PROJECT TITLE: ECOLOGICAL RESTORATION OF LA PIEDAD LAGOON

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• PROJECT OBJECTIVES

The objective of the project is the ecological restoration of La Piedad Lagoon and its canals to reduce economic impacts, water conflicts, health deterioration of inhabitants surrounding, and biodiversity and ecosystem services loss, in addition to avoiding recreation and sports spaces. La Piedad Lagoon is in Cuautitlan Izcalli, in the Metropolitan Area of Mexico City (MAMC). This intervention will allow the construction of a new peri urban development model on sustainable water management, which promotes green economic development based on the social and solidarity economy approach by forming cooperatives that promote the conservation of the Lagoon. It is worth mentioning that the project directly contributes to six SDGs, including SDG11-Cities; SDG6-Water; SDG1-Poverty; SDG3-Health; SDG13-Climate Change; and SDG15-Ecosystems.

• JUSTIFICATION AND USEFULNESS OF THE PROJECT FOR THE COMMUNITY

The project will have a relevant impact in socio-economic, governance, and environmental terms since it proposes that the ejidatarios transform the governance of their property with a new model of peri urban development, which stands out for its democratic structure of direct participation in the planning and management of its territory, and that it is also replicable. Also, it will constitute an example of safely treated, filtered, polished, and reused wastewater management, being a novel experience of IWRM application with an adaptive approach. Likewise, it will allow the ejidatarios to create an auxiliary body that favors participation in water management. The ejidatarios are the owners of a tract of land held in common by the inhabitants of a Mexican village and farmed cooperatively or individually.

On the other hand, the project's wetland system, together with the greenhouses, crops, and birds, will generate an explosion of its ecosystems, in addition to the fact that the project will contribute to reducing the impacts on health due to the lack of sanitation.

The intervention logic of the project is based on the construction of a solid social process with the 227 ejidatarios (69 from Huilango and 158 from Tepojaco), who are the owners of the land where the ecosystem of the Lagoon will be rehabilitated, whose water can later be used as a potential source of water supply. The project's direct beneficiaries include the ejidatarios of San Jose Huilango and San Francisco Tepojaco and their families, who protect La Piedad Lagoon.

Since 2003, they have sued the authorities to clean up the Lagoon since its contamination is attributed to wastewater discharges from La Piedad and Lomas de Cuautitlan housing units, whose Wastewater Treatment Plants (WTP) do not operate. In addition to the ejidatarios and their families, 37 thousand people live in the ejidos, whose health, environment, and income have been affected by this body of water contamination.

The ejidatarios, due to the contamination of the Lagoon, stopped receiving income and food derived from self-consumption and commercial fishing from tourist and agricultural activities. They grow fodder oats irrigated with wastewater and suffer frequent gastrointestinal illnesses. Their demands to recover La Piedad Lagoon made to local, state, and national authorities have received attention. The closest indirect beneficiaries to the project comprise 15 neighborhoods around the Lagoon, with a population of 95,000 people. However, since La Piedad Lagoon is related to other vital bodies of water, such as the Guadalupe Dam, the indirect beneficiaries also include the inhabitants of Cuautitlan Izcalli (CI) (555,000 people) and the Cuautitlan Sub-basin, amounting to 1.12 M people from the municipalities of CI, Jilotzingo, Villa Nicolas Romero and Teoloyucan. Due to the close relationship with the Basin Council of the Valley of Mexico (BCVM), the lessons learned from the project can be replicated in the Basin of Mexico (BM).

The intervention logic is based on six principles:

(1) Participatory diagnosis of the current environmental and social situation.

(2) Participatory design of a Master Plan for the development of the Cuautitlan Izcalli Water Recovery and Climate Buffer Park (PARC-Cuautitlan-Izcalli). This plan will be fed back with the evaluation of the co-benefits identified from the ecological restoration of the Lagoon, such as carbon sequestration, removal of contaminants, improvements in health, and provision of water, among others. From this, the concept note for the Green Climate Fund will be fed back.

(3) Social and solidarity economy plan for the development of sustainable productive activities that promote collaborative innovation.

(4) Program for citizen monitoring of biodiversity and water quality that considers the participation of different social groups and includes a program for communicating knowledge and project results.

(5) Participation of the ejidatarios in implementing actions and works, as well as their operation and maintenance.

(6) Creation of governance spaces for decision-making, such as a Basin Committee.

(7) Immersion processes will be carried out in other communities with cooperative economic projects for environmental conservation, whose lessons are replicated. It is essential to build local capacities, mainly in the municipality and social groups, for their participation in constructing and maintaining constructed wetlands.

• PROBLEM TO BE ADDRESSED

La Piedad Lagoon is in Cuautitlan Izcalli, State of Mexico; it covers 39 ha and has a storage capacity of 0.8 Mm3. Its polygon of influence is 208 ha of undeveloped ejido land, whose ordering defines it as an unprotected natural and agricultural area. However, it faces severe real estate pressures due to the area's poverty levels. The Lagoon receives between 1-2 Mm^3 of water/year due to the replacement of the Guadalupe Dam and wastewater discharges of 150 liters/second from Lomas de Cuautitlan and La Piedad neighborhoods since 2003 due to the lack of operation of the WTPs in the area. This situation implies regulation violations of NOM-001 and NOM-003. Despite the contamination, there is great biodiversity with more than 1,500 species of flora and fauna;

some are listed in NOM-059; most of these species require riparian habitats. The large number of birds in the area demonstrates the potential for developing new economic sectors (i.e., bird watching) based on cooperatives.

