

Technical Note 2

Evaluation to the Water and Sanitation System in Schools: Comprehensive School Water and Sanitation System (SIASE)

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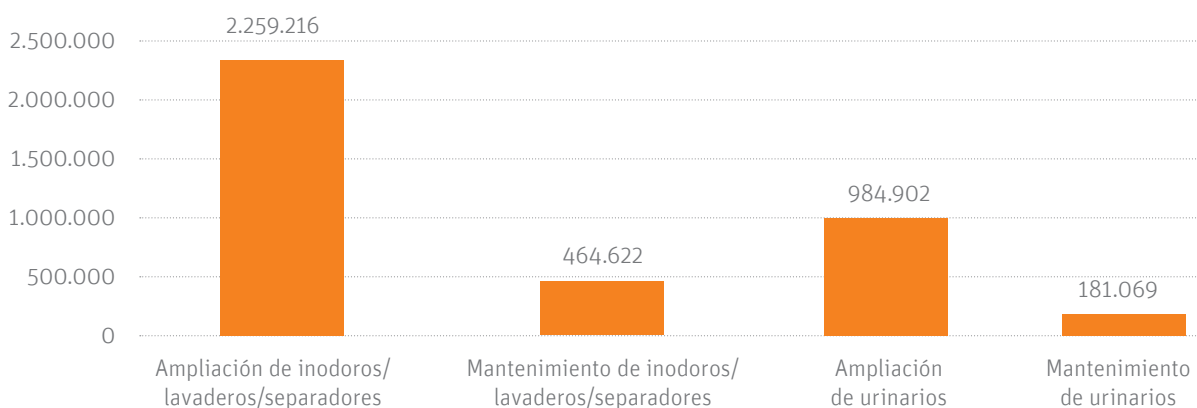
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INTRODUCTION

As it prepared the first School Infrastructure Census (2014 CIE), the Ministry of Education of Perú was given advice from the World Bank for the purposes of analyzing the physical status of public school infrastructure. The results were the input to prepare the National School Infrastructure Plan (PNIE), as the core school infrastructure planning instrument as of 2025. The experience gained on this analysis encouraged the preparation of a Comprehensive School Water and Sanitation System (SIASE) that may be applied in other countries to evaluate their own realities, in terms of school infrastructure.

Based on the CIE analysis¹ 58 % of the school students in Peru require more toilets, sinks, and partitions to assure privacy and safety in their school restrooms, and 25 % of them require more urinals.

Número de ESCOLARES por tipo de intervención para indicador de idoneidad de servicios higiénicos



Although CIE collects data on water access and sanitation in schools², there are limitations, in terms of the information gathered from all the comprehensive water and sanitation system components and the restroom quality to estimate the demand. An example of the latter would be to know if gender segregated restrooms for boys and girls exist and are kept; this is linked to student privacy requirements. In addition, neither CIE nor the country have sufficient data that allow evaluating the conditions of the restrooms inside the school buildings, the system's operativity or maintenance status. This affects the definition of operation and maintenance cost efficient interventions.

On the other hand, there are gaps in the law regarding school water and sanitation. Not all the components of a comprehensive system are addressed in Peru. Almost all the regulations, directives or instructions focus on design and availability, but fail to include other characteristics, such as operativity, maintenance status, and/ or functionality of such components.

1. Schools (IE) were classified, based on their water and sanitation facility status, namely: with suitable access (facility has water supply and excreta and wastewater disposal system), with unsuitable access (facility lacks either the water supply service or the excreta and wastewater disposal system), and with no access (facility lacks both services.)
2. Set of sanitary elements located outside the school building that make up the water supply service and the wastewater disposal service.

In addition, the existing regulations, directives, and instructions have not been included in one single regulatory framework; several existing regulations have not been enacted, and others are still in force, although they were issued over two decades ago. Although the National Construction Standards of Peru are the framework on which all the construction standards rely and hold specific sections for schools, it is apparent that having a specific regulation for schools from the Education Sector that is differentiated for each geographic or climate area could help to meet technical and cultural needs in the school communities.

This approach reveals a need to reorient the focus on an integrating and organized view of the school water and sanitation system, for the purposes of overcoming the lack of information and regulations about all its components, including aspects, such as quality, operation, and maintenance.

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PURPOSE OF THE NOTE

To describe the methodology of SIASE, which is an organized and comprehensive system of school water and sanitation indicators that encompasses, both inside and outside a school's space, and involves all the comprehensive system's components, and its analysis allows to identify the interventions that are necessary to provide a complete and quality service, either at local or nationwide level.

