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Research Article

Universal Access to Sanitation Services, with Quality and Sustainability, Peru 2025 – 2055.

Pablo Fernando Jaime Perry Lavado
(orcid.org/0000-0002-8635-3944)
Universidad César Vallejo de Lima, Perú

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ABSTRACT

The study focuses on making a comprehensive balance of the supply and demand of drinking water, sewerage and wastewater treatment services in Peru, with the primary objective of estimating the investment necessary to overcome the existing deficiencies in the coverage and quality of these essential services. At the same time, the capacity of the State to carry out the required works in the sanitation sector will be analyzed. As regards demand, a detailed assessment will be carried out considering various factors: population levels, the size of cities, the type of operator, as well as the type and quality of services currently available. In addition, the analysis of the negative impact that the lack of these services has on the health and quality of life of the population will be deepened, including deficiencies in water management and storage, waste disposal and sanitation in special conditions. The current and future population at the national level will be estimated, identifying trends in demand growth, and the allocation of resources for investments in water and sanitation by the State at all levels of government will be examined. In relation to the supply, the capacity of the existing infrastructure will be quantified, the replacement value of the current infrastructure will be estimated, the proportion of the infrastructure that requires renovation will be determined and the annual requirement for investment in renovation will be projected. Likewise, the investment costs by type of operator for expansion, renovation, institutional and operational improvement, risk and disaster management, and mechanisms for remuneration for ecosystem services will be estimated, and the execution of resources by the State in investments in water and sanitation will be analyzed. Finally, a final balance of supply and demand will be presented, and the possibilities of closing the identified gaps will be evaluated, considering capacities, costs and deadlines.

Keywords: Closing gaps , Sanitation Services

Introduction

In Peru, the sanitation sector, which encompasses drinking water, sewage, excreta disposal and wastewater treatment, faces significant challenges. The Ministry of Housing, Construction and Sanitation (MVCS), with the support of various entities such as the National Urban Sanitation Programme (PNSU), the National Rural Sanitation Programme (PNSR), and the Technical Agency for the Administration of Sanitation Services (OTASS), is the political responsible for this sector. Despite the existence of a regulatory framework (SUNASS) and the participation of numerous institutions, the implementation of plans to close the gaps in accessibility to these services has been insufficient.

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Research Article

During the last six years, state investment in sanitation has not exceeded 57% per year in relation to what was programmed, which aggravates the situation, especially for the low-income population. The proposal to subsidize water for these groups, although well-intentioned, does not solve the underlying problem. A strategy is required that prioritizes investment in infrastructure, through international financing and the efficient execution of works. Current tariffs, which recognize capital expenditure, provide a framework to ensure financial commitments are met.

It is crucial that state entities, at all levels, recognize that access to sanitation services is a citizen's right and an obligation of the state, financed by everyone's taxes. The magnitude of the problem is clear: millions of Peruvians lack access to safe water and sewage, and population growth exacerbates the situation.

The State's investment capacity, on average, has been much lower than needs. On average, 8,594 million soles have been programmed annually and 4,960 million soles have been executed annually. And if we consider that according to estimates, investments of 419,854 million soles are required to close gaps in reasonable terms and preserve this condition for the next 30 years, it is necessary to significantly multiply the amount of current investment. In addition, the time required by project cycles must be considered, which from the idea stage to implementation can take 5 to 8 years.

The need for investment involves several concepts, investment for universal access to services, that is, in expansion works. Secondly, it is necessary to invest in the rehabilitation, renovation and improvement of the existing infrastructure to provide a quality service and respect for the environment. And finally, investments in maintenance, rehabilitation and permanent replacement of the infrastructure to guarantee the sustainability of the infrastructure for the next 30 years.

In summary, Peru needs a change of approach in the sanitation sector, prioritizing efficient investment and recognizing access to these services as a fundamental right.

Background

In her study, Dianderas, A. (2022) delved into inequalities in access to basic services such as drinking water and sewerage between rural and urban areas. Through statistical data, the author shows a persistent gap in the coverage of these services, despite government investments. Their findings suggest that current strategies are not sufficient to close this gap, pointing to the need to rethink public policies.

The UN report underlines the crucial importance of science, technology and innovation to ensure universal access to drinking water and sanitation, as set out in Sustainable Development Goal number 6. It highlights the need to manage water resources in an integrated and equitable manner, with particular emphasis on reducing gender inequalities. In addition, the paper explores how the most advanced technologies can contribute to achieving this global goal.

According to Bonifaz et al. (2023), investment in infrastructure in Peru has been fundamental to its economic development in recent years. It has been possible to increase the coverage of basic services, both in terms of water, sanitation and electricity, but there are still gaps to be filled. The objective of this study is to calculate the infrastructure gap in the country, taking into account different comparison groups at the global level. The results obtained vary according to the assumptions and qualitative aspects considered. Importantly, the gap not only encompasses basic access, but also aspects of quality, sustainability, and mitigation of environmental risks. The prioritization of investments must go hand in hand with measures that improve resource management, coordination between the public and private sectors, and adaptation to the country's geographical and climatic conditions.

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Research Article

Gamio and Choquehuanca (2024) analyzed the influence of public investment on Lima's economic growth between 2007 and 2021. Using a quantitative approach, the authors concluded that there is a direct causal relationship between both variables. That is, an increase in public investment, in its various forms, boosts regional economic growth. This study provides solid empirical evidence on the importance of public investment policies to boost the Lima economy.

Legislative Decree 1280, issued in 2017, establishes the policies and standards that regulate the provision of sanitation services at the national level. The main objective of this decree is to promote efficient management by sanitation service providers, in which it clearly defines the roles and competencies of government entities in relation to the provision of these services. As well as the MVCS itself as the governing body, the SUNASS as the regulatory body, the Regional Governments (GORE), the Local Governments (provincial and district municipalities), the Transitional Administration Body (OTASS) and the body promoting private investment (Pro Inversión).

According to the statistical reports "Benchmarking" published on its website by SUNASS. The operational, economic, financial, commercial and management indicators achieved by each EPS are shown. And in the case of NON-EPS, it is consolidated by provider size. From this data, the total population, covered with water and covered with sewerage of each locality is obtained, using as support the tariff studies prepared by the Directorate of Tariff Regulation (DRT)

In the "Benchmarking" it can be seen that urban cities that have Service Provider Entities (EPS), are divided into eight groups. A Mega EPS that is SEDAPAL and that is under the responsibility of the state through FONAFE. Then there are the 06 EPS Large 1, the 13 EPS Large 2, the 15 Medium EPS and 15 Small EPS, the 49 EPS are under the responsibility of the Provincial Municipalities. Then there are in the case of urban cities with more than 15,000 inhabitants and that do not belong to any EPS, which are under the responsibility of the District Municipalities. Then follow the so-called small cities that have more than 2,000 and less than 15,000 inhabitants, which are in charge of the district municipalities through the UGM, and finally there are the rural areas with population centers of less than 2,000 inhabitants and are under the responsibility of the District Municipalities through the ATMs.

