

EVALUATION OF POLICIES TO IMPROVE CLEAN WATER SERVICES BY THE TIRTA BENTENG REGIONAL PUBLIC UTILITY COMPANY TANGERANG CITY

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ABSTRACT

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Clean water access is a fundamental need that significantly affects public health and quality of life, making Perumda Tirta Benteng Tangerang City responsible for providing reliable water services. This study evaluates the clean water service improvement policy by examining effectiveness, supporting and inhibiting factors, and public satisfaction. A descriptive qualitative approach was employed using interviews, observation, and documentation. The findings indicate that policy effectiveness remains suboptimal due to aging infrastructure, limited technical human resources, and weak inter-agency coordination. Digital complaint services support improvements, yet technical distribution issues remain dominant barriers. Public satisfaction varies across service areas. This study recommends accelerating pipe network rejuvenation, strengthening technical capacity, improving transparency, and enhancing inter-agency collaboration.

1. INTRODUCTION

As a basic need that determines quality of life and public health, the provision of clean water is a top priority for public services (Djana, 2023; Sholahuddin & Rodhi, 2024) and is closely linked to socio-economic productivity through its impact on household activities, industrial operations, and urban environmental resilience (United Nations, 2023). Access to clean water is a crucial indicator of the success of sustainable development and a primary target within the Sustainable Development Goals (SDGs), particularly Goal 6 on sanitation and clean water (United Nations, 2023), making its fulfillment a global priority.

As a strategic public service, the provision of clean water in Indonesia is a local government obligation aligned with the principles of basic public service governance, carried out through Regionally Owned Enterprises (BUMDs) as the entities responsible for production and distribution to the public (Enhancing BUMD Organizational Performance Toward Sustainable Development, 2025), and reflects the institution's effectiveness in fulfilling its mandate oriented toward the public interest (Dwiyanto, 2018).

As an urban area with rapid population growth and economic activity, the City of Tangerang faces critical challenges in meeting clean water needs due to urbanization, residential expansion, and industrial growth that are not matched by adequate distribution capacity or water treatment facilities (World Bank, 2020), thereby compelling service providers to strengthen infrastructure and improve service quality to address the surge in public demand (Asian Development Bank [ADB], 2021).

The Regional Public Enterprise (Perumda) Tirta Benteng of Tangerang City, as one of the regional-owned enterprises (BUMD) providing clean water services, faces various operational challenges, including unstable water pressure, recurring distribution disruptions, and slow responses to public complaints, reflecting complex challenges encompassing production capacity, distribution network resilience, and the effectiveness of the customer service system (Antara News Banten, 2026).

Issues with clean water services frequently occur in various regions across Indonesia, as demonstrated by Hijrah et al. (2024), who indicate that customer satisfaction with PDAM is influenced by service continuity, water quality, and the speed of response to service disruptions. This is reinforced by Hasibuan's (2022) findings regarding service quality barriers stemming from limited network infrastructure, weak operational SOPs, and insufficient training and human resource development, thereby underscoring the need for service improvement policies that are not merely administrative but also technical and managerial.

The effectiveness of public service policies cannot be measured merely by the existence of programs or innovations but must be assessed based on outcomes directly experienced by the public. As noted by Dunn (2018), policy evaluation is necessary to measure effectiveness, efficiency, responsiveness, and the equitable distribution of policy impacts. Policy evaluation in clean water services is crucial because water is a basic need; disruptions to it have adverse effects on public health, social stability, and the economic burden on households (WHO, 2022).

Digital transformation is now a key strategy in public services to enhance efficiency and transparency, as evidenced by the findings of Alfarizi and Hasbullah (2025) and Irawan, Putra, and Darmawi (2025), who found that the implementation of the Simayang service application at Perumdam Tirta Mayang in Jambi City accelerated service processes, strengthened digital documentation, and improved customer satisfaction. Digital transformation in the public sector is not merely about adopting technology but involves changing processes and work culture to achieve faster, more cost-effective, and accountable services, as emphasized by Badruddin et al. (2022) and reinforced by the OECD (2020), which underscores the need to strengthen institutional frameworks and human resource capacity so that technology does not merely serve as a symbol of innovation.