Its application will contribute to have a baseline on school reality in a specific geographic space available.

Methodological Introduction of SIASE

Support

Access to quality water, sanitation, and hygiene services in the schools, houses, and community offers a series of benefits associated to school attendance of boys and girls and an impact on school students' health and nutrition. Evidence of such benefits and impacts are shown in the Table below:

Table 1. Evidence of the Benefits brought by the Water and Sanitation System in Schools

Benefit	Impact on the population	Impact on the population
Water service to the community	Girls' attendance to school	It has been proven that a reduction of 15 minutes in the time devoted to haul water to a family home would represent an 8 % to 12 % increased attendance to school for 5- to 15- year old girls ³ . A reduction of one (1) hour in such time would represent a 10 % increased enrollment for such population group in Yemen, and a 12 % increased enrollment in Pakistan ⁴ .
Access to school sanitation	Increased school enrollment and decreased student dropouts	In the case of India, elementary school enrollment (children ages 6 to 10) increased 12 %, namely, 607,000 students; middle school enrollment (children ages 11 to 14) increased 8 %, namely, 75,000 students ⁵ . It was also proven that impact generated by interventions on school infrastructure usually declines over time, whereas latrine constructions caused an impact on enrollment for three additional years ⁶ .
Access to segregated school sanitation for men and women	Female children's and adolescents' attendance to school, once concerns about privacy and safety are solved.	Impact on female children's and adolescents' attendance to school is caused not only by the discomforts related to menstruation, but also by concerns about privacy and safety. According to a report by UNESCO, it is estimated that 1 out of every 10 girls in Sub-Saharan Africa does not attend school (IE) during her period. According to some estimations, this is equivalent to 20 % of any given school year ⁷ .
Hygiene in water and sanitation interventions	Changes in school students' behavior	It has been proven that hygiene programs should be an integral part of water and sanitation interventions, for the purposes of achieving behavioral changes. In addition, it has been proven that such change is feasible as long as there are existing water and sanitation services ⁸ .

3. Céline Nauges and Jon Strand. Water hauling and girls' school attendance: some new evidence from Ghana. Toulouse School of Economics / World Bank. May 2011.
4. Koolwal and van de Walle. WP. 2010.
5. Sanitation and Education. Anjali Adukia. Harvard University, November 2013. Job Market Paper.
6. Sanitation and Education. Anjali Adukia. Harvard University, November 2013. Job Market Paper.
7. <http://blogs.worldbank.org/voices/es/la-menstruacion-causa-ausentismo-escolar-de-las-ninas-en-el-mundo>.
8. Hygiene Promotion -the backbone of BRAC WASH: Embedding long-term change in communities. Abu Taleb Biswas and Peter McIntyre. BRAC / IRC. February 2015.

Benefit	Impact on the population	Impact on the population
Access to water, sanitation, and hygiene services in the family homes	Increased number of school attendance days, as a result of decreased diarrheic diseases	WHO has estimated that 1.863 billion school attendance days would be gained, as a result of decreased diarrheic diseases, if everybody had access to water and sanitation services in their homes. Helminthiasis, that is transmitted directly from the ground, can reduce the cognitive potential and can indirectly result in school absence, attention deficit, and dropout. Studies on this disease point out that 100 % of these infections that are caused by helminths can be prevented with a suitable access to quality water, sanitation, and hygiene services ⁹ .
Access to potable water, upgraded restrooms, and handwashing with soap services	Decreased chronic malnutrition.	It was found that children in Bangladesh experienced a 50 % improvement in their chronic malnutrition rates against the control group that showed no improvement at all. Similar results were shown in Sudan and Mexico ¹⁰ .

These impacts on school age boys and girls highlight an urgent need for the countries to address interventions that will assure access to quality water, sanitation, and hygiene, from a comprehensive analysis of all the components that make it up. As a result of such analysis, policies, programs, and plans that could contribute to improve results, in terms of school attendance, learning, health, and nutrition for children and young people, shall be defined.

In the face of a lack of comprehensive information on water and sanitation, both outside and inside schools, SIASE is proposed as a methodological alternative to assure the provision of a quality service to students and the school community. A summary of the main existing barriers and the benefits offered by SIASE is shown in the table below.

