

Terms of Reference

Consultancy to Develop a Plan

for the Management of Climate Change and Disaster Risks

for the Ministry of Public Utilities

1. Background

- 1.1. Trinidad and Tobago's water resources are under threat from pollution, watershed degradation and climate change. It is very likely that climate change will have a significant impact on the water sector of Trinidad and Tobago. Rainfall is projected to decrease slightly and become more variable leading to intense rains and flooding on the one hand, and droughts on the other. Warmer temperatures will also exacerbate drought conditions. (McSweeney et al., 2009, 2010; IPCC, 2007, 2013).
- 1.2. There are 55 watersheds in Trinidad and 15 in Tobago. Large-scale development of surface water has been limited to four rivers in Trinidad and Tobago. These are the Caroni and Oropouche Rivers in Trinidad's Northern Basin; the Navet River in Trinidad's Central Range; and the Hillsborough River in Tobago, which is the principal source of supply for Scarborough and South-West Tobago. Before 1981, 60 percent of the total municipal water supply was provided by groundwater. After large surface water plants were constructed, such as the Caroni-Arena Pump Storage Complex and the North Oropouche Scheme, groundwater has accounted for only about 25 percent of the total water supply of Trinidad. Whilst the Trinidad and Tobago Water and Sewerage Authority (WASA) is the major abstractor of water resources, other users include industrial and agricultural facilities. Approximately 94.7 percent of the population in Trinidad and 84.8 percent in Tobago are connected to the piped water supply network. However, a 24-hour supply is provided to only 16.6 percent and 39.6 percent of the population on the islands of Trinidad and Tobago, respectively¹.
- 1.3. The quality of the surface water is deteriorating in many locations, as evidenced by high levels of biological oxygen demand, bacterial content, turbidity, and the presence of chemical pollutants in rivers (Food and Agriculture Organization of the United Nations [FAO], 2015). The main threats are uncontrolled point waste discharges from industrial and domestic sources, as well as the high level of erosion in the upper reaches of watercourses. Pollution of surface water not only affects the production of drinking water, but also the ability of the rivers to provide productive habitats for terrestrial and aquatic species. Reduced freshwater supply has also been reported due to decreased rainfall and subsequent reduction in stream flow.
- 1.4. To help the country respond to these challenges, the Inter-American Development Bank Group (IDBG) approved in 2022 the Conditional Credit Line for Investment Projects (CCLIP) and the first operation under it, called ***National Water Sector Transformation Program***. Both the CCLIP and the Program have as general objective to improve the efficiency, quality, sustainability and resilience of potable water supply service and water security in T&T. The specific objectives are to:
 - (i) improve operational efficiency and reliability of water supply services;
 - (ii) improve quality of water services for underserved communities in Trinidad and Tobago
 - (iii) develop capacity and provide institutional strengthening to the MPU and WASA to improve governance and sustainable management of water resources.

The NWSTP has three (3) main components as follows:

¹ HR Wallingford Report 2021, Vulnerability Assessment and Water Sector Adaptation Plan Project

- 1.5. **Component 1: Water Stabilization and Improvement** - This component will finance the development of a comprehensive program to urgently stabilize water supply services to prevent further service decline throughout the country and to improve quality of water service in underserved communities with a level of service below 24/3.
- 1.6. **Component 2: Support for Water Sector Transformation** – This component will support capacity development and institutional strengthening of the MPU and WASA to improve governance and sustainable management of water resources. In addition, it will support the separation of the functions of water resources management from WASA and implementation of Integrated Water Resources Management (IWRM).
- 1.7. **Component 3. Network Optimization** – This component will finance urgent priority works to optimize network performance and reduce non-revenue water. These works will be executed through a Co-Management Performance Based Contract with a specialized consulting firm (CF). The CF will be required to prepare and commence the implementation of a Non-Revenue Water Reduction Strategy and Programme for the country. The CF will also provide strategic advice and technical support to the Executive Team of WASA in the transformation of WASA.
- 1.8. Regarding component 2, one of the main activities is to develop and implement a ***Plan for the management of Climate Change and Disaster Risks*** which will help to guarantee the reliable operation of the water supply system and contribute to the resilience of both grey and green infrastructures key for the water supply service in Trinidad and Tobago. This Terms of Reference (TOR) describes the specific deliverables and activities expected to be carried out by the selected consulting firm or consortium for the development of said plan.

