

**TC ABSTRACT**  
BR-T1305

**I. Basic project data**

§ Country/Region:	Brazil
§ TC Name:	A Water Resources Decision Support System to Reduce Drought Vulnerability and Enable Adaptation to Climate Change in Pernambuco
§ TC Number:	BR-T1305
§ Team Leader/Members:	Fernando Miralles-Wilhelm (INE/WSA); Team Leader; Raúl Muñoz , Silvia Ortiz and Yolanda Galaz (INE/WSA); Krysia Avila (LEG/SGO); Maricarmen Esquivel (INE/CCS)
§ Type of TC:	Knowledge Generation and Dissemination
§ Reference to Request <sup>1</sup> :	IDB docs # <a href="#">39028285</a>
§ Date of TC Abstract:	March 2014
§ Beneficiary:	Brazil
§ Executing Agency and contact name	Bank executed
§ IDB Funding Requested:	US\$1,000,000 (Aquafund Multidonor)
§ Local counterpart funding, if any:	None
§ Disbursement period	24 Months
§ Required start date:	March 2014
§ Types of consultants	Firm and Individual Consultants
§ Prepared by Unit:	INE/WSA
§ Unit of Disbursement Responsibility:	INE/WSA
§ Included in Country Strategy o CPD	N/A
§ GCI-9 Sector Priority:	Climate change and environmental sustainability

**II. Background and Justification**

2.1 While there are common challenges in water management around the world, these issues manifest in specific ways in each region based on local context. In Pernambuco, there is nearly universal water supply access via household connection in the urban areas, including the city of Recife, home to three quarters of the state's nearly 9 million residents. Although access is nearly universal – more than 90 percent of urban households are connected to the water supply network – water service delivery in the urban area is intermittent. According to a 2010 World Bank estimate, only about 30 percent of the 170 municipalities served by Compesa received water 24 hours a day<sup>2</sup>. Rationing is a routine aspect of daily life, even in the Recife metropolitan region where, residents have alternated between 24 hours with water supply on and 28 hours without service, impinging on both social and economic success, and many areas of the city lack improved sanitation. Excessive groundwater pumping, much of it unpermitted but driven by inconsistency of water service, is also a problem. The gap between water access and service delivery is a fundamental challenge to urban areas in Pernambuco.

<sup>1</sup> A copy of the Letter of Request, Programming/Portfolio Review Mission Aide Memoire or Report requesting the TC should be submitted with the Abstract.

<sup>2</sup> <http://documents.worldbank.org/curated/en/2010/10/16583734/brazil-pernambuco-sustainable-water#>

- 2.2 To address these challenges, the State of Pernambuco, with support of the IDB, is implementing plans to improve water and sanitation in the region<sup>3</sup>. The IDB recently approved a \$200 million loan to promote environmental sanitation of Ipojuca River basin through expanded sewer services, wastewater treatment coverage rates, and other social and environmental improvements. The State of Pernambuco will provide an additional \$130 million in local funds to support the project. The project aims to connect 143,000 homes to the sewerage system and wastewater treatment plant; construct 1,190 km of sewers; and install five new wastewater treatment plants; and add continuous water service for 63,000 families. Additionally, The World Bank has implemented the Pernambuco Sustainable Water project with the goals of strengthening water sector's institutional and regulatory frameworks and integrated planning capacity; improving water sector's institutional operations and economic performance; and improving water supply and sanitation services in the metropolitan regions and the Capibaribe River basin<sup>4</sup>.
- 2.3 The project proposed here seeks to build upon these efforts. To this end, the general objective of this Technical Cooperation project is to support the continued development of Pernambuco's society and economy by reducing its vulnerability to recurrent droughts. This general objective will be achieved through the development of an integrated water resources decision support system that is designed to achieve the following specific objectives:
- Focus on emergency response, early warning and information delivery during an event.
  - Addresses water resources operations for meeting prioritized demands and managing sectoral shifts in demand with compensation anticipating drought.
  - Emphasizes vulnerability assessment, stakeholder identification, water and economic relief allocation.
  - Incorporates economic trends, projections of climate or other variables, used to guide short-term strategy.
- Integrates with a long term strategy, where relief and response measures are tied to development goals.