Table 2. Benefits offered by SIASE in the face of the Existing Barriers

Existing Barriers	Benefits offered by SIASE
Lack of a comprehensive view of the water and sanitation system	The school water and sanitation system involves a series of specific indicators that assure that the whole service chain is included. Each and every indicator can be evaluated in-depth from a technical, statistical, legal, and costing point of view.
Lack of connection between the water supply and sewerage outside a school (IE) and the water supply and sewerage inside the school, in such areas that are benefited with a network service.	A quality service is assured, by identifying the supply capacity and the quality of the system outside, and connecting it to the service inside a IE. Confirmation of the existence or non-existence of a service outside a IE shall allow to decide on the technological solution to be proposed for inside a IE.
No existing data that evaluate the whole school system, and thus can propose ad- hoc interventions	SIASE's organization in five indicators, each one of them comprising of specific components, offers guidance in the design of research studies or censuses on comprehensive school water and sanitation infrastructure.

9. Evidence base: Water, Sanitation and Hygiene Interventions. Peter van Maanen. WASH Section, UNICEF, HQ New York. September 2010. Literature review.

10. Beyond Malnutrition. The Role of Sanitation in Stunted Growth. Charles W. Schmidt. Environmental Health Perspectives. Volume 122, number 11. November 2014.

Existing Barriers	Benefits offered by SIASE
Need for further control on the quantity and the quality of the service at school	Managing a comprehensive system helps towards timely decision- making on the following issues: (i) if the available restrooms in the schools are sufficient, in terms of quantity and (ii) if the restrooms require some sort of improvement (upgrading or maintenance) or replacement.
Dissemination of the regulations and the instructions that promote it, such as Housing, Education, and Health.	An organized view of the system helps to evaluate the relevance of generating supplementary regulations on all the parts of the system, and the interrelation that should be generated between the sectors, for the purposes of meeting these school population's needs.

Organization

SIASE establishes a comprehensive view that involves two spaces: the first one, outside a school, where the type of access to water and the excreta and wastewater disposal systems from school and the community where these are located, are evaluated; and the second one, which specifically focuses on the availability and the conditions for water and sewerage services inside a school. This initial view helps to understand the interrelation between the access outside and the conditions inside a school and the comprehensive view of the water and sanitation system; this facilitates defining the interventions that assure the provision of quality. Graph 1 shows the emphasis between the outside and the inside factors.

It must be pointed out that this view that covers the service, both outside and inside a school, applies to areas where there is an existing water and sewerage network service supply.

Secondly, based on functionality, this comprehensive system is organized in five indicators that have been identified, based on the roles they play in the system:

- Access to water and sanitation,
- Storage and pumping system,
- Suitability (of the restrooms),
- (Water) Drinking Fountains,
- Rainwater drainage network.

Each indicator involves in turn a series of components that have been identified along their route down the system. The emphasis of this organization lies in the fact that its thoroughness removes the risks of failure for this system, if all the components are operative and given ongoing maintenance. Table 3 shows SIASE's organization and the connection between each indicator and its components.