2. Objective(s) of the Assignment

The objective of this consultancy is to develop a Climate Change and Disaster Risk Management Plan (CCDRMP) and a corresponding Implementation Strategy. The CCDRMP should cover actions both to prevent the materialization of climate and disaster risks and to effectively and efficiently respond to a disaster linked to a hydrometeorological hazard. The Plan should be a practical and operational instrument to guide the Water Operator in the inclusion of climate resilience in their day-to-day operation, planning, decision making and development (design and construction) of new water and sanitation infrastructure. The Plan should also include a road map of activities and a quantification of human and financial resources necessary for its implementation.

3. Scope of Services, and Expected Deliverables

The firm or consortium will carry out the following key activities and will deliver the following outputs.

3.1 Key Activities

- a. Conduct Desk Review of existing official and non-official documentation related to climate change impacts, vulnerability, and associated risks on the water sector. This includes but should not be limited to, National Communications to the United Nations Framework Convention on Climate Change, Adaptation Plans or Strategies for the Water Sector, National Adaptation Plans, National Determined Contributions (NDCs), and National

- policies/regulations pertaining to the management of climate and disaster risks. Use this information as an input for the development of the CCDRMP.
- b. Revise additional technical documentation that could be used as an input for the development of the CCDRMP such as tools and technical guidelines developed by institutions such as the [American Water Works Association](#), the [US Environmental Protection Agency initiative CRWU](#), or any other agency worldwide that has developed technical materials on managing climate related risks for water operators. The materials should be used as an input and adapted to the local context of Trinidad, taking into considerations, limitations and challenges around trained personnel, data, and national existent institutional capacities.
 - c. Identify key hydrometeorological hazards to which the water and wastewater infrastructure will be exposed. Identify additional stressors that can multiply the negative impacts of said exposure to identified hazards. (e.g., environmental degradation, groundwater contamination, among others). Identify if there are any national plans to manage these stressors. Use this information as an input to the CCDRMP.
 - d. From the national Disaster Risk Management (DRM) policy/bill that applies to water and sanitation operators, define responsibilities and levels of liability that the operator needs to assume. Use this information as an input for the design of the CCDRMP.
 - e. Conduct meetings with personnel from the WASA, MPU, government officials and any other stakeholder of relevance for the development of said CCDRMP.
 - f. Evaluate WASA's capacity for the implementation of new CCDRMP. Validate main findings with stakeholders. Based on the results of the evaluation, propose recommendations for improvement through the development of an implementation strategy in order to guarantee the seamless implementation of the CCDRMP.
 - g. Participate in meetings as requested to present/discuss specific topics related to the consultancy or status of work under development.
 - h. Conduct training to prepare WASA's technical and administrative personnel for the implementation of the CCDRMP.
 - i. Conduct a vulnerability assessment of the water supply system to identify critical points in the system. Said assessment should follow the Robust Decision-Making (RDM) approach followed by the identification of cost-effective adaptation measures to reduce said vulnerability. These measures should be presented following a sequential structure guided by specified adaptation tipping points. This can be done by using the concept of "adaptation scenarios". To ensure synergies, this activity should be in collaboration with the Environment Management Authority (EMA) who is currently conducting a vulnerability and risk assessment for the water resources sector.
 - j. Identify key nature-based solutions, including ecosystems, aquifers and recharge areas that need to be prioritized for the design of conservation/protection plans.

3.2 Expected deliverables

- a. **Deliverable 1. Scope of work and methodology.** Technical document with the scope of work and the methodology to be used. Said methodology should present the sequential steps that will be followed to carry out activities described in this TOR and which will consequently facilitate the generation of deliverable 2 to 5. The methodology to be presented should also include processes to be followed to achieve high rates of participation during planned consultation with the different stakeholders.

