

# Providing Affordable, Integrated Wastewater Treatment

## HIGHLIGHTS

- Wastewater treatment enterprises treat water before disposal or recycle the water for reuse.
- Enterprises provide household wastewater treatment systems that are modular, have low operating costs in terms of electricity and maintenance, have silent operation and less odor and offer quick returns on investment.
- Enterprises focusing on industrial wastewater treatment solutions offer efficiency and cost effectiveness. They are quickly commissioned, fully automatic, have remote monitoring, require minimal hazardous chemicals, and treat water for reuse.



## Development Challenge

Wastewater management is increasingly becoming a priority issue in developing countries; accelerating urbanization exacerbates the situation resulting from inadequate systems, technology and infrastructure. In most developing countries, wastewater treatment is the responsibility of the local government. Municipal treatment of household sewage involving large collection networks and treatment plants incur enormous costs and considerable time for construction. These centralized treatment plants are also often economically unviable as they require investments in collection and conveyance of wastewater via piped networks. Similarly, there are challenges in treating industrial waste water. Manufacturing units generate large volumes of effluents, which include toxic and hazardous components. Wastewater treatment allows human and industrial effluents to be disposed of without danger to health or damage to the environment. Treated wastewater can alleviate water supply challenges, and be used for non-potable purposes such as agricultural and landscape irrigation, industrial processes, toilet flushing, and recharging groundwater basins.

## Business Model

Many social enterprises have developed solutions that not only address domestic wastewater disposal, but also facilitate recycling of the waste water such that it can be used for cleaning, irrigation, flushing and other non-drinking purposes. The household systems generally have a capacity that ranges from 1.5 m<sup>3</sup> to 150 m<sup>3</sup> and serve 1–20 households or small enterprises.

Some solutions also use unique biological treatment methods to treat water from commercial buildings. Vision Earth Care, a, India-based startup, uses a unique soil biotechnology process to provide water treatment and reuse for hotels, resorts, hospitals, and railways. Its treatment plants incur operational and maintenance costs 60 percent lower than a conventional sewage treatment plant. It uses a novel high-efficiency natural oxidation process that replaces the use of heavy blowers for oxidation in conventional technologies. The recycled water can be used for water-demanding activities such as toilet-flushing, gardening, irrigation, construction work, and car washing.

Generally, most traditional water treatment solutions require space. To address this issue, some enterprises have developed lightweight and modular solutions. For example, Grey Water manufactures decentralized and automatic sewage treatment systems that purify and recirculate water for cleaning homes, heating/cooling, and flushing.

## Features of Wastewater Treatment Solutions Model

### Household wastewater treatment



- Social enterprises offer ready-to-use sewage treatment solutions to societies / apartments
- They deploy innovative technologies to make the product sustainable, cost-effective and energy-efficient
- The treated water is used for non-potable applications like toilet flushing, gardening, construction and filling of water ponds

• Wetland Works!, Ecosoft, Grey Water (Jaldhara), Greenenvironment Innovation and Marketing, AcuaCare,

### Industrial wastewater treatment



- Enterprises provide end-to-end solution for extraction of hazardous / valuable components from waste water
- Generally, the technology is such that the plants can be installed with minimal on-site fabrication, space requirement and manual operation
- Advanced treatment plants are automated and are energy-efficient, making them cost-effective

• Agua Inc, Bridgedots, India Green Services, SKS Infrastructure, Vision Earth Care, Saha Global

## Implementation: Delivering Value to the Poor

### Awareness

Wastewater treatment enterprises have dedicated staff to reach out to residential communities and industries to explain their treatment process and potential benefits. Some enterprises conduct roadshows in rural areas, while some industrial wastewater system manufacturers approach industry associations to reach out to network processing companies for sourcing customers. Other enterprises spread awareness about general hygiene and environment protection in local schools and communities. Ecosoftt runs a program called AQUA that embeds concepts of water, wastewater and environment protection into the curriculum of schools.

### Acceptance

Enterprises provide a range of sizes of the system to apply to different quantities of waste. These solutions fit specific needs and are scalable to cater to future requirement. They also offer speedy installation to gain acceptance among the households. Vision Earthcare produces systems that can be customized to residential client requirements. In the system, the sewage water is passed through the specialized media and as the water is filtered down through it, the sewage is converted into potable water within four hours. The technology is referred to as soil biotechnology. These improvements make the wastewater systems more readily accepted by non-commercial clients. Industrial wastewater treatment enterprises that offer end-to-end waste management solutions find ready acceptance.

### Accessibility

Many communities do not have regular access to clean water. However, last-mile delivery and service is not always commercially feasible for water treatment enterprises. Some enterprises have started a franchise model in which the reseller is also one of the beneficiaries. Saha Global, a non-profit enterprise in Northern Ghana, trains local women to be water entrepreneurs in communities that lack clean water. Saha Global Field Representatives distribute Safe Storage Containers to every family in the community.

### Affordability

Standard wastewater treatment plants for potable and drinking purposes are expensive. A localized solution at the community level through which the consumers can also contribute toward water purification is more affordable and sustainable. Saha Global does not drill wells or use imported pumps that often break down. All of the water is transported by hand from the dugout, treated by hand in the village and then carried home by the consumer. All revenue from the water businesses stays within the community and is managed by female entrepreneurs.

The capital costs of wastewater treatment plants include civil construction, equipment supply and installation, auxiliary buildings, and contractors' overheads. Running costs of wastewater treatment plants include wastewater discharge fee, electricity cost, chemical cost, staff cost, maintenance and replacement cost, sludge disposal, administration cost. The proportion of these components in total cost varies.

The revenue streams for household wastewater treatment systems are from sale of the product, annual maintenance fee and installation charges. For industrial wastewater systems, revenue streams include price of system setup, consulting fees and operating fees.

The wastewater treatment market in developing countries such as India is highly fragmented. Enterprises compete on the basis of cost, technical expertise, experience and brand equity. For large municipal and industrial projects, there is a pre-bidding process, and hence expertise and past experience with credible or well-known clients are critical factors. Enterprises that offer energy-efficient solutions at competitive costs are likely to find a larger slice of the wastewater treatment market.

Wastewater enterprises in low-income communities work closely with corporates, educational institutions, government, NGOs and other waste sector stakeholders.

## Results and Effectiveness

Wastewater treatment reduces the amount of waste released into the environment and impacts health risks associated with pollution. It also reduces the freshwater loss induced through water pollution. Wastewater treatment reduces the amount of money spent by a country on environmental rehabilitation projects required to battle pollution. Household wastewater systems can help in recycling wastewater for reuse. For example, Ecosoftt's platform allows water sustainability by reducing water footprint and waste by up to 50 percent, recycle and reuse up to 80 percent of wastewater for non-potable purposes; and discharge the balance in an environmentally friendly way.

Wastewater enterprises catering to industrial customers also help them meet environmental norms. For example, PT. Tirtakreasi Amrita in Indonesia has a concept of integrated waste management with zero discharge that reduces greenhouse gases and enables its clients to generate Certified Emission Reductions. Some enterprises enable livelihoods generation along with sustainable access to treated water in local communities. Saha Global has provided jobs to 178 women entrepreneurs in northern Ghana.

Some enterprises provide advanced wastewater treatment systems that make on-site treatment of wastewater within homes and residential communities highly effective compared to other systems. Additionally, consumers can produce rich organic fertilizer as by-product which can be revenue-generating.