

Evaluation of Drinking Water Service Achievement in Tanah Bumbu Regency, South Kalimantan

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ABSTRACT

The issues with drinking water services in Tanah Bumbu Regency include the fact that service levels have not yet reached 100% adequacy and 15% safety as outlined in the RPJMN 2024, and the level of water loss remains high. The research aims to evaluate the achievement of drinking water services in Tanah Bumbu Regency, South Kalimantan Province. The study was conducted in Tanah Bumbu Regency, South Kalimantan Province. Sampling for community respondents utilized purposive sampling methods. Sampling for PTAM respondents employed purposive sampling methods, with 11 employees selected from the organizational structure of the office (head of general affairs and personnel; head of technical affairs; and head of each IKK unit). The evaluation results regarding the management of drinking water services in Tanah Bumbu Regency in terms of the 4K aspects (Quality, Quantity, Continuity, and Affordability) indicate that the quality aspect is still suboptimal due to limited funding for health department inspections, resulting in limited water sample collection at household connections. Regarding Quantity, the provision of drinking water services is prioritized in urban areas, while in rural areas, the operator (PTAM Tanah Bumbu) has not been able to meet the needs of the entire population of Tanah Bumbu Regency,

both urban and rural, due to production capacity constraints.

Keywords: Evaluation, Drinking water, Tanah Bumbu

INTRODUCTION

The need for clean water is crucial to support social and economic activities. In order to achieve the Sustainable Development Goals (SDGs) 2030, particularly Goal 6 on Clean Water and Sanitation, the Indonesian Government has targeted to provide 100% access to safe drinking water (including 15% access to safe drinking water) within the National Medium-Term Development Plan (RPJMN) 2020-2024 to promote housing, drinking water, and sanitation in accordance with the mandate of the 1945 Constitution in Article 28 H and Law No. 1 of 2011.

Efforts to achieve the target coverage of drinking water services as outlined in the RPJMN 2020-2024 include improving the coverage of water supply system services (SPAM) per district/city and increasing coverage through Regional SPAM (across district/city regions). The coverage of drinking water services in South Kalimantan Province in 2022 only reached 81.37%, still below the target. There are several sources to obtain clean water, including piped networks (JP) and non-piped networks (BJP).

Tanah Bumbu Regency is one of the regencies in South Kalimantan Province, covering approximately 5,066.96 km² (506,696 ha) or about 13.56% of the area of South Kalimantan Province. Geographically, Tanah Bumbu Regency is located between 2° 52' - 3° 47' South Latitude and 115° 15' - 116° 04' East Longitude. Tanah Bumbu Regency is one of the 13 regencies/cities in South Kalimantan Province located at the southeastern tip of Borneo Island. The regency, with its capital Batulicin, has 8 Sub-District Water Supply Installations (IKK) and 1 Basic Need Approach (BNA).

Tanah Bumbu Regency achieved existing access to drinking water of 82.32% in 2022, with 17.68% of households still not served. The JP SPAM in Tanah Bumbu Regency is managed by PTAM Bersujud, established in 2006 with continuously improving services each year. However, the current condition of service provision is still uneven.

Some of the issues with drinking water services in Tanah Bumbu Regency include the fact that service levels have not yet reached 100% adequacy and 15% safety as per the RPJMN 2024 targets, and the rate of water loss is still high. Based on these issues, strategies are needed for providing access to safe and sustainable drinking water infrastructure, including technical, institutional, and community aspects.

Therefore, an evaluation of the ongoing drinking water services is necessary. Through this research, the problems occurring in drinking water services in Tanah Bumbu Regency can be identified. This study is expected to serve as a basis for the government to accelerate access to safe and adequate drinking water in Tanah Bumbu Regency, South Kalimantan.

MATERIALS & METHODS

Place of Research

The research was conducted in Tanah Bumbu Regency, South Kalimantan.

Sample

Sampling for community respondents was done using purposive sampling method. Sampling for PTAM respondents was also done using purposive sampling method, where 11 employees from the organizational structure of the office were selected (including heads of the general and personnel department, heads of the technical department, and heads of each IKK unit).

