BUSINESS MODEL PROFILES: WATER
SUMMARIZED FROM THE FORTHCOMING PUBLICATION
RESOURCE RECOVERY FROM WASTE
CGIAR RESEARCH PROGRAM ON Water, Land and Ecosystems
LED BY: IWMI International Water Management Institute

Wastewater for Greening the Desert

Business characteristics

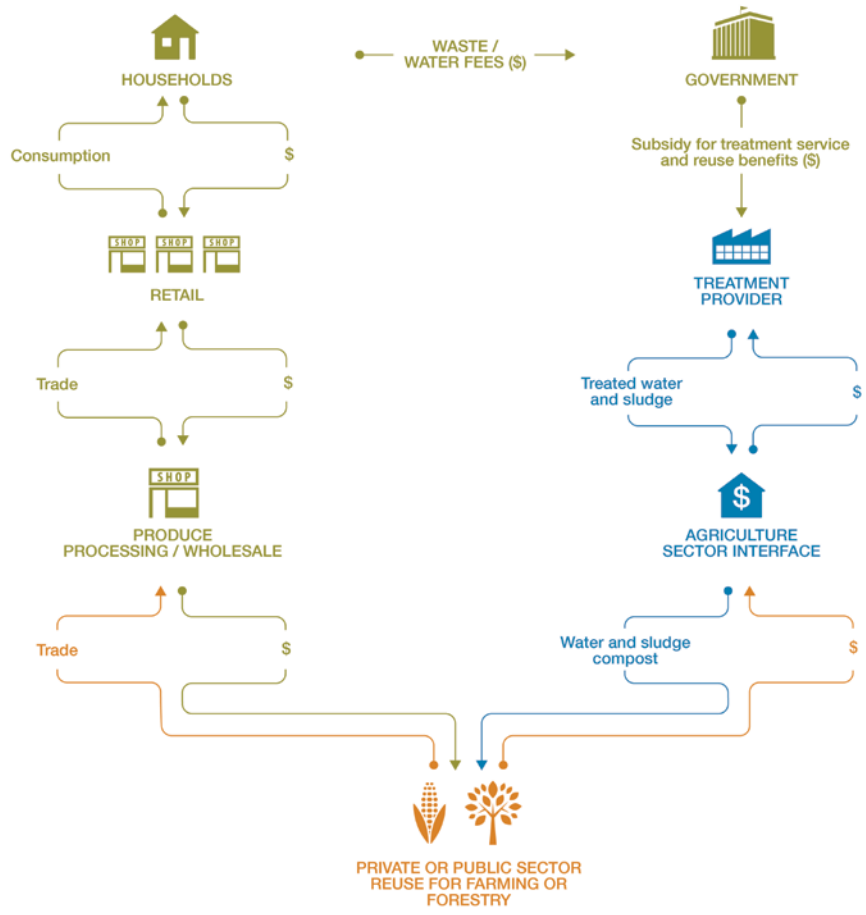
Geography	Arid and semi-arid regions
Scale of production	300 to 30,000 cubic meters of water reused per day
Type of organization	Public or public-private, or just private for the reuse component
Investment cost range	Treatment plants: USD 1-50 million Agroforestry system: USD 300,000 to USD 1.6 million
Key costs	Capital investment (treatment plant, water to farm conveyance), operation and maintenance (O&M) costs (including in-house quality monitoring and costs of risk prevention), and customer interface and social marketing/promotional costs
Revenue stream	Sewage tax for connected households, government subsidy (environmental and social benefits), sale of forest products, wastewater and sludge, energy savings (via internal energy recovery), and possible carbon sequestration

Business model

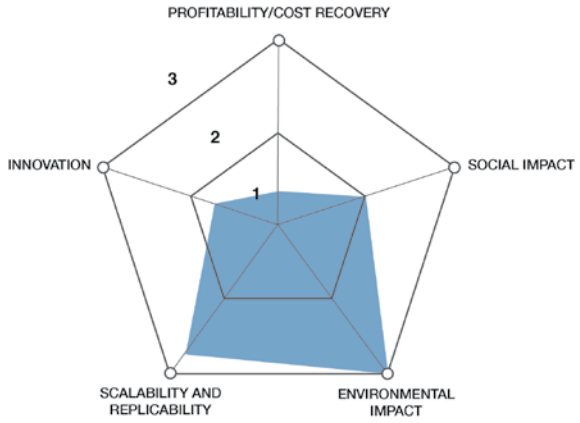
The business model recovers treated wastewater in arid and semi-arid regions to be reused for activities such as afforestation for timber or fruit production. This investment minimizes the unproductive or environmentally harmful discharge of water and sludge, and provides businesses or government authorities with the potential of cost recovery through reuse as well as social benefits.