The MEF's Friendly Consultation website, (2023), shows statistical information on investment programmed and executed during the last five (1919 – 1920 – 1921 – 1922 – 1923), in drinking water and sanitation issues, detailed at the central government level, regional governments by region, local governments by department and the 50 EPS at the national level. From this it can be seen that the average annual programming of that period was 8,407 million soles and the annual average executed was 4,549 million, which indicates that the investment execution capacity only reaches 56.3%. This situation partly explains why the gap is getting bigger.

Recent research by Benites et al. (2021) has highlighted the reasons behind the failure to meet investment targets in the Peruvian sanitation sector. The absence of privatization in this area and the consequent concentration of power in the hands of municipalities have created a context conducive to the politicization of decisions and the lack of transparency. The consequences of this situation are obvious: weak regulation, inefficient management of service providers and poor inter-institutional coordination. Users are the ones who pay the consequences of these shortcomings, facing high rates and a quality of service below expectations. The research underscores the urgency of implementing deep reforms in the sector to ensure universal access to safe and affordable sanitation services.

Calle L., (2020), conducts research related to the decentralization of the distribution of the Peruvian budget with the aim of closing gaps in the country and reducing poverty. According to the UN, poverty is multidimensional and encompasses areas such as health, education and quality of life. The generation of income and expenditure in OECD and Latin American countries was analyzed, as well as the distribution of the budget in Peru by geographical areas and ministries. It was concluded that most of the expenditure is concentrated in Lima, without a clear strategy or regulated criteria. It is proposed

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Research Article

to improve budget allocation by implementing the Results-Based Budgeting approach and considering allocation criteria to optimize available resources.

Bujele, N. (2023) in his study analyzes the budget decentralization system in Peru with the aim of reducing the existing gaps in the country and meeting the needs of society, regardless of its geographical location. The importance of addressing poverty as a multidimensional problem, which affects people's health, education and quality of life, is highlighted. A comparative analysis of income and expenditure in OECD countries and Latin American countries is included, concluding that Peru needs to improve the distribution of its resources, since most of the expenditures are concentrated in the capital city (Lima). It is proposed to implement the Results-Based Budget as a strategy for a more equitable and efficient distribution of the budget.

SUNASS has prepared and published its fourth investment monitoring report, a document that provides an overview of investment management in the urban sanitation sector at the level of service providers. Its objective is to monitor compliance with the execution of investment programs in the provider companies in order to guarantee the sustainability of the services and motivate the provider companies to comply with the approved schedules. The report details the importance of closing the infrastructure gap in the long term, as well as making strategic investments in the sector to ensure the sustainability of infrastructure. However, the results obtained are not encouraging, with the exception of SEDAPAL, the average compliance with the investment program of the other 50 EPSs on average does not exceed 30% of those programmed. The report is structured in sections that address relevant aspects of the sector and offers recommendations to improve resource management and the quality of sanitation services. The possibility of variations in the figures during the audit process is mentioned.

Theoretical Bases

The theoretical bases on issues of closing gaps are given by the different types of approach according to the experience of the researchers, these can be: Economic Approaches, Political Approach, Social Approach, Interdisciplinary Approach and others, which are detailed below.

a) From the Economic Approach

On the subject of closing gaps, we can cite three great thinkers who studied the problem of gaps from an economic point of view, they are Rostow, Lewis and Prebisch, whose studies have been fundamental pillars for understanding the dynamics of growth and inequalities between countries. Each of these economists proposed models that seek to explain how nations move from poverty to prosperity, and what factors hinder or facilitate this process.

All three offer different perspectives on the process of economic development and inequalities between countries, with their advantages and limitations aimed at promoting growth and reducing poverty. However, these theories were developed in a specific historical context and may not be fully applicable to the current situation, taking into consideration that each country has its own experiences and different challenges.

According to Morazán P. (2021), Walt Rostow proposed a model of economic development in stages, comparing the growth of nations to a journey. According to Rostow, all societies begin in a traditional phase, dominated by agriculture, and gradually evolve into a stage of mass consumption. This process, according to Rostow, is accelerated by industrialization and investment, with the state playing a key role. However, this linear and universal vision has been questioned for various reasons. On the other hand, he indicates that many critics argue that Rostow ignores the particularities of each country and simplifies reality by not considering factors such as inequality or social conflicts. Despite these criticisms, Rostow's theory remains a benchmark for understanding development processes, although it is important to recognize that economic development is much more complex and diverse than this model suggests.

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Research Article

According to Jiménez, Y. (2011), it was Arthur Lewis who in 1979 proposed a theory that divides developing economies into two sectors: a traditional, agricultural and low-productivity sector, and a modern, industrial and more efficient one. According to Lewis, economic development occurs when labor moves from the traditional to the modern sector. At first, wages in the modern sector are low, but as this sector grows, wages rise, generating a virtuous circle of increased consumption, investment, and job creation. However, this theory simplifies reality by failing to consider the complexity of developing economies and has been criticized for ignoring problems such as inequality and the difficulty of absorbing all the labor in the modern sector. Despite these limitations, Lewis's theory is still relevant to understanding developmental processes, although it is important to complement his view with other, more complex approaches.

According to Briceño, J. (2024), Raúl Prebisch was a prominent Argentine economist who developed dependency theory to explain why Latin American countries, despite their resources, did not reach the levels of development of industrialized countries. Prebisch believes that the world economic system was unevenly structured, benefiting rich countries at the expense of poor ones. That poor countries exported raw materials at low prices and bought expensive manufactured goods, becoming trapped in a dependent economy. To change this, he proposed that developing countries should industrialize and produce the goods they previously imported. His ideas influenced many economic policies in Latin America, but they were also criticized for simplifying reality and not explaining all inequalities. In short, dependency theory sought to understand why poor countries were left behind.

b) From the Political Approach

The researcher Silva, A., (1993), researched on the subject that democracy is more than a system of government; it is a fundamental engine for human progress. This supports the thesis of thinkers such as Dahl and Schumpeter, who consider that the active participation of citizens in politics is essential to reduce inequalities and promote development. When people have a say, policy decisions better reflect their needs, which in turn drives economic and social growth. In addition, democracy promotes values such as tolerance and equality, creating more cohesive and open societies. However, democracy faces challenges such as corruption and inequality. Despite these obstacles, it remains the best way to build fairer and more prosperous societies, as long as citizens are committed to strengthening it.

Urteaga, E. (2013) studied the treatise of Robert Putnam, a renowned political scientist who has highlighted the importance of social capital for the proper functioning of societies. Social capital refers to the ties that bind us together as a society, such as trust and social media. Putnam found that communities with greater social capital, that is, with more citizen participation and trust, tend to have more efficient governments and a better quality of life. Putnam suggests that social capital is essential for a healthy democracy and that institutions play a key role in strengthening or weakening it. Although his theory has been debated, Putnam's work remains a fundamental reference for understanding how societies are organized and function.

c) From the Social Approach

Hoyos, D. (2008), made a profound comparison between the theories of justice of Rawls and Sen. Both philosophers seek to establish the fundamental principles for a just society, but from different perspectives. Rawls emphasizes equality of opportunity and equitable distribution of benefits, while Sen focuses on human capabilities and the freedom to achieve the functions we value. Hoyos analyzes the strengths and weaknesses of both proposals, offering a more complete view of the complex discussion on social justice. This article is a valuable tool for understanding the different dimensions of justice and their implications for building more equitable societies.

