlfabeta
- [11]. Trenggono, F. C., & Wahyono, H. 2017. Persepsi Masyarakat Mengenai Kinerja Pelayanan PAMSIMAS di Kota Semarang. *Jurnal Pembangunan Wilayah & Kota*, 13(4), 411. <https://doi.org/10.14710/pwk.v13i4.18261>
- [12]. Yuliani, Y., & Rahdriawan, M. 2015. Kinerja Pelayanan Air Bersih Masyarakat Di Kelurahan Tugurejo Kota Semarang. *Jurnal Pengembangan Kota*

Arifin. "Analysis of Clean Water Service Performance of the Kotabaru Pamsimas Program." *American Journal of Engineering Research (AJER)*, vol. 10(9), 2021, pp. 39-46.