

IDB-KIAT Collaboration Project Proposal

Project Overview

Project Title	Scaling-up Ideas in Action Innovative Proposal / Comprehensive risk management and disaster response system in Quito's drinking water and wastewater systems (Quito Resilient Program)		
Sector (sub-topics)	<i>Water and Sanitation</i> <i>Innovation on Water and Sanitation</i>		
Country	Ecuador	Location	Quito Metropolitan District
Project Duration	60 months	Budget	USD 9 million
Association with Other Projects	<i>The project is aligned with IDB EC-L1242 Potable Water and Sewerage Program for Quito, currently in execution</i> <i>This project is also aligned with Source of Innovation (SOI). SOI is an initiative to promote the development and integration of innovative solutions in the water, sanitation and solid waste sector that contribute to providing universal safely managed water, sanitation, and solid waste management services. SOI is a joint initiative of the IDB Group co-lead by IDB INE/WSA and IDB Lab, innovation laboratory of the Inter-American Development Bank.</i>		

Submitter's Information

IDB (country office)	
Name	(details to be provided when selected)
Position	
E-mail	
Telephone	

Partner Country's Implementing Organization(s)

Partner Country Contact 1	
Name	(details to be provided when selected)
Position	
Organization	Ministerio Ambiente, Agua y Transición Ecológica
E-mail	
Partner Country Contact 2	
Name	(details to be provided when selected)
Position	
Organization	EPMAPS
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Partner Country Contact 3	
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Position	
Organization	EPMAPS
E-mail	

1. Project Background

Current Situation

The Metropolitan Public Drinking Water and Sanitation Company of Quito (EPMAPS) strengthens resilience in the management and operation of drinking water and wastewater systems, contributing to local and national water security. EPMAPS has developed several systems that support resilience. One of these is AguaQuitoPeriferica, which monitors urban growth in the city's peri-urban areas and assesses the impact on EPMAPS' infrastructure and demand for services in the medium and long term. AguaQuitoPeriferica received the honorable mention "Innovation Toward Resilience" and "Innovative Management Model" by MingaDigital in the IDB Ideas in Action Award.

EPMAPS plans to develop and implement an integrated system that addresses all dimensions of the risks faced by the company for managing drinking water and wastewater services in the city of Metropolitan District of Quito (DMQ).

According to the Quito Natural Disaster Atlas¹, 70% of the DMQ territory is exposed to natural disasters. In addition, the city of Quito was built on a seismic fault that runs through the entire city. Therefore, the city of Quito is vulnerable to disasters such as earthquakes, floods, and volcanic eruptions.

Disasters from landslides and floods are another vulnerability that plagues Quito. The excessive growth of the city, both past and present, without planning and control, has caused the creeks that form the natural drainage of water from the hills to become clogged and compacted.

The entire drinking water and sanitation system managed by EPMAPS is subject to the same vulnerabilities. Negative events and disasters related to the operation and maintenance of EPMAPS include: urban flooding and alluvial deposits associated with heavy rains, and collateral damage due to leaks in water networks and collectors. However, these events are consequences of external factors that are usually anthropogenic in nature and do not fall under the responsibility of EPMAPS.

That is, the threat of risks is permanent and motivates EPMAPS to take measures of constant preparation as collective protection and respecting the norms of control and civilized coexistence to protect life. For this reason, EPMAPS intends to implement an innovative comprehensive system for risk management in drinking water and sanitation in Quito. In this way, it would link

¹ [DMQ \(2022\), Atlas amenazas naturales](#) del Distrito Metropolitano de Quito, Secretaria de Riesgos del Municipio, www.quito.gob.ec.

its current systems that seek to reduce risks (SCADA, GIS, SAP, Quito Resilient Program), improve response time and structure a contingency plan.

Challenge 1 - Integrate EPMAPS computer systems and internal risk management in accordance with municipal and national strategies, emergency operations center at the national level (COE).

Challenge 2 - Ensure innovative platform and integrated system to achieve a resilient city in drinking water and sanitation. This tool should be citizens access to strategic information in real time such as open innovation project.

This project has been recognized by "Ideas en Accion", the IDB Group's initiative to reward the most innovative and scalable utility initiatives in the region. This award is part of Source of Innovation (SOI), as pointed out before, the regional initiative of IDB for innovation in the water and sanitation sector. SOI is supported by FEMSA Foundation, SECO (Swiss Cooperation) and the Government Israel. One of the main goals of SOI is to scale up existing innovations from the region. "Ideas en Accion" is an interesting pipeline of successful and promising projects to reach scale.

