IMPLEMENTATION DESCRIPTION REPORT

"Rainwater harvesting in the community of Villa Olivença, Sao Paulo de Olivença, Amazonas, Brazil"

Executing organization: REDE ASSA (REDE Agua Segura e Saúde)

Funding Organization: WEFTA (Water Engineers for the Americas & Africa)

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1. Executive Summary

This report describes the implementation and results of the Rainwater Harvesting Project, an initiative designed to provide a safe, sustainable, and decentralized water source for a group of 20 households.

Before entering with the technical development, it is important to note the collaboration of Caritas Parroquial de Sao Paulo de Olivenca, who were in charge of the negotiations with the local school to provide the spaces for meetings, training workshops with families and social accompaniment that was a key piece for the development of all this work since it interceded with the families in the generation of trust with an organization in creation such as REDE ASSA, since families are wary of external help.

Image 1.1. Coordination meeting for the execution of the project, held at CEMEF - Professor Marlita Pinto Elias.

Image 1.2. Training workshop for use and maintenance, held at CEMEF - Professor Marlita Pinto Elias.

Also, the participation of the local UBS that was present in the workshops and is the one who through its health technicians who make monthly visits to families will be able to monitor the use and operation of the systems.

Image 1.3. Coordination meeting with UBS coordinator Jorge Vargas.

Image 1.4. REDE ASSA team, posing with UBS coordinator Jorge Vargas.

However, unlike conventional water harvesting approaches that only install containers, this intervention implemented a comprehensive model that ranged from the diagnosis and structural restoration of the roofs (with more than 16 years of deterioration), to the waterproofing of surfaces, advanced channeling, physical pre-filtering and a final domestic purification system. Through an adaptive methodology, the project successfully overcame critical unforeseen events in the support of the roofs and made its technical criteria more flexible to include multiple types of roofs, guaranteeing the fulfillment of the goals and establishing a positive and immediate impact on the health and water autonomy of the beneficiary families.

2. Introduction and Context

Access to drinking water is a priority challenge in consolidated residential settlements. The 20 houses selected for this intervention presented the technical opportunity to take advantage of rainwater resources. However, the original ceramic roofs had a 16-year history of accumulation of biological organisms (moss, lichens), sediments and embedded dirt that put the quality of the collected water at risk. In this context, the project was proposed as a mechanism not only for catchment, but also for reconditioning the housing environment, ensuring the safety of the water resource from the first contact with the structure of the house and also solving problems of leaks or dangers of collapse due to poor condition of the structure.

3. Work Done (Methodology and Execution)

- **Phase 1:** Diagnosis and Surface Preparation. Exhaustive physical evaluation of the ceilings. On ceramic roofs, a deep wash was applied using high-pressure washers combined with industrial chemical descalers to remove biomass and aged dirt. In homes with other roofs, manual and adapted mechanical cleaning was conducted.

Image 1.5. Technical staff spraying descaling liquid on the roof of a house, Villa Olivença.

Image 1.6. Technical staff removing softened dirt with the use of pressure washers, Villa Olivença.

- **Phase 2:** Structural Reinforcement and Conditioning. Corrective repair of carpentry when detecting collapsed or broken wood and support ribs due to the passage of time. After stabilizing the structure, two airtight layers of drunken liquid blanket were applied using specialized painting equipment with airless technology, guaranteeing a uniform and long-lasting seal.

Image 1.7. Technical staff conducting the repair on the roof structure and arranging the tiles before painting, Villa Olivença.