Perumda Tirta Benteng has implemented digital innovation through the SiGanteng app as a platform for complaints and customer information services, which, according to Silalahi and Wahyudi (2024) and Hilwa et al. (2025), contributes to improving service access, enhancing transparency, and accelerating communication; however, Putri (2023) asserts that its effectiveness remains dependent on operational follow-up in the field, as digitalization does not automatically resolve distribution issues while physical infrastructure remains problematic.

The implementation of policies to improve clean water services is heavily influenced by the physical, social, cultural, and economic context; thus, a policy's inability to adapt to these local conditions risks implementation failure, as explained in Administrative Ecology (2024). Bureaucratic reform in public services is often hindered by organizational culture, resistance to change, and institutional capacity constraints; thus, policies to improve clean water services require robust implementation strategies rather than merely formal regulations (Leading Bureaucratic Reform, 2020).

Public satisfaction serves as a crucial indicator in evaluating public services because it reflects the alignment between user expectations and actual performance, as emphasized by Kotler and Keller (2016), who state that customer satisfaction arises when service quality meets or exceeds expectations. In clean water services, customer satisfaction is determined by water quality, pressure stability, distribution continuity, response speed to disruptions, transparency of billing information, as well as service quality and customer trust factors that are dominant in building public loyalty toward service providers.

Safe and sustainable clean water management requires a participatory approach rooted in local wisdom, as demonstrated by Kusnanik and Burhan (2025), who noted that water treatment projects are more successful when technology is co-designed with the community to suit local conditions and be easy to maintain, and further emphasized by Sustainable Governance (2025) that water governance must involve local communities because social and cultural aspects influence the success of policies.

Based on the above discussion, the policy to improve clean water services by Perumda Tirta Benteng in Tangerang City needs to be systematically evaluated to measure the effectiveness of its implementation, supporting factors, inhibiting factors, and the level of satisfaction among the public as service recipients. This is to ensure that the policy does not merely produce program outputs but also yields outcomes in the form of improved service quality as

perceived by the public (Dunn, 2018; Surya & Sihombing, 2023); thus, this study focuses on evaluating the policy.

This study contributes to the public administration literature by integrating policy evaluation, digital governance, and public service effectiveness within the context of urban clean water management. Unlike previous studies that mainly focused on service quality or technical infrastructure, this research emphasizes the interaction between digital transformation, organizational readiness, and public satisfaction in local public utilities.

This study formulates research questions regarding the effectiveness of clean water service improvements by Perumda Tirta Benteng in Tangerang City, the supporting and hindering factors in these service improvements, and the public's perception of satisfaction with the services provided. The aim is to evaluate the policy through an analysis of effectiveness, identification of supporting and hindering factors, and an assessment of public satisfaction.

Conceptual Framework

This study integrates four interrelated concepts: digital transformation, organizational culture, service effectiveness, and public satisfaction. Digital transformation (e.g., the SiGanteng app and SCADA monitoring) serves as a policy input that improves service access, transparency, and communication between provider and customers; however, its impact on service outcomes depends on organizational readiness and work culture (Mergel et al., 2019; OECD, 2020). Organizational culture encompassing institutional readiness, leadership, operational procedures, and human-resource competencies mediates the extent to which technology is leveraged to accelerate operational follow-up and coordination. Service effectiveness is the immediate output measured by distribution continuity, water-pressure stability, water quality, and responsiveness to disruptions (Dunn, 2018; Steers, 2013). Public satisfaction is the ultimate outcome reflecting users' experience of service quality (Kotler & Keller, 2016) and is influenced directly by service effectiveness and indirectly by digital transformation (via improved communication) and organizational culture (via the quality of operational follow-up). In short, the proposed causal chain is: digital transformation, mediated by organizational culture, leads to service effectiveness, which in turn leads to public satisfaction, with contextual factors (physical infrastructure, pipe network conditions, staffing, and inter-agency coordination) acting as moderators that can strengthen or weaken these relationships.

