Brazil: Wastewater sets smallholders free in the Sertão

Key facts

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<th>Project name</th>
<th>Sustainable Development Project for Agrarian Reform Settlements in the Semi-Arid North-East (Dom Hélder Câmara Project) including GEF-supported component of the same name</th>
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<td>Dates</td>
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The sustainable development challenge

Even in water-abundant countries such as Brazil, water still emerges as a constraint affecting particular livelihoods, farming systems or specific geographies. The Sertão region of north-east Brazil covers an area of almost 1 million square kilometres, and the caatinga, the region’s predominant ecosystem and unique to the country, is a biodiversity hot spot. However, the Sertão is directly exposed to land degradation, with around 20 per cent of the region already affected by desertification. Since 2011, the Sertão has been affected by seven consecutive years of severe drought, representing the most important water crisis affecting the region in a century. This is threatening the livelihoods of about 15 million people. In the semi-arid Sertão, water was even
used by former landlords to control poor rural people and keep them dependent, as landlords had control over access to water.

**IFAD action**

The project adopted a concept of *Conviver com o semiárido* ("co-existing with the semi-arid"), and therefore one of the objectives was that families in targeted settlements and communities would harvest and manage water efficiently with technical assistance from stronger local institutions and service providers. A key focus of technical assistance included helping farmers to use water resources more sustainably and build essential infrastructure, which were identified as priorities by project target groups during preliminary consultations. The project worked to leverage public investment programmes to provide families with water tanks to harvest and store rainwater, and build reservoirs, artesian wells and underground small dams. These water-related small-scale interventions were decentralized and easily absorbed by the project’s target population of poor rural people.

The project supported better access to water for both domestic use and agricultural activities. For example, a drinking water tank programme (*Programa um milhão de Cisternas* or One Million Cistern Programme) was also financed by the government, with Articulação no Semiárido Brasileiro (ASA) as the main implementing partner. Meanwhile, an “Investment Fund for Social and Productive Projects” also financed water tanks for individual houses; productive activities included wells and underground dams for water harvesting; and conservation for productive uses and beekeeping, animal husbandry and vegetable production. Partnerships with the private sector were also pursued; for example, in *Sombras Grandes*, Petrobras (an oil company) financed the basic infrastructure through a grant to enable communities to build and maintain their own water systems as part of its corporate social responsibility programme.

Finally, one of the project’s innovations was to promote ways to treat wastewater for use in vegetable production. Many families had simple ditches and sewage pipes to make use of grey water from their kitchens and daily bathwater to water fruit...
trees in the back garden. However, much of this water was used and remained as open-air sewage. Whether used for irrigation or not, this untreated water represented a risk of environmental pollution, since it potentially contained products that are harmful to plants (detergents), to the soil (salts and heavy metals) and to human health (pathogens).

A partnership with a non-governmental organization and the Federal Rural University of the Semi-arid Region, together with three farming families from the municipality of Olho-D’Água do Borges, marked the start of efforts to develop a “family bio-water system” that made use of domestic grey water for food production and to make back gardens more sanitary. The system consists of a filtering process with a mechanism to physically and biologically block the residues present in the grey water, so that the organic matter is biodegraded by micro-organisms and earthworms. The water is reused through a drip-fed closed irrigation system that feeds vegetables, fruits, medicinal plants, green leaves for laying hens, and other kinds of foods. As well as the evaluation of the system as a whole, the efficiency of the filtering unit, the soil cultivated with the treated water, and the quality of filtered water were assessed in regard to suitability for the irrigation of fresh vegetables and fruit. The system is particularly suitable for the cultivation of vegetables (leaves, roots and tubers; and fruits such as guava, passion fruit and mango) in areas of around 300 m², with sustainable management tools based on the principles of agroecology without the use of pesticides.

**Impacts**

By levering public investment programmes, the project provided families with water tanks to harvest and store rainwater; and built reservoirs, artesian wells and underground dams, thus reducing the families’ dependence on landlords. Overall, the project improved water management for some 3,500 families. This in turn allowed the families to diversify production, and increase productivity and food consumption. Over 55,000 hectares, including the caatinga, were brought under sustainable management practices. These included agro-ecological vegetable gardens and orchards, watershed management and grey water reuse systems, as well as other soil and water management practices.

With regard to the “family bio-water system” for grey water reuse, field trials and successive laboratory analyses showed that plant growth and development, physical and chemical properties of the soil, and chemical properties of the water all met required standards for agricultural use. Moreover, the reused water contained high quantities of nutrients and did not present a risk of environmental pollution. The water also had the potential to lower the risk of *E.Coli* infection and met World Health Organization guidelines for grey water. Low installation and maintenance costs were additional benefits, and the quantity and type of grey water produced by families proved to be sufficient for the system to keep a family supplied with irrigated greens, fruit and root vegetables from their back gardens, and even to produce marketable surpluses in the rainy period. The Secretariat for Agrarian Development in the State of Ceará took up the system through a World Bank-financed project (São José III), replicating the experience and contributing to capacity development among advisers, farming families and others in its installation and management.