Graph 1. The Comprehensive Water and Sanitation System's Components

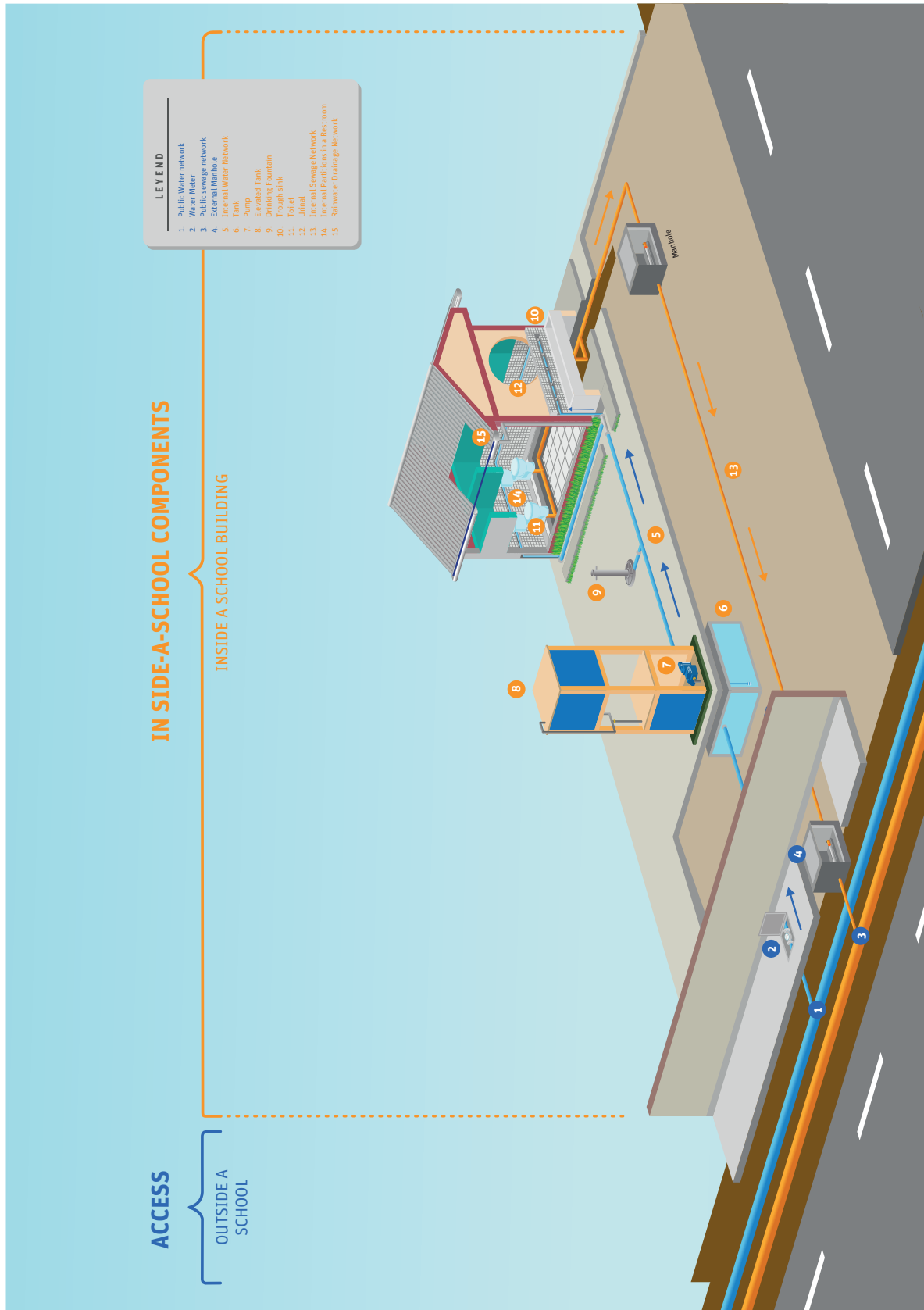


Table 3. SIASE’s Organization, based on its Indicators and Components

No.	Indicator	Definition	Components	Details of each Component
1	Access to water and sanitation	It is relevant to the school’s probable situation whether it has or not public water and sewerage networks in the local area, and thus, to have the option of a connection to the networks, or, as an alternative, to require other in situ water and sanitation access modalities.	Water: Public Water network Water Meter	<p>a) Public Water network It is the set of pipes that have been installed underground a street, and supply water to a school.</p> <p>It is made up of a distribution service pipe that reaches the Water Meter, and from there, it enters the school building.</p> <p>b) Water Meter It is the device that measures the amount of water that runs through it into a school building. It is usually located on the ground at the entrance of the school building.</p> <p>It is made up of a body or casing that holds other several elements inside it, and it is installed underground, inside a box with a lid.</p>
			Sewage: Public sewage network External manhole	<p>c) Public Sewage Network It is a set of pipes that have been installed underground a street, and receive the wastewater discharge from the school building.</p> <p>It is made up of a sewer service pipe and a manhole.</p> <p>d) External Manhole It is a box built underground, and its function is to allow the meeting and change of direction of the sewage pipes, and facilitate pipe maintenance whenever there are any clogs.</p> <p>It is made up of the box’s body, frame, and lid. The lid is the visible part of the box, and it is ground level.</p>
2	Storage and Pumping System	It is relevant to a need for, and the existence or non- existence of, a water storage system at the school building, for the purposes of assuring sufficient water volume availability during the school day, by means of three components.	Tank Pump Elevated Tank	<p>e) Tank An underground buried water storage tank underneath the school building.</p> <p>It is made up of a body that includes walls and ceiling, where the lid is located, and water inlet and outlet pipes.</p>