Journal of Information Systems Engineering and Management
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https://www.jisem-journal.com/

Research Article

For Urteaga, E. (2013). Social capital is the network of connections, trust, and cooperation that binds people together in a community. This concept, popularized by Robert Putnam, is fundamental to understanding how societies work. Communities with high social capital are more united, innovative and with more efficient governments. However, factors such as individualism and inequality weaken it. To strengthen it, it is necessary to encourage citizen participation, invest in local institutions and combat inequality. In short, social capital is key to the well-being and development of communities. By investing in it, we are investing in our future.

d) From the Interdisciplinary Approach

Santana, D. (2021), in his treatise on interdisciplinarity, takes Cuba as an example, where education seeks to form integral individuals, with solid knowledge and values such as honesty and solidarity. To achieve this, interdisciplinarity in teaching is promoted. This is not just a relationship between subjects, but a way of thinking and acting that allows students to understand the world holistically and act as critical and transformative citizens. Teachers, by mastering various disciplines and methodologies, can create a learning environment where students solve complex problems and develop critical thinking. Interdisciplinarity favors attention to the individual needs of each student, preparing them for working life and to face social challenges. In addition, it allows a better understanding of reality, by relating different areas of knowledge and encouraging more complex thinking.

For Madroñero, S. & Guzmán, T. (2018). The concept of sustainable development has evolved from a defined approach to a comprehensive approach that seeks to balance economic, social, and environmental needs. However, its implementation faces challenges such as lack of conceptual clarity, the difficulty of measuring it and the influence of economic interests. The origins of sustainable development date back to the mid-twentieth century, when the relationship between economic growth and environmental degradation began to be recognized. Despite its importance, the concept of sustainable development presents ambiguities and challenges. Its practical application is complex due to the diversity of contexts and the difficulty of balancing the different dimensions. In addition, the anthropocentric approach to the concept has been criticized for not sufficiently recognizing the intrinsic value of nature. In conclusion, sustainable development is a constantly evolving concept that seeks to build a more just and equitable future for present and future generations. However, its implementation requires a joint effort by governments, companies, civil society organizations and citizens, as well as greater conceptual clarity and a more holistic approach that integrates the economic, social and environmental dimensions.

The UN has recognized the right to water and sanitation as a fundamental pillar for sustainable development, integrating it into its Sustainable Development Goals. SDG No. 6, specifically dedicated to water and sanitation, is intertwined with other goals such as eradicating poverty, ensuring healthy lives and promoting gender equality. Access to safe drinking water and sanitation is essential to achieve sustainable cities and improve the quality of life for all people, especially women and girls.

There are other relevant theories such as the Social Justice Theory that underlines the importance of equity in the distribution of basic resources such as water and sanitation, and the need to address the social and economic inequalities that perpetuate gaps. There is also Systems Theory that emphasizes the interconnection between the components of a system, such as water, health, economy, and the environment. This implies that solutions must be holistic and consider the multiple dimensions of the problem. And finally, the Theory of Collective Action , which recognizes the fundamental role of citizen participation and community organization in the management of water resources and the provision of sanitation services. All the theories supported and argued by the UN, UNICEF, World Bank and the WHO.

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Research Article

In summary, closing gaps in access to water and sanitation requires a comprehensive approach that combines technical, social and political elements. Social justice theory, systems theory, and collective action theory provide useful conceptual frameworks to guide this process.

Dimensions

According to theorists and specialists, the gap closing variable has multiple dimensions, from which the six main dimensions have been selected, such as economic, social, cultural, gender, geographic and ethnic, which are described.

The economic dimension seeks to create a fairer society where everyone has the same opportunities. This implies reducing inequality in the distribution of wealth, income and access to basic services. To achieve this, it is necessary to promote the creation of quality employment, ensure quality education and health for all, and reduce poverty. By promoting these actions, the aim is to level the playing field and enable all people to reach their full potential, regardless of their background or circumstances. At its core, closing economic gaps means building a future where everyone has an equal chance of thriving.

The social dimension seeks to build communities where everyone has the same opportunities and feels included. This means ensuring access to basic services such as education, health and housing, as well as encouraging everyone's participation in community life. It is critical that all social groups, especially those historically marginalized, are represented and able to make decisions that affect them. To achieve this, it is necessary to implement policies that remove barriers that prevent full inclusion, such as discrimination and lack of opportunities. In short, closing social gaps seeks to create a stronger and more equitable social fabric, where everyone can reach their full potential.

The cultural dimension involves building a society where all cultures are valued and respected equally. This means recognizing the richness that each culture brings and ensuring that all have the same opportunities. To achieve this, it is essential to promote intercultural education, protect the cultural heritage of all groups, combat discrimination, and encourage the participation of all communities in decision-making. It is important to understand that cultural diversity not only enriches, but also implies an equitable distribution of power. By closing these gaps, fairer societies are built, more cohesive and enriched by diversity.

The gender dimension focuses on reducing inequalities between men and women. This approach recognizes that, in addition to biological differences, there are social and cultural constructs that limit women and favor men. To achieve equality, it is necessary to transform power relations and question roles and stereotypes. Gender inequality manifests itself in various areas, such as the economy, politics and everyday life. Reducing it requires public policies, education in equality, women's empowerment and a profound cultural change. In short, the gender dimension seeks to build fairer and more equitable societies for all people.

The geographical dimension focuses on reducing inequalities between the different regions of a country. It seeks to promote more equitable development, where rural and disadvantaged areas have the same opportunities as urban areas. These inequalities are manifested in access to basic services, economic opportunities, and infrastructure. To reduce them, it is necessary to design specific public policies, strengthen local governments, invest in infrastructure and promote local economic development. In summary, the geographical dimension seeks to achieve a more equitable and sustainable development, where all regions contribute to economic growth and improve the quality of life of the entire population.

The ethnic dimension focuses on reducing inequalities between the different ethnic groups of a society. These inequalities are the product of discrimination, racism and historical exclusion. To achieve a fairer and more inclusive society, it is necessary to promote equal opportunities and respect for cultural

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https://www.jisem-journal.com/

Research Article

diversity. This involves designing specific public policies, promoting intercultural education, combating racism and discrimination, and recognizing the rights of indigenous peoples. In short, the ethnic dimension seeks to build more equitable societies where all ethnic groups have equal opportunities and their cultural diversity is valued.

Methodology

The study aimed to study and learn more about closing gaps in drinking water and sanitation at the national level in Peru. The aim is to obtain an estimated figure of the cost of closing gaps and to preserve it for 30 years. And on the other hand, the capacity of the state as a whole to execute sanitation works and thus be able to estimate the probabilities of closing gaps and what is needed for this to happen.

The type of research was basic, quantitative approach, non-experimental design and descriptive level. It was based on statistical information generated by SUNASS, MEF, MVCS, MIDIS, as well as projection and costing techniques and criteria. It is worth mentioning that there was also a need to renovate at least 29% of the existing infrastructure that has already long exceeded its useful life, generating losses, cost overruns and deficiencies in the quality of services.