### III. Description of Activities

- 3.1 The project will support the development of methodologies and outputs consisting of the following activities. These activities are further detailed in the TC Document for this operation.
- A. Develop rainfall and river flow seasonal, annual and decadal forecasts to obtain reservoir inflows using the *Hydro-BID* simulation system.
  - B. Develop estimates of monthly water demand for each major demand area on the water distribution system for the short-term operation period consistent with the supply forecast scenarios.
  - C. Develop improved short-run (1 to 2 year) and long-term (10 years) reservoir operation and water allocation strategies for drought and normal years that explicitly use extended range climate and hydrologic forecasts. Improve the existing water system simulation and optimization modules to incorporate a two level reservoir optimization model (annual/seasonal and decadal).
  - D. Develop a long-term strategy for water supply development and demand management for the state, that considers climate variability, as well as possible changes in land use, technology and society (Decision Theater approach and tools).

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<sup>3</sup> [http://www.iadb.org/en/news/news-releases/2012-12-21/sanitation-of-the-ipojuca-river-basin-in-brazil.10276.html#UjCh\\_sbD98E](http://www.iadb.org/en/news/news-releases/2012-12-21/sanitation-of-the-ipojuca-river-basin-in-brazil.10276.html#UjCh_sbD98E)

<sup>4</sup> <http://www.worldbank.org/projects/P108654/pernambuco-sustainable-water?lang=en&tab=overview>

- E. Prototype a participatory incentive based mechanism to allocate water.
- F. Develop applications and capacity building working with local University and Water Agency

**IV. Budget**

Activity	Total Funding (SGTF)
A. Develop rainfall and river flow forecasts (Hydro-BID)	100,000
B. Develop estimates of water demand	100,000
C. Develop reservoir operation and water allocation strategies	100,000
D. Long term strategy for water supply development and demand management	350,000
E. Prototype participatory incentive-based mechanism	200,000
F. Applications and capacity building	150,000
<b>TOTAL</b>	<b>US\$ 1,000,000</b>

**V. Executing agency and execution structure**

5.1 This is a Bank-originated TC focused on integrating recently developed methods and tools in modeling, visualization and decision-making processes, which that are particularly applicable to Pernambuco as a case application that may be replicated in other climate-sensitive parts of the LAC region. In addition, this detailed research and development effort in Pernambuco will add value by offering the opportunity of mainstreaming climate change impacts in the design of water resources planning and Bank infrastructure operations in different sectors (Water Supply, Water Resources Management, Hydro-energy, Irrigation, Natural Hazards and Risk Management and Transport). Besides the water resources management and planning uses of Hydro-BID, the knowledge and tools developed through this TC will be able to serve as support for the environmental evaluation and screening of Bank's project loans at regional scale. The execution of this TC will provide a learning, knowledge transfer and data gathering opportunity for Bank staff involved in issues of water resources, vulnerability and adaptation to climate change, which is an increasing area of work for the Bank (and particularly the WSA division). Therefore, it is deemed critical that this TC is Bank-executed. The Bank will contract all consulting services (firms and individual) according to current corporate acquisitions policies and procedures.

**VI. Project Risks and Issues**

6.1 The primary risk for implementation of this TC project is the lack of technical capacity of some of Bank's clients and the gap of information for model parameterization in particular areas. To mitigate this risk, the TC includes providing technical support and guidance to Hydro-BID users and building capacity with Pernambuco's water and climate agency (APAC), as well as with a local university to sustain this effort beyond the duration of this TC. An additional risk stems from the pioneering nature of this TC; there isn't much operational experience with the kinds of products that this TC will yield. We have therefore included peer review of all outputs of this TC by at least 2 anonymous reviewers (one within the Bank and one outside the Bank) to insure quality of the TC deliverables.

**VII. Environmental and Social Classification**

7.1 Following ESG's project classification process (Safeguard Policy Filter and Safeguard Screening Form) requirements, it has been determined that this project falls under Category C. No environmental assessment studies or consultations are required for Category "C" operations.