

TC Document

I. Basic Information for TC

▪ Country/Region:	URUGUAY
▪ TC Name:	Innovation for adsorption, purification systems and arsenic removal in Uruguay- Source of Innovation
▪ TC Number:	UR-T1305
▪ Team Leader/Members:	Rezzano Tizze, Nicolas Guillermo (INE/WSA) Team Leader; Bocco, Maria Julia (INE/WSA) Alternate Team Leader; Alvarado Chaparro, Eugenia (VPS/ESG); Barbosa Taves De Gouvea, Heleno (ORP/REM); Basani, Marcello (INE/WSA); Casalino Franciskovic, Juan Manuel (LEG/SGO); Crespín Villatoro, Alexandra (INE/WSA); Leticia Ortega (INE/WSA); Nicolas Moreno (ORP/GCM); Youngmin Oh (INE/WSA) Team Leader; Bocco, Maria Julia (INE/WSA) Alternate Team Leader; Alvarado Chaparro, Eugenia (VPS/ESG); Barbosa Taves De Gouvea, Heleno (ORP/REM); Basani, Marcello (INE/WSA); Casalino Franciskovic, Juan Manuel (LEG/SGO); Crespín Villatoro, Alexandra (INE/WSA); Leticia Ortega (INE/WSA); Nicolas Moreno (ORP/GCM); Youngmin Oh (INE/WSA) Team Leader; Bocco, Maria Julia (INE/WSA) Alternate Team Leader; Alvarado Chaparro, Eugenia (VPS/ESG); Barbosa Taves De Gouvea, Heleno (ORP/REM); Basani, Marcello (INE/WSA); Casalino Franciskovic, Juan Manuel (LEG/SGO); Crespín Villatoro, Alexandra (INE/WSA); Leticia Ortega (INE/WSA); Nicolas Moreno (ORP/GCM); Youngmin Oh (INE/WSA) Team Leader; Bocco, Maria Julia (INE/WSA) Alternate Team Leader; Alvarado Chaparro, Eugenia (VPS/ESG); Barbosa Taves De Gouvea, Heleno (ORP/REM); Basani, Marcello (INE/WSA); Casalino Franciskovic, Juan Manuel (LEG/SGO); Crespín Villatoro, Alexandra (INE/WSA); Leticia Ortega (INE/WSA); Nicolas Moreno (ORP/GCM); Youngmin Oh (INE/WSA)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	UR-L1189
▪ Date of TC Abstract authorization:	04/28/2023
▪ Beneficiary:	Uruguay
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	Cofinancing Special Grants(COF)
▪ IDB Funding Requested ¹ :	US\$250,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	July 2023
▪ Types of consultants:	Firms; Individuals
▪ Prepared by Unit:	INE/WSA-Water & Sanitation
▪ Unit of Disbursement Responsibility:	CSC/CUR-Country Office Uruguay
▪ TC included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	Yes

¹ Resources come from the Facility Source of Innovation RG-O1693.

▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation; Institutional capacity and rule of law; Environmental sustainability; Gender equality; Diversity
--	---

II. Objectives and Justification of the TC

- 2.1 The main objective of the Technical Cooperation (TC) is to strengthen innovation capabilities and improving the knowledge in the adsorption technology for arsenic removal for better water supply services in Uruguay. The Bank is working with the government on the preparation of a USD30 million loan operation for arsenic removal (UR-L1189) to fulfill the UNIT 833-2010 arsenic standard in water supply systems.
- 2.2 Uruguay was one of the first countries in the world to incorporate access to drinking water and sanitation as a fundamental human right at their constitutional level. 95,2% of its population has access to drinking water through water supply networks; 4,2% has access through improved water sources and 0,5% access water sources from unprotected wells, cisterns and/or pipes. Approximately 6% of the country's schools still do not have a drinking water supply. More than 350 million cubic meters (m3) of drinking water are produced annually, 90% come from surface sources and 10% from groundwater sources. Throughout the country, the provision of potable water services through networks is carried out by the state's utility Administración de las Obras Sanitarias del Estado (OSE), which is also in charge of providing sanitation services in rural areas of the country.
- 2.3 Despite this generally positive picture, some challenges remain in terms of service provision. One of the main challenges faced by Uruguayan authorities is the capacity to guarantee drinking water quality as well the redundancy of sources, considering critical issues in the purification systems and supply to the population (e.g., emerging pollutants). During the last two years, the third issue has been gaining relevance, considering that based on the recommendations of the Drinking Water Quality Guidelines of the World Health Organization (WHO) and the United States Environmental Protection Agency (EPA), and through the UNIT 833-2010 standard and a decree of the Executive Power, in 2011 Uruguay established stricter values for arsenic, a potentially carcinogenic chemical element that is found in water naturally and is not the product of human contamination. In this regulation, the maximum limit of 50 micrograms of arsenic per liter of water was lowered to 20 micrograms (that is, 0.02 milligrams) per liter, and a horizon of 10 years was to set to reach the maximum limit of 10 micrograms (0.01 milligrams) per liter. Despite the new regulations, today in Uruguay there are 150 places, including 287 boreholes, and about 130,000 inhabitants (4% of the population), where arsenic concentrations are higher than 10 micrograms per liter. This complicated problem calls for the adoption of innovative solutions to facilitate the identification, selection, and use of technologies that guarantee compliance with the standards established by the authorities.
- 2.4 The sectoral challenges are exacerbated by intrinsic sectoral inequalities related to gender. The World Economic Forum (WEF) Report (2022) shows that the Global Gender Gap Index in Uruguay is 0.711, a value that places the country in 72nd place out of a total of 146. In addition, the Participation Rate in the Women's Labor Force is 54.78% the same value for men is 69.25%, with a gap of 14.47% in

