newsreach

THE LIVELIHOODS AND DEVELOPMENT BIMONTHLY

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The Women of Unnatipatha Cheli Samiti

The New Entrepreneurs

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Making a tentative beginning at goat-rearing, the women from Kandhamal cannot be held back, as they manage their animals and deal with the market too.

SM SEHGAL FOUNDATION

INNOVATIVE TECHNOLOGY: Clean Drinking Water in Villages

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Finding a way to harvest rainwater by creating freshwater pockets in existing saline aquifers is a novel and creative way to solve the drinking water problem in the arid regions of Haryana, which have very few surface water resources.

"MY DAUGHTER AND I USED TO CARRY AROUND 80 to 100 litres of water per day, not for our needs, but for the school. How else would the children have survived at school?" asked Saliman, an *anganwadi* worker at the school in Sukhpuri, Nagina block, Nuh district.

This one poignant statement depicts the sheer challenge of the activity, on the one hand, and the utmost dedication of an individual on the other. There are many more such examples.

The district of Nuh in Haryana is a semi-arid region with very few surface water resources. Groundwater is the primary source of water for domestic as well as agricultural purposes. However, because the groundwater is highly saline and of poor quality, it is unfit for human

The cost of boring a well is high; therefore, the villagers are compelled to purchase water from commercial water tankers. However, those who have limited resources are forced to fetch water from distant sources to meet their needs

consumption. Pipe water supply network is maintained by the Public Health Department of the district. This water is sourced from canals and tube-wells near the foothills, where fresh water is still available. Due to the erratic nature of the supply, even the domestic demand for water is hardly met. Most villagers suffer as a result of the lack of availability of potable water. The owners of sweet water bore-wells engage in water trade. The cost of boring a well is high; therefore, the villagers are compelled to purchase water from commercial water tankers. However, those who have limited resources are forced to fetch water from distant sources to meet their needs. These sources of water are either government tube wells, ponds or hand pumps.

In 2015–16, with the support of the Millennium Alliance (MA), the Sehgal Foundation, which works to strengthen community-led development initiatives, installed high-pressure recharge wells in four schools in the water-scarce villages in Nagina block. The aim was to create freshwater pockets in saline aquifers, to make water available for drinking purposes in these schools. This was done in four select schools where groundwater levels were shallow (around 15–20 feet below ground level).

Apart from installing high-pressure recharge wells, the project includes creating awareness about the usage and applicability of these wells in a way that the people can adopt this model in households and at the community level; this will, in turn, help mitigate the problems of water scarcity and salinity in these villages.

High-pressure Recharge Wells

A high-pressure recharge well is a rainwater harvesting system that creates a freshwater pocket in a saline aquifer. An open cylindrical tank of reinforced concrete is constructed over-ground, with its foundations reaching deep beyond the existing groundwater level. The rainwater from the roof-top is channelized into the recharge well through PVC pipes. Because the tank is constructed above the ground, sufficient pressure is created. This enables the harvested water to push the saline water sideways creating a freshwater pocket within the saline aquifer.

This phenomenon occurs because saline water is denser than rainwater. The pressure exerted by the surrounding saline groundwater keeps the rainwater pocket intact. A hand-pump is then used to extract the harvested rainwater. The water passes through a bio-sand filter that removes physical, suspended, and biological contaminants. The filtered water is drawn through water taps in the school. The total roof area of all four schools is 2400 sq. m; and with an average rainfall of 600 mm, a total of 1.44 million litres of water can be harvested. The harvested rainwater is available for 9–10 months, depending on the usage and the average rainfall that year.

Susmita Guru, Social Scientist, Research, Monitoring and Evaluation, Sehgal Foundation, who assessed the impact made by the structure in schools says, “In the case of schools in Sukhpuri and Danibas, the installation of the structure has reduced the burden on children, in terms of bringing water bottles from

The students say that the water extracted from the high-pressure recharge well tastes good and is similar to the bottled water available in the market

home. Besides this, the assured access to clean and safe drinking water helps in maintaining the health of the students through proper hydration during the day at school, which is very important."

Sayira, a student of Grade VIII of the government school in Sukhpuri, says: "I used to bring a water bottle from home and drink only small quantities, fearing that it would finish. Now I do not need to worry about this anymore because there is sufficient drinking water available in the school."

Israil, a resident of Danibas village, said that he often asks his child to bring home some water from the structure installed in the school because the water is clean and tasty. The students say that the water extracted from the high-pressure recharge well tastes good and is similar to the bottled water available in the market.

The cylindrical tank built over the ground to collect the water from the high-pressure recharge well, Government High School, Sukhpuri, Nagina block

In schools, there has been a transition from purchasing drinking water to using rainwater extracted from high-pressure recharge wells. For one school, one water tanker lasts 20 days and costs Rs 700–1200. With schools being open on 230 days a year, the total financial savings amount to around Rs 11,000. The amount saved can be spent on other useful activities.

Replication of this model in households and at the community level is one of the objectives of the project. The model has yet to be adopted at the household level even though everyone realizes that the structure could be a solution to the ongoing water problems in the villages. However, on the flip side, the installation of high-pressure recharge wells is expensive. The average installation cost per school is dependent on the roof area. For a roof area of 600 sq m, the average cost of installation would be Rs 4,00,000. Acute drinking water scarcity has prompted the villagers and the school teachers to try out this model. However,

The challenges to scaling up are many. The very first challenge was to make people understand what clean and safe drinking water is and its importance. This included talking to the members of the school management committee, parents, teachers and students.

up-scaling to harvesting water at the household and the community levels will require technical assessment as well as a greater sensitisation of the people.

Siraju, of Sukhpuri village in Nagina block, wants to install a high-pressure recharge well in his compound. He says, "I am interested in installing the structure after my visit to one of the schools, where such a well has been installed. In fact, I often visit the school to understand the structure and its functionality of bringing quality water to the school. The water is clean and is tastier than the water I use at home. Due to the high salinity in the water, my family and I buy water for our household consumption, which is expensive. I think recharge wells could work out as a permanent solution to my everyday water problems, provided I receive financial support and technical guidance."

"The challenges to scaling up are many. The very first challenge was to make people understand what clean and safe drinking water is and its importance. This included talking to the members of the school management committee, parents, teachers and students. The second was to encourage a more participatory role, in contrast to a passive acceptance of the asset created. The third was to create awareness that it was important to meet the criteria of a shallow water table and certain characteristics of soil in the prospective area of intervention. For example, the intervention cannot be executed in clay soil because the infiltration rate of water in such soil is very low. However, with the passage of time, interventions have seen innovative tweaking and some improvisations, which have resulted in successfully overcoming the challenges concerned," adds Parth Gohel, Programme Leader, Water Management, Sehgal Foundation.

A similar model has been adopted in a school campus in Punhana block and the results are positive. We are also planning to experiment with this technology, in areas where the groundwater is deep and brackish. If the experiment is successful, the model can be replicated in other regions that have saline groundwater.

The above is just another step taken to address the challenge of water quality in this geographical area. Other new avenues are being explored on a continual basis through research and development. The idea is to find innovative and cost-effective solutions for the challenges at hand, bringing about all-encompassing changes.

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SM Sehgal Foundation *is a Gurugram-based organisation*