TC Document

I. BASIC INFORMATION TC

▪ Country/Region:	Regional
▪ TC Name:	Investigation of the effects of intermittent water supply on drinking water quality and infrastructure
▪ TC Number:	RG-T2441
▪ Associated Loan/Guarantee Name:	N/A
▪ Associated Loan/Guarantee Number:	N/A
▪ Team Leader/Members:	Alejandra Perroni (INE/WSA) team leader; team members: Gustavo Martínez (WSA/CPN), Jorge Ducci, (WSA/CCH); Fernando Miralles, (INE/WSA); Coral Fernandez Illescas (INE/WSA), Roxana Chávez (INE/WSA); Bernardita Saez (LEG/SGO), René Herrera (VPC/FMP).
▪ Date of TC Abstract authorization:	3/12/2014
▪ Beneficiary:	Latin America and the Caribbean
▪ Executing Agency and contact name	Executed by the Bank
▪ Donors providing funding:	AquaFund
▪ IDB Funding Requested:	US$ 105,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period (which includes Execution period):	March 2014-July 2016
▪ Required start date:	March 2014
▪ Types of consultants:	Academic institution
▪ Prepared by Unit:	INE/WSA
▪ Unit of Disbursement Responsibility:	INE/WSA
▪ TC Included in Country Strategy (y/n): ▪ TC included in CPD (y/n):	No No
▪ GCI-9 Sector Priority:	Infrastructure for Competitiveness and Social Welfare

II. OBJECTIVES AND JUSTIFICATION OF THE TC

2.1 The objective of this TC is to evaluate the effects of different drinking water supply situations (ranging from continuous to different varieties of intermittent supply) on drinking water quality and infrastructure.

2.2 As per statistics prepared by The Pan American Health Organization (PAHO) and The World Health Organization (WHO), in 2001 approximately 60% of households with connections to piped water supply in Latin America and the Caribbean had intermittent water supply (IWS). In the same line, data from a survey conducted by the National System of Sanitation Information (SNIS)[1] of Brazil in 2011 indicate that around 40% of

[1] http://www.snis.gov.br/

households with connections to water piped supply countrywide suffered some kind of intermittence in their service during that year.

2.3 Intermittency occurs when a water utility is unable to maintain positive pressure in the entire water distribution system (WDS) at one time, due to insufficient water resources, inadequate infrastructure, excessive consumption and water losses, or a combination of those factors.[2] IWS, water quality, infrastructure condition and leakage are inter-related. Poor infrastructure leads to increased leakage, which can result in IWS. IWS may further damage infrastructure, worsening the situation. Both IWS and poor infrastructure condition can threaten water quality through intrusion or regrowth of microorganisms.

2.4 Despite these elevated risks, only a small portion of research on water quality in distribution systems has focused on intermittent systems and the relationships between all the related factors. The proposed TC will lead to a better understanding of these relationships through a combination of analytical and field research works, to be conducted in areas that present IWS conditions that are representative of the situation faced at the regional level. For field works, the Bank selected the WDS in Arraiján, a rapidly growing suburban area of approximately 220,000 inhabitants outside of Panama City, Panama. Water services in the area are provided by IDAAN[3], the national water and sanitation utility of Panama. A significant portion of households in Arraiján receive intermittent water service in different supply conditions, which are similar to others existing in several other utilities in the region. With financial support and technical assistance provided by IDB, IDAAN and other utilities in the region are carrying out investment programs to rehabilitate and upgrade infrastructure for provision of water services, aimed at reducing or eliminating IWS situations. The impacts of those improvements could be assessed in a second phase of the study.

2.5 Being a knowledge product, it is expected that the conclusions of this work will be used to better inform future programs funding rehabilitation of water networks in Latin America and the Caribbean.

2.6 This study is aligned with the Bank's GCI-9 sector priority: "Infrastructure for Competitiveness and Social Welfare".

III. DESCRIPTION OF ACTIVITIES/COMPONENTS AND BUDGET

3.1 The project is expected to comprise two phases. Phase I includes one year of water quality, pressure and flowrate measurements in four study zones representing different supply conditions existing in Arraiján, to be defined between the Bank, IDAAN and the academic institution to be hired to carry out the study, and the analysis of collected data. Phase II would include a second year of measurements in the same zones once intermittency has been reduced as a consequence of infrastructure improvements made by the utility in order to allow a before-and-after comparison of parameters involved.

2 Coelho et al., 2003; Lee and Schwab, 2005; Vairavamoorthy et al., 2008; Yepes et al., 2001

[3] Instituto de Acueductos y Alcantarillados Nacionales

3.2 This TC supports activities in the scope of Phase I. Funding of Phase II activities will be considered once results of Phase I are duly analyzed. Activities included in Phase I are:

3.3 **Activity 1:** Selection of study zones and installation of sampling access points. Through consultation between IDAAN staff, the Bank's counterpart team and the academic institute experts, four "study zones" of the Arraiján distribution system showing different supply conditions will be selected to assess the main issues characterizing IWS and its effects. The study zones will be selected based on representativeness of different water supply conditions, and the possibility of being hydraulically isolated from the rest of the distribution network in a simple way, and without affecting service provision. Access points for monitoring water quality, pressure and flow rates will be installed, in full coordination with IDAAN staff in charge of operations in the areas.

3.4 **Activity 2:** Collection and analysis of data on water quality, pressure and leakage rates under different supply conditions. Parameters defining water quality, pressure and flow rates will be measure and characterized under the different supply conditions found in the different zones. To observe conditions during all seasons, measurements will be carried out over a period of one year. Resulting data will be analyzed, together with existing information on other comparable cases in order to identify and characterize relationships between main involved factors.

