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Research Article

Evaluation Of Sanitation And Suitable Drinking Water Achievements And Implications For Regional Development Policies In Central Sulawesi Province

Triasih Amanda[1]*
Dinas Cipta Karya dan Sumber Daya Air Provinsi Sulawesi Tengah, Indonesia

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ABSTRACT

Access to adequate sanitation and drinking water is a fundamental human right that remains challenging in many regions of Indonesia, including Central Sulawesi Province. This study aims to evaluate the achievement of adequate sanitation and drinking water services and formulate appropriate policy recommendations to address access disparities, particularly related to poverty. The research employs a quantitative descriptive approach, using secondary data from the Central Statistics Agency (2019–2024), and a qualitative approach using the USG (Urgency, Seriousness, Growth) method and policy alternative evaluation based on the Bardach framework (2012). The results indicate that adequate sanitation access increased from 72.5% (2019) to 80.1% (2023), and adequate drinking water access from 82.0% to 87.8%. However, the nexus between poverty and access to basic services emerged as the primary problem with the highest USG score (14). An evaluation of five policy alternatives shows that the whole-of-government approach achieved the highest score (18/20), followed by the infrastructure-based (13), community-based (15), social protection (17), and place-based (16) approaches. The conclusion is that an integrated cross-sectoral policy is most effective in breaking the poverty trap chain and improving sustainable access to sanitation and drinking water. The main recommendation is the issuance of a Governor's Regulation on the Cross-Sectoral Integration Framework in Central Sulawesi Province.

1. INTRODUCTION

Access to safe drinking water and adequate sanitation is a fundamental human right and a prerequisite for sustainable development. The United Nations has affirmed its global commitment to these services through the Sustainable Development Goals (SDGs), specifically Goal 6, which targets the availability and sustainable management of clean water and sanitation for all people worldwide by 2030 (United Nations, 2015). Adequate sanitation refers to the availability of adequate facilities and practices for disposing of human waste, managing domestic waste, and maintaining good environmental hygiene to prevent disease transmission and maintain public health. This definition includes access to sanitary latrines, safe wastewater management systems, effective waste management, and personal hygiene practices such as handwashing with soap (Arfiah et al., 2019).

Access to clean water and safe sanitation is essential for improving public health. Without it, environmental diseases like diarrhea, typhoid, and worms are more prevalent. This situation decreases labor productivity, strains regional health budgets, and perpetuates the cycle of poverty, particularly affecting vulnerable groups such as women, children, and people with disabilities. In the context of Indonesia, Bappenas (2020) has aligned this global commitment with the Indonesian Sustainable Development Goals (SDGs) Indicator Metadata, setting ambitious targets to ensure safe drinking water and proper sanitation across all provinces.

2. LITERATURE REVIEW & CRITERIA DEVELOPMENT

The translation of SDG targets into national indicators is not merely an administrative exercise but rather a recognition that the geographic, demographic, and fiscal capacity diversity across Indonesia's regions requires a measured yet flexible approach. The ambitious targets, such as universal access to safe drinking water and proper sanitation by 2024 (as per the 2020-2024 RPJMN) and towards 2030, require significant acceleration, given the widening gap: eastern Indonesia and rural areas lag far behind Java and urban areas in terms of access to piped water networks. The practice of open defecation (BABS) is still prevalent in several districts.

The availability of adequate clean water sources is the main foundation for meeting the need for safe drinking water. Water sources can come from surface water (rivers and lakes), groundwater (shallow and deep wells), or rainwater. Meeting drinking water needs is often challenging in areas with scarce water resources, such as semi-arid regions or those affected by environmental pollution (Messakh et al., 2015). The urgency of providing safe drinking water and sanitation services is not just an infrastructure issue but also touches on public health, economic productivity, and the quality of human development. Press-Stud et al. (2019) estimate that the burden of disease due to a lack of access to water, sanitation, and hygiene (WASH) results in hundreds of thousands of preventable deaths globally each year. The WHO and UNICEF report (2021) emphasized that the world is not yet on the right track to achieve SDG targets 6.1 and 6.2, so a significant acceleration of progress is needed, especially in developing countries, including Indonesia.