It should be noted that the proposal emphasizes the SDGs, with respect to universal access to sanitation services and also to care for the environment, so this proposal includes, among others, the per capita investment costs of the wastewater treatment component, the cost of projects and remuneration mechanisms for ecosystem mechanisms.

Discussion and Results

The regulatory body that establishes the programs and policies of the sanitation sector in Peru is the MVCS, and in coordination with the GORE and the Municipalities (MP) and (MD), they have the operational responsibility for the services at the national level.

The organization for the provision of services has the following structure: At the urban level, 51 Service Provider Entities (EPS), of which one mega-company is SEDAPAL, which is under the responsibility of the state (FONAFE) and the other 50 EPS, which are in charge of the (MP). This group of companies is divided into 4, Large EPS 1 (G1), Large EPS (G2), Medium EPS (M) and Small EPS (P).

Then there is a group of 48 urban cities with more than 15,000 inhabitants that do not belong to any of the 51 regulated EPS, There are 580 small cities that are administered by UGM, and finally we see that there are 73,864 communal organizations that are managed by the user boards, under the technical assistance of the municipal technical areas (ATM).

Table 1 shows the organization already described, and the population that involves each sector. As of December 2023, Peru had an estimated population of 34.319 million inhabitants, of which 4.17 million inhabitants do not have access to safe water and 9.97 million inhabitants do not have conventional or alternative sanitation service.

In the same table, it can be seen that accessibility to services is greater when cities are larger. For example, in drinking water in Lima the coverage is 93.8% while in rural areas it is 81.5%. And in sewerage, in the city of Lima it is 91.4% while in rural areas it is 39.6%.

Table N°1 Population and service coverage

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Research Article

ESTIMACIÓN DE LA POBLACIÓN COBERTURADA CON SERVICIOS A NIVEL PAÍS								
TIPO DE OPERADOR				POBLACIÓN (MILES DE HAB.)				
TIPO		CANTIDAD A NIVEL PAÍS	Densidad Hab / Viv.	TOTAL	CON AGUA POTABLE		CON ALCANTARILLADO	
					Habitantes	Cobertura	Habitantes	Cobertura
SEDAPAL	EPS - S	1	3.75	11,039	10,351	93.8%	10,085	91.4%
EPS GRANDES 1	EPS - G1	6	3.90	5,523	4,958	89.8%	4,560	82.6%
EPS GRANDES 2	EPS - G2	13	3.23	3,806	3,226	84.8%	2,760	72.5%
EPS MEDIANAS	EPS - M	15	3.17	1,773	1,477	83.3%	1,293	72.9%
EPS PEQUEÑAS	EPS - P	15	3.41	504	438	87.0%	416	82.6%
URBANOS NO EPS	UGM	48	3.44	1,149	1,035	90.1%	662	57.6%
PEQUEÑAS LOCALIDADES	UGM	580	3.73	2,316	1,977	85.4%	1,324	57.2%
RURALES	OC	73864	3.10	8,210	6,687	81.5%	3,249	39.6%
TOTAL		74,542		34,319	30,149	87.8%	24,349	70.9%

Source: Benchmarking SUNASS. In original Spanish language

To estimate the value of the existing sanitation infrastructure at the level of urban cities that are under the management of any of the 50 companies, information has been extracted from the operational diagnoses of each city described in the Tariff Studies prepared by the regulator. This infrastructure has been valued through investment cost functions.

In the case of small cities, there is no information on the type and amount of infrastructure that each of them has, for this it has been determined indirectly with information collected from 357 projects and works from the PNSR database, determining the average investment costs per home benefited by type of service.

Similarly, to determine the value of the existing infrastructure in rural localities that are also not registered, it was determined indirectly with information collected from 4,242 projects and works from the PNSR database, determining the average investment costs per home benefited by type of service.

calculated by relating to the statistical basis of and for the case of rural localities, the cost of infrastructure has been estimated on the statistical basis of 4,242 projects and works developed by the PNSR.

As a result of the first part of the analysis, there is an estimate of the value of the existing infrastructure at the national level, according to company size, type of location. Table No. 1 shows that the new replacement value of sanitation infrastructure at the national level is 198,734 million soles and with an average useful life of 50 years.

On the other hand, if relating the records of effective investment in sanitation at the country level and the current levels of coverage, it would give a reference that 46% of all that investment was directed to expansion works and 54% to renovation and improvement works, but this was insufficient considering that by 2024 the level of accessibility of drinking water at the country level was 87.5% and sewerage 69.4%.

From the calculations and estimates made, it can be seen that the cost of investment in infrastructure in rural areas is more expensive than what infrastructure investment in densely populated areas demands. Among the factors can be cited; the distance, the accessibility to carry materials, the cost of freight, the lack of specialized labor in the locality, the dispersion of housing, among other factors.

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Research Article

Similarly, Table No. 2 shows that the costs of sewerage infrastructure in cities are higher than the costs of investment in drinking water, with the exception of rural localities where conventional systems do not work due to the dispersion of housing, making it necessary to use alternative systems such as latrines. septic tanks, among others, which are low cost.

Table N°2 Estimation of investment costs for non-EPS

ESTIMACIÓN DE COSTOS UNITARIOS DE INVERSIÓN		
TIPO DE PRESTADOR	EN SOLES POR CONEXIÓN (Sin IGV)	
	Agua Potable	Alcantarillado
SEDAPAL	11,790	17,640
EPS GRANDES 1	22,491	11,361
EPS GRANDES 2	9,277	10,946
EPS MEDIANAS	6,381	11,124
EPS PEQUEÑAS	6,595	9,616
URBANO NO EPS	6,653	9,701
PEQUEÑAS CIUDADES	8,283	7,730
CENTROS POBLADOS RURALES	11,760	11,660

Source: Own. In original Spanish language

With the reference information, it has been possible to estimate the investment cost by type of service and by type of provider as an average per unit of use. It should be noted that the estimate is as a new replacement value.

Based on the above, Table No. 3 shows the new replacement value of all the water and sanitation infrastructure in the country, that is, if all the infrastructure were new, it would have an estimated cost of 198,734 billion soles.

Table N°3 Estimated value of the existing infrastructure in year zero

VALOR ESTIMADO DE LA INFRAESTRUCTURA EXISTENTE COMO VALOR NUEVO DE REEMPLAZO (En Millones de Soles - Sin IGV)					
TIPO DE PRESTADOR	TIPO	N°	TIPO DE SERVICIO		
			Agua Potable	Alcantarillado	Total
SEDAPAL	EPS - S	1	32,587	47,502	80,089
EPS GRANDES 1	EPS - G1	6	28,562	13,269	41,830
EPS GRANDES 2	EPS - G2	13	9,264	9,355	18,619
EPS MEDIANAS	EPS - M	15	2,977	4,544	7,521
EPS PEQUEÑAS	EPS - P	15	848	1,173	2,020
URBANOS NO EPS	UGM	143	2,000	1,865	3,864
PEQUEÑAS LOCALIDADES	UGM	618	4,394	2,745	7,139
RURALES	OC	5926	25,410	12,241	37,651
TOTAL			106,040	92,694	198,734

Fountain; Own elaboration. In original Spanish language

Journal of Information Systems Engineering and Management
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https://www.jisem-journal.com/

Research Article

The second part of the analysis consists of determining the need for renovation and improvement of the existing infrastructure. To this end, the investment executed at the country level in the last 50 years has been correlated with the unit costs of investment per beneficiary and the current levels of accessibility. As a result, 46% of the investment went to renovation works, an amount that has not been enough to have quality services.