The winners of Ideas into Action automatically become part of the IDB Group's Source of Innovation initiative for innovation in water, sanitation and waste management. If the proposal evolves promisingly, Source of Innovation could potentially contribute with additional studies or with some financial contributions.

Relevant National Policies, Codes

- Public and State Security Law.- Determines the executors of the public and state security system responsible for defense, public order, prevention, and risk management measures.
- Organic Code of Territorial Planning, Autonomy and Decentralization (COOTAD) - Establishes the exercise of responsibility for risk management.
- Emergency Operations Committee Manual - Describes the structure of the National Decentralized Risk Management System (SNDGR) for coordinating attention and response to emergencies and disasters.
- Global and local COE
- Metropolitan Code - Metropolitan Risk Management System of the Metropolitan District of Quito.

2. Project Objectives

The objectives of the proposed Program are to: (1) Capture and assess the current situation of the EPMAPS systems involved, resulting in a AS IS /TO BE /TO DO, (2) Create capabilities and

knowledge to mitigate risks and prevent associated disasters, (3) Integrate systems and capabilities, and (4) Generate innovative platform and integrated system to achieve a resilient city in drinking water and sanitation.

3. Project Components

Component 1: Feasibility study. The study must analyze, evaluate, and propose designs for the technological and operational infrastructure needed to implement the Quito Resilient Program System. In this system, information and communication will be essential components for risk management in adverse natural situations. The development of the system will be based on the interconnection of innovative technologies that will make it possible to generate warnings through text messages (SMS), social networks, media (radio, television) and others. It will also support emergency and disaster management agencies such as COE (National Service for Risk and Emergency Management), national and municipal authorities, and ECU911 (Integrated Security Service) to prevent, manage resources, and make decisions by the competent authorities for the citizens of the DMQ.

Component 2: Implementation of monitoring devices. Implementation of monitoring devices that will be integrated into the SCADA system must include communication links and data transfers to the EPMAPS data center. These early warning instruments will be installed in streams, peri-urban areas, watersheds, sinkholes, conservation areas, wastewater treatment plants, distribution tanks, wastewater disposal and volcano monitoring areas that are close to operational drinking water infrastructure. On the other hand, to complement the disaster management system in the DMQ, the system for processing satellite images of the mentioned areas and transmitting them to the EPMAPS data center must be implemented to be integrated into the system.

Component 3: System development and implementation. The development of the system (Quito Resilient Program) will be based on the processing of large amounts of data (through machine learning, artificial intelligence, and other technologies) derived from the monitoring of the different areas where disasters are likely to occur, as well as from the different systems that the company manages, such as SCADA (Supervision, Control and Data Acquisition), GIS (Geographic Information System), and SAP (Systems, applications and products in data processing). The results of information processing will be displayed on the dashboard to make decisions and issue early warnings in real time. the information would be accessible to people as an open innovation Project.

4. Project Location, Period, and Estimated Cost

The project is taking place in the Metropolitan District of Quito in the province of Pichincha in Ecuador. The priority areas for instrumentation and analysis are urbanized areas, especially peri-urban areas.

- Project Timeline

Feasibility studies: January 2024 - December 2024.

Instrumentation equipment implementation: January 2025 - December 2025.

System development and implementation: January 2026 - December 2027.

Expected Project Cost: US\$ 9 million

Component	Amount (US\$)
• Component 1 Feasibility study	950.000
• Component 2 Implementation of monitoring devices. Integrated SCADA, GIS, SAP to Resilient System	6.500.000
• Component 3 System development and implementation	1.550.000

5. Project Implementing Organization

Contact information will be provided when the contract is awarded.

6. Required Coordination at National/Regional Level

COE (National Service for Risk and Emergency Management), national and municipal authorities, and ECU911 (Integrated Security Service)

7. Risks and Opportunities

Risks:

- Sectional elections for new mayor in the Municipality of the Metropolitan District of Quito that can create discontinuity with the current policies of EPMAPs.

Opportunities:

- Financing from international organizations.
- Exceptional decrees from the national or local government for urgent financing in case of emergencies.
- Informed citizens to improve their decisions in emerging drinking water and sanitation events.