

I. Basic Information for TC

▪ Country/Region:	REGIONAL
▪ TC Name:	Support for the Development of Innovative Solutions to Improve the Drinking Water Supply and Sanitation Services in Urban Areas in Dominican Republic and Haiti
▪ TC Number:	RG-T3598
▪ Team Leader/Members:	Perez Monforte, Sergio (INE/WSA) Team Leader; Maria Eugenia De La Pena (INE/WSA) Alternate Team Leader; Ortiz Stradtman, Silvia (INE/WSA) Alternate Team Leader; Gil, Byungwoo (INE/WSA); Gonzalez Medina, Francisco De Asis (INE/WSA); Kirkagacli, Romina Emanuela (VPC/FMP); Lopez, Liliana M. (INE/WSA); Madrigal Barquero, Diana (INE/WSA); Negret Garrido, Cesar Andres (LEG/SGO); Paniagua De Montero, Lady Kissairis (CID/CDR); Rodriguez Vera, Maria (INE/WSA); Velasquez Rodriguez, Manuela (INE/WSA)
▪ Taxonomy:	Research and Dissemination
▪ Operation Supported by the TC:	
▪ Date of TC Abstract authorization:	11 Dec 2019.
▪ Beneficiary:	Regional-CID (Dominican Republic, Haiti and Costa Rica)
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	Knowledge Partnership Korea Fund for Technology and Innovation(KPK)
▪ IDB Funding Requested:	US\$750,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	30 months (execution 24)
▪ Required start date:	June 2020
▪ Types of consultants:	Consulting firms and individual consultants
▪ Prepared by Unit:	INE/WSA-Water & Sanitation
▪ Unit of Disbursement Responsibility:	INE-Infrastructure and Energy Sector
▪ TC included in Country Strategy (y/n):	N/A
▪ TC included in CPD (y/n):	N/A
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Social inclusion and equality; Productivity and innovation

II. Description of the Associated Loan/Guarantee

- 2.1 Through different operations (or “programs”), the Inter-American Development Bank (IDB or Bank) is supporting two of the three (2/3) largest institutions in the Dominican Republic with competence in the provision of drinking water and sanitation services: the National Institute of Potable Water and Sewerage (INAPA by its Spanish acronym) and The Corporation of Aqueduct and Sewerage in Santiago province (CORAASAN by its Spanish acronym). The first one covers 40% of the country's population while CORAASAN covers 10%, being the second most significant among the eight (8) existing corporations in the country. The Corporations of Aqueduct and Sewerage constitute public organisms, autonomous, with juridical personality and own and independent patrimony, that have as mission to provide services of potable water and sewerage, with quality and efficiency, to the residents of the different demarcations.

- 2.2 CORAASAN is supported through the operation DR-L1007, amounting to US\$25 million. In addition to this fully executed operation, which will be closed this year. The Bank supported CORAASAN in the preparation of a new operation of up to US\$125 million that could be prioritized by the Government during 2021. Otherwise, the Bank has supported INAPA through the operation DR-L1041, for USD\$70 million. The provinces covered are the following: (i) San Pedro de Macorís; (ii) San Cristobal; (iii) Elias Piña; (iv) Bahoruco; (v) Independencia; (vi) Barahona; and (vii) San Juan. Infrastructure investments in these provinces are under way. In San Cristobal, a technical assistance contract by results is in execution since April 2019 (ATPR in Spanish) to accelerate the processes of decentralization and to improve the INAPA's performance at the provincial level. This innovative bidding model includes within the same contract different activities such as: (i) construction works for the improvement of the water supply; (ii) acquisition of goods such as vehicles or leak detection equipment; (iii) integration of specialists in the organization structure of INAPA in the province to operate the water systems and train the local personnel. An annual evaluation of key performance indicators such as water quality, non-revenue water, and company revenue have been established in the contract to evaluate the contract holder and to link it to its remuneration. Other provinces with the institutional and patrimonial conditions to implement this type of contract are: San Juan (232,783 inhabitants), San Pedro Macorís (290,488 inhabitants), Puerto Plata (321,597 inhabitants) and La Vega (201,637 inhabitants).
- 2.3 In Haiti, the Bank has a portfolio of US\$225.5 million in three (3) different operations with varying degrees of execution. The National Drinking Water Supply and Sanitation Authority (DINEPA by its French acronym), through its regional structures, implements these programs. Within the operation HA-L1135 improvements concerning drinking water supply of Cap Haitian inhabitants have been included. Cap Haitian, which counts with 400,000 inhabitants, is the second most important city in the country. A results-based technical assistance contract has been prepared based on the experience of San Cristobal but considering the Haitian institutional context. The most important difference between both contracts is the inclusion of the supervision of the works within the contract holder responsibilities. DINEPA has also shown interest in using the ATPR model in two other cities where HA-L1135 investments are allocated: These cities are Gonaives and Saint Louis du Nord.

