

# Clean drinking water model makes waves in AP villages

For years the people of Vinjinampadu village in Guntur district, Andhra Pradesh, suffered serious health problems such as diarrhoea, joint pains, typhoid and frequent bouts of fever. None of the available water in the village was potable: the local pond's filter had fallen into disuse, the overhead tank that supplied water to homes was outdated, and the groundwater contained alarming levels of fluoride and chlorine.

Technically, Vinjinampadu is covered under the government's safe drinking water norms. But in reality most of its inhabitants did not get clean drinking water. Supplying water to the community was a huge challenge for the village panchayat (local self-governance body).

WaterHealth India (WHI), a wholly owned subsidiary of [WaterHealth International](#) that has a presence in countries like Ghana, the Philippines and Sri Lanka, understood the situation well.



**The WHI plant in Vinjinampadu**

WaterHealth International helps remote and underserved communities get access to safe drinking water by involving the community in setting up low-cost water purification plants. It is not a social service organisation; customers pay for the water they use. WHI's latest plant was inaugurated at Vinjinampadu on December 9, 2008. On the first day itself, 130 people registered as customers.

## **Filling the supply chain gap**

WaterHealth India launched its operations with support from IFMR Trust. Through its Network Enterprises Equity Fund, IFMR Trust seeks to address supply chain gaps across a variety of sectors. By incubating specialised supply chain companies, the Trust seeks to build 'networks' of enterprises in identified sectors.

Clean drinking water in remote rural India is a particular supply chain of interest to IFMR Trust and is pursued by the Drinking Water Network Enterprise (DWNE). WHI has set up a total of 220 water purification plants, leveraging funding provided by DWNE. These plants are located in rural Andhra Pradesh (AP), between the districts of Hyderabad and Vijayawada.

Explaining the investment philosophy, Puneet Gupta, Senior Vice President, IFMR Trust, says: "While there are many people willing to supply water purification equipment, there are very few entrepreneurs who are ready to take on the challenge of distributing water to the vast rural population in the country. Hence, DWNE formed a partnership with WHI to provide clean drinking water to people, at an affordable cost. We are talking with several other potential business partners to reach different parts of the country."

### **Innovative investment structure**

IFMR Trust devised an innovative investment structure for WHI's plans in India, for which it required around INR 200 million (USD 5 million).

The company's existing cash flows made the likelihood of getting a bank loan at reasonable rates rather slim. Financing the building of water plants purely by selling equity could have turned out to be an expensive option for WHI -- if sales exceeded expectations and created a valuable enterprise.

In any case, WHI's India plans involved capital-intensive projects that are usually financed by debt or project finance.

IFMR Trust worked out an arrangement with Acumen Fund, a non-profit global venture fund and one of WaterHealth International's early equity investors, whereby Acumen Fund agreed to provide a 15% first loss deficiency guarantee (FLDG) so that IFMR Trust could extend a loan of around INR 200 million to WHI.

"What this meant was that if WHI could not make the interest payments, Acumen Fund would pay IFMR Trust on WHI's behalf, for a value of up to 15% of the total loan amount," explains IFMR Trust's Nayantara Kothari who was involved in the structuring of the WHI funding.

IFMR Trust's loan to WHI carries a 15% coupon, in line with prevailing commercial bank rates, and an eight-year term, plus a revenue share accruing to IFMR Trust, payable to IFMR Trust in the eighth year.

The arrangement benefits all parties. IFMR Trust gets a chance to earn an 'equity-like' return for taking an 'equity-like' risk. WHI did not have to sell more equity to achieve its growth targets. It got a funding instrument that allows it to reasonably match projected cash flows from water sales with funding costs -- it makes only interest payments early on until water sales increase enough to make principal repayments.

As a 'first impact' investor, Acumen Fund got the opportunity to achieve a five-fold impact with its money: its guarantee of around USD 1 million is responsible for the setting up and running of plants worth USD 5 million.

### **Public-private partnership model**

IFMR Trust's investment in WHI is unique in that it rests on a joint effort between the investee company and the village panchayat. A public-private partnership model between WHI and the village panchayat ensures that the community water system (CWS) plant installed by WHI becomes a working solution to the problem of unsafe drinking water.

After discussions with the company, the village panchayat is required to pass a resolution allotting it land and a water source to set up the plant. The process is not always smooth.

Ganavaram is one of the wealthier and larger villages in Andhra Pradesh's Krishna district. The average household income here is around INR 3,000, mainly from paddy cultivation. A national highway runs alongside the village which has 10 schools, a government degree college, four banks with ATM centres, a government hospital, and a medical college just 3 km away.

Despite all this, the villagers did not enjoy clean water supply.



**WHI's patented water purification system**

When WHI proposed to set up a plant, there was opposition from political leaders as well as government officials who believed that panchayat land must not be given to a private company.