Data Analysis

Evaluation of Drinking Water Services

The evaluation is conducted through questionnaire interviews with the community of Tanah Bumbu Regency and the PAM Bersujud Agency. Subsequently, statistical analysis is performed using the Likert method. In this research, the scoring of answers utilizes a rating scale of 1-5. For quantitative analysis purposes, the answers can be scored as follows:

Agree/Always/Very Positive (score 5)

Agree/Often/Positive (score 4)

Neutral/Sometimes (score 3)

Disagree/Hardly ever/Negative (score 2)

Strongly Disagree/Never (score 1)

Below are the criteria for interpreting scores based on intervals:

Score 0%-20% = Very Poor

Score >20%-40% = Poor

Score >40%-60% = Fair

Score >60%-80% = Good

Score >80%-100% = Excellent

RESULT

The Condition of Drinking Water Services in Terms of 4K

Improving the efficiency and effectiveness of drinking water services to the community requires consideration of the 4K aspects. These aspects are based on the current condition of drinking water services in Indonesia, which is still inadequate. The issues faced include the safety of drinking water in terms of quality, where the water is suitable for consumption but not yet considered safe. This is indicated by field observations, where the relevant authorities,

such as the Health Department, have not conducted regular and consistent water quality checks. Therefore, it cannot be categorized as meeting expectations.

The quantity aspect is still insufficient to meet the needs of the community, partly due to the very high water loss. Continuity is not provided to the community as a whole for 24 hours. PTAM only serves urban areas for 24 hours. The affordability level refers to the ability of the community to pay for water at the prices set by the local government regulations, which still requires attention from the local government because the set prices do not correspond to the services provided by PTAM. On the other hand,

PTAM is still burdened with high production costs, resulting in selling prices below production costs.

The Drinking Water Supply System (SPAM) in the Tanah Bumbu area is divided into two, originating from PTAM Bersujud and Rural SPAM. This research is conducted using a survey in the form of a questionnaire. Respondents are selected from PTAM customers served by BNA Batulicin and IKK Kusan Hulu, comprising 4 districts. Thus, a total of 100 customer samples and 11 PTAM employees are obtained as respondents. The research, aimed at measuring the level of service, is assessed using a Likert scale.

Table 1. Results of questionnaires to community respondents

No	Questions	Score
1	How is the overall quality of water you obtain from PTAM?	92,4%
2	What is the availability level of water during the dry season?	93%
3	What is the level of cleanliness and clarity of the water provided by PTAM?	89%
4	Do you think the water provided by PTAM is suitable for consumption?	91,6%
5	Is water from PTAM always available at all times?	92,2%
6	In your opinion, are the water tariff rates set by PTAM appropriate?	82,6%
7	Is the service provided by PTAM in line with your expectations?	82,4%
8	Do you agree that PTAM should further improve its services?	97,8%
	Total Score	91,28% (Excellent)

Table 2. Results of Questionnaires to Employee Respondents PTAM

No	Questions	Score
1	Can the raw water source meet the customers' needs?	81,81%
2	Is the sold water regularly checked?	69,09%
3	Are the building and operational conditions of the technical unit in good shape?	94,54%
4	Is the water loss rate in the field significant?	58,18%
5	Are the number of employees at PTAM proportional to the number of customers served?	58,18
6	Does the selling price tariff of PTAM meet full cost recovery (FCR)?	40%
7	What is the trend in the number of PTAM users?	87,27%
	Total Score	52,39% (Fair)

Quality Aspect of PTAM Bersujud Raw Water Unit

The raw water source utilized by PTAM Bersujud is derived from 3 (three) watersheds and 2 (two) rivers within the Tanah Bumbu Regency area, namely Satui Watershed, Kusan Watershed, Batulicin Watershed, Sebamban River, and Setarap River. Surface water is the primary source of raw water utilized. Extraction is facilitated through tapping pipes employing a transmission distribution system utilizing pumping. The diameter of the transmission pipes varies between 8 inches to 12 inches, constructed from HDPE material.

The raw water source undergoes prior testing in the Environmental Laboratory of the Tanah Bumbu Environmental Agency in accordance with the quality standards stipulated in the Minister of Health of the Republic of Indonesia Regulation Number 492/MENKES/Per/IV/2010 regarding Drinking Water Quality Requirements. Moreover, the Government has recently issued a new regulation through Minister of Health of the Republic of Indonesia Regulation Number 2 of 2023.