No.	Indicator	Definition	Components	Details of each Component
				<p>f) Pump The water pump is an engine- driven machine that pumps water from the tank; it is located in the lower part, towards the elevated tank.</p> <p>It is made up of a body or casing that holds elements that pump the water. It works jointly with an engine that provides energy to the pump.</p> <p>g) Elevated Tank It is a water storage tank that is located in the upper part of the school building; it allows to compensate the consumption variations during the day, and keep the necessary service pressure in the water distribution network.</p> <p>It is made up of a supporting structure, walls, and a ceiling, with a lid on top of it, and water inlet and outlet pipes.</p> <p>All three components: the tank, the pump, and the elevated tank operate jointly to assure water supply to the school.</p>
3	Suitability of the Restrooms	It is relevant to the schools' requirements for a full set of sanitation fixtures with their corresponding networks and water and sanitation service.	Internal water network Internal sewage network Trough sinks Toilet Urinal Internal partitions in the restrooms	<p>h) Internal Water Network A set of elements that carry and distribute potable water inside a school building.</p> <p>It is made up of pipes and accessories for direction changes and joints between pipes and the sanitation fixtures.</p> <p>i) Internal Sewage Network A set of elements that receive wastewater from the sanitation fixtures and dispose of them outside the school building.</p> <p>It is made up of pipes, manholes, and accessories for direction changes and joints between pipes and the sanitation fixtures</p>

No.	Indicator	Definition	Components	Details of each Component
				<p>j) Trough sink It is a sanitation fixture that provides water for grooming purposes. It is generally concrete- built. It may be installed mounted against the wall, either inside or outside a restroom. It is made up of a set of faucets, a sink, and a sewerage pipeline.</p> <p>k) Toilet It is sanitation fixture that is used to deposit and dispose of excreta and urine. Toilets are installed inside a restroom, in private modules that have been separated by partitions. Each toilet comprises a water tank, the toilet itself, and a sewage pipe.</p> <p>l) Urinal It is a sanitation fixture that allows disposing of urine. Urinals can be either individually anchored to the wall, or can be trough- like placed on the floor. Urinals are installed inside a restroom and comprise a spreader, a pan, and a sewage pipe.</p> <p>m) Internal Partitions in a Restroom They allow separating each one of the toilets in private modules. They comprise screens or walls and a door that is closed from inside the module.</p>
4	Water Drinking Fountains	They are proposed as a new requirement to be implemented in the schools; they meet a potential demand for an individual drinking service that provides water for direct human consumption.	Drinking Fountain	<p>n) Drinking Fountain It is a sanitation fixture that supplies water for human consumption; it is located in a place of easy access inside the school building. It usually comprises a faucet on a pedestal that is fed by a service pipe from the internal water distribution network.</p>

No.	Indicator	Definition	Components	Details of each Component
5	Rainwater Drainage Network	It is relevant to the requirement for a school to be supplied with a basic rainwater drainage system in all its school buildings. Basically, it is made up of a chute and downspouts.	Rainwater drainage system	<p>o) Rainwater Drainage Network It allows collect rainwater that falls on the building surfaces and draining the water to the lower part of the building.</p> <p>It is made up of air chutes and rainwater downspouts</p>

A Useful Tool for the School Water and Sanitation System Analysis

The organization and definition of the indicators and their components were the first milestone to apply the system analysis methodology. In this way, the interventions required to provide the school water and sanitation service with the required quality will be identified.

For the purposes of assuring a thorough analysis of the school water and sanitation situation, a methodology to estimate the intervention needs was established; such methodology followed these steps: (i) defining the analysis criteria of the components that have been organized in indicators; such analysis shall be carried out, by considering units, such as environment, building, and grounds, that have been taken into account for a school's consolidation and (ii) identifying the assessment of the water and sanitation services status in schools, by defining the type of physical and material intervention demanded by each school, for each one of the 15 components that make up the school water and sanitation system; such assessment is described in five sections: (a) basic assessment unit, (b) identification of questions and information sources, (c) rules for decision- making, (d) operational definitions of the rules for decision- making, and (e) the algorithm to identify the intervention type per school. This methodology is explained in detail in the Technical Note on the process of identifying the water and sanitation gap¹¹.

Once the intervention needs have been identified, SIASE facilitates cost assignments to the interventions. In this way, the people in charge can have all the information they need for decision- making purposes; this in turn will promote their actual execution and for all the water and sanitation problems to be solved at school level. In this way, an operative, maintained, comprehensive, and sustainable service will be available.

The cost methodology was prepared by taking the following steps: (i) assigning cost units to the SIASE components, based on the units for need estimations, (ii) consulting multiple sources, given the lack of official information in Peru¹², such as project samples, budgets for typical modules, (iii) appraising at market prices to consider reduced margins of error, (iv) estimating coefficients for replacement, moderate and mild rehabilitation costs for an elevated tank, maintenance costs for sanitation fixtures, chutes, maintenance of downspouts, (v) combining the costs of the sanitary specialty, the cost of the structures, the architecture, and the electrical installations, and the transportation costs, by taking into account scenarios, such as the new bioclimatic zones. Technical Note 1: Identification of Investment Needs in School Water and Sanitation Infrastructure in Peru, reviews in detail the cost allocation methodology for the proposed interventions.