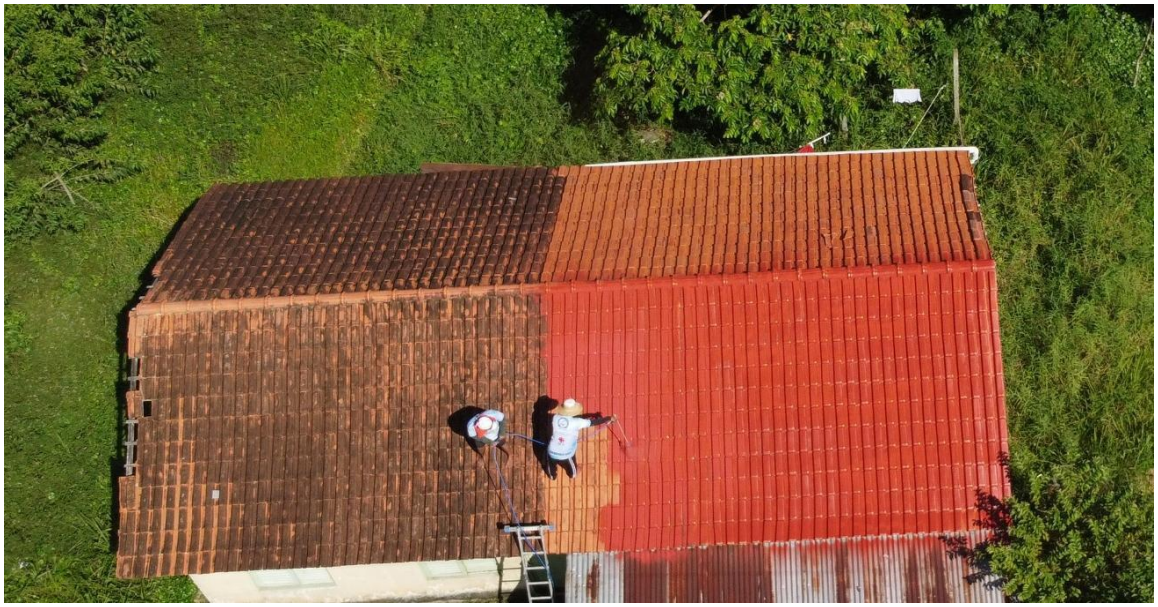

Image 1.8. Drone view of the painting of the first layer of roof with the use of an airless painting equipment, Villa Olivença.

Image 1.9. View of the roof after the 2 coats of paint with liquid blanket and comparison with the roof without maintenance, Villa Olivença.

- **Phase 3:** Installation of Capture and Storage Systems. Assembly of perimeter gutters and networks of high-strength conduction pipes. The filtering system was configured in a staggered manner: leaf retention filter, trap for the discarding of the first rains (removal of initial dust), and a coarse filtration module composed of activated carbon and gravel. The final storage was solved by means of plastic tanks of 500 liters per house.

Image 1.10. Technical staff installing the gutter on the roof of a house, Villa Olivença.

Image 1.11. Technical personnel installing the fittings and routing pipe to the filtration system, Villa Olivença.

Image 1.12. Filtering system and connection to the storage tank, Villa Olivença.

- **Phase 4:** Water Treatment and Safety Assurance. To mitigate any residual health risk and certify safe human consumption, a domestic triple-action filter candle system (mechanical filtration, activated carbon and colloidal silver sterilization) was delivered and installed at the point of use of each home.

Image 1.13. Water filtration and purification system for direct consumption, Villa Olivença.

4. Stakeholders and Responsibilities

Actor / Role	Primary Responsibilities in Implementation
Technical Execution Team	Operation of specialized equipment (pressure washers and airless systems). Execution of structural carpentry work and assembly of the entire network of gutters, filters, traps and 500-liter tanks.
Beneficiary Families	Active cooperation facilitating access to the premises, providing information on the technical history of the roofs, and responsibly adopting the protocols of use and maintenance autonomous of the system.
Logistics and Purchasing Area	Ensure timely supply of critical materials (safety equipment, descaling chemicals, drunken liquid blanket, power tools, pipes, plastic tanks, and candle kits filters).
Project Supervisor / Quality	Validation and control of technical quality in each phase, supervising the calibration of the first rain traps and certifying the correct functional delivery of the triple action system.

5. Qualitative Impact Indicators

Dignification of the Housing Infrastructure: The restoration of the roofs reversed a deterioration of 16 years, eliminating sources of biological contamination on the homes and increasing the useful life of the property thanks to the elastic sealing with liquid blanket.

Strengthening Family Water Resilience: Families acquired a continuous self-sufficiency scheme that reduces critical dependence on external networks or tanker trucks, mitigating family stress in periods of scarcity.

Culture of Care and Water Quality: The introduction of multiple retention barriers (washing traps, carbon/gravel filters, and household candles) raised the community's perception of safe consumption, promoting rigorous hygienic habits.

Inclusion and Equity of Coverage: The methodological flexibility to adapt the collection systems in non-ceramic roofs guaranteed that families in situations of greater structural vulnerability were not excluded from the benefit of the project.

6. Challenges and Lessons Learned

Structural Support Challenge: During pressure dirt removal, the hidden weakness of the interior structure (timbers and ribs) caused fractures in the supports, forcing the subsequent phases to be temporarily stopped.

Mitigating Action: A line of work oriented towards corrective carpentry was immediately integrated, reinforcing the internal structure as an essential prerequisite to ensure the support of the ceramic roof and the gutters.

Lesson Learned: Evaluations of existing buildings must include diagnoses of internal mechanical resistance. The aesthetic condition of the exterior surface does not always reflect the structural soundness of the building.

7. Conclusions and Sustainability

The project concluded successfully, transforming 20 homes into units capable of generating and drinking water resources autonomously. The use of efficient technologies, such as pressure washing equipment, airless painting and staged filtering systems, demonstrated that it is possible to conduct high-quality works adapted to local realities.

Image 1.14. Beneficiary showing the clean water stored in her tank, Villa Olivença.

The sustainability of the system is guaranteed through the technological transfer of the triple-action sail filter and the practical training provided to users, forcing preventive maintenance and sanitary control to reside in an empowered way within each family community.

Image 1.15. Project conclusion event and delivery of water filtration and purification systems to families 30/06/2026, CEMEF - Professor Marlita Pinto Elias, Villa Olivença.

Image 1.16. Management team and technical staff of REDE ASSA, Villa Olivença.