- b. **Deliverable 2. Adaptation Plan to manage physical climate risks associated to rapid and slow onset impacts.** Technical document that contains a methodology to be used by the WASA's responsible personnel for the strategic planning and decision making of water and sanitation infrastructure and water sources conservation activities. The document should provide the structure, tools and analysis required to effectively streamline climate resilience at the plant level and at the systemic level (e.g., water supply system for a city). The approach to be followed to develop this product shall consider the following components; additional components can be added as deemed necessary,
- (i) **Introduction and main objectives of the document**, establish its users and how the document is supposed to be used,
 - (ii) **Vulnerability context and summary of observed and anticipated impacts of climate change for the water sector** in Trinidad & Tobago,
 - (iii) **Climate change vulnerability and risks maps, including vulnerability of water sources both superficial and underground and key ecosystems that capture and regulate water resources, define critical and highly exposed infrastructure** to hydrometeorological hazards, checklist for planners that helps on the prioritization of investments in line with its criticality (level of vulnerability),
 - (iv) **Revision of existing adaptation strategies for the water sector and comparison against existing investment plans** for Water and Sanitation infrastructure and ecosystems conservation,
 - (v) **Application of and training in the use of Decision Support Planning Methods for the development of a portfolio of cost-effective adaptation measures** including a broad variety of stakeholders, specifically, the (1) RDM approach to define specific adaptation strategies for the water supply system and (2) the Dynamic Adaptive Policy Pathways (DAPP) concept to define how these adaptation actions should be implemented following specified adaptation tipping points,
 - (vi) **Guidelines for including climate resilience considerations in the design of new water and sanitation infrastructure**, including a reference to existing and available tools to carry out needed analyses, estimated costs for conducting assessments.
- c. **Deliverable 3. Integrated Emergency Response/Management Plan.** Technical document that contains an **emergency management/response plan** for WASA in alignment with WASA's hurricane Emergency Response Plan and Disaster Management and Business Continuity Plan. This document should contain all the details and steps that WASA should follow to adequately respond to a materialized hydrometeorological risk. Specifically, the methodological approach to develop the document shall follow the following structure, however, additional elements can be added as deemed necessary,
- (i) an **introduction to the preparedness culture**, including preparedness and keys for developing and supporting with tools and tactics the preparedness culture within the organization,
 - (ii) **risk and resilience assessment**, what it is, goals, how to conduct it and manage it, identification of threats, definition of acceptance level for the systems, conclusions, and references,
 - (iii) **developing an effective emergency response plan** in T&T for a water operator, its relevance, why the importance of preparedness, overview and types of preparedness plans, how to develop an emergency response plan,
 - (iv) **definition of mutual aid and partnerships**, identification of key partnerships, what type of collaborative partnerships would be needed, define type of mutual aid coordination

- required with local emergency institutions, operational plans, exercises, incident response,
- (v) **internal and external communications**, procedures and guidance for general crisis communication planning, internal communication with employees, communications with emergency response agencies and government and regulatory agencies, communications with the public and customers, use of social media to communicate, contact information,
 - (vi) **training and exercises**, training sources and methods, training and exercises matrix-when-where-who-what, conducting exercises and documentation required.
- d. **Deliverable 4. Development of an Implementation Strategy** for the CCDRMP for the water sector in Trinidad and Tobago; the strategy should provide all the supporting information so that WASA can effectively and efficiently implement the CCDRMP to reduce the vulnerability of its assets (both green and grey infrastructure and operators in charge of the different systems). It should entail at least the following elements:
- (i) Clearly define the objectives of the implementation strategy and develop a **detailed action plan** that outlines the specific activities, initiatives, and projects to be undertaken;
 - (ii) Conduct a comprehensive **risk assessment** to identify the most critical climate change impacts and disaster risks affecting the water sector. Prioritize actions based on their urgency and potential impact.
 - (iii) **Stakeholder Engagement** is crucial. Involve key stakeholders, including MPU & WASA, government agencies, water utilities, communities, NGOs, and private sector entities, throughout the development of the strategy to ensure ownership and collaboration;
 - (iv) **Capacity Building**: Identify capacity-building needs and initiatives for stakeholders involved in implementing the plan. This may include training programs, workshops, and knowledge-sharing platforms;
 - (v) **Institutional Arrangements**: Determine the necessary changes in institutional arrangements, roles, and responsibilities to facilitate effective coordination and collaboration among various agencies and stakeholders;
 - (vi) **Financing and Resource Mobilization**: Explore potential funding sources and mechanisms for resource mobilization to support the implementation of the strategy. Analyze the financial requirements and consider cost-effective measures;
 - (vii) **Climate Finance Mechanisms**: Investigate and establish mechanisms to access climate finance funds and grants available for climate change and disaster risk management projects in the water sector;
 - (viii) **Monitoring and Evaluation Framework**: Develop a robust monitoring and evaluation framework with clear indicators to track progress and assess the effectiveness of the implementation efforts;
 - (ix) **Communication Strategy**: Design communication strategies to raise awareness about the CCDRMP. Engage with stakeholders to encourage their active participation.
- e. **Deliverable 5. Climate Change and Disaster Risk Management Plan**, integrating deliverables 2 to 4 and clearly laying out an implementation timeline.