2. METHODS

This study employs a descriptive qualitative approach to gain an in-depth understanding of the implementation of the clean water service improvement policy by Perumda Tirta Benteng in Tangerang City and its impact on the community. A qualitative method was chosen to emphasize an understanding of the context, informants' experiences, and policy processes that cannot be fully explained through quantitative data (Miles et al., 2014), and a descriptive method to present policy phenomena systematically and factually as they occur in the field.

This study was conducted within the service area of Perumda Tirta Benteng in Tangerang City, covering both the city center and outlying areas that represent disparities in water distribution quality, taking into account the dynamics

of rapid urban growth that make clean water supply a strategic issue in local public services (ADB, 2021), and positioning Perumda Tirta Benteng as the primary institution providing clean water to the local community.

Data collection techniques included in-depth interviews to gather information regarding policy implementation, operational challenges, and public satisfaction perceptions; field observations to assess the condition of water distribution infrastructure, such as pipeline networks, treatment facilities, and service quality at specific points; and documentation as supporting data sources, including internal reports, policy documents, media publications, and scientific references related to clean water services.

This study involved five informants selected through purposive sampling based on relevance to the research objectives, namely operational staff and field technicians from Perumda Tirta Benteng, officials from relevant government agencies, and customers in both the city center and outlying areas, to ensure a variety of perspectives between service providers and recipients.

Data analysis was conducted using the Miles, Huberman, and Saldaña (2014) model, which includes data reduction, data presentation, and drawing conclusions. Interview and observation data were then classified based on themes of policy effectiveness, enabling and hindering factors, and public satisfaction, and analyzed thematically to identify patterns and the meaning of field findings.

Data validity was ensured through source triangulation by comparing information from Perumda employees and customer communities, and through technical triangulation by comparing results from interviews, observations, and documentation, ensuring that the data obtained is valid and reliable.

3. RESULTS AND DISCUSSION

Effectiveness of Clean Water Service Improvements by Perumda Tirta Benteng, Tangerang City

The effectiveness of the clean water service improvement policies implemented by Perumda Tirta Benteng in Tangerang City has not yet reached an optimal level, as evidenced by public complaints regarding low water pressure, unstable water quality, and slow response times to service disruptions in certain service areas. The success of public services is not merely measured by the presence of programs or innovations, but by the extent to which the benefits of the services are felt by the public. This is because, despite the construction of networks and the implementation of digital monitoring systems, distribution disruptions continue to occur and affect customer satisfaction within the Perumda Tirta Benteng service area (Antara News Banten, 2026).

Figure 1. Director General of Perumda Tirta Benteng, Doddy Effendi (left), and Acting Mayor of Tangerang Nurdin (right) while monitoring the readiness of the Sitanala Water Treatment Plant.



Source: Antara News Banten, 2026.

From a public policy evaluation perspective, effectiveness is measured by the degree to which objectives are achieved and the alignment of outputs and outcomes produced, as explained by Dunn (2018), who states that a policy is considered effective if it can reduce the underlying issues that led to its creation. Thus, in clean water services, effectiveness is reflected through the continuity of distribution, stability of water pressure, adherence to quality standards, and the organization's responsiveness to disruptions (Steers, 2013). However, based on field findings, Perumda Tirta Benteng, despite having implemented various improvement efforts, has yet to achieve uniform stability in water distribution.

Research findings indicate that water distribution in the city center is relatively more stable than in outlying areas, reflecting disparities in service equity due to differences in distribution distance, pipeline capacity, and uneven network conditions. According to the World Bank (2020), developing cities often face water distribution challenges due to rapid population growth and the imbalance between network capacity and public demand; therefore, the effectiveness of service improvement policies must be evaluated not only based on implemented development programs but also in terms of the equitable distribution of outcomes.

Perumda Tirta Benteng has developed a technology-based innovation strategy through the implementation of the SiGanteng app as a customer complaint platform, part of a smart governance strategy to improve public services. According to Hilwa et al. (2025), this approach accelerates service access, improves complaint response times, and enhances service transparency, demonstrating tangible adaptation to technological advancements in public service delivery.

Figure 2. Perumda Tirta Benteng introduces the SiGanteng application at the Tangerang Digital Festival Vol. 2.



