SUMMARY OF THE PROJECT IN DESIGN * (*)

Water 4.0 – IoT and ML for Smart Water Treatment

PITCH ELIGIBILITY DATE	COUNTRY(IES)
11/20/2024	Brazil

ALIGNED WITH COUNTRY STRATEGY?
Yes

PARTNER(S)
Conatus Environmental Technologies

PRELIMINARY CLASSIFICATION ENVIRONMENTAL AND SOCIAL IMPACT
C (**)

TOTAL BUDGET	IDB Lab	LOCAL COUNTERPART AND COFINANCING
US 728,000	US 364,000	US 364,000

DESCRIPTION

The problem. Currently, it is estimated that 37,8% of treated water in Brazil is lost due to leaks and inefficiencies in the distribution system. Water Treatment Plants (WTPs) in Brazil endure several challenges due to the growing demand for potable water and the need to manage resources efficiently. In addition to the high levels of water loss, over 80% of Brazil's WTPs have been operating for more than 30 years, and a large number of these facilities still rely on manual processes, which makes accurate chemical dosing even more challenging. These manual systems require operators to conduct time-consuming tests and calculations to adjust chemical levels, which are not always accurate, and lead to problems faced such us: (i) Inefficiency and inaccuracy; (ii) Resource intensive; (iii) Environmental impact.

With climate change projected to increase the frequency of droughts, particularly in the southeastern and northeastern regions, enhancing the resilience of Brazil's water infrastructure is becoming increasingly urgent. While effective, traditional automation solutions are often quite expensive. The complexity of water treatment, which relies on precise control of multiple variables, can diminish the effectiveness of standard automation methods. Additionally, the scarcity of skilled workers in these areas exacerbates operational challenges, impacting efficiency and water quality.

The solution. Automate chemical dosing in water treatment plants, addressing the limitations of outdated technologies and manual testing. This will be achieved by implementing advanced technologies that optimize efficiency, reduce costs, and enhance process reliability. The proposed solution integrates the Internet of Things (IoT), Machine Learning (ML), and Cloud Computing. These technologies enable the collection and analysis of data from both proprietary and legacy sensors within WTPs, facilitating the automation of chemical dosing. This value proposition was developed based on insights gathered from over 50 interviews with experts in the water treatment field, ensuring that the solution meets the needs of operators, supervisors, and managers in terms of reliability, time savings, and return on investment.

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**The IDB categorizes all projects into one of six E/S impact categories. Category A projects are those with the most significant and mostly permanent E/S impacts, category B those that cause mostly local and short-term impacts, and category C those with minimal or no negative impacts. A fourth category, FI-1 (high risk) Financial Intermediary (FI)'s portfolio includes exposure to business activities with potential significant adverse environmental or social risks or impacts that are diverse, mostly irreversible or unprecedented, FI-2 (medium risk) FI's portfolio consists of business activities that have potential limited adverse environmental or social risks or impacts, FI-3 (low risk) FI's portfolio consists of financial exposure to business activities that predominantly have minimal or no adverse environmental and social impacts.

The **business model** is centered on offering the technology as a service (TaaS), eliminating the need for costly upfront investments by water service providers. Instead, customers pay a subscription-based monthly fee, which represents only a fraction of the operational efficiency gains achieved through automation.

The beneficiaries. The project will benefit local communities where access to clean water may be limited or inefficient, especially in regions such as Brazil's semiarid, where water scarcity is a constant challenge. Also, it will directly benefit Water Utilities and Municipalities (B2G) and WTP from industrial clients (B2B) reducing reliance on expensive infrastructure, lowering operational costs, and improving efficiency.

Expected Results. **Reduce water loss** saving up to 15-20% of the 8% typically utilized for this purpose; **Improve water quality** through automated management; **Increase environmental sustainability:** By curtail consumption by up to 25%; **Increase financial sustainability b**y reducing costs for chemical consumption and the decreased volume of sludge disposal that results in cost savings related to waste management; **GHG emissions avoided** due to the minimized use of chemicals because of emissions associated with their production, transportation and from the lifecycle of WTP sludge, from raw material extraction to final disposal.

The partner. Conatus Environmental Technologies, a Brazilian startup from Mogi Guaçu, São Paulo, is structured in two companies that operate in the chemical sector, each focusing on different aspects of the water treatment market. Together, they generated over US$1M in chemical revenue in 2023 and have secured substantial funding from Brazilian government agencies for research and development:

- Supply Comércio de Produtos Químicos LTDA, established in 2019, primarily involved in reselling chemicals for government entities through public tenders (B2G), particularly for water treatment. The company also engages in some sales to private companies for specific products. This entity is notable for receiving research and innovation funding from key Brazilian institutions such as FINEP, FAPESP, CNPq, and EMBRAPII.

- Conatus Indústria e Comércio de Produtos Químicos LTDA, founded in 2022, specializes in the distribution of chemicals for water treatment with a business-to-business (B2B) model. The company also repackages chemicals for easier distribution. Its core products include biocides, oxidants, and pH adjusters, which are essential for water purification and treatment processes.

The IDB Lab's contribution will be US$264.000 as a Contingency Recovery Investment Grant (CRIG) and US$100.000 as a Non-Reimbursable Technical Cooperation (NRTC) with core resources from Source of Innovation.

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