Summary,

	Deliverables	Time Frame (Workdays)	Review Period (Workdays)	Payment %
1	Scope of work and methodology to be used	10	5	10%
2	Adaptation Plan to manage physical climate risks associated to rapid and slow onset impacts	50	20	25%
3	Integrated Emergency Response/Management Plan	40	20	25%
4	Implementation Strategy for CCDRMP	65	24	25%
5	Climate Change and Disaster Risk Management Plan integrating deliverables 2 to 4.	60	24	15%

4. Experience Requirements

- a. **General:** The firm or consortium should have at least ten (10) years of general experience in the development of the type of Climate Change and Disaster Risk Plan required, including specific analyses described in the TORs for this consultancy. In addition, firm or consortium should have at least 5 years of experience in Trinidad and Tobago or the Caribbean region.
- b. **Specific:** The firm or consortium should have at least ten (10) years strong and demonstrable experience working in the water sector, especially with water utilities/operators. Experience should include not only designing strategic plans but also training materials and assessing institutional capacities required for the implementation of said plans.

5. Quality Requirements

- a. Team Composition & Qualification Requirements for the Key Experts:
The required profiles are as follows:
 - **Climate Change Specialist**
 - Degree: Meteorologist or environmental engineer
 - Specialty area: At least 15 years of experience on adaptation and/or climate resilience, ideally with at least 10 years of working experience in the water sector. Experience in the water sector should have a good balance between analytical work at the project level (e.g., risks assessments) and strategic planning work at the sectorial level (e.g., sectorial cc vulnerability and impacts assessments, application of RDM and DAPP techniques, among others).
 - Specific Experience: At least 5 years' experience working in Trinidad and Tobago or the Caribbean region.
 - **Disaster Risk Specialist**
 - Degree: Civil/ Hydraulic/ Environmental Engineer or related degree
 - Specialty area: At least 10 years of experience on assessment, management and governance of disaster risk. Specialists who can assess vulnerabilities, conduct risk analysis, and develop strategies for disaster risk reduction and response.
 - Specific Experience: At least 5 years' experience working in Trinidad and Tobago or the Caribbean region.

- **Water Sector Specialist**
 - Degree: Civil/ Hydraulic/ Environmental Engineer or related degree
 - Specialty area: At least 15 years of experience in the water sector both at the project/plant operation level and the strategic planning/decision-making level. Ideally the candidate shall have some basic knowledges of climate change and its impacts on water availability and quality (e.g., through the consideration of climate change both at the project/operational level and at the broader strategic planning level).
 - Specific Experience: At least 5 years' experience working in Trinidad and Tobago or the Caribbean region.
- **Institutional Organization Specialist**
 - Degree in Law, Political Science, or related degree.
 - Specialty area: least 10 years of experience analyzing the organizational structure of disaster risk management. Knowledge and experience in the preparation of strategies and operational management of disaster risk management related public works and the ability to make strategic and operational recommendations to key stakeholders.
 - Specific Experience: At least 5 years' experience working in Trinidad and Tobago or the Caribbean region.

6. Reporting Requirements and Time Schedule for Deliverables

- a. **Deliverables content and format:** All reports will be written in English and in a format compatible with Microsoft Office. They must be in an editable format and must be delivered with their corresponding digital support.
- b. **Delivery dates:** Products shall be delivered in accordance with the dates established for each one in deliverables table presented above. A schedule proposal for the execution of the activities must be presented as the first deliverable. The schedule should indicate the proposed start and finish dates for each of the tasks required in the work and any important or specific milestones of the Project (i.e., delivery of reports, etc.). An economic proposal in US dollars must be submitted for all the tasks of the proposed work (i.e., tabular format) that includes direct labor costs (i.e., number of hours or days per team member and their associated costs per unit) and indirect labor costs (i.e., travel, per diem, subcontractors, etc.). All assumptions related to the economic proposal must be clearly specified. If any additional task is to be recommended, it should be included in the proposal.