favor of men. In the country, 11.60% of companies have majority participation of women and 10.60% of companies have women in senior management. The total number of officials in OSE is 3,681 people, of whom 63.16% are men, 0.06% are trans men, and 36.78% are women. In addition, 22 men (0.60%) and 14 women (0.38%) are people with disabilities (PwD). In this regard, within the framework of UR-L1189, work is being done with a consultant on the institutional diagnosis of G&D in the OSE, to identify gaps and inequalities that may be present, as well as proposing actions to overcome them and indicators to its monitoring and follow-up.

- 2.5 Given these challenges, three technologies are being considered to address the issue: Unidades Potabilizadoras de Agua (UPA), osmosis, and adsorption, the latter of which represent an innovative solution for the region. While adsorption systems have been studied and represent a viable cost-effective alternative to other treatment methods, there is no local experience with this type of system. For this reason, it is necessary to accelerate the learning curve for its design, construction, operation, and maintenance. This TC is aimed at this objective: to support the country in accelerating this learning process through the resources of Source of Innovation and the expertise of its partners, in this case the Ministry of Environment of South Korea.
- 2.6 South Korea has been known for universal service of safely managed water and waste treatment services and digitalized operations with innovative technologies. Korea's experience in integrated policy planning in water supply systems. Considering that South Korea has achieved it in a remarkably short period of time from a war-torn country, its experience will provide a meaningful case-study that is adequately adoptable to Uruguay and the LAC region. Through decades of efforts to expand waterworks facilities and service network, 99.1% of the total population has access to water supply service in Korea. In 2004, Korea has introduced the Total Water Pollution Load Management System (TPLMS) at river basin level to protect and improve water quality of rivers across the country. The system sets water quality goals for each river basin, calculates the amount of pollutant discharges to meet the goals, allocate permissible discharges to each local government, and monitor the compliance based on which special measures including development restrictions are taken. Korea's national water grid is evolving towards higher stability, safety, and efficiency by incorporating smart technologies such as automated water treatment and real-time measurement and analysis. Through this TC, the Ministry of Environment of Korea in charge of water quality regulations and its affiliated government agencies will share its experiences and introduce innovative technologies including the long-practiced absorption treatment in controlling pollutants including arsenics. Taking advantage of these Korean experiences is a tremendous opportunity for the country's learning process.
- 2.7 The operation is consistent with the Second Update of the Institutional Strategy (UIS) 2020-2023 (AB-3190-2) and is directly aligned with the priority area of:
(i) Productivity and innovation, by promoting cutting edge innovative applications in the water sector. The TC is also aligned with the cross-cutting themes of:
(i) Institutional Capacity and the Rule of Law, since the operation will support the strengthening of the OSE by training and building capacities among its staff; and
(ii) Climate Change and Environmental Sustainability, by offering integrated solutions that address obstacles to sustainable growth and (iii) Gender Equality considering the inclusion of the perspective of gender equality in the components.