However, members of the panchayat pursued the matter single-mindedly. A plant was finally set up, catering to 6,000-7,000 customers; 10,000-12,000 litres of water are consumed every day.

According to the standard agreement between WHI and the panchayat, for the first eight years WHI will maintain the plant and retain the revenue made from it. At the end of

eight years, the plant will be handed over to the panchayat, after which the panchayat gets the right to revenue. If the panchayat chooses, the company will continue maintaining the plant after the eight-year period, for a service fee.

There are two types of plants. To serve a population of over 10,000, a 65,000-litre (2700l/hr) community water system (WH-65 CWS) is installed. For smaller villages, a modified system (WH-21 MCWS), with a capacity of 21,000 litres (900l/hr) is used.

The community is necessarily a financial stakeholder: it contributes 30-45% of the plant's cost. In most villages, the panchayat has paid the contribution; in a few cases it has been provided by a private donor in the village.

The plant occupies around 150 square metres of land and is usually located near a water source. Due to the plant, some employment is generated—for one or two operators, village health workers, a driver and a helper for delivery of water.

A lot of work is done before setting up a plant; health considerations are paramount.

### **Health information**

A preliminary information research (PIR) team from WHI identifies villages where plants can be set up. Then, water sources in the village are evaluated on four parameters: commercial viability, social feasibility, technical viability, and political feasibility.

Once a village is considered suitable for the setting up of a plant, the PIR team assesses the knowledge, behaviour patterns, and practices of the community on safe water.

Seema N, WHI's education coordinator, says: "We organise awareness campaigns on the importance of using clean water, proper storage of water, and good sanitation practices."

After discussions with the panchayat, the plant is set up and the quality team checks the technical aspects such as maintenance and delivery.

The village health worker appointed by the company plays a crucial role. She/he is trained to advise people on the ill effects of using contaminated water, and proper methods of storage. Meetings are organised at anganwadis (health and nutrition centres for young children and pregnant women) to convince people to start using water from the plant.

"We encourage community members to ask questions at the meetings," says Seema. Typical questions addressed by WHI staff are: What are waterborne diseases? What happens to water stored at home when we go out of town? Does the pure water smell? How is the water processed? Why does pure water taste different?

### **Technology**

WHI plants employ UV Waterworks (UVW), a patented, award-winning technology that uses an ultraviolet light source, suspended in air, to inactivate a broad range of micro-organisms.

UVW delivers a high dose of ultraviolet light that inactivates micro-organisms through disruption of their DNA processes. When organisms try to replicate, they die. In addition, a multi-stage filtration process removes silt, taste and smells, converting contaminated water into clean, potable water.

WHI plants are sanitised every 15 days and a more thorough wash of the plant is carried out once a month. The operator collects a sample of the water in a bottle every day. If there is a complaint, the sample water is analysed.

### **Cost of water**

Water processed at WHI plants is sold at the rate of INR 2 for 12 litres, and INR 3 for 20 litres. At the time of registration, each customer is required to buy either a 12-litre can, for INR 100, or a 20-litre can for INR 150. The customer gets a sheet of 15 coupons; one coupon is used every time she/he receives water from the plant. A customer register traces buying patterns.



**Clean drinking water is also delivered home through carts and vans**

Water is also delivered to people's homes at an additional cost of INR 4 per 12-litre can.

### **Impact**

WHI's system has caught on rapidly in the Guntur and Krishna districts of Andhra Pradesh where many rural people are aware of "plant water", also called "Naandi water" in some villages (Naandi is an NGO that was a channel partner of WHI).

The biggest impact of the plant has been on health. "Previously, with the onset of winter there used to be at least 10 patients every week with fever or diarrhoea. But till now there have been none," says Dr D Hanumantharao, the village doctor at Raavipadu in Guntur district.

With a population of around 3,500, Raavipadu was all set to build a new temple with support from one of its ex-residents, Peddarosiah, a software engineer. However, when Peddarosiah, who now lives in Bangalore, visited the village he saw the need for a water purification plant and offered to contribute towards setting one up. The plant started on August 17, 2008; it has 300 households as regular customers.

"We used to use water from wells, and as a result we developed joint pains, got fever and colds frequently," says Peddarosiah's father M Venkateshwar, a farmer who owns 20 acres of agricultural land. "After using plant water, all these illnesses have reduced."

In Lalapuram village, Lalapuram block, Guntur district, K Peddappa used to buy bottled drinking water at the rate of INR 10 for 20 litres. A customer of the plant in his village from the very first day, he says the "plant water" is not only much cheaper but also better.

Another consumer in the village, Satyavani, says her family of five used to boil their water every day. Now they use up to 20 litres of "plant water" a day.

Some customers like Dr G Ramaswamy of Vinjinampadu buy water even for others. Ramaswamy and his wife used to walk 2 km to collect water from a well. Now they buy "plant water" for themselves and a relative in a nearby village. Hotels in the area too have started using water from the plant.