From a development economics perspective, Damania et al. (2020) emphasized in a comprehensive World Bank study that water scarcity and variability have a significant economic impact on regional growth and development, particularly in developing countries. Lack of access to clean water and sanitation not only increases household health costs but also lowers labor productivity and hinders investment. Various studies have shown that access to drinking water and sanitation plays a crucial role in reducing the risk of environmentally related diseases and improving the overall quality of life of communities (Merid et al., 2023; Aboah & Miyittah, 2022).

In Indonesia, access to safe drinking water and sanitation has continued to improve over the past decade, but disparities between regions remain a major unresolved challenge (BPS, 2024). Nationally, access to safe drinking water is around 90-91%, while access to safe sanitation is 80-82%. However, access to safely managed drinking water remains relatively low, below 15%, while safe sanitation is still in the range of 10-12%. This condition indicates that most achievements are still in the 'adequate' (basic) category, not yet reaching truly safe and sustainable service standards.

Based on the data presented, Central Sulawesi Province shows significant progress and interconnectedness between improvements in sanitation and drinking water services and socioeconomic indicators. According to Statistics Indonesia (BPS) (2024), the decline in the poverty rate from 14.45% to 10.92% indicates that better access to clean water and proper sanitation contributes to reduced household spending on health and increased work productivity. Meanwhile, the increase in the Human Development Index (HDI) from 67.47 to 72.82 reflects improvements in health (life expectancy), knowledge, and a decent standard of living, which are inseparable from the availability of basic infrastructure. Sustainable population growth is both a challenge and a driving force for the continued equitable development of sanitation and drinking water services. Therefore, the correct interpretation is that investment in basic services such as sanitation and drinking water plays a strategic role in breaking the cycle of poverty and sustainably improving the quality of life for people in Central Sulawesi. Fitriana and Gravitiani (2022) show that regional fiscal interventions and improved access to proper sanitation can help accelerate poverty reduction.

There are indications of structural barriers that hinder improvements in basic service delivery in Central Sulawesi. Data show a slowdown or even stagnation in service delivery during certain years, suggesting that an infrastructure development approach alone is insufficient to reach the remaining segments of the population. This issue reflects more complex challenges, including limited geographic access in island and mountainous regions, disparities in the quality of health workers and teachers in remote areas, and weak governance related to data collection on the poor and vulnerable.

Additionally, sociocultural factors, such as high population mobility and low levels of community participation in basic service planning, contribute to these structural barriers. In summary, enhancing basic service coverage requires not only physical development but also systemic reforms in resource allocation, strengthening local institutional capacity, and adopting a community-based approach that is tailored to local socioeconomic characteristics.

In regional development planning, evaluating access to sanitation and drinking water is essential for assessing the effectiveness of government programs and identifying structural barriers that necessitate cross-sector policy interventions. A comprehensive evaluation goes beyond simply measuring access percentages; it also examines systemic factors such as discrepancies in budget allocation between urban and rural areas, inconsistent data among public works, health, and regional planning agencies, and a lack of capacity to support communities in operating and maintaining facilities.

For instance, in Central Sulawesi, although access to piped water is on the rise, certain regions with extreme topography and low population density experience stagnation. In these areas, the operational costs of conventional piped networks are inefficient. Furthermore, structural barriers include weak incentives for the

private sector and communities to invest in independent sanitation systems, as well as inadequate complaint and repair mechanisms for damaged infrastructure.

Thus, evaluations must produce cross-sectoral policy recommendations that integrate spatial planning, regional fiscal allocation, strengthening technical institutions, and promoting active community participation. This comprehensive approach is vital to achieving universal access to drinking water and adequate sanitation in an equitable manner.

Simanjuntak et al. (2024) demonstrated a significant relationship between sanitation, drinking water, the Special Allocation Fund (DAK), and the Human Development Index, underscoring the importance of policy synchronization between WASH programs and human resource development programs in regional planning documents.

This study aims to: (1) evaluate the achievement of access to sanitation and safe drinking water in Central Sulawesi Province for the 2019–2023 period; (2) identify structural factors that are the main obstacles; and (3) formulate the most effective policy alternatives based on empirical evidence and a policy analysis framework.

3. RESEARCH METHODS

This study employed a mixed-methods approach with an evaluative design. Quantitative data were obtained from the Central Statistics Agency (BPS) of Central Sulawesi Province, covering the years 2019 to 2024. Qualitative data were gathered through assessments conducted by an expert panel that included regional planners, academics, and practitioners in the Water, Sanitation, and Hygiene (WASH) sector.