As a result of the evaluation, it is estimated that there is a deficit of 32.6% in renovation investments, which represents an approximate of 64,787 million soles. And on the other hand, it must be taken into account that the infrastructure renovation process will continue every year at a sequence of 2% per year, considering on average 50 years of life associated with the infrastructure. And to know the cost of infrastructure in non-EPS urban localities, the same investment costs as that of small companies have been considered due to their size, similarity and investment characteristics. In summary, the accumulated demand from year zero to year 30 years of investment in renovation would reach 173,739 million soles.

Table N°4 Investment projection in infrastructure renovation

ESTIMACIÓN DE LA INVERSIÓN REQUERIDA EN RENOVACIÓN DE INFRAESTRUCTURA DE AGUA POTABLE Y ALCANTARILLADO (Expresado en Millones de Soles - Con IGV)									
TIPO DE PRESTADOR			Año Base y Quinquenios						
TIPO		N°	Año " 1 "	(2-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)
SEDAPAL	EPS - S	1	26,109	7,130	7,130	7,130	7,130	7,130	7,130
EPS GRANDES 1	EPS - G1	6	13,637	3,938	3,938	3,938	3,938	3,938	3,938
EPS GRANDES 2	EPS - G2	13	6,070	1,689	1,689	1,689	1,689	1,689	1,689
EPS MEDIANAS	EPS - M	15	2,452	668	668	668	668	668	668
EPS PEQUEÑAS	EPS - P	15	659	180	180	180	180	180	180
URBANOS NO EPS	UGM	143	1,260	352	352	352	352	352	352
PEQUEÑAS LOCALIDAD	UGM	618	2,327	663	663	663	663	663	663
RURALES	OC	5926	12,274	3,539	3,539	3,539	3,539	3,539	3,539
TOTAL			64,787	18,159	18,159	18,159	18,159	18,159	18,159
						173,739			

Source: Own elaboration. In original Spanish language

The third step of the analysis consists of estimating the investment requirements in plans and programs such as Institutional and Operational Improvement (MIO) projects, plans and programs related to Remuneration for Ecosystem Mechanisms (MERESE), Disaster Risk Management (DRM) plans and programs, quality control plans and programs (QAC), among others.

In the case of the 51 EPSs, the investment amounts for these concepts have been obtained from the respective tariff studies by EPS size group. In the case of urban cities that are not in an EPS, for small towns and for rural localities, the amount corresponding to small companies has been considered to be 6.95 soles per inhabitant for drinking water and 2.53 soles per inhabitant for drinking water. sewer system.

As a result of the above, it has been estimated that the investment requirement in Projects (MIO), (GRD) and MERESE for year zero and the next 30 years will be 3,572 million soles in drinking water and 1,854 million in sewerage, for a total of 5,426 million soles.

Table N°5 Projectio of investments in MIO – GRD - MERESE

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

ESTIMACIÓN DEL TOTAL DE INVERSIÓN EN PROYECTOS MIO-GRD-MERESE POR QUINQUENIO									
PRESTADOR			REQUERIMIENTO EN MILLONES DE SOLES						
TIPO		N°	Año " 1 "	(2-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)
SEDAPAL	EPS - S	1	32.7	340.7	261.3	120.0	100.0	100.0	100.0
EPS GRANDES 1	EPS - G1	6	170.1	349.3	346.8	346.6	346.8	346.8	346.6
EPS GRANDES 2	EPS - G2	13	38.1	152.4	190.5	190.5	190.5	190.5	190.5
EPS MEDIANAS	EPS - M	15	23.0	91.8	114.8	114.8	114.8	114.8	114.8
EPS PEQUEÑAS	EPS - P	15	5.3	21.2	26.5	26.5	26.5	26.5	26.5
URBANOS NO EPS	UGM	143	10.0	0.4	0.8	0.9	0.9	1.0	1.0
PEQUEÑAS LOCALIDAD	UGM	618	19.2	1.9	1.3	1.4	1.5	1.5	1.6
RURALES	OC	5926	61.2	2.6	3.7	3.9	4.0	4.2	4.4
TOTAL			360	960	946	804	785	785	785
						5,426			

Source: SUNASS Tariff Studies. In original Spanish language

The next step in the analysis is to estimate the investment requirement needed to achieve universal accessibility of services in year 1, and to maintain this universal accessibility for the next 30 years.

Evaluating the information from the demographic indicators by department 2020-2025 published by the National Institute of Statistics (INEI) on its website, the existing population in each of the service supply groups, the growth rates and the population projection for the next 30 years were determined.

On the other hand, from the tariff studies published by the regulatory body on its website, the population served in each of the localities served by an EPS has been determined. And from the National Sanitation Plan published by the MVCS on its website, the population served in small cities and in rural areas was determined.

In this sense, it can be seen in Table No. 1 that the accessibility of drinking water services at the national level is 87.8% and in accessibility to sewerage is 70.9%, This means that there are 4.17 million inhabitants without access to drinking water service and 9.97 million inhabitants without access to sewerage.

For the population projection, growth rates differentiated by city size have been considered, such as Lima with a rate of 2.4%, for cities of Large Companies 1 with a rate of 2.3%, for cities of Large Companies 2 with a rate of 2.2%, for cities of Medium Companies with a rate of 2.1%, for Small Business Cities with a rate of 1.5%, for urban cities that are not in an EPS with a rate of 1.12%, for small localities with a rate of 1.0% and for rural areas a rate of 0.8%, the results of the projection are shown in Table No. 6.

Table N°6 Population projection

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

POBLACIÓN INCREMENTAL POR ÁREA DE PRESTADOR POR QUINQUENIO									
PRESTADOR			Habitantes						
TIPO		N°	Año 0	(1-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)
SEDAPAL	EPS - S	1	11,039	1,415	1,597	1,801	2,032	2,293	2,587
EPS GRANDES 1	EPS - G1	6	5,523	665	745	835	935	1,048	1,174
EPS GRANDES 2	EPS - G2	13	3,806	437	488	544	606	676	754
EPS MEDIANAS	EPS - M	15	1,773	194	215	239	265	294	326
EPS PEQUEÑAS	EPS - P	15	504	39	42	45	49	52	56
URBANOS NO EPS	UGM	143	1,149	71	75	80	84	90	95
PEQUEÑAS LOCALIDADES	UGM	618	2,316	118	124	130	137	144	151
RURALES	OC	5926	8,210	334	347	361	376	391	407
TOTAL			34,319	3,273	3,633	4,036	4,486	4,989	5,552

Source: SUNASS Tariff Studies and Own Elaboration. In original Spanish language

Knowing the population of the base year and its projection as can be seen in Table N°6; knowing the density of inhabitants per dwelling as seen in Table N°1; knowing the cost of investment in infrastructure by size of providers as seen in Table No. 2; and knowing the coverage of the base year as seen in Table N°1; The necessary resources are already in place to project the need for investment to close gaps in the base year and the need for investment that is required year by year.