11. See Technical Note 1: Identification of Investment Needs in School Water and Sanitation Infrastructure in Peru

12. For further details, refer to Technical Note 1: Identification of Investment Needs in School Water and Sanitation Infrastructure in Peru

Although most proposed interventions were established, based on the existing regulations, it must be pointed out that these regulations fail to cover all the necessary aspects; there are even no regulations in the country with regard to the Drinking Fountain indicator. SIASE included an analysis to the regulations with regard to the indicators and their components, for the purposes of establishing which components require legal support, and what aspects with regard to quality, operation, and maintenance should include guidelines, principles, or guides. As an example, Table 4 shows the proposed intervention and the basic criteria for the suitability indicator, as well as its relation with the regulations. Annex 1 shows the proposed interventions for the other indicators and the existing regulations.

Table 4. Proposed Interventions for the Suitability Indicator

Intervention Name	Basic Criteria	Existing Regulations	There are no Regulations for This
Toilet Maintenance	Toilets deteriorate frequently, for instance, they get clogged, as a result of introducing strange elements into them, and some of its parts get broken (tank lid, accessories); this limits their functionality. Partition structures are also frequently damaged. Toilets should be located in private partition-separated modules.	RM-022-2015-MINEDU. Technical instructions for maintenance of school buildings.	
Urinal Maintenance	Urinals deteriorate frequently, for instance, they get clogged, as a result of introducing strange elements into them, and the spreader gets broken; this limits their functionality. Installed urinals shall be suitably operated and given maintenance for them to keep their functionality.	RM-022-2015-MINEDU. Technical instructions for maintenance of school buildings.	
Sink faucet maintenance	Sinks deteriorate frequently, for instance, they get clogged, as a result of introducing strange elements into them, and their faucets deteriorate, as well; this limits their functionality. Installed faucets shall be operated and given maintenance for them to keep their functionality.	RM-022-2015-MINEDU. Technical instructions for maintenance of school buildings.	
Toilet Installation	Toilets deteriorate frequently, to the point of becoming unusable. In other cases, the number of existing toilets may turn out to be insufficient for the number of students. A suitable number of new toilets need to be installed with their corresponding partitions, so that they can provide a suitable service, in terms of excreta and wastewater disposal.	O4 RSG N° 295-2014-inicial MINEDU. It provides a specific description of restroom equipment and furniture characteristics. TN 03 on Urban Elementary- High School Design RJ 338-83 INIED. Technical Regulation on S 200 Building. Sanitary installations for buildings.	

Intervention Name	Basic Criteria	Existing Regulations	There are no Regulations for This
Urinal Installation	<p>Urinals deteriorate frequently, to the point of becoming unusable. In other cases, the number of existing urinals may turn out to be insufficient for the number of students.</p> <p>A sufficient number or suitable size of urinals need to be installed, so that they provide a suitable urine disposal service.</p>		There are no specific regulations for urinals. The same regulations for toilets apply here, in terms of defining the number of students per urinal.
Sink faucet installation	<p>Sinks deteriorate frequently, to the point of becoming unusable. In other cases, the number of existing sinks may turn out to be insufficient for the number of students.</p> <p>New sinks need to be installed, so that they provide a suitable water supply service for grooming purposes.</p>		There are no specific regulations for sinks. The same regulations for toilets apply here, in terms of defining the number of students per sink.