K Chandrika, village health worker in Ganavaram, says: "Earlier, people used to suffer from gastroenteritis, joint pains, coughs and colds. These cases have come down drastically. Some people had skin allergies and suffered severe hair loss. These cases have also come down."

Ganavaram's private doctor, C H Apparao, agrees. "People developed joint pains due to high fluoride content and hardness of the water. The number (of patients) has declined since the water plant was set up in the village."

## **Reach**

WHI's plants do not cater only to the villages where they are located. People from neighbouring villages are also regular customers. Villagers from G G Palen, Vangipuram and Medawarpalen visit Raavipadu regularly to buy water. Many also get water delivered to their homes at INR 8 per 20-litre can.

At Kouthuravaram, in Krishna district, around 450-500 people buy water from the plant every day. In addition, the plant caters to 250-300 customers from six other villages, the furthest being Kavipuram, 9 km away.

### **Behavioural changes**

The water purification plants are responsible for several changes in attitude and behaviour.

In Raavipadu, the panchayat has ruled that whoever rents the local community hall for functions has to buy water from the plant. If not, they will not be allowed to use the hall.

Hundreds of migrant labourers visit Raavipadu every six months from Kurnool district to work on the cotton farms. As many of them cannot afford to spend on water, the panchayat is planning to offer a subsidy to each consumer so that the labourers will spend less for a 20-litre can.

In Ganavaram, the panchayat has provided dustbins to every household, and garbage is collected every day. Most homes now have toilets.

In Kouthuvaram, migrant workers fought to have purified water supplied to them at their work sites. Around 200-250 migrants work in the village for 30 days during the harvesting season. When they heard about the water plant they made sure that their contractor supplied them water from it.

### **Non-consumers**

However, there remain a significant number of villagers who are reluctant to use "plant water". A typical response is: "We have been drinking this water for generations and nothing has happened to us. What can happen now?"

Mastanamma, who lives in a scheduled caste colony in Lalapuram village, says she has tried the plant water but prefers to drink well water. "They (the company people) have told us about the importance of clean water, but we don't understand it. We have a well, which is close by, so we use water from there."

Nageshwar Rao from Raavipadu too says that he and his wife are used to well water and see no reason to change to plant water. "Illnesses come and go," he philosophises.

Y Basavapunarao and G Parmeshwar Rao, two elderly residents from Vinjinampadu village, say they prefer using water from the public tap as they have been doing so for years. "We don't understand what the sudden problem with this water is. Nothing has happened to us until now."

Other reasons given for non-usage of plant water are its "taste" and fears about a new water source. In Raavipadu, Sheikh Baba says: "The (plant) water is not appealing. It does not taste good. We tried it two-three times, but we did not like it."

Krishna Rao of Gangavaram claims he used plant water for 40 days and suffered from "heavy eyes". He went back to drinking water from the well.

Price is also an issue for some households. M Leelavathi and her husband, in Telaprolu village, Krishna district, are tailors. They say they cannot afford to pay even INR 1 a day for water, although they are aware of its benefits.

K Rangamma from the same village knows about the health risks of using water from the village pond for drinking and is keen to use "plant water", but her husband and mother-in-law have not heeded her suggestions as the water is "too expensive".

The location and timing of the plants are other issues. The water plant is usually situated at the centre of the village, near a water source. People living in peripheral hamlets find the distance inconvenient and cannot afford to pay for home delivery. Migrant labourers who leave their villages early for work find the plant closed when they return.

Irregular supply of electricity will also pose problems. Typically, there is no electricity in Andhra Pradesh's villages for around four to six hours a day; during summer it could extend to eight hours. This could drastically cut down the plants' capacity.

### **WHI's course of action**

Even as it grapples with these issues, WHI has concrete strategies for expanding its consumer and product base. It plans to conduct an assessment in early-2009 to validate the impact of using its water on the incidence of waterborne diseases.

WHI also aims to widen its technology options by exploring ways to treat all kinds of contamination, including high levels of fluoride and chlorine.

"We plan to extend our services to other states in 2009," says Vikas Shah, Chief Operating Officer, WHI. "Key opportunities emerge in West Bengal, Uttar Pradesh, Rajasthan, Chhattisgarh and Gujarat. We will also scale up in Andhra Pradesh."

### **The way forward for IFMR Trust**

The 220 water plants financed by IFMR Trust were expected to be in operation by the end of March 2009, impacting over 2 million people.

The Trust's mission is financial inclusion: that every individual and every enterprise has complete access to financial resources. In keeping with this mission, a crucial next step is to get the loan portfolio rated and securitised. If successful, it will be the first of its kind



in India, and will be a significant step towards breaking barriers in the country's conservative bond market.

"Universal access to clean drinking water seems like an achievable goal today because of organisations like WHI," says Bindu Ananth, President, IFMR Trust. "Ensuring adequate financing -- debt and equity -- for setting up and expanding drinking water utilities is a key component of the Trust's mission."