3.5 **Activity 3:** Analysis, publication, and dissemination of results. Results of the research will be disseminated to enable their application by IDB, IDAAN and the water and sanitation sector in the Region, through two conferences to be organized by IDB, involving regional and other relevant stakeholders, and a technical note to be published by the Bank.

3.6 This TC will finance dissemination activities such as conferences/workshops in different countries and the IDB staff participation in events. Taking into account that this is a knowledge activity, the resources from the administration, supervision plans or for preparation of projects cannot be used for this purpose. These expenses are not considered routine or customary activities and will not supplement the administrative budget of the Bank. (Policy GN-2470-2, Paragraph 2.32: The proposed policy establishes that resources may also support technical cooperation executed by Bank staff members, by financing the cost of delivering such TC (including salaries, benefits and overhead costs), when this is stipulated by the funding source).

3.7 Expected outputs are: (i) written reports and workshops/conferences presenting findings to IDAAN, IDB and other water and sanitation actors in the Region and (ii) publication of results.

3.8 Expected results are improved understanding of the effects of different intermittent supply conditions on water quality, pressure transients and leakage, in order to improve preparation of loan programs for the region.

Indicative Results Matrix

ID	Output indicators	Unit	Quantity/target value
1	Report elaborated in cooperation with external partners (within 24 months after signing contract)	Report	1
2	Conferences/workshops delivered (within 24 months after signing contract)	event	2
	Results		
1	Number of citations	reference	2

Indicative Budget (US$) IDBdocs38647784

Activity/ Component	Description	IDB/Fund Funding	Counterpart Funding	Total Funding
Component	Investigation of the effects of intermittent water supply on water quality and infrastructure- consultancy services			
Activity 1	Selection of study zones and installation of sampling points	53,196	-	53,196
Activity 2	Collection and analysis of data	36,972	-	36,972
Activity 3	Analysis, publication and dissemination of results	9,832	-	9,832
Total component		100,000	-	100,000
Bank Dissemination activities		5,000		5,000
Total		**105,000**		**105,000**

3.9 The Coordination of this consultancy will be conducted by Alejandra Perroni (INE/WSA) and Gustavo Martínez (WSA/CPN).

3.10 Monitoring and Supervision will be carried out by the Bank technical team.

IV. EXECUTING AGENCY AND EXECUTION STRUCTURE

4.1 The TC will be executed by INE/WSA, with the support of the Blum Center for Developing Economies and Department of Civil and Environmental Engineering, UC Berkeley (hereinafter "the Center"), to be hired using the single source selection mode. Because of the nature of this project, the project team, under the coordination of the Team Leader, finds that the Blum Center at UCB is the entity that is most suited to provide technical assistance to the project given its comprehensive and experience in the matter.

4.2 The Center will provide faculty, graduate and undergraduate technical expertise. Statistical methods similar to those used by UC Berkeley researchers in previous IWS research in India (Kumpel and Nelson; 2013- 2014) will be used for this study. Furthermore, there is a Memorandum of Understanding between the Bank and the Center for collaboration in these types of efforts.

4.3 Therefore, given the competencies and expertise of the Center, and their technical knowledge, the project team suggests contracting that entity for the amount of US$100,000 to provide technical support in implementation of the project, in single-source selection process as per policy GN-2350-9, 3.10 (d).(Link to SS Justification).

4.4 In order to ensure a smooth and effective development of the study, IDAAN has committed to provide permission to conduct water quality monitoring in various points in the network, support to access those points and operational information and use of the results of the study to write articles in academic journals and make presentations at academic and professional conferences. (Link to IDAAN letter).

4.5 The Center will be granted to use the information on the results of the study.

V. MAJOR ISSUES

5.1 The main risk for this project is that IDAAN will not be able to ensure availability of technical capacity to support the Center works, in particular the provision of information on service in the selected study zones, and access and connection to monitoring points in the WDS. This risk will be addressed through an ex-ante joint selection of the study zones between IDAAN, the Bank´s team and the academic institute experts.

VI. EXCEPTIONS TO BANK POLICY

6.1 No exceptions to Bank policy were identified.

VII. ENVIRONMENTAL AND SOCIAL STRATEGY

7.1 Given the nature of the activities to be financed, and in accordance with the guidelines of the Bank's Environment and Safeguards Compliance Policy (OP-703), the proposed technical cooperation is classified as "C" (See Filters).

Required Annexes:

Annex I: Letter of Request
Annex II: Terms of Reference
Annex III: Procurement Plan

INVESTIGATION OF THE EFFECTS OF INTERMITTENT WATER SUPPLY ON DRINKING WATER QUALITY AND INFRASTRUCTURE

RG-T2441

CERTIFICATION

I hereby certify that this operation was approved for financing under the AquaFund (AQF) through a communication sent by Gerhard Lair (ORP/GCM) on March 12, 2014. Also, I certify that resources from the AquaFund (AQF) are available for up to US$105.000 in order to finance the activities described and budgeted in this document. This certification reserves resources for the referenced project for a period of four (4) calendar months counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, for which the Fund is not at risk.

Sonia M. Rivera
Chief
Grants and Cofinancing Management Unit
ORP/GCM

03/31/2014
Date

APPROVAL

Approved:

Sergio I. Campos G.
Chief
Water and Sanitation Division
INE/WSA

4/1/2014
Date