CONCLUSIONS

- **SIASE is a useful tool for planning purposes** to be used by the authorities or stakeholders in the public and private sector, both at sub- national and national level, with regard to the school water and sanitation system. SIASE's comprehensive view that involves the outside- the- school part (connection to the community networks) and the inside- the- school part, assures that the intervention proposals effectively solve all the system needs. A look to the school infrastructure, as it is associated to an educational project for the country with a comprehensive view to the educational processes is promoted.
- **SIASE's contribution** focuses on supporting that the Sustainable Development Goals are met, especially Goal 6 (Ensure water availability and sustainable management and sanitation for all), as they look for achieving universal and equal access to potable water and suitable sanitation special attention to the needs of women and children and people living in vulnerable conditions.
- **SIASE's sustainability towards improving educational quality** will be accomplished, as operation, maintenance, and hygiene elements are included in school management, as well as in the school syllabus. Impact on the households with interventions that involve school children has been proven; for instance, the Handwashing Initiative has proven that only those households with school age children who have been benefited with a handwashing syllabus showed improved handwashing practices. Those households with children attending the selected schools showed a significantly increased handwashing behavior, as reported in two out of a total of four critical moments (the number of surveyed households that reported their members washed their hands with soap before meals increased by 23.6 %, and the number of surveyed households that reported parents washed their hands with soap before feeding their children increased by 27.8%), against the control group. Finally, direct observations that were carried out only to those households with children attending intervened schools and the control group showed substantial effects in two out of a total of four critical moments (the number of households with children attending intervened schools that reported their members washed their hands with soap before meals was 61 % larger than those in the control group.) Likewise, parents in households with children attending intervened schools were 69 % more prone to wash their hands before preparing meals than those in the control group.)¹³
- **SIASE's scope will increase with the involvement of those sectors** that are committed to the supply capacity of the school water and sanitation system, both outside and inside a school. In Peru, it is the responsibility of the Ministry of Housing, Construction, and Sanitation to provide potable water, and collect, treat, and provide final disposal of, wastewater in the community; it is the responsibility of the Ministry of Health to look after the quality of the water sanitary quality assessment, and finally, it is the responsibility of the Ministry of Education to extend, improve, and provide school infrastructure to the country in a concerted way between the various government levels – central, regional, and local.

13. Perú: Iniciativa Lavado de Manos: Lecciones de la evaluación de impacto. Banco Mundial. Síntesis de investigación 72344. Julio 2012 (Peru: Handwashing Initiative: Impact Evaluation Lessons. World Bank. Research Summary 72344. July 2012.)

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Annex 1

Proposal for Interventions, per Indicator

Indicator: Water Storage and Pumping System

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
For the water supply system			
School grounds connected to the public potable water network	<p>School must start procedures for connection with the water supply authority to get successfully connected to the public network. Such network is located outside the school building, and it comprises a distribution service pipe that reaches the Water Meter.</p> <p>This intervention also includes the Water Meter component.</p>	<p>RNE – OS 050 (SD No. 011-2006 Vivienda): It establishes the minimum requirements for water distribution network design for human consumption</p> <p>National Metrology Service Orders No. 001-2011/SNM INDECOPI; NMP 005-1:2011, NMP 005-2:2011, NMP 005-3:2011. Specific aspects about meters</p> <p>2006 Technical Standard for Comfort, Safety, and Specialties. It includes the House Intake component.¹⁴</p>	
Using rainwater and setting up a water treatment compact plant	<p>A school may have a rainwater or surface water (from a river or a lake) source, an intake area, and a collection and conduction or supplying element to a compact type treatment plant (for small flows) that is suitable to a school's size and corresponding number of students, a storage tank, and other internal elements that allow a school to meet its potable water supply requirements.</p> <p>This system will be set up in schools located in the jungle area.</p>	<p>2006 Technical Standard for Comfort, Safety, and Specialties. Rainwater use.</p> <p>Law 17752 on water management. Water priority use.</p> <p>Standard OS. 020 Water Treatment Plant for human consumption. Design characteristics.</p>	
Construction of a water well and a chlorination system	<p>A school may have an underground water source (water well), and a water chlorination system will be added to it, for the purposes of meeting the school's potable water requirements.</p> <p>This system is proposed for schools located in the Coast and Andes Mountains areas.</p>	<p>2006 Technical Standard for Comfort, Safety, and Specialties. It takes into account a system with wells.</p> <p>RNE S200 Sanitary installations for buildings. Private supply system installations.</p>	

14. This is a technical paper that has not been upgraded to a Standard to date, but it is available among the sector papers.

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
For the sanitation system			
School grounds connected to the public sewerage network	<p>When the school building is located in a community that has a public sewerage network available.</p> <p>School must start procedures for connection with the sewerage authority to get successfully connected to the public network. Such network is located outside the school building, and it comprises a distribution service pipe and a manhole.</p>	<p>RNE – OS 070 (SD No. 011-2006 Vivienda): It establishes the minimum requirements for wastewater network design.</p> <p>2006 Technical Standard for Comfort, Safety, and Specialties. It includes the House intake and the house connection to the Public Network components.</p>	
In situ excreta and wastewater disposal and treatment	<p>Intervention is taken into account whenever a school is located in climatic zones that are not floodplains.</p> <p>A school may have a system that allows it to successfully dispose of its excreta and wastewater.</p>	<p>Technical Standard I.S. 020. General Criteria for Septic Tank design, construction, and operation, as an alternative for wastewater treatment and disposal.</p> <p>RM-184-2012 VIVIENDA. Technical Options Guide for potable water supply and sanitation in rural villages.</p> <p>Technical Standards for elementary and high school conventional building designs – 2009. They refer to the Guide to Adjust Prototypes to Rural schools that proposes four types of latrines for non prone to flooding zones.</p> <p>Technical Standards for elementary and high school building designs – 2011. They take into account rural service modules that include restrooms or latrines.</p> <p>Technical Standards for pre-school level conventional building designs, RSG No. 295-2014-ED. They take into account aspects, such as soil characteristics, the public sewerage network, the septic tank or biodigester.</p>	

