



## ***Nature-based solutions and the Circular Economy as a tool for rural sanitation solutions with a systems approach:***

### ***Experience from the rehabilitation of rural wastewater treatment plant in Reque, Peru***

- **Location:** Reque District, Chiclayo Province, Lambayeque Department, Peru
- **Implementation Dates:** 2021-2024
- **Investment:** US\$ 170,000
- **Partners:** Reque District Municipality | Las Delicias Sanitation Services Management Board | Water for People | Poul Due Jensen Foundation (Grundfos)

**Background – Justification:** Water For People's experience in cooperation and technical assistance with local and subnational governments in Peru has allowed for the participatory co-development of proposals that respond to the challenges posed by implementing Sustainable Development Goal 6 and the National Sanitation Policy in rural areas. The diagnosis carried out between 2019 and 2020 provided information leading to the identification that the wastewater treatment plants:

- Were causing health problems and environmental pollution
- Their poor functioning could be explained by deficient or non-existent operation and maintenance routines associated with a lack of training and/or the communities' refusal to assume the high operating costs; and
- The population and authorities, while rejecting the wastewater treatment plants, demanded an alternative solution.

## Executive Summary

### Project objectives

**General:** Testing efficient and low-cost technologies for treating sludge and wastewater in rural wastewater treatment plants by implementing artificial wetlands at the Las Delicias wastewater treatment plant.

### Specifics:

- Develop a solution with environmental, social, and economic sustainability characteristics for treating wastewater generated by rural WWTPs.
- Strengthening the local management capacity of the organized community and the Municipality in wastewater management.
- Conduct research and influence sectoral public policy on artificial wetlands as a viable technological option for wastewater treatment in rural areas, reflecting this in regulations.



### Approaches and strategies

1. **Nature-based solutions:** *Artificial wetland.*
2. **Circular economy:** *wastewater and compost marketing businesses.*
3. **Enhancement of sanitation infrastructure:** *recovery of existing wastewater treatment plant (lagoons and stabilization).*

### Components

1. **Infrastructure:** Construction of an artificial wetland integrated into the sanitation system, with improvements and restoration of the wastewater treatment plant as its core.
2. **Capacity Building:** Development of knowledge and skills for operating and maintaining the plant and wetland, strengthening both the Las Delicias

Sanitation Board and the Municipal Technical Area for assistance and oversight.

3. **Business Plan:** Defines goals and actions for wastewater and sludge commercialization: water quality evaluation under LMP, discharge/reuse certification, and implementation.
4. **Communication and Dissemination:** Internal communication with users to support JASS management, and external promotion to replicate the experience in other municipalities.
5. **Monitoring and Follow-up:** Comprehensive oversight of commitments, design, construction, capacity building, and communication throughout the project.

## Challenges and Learnings

1. Like the rest of the country, Lambayeque lacks accredited laboratories to test bacteria in wastewater from the Las Delicias WWTP.
2. Local populations quickly embraced artificial wetlands, valuing both the solution to WWTP issues and the creation of a natural ecosystem.
3. Women, especially JASS leaders, showed strong interest in landscape improvement, planning tree-planting campaigns.
4. For JASS “Las Delicias,” developing a business plan linked to ventures was motivating for long-term plant sustainability.
5. Affordable family fees are essential for valuing and sustaining sanitation services.
6. Sustainability depends on five interconnected components, not just infrastructure.
7. Early participatory approaches from leaders and community managers.

## Results and Innovations

1. Implement artificial wetlands consisting of two stabilization ponds in the area designated for the "Las Delicias" WWTP.
2. Generation of wetland ecosystem (appearance of wetland fauna).
3. Improvement of the landscape space, and its appreciation by the population
4. Creation of a business in synergy with the Reque District Municipality, which provides its cistern for irrigating green areas in rural population centers and residential areas.
5. Generation of public-private partnerships during the whole process, funding until demand identification of use of treated wastewater.
6. Elimination of unpleasant odors. 85% reduction in oils and greases and 75% plant efficiency.