III. Objectives and Justification of the TC

- 3.1 The main objective of this TC is to support the development and dissemination of innovative solutions to improve water and sanitation management in urban areas of the Dominican Republic and Haiti based on the Korean experience.
- 3.2 The Dominican Republic counts 10,520,000 people, 79% of whom live in urban areas. In them, the drinking water coverage in 2015 was 97%, up from 83% in 2000. Despite water access, Dominican Republic water utilities present management indicators below the region's average. High rates of Non-Revenue Water (NRW) above 70%, a high ratio of employees per 1,000 clients (47 in the case of INAPA and 14 in CORAASAN), far above of efficient companies, irrational water consumption for domestic use (above 500 l/pd in Santiago), low rates of water metering. These indicators lead not only to deficient services if continuity of service or water quality are considered, but also to dependence of these institutions on the Dominican Government (Gob). Current transfers from the Gob to the water and sewerage public

institutions amounted to RD\$3,298 million in 2016, mainly for personnel and electricity costs. This amount was mostly absorbed by INAPA, CAASD and CORAASAN¹ (SIGEF, 2016). Greater sustainability of these institutions would contribute to greater availability of funds to attend other basic services. In comparison, Haitian case is worth considering the lower coverage rates (10% people have access to drinking water on premises according to Joint Monitoring Program) and the very small governmental transfers to subsidize current cost. Among the 24 water and sanitation utilities in Haiti, only 2 are reporting financial sustainability considering the ratio of revenue versus operational expenses. Haiti also presents an additional challenge because 70% of the urban population of the Haitian cities lives in informal settlements (or “slums”). Population's demand in slums has evolved from water kiosks to household connections. The denominational condominial networks are a suitable solution for these areas since the condominial network can be adapted to the characteristics of the settlement combined with management models based in the community or in small private operators. The crises caused by COVID-19 have led to a decrease in the income of water companies in both the Dominican Republic and Haiti during the first month. It is expected that in the coming months the situation could worsen and that measures to improve management will become more important than ever.

- 3.3 Regarding sanitation, 25% of Dominican households were connected to sewerage in 2015, 51% to septic tanks and 9% had latrines. The percentage of septic tanks has doubled in the last 15 years, since in 2000 was 24%. This means that nowadays about 2 million septic tanks exist in urban areas. A lack of regulation and monitoring of these septic tanks by national institutions has been identified in the country while some Dominican utilities are looking at the most efficient way to address this environmental and health challenge within the existing regulatory framework. In Haiti, which counts with 11 million people, 47% of the population uses septic tanks. Septic tanks are simple solutions from a technological point of view; however, the management of the entire sanitation chain, particularly the management of faecal sludge from this type of solution, presents challenges. Septic tanks must be emptied mechanically from time to time, depending on the type of solution and the daily volume of sludge accumulating. The complexity of this type of intervention stems both from the institutional challenge posed by the enormous diversity of actors involved (households, informal private sector or not, regulators, local governments) and the absence of a homogenizing effect in reference to the polluting loads achieved by collective models such as sewerage. In recent years, sludge management has received special attention within the sanitation sector with the appearance of tools such as the excreta flow diagram (EFD) that allows a complete analysis of the sanitation chain. The determination of the quantity and quality of faecal sludge, as well as the management of geospatial information related to emptying truck routes or the location of septic tanks are areas

¹ These are the largest institutions in the Dominican Republic with competence in the provision of drinking water and sanitation services. The National Institute of Potable Water and Sewerage (INAPA by its Spanish acronym) covers 40% of the country's population while the Corporation of Aqueduct and Sewerage in Santiago province (CORAASAN by its Spanish acronym) covers 10%, being the second most significant after CAASD, among the eight (8) existing corporations in the country. CAASD covers 35 % of the Dominican population. The Corporations of Aqueduct and Sewerage constitute public organisms, autonomous, with juridical personality and own and independent patrimony, that have as mission to provide services of potable water and sewerage, with quality and efficiency, to the residents of the different demarcations.

with enormous possibilities for the use of innovative technologies. Recently the EFD of Cap Haitian and Alajuela show the need to improve the sludge management.