From the analysis of water quality in the Tanah Bumbu Regency area, encompassing the Satui, Kusan, and Batulicin watersheds, as well as the Sebamban and Setarap rivers,

the concentration of water quality parameters falls below the required standards, as stipulated. Additionally, there are levels of E-Coli and Total Coliform exceeding the prescribed standards. The high levels of these parameters render the drinking water in Tanah Bumbu Regency still unfit and unsafe, necessitating more optimal treatment. This situation arises due to ongoing activities of residents disposing domestic waste directly into the rivers.

The quality of raw water is under the supervision of the Tanah Bumbu Health Department (externally) and PTAM Bersujud as the water supply provider (internally). It is hoped that with the preservation of water quality, the overall health status of the community can be enhanced.

The Quantity Aspect of PTAM Bersujud With the growing population, the demand for water is increasing. The sufficiency of water quantity for the community's needs is measured according to the standards set forth in Minister of Public Works and Public Housing Regulation No. 29 of 2018 regarding Minimum Service Standards, which is set at 10 m³/household/month or 60 liters/person/day. From the number of household connections served by PTAM, after examining payment records, the average drinking water usage by the community ranges from 60-80 liters/person/day. However, the planned increase in service connections is still hindered by PTAM's water production reserves, which are affected by a persistently high percentage of water loss in the production system.

Table 3. Production and distribution produced by PTAM Bersujud during the last 5 years.

Annual Report	Water Production (m ³)	Water Distribution (m ³)	Water Sold (m ³)
2019	9.978.605	9.385.947	7.163.720
2020	11.047.291	10.564.623	8.316.327
2021	13.232.005	12.588.381	9.217.725
2022	14.019.050	13.166.553	10.082.623
2023	14.727.364	14.153.291	10.885.571

Production Unit

The processing system in the production unit at BNA and IKK in PTAM Bersujud consists of a conventional Water Treatment Plant (WTP) with complete treatment types, including intake, pre-sedimentation tank,

coagulation-flocculation tank, sedimentation tank, filtration, disinfection, reservoir, distribution pump, and distribution network. PTAM Bersujud has 2 WTPs which supply 1 BNA and 8 IKK with capacities as listed in the following table.

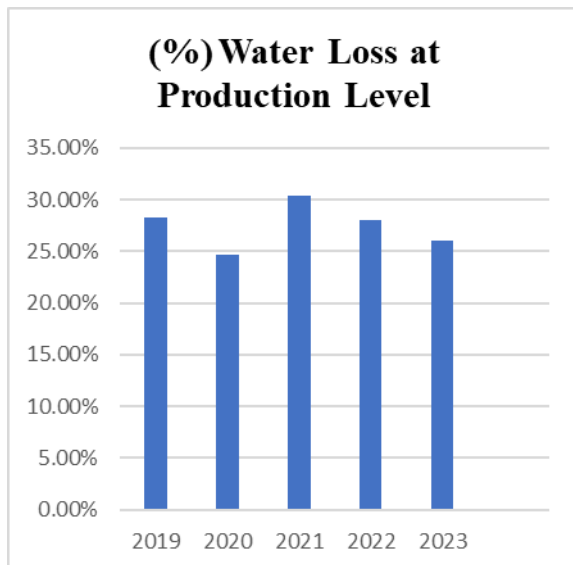
Table 4. IPA production capacity

No	IPA	Installed Capacity (L/sec)	Production Capacity (L/sec)
1	Karang Bintang	80	65
	Processing Unit 1	10	10
	Processing Unit 2	20	20
	Processing Unit 3	50	35
2	Sarigadung	260	240
	Processing Unit 1	50	45
	Processing Unit 2	50	45
	Processing Unit 3	50	45
	Processing Unit 4	30	30
	Processing Unit 5	30	30
	Processing Unit 6	50	45

One of the issues in the production unit, particularly at IKK Satui, for services in the Satui District during heavy rainy seasons is the risk of inundation or flooding, rendering it non-functional. Water loss in PTAM

Bersujud's production system for the entire IPA over the last 5 years from 2019-2023 amounted to 28.21%, 24.72%, 30.34%, 28.08%, and 26.09% respectively. Water loss in the overall IPA is partly due to issues

related to machines' age exceeding 10 years. The target for water loss in the production system is 0%; however, in reality, achieving this is challenging.