With the aforementioned information, it was estimated that the need for investment for universal accessibility to services in year 1 is 14,571 in drinking water and 34,891 million soles in sewerage. to year 1 is 34,891 million soles, requiring a total of 34,319 million soles to year 1, and the cost of maintaining universal accessibility for the next 30 years would cost 191,219 million soles, giving a total investment demand of 240,681 million soles.

Graph N°7 Investment Demand in Expansion Works

INVERSIÓN ESTIMADA PARA AMPLIACIÓN DE INRAESTRUCTURA PARA CIERRE DE BRECHAS A NIVEL PAÍS									
PRESTADOR			AGUA POTABLE Y ALCANTARILLADO EN (MILLONES DE SOLES)						
TIPO		N°	Año 1	(2-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)
SEDAPAL	EPS - S	1	6,658	11,122	12,548	14,157	15,972	18,019	20,330
EPS GRANDES 1	EPS - G1	6	6,063	5,930	6,644	7,444	8,340	9,344	10,469
EPS GRANDES 2	EPS - G2	13	5,208	2,566	2,861	3,190	3,557	3,965	4,421
EPS MEDIANAS	EPS - M	15	2,282	1,013	1,124	1,247	1,383	1,535	1,703
EPS PEQUEÑAS	EPS - P	15	374	178	192	207	223	240	259
URBANOS NO EPS	UGM	143	1,591	324	344	365	388	412	437
PEQUEÑAS LOCALIDAD	UGM	618	2,809	506	532	559	588	618	649
RURALES	OC	5926	24,476	2,305	2,399	2,496	2,598	2,703	2,813
INVERSIÓN POR PERIÓDO			49,462	23,945	26,644	29,665	33,048	36,837	41,081
INVERSIÓN TOTAL (MILLONES DE SOLES)						240,681			

Source: SUNASS Tariff Studies and Own Elaboration. In original Spanish language

Finally, we consolidate the results obtained, adding the estimates of investment in infrastructure renovation (Table No. 4), with the estimates of investment in MIO, MERESE, GRD, PCC

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

and other projects by type of service and type of operator (Table No. 5), with the estimates of investment in expansion works by type of service and type of operator (Table No. 7). and whose results show that the demand for investments in year one is 114,609 million soles to close total gaps in year 1. It also shows that to maintain universal access for the next 30 years, 305,327 million soles are required, which gives a total of 419,845 million, as can be seen in Table No. 8.

Table N°8 Projection of total investment to close gaps

DEMANDA DE INVERSIÓN PARA EL CIERRE TOTAL DE BRECHAS A NIVEL PAÍS									
PRESTADOR			PERIODO (En Años)						
TIPO		N°	Año 1	(2-5)	(6-10)	(11-15)	(16-20)	(21-25)	(26-30)
SEDAPAL	EPS - S	1	32,800	18,593	19,939	21,407	23,202	25,249	27,560
EPS GRANDES 1	EPS - G1	6	19,870	10,217	10,928	11,728	12,624	13,629	14,754
EPS GRANDES 2	EPS - G2	13	11,316	4,407	4,740	5,069	5,436	5,845	6,300
EPS MEDIANAS	EPS - M	15	4,757	1,773	1,907	2,030	2,166	2,318	2,486
EPS PEQUEÑAS	EPS - P	15	1,038	380	399	414	430	447	466
URBANOS NO EPS	UGM	143	2,861	677	697	718	741	765	790
PEQUEÑAS CIUDADES	UGM	618	5,156	1,171	1,197	1,224	1,252	1,282	1,314
RURALES	OC	5926	36,811	5,846	5,941	6,039	6,140	6,246	6,356
INVERSIÓN POR QUINQUENIO			114,609	43,063	45,748	48,628	51,991	55,781	60,025
INVERSIÓN TOTAL (MILLONES DE SOLES)						419,845			

Source: Own elaboration. In original Spanish language

Although the investment requirement to close the existing gaps has been estimated, the following question arises: What is the capacity of the State to execute drinking water and sanitation works? To answer this question, the "Friendly Consultation" platform of the Ministry of Economy and Finance (MEF) web portal has been consulted. This tool provides detailed statistical information on the amounts allocated and executed in the last six years, broken down by levels of government. Based on the data obtained, the following analysis is presented:

The first level corresponds to the MVCS, which as an annual average its capacity to program investments is 1,739 million, and its execution capacity is 907 million soles, which demonstrates an efficiency of investment execution of 52%.

At the second level are the regional governments, whose annual average is 490 million soles and their execution capacity is 322 million, showing a level of investment execution efficiency of 66%.

The third level corresponds to local governments (Provincial Municipalities and District Municipalities), which as an annual average their investment programming capacity is 4,717 million and their execution capacity is 2,703 million soles, which shows a level of efficiency of investment execution of 57%.

The fourth level corresponds to SEDAPAL, which as an annual average its investment programming capacity is 886 million soles and its execution capacity is 809 million, with 91% efficiency of investment execution.

The fifth level is made up of the 50 EPSs whose annual average capacity for investment programming is 761 million and their execution capacity is 218 million, with 29% efficiency of investment execution.

In summary, it can be seen that on average the capacity of resources programmed for drinking water and sanitation works at the country level is 8,594 million soles. And on the other hand, the average capacity for investment execution at the country level is 4,959 million soles, which indicates that at the country level only an investment execution efficiency of 57% is achieved.

Table N°9 Statistics on programming and execution of investments

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

CAPACIDAD DE EJECUCIÓN DE INVERSIONES EN SANEAMIENTO A NIVEL PAIS						
INVERSIÓN PROGRAMADA (MILLONES DE SOLES)						
AÑO	2019	2020	2021	2022	2023	2024
GOBIERNO CENTRA (MVCS)	1,839	1,543	1,413	1,503	1,835	2,303
GOBIERNOS REGIONALES (GOREs)	473	384	451	589	502	543
GOBIERNOS LOCALES	4,830	4,325	4,877	4,994	4,729	4,545
EPS ESTATAL (SEDAPAL)	486	651	778	1030	1188	1187
EPS MUNICIPALES	762	696	683	668	655	1,102
TOTAL A NIVEL PAÍS	**8,730**	**7,558**	**8,187**	**8,799**	**8,950**	**9,340**
INVERSIÓN EJECUTADA (MILLONES DE SOLES)						
AÑO	2019	2020	2021	2022	2023	2024
GOBIERNO CENTRA (MVCS)	832	780	839	809	827	1,357
GOBIERNOS REGIONALES (GOREs)	232	260	318	376	395	350
GOBIERNOS LOCALES	2,674	2,137	2,927	2,955	2,579	2,945
SEDAPAL	516	336	626	1279	1193	908
EPS MUNICIPALES	209	213	165	245	183	291
PAÍS	**4,545**	**3,696**	**4,955**	**5,584**	**5,207**	**5,769**
CAPACIDAD DE EJCUCIÓN						
AÑO	2019	2020	2021	2022	2023	2024
GOBIERNO CENTRA (MVCS)	45%	51%	59%	54%	45%	59%
GOBIERNOS REGIONALES (GOREs)	49%	68%	71%	64%	79%	64%
GOBIERNOS LOCALES	55%	49%	60%	59%	55%	65%
SEDAPAL	106%	52%	80%	124%	100%	76%
EPS MUNICIPALES	27%	31%	24%	37%	28%	26%
PAÍS	**52%**	**49%**	**61%**	**63%**	**58%**	**62%**