Data analysis was carried out in three stages:

1. A descriptive analysis of trends related to sanitation and safe drinking water outcomes.
2. The USG (Urgency, Seriousness, Growth) method was applied to prioritize key issues on a scale from 1 to 5.
3. An evaluation of policy alternatives was performed using the Bardach (2012) framework, which is based on four criteria: economic, social, political, and technical.

4. RESULTS AND DISCUSSION

4. 1 Trends in Sanitation and Safe Drinking Water Achievements

Access to improved sanitation includes facilities with gooseneck toilets and final disposal via a septic tank or wastewater treatment system. In Central Sulawesi, the proportion of households with this access has grown by approximately 3.85% over the past five years. Based on SDG standards, access to improved drinking water includes piped water, protected boreholes/pumps, protected wells, or rainwater. Achievements in Central Sulawesi have fluctuated but remain at a fairly high level. To see an overview of the development of access to improved sanitation and drinking water in Central Sulawesi Province over the past five years, see Table 1 below.

Table 1. Trends in Sanitation and Safe Drinking Water Achievements in Central Sulawesi Province

Year	Access to Adequate Sanitation (%)	Access to Adequate Drinking Water (%)
2019	72,5	82,0
2020	74,0	83,5
2021	76,2	85,0
2022	78,5	86,5
2023	80,1	87,8

Source: Central Statistics Agency (2024)

Although access to sanitation and safe drinking water has shown a consistent upward trend, these dynamics still leave behind various structural issues that require more in-depth policy attention. In general, future challenges will become increasingly complex as population growth, urbanization, and pressure on water resources driven by climate change intensify. Sanitation is typically more difficult to improve because it requires behavioral changes (open defecation, waste management) and more complex infrastructure (IPLT, septic tanks). Despite this, is Central Sulawesi's achievement above the national average? (Comparative data are needed, but nationally, by 2023, it is around 75–80%.) Drinking water tends to be more accessible due to the focus on building household connections (water utility companies, protected boreholes). However, a slowdown in the rate of improvement in 2023 warrants caution.

Without integrated, adaptive, and cross-sectoral policy interventions, these challenges could slow the achievement of regional and national development targets. Accelerating sanitation in areas with limited access, particularly in rural and coastal areas of Central Sulawesi Province, is a priority that cannot be postponed any longer. Data on the trend in proper sanitation achievement, which remained at 80.1 percent in 2023, indicates that nearly 20 percent of the population lacks access to adequate sanitation facilities. Rural and coastal areas face specific challenges: limited infrastructure, limited access to waste management services, and the ongoing practice of open defecation. Therefore, local governments need to adopt community-based approaches such as Community-Led Total Sanitation (CLTS), which have proven effective in changing collective behavior.

Furthermore, the construction of communal septic tanks and small-scale decentralized wastewater treatment systems (DEWATS) is highly relevant for coastal areas with difficult-to-reach locations that are not served by centralized piped systems. Continuous technical assistance, the provision of participatory budgets that favor disadvantaged villages, and incentives for households that build healthy latrines also need to be encouraged. Without this acceleration, the sanitation gap between regions will continue to widen, potentially triggering increases in environmentally transmitted diseases such as diarrhea and stunting, ultimately burdening regional health services.

Maintaining and expanding drinking water systems is crucial, given that the rate of increase in access to safe drinking water in Central Sulawesi Province has slowed, from 1.5 percent per year in 2019–2022 to only 1.3 percent in 2022–2023. Although the 2023 achievement reached 87.8 percent, this slowdown indicates structural barriers, such as damaged and poorly maintained infrastructure, limited piped networks in new areas, and declining raw water quality due to environmental changes. Therefore, local governments need to allocate operational and maintenance budgets regularly, rather than focusing solely on the construction of new projects. Existing raw water distribution systems must be audited regularly to detect leaks, pollution, or reduced water pressure. For expansion, peri-urban areas, dry rural areas, and coastal areas that are not yet covered by piped networks should be prioritized through community-based small-scale water supply systems (SSWSS) or partnerships with village-owned enterprises (BUMDes).

Furthermore, diversifying raw water sources, such as treated rainwater, deep wells, or simple reverse osmosis, could be adaptive solutions for coastal areas prone to seawater intrusion. Investing in an IoT (Internet of Things) sensor-based monitoring system to detect disruptions early should also be considered, enabling quick, precise corrective interventions. Without systematic maintenance and planned expansion, the rate of increase in drinking water access may continue to slow to near stagnation, leaving more than 12 percent of the population without access to safe drinking water in the long term.