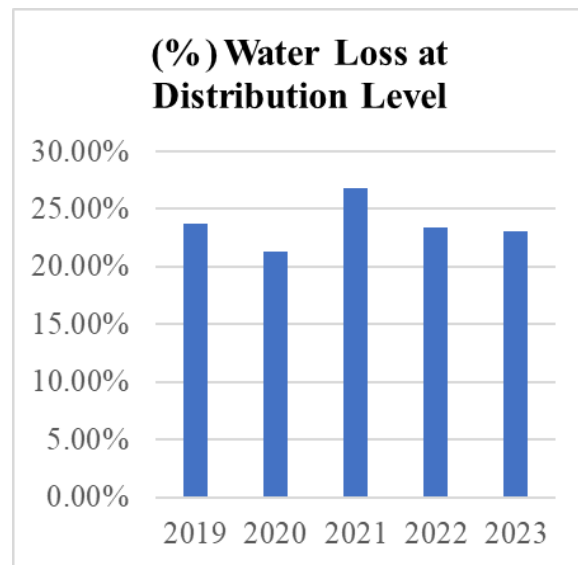


Graph 1. Production level water loss

Distribution unit

The reservoir is a structure for storing drinking water before distribution to customers or the public, which can be placed underground or above ground in the form of towers. The diameter of distribution pipes varies from 50mm to 400mm with materials made of PVC. Water loss in PTAM Bersujud's distribution system over the last 5 years from 2019-2023 amounted to 23.68%, 21.28%, 26.78%, 23.42%, and 23.09%, respectively. The target for water loss in the distribution system is 0%; however, in reality, achieving this is challenging. The distribution unit currently provides services to up to 87%. However, the loss in the distribution system occurs due to limited existing distribution pipeline networks, limited capacity of distribution pumps to deliver water to customers, as the pumps are quite old, the main distribution pipeline network, which mostly lacks master meters, and errors in water meter readings (human error) and water theft. Water lost due to NRW results in the loss of potential revenue from drinking water. Pipe leakage poses a threat of microbiological and physical contamination into customers'

drinking water pipes (Ministry of Public Works and Public Housing, 2022).



Graph 2. Distribution level water loss

Continuity Aspects of PTAM Prostrate

PTAM Bersujud has yet to implement 24-hour service, as required by Minister of Public Works and Public Housing Regulation Number 27 of 2016 regarding the Provision of Drinking Water Supply Systems. Hence, it can be said that the service provided to its customers still requires improvement. The hope is that with uninterrupted water supply for 24 hours, it can assist the community in accessing water. Currently, the total service reaches 665 l/d with 13 serviced districts. There is high enthusiasm among residents to use water from PTAM, but this enthusiasm is not matched by the available human resources. Challenges faced by PTAM Bersujud include the current workforce lacking adequate skills for their respective fields, insufficient training to enhance quality and skills, and the need for an increase in the quantity or number of employees.

Affordability Aspects of PTAM Bersujud

In the past 5 years, PTAM Bersujud has not achieved Full Cost Recovery (FCR), meaning that all operational costs have not been covered by water revenue, resulting in a negative difference between the average

tariff and the Actual Cost Price (ACP), thus still requiring assistance from the Central Government. Currently, the clean water tariff is Rp. 31,000/10 m³. From interviews conducted, there are still community members who object to this tariff.

The FCR tariff is implemented to cover operational costs. Operational costs are expenses that must be incurred by the Regional Drinking Water Company (BUMD Air Minum) for managing the SPAM (from raw water to customer connections). Ideal tariff conditions and healthy finances enable BUMD Air Minum to invest independently and/or attract other parties to collaborate on improving the 3K services and developing SPAM (Ministry of Public Works and Public Housing, 2022).

The habit of indiscriminate defecation is one of the main factors hindering access to safe drinking water. Safe drinking water is household water that has undergone processing stages or is untreated but meets health standards and can be consumed directly. Access to safe drinking water is a source of drinking water originating from protected springs, but does not include packaged or refill water because it still needs to be checked again (Pokja PPAS, 2022).