- 3.4 Also, the IDB is promoting the Optimal Sanitation Initiative, in which several integrated solutions to provide sustainable sanitation services adapted to multiple contexts. Within this initiative, SANIBID is a platform to promote the use of non-conventional sanitation technologies. The condominial sanitation module is already available but there is a demand and the incorporation of other technologies such as the septic tank management.
- 3.5 ATPR contract, SANIBID, and Korea experience can be used to address these challenges. Korea Government has supported municipalities to improve their efficiency in water management through the public entities such as KEITI (Korean Institute of Industry and Environmental Technology) and K-water. As a result, the value of NRW in Korea is 14.8%, and it is only around 5~6% in the case of big cities such as Seoul and Busan. Korea numerous companies are at the forefront of developing applications for mobile devices such as phones and tablets. In sanitation, wastewater treatment plants designed, built and operated in Korea are among the most efficient in the world in parameters such as treated water quality or energy efficiency. Also, Korea is a leader in the manufacture of intelligent meters and drinking water operators have extensive experience in so-called smart water management. Smart meters are an excellent tool to improve the management given the continuous recording of data, consumption patterns per customer can be generated, which facilitates the rapid detection of possible clandestine withdrawals and leaks at the customer's facilities, activating an alarm to the customer and provide early diagnostic assistance to solve the water losses. Likewise, the customer can consult his consumption at any time. A better-informed client contributes also to a rationalization of the use of the service provided. Smart meters are therefore a tool for improving water management in cities. Condominial systems are also especially suited to the use of smart meters by bundling the measurement of 20 to 30 houses into only one meter and having the ability to operate on a prepaid basis. The transformation of water companies such as the proposed use of smart micro-meters must consider the institutional and governance context in which they are framed.
- 3.6 ATPR visible benefits through San Cristobal experience, have led to an increased demand for this type of technical assistance by utilities in Haiti and the Dominican Republic. On the other hand, a greater systematization is needed to facilitate the elaboration and follow-up of this type of contract. It is also important to incorporate within the contracts for results urban sanitation from the broader approach defined by the Optimal Sanitation initiative. This implies having results not only from connection to sewage systems but also from management of sludge from septic tanks to give an example.
- 3.7 SANIBID, which can be used to promote the use of non-conventional sanitation technologies, is integrated in QGIS so it has already the potential of using the geographic information system tools in order to improve the spatial decision making that concern the whole chain of services required for the correct management of individual solutions. In addition, the availability of a platform like SANIBID greatly facilitates the implementation of online training and therefore is fully adapted to the period of teleworking.
- 3.8 **Lessons learned through Banks's TC and loans in Haiti and Dominican Republic.** The implementation of technical cooperations in recent years has shown

the importance to strengthen the dissemination of the results so that they can be rooted in the countries' decision-makers. This TC has included various activities to disseminate and strengthen the exchanges. In addition, through various operations underway in both countries, a demand-side approach (water utilities that are more collaborative and participative; that show greater interest) is essential to optimize results. This approach will be used in the execution of this CT.

- 3.9 This TC is consistent with the Bank's Institutional Strategy Update 2010-2020 (GN-2788-5) and responds to the following development challenges: (i) Low levels of productivity and innovation; and (ii) Social exclusion and inequality since it will contribute to reducing gaps in access to services that are basic to the development of a region in an equitable and inclusive manner and to improving the efficiency of water and sanitation services. This TC is aligned with both the sectoral framework and the innovation initiative of the IDB's water and sanitation division.
- 3.10 This TC is also strategically aligned with the Bank's country strategy for Haiti mainly with the increase of access to essential services to enhance human development and the inefficiency of the suppliers of services. This TC is also strategically aligned with the Bank's country strategy for Dominican Republic mainly with the provision of basic public services objective and it responds to the following challenges: (i) human capital deficiencies and coverage of quality basic social services; (ii) lack of coherent and coordinated actions to promote the use of technologies and innovation since the TC will strengthen the capacities of human capital in highly deficient or traditionally unattended areas that are necessary for the provision of services on a sustainable basis such as fecal sludge management from non-conventional solutions and reduction of unaccounted-for water, through innovative solutions as Optimal Sanitation, Smart meters, contract based results and Aquarating.
- 3.11 **Alignment with Knowledge Partnership Korea fund for Technology and Innovation (KPK).** This operation is aligned with the KPK's objectives as it focuses on using smart technology solutions and analytical work to establish priorities in water and sanitation sector of Dominican Republic, Haiti and Costa Rica, and innovation-related projects and training initiatives to increase water company's capacity to manage water and sanitation.
- 3.12 **Results.** Thanks to this TC, five (5) water and sanitation utilities, from Dominican Republic and Haiti will be able to improve their knowledge through tools designed to improve the management of their water and sanitation services.
- 3.13 **Sustainability.** The products obtained through this TC are sustainable given the Bank's presence in the countries covered and the loans underway, which facilitates mechanisms to ensure exchanges, test the experiences developed and even mobilize funds to scale up certain innovative actions.