- 2.8 The operation is also aligned with the IDB Group Country Strategy with Uruguay 2021-2025 (GN-3056), and with the priority area of equity and social inclusion, which among other things promotes comprehensive actions on sanitation and drinking water to achieve higher levels of sustainability. Additionally, it is aligned with the Bank's Corporate Results Framework document, through its Social Progress Index and Government Effectiveness indicator. Also, this operation is aligned with the first line of action for the IDB Group in the water and sanitation sector defined in the Water and Sanitation Sector Framework Document (SFD, GN-2781-13), aimed at promoting universal access to quality water and sanitation services with equity, inclusion, and affordability, and the fifth line of action involving the drive of innovation in the water and sanitation sector.
- 2.9 Finally, the TC is aligned with the general objective of Source of Innovation (RG-O1693) that will finance the TC, which is to enable the development and integration of innovative solutions in the water, sanitation and solid waste sector that contribute to safely managed water, sanitation, and solid waste management services for all. In particular, the operation aligns with the specific objective:
- Strengthen the demand-side of innovative solutions and products, through the design of innovative pilots.
 - Stimulate productive partnerships between service providers and new solutions, through the organization of a workshop to share South Korea's best practices in adsorption as a water supply treatment.
 - Promote a culture and an enabling environment for innovation in the sector, through the development and publication of a knowledge products on innovative solutions for arsenic treatment.
- 2.10 The operation is aligned with the Country Strategy with Uruguay 2021-2025 (GN-3056) in the strategic area of equity and social inclusion, contributing to the strategic objective of Facilitating urban and housing services.
- 2.11 Sustainability of activities: The empowerment of staff through capacity building and knowledge exchange, as well as the direct link with UR-L1189 approved in 2023 will guarantee the sustainability of the activities financed through this operation, which will be escalated through loan's resources.

III. Description of activities and Outputs

- 3.1 **Component I: Pilot development and assessment (focused on adsorption water supply systems) (US\$190.000).** This component will contribute to the development and assessment of different adsorption systems pilots in priority areas. This will provide knowledge and lessons applied within the Uruguayan context, which can improve the future engineering projects that will be financed through the UR-L1189. This component will include studies to design the pilot projects (3) and assessment criteria to improve future projects. The pilots will demonstrate innovative technological solutions to address key challenges. The selection of pre-pilots/pilots will be carried out jointly by the IDB and OSE. The main products of this component are the arsenic removal feasibility studies and designs for construction bidding documents, and a report on the pilot development and assessment.

- 3.2 **Component II: Capacity building (US\$60.000).** The objective of this component is to facilitate and promote access to water adsorption technologies and produce and disseminate knowledge on integrated approaches in LAC across the water supply sector. The activities included in this component are: (i) identify key aspects to accelerate the knowledge curve on the design, operation, and maintenance of adsorption systems by OSE; (ii) identify South Korea's experiences in water supply adsorption treatment, select the most relevant for Uruguay and prepare a knowledge product; (iii) during the implementation of the pilots, carry out on site workshops to share South Korea's best practices in adsorption as a water supply treatment; (iv) design of awareness-raising activities on gender and diversity issues (PWD and LGBTQ+). The main product of this component are Workshops on adsorption management techniques.
- 3.3 **Expected results of the TC.** The project will contribute to the strengthening the technical capacities of water policy makers and professionals, including government officials of OSE. The general results include concrete solutions proposed and designed under the pilots activities, which could lead to significant gains, such as: (i) population/households benefitting from wider access to water services; (ii) cost-efficient economic benefits arising from policy efficiency gains and technological innovation; and (iii) and implementation of sustainable development strategies in water supply management disseminated from top-notch leaders from public entities and private companies in South Korea.
- 3.4 Participation of women and diverse groups (people with disabilities, Afro-descendants, indigenous people, and LGBTQ+) will be encouraged. The knowledge products that are generated as well as the campaigns that are designed for dissemination and invitations to participate in the activities of Components I and II will include the perspective of gender equality and inclusion of diversity, that is: (A) the texts will be written using inclusive and non-sexist language; (B) egalitarian images of women and men, as well as of people belonging to diverse groups, will be shown, eliminating the sexist and stereotyped use of the image of women and presenting a realistic image of the skills and potential of women and people from diverse groups in the use of technology. The data of the participants will be disaggregated by gender.
- 3.5 The total cost of this operation is US\$250.000, which will be financed with the resources of Source Innovation Facility (RG-O1693) funded by the Government of Switzerland through the State Secretariat for Economic Affairs (SECO) and by FEMSA Foundation. There will be no local counterpart financing. The distribution of resources is as follows:

Indicative Budget

Activity/Component	Sol (US\$)	Total (US\$)
Component I: Pilot development and assessment	\$190.000	\$190.000
Component II: Capacity building	\$60.000	\$60.000

TOTAL	\$250.000	\$250.000
--------------	------------------	------------------

- 3.6 Resources of this project to be received from the Donors of the RG-O1693 through a Project Specific Grant (PSG). A PSG is administered by the Bank according to the "Report on COFABS, Ad-Hocs and CLFGS and a proposal to unify them as Project Specific Grants (PSGs)" (Document SC-114).