Rural SPAM Pipe Network

SPAM Perdesaan's pipeline network is managed by Community Groups in a program known as PAMSIMAS. Community-managed PAMSIMAS systems only serve a portion of the population in each village (one system for one neighborhood). In remote areas like the Kusan Hulu District, some residents prefer using PAMSIMAS over the services provided by PTAM. Besides the affordable tariff, which is only Rp. 2,000/m³, residents cite better water quality compared to water sold by PTAM as another reason for choosing PAMSIMAS. However, some residents still hope for services from PTAM, but the pipeline network has not reached their area yet.

A water supply system can be considered sustainable if it functions and is utilized. It should provide benefits that meet the 4K criteria (quality, quantity, continuity, and affordability). According to Ministerial Regulation No. 27 of 2016 regarding the Provision of Drinking Water Supply Systems (SPAM), evaluation is one of the stages in the SPAM provision process. The evaluation of SPAM implementation activities includes technical, institutional, and drinking water service evaluations, which are conducted periodically. Through evaluation, recommendations and policies can be formulated to improve the performance of SPAM provision.

Not a Pipeline Network

According to the Regulation of the Minister of Public Works and Public Housing Number 27/PRT/M/2016 concerning the Provision of Drinking Water Supply Systems, the types of Non-Piped Water Supply Systems (BJP) include shallow wells, pump wells, rainwater reservoirs, water terminals, and spring catchment structures. Some residents in the Kusan Hulu District still utilize wells in their homes for daily activities. However, based on observations, most of the dug wells owned by residents are not suitable. This is indicated by the lack of concrete flooring, no cementing, and absence of rings.

Nevertheless, the community's behavior towards safe and clean drinking water is good. This is because the community treats the water obtained from wells before using it, one of which is by adding alum to the storage for one day before use for daily activities.

Krisdhianto, A., and Emenda S. (2016) conducted an evaluation of the sustainability of rural clean water supply systems in the Ledokombo District of Jember Regency, East Java Province. Through quantitative analysis, observation, questionnaires, documentation, and interviews, the study revealed that variables such as community, technical aspects, financing, and institutions exhibited strong correlations in measuring

the sustainability of clean water supply systems. However, the environmental variable showed relatively insignificant correlation.

Marcella, A., & Parjiyana (2018) analyzed public services in the Regional Drinking Water Company (PDAM) Tirta Indra in Indragiri Hulu Regency. The study employed descriptive quantitative methods, determining that the public service at PDAM Tirta Indra falls within the "fairly good" rating interval. The recommendation proposed emphasizes the necessity for PDAM to enhance the quality of services provided to customers.

Saputra Ardian (2021) evaluated the Community-Based Drinking Water and Sanitation Program in the Bengkalis District. Utilizing quantitative methods, observation, and questionnaires, the study found that the management bodies, such as the government and the Drinking Water Management Agency (BPSPAM), played effective roles. Moreover, the availability of supporting infrastructure for the program received a high score, indicating the effectiveness of community involvement. Consequently, the overall effectiveness of the Pamsimas program in the Bengkalis District scored 72.91, denoting its efficient implementation.

Kamulyan (2018) conducted an evaluation of the sustainability of Community-Based Drinking Water Supply Management in Blitar City. Employing quantitative methods, observation, and interviews, the assessment showed sustainable outcomes in technical, institutional, financial, and social aspects, with the environmental aspect demonstrating highly sustainable results. The study highlighted the significance of community contributions to the management of community-based drinking water systems and identified areas for further development, including transparency in management, community engagement, optimization of pump and reservoir performance, regulatory improvements, expanded service coverage, and appropriate

fee setting for operational maintenance needs.

CONCLUSION

The evaluation results of water service management in Tanah District, when viewed from the perspective of the 4 Ks (Quality, Quantity, Continuity, and Affordability), indicate several areas needing improvement. Regarding Quality, it's still not optimal due to limitations in funding for inspections by the Health Department, resulting in limited water samples taken from household connections. Regarding Quantity, priority is given to water supply fulfillment in urban areas. However, for rural areas, the operator (PTAM Tanah Bumbu) is unable to meet the needs of the entire population of Tanah Bumbu District, both urban and rural, due to production capacity limitations. Continuity is also suboptimal. Based on my observations, service hours range from 18 to 22 hours per day, which still falls short of the expectation of round-the-clock service. Affordability also requires attention. According to interviews, especially with low-income respondents, they still perceive the price (tariff) of PTAM services as high.

Declaration by Authors

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