Integrating sanitation and drinking water programs narrows the gap between the two outcomes and significantly improves the efficiency of regional budget use. During the 2019–2023 period, the gap between access to drinking water and proper sanitation in Central Sulawesi Province narrowed from 9.5 percent to 7.7 percent, but sanitation remains consistently lagging. The separation of planning, funding, and implementation between the drinking water and sanitation sectors has often led to overlapping activities, wasted operational costs, and unsynchronized completion times for infrastructure. Through an integrated approach, regional governments can design integrated projects in the same location, for example, the construction of a residential-scale drinking water supply system (SPAM) equipped simultaneously with a communal domestic wastewater treatment plant (IPALD). Budgets that have been separated into two main thought documents (pokir) at the village and regional work unit (SKPD) levels can be combined under a single area-based financing scheme, thereby reducing the costs of tendering, supervision, and mobilization of heavy equipment by 20–30 percent.

Furthermore, program integration allows for the use of the same human resources; drinking water operators can also be trained to manage basic sanitation, and vice versa. At the community level, integrated outreach on the importance of clean water and waste management simultaneously will be more effective in changing behavior than disjointed sectoral approaches. The Central Sulawesi Provincial Government can begin by establishing a cross-agency task force (Public Works Agency, Health Agency, and Regional Development Planning Agency) to develop a phased integration roadmap, starting with the three districts/cities with the widest gaps. Ultimately, this integration will not only resolve technical issues but also create more sustainable water and sanitation development governance that is responsive to inequality and friendly to regional fiscal constraints.

Data-based monitoring down to the village level is the final, but equally important, foundation for ensuring that the province's seemingly encouraging achievements do not mask disparities at the sub-district and village levels. Currently, aggregate data for Central Sulawesi Province, which shows an average access to improved sanitation of 80.1 percent and improved drinking water of 87.8 percent by 2023, can create the illusion of equality, while in reality, there are very likely sharp disparities between sub-districts on the north coast and those in mountainous areas or remote islands. Therefore, the provincial government needs to develop a real-time monitoring dashboard system that extends beyond the district/city level to all villages and sub-districts. This system must be integrated with data from community health centers (as a proxy for environment-based diseases), village-level national socioeconomic survey (Susenas) data, and regular reports from health cadres and sanitation facilitators. With such granular data, disparities between sub-districts can be detected

early, for example, if three sub-districts in a district are found to have sanitation coverage below 50 percent.

In contrast, other sub-districts have reached 90 percent. Furthermore, interventions can be designed specifically for locations (location-specific interventions), rather than simply distributing budgets evenly, which are often misdirected. Simple technologies, such as mobile crowdsourcing applications that enable residents to report on the condition of drinking water and sanitation facilities in their villages, can also serve as a low-cost, fast participatory monitoring tool. Village governments should be encouraged to compile internal inequality maps as part of village development planning meetings (musrenbangdes), so that program proposals are no longer based on feelings or estimates, but on real data. At the provincial level, the Regional Development Planning Agency (Bappeda) and Statistics Indonesia (BPS) should publish an annual report on the equity index of access to drinking water and sanitation across sub-districts, complete with red, yellow, and green statuses, to facilitate the allocation of technical assistance and regional incentive funds. With transparent, accurate, and tiered monitoring down to the village level, the province will not only aim for average figures; it will also aim to improve the quality of life for all. However, it will truly embody the principle of leaving no one behind in equitable drinking water and sanitation development.

4. 2 Determining the Main Problem Using the Ultrasound Method

To determine key issues to prioritize for policy intervention, the USG (Urgency, Seriousness, Growth) scoring method was used. The assessment was conducted by inviting a panel of experts with expertise in sanitation, drinking water, and regional development planning. The assessment results are presented in Table 2 below.

