

Harvesting rainwater through an innovative model provides potable drinking water in Mewat



School children of Sukhpuri reap the benefit of HPRW school compound.

The students and teachers of Government Middle School in Sukhpuri village of Mewat district, Haryana, are a happy lot today. The 356 students, who are thirsty during school hours, now have access to potable water, harvested from rain, right within their

The groundwater is saline in Sukhpuri, a tiny village in Nagina Block tucked in the Aravalli hills. The level of total dissolved solids (TDS) in the groundwater is 7,560 parts per million (ppm)¹, making the water unfit for consumption.

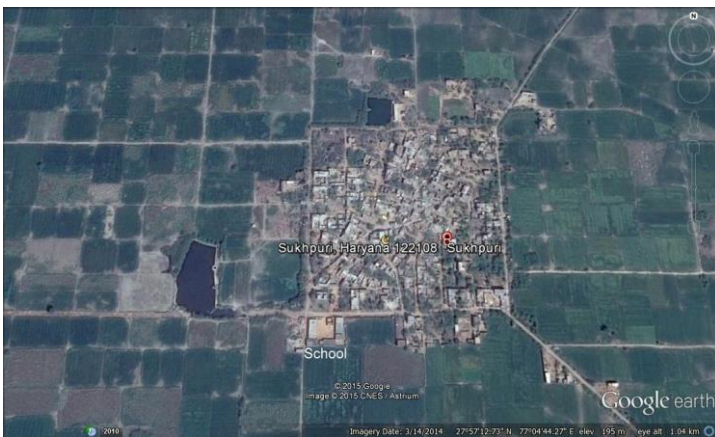


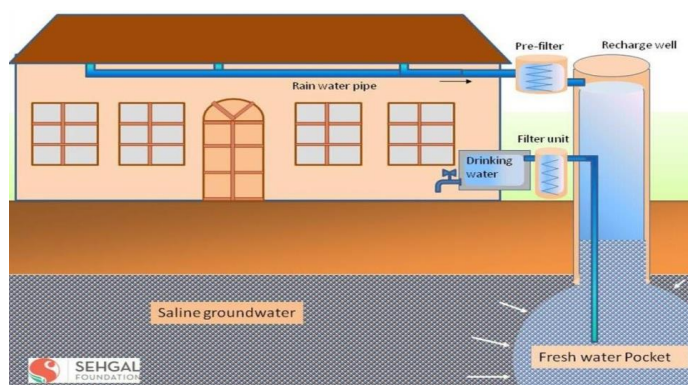
Image of Sukhpuri Government Middle School (Source: Google Earth)

Schoolchildren of Sukhpuri had always suffered the most from the scarcity of potable water. The school depended on tankers to meet water needs for drinking and cooking, at a cost of up to Rs.1,200 per month. Even though the quality of the tanker water was always questionable, there was no other alternative. For many years before, whenever

tanker water was unavailable, the school had borrowed water from neighbouring households or, in extreme cases, children had to leave school and return home to drink water.

¹ The Indian standard maximum desirable TDS for drinking water (BIS specifications) is 500ppm and the maximum permissible TDS level in the absence of a better source of water is 2,000ppm.

To tackle the water problem in Sukhpuri Government Middle School, Sehgal Foundation², a public charitable trust, registered in India since 1999 in Gurgaon, developed and constructed an innovative rainwater harvesting structure called a 'high pressure recharge well' (HPRW).



Schematic diagram of high pressure recharge well

This well stores "sweet" rainwater below the ground, as a freshwater pocket within a saline aquifer (groundwater zone). This is achieved by recharging collected rooftop rainwater, below the water table, with gravity-induced hydrostatic pressure. For this, the recharge well is sunk to a depth, lower than the existing groundwater level and raised to an above ground height to gain additional hydrostatic pressure. As rainwater enters this well, hydrostatic pressure pushes the existing saline water aside and forms a pocket of freshwater within the saline aquifer. Later, this sweet water is extracted with a hand pump. The water passes through a biosand filter that removes physical, suspended, and biological contaminants and is accessed through water taps at the school. The model is environment friendly as the system requires no use of chemicals or energy.