Prior to the contamination of the Lagoon, the ejidos of San Jose Huilango and San Francisco Tepojaco produced food and obtained income from fishing. The supply sources face severe exploitation conditions, like the Cuautitlan-Pachuca aquifer (overexploited by 189 Mm^3/year) and the Cutzamala System. Climate change could reduce water availability by 40%; this, coupled with the null treatment of wastewater discharges, has affected the population's and ecosystems' health. Population growth of more than 200 thousand inhabitants is projected by 2030, with an increase in the demand for water of 22 Mm^3 and the generation of wastewater discharges for 17 Mm^3.

The Lagoon has an extension of 39 ha, a storage capacity of 0.762 Mm^3, and a depth between 1.5-2 m. It receives 1-2 Mm3 of water per replacement of the Guadalupe Dam per year, storm runoff, and wastewater discharges of 150 liters per second. Its degradation generates opportunity costs of 110 thousand pesos for environmental services that it does not provide, 3 million pesos for unrealized agricultural production, 25 million pesos for carbon not captured, 250 million pesos for water payments not recovered from urban use, and 940 million pesos from industrial use (IDB, 2021).

The proposing group has searched for solutions to resolve the contamination of the Lagoon. The project is aligned with the National Water Program 2024, the Regional Water Program (PHR) 2021-2024, the National Land Policy, the Zumpango Lagoon Water Sanctuary Management Plan, and the Paris Agreement. Thus, it will contribute to accomplishing the 2030 Agenda and be relevant for the Basin water security. So far, there have yet to be any interventions for ecological restoration of the Lagoon due to the lack of technical capabilities and the consent of the ejidatarios.

• PROPOSING GROUP AND ACTIVITIES TO BE CARRIED OUT

The proposed group comprises a transdisciplinary group of institutions, civil society, community and youth organizations, government institutions, companies, and indigenous peoples. The group has extensive experience in environmental monitoring, technological developments, green infrastructures, community work, legal analysis, development of cooperative projects, the rescue of species, and certifications in environmental education, highlighting: the development of the Naturalista application, the construction of the Ecoduct, the rehabilitation of the Cuitlahuac Park, the development of new technologies and patents, the participation as members in the Basin Council of the Valley of Mexico. This group is made up of the main universities in Mexico (academy): Metropolitan Autonomous University (UAM)-Azcapotzalco (responsible for the project), Iztapalapa, Lerma, and Xochimilco; the Polytechnic National Institute (IPN); and the National Autonomous Mexican University (UNAM). The community and social organizations that participate are neighborhood organizations Rescue of La Piedad Lagoon; Civil Community Pro-Lagoon Lirios; Hydrating Izcalli; Defense Movement for the Conservation of the Axotlán Lagoon; the Ejidos of San Jose Huilango and San Francisco Tepojaco; Strategies for Adaptation to Climate Change (EACC); Geohydrological Association of Mexico (GAM), and ECOPIL. On the other hand, the government institutions involved are the Municipality of Cuautitlan Izcalli, the Municipal Youth Institute of Cuautitlan Izcalli, the Local Water Operator Agency-OPERAGUA, the Cuautitlan Irrigation Unit, the Water Commission of the State of Mexico (WCSM), the Valley of Mexico Basin Council (VMBC), the Valley of Mexico Water Basin Organization, the National Water Commission (CONAGUA), the National Commission for the Knowledge and Use of Biodiversity (CONABIO), the State Commission for Natural Parks and Fauna (CEPANAF), and the National Institute of Social Economy (INAES). COPARMEX and the companies Riparia, Ecotonica, and RJB Chemistry also participate, highlighting the advice of Turenscape, led by the world-renowned landscape architect Dr. Kongjian Yu.

Most of the actors are involved in the mentioned activities of the project:

- allocating different hours of their working time;
- participating in the systematic monitoring of water quality and biodiversity;

- supporting the conservation of La Piedad Lagoon (i.e., bird-watching, ecotourism) and being involved in training courses for capacity building, and
- constructing and maintaining wetlands.

The ejidos, environmental organizations, the local government, academia, the Irrigation Unit, and CONAGUA will also participate in the creation of a Basin Committee to support decision-making for the conservation of the Lagoon, and together with the operating agency (OPERAGUA) will form the Project Committee. The IDB, Ministry of Taxes, Green Climate Fund (GCF), EACC, and UAM-A will follow up to know and comply with the requirements to request international financing and prepare the required concept note. Instances such as CONAGUA, WCSM, CEPANAF, and the local government will accompany and monitor the project's progress and the actions required to improve sanitation. Finally, the UAM-A and EACC will also support the project's coordination and the actors.

On March 21, 2023, the Basin Committee for the Rescue and Conservation of the Lagoons La Piedad, Axotlan, and Lirios was established. This Committee represents a valuable effort by all the actors to promote new water management and create a new participatory space for decision-making about water in the lagoons, where actors that have traditionally been excluded, such as native peoples, vulnerable groups, youth, women, and community organizations. The Committee has a Specialized Working Group that acts as the Project Committee to agree on the actions required to achieve this goal. This group is currently planning the construction of a marginal collector, which is essential to start the area's sanitation.