Source: www.tangerangkota.go.id, 2026

These various innovations have not yet fully resolved on-the-ground water distribution issues, such as recurring disruptions, pressure drops, and inconsistent water quality, indicating the limited impact of these policies. As emphasized by Putri (2023), while the SiGanteng app does simplify the submission of customer complaints, service effectiveness still depends on prompt and appropriate operational follow-up, so digitalization has not yet been able to address technical issues in the water distribution network.

In the literature on digital transformation, technology is viewed as a tool for service improvement, the success of which heavily depends on organizational readiness and operational capacity, as explained by Mergel et al. (2019), who note that digital transformation in the public sector requires organizational cultural change, system improvements, and the strengthening of human resource competencies. The OECD (2020) emphasizes that digital government is not merely application-oriented but focuses on data integration, monitoring systems, and rapid, information-based decision-making. Thus, in the context of Perumda Tirta Benteng, the SiGanteng application can improve customer communication but is insufficient to address structural damage to the pipeline network.

Disruptions in clean water distribution in Tangerang City in early 2026, affecting 30,000 customers due to the interconnection process of the main pipeline network, highlight the service's reliance on technical readiness and operational field capacity, which are hindered by aging pipeline conditions. Consequently, digital innovations and smart governance approaches must be supported by comprehensive improvements to physical infrastructure (Antara News Banten, 2026; Hilwa et al., 2025; Putri, 2023).

Figure 3. The process of repairing the Main Distribution Network (MDN) pipeline owned by Perumda Tirta Benteng on K.S. Tubun Street, Koang Jaya, Karawaci, Tangerang City.



Source: Public Relations Office of Perumda Tirta Benteng, Tangerang City. 2026

In an infrastructure asset management approach, water distribution networks require a structured strategy that includes leak mapping, pipe replacement prioritization, and network damage risk assessment (Alegre et al., 2016), so that if pipes exceed their technical lifespan, distribution disruptions will continue to occur and weaken service effectiveness, confirming that the primary obstacle to the effectiveness of Perumda Tirta Benteng's services lies not in a lack of administrative innovation, but in technical issues with the distribution network.

The overall effectiveness of policies to improve clean water services at Perumda Tirta Benteng has not yet been maximized, because although pipe rehabilitation and the digitization of complaint handling have shown progress, these efforts have not yet fully resulted in stable and equitable distribution therefore, strengthening is required through accelerated network rehabilitation and enhanced operational capacity.

Supporting and Hindering Factors for Clean Water Service Improvement

The implementation of clean water service improvements at Perumda Tirta Benteng faces obstacles related to infrastructure, human resource capacity, and inter-agency coordination, which result in unstable distribution, inconsistent water quality, and uneven responses to service disruptions; however, the company has sought to make improvements through the digitization of complaint services, phased network upgrades, optimization of water treatment facilities, and customer education to ensure faster reporting of disruptions.

Digital innovations in the form of a customer complaint app have been a key enabler in improving public access to submitting complaints without having to visit service offices in person, strengthening the relationship between Perumda Tirta Benteng and the community through the SiGanteng communication platform, and, as emphasized by Alfarizi and Hasbullah (2025), enhancing service process efficiency, expediting administrative processing, and increasing customer satisfaction.

Supporting factors for improving PDAM services include a phased pipeline renewal program to minimize distribution disruptions caused by leaks or infrastructure damage, system improvements to ensure stable distribution quality as emphasized by Hasibuan (2022), and the implementation of a SCADA monitoring system to facilitate rapid and accurate network monitoring (Antara News Banten, 2026).

The primary constraints in urban water distribution systems are the deteriorated condition of pipeline infrastructure, which triggers recurring leaks that disrupt water pressure, reduce service efficiency, and significantly increase operational costs for rehabilitation (Alegre et al., 2016; ADB, 2021), which ultimately underscores that the sustainability of clean water services requires substantial investment in the management of these assets.

Other operational challenges include a shortage of field technical staff, which prolongs the time required to address disruptions particularly during widespread damage across multiple locations and hinders routine maintenance of the Perumda pipeline network. This is because the quality of public services heavily depends on the capacity of staff to respond swiftly to community needs, as explained by Dwiyanto (2018), so that a shortage of human resources tends to slow down service and lower customer satisfaction levels.