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
Without a defined intervention.	<p>This group of schools demand an in situ sanitation system, but they are located in floodplain zones.</p> <p>Urban and rural communities that lack conventional sewerage systems may use non- conventional or alternative excreta and wastewater disposal and treatment systems. The array of technological options is quite limited, as these communities are located in floodplain zones. Nevertheless, an excreta and wastewater disposal system can be installed in a school.</p>		<p>There are no specific regulations, with regard to interventions in floodplain zones. However, the Ministry of Housing, Construction, and Sanitation (MVCS) has issued Ministerial Resolution (RM) 173-2016 “Technological Options Guide for water supply for human consumption for human consumption and sanitation systems in rural villages,” and considers how prone a zone is to flooding, as one of the design criteria.</p>

Indicator: Water Storage and Pumping System

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
At elevado tank level			
Elevated tank requires mild rehabilitation	<p>A school needs to set up an indirect water supply system that shall be located in the school building.</p> <p>The tank may be slightly deteriorated, showing signs, such as cracks on the stucco.</p>	<p>Technical instructions for school building maintenance, 2015. Maintenance to the elevated tank and tank are a priority.</p> <p>2006 Technical Standard for Comfort, Safety, and Specialties. It describes the direct and indirect water supply systems</p> <p>RNE IS 010. It defines aspects related to the tank and the pump</p>	
Elevated tank requires moderate rehabilitation	<p>A school needs to set up an indirect water supply system that shall be located in the school building.</p> <p>The tank may be moderately deteriorated, showing signs, such as minor stucco falling off (moderate cracks; therefore, a moderate rehabilitation shall be required for the tank to be in good shape again.</p>	The same standards apply	

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
Elevated tank requires to be replaced	A school needs to set up an indirect water supply system that shall be located in the school building. The tank may show deep cracks and openings that might go through the wall; therefore, the elevated tank requires to be replaced.	The same standards apply.	
At school building grounds level			
Elevated tank requires to be installed	A school needs to set up an indirect water supply system that shall be located in the school building. The system shall be made up of a directly fed elevated tank, if the water source has enough pressure for some hours to fill the tank.	The same standards apply.	
Tank and water pump require to be installed	A school needs to set up an indirect water supply system that shall be located in the school building. The system shall be made up of a tank and an elevated tank; if pressure from the water source fails to fill the elevated tank, water will be carried to the tank and shall be pumped to the elevated tank with a pump.	The same standards apply.	

Indicator: Drinking Fountain

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
Installation of Drinking Fountains.	It is necessary that consumption of potable water is encouraged as a habit, for the purposes of reducing sugary drinks consumption. Installation of Drinking Fountains inside a school is necessary. They should be located at easily accessible points and be permanently available to the entire school community.		The Mexican regulations were taken as a reference.

Indicator: Rainwater Drainage Network

Intervention name	Basic criteria	Existing regulations	There are no regulations for this
Maintenance is required	<p>Both chutes and downspouts can show deterioration, such as holes or breaking, smashing or twisting in a small section of a chute or pipe, in such a way that they still operate, but in a limited way.</p> <p>They need rehabilitation back to their normal conditions, so that they keep on providing suitable rainwater handling service at school.</p>	Standard OS.060 Urban rainwater drainage that establishes general design criteria.	
Replacement is required	<p>Both chutes and downspouts can show deterioration, such as holes or breaking, smashing or twisting along a significant section of a chute or pipe, in such a way that they become inoperative and can no longer provide their service.</p> <p>Rainwater drainage system needs to be replaced, so that its suitable rainwater handling service is restored at school.</p>	The same Standard OS.060 on urban rainwater drainage applies.	
Installation is required	<p>There are schools that have no rainwater drainage system, although they need it</p> <p>Rainwater drainage system needs to be installed, so that a suitable rainwater handling service is provided at school.</p>	The same Standard OS.060 applies.	

