

UNDERGROUND DAMS: CONTRIBUTING TO CLIMATE CHANGE RESILIENCE OF FAMILY BASED AGRO-ECOSYSTEMS IN THE SEMI-ARID REGION OF NORTHEASTERN BRAZIL.

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The Brazilian semi-arid region in the Caatinga Biome is considered one of the most vulnerable to climatic variations due to irregular rainfall, water deficiency, low capacity for adaptation and the poverty of the population. Currently, there is a set of social water technologies for capturing and storing rainwater in order to make the most of it, which has been used throughout the Brazilian semiarid by public policy programs. The underground dam is one of these technologies and, due to its importance for families, it is the subject of research developed by Embrapa and partners, aiming to contribute to family-based farmers resilience to the challenging weather of the Brazilian Northeast Semiarid. This research, developed since the 1980s, has contributed to sharing the experiences of farmers, development agents and researchers, through the exchange of popular and technical-scientific knowledge. The underground dam is a hydraulic structure that aims to intercept rainwater, by constructing a wall inside the soil that crosscuts the waters descent. With the underground dam, families are overcoming the social and environmental limitations of the Brazilian semiarid region, using this technology to perfect and balance the production process (Figures 1 and 2), however, some challenges have been faced regarding what is the best place to implement the dam in rural communities. In order to overcome this challenge, Embrapa and partners are developing an edaphoclimatic Zoning project for potential areas for the construction of underground dams in the Alagoas Semiarid - ZonBarragem. Through the project, it was possible to identify and spatialize geoenvironments with the potential for implementing underground dams. Based on the map generated as a result of the project, the Government of the State of Alagoas launched the State Program for Underground Dams. Over three decades, research projects and structural action, is developed with partners such as state and federal universities, federal institutes (IFs), federal, state and municipal government institutions and programs, Brazilian Semi-Arid Articulation (ASA), Brazilian Institute for Development and Sustainability (IABS), Faeal/Senar-AL and Sebrae-AL systems. The projects have relied on financial support from Banco do Nordeste, CNPq, Banco do Brasil, Sudene, Petrobrás, the World Bank and BNDES. International technical cooperation has also been established with institutions in Switzerland, Honduras, Mozambique and Cape Verde.

RESULTS

- Contribution to family's food sovereignty and nutritional security;
- Increased access to and multiple uses of water;
- Diversification and integration, providing greater resilience and sustainability to family-based agroecosystems;
- Strengthening social inclusion and the productive organization of women and youth;
- Surplus is sold at local free markets;
- Creates a solidary space that is self-managed and farmer-led; and
- Is aligned with five of the 17 Sustainable Development Goals (SDGs) in the UN 2030 Agenda: 1, 2, 5, 6 and 13.

NEXT STEPS AND RECOMMENDATIONS

- Edaphoclimatic zoning of potential areas for the construction of underground dams in the semiarid states of northeastern Brazil;
- Diagnosis and assessment of the resilience, stability and sustainability of agroecosystems with an underground dam;
- Technical-economic feasibility study of appropriate crops in underground dam areas; and
- Training of farmers and technicians in the selection, construction, types, models and management of the underground dam.

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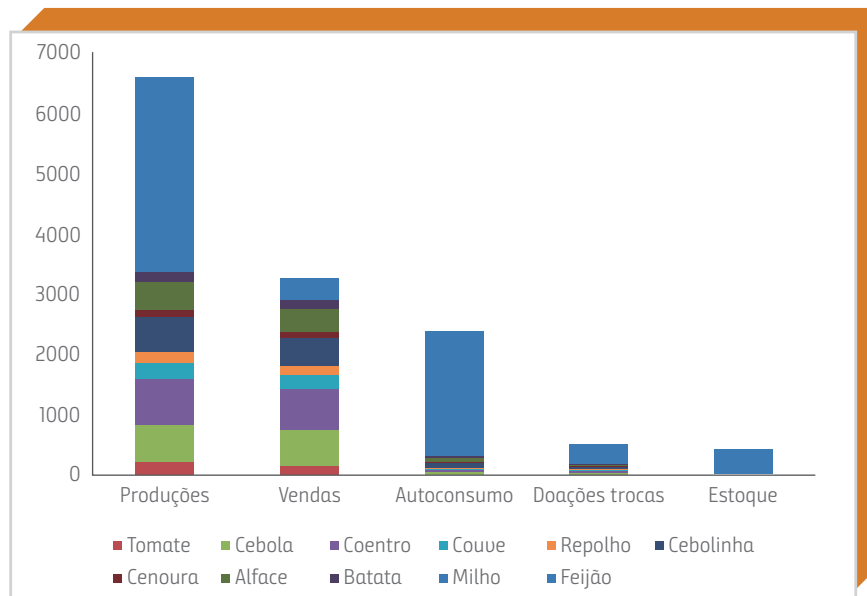
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Figure 1: Underground dam generating autonomy and dignity for families through food production.



Source: Maria Sonia Lopes da Silva.

Figure 2: Underground dam under construction and production



Crédit: Maria Sonia Lopes da Silva.