The Sehgal Foundation field staff provides information about the benefits of HPRW to the community during their regular interactions and awareness-building activities. The team conducts a technical feasibility assessment for the school and seeks an approval letter from the school authority to commence the construction work. Financial contributions toward the project are collected and deposited in a bank to ensure the sustainability of the structure over a period of time. This instils a sense of ownership among the school authority and the Village Development Committee³. While construction of HPRW is underway, the field team conducts water literacy sessions with community members and schoolchildren. Once the structure is functional, it is handed over to the school authority. Responsibility for the structure's operations and maintenance lies with them. This includes cleaning the roof, maintaining the biosand filter, and replacing the taps and other parts of the structure in case of any damage.

This innovative model was originally conceptualised by civil engineer [Lalit Mohan Sharma](#), who has been finding solutions to the water issues of rural Mewat for past 15 years with input from a talented team of experts. The primary issues in all the villages of Mewat were related to availability, accessibility, and quality of water. The HPRW was

Field Code Changed

² Sehgal Foundation's mission is to strengthen community-led development initiatives to achieve positive social, economic, and environmental change across rural India. With support from donors and partners in the corporate, government, and social sectors, the organization works with rural communities to increase agricultural productivity, manage water resources, strengthen grassroots democracy, and facilitate citizen participation through good rural governance, putting a strong emphasis on gender equality and women's empowerment.

³ The Village Development Committee is a voluntary association of village people for local administration.

designed to address the prevailing conditions in the district, i.e., shallow groundwater table (depth about 4 meters), silt or sandy soil, and high levels of salinity in groundwater in all but 60 of the 431 villages of Mewat.⁴

In November 2014, Millennium Alliance⁵ awarded a grant to Sehgal Foundation, to build the innovative model in more locations. The construction of HPRW in the Sukhpuri school, took about two months with financial support of Rs. 3, 20,000 from the Federation of Indian Chambers of Commerce and Industry (FICCI). With an average rainfall of 600mm and the school's roof area at 3,024 square feet, this system can harvest nearly 1,50,000 litres of rainwater per year, which can comfortably meet the annual drinking and cooking water needs of the school. The direct beneficiaries of this project are 356 schoolchildren and their teachers.

The decision by the community and school to construct a HPRW is paying rich dividends and changing the lives of schoolchildren. Responses from various stakeholders of the project reflect this. "There is good-quality drinking water in school with the construction of the system. There was no regular system of government water supply in the school and we had to spend time and money to get water, but now that is not the case. . . HPRW is



a "अनोखी सोगात" (unique gift) for children," says Haji Sirajjudin, a Village Development Committee member. "I have participated in all the meetings related to this project. Even though I do not have formal education, I understand the science behind the technology. I regularly monitored the construction work" He pointed out that the school has a security guard, Fazruddin, who takes care of the school and the infrastructure after school hours. Fazruddin, says, "Children, don't throw stones at pipes or fiddle with the taps . . . I have seen a change in their behavior; they are more responsible towards the tank."

⁴ The HPRW innovation was selected as the subject of a "Lightning Talk" given by Mr. Sharma at the Solutions Summit at the United Nations headquarters in New York in September 2015, bringing attention to the UN's new Sustainable Development Goals.

⁵ The Millennium Alliance is a consortia of funding partners of United States Agency for International Development (USAID), Department for International Development (DFID), United Kingdom, Interchurch Organization for Development Cooperation (ICCO), Dutch Government, Federation of Indian Chambers of Commerce and Industry (FICCI), Department of Science and Technology, Government of India, WISH, and ICICI Foundation.



Mid-day meal prepared using water from HPRW

The schoolchildren and staff learned about the benefits of the project from a water literacy session and monthly meetings conducted at the school by Abid Hussain, the Sehgal Foundation coordinator of the project. He observed, "Initially, the school was hesitant about the project, but with regular face-to-face interaction, we won their trust and respect, which helped us in carrying out the work smoothly."

HPRW was installed in June 2015. Aravind, the school teacher, says, "Water is now available in the school, which has helped in student retention especially after the distribution of midday meal."



Muniri Bhai fetches water for cooking the midday meals

The midday meal cook of the school, Muniri Bai, says that "Earlier I used to bring water from home for cooking, but now, I use water from the newly constructed system. This has reduced the burden of carrying water and also saves my time and energy."

Schoolchildren are overjoyed as they now have water within the school premises. "The 'Pressurized Recharge Wells: Ensuring Water Availability in Saline Water Areas' project has so far supported two HPRWs in Mewat district and work on a third HPRW is underway," says Parth Gohel the project leader. A similar structure constructed in Jargali village, 20km away from Sukhpuri School, has ended years of water misery in the school. The effective functioning of these models will provide the basis for government to consider further replication of the HPRW innovation.