IV. Description of activities/components and budget

- 4.1 **Component 1. Development of innovative technologies in water and sanitation companies (US\$250,000).** This component will collaborate with leading Korean institutions in this sector such as KEITI (Korea Environmental Industry and Technology Institute) and K-water. An action plan for the implementation of smart water management will be developed, as well as a proposal for funding for Korean smart metering equipment for Dominican and Haitian water companies. In the case of Haiti, the action plan will have the peculiarity of specifically addressing the management of

smart meters in slums. Additionally, this component will allow the support the development of innovative solutions in the field to improve the efficiency of sludge management, mainly aimed at: (i) management of geospatial information relating both to the location of trucks and septic tanks; and (ii) automation of the collection of information relating to the volumes of septic tanks and the fundamental parameters of fecal sludge. Two of the water utilities where the action plans are carried out will preferably coincide with those where the ATRP type contracts are prepared (component 3), but they are two independent products. The proposed action plans will take into the special institutional and governance ecosystem of both Haitian and Dominican water companies.

- 4.2 To do so, the component will finance the following activities: (i) a contract with K-water (\$250,000) to develop the products mentioned above. Videoconference meetings, one-time visits to key locations and collaborations with KEITI and the individual consultants hired through component 2 are activities included in this contract.
- 4.3 Justification for Single Source Selection (SSS) of K-Water. As per GN-2765-1, this is a SSS because this firm is qualified or has the experience of exceptional worth for this assignment and it presents a clear advantage over competition mainly due to: (i) it has abundant experience and know-how to deal with existing and potential water challenges; reduction of nonrevenue water level, Smart Water Management (SMW) and wastewater treatment are the most usable experiences for the purposes of this TC; (ii) K-water launched the SMW Initiative in 2015 during the 7th World Water Forum, which was first in the world and has carried out a lot of SWM projects inside and outside of Korea; (iii) K-water agreed the MOU with the IDB in 2019 and it is supposed to provide the country policy makers and operators in LAC with in-kind capacity building opportunities; (iv) K-Water is the only government-owned corporation in water sector at the national level of Korea and one of the advantages expected from this TC is to identify Korean projects for SMW in beneficiary countries and K-Water takes a proxy role on behalf of Korean Ministry of Environment in the water sector so understands well the decision making process and relevant financial resources available.
- 4.4 The products of this component are: (i) rapid assessments of smart water management capacity for (5) selected Haitian and Dominican Water Utilities, (ii) action plan for the implementation of smart water management in three (3) water utilities, and (iii) Technical note on the introduction of innovative technologies such as smart meters or septic tank management in water companies.
- 4.5 **Component 2. Training and capacity building for the implementation of optimal sanitation strategies (US\$300,000).** This component will strengthen water and sanitation operators by empowering them with the tools and knowledge to prepare their own optimal sanitation strategies using the SANIBID platform regarding the sanitation technologies.
- 4.6 The products of this component are: (i) training of at least 60 technicians from different water and sanitation utilities in the use of SANIBID in different online sessions; (ii) two (2) technical notes for faecal sludge management and mathematical modeling of sewer systems; and (iii) Two (2) technological sanitation strategies in two (2) different cities obtained through the use of SANIBID. For the preparation of the strategies, priority will be given to the two cities covered by the ATRP model contracts (component 3). Training will mainly benefit technicians from Alajuela municipality

and water and sanitation utilities from Haiti and Dominican Republic object of component 1 and 2.