The treatment plant recovering wastewater can be run by both the public and/or private sector and has to be located near a town or city with available land for agriculture, forestry or landscaping in the vicinity. There are different institutional options for running the model. Two common examples are: (i) the treatment plant and agriculture/forestry industry are managed by the same public company; and (ii) the responsibilities between treatment, water transport and reuse are shared between different stakeholders which can be public or private. In the second case, the treatment plant sells water- and nutrient-rich sludge, e.g., to a water user association for the forestry/agriculture sector. In both cases, the treatment plant maintains its revenues from households through sanitation fees and government subsidies.

BUSINESS MODEL VALUE CHAIN



Business performance



The business model scores particularly high on environment impact, with reduced environmental pollution and water contamination due to the prevention of wastewater and sludge discharge. However, it ranks low in terms of profitability due to the low freshwater tariffs, which hampers the ability of the business to charge sufficiently for wastewater to recover treatment costs.

Main risks

Market and competition risks: The reuse market is booming and so is the need for forest products in dry climates. Risks can come from competing water and/or fertilizer sources, competing final (wood) products, and lack of trust in product quality due to varying water quality standards.

Technological risks: In low-income countries, poor technical performance in wastewater treatment can occur due to factors such as lack of electricity or water to flush the sewers. There can also be a mismatch between imported treatment technologies, and local requirements, possibilities and capacities.

Political and regulatory risks: Risks can be high in countries where the regulatory frameworks, like reuse standards, are unclear (under discussion) or managed by different authorities with overlapping responsibilities.

Safety, environmental and health risks: Wherever wastewater is used, there can be a health risk for different stakeholders and the environment. Risk mitigation measures should ideally be installed all along the wastewater treatment to reuse value chain.

Case study: Drarga, Morocco

The wastewater treatment plant in the town of Drarga, Morocco, has been set up with a business model geared to generating revenue through a reuse system which produces tertiary treated water, reed grass and sludge-based co-compost for sale. With this system, and household users' fees, the plant achieved its objective of operational cost recovery while eliminating soil and aquifer pollution from raw sewage release, which was common before construction of the plant.

The plant was set up through a multi-stakeholder agreement with the commune of Drarga providing the land for construction and initially owning the treatment facility, the provincial government facilitating administrative procedures, the Al Amal Water User Association managing the plant, and the Regional Agency for Planning and Construction financing construction of the main sewage collector. Water was treated to World Health Organization standards, making it available for unrestricted use in irrigation. This water could, therefore, be sold to farmers who were suffering from increased challenges in terms of groundwater availability and pumping costs, guaranteeing them a year-round water supply.

With the change of plant management from decentralized to centralized responsibility, the need for local cost recovery (through the support of resource recovery) received less attention after 2004.

Key performance indicators (as of 2012)

Capital investment:	USD 1.7 million
Labor:	Around five workers, costing about 27% of the O&M costs
Operation and maintenance cost:	USD 2,300-3,600 per month
Output:	1,800-2,700 m^3 of water treated per day (design capacity 600-1,000 m^3 per day)
Social and environmental impact:	Job creation along the value chain, controlled health risks and an improved living environment

For more information on the business model and related cases, see Chapter 14 of **Otoo, M.; Drechsel, P. (Eds.). 2017. *Resource recovery from waste: Business models for energy, nutrient and water reuse in low- and middle-income countries.* London: Earthscan/ Routledge. In press.** The book has been produced by the Resource Recovery and Reuse subprogram of the International Water Management Institute (IWMI), under the CGIAR Research Program on Water, Land and Ecosystems (WLE) and its Rural-Urban Linkages Research Theme. The support of the Swiss Agency for Development and Cooperation (SDC), the International Fund for Agricultural Development (IFAD), and CGIAR Fund Donors (www.cgiar.org/about-us/our-funders/) is gratefully acknowledged.