Source: WEB, Friendly Consultation – MEF. In original Spanish language

To be objective with the results, a graph shows the Projection of the total investment requirement for closing gaps and for all concepts (Table No. 8), the information on investment programming of the state as a whole (Table No. 9), and the information on the investment execution capacity of the state as a whole (Table No. 9). as shown in Graph N°1

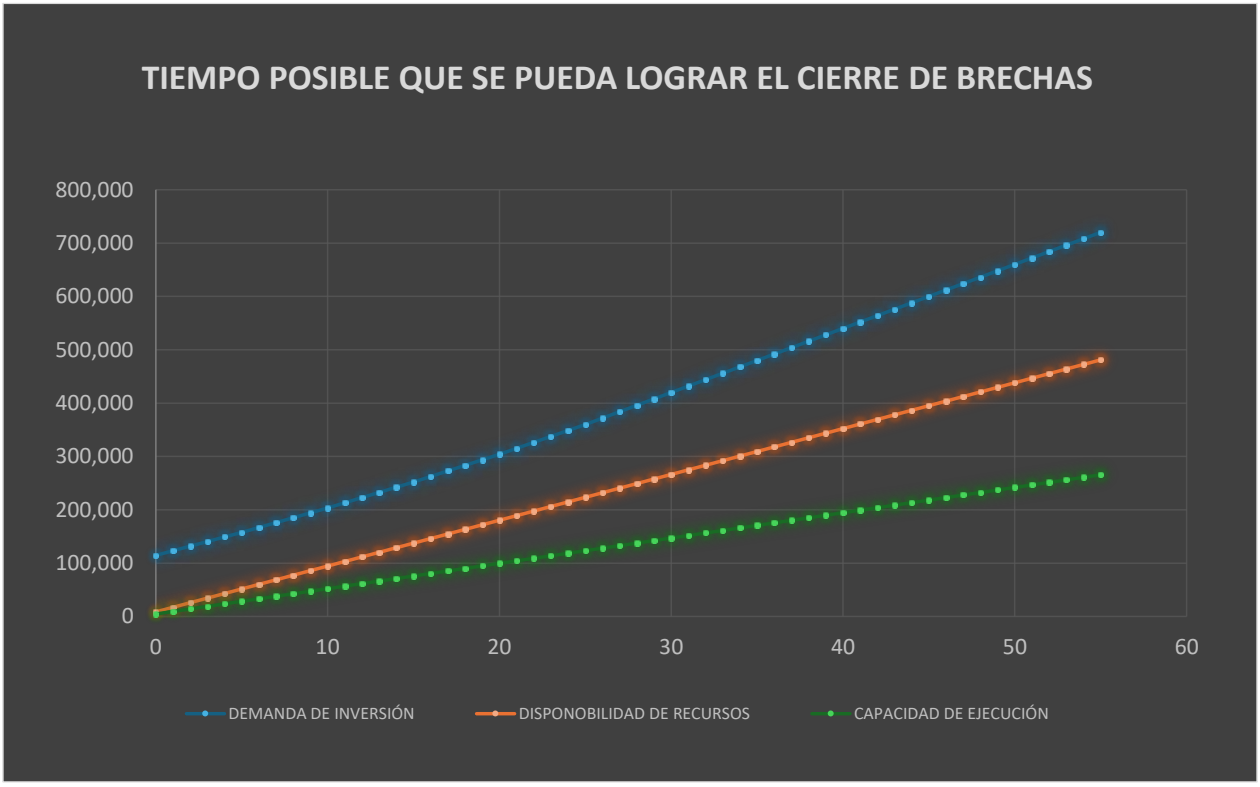
Analyzing graph No. 1, it can be seen that the capacity to program investments will never reach the need for investments, although at least the gaps are maintained over time. And even less will be possible if we compare it with the capacity to execute investments, which as we can see the gap is getting bigger every year.

What the graph shows is that, although investments are made every year, this is not enough to close gaps in accessibility, quality and operational sustainability.

Graph N°1 Estimation of the time to close gaps

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article



Source: Own elaboration. In original Spanish language

This leads us to propose alternatives to achieve the closing of gaps, depending on how long it would take to achieve the closure of gaps. To this end, six alternatives have been developed to close total gaps and these will depend on how many years it is expected to close gaps.

Table No. 10 shows by what percentage it is necessary to increase the current capacity for the execution of investments depending on how many years it is desired to close gaps; To close in 10 years, it is necessary to increase the capacity to execute investments by 3.9 times, from 4,959 million soles to 18,513 million soles and which is equivalent to 2.15 times the capacity to program investments.

In the same table it can be seen that to close gaps in 20 years it is necessary to increase 3.05 times the current annual investment, to close in 30 years it is necessary to increase the current annual investment by 2.86 times, to close in 40 years it is necessary to increase the current annual investment to 2.78 times, to close in 50 years it is necessary to increase the current annual investment to 2.73 times. and to close in 60 years, it is necessary to increase the current annual investment to 2.70 times, as can be seen in Table No. 10 and Graph No. 2.

Table N°10 How many times does it require increasing investment capacity to close gaps?

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

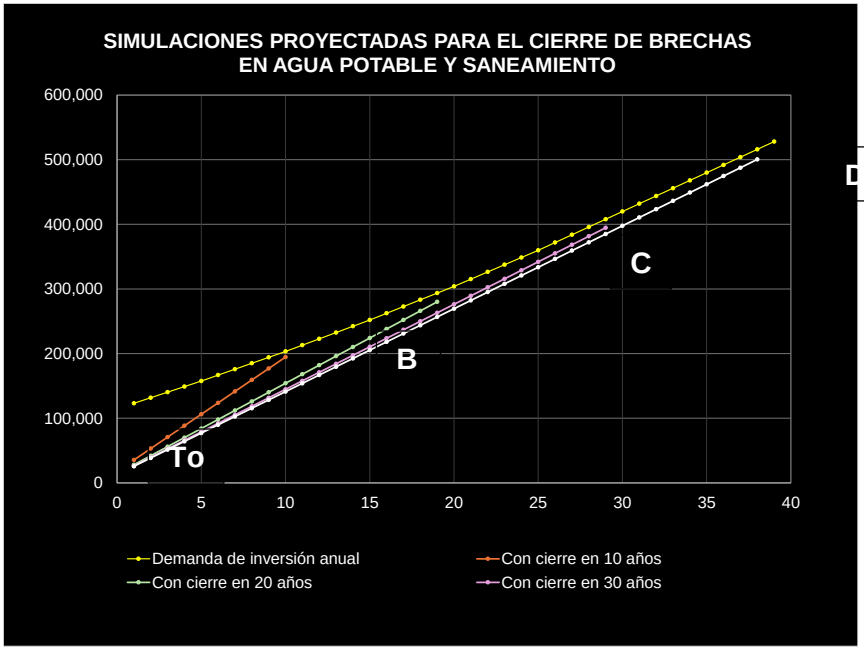
PROPUESTAS DE INVERSIÓN ANUAL EN MILLONES DE SOLES PARA EL CIERRE DE BRECHAS PROGRAMADO				
Alternativas	Año de Cierre de Brechas	Años	Incremento de Inversión	Inversión Anual Propuesta
Alternativa N°1	2034	10	3.90 Veces	18,513
Alternativa N°2	2044	20	3.05 Veces	14,478
Alternativa N°3	2054	30	2.86 Veces	13,576
Alternativa N°4	2064	40	2.78 Veces	13,173
Alternativa N°5	2074	50	2.73 Veces	12,940
Alternativa N°6	2084	60	2.70 Veces	12,793