Weak inter-agency coordination, complex bureaucratic procedures, and overlapping jurisdictions often hinder pipeline network repairs due to water distribution disruptions that stem not only from internal Perumda factors but are also impacted by road or drainage construction projects. As explained in Administrative Ecology (2024), inter-agency coordination is a key factor in the successful implementation of public policies, which is heavily influenced by the governmental environment.

Public Satisfaction with Clean Water Services

Public satisfaction is a crucial indicator in assessing the success of public services; according to Hijrah et al. (2024), PDAM customer satisfaction is influenced by the continuity of water distribution, water quality, and the speed of addressing disruptions. In this study, public perceptions indicate variations in satisfaction based on service areas.

Residents in the downtown area tend to rate the service more highly due to stable water flow and adequate pressure; they find the complaint app helpful for submitting grievances; and they indicate that service improvement policies have had a positive impact, aligning with Kotler and Keller's (2016) view that customer satisfaction occurs when service meets expectations, which in this context have been relatively fulfilled.

Residents in suburban areas tend to have lower satisfaction levels due to frequent low water pressure, recurring distribution disruptions, as well as perceptions of slower response times for repairs compared to the city center, thereby indicating service disparities that lead to customer dissatisfaction. As explained by Kurniawan (2025), inconsistent service quality can erode public trust and affect customer loyalty toward service providers.

Differences in satisfaction levels across regions indicate that service improvement policies have not yet fully succeeded in achieving equity, even though, from a public service perspective, this principle is crucial to ensure that basic services are accessible fairly to all members of the public (Dwiyanto, 2018). Thus, if service optimization is concentrated solely in urban areas, the policy objective of improving quality comprehensively remains unmet.

Analysis of Policy Implementation Gaps

This study reveals a gap in perspectives between Perumda, as the service provider focused on internal constraints such as aging pipes, limited technical human resources, and infrastructure investment budgets, and the public, as service recipients, who highlight direct impacts: low water pressure, unstable distribution, and slow response to disruptions.

This difference in perspective indicates that service improvement policies have not fully delivered a satisfactory experience for the public. Therefore, according to Denhardt and Denhardt (2015), public services must be oriented toward citizens' needs and designed based on user experience, as focusing on internal programs without considering the real world impact on the public can undermine the legitimacy of public services.

Digital innovations such as complaint apps represent a step forward, but they are insufficient to resolve technical distribution issues; thus, according to Badruddin et al. (2022), digital transformation must be supported by improvements to operational systems and organizational work culture. Consequently, policies to improve clean water services must proceed in two directions: strengthening service technology and improving network infrastructure.

4. CONCLUSION

Conclusion

The clean water service improvement policy implemented by Perumda Tirta Benteng in Tangerang City is a crucial instrument for the Tangerang City Government in

meeting the basic needs of the community; however, its effectiveness remains suboptimal due to aging pipeline network infrastructure, limited technical human resources, and inter-agency coordination that has not yet been fully optimized.

Service improvements are supported by the digitization of complaints through the SiGanteng app, the implementation of a network monitoring system, and the gradual renewal of pipes, but the main obstacles still lie in the dilapidated condition of the pipes, a shortage of field technicians, and ineffective inter-agency coordination, resulting in varying levels of public satisfaction across different areas, with better service in the city center compared to the outskirts, which still experience low water pressure and recurring distribution disruptions.

Recommendations

Based on the research findings, the following recommendations can be made:

1. Perumda Tirta Benteng needs to accelerate the pipeline network renewal program, particularly in outlying areas that frequently experience disruptions.
2. The local government and Perumda need to enhance the capacity of technical personnel through training, increasing staff, and procuring adequate equipment.
3. The optimization of the SiGanteng application needs to be improved by providing real-time transparency regarding disruption information and the status of follow-up on complaints.
4. Strengthening inter-agency coordination is necessary to ensure that urban development projects do not hinder pipeline network repairs.
5. Equitable service delivery must be a priority so that residents in outlying areas receive service quality equivalent to that in the city center.

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