IV. Executing agency and execution structure

- 4.1 Since this is a client support (CS) TC, this operation will be executed by the IDB, in accordance with OP-619-4 Annex 2. The water and sanitation division (INE/WSA), will be responsible for all aspects of this TC, including disbursements, under the supervision of Nicolas Rezzano (nicolasre@iadb.org), Specialist at INE/WSA. Activities developed in any country in the region will be coordinated with the respective INE/WSA specialist in Country Offices (COF); and, if necessary, when activities are developed in a specific country, with the liaison authority in the country and/or sector officials. Further: (i) the Bank has experience in successfully executing regional TCs of this type which have contributed to spreading innovative tools in the sector.
- 4.2 All activities to be executed under this TC have been included in the Procurement Plan (see Annex IV) and will be contracted in accordance with Bank policies as follows: (i) AM-650 for Individual consultants; (ii) GN-2765-4 and Guidelines OP-1155-4 for Consulting Firms for services of an intellectual nature and; (iii) GN-2303-28 for logistics and other related services.
- 4.3 The project team will be responsible for the preparation and submission to the donor of the project reporting in compliance with the stipulation of the Administration Agreement. If at the end of execution, the project was closed with a positive uncommitted and unspent balance, the project team will be responsible for informing ORP/GCM to transfer the unspent balance as agreed to by the donor and the Bank pursuant to the terms of the Administration Agreement.
- 4.4 This TC aims to improve knowledge on policy frameworks and innovation issues and disseminate that knowledge throughout the region. That said, prior to the start of the activities to be carried out by the firms or individual consultants in specific countries, letters of no objection will be obtained from the Bank's liaison bodies in the respective countries. Specific countries will receive support only when the activity to be financed is demonstrative in its concept and serves to promote knowledge and learning at the regional level.
- 4.5 Relevant lessons learned and linkages to other Bank experiences. We can mention some lessons learned from previous pilots such as: RG-T3410 (Promotion of Innovation in the Water and Sanitation Sector in Latin America and the Caribbean), RG-T3843 (Promotion of Innovation in the Innovation in the Water, Sanitation and Solid Waste Sector in Latin America and the Caribbean) and RG-T3298 (IDB-Israel Collaboration: Improving Capacities in Water Resource Technologies. In all three cases, for the pilots to be successful, the following elements have been identified:

- It is key that the beneficiary has a demonstrated commitment through the availability of human or financial resources to follow up on the implementation of the pilot.
- It is key that the beneficiary has a technical champion who can lead the supervision of the pilot.
- It is key that the beneficiary is open and willing to try new technologies and eventually has the possibility of adopting the solutions (using procurement policies that allow for eventual direct contracting or public procure policies for innovation.)

V. Major issues

5.1 This TC poses very low or no risks, as it supports activities where the IDB-Soth Korean collaboration and innovations will bring significant improvements to the waste and water sector solutions. The close involvement of the technical expert from South Korea and collaboration within INE/WSA (in HQ and COFs) will guarantee effectiveness in planning and execution of the activities. Uruguay stakeholders' involvement from governments, public utilities and the professional and academic communities during TC implementation will help maximize the benefits of the TC, allowing for a broader use of policy frameworks and innovative technologies.

VI. Exceptions to Bank policy

6.1 This subheading should identify and address any exceptions to Bank policy.

VII. Environmental and Social Strategy

7.1 This TC will finance feasibility (or pre-feasibility) studies of investment projects and associated environmental and social studies, whose terms of reference and outputs will be consistent with the applicable requirements of the Bank's Environmental and Social Policy Framework (ESPF). As a result of the Environmental and Social (E&S) Risk Analysis and based on the description of activities and components, the investment project for which the prefeasibility or feasibility studies will be financed is expected to have a substantial level of direct impacts and a moderate level of indirect and/or cumulative impacts. Given that the Borrower/Executing Agency has good organizational capacity and competence in environmental and social management, there are contextual risks associated with the investment project given that a water emergency has recently been declared in Uruguay due to drought.

Required Annexes:

[Request from the Client - UR-T1305](#)

[Results Matrix - UR-T1305](#)

[Terms of Reference - UR-T1305](#)

[Procurement Plan - UR-T1305](#)