Source: Own elaboration. In original Spanish language

On the other hand, and regardless of the investment capacity, it is necessary to take into consideration the investment cycle, from the moment the idea is generated, it goes through the various levels of pre-investment, stages of profiles, definitive studies, financing, tenders, execution of works and start-up, all within the process of pro investment can take between 5 to 8 years.

It is also necessary to take into account that in the last two decades thousands of unfinished, paralyzed and arbitrated works have accumulated, many of them have been vandalized because they are abandoned. This is another problem that will have to be addressed by the housing sector as a whole.

Graph N°6 Alternatives for closing Gaps in Drinking Water and Sanitation at the country level.



Source: Own elaboration. In original Spanish language

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Conclusion

It may be painful to admit our reality, but the truth is that, in Peru, and in the 21st century, there are 4.17 million inhabitants without access to safe water and 9.97 million inhabitants without access to sanitation services. This situation is generated by the inability of the state at all levels to execute investments. Its investment programming is on average 8,594 million per year, of which it only invests 4,959 million per year, that is, only 56.4%.

That there is a delay in investments in infrastructure renovation generated especially in the last two decades, estimating that in year zero it is necessary to renew at least 32% of the existing infrastructure and in the future the renovation of infrastructure should be at a rate of 2% each year. Estimates indicate that 64,787 million soles will be required for this concept in year zero and 108,952 million for the next 30 years, which gives a total of 173,739 million soles.

That, in relation to the requirement for investment in projects and works of Institutional and Operational Improvement, in disaster risk management, and in ecosystem retribution mechanisms, 360 million of investment are required for year zero and 5,066 million for the next 30 years, which totals 5,426 million.

That, in relation to the investment requirement for expansion works to close gaps, 49,462 million soles are required for year zero and 191,219 million for the next 30 years, which gives a total of 240,681 million soles.

That, in summary, the estimated demand for investment in all respects for closing gaps is 114,609 million soles for year zero and 305,236 million for the next 30 years, which gives a total of 419,845 million soles (three hundred and forty-six thousand, three hundred and eighty million soles).

That, if the state as a whole maintained the same levels of investment and investment efficiency, it would never close gaps. To do this, it is necessary to consider two conditions: First, that the state is efficient and executes 100% of the programmed resources; Second, that resources for investment in Drinking Water and Sanitation be increased, to the extent that more financial resources are available, the closer the gaps will be closed.

That, according to investment simulations, if the investment capacity of 4,959 million soles rose to 18,513 million soles per year, the closing of gaps would be achieved in 10 years. If it rose to 14,478 million soles per year, the closing of gaps would be achieved in 20 years. If it were to rise to 13,576 million soles per year, the closing of gaps would be achieved in 30 years. If it were to rise to 13,173 million soles per year, the closing of gaps would be achieved in 40 years. If it were to rise to 12,940 million soles per year, the closing of gaps would be achieved in 50 years. And if it were to rise to 12,793 million soles per year, the closing of gaps would be achieved in 60 years.

That, whatever the strategy, it is necessary to consider a dead time of at least 5 years, which is what the cycle of investment projects demands, from the idea of projects to the start-up.

This implies that the political decision to close gaps and increase the amount of resources for investment is necessary. And on the other hand, the state must generate creative strategies that allow increasing investment capacity and the capacity to execute works in order to close the gaps as soon as possible.

Finally, I consider that in order to close the gaps in urban areas that are under the administration of any of the 51 regulated EPS, the state should not allocate internal resources to carry out works, considering that the rates allow the recovery of the capital invested, for this it should resort to international banks in search of financing. What is true, the state should assume the investment costs of rural areas and small cities in coordination with the Regional, provincial and district governments.

Journal of Information Systems Engineering and Management
2025, 10(49s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Conceptual Basis

MVCS: Ministry of Housing, Construction and Sanitation

MEF: Ministry of Economy and Finance

PNSU: National Urban Sanitation Program

PNSR: National Rural Sanitation Program

Pro-Inversión: Private investment promotion agency.

PASLAC: Safe Water Program for Lima and Callao

SUNASS: National Superintendence of Sanitation Services

UN: United Nations

UNICEF: United Nations Children's Fund

UGM: Municipal Management Unit

ATM: Municipal Technical Area

GORE: Regional Government

MP: Provincial Municipality

MD: District Municipality

Drinking water: Water processed and suitable for human consumption, in accordance with the physical, chemical and microbiological requirements established by current regulations.

Wastewater: Water that has been used in domestic or non-domestic activities and that, due to its quality characteristics, requires treatment prior to its final disposal or reuse.

Raw Wastewater: Wastewater not yet treated

Scope of responsibility: Territorial space under the responsibility of a provider.

User Associations: A non-profit board or association of users for the purpose of managing sanitation services in a JASS locality.

Service gap: Population that does not have access to water or sanitation services in a conventional way.

Supply contract: A contract signed between a resident and a provider to receive sanitation services through connections.

Family fee: Payment made in rural areas and in small urban cities administered by a UGM for the provision of services.

Tariff study: Technical document that supports the rates approved by the regulatory entity of sanitation services for the EPS.

Conventional Technology Options: Techniques Commonly Used to Deliver Drinking Water and Sanitation Services

Non-conventional technological options: Innovative and special techniques of alternative use to provide drinking water and sanitation services,

Optimized Master Plan (PMO): Management and planning plan for 30 years of the EPS and at the level of efficiency.

Research Article

National Plan for Drinking Water and Sanitation (PNAS): This is the main instrument for planning and implementing the National Policy on Drinking Water and Sanitation.

Drinking water and sanitation services: Includes the supply of drinking water, the collection of wastewater and subsequent treatment or the sanitary disposal of excreta.

User: Natural or legal person to whom drinking water and sanitation services are provided.

Peri-urban zone: A partially populated area that grows around a consolidated urban area.

MIO: Institutional and Operational Improvement

DRM: Disaster Risk Management

MERESE: Mechanisms for remuneration for ecosystem services

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