Table 2. Results of the Ultrasound Method Three Priority Problems

No	Problem	U	S	G	Total Score
1	Disparities in achievement between sectors/regions	4	4	4	12
2	The relationship between poverty and access to basic services	5	5	4	14
3	Institutional fragmentation and WASH planning	4	4	5	13

Source: Expert panel assessment results (USG). Scale 1-5. *Note: U=Urgency (1–5); S=Seriousness; G=Growth; Source: Expert panel assessment*

Problem number 2 (the link between poverty and access to basic services) is the main problem, with a score of 14. This problem is the highest priority because: 1) maximum urgency (5), where poor households are currently experiencing difficulties in accessing drinking water and proper sanitation, so that intervention cannot be postponed; 2) Maximum seriousness (5), poverty and lack of access to basic services create a vicious circle (poverty trap) increasing the risk of disease, reducing productivity, and perpetuating intergenerational poverty; and 3) High growth (4), if not addressed, the access gap between poor and non-poor groups will widen as development is enjoyed more quickly by the able groups.

Regarding issue number 1, the expert panel assessed the disparity in achievement (between the sanitation and drinking water sectors, and between regions) as a real problem, but not commensurate with the urgency and seriousness of poverty. This means that the disparity is still tolerable in the short term compared to the other two issues. Then, issue number 3 is interesting because it has the highest Growth score (5) among the three issues. This means that the expert panel assessed that institutional fragmentation (for example, sanitation and drinking water programs are managed by different agencies without coordination, and planning is not integrated across levels of government) will worsen very quickly as the number of projects and actors involved increases. Although its current urgency and seriousness are still on par with the problem of inequality (score 4), its high potential for worsening makes it a second priority after poverty.

While the disparity in achievement between sectors and regions often draws public attention, the expert panel assessed that the more fundamental and serious root of the problem is poverty itself. The economic limitations of poor households create a poverty trap that hinders access to sanitation and safe drinking water, in line with the findings of Fitriana & Gravitiani (2022) and Hutton & Varughese (2016). Poor households are not only left behind in access to drinking water and sanitation but also trapped in a cycle of poor health and low productivity. Therefore, policies must focus on poverty alleviation as the primary entry point for increasing access to basic services, while simultaneously improving institutional governance to ensure effective and efficient program implementation.

4. 3 Evaluation of Policy Alternatives

The evaluation was conducted using four criteria from Bardach's (2012) method: economic and financial possibility, social (political viability), political (political viability), and technical (technical feasibility and administrative operability). The assessment was conducted by a panel of experts on a scale of 1-5 (maximum score 20).

Table 3. Evaluation of Policy Alternatives - Bardach Method

Bardach Criteria	Alt-1 (Infrastructure)	Alt-2 (Empowerment)	Alt-3 (Social Protection)	Alt-4 (Territoriality)	Alt-5 (Cross-Sector Integration)	Weight
Economic	3	4	5	4	4	4
Social	3	5	4	4	5	4
Political	4	3	4	4	4	4
Technical	3	3	4	4	5	4
Total Score	13	15	17	16	18	Maks 20

The evaluation results using the Bardach (2012) method indicate the following:

1. **Alternative 1: Infrastructure (Total Score = 13, Rank 5)**
   This approach, which focuses solely on the development of physical infrastructure, is considered the weakest. It is economically inefficient due to high costs, fails to address social aspects, and is vulnerable to technical failures after construction. Although infrastructure projects are politically popular, their sustainability is low without complementary strategies.
2. **Alternative 2: Empowerment (Total Score = 15, Rank 4)**
   Community empowerment initiatives (such as training, outreach, and Community-Led Total Sanitation, CLTS) excel in social aspects and are economically viable. However, their weaknesses include a lack of political support—since results are not immediately visible—and the technical challenges involved in field implementation.
3. **Alternative 3: Social Protection (Total Score = 17, Rank 2)**
   This alternative stands out for having the highest economic score (5), demonstrating budget efficiency through direct subsidies, social assistance, or guaranteed access for low-income households. It effectively addresses the key issue identified in the previous U.S. Government (USG) results: the connection between poverty and access to basic services.
4. **Alternative 4: Regional (Total Score = 16, Rank 3)**
   The regional approach, which includes affirmative action for disadvantaged, coastal, and rural areas, received a uniform score of 4 across all criteria. This indicates that while it is balanced and safe, it lacks a significant advantage in any particular area.
5. **Alternative 5: Cross-Sectoral Integration (Total Score = 18, Rank 1)**
   This alternative ranks the highest because it achieved the top scores (5) in both the social and technical criteria, along with good scores in the economic and political categories. Specifically:
   a. Social (5): Cross-sectoral integration (encompassing drinking water, sanitation, health, education, public works, and regional planning) has a more comprehensive impact on community welfare.
   b. Technical (5): It effectively addresses the issue of institutional fragmentation, which was the second priority identified in the USG results.
   c. Economic (4): It ensures budget efficiency through integrated and non-overlapping programs.