- 4.7 To do so, this component will finance the following activities: (i) training for SANIBID for 60 people (US\$50,000), (ii) four individual consultants specialized in sewerage, faecal sludge management in geographic information systems and in computer programming (US\$210,000) to support the training and support water and sanitation utilities in the preparation of two sanitation strategies and prepare two manuals; and (iii) development of two technical notes regarding the non-conventional technologies (US\$40,000). The technical notes will be elaborated in collaboration with local universities and water companies in order to facilitate their dissemination. Two dissemination workshops are planned in their online or face-to-face version.
- 4.8 **Component 3. Preparation of tender documents based on technical assistance by results in two Dominican water utilities (US\$200,000).** The products of this component are the following: (i) two (2) diagnoses of two public water utilities that will include aspects related to commercial, financial and technical management to obtain two bidding documents; (ii) technical note corresponding of a manual for the preparation ATPR contracts in the IDB's programs including an analysis of existing examples of technical assistance by results including among others Sao Paulo (Brazil), Ciudad del Este (Paraguay) and San Cristobal (Dominican Republic); and (iii) organization of a webinar together with other stakeholders such as AECID², the WB³ or AFD⁴ to present the manual to the water companies of the region and to the specialists of the Bank. The diagnostics will be carried out with the use of Aquarating complemented with specific activities aimed at the preparation of the tender document. A list of potential companies is made available for initial diagnosis. At the beginning of the execution of the CT, the companies to be studied will be selected based on technical, institutional strategic criteria and demand-side approach.
- 4.9 The component will finance: (i) hiring three individual consultants to carry out the technical and commercial diagnostics to perform the tender document as well as procurement specialist knowledgeable about this type of contract (US\$200,000). These contracts include videoconference meetings, and one-time visits to key locations.
- 4.10 Rights of products obtained by component 1 and 2 will be the property of the Bank.
- 4.11 Disclosure letters from official entities requesting non objection will be necessary prior to carry out visits in key locations in both countries.
- 4.12 The total budget of the TC will reach US\$750,000.

Indicative Budget (in US Dollars)

Component	IDB/Funding	Counterpart	Total
Implementation and development of innovative technologies in water and sanitation companies	250,000	0	250,000
Training and capacity building for the implementation of two optimal sanitation strategies	300,000	0	300,000
Preparation of tender documents based on technical assistance by results in two water utilities	200,000	0	200,000

² Spanish Agency for Development Cooperation.

³ World Bank.

⁴ French Development Agency.

Total	750,000		750,000
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V. Executing agency and execution structure

- 5.1 The executing agency for this TC will be the Inter-American Development Bank (IDB), through the Water and Sanitation Division (INE/WSA), as it is a regional research and dissemination TC. Following the operational guidelines for technical cooperation operations, the Bank is the Executing Agency and has no counterpart. INE/WSA will be responsible for the administration, planning, control, and supervision of the financial resources allocated, as well as all activities related to the adequate preparation and programming of the operation. The activities will be coordinated between the team leaders of both countries.
- 5.2 The activities to be executed under this operation have been included in the Procurement Plan (Annex) and will be implemented in accordance with the Bank's established procurement methods, namely (a) Hiring of individual consultants, as established in AM-650; (b) Hiring of consulting firms for services of an intellectual nature according to GN-2765-4 and its associated operational guidelines (OP-1155-4) and (c) Hiring of logistics and other non-consulting services, according to policy GN-2303-28.
- 5.3 This is a Research and dissemination TC because mainly components and activities are related to development sector challenges and gaps as fecal sludge management and non-revenue water with main objective to draw on knowledge that is available, but deepening it and developing action plans that are independent of the Bank's operations but that would also able to deepen Banks position in optimal sanitation initiative, contracted based results and will improve dialogue with counterparts with specific tools.

VI. Major issues

- 6.1 A potential risk is the change in the commitments of partner governments in the water sector and water companies regarding their innovation agendas. In order to mitigate this risk, these agendas will be institutionalized and the revenue they represent for the institutions will be clearly visible. Another risk is the mobility of personnel within institutions. To alleviate this risk, the creation of training material that can be used by different actors will be influenced to provide continuity to the lines of training and awareness-raising.
- 6.2 To mitigate impacts on the development of the TC due to the international movement limitations caused by COVID-19, a prioritization of cities where available information is exiting will be selected. Also, two alternatives to support international consultants engaged by this TC will be applied to complete information: through local consultants hired by WSA that are already in place if local movements become possible in the next months or/and by videoconferences. On the other hand, the trainings included in this TC can be carried out remotely with no major risk as proven by the fact that we have been working remotely with counterparts and holding webinars without connectivity limitations since the outbreak of the pandemic.

VII. Exceptions to Bank policy

- 7.1 None.

VIII. Environmental and Social Strategy

- 8.1 Because of their nature, the components financed in this operation will not have negative environmental or social impacts. This TC is classified as "C". See Environmental Filters ([SPF](#)) and ([SSF](#)).

Required Annexes:

[Results Matrix_22198.pdf](#)

[Terms of Reference_18030.pdf](#)

[Procurement Plan_77988.pdf](#)