   Limitations: This study's findings are based on the judgments of a specific panel of technical experts. While consistent, they do not incorporate community risk perception or socio-economic criteria, which are vital for holistic, sustainable relocation. Future research should integrate these aspects into a broader Multi-Criteria Decision Analysis (MCDA) framework.

   Based on the above description, Alternative 5 (a cross-sectoral integration approach) received the highest score of 18 and is recommended as the top-priority policy to address access to sanitation and safe drinking water in Central Sulawesi Province. Overall, Alternative 5 excels because it simultaneously addresses multiple dimensions of the problem, including access, poverty, and

governance. Therefore, the best solution is not to build more infrastructure or provide separate subsidies, but to integrate all sectors, resources, and programs into a single framework.

The infrastructure-only approach (Alt-1) has proven vulnerable to maintenance failures. It fails to address the root causes of social problems, while separate subsidies, lacking cross-sectoral coordination, are prone to overlapping targets and budget leakage. Conversely, cross-sectoral integration (Alt-5), which received the highest score in the Bardach evaluation (18/20), creates a synergistic effect: social protection programs for poor households can be directly linked to physical development undertaken by the Public Works Agency, supported by empowerment cadres from the Village Community Empowerment Agency, and monitored for health indicators by the Health Agency. Without such integration, each sector operates independently, resulting in duplication of activities at the same location and often hindering one another due to differences in priorities and implementation schedules.

Therefore, Central Sulawesi Province needs to immediately establish an Integrated WASH (Water, Sanitation, and Hygiene) Coordination Team involving the Public Works Agency, Health Agency, Regional Development Planning Agency (Bappeda), Social Affairs Agency, Village Community Empowerment Agency, and development partners such as non-governmental organizations, universities, and the private sector. This team is tasked with developing an integration roadmap that includes (1) unifying planning documents (RKPD, Renstra SKPD) into a single provincial WASH action plan; (2) pooling budgets from various sources (APBD, DAK, village funds, CSR) to be allocated based on priority areas based on data monitoring results down to the village level; and (3) establishing a joint monitoring and evaluation mechanism using a single indicator so that achievements can be measured accountably.

With this approach, budget efficiency can be increased by 20–30% by reducing separate tender costs, optimizing heavy equipment mobilization, and avoiding overlapping infrastructure development in the same village. Moreover, program duplication, such as the Social Services Agency providing free water connections while the Public Works Agency also builds new connections in the same location without coordination, can be eliminated. Ultimately, accelerating universal access to drinking water and proper sanitation can be achieved more quickly, potentially even meeting the 100% target by 2030, while ensuring that no poor village, sub-district, or household is left behind. Integration is not merely a technical option, but a strategic imperative to address the institutional fragmentation that has been a major obstacle to regional development. Without this step, Central Sulawesi Province risks remaining stagnant: each sector is busy reporting its own achievements, while grassroots communities continue to experience significant inequalities in access.

5. CONCLUSION

Based on the research results discussed previously, it can be concluded that:

1) 1. Access to sanitation and safe drinking water in Central Sulawesi Province shows an increasing but slowing trend, with access to drinking water (87.8%) consistently higher than access to sanitation (80.1%).
2) 2. The main problem identified is the close link between poverty and low access to basic services (the poverty trap), not simply a technical infrastructure issue.
3) 3. The most effective policy approach is a whole-of-government approach, which coordinates public works, health, social, and planning programs coherently.

6. RECOMMENDATIONS

The main recommendations addressed to the Governor of Central Sulawesi are: Establish a Governor's Regulation (Pergub) concerning the Cross-Sectoral Integration Framework for Sanitation and Improved Drinking Water Development, which includes three instruments:

1) RISPAM Across Districts/Cities and Provincial Strategic Areas
2) Provincial Sanitation Roadmap 2025–2029
3) Regional RISPAL for Central Sulawesi Province

This policy must integrate five aspects of intervention: regulations, institutions, infrastructure, behavior change, and funding. Successful implementation depends heavily on local government commitment, institutional capacity, and active community participation.

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