

Teams from Tata Trusts, and its associate organisation, Himmotthan Society, in Uttarakhand, show the way to harness the strength of community mobilisation and the power of technology to tackle the biggest problem faced by the community – Access to safe drinking water.

Case Study: Using Renewable Energy to enhance Access to Potable Water in a remote village in Uttarakhand

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Using Renewable energy to enhance access to Potable Water: A Community-Owned Intervention in Chureddhar village in Uttarakhand

Background

Chureddhar village is located at an altitude of 2040 metres above Mean Sea Level (MSL) in Tehri Garhwal District of Uttarakhand, a province in north India. The village has sloping undulating topography (slope is in the range of 30%-60%), and barren hills. The average annual rainfall is about 1,800 mm in Uttarakhand, of which about 1,200 mm occurs between June to October. Most of Uttarakhand's water needs are met by natural springs, which are the sole source of drinking water, especially for many marginal communities. Due to unabated ecological degradation, mostly because of anthropogenic interventions, the discharge from springs is declining at an alarming rate. What were once perennial springs are becoming seasonal, adversely affecting life and livelihoods, and not only irrigation but also drinking water.

The source of water in the village of Chureddhar, a habitation of 356 people, was a hand pump. By summer of 2002, the hand pump in Chureddhar had dried up. A natural spring, over 1.5 kilometres away, was the only other available source of water. In the face of water scarcity, the usual approach is to tap natural water resources to provide gravity-piped water supply or to collect rainwater via Rain Water Harvesting Tanks (RWHT), particularly in villages where there were no potential natural gravity flow resources. However, such practices have limitations in villages where rainfall is scanty and there is no perennial source of water. Such villages remain overlooked.

Till 2003, Chureddhar, a village of 70 households, was one of such overlooked villages. That was the year when the Tata Trusts decided to intervene under the drinking water supply interventions within Himmothan Pariyojana. The village had no natural spring which could be tapped for provision of gravity flow water supply to village. Hence, it was decided to construct 59 individual owned Rain Water Harvesting Tanks (RWHT) of 7,000 litres each.

However, changing precipitation patterns and adverse climatic conditions, such as limited days and erratic rains threw up new challenges and pushed towards exploring alternate solutions to meet the demands of the community.



Challenges Converted into Opportunities

The first challenge came in the form of topography - water had to be lifted over an elevation of 186 meters, something that was not experimented in Uttarakhand, and understandably, the community was sceptical. As this was community project, land had to be made available for installing the solar power grid and creating clear water reservoir (CWR). But a few people were against the project, and hence, land and community contribution was not mobilized as per plan within the stipulated time.

However, various technical options was presented to the village community and gradually people came together to participate in meetings and started collecting the community contribution towards the project. They understood that in case the project became successful, the name of their village Chureddhar would be known to all. A seven member village committee was formed for supervision and equipment purchase.

This led to the much-awaited progress on the project. Finally, after many discussions with the local village community and much research, dialogues with First Solar Inc. (manufacturer of thin film photovoltaic

modules, or solar panels) and Tata Power Solar, a cost-effective solution was finalised for implementation by the Dehradun-based Himmotthan Society and Himalayan Institute Hospital Trust (HIHT).

Working of the System

The implementation work on the solar project had started in May 2013. Under this scheme, spring water is collected in the Source Collection Chamber (SCC) and after a three-step filtration process, a 710-metre pipeline carries the pumped water to a height of 186 metres at the rate of 38 litres per minute, through a single stage pumping. Two solar off-line grids comprising 50 solar panels of 77.5 watts (Wp) each, have been installed in Chureddhar. Together, the panels produce 3,750 Wp solar energy which enables the pump to push the water towards a clear water reservoir where the water is chlorinated. Since there is limited availability of water, it is not possible to provide individual connections for every household; instead, four public taps have been installed at a convenient location within the village from where the water is collected by the villagers.

The overall project was implemented through a village institution, and by involving village members for pipe laying and fitting, and for civil construction, under the technical supervision of Himmotthan Society.

The overall project implementation cost was INR 9,00,000, with the community contribution being 10%. Post-implementation maintenance is being taken care of by the villagers with the support of Himmotthan Society. The Village Management Committee collects monthly user charges of INR 50 from each household to meet basic expenditure such as chlorination, insurance and other operational charges. The scheme is fully insured. INR 1,00,000 has been put into a reserve fund.



Basu Devi, 50, a resident of Chureddhar village in Tehri district, pats the water tank outside her house affectionately. *"This tank to me is what a bank is for most people. I draw out water from it judiciously and only when absolutely required,"* she says. Devi, who comes from a remote mountain village in the northern Indian state of Uttarakhand, vividly remembers the time when she spent most of her waking hours trudging long distances, not once but several times in a single day, to collect water for the household's needs.

She has truly seen it all – the days when sourcing water was all the women could think about day and night to becoming self-sufficient.

"Water scarcity was a critical issue in our village even before I settled here after my marriage over four decades ago. This project has not only significantly improved our lives, but it has given women a platform to speak out openly about their problems, which is a first for us."

Achievements of the Project

The villagers are ecstatic. The scheme has not only provided drinking water to the village, but also reduced the women's workload considerably. Earlier they used to spend 3-4 hours for fetching the water, now the potable water is available at the door step. *"The incidence of water borne diseases will also decrease,"* as the water is chlorinated, they say. Moreover, the use of solar energy saves INR 34,000 per annum on electricity bills on an average. Details of other personal and impacts against the base line which project is made is attached in Annexure-1.

The collaboration between the villagers, Tata Trusts, Himmotthan Society, First Solar and Tata Power Solar has changed the face of Chureddhar. The success of this project has inspired government officials to consider using solar energy to solve the problems of drinking water in the mountains. A little support goes a long way in helping a community help themselves.

The Solar Lift Drinking Water scheme implemented in Uttarakhand is the first project of its kind, and has the potential to become a long-term solution to implement anti-gravity water schemes, especially in regions where availability of electrical power is a major problem.



Chief Secretary of Uttarakhand along with Secretary of Sir Ratan Tata Trust inaugurating the solar water pumping scheme



Two off line solar grid in the village producing 3,750 Wp to lift the water



The sump got damaged twice due to heavy rains during 2013; Solar grid work at progress in 2013



Spring water coming to the Sump and pumped to the Village through Submersible Solar pump



System in use and benefiting around 400 people in Chureddhar village

Annexure -1
Himmothan Pariyojana: Chureddhar
Impact Assessment Indicator

Name of the Village:

Chureddhar (Solar project)

Sl.	Item	Base Data as on starting of planning phase (Jan 2013)	Target as fixed in the starting of planning phase	Achievement upto March 2014 (end of Project)
A.	Personal Hygiene			
1	Daily bathing (%)	35	100	92
2	Regular cleaning of teeth (%)	42	100	100
3	Regular cutting of nails (%)	38	100	100
4	Washing hands with soap / ash			
	a. Before taking meals (%)	45	100	94
	b. After ablution (%)	57	100	100
B.	Household Hygiene			
1	Regular sweeping of house (%)	42	100	100
2	Cleaning and proper up keep of utensils (%)	48	100	100
3	Keeping drinking water covered & use of safe water (%)	31	100	100
4	Using long handle saddle to draw water (%)	24	100	86
5	Keeping cooked food properly covered (%)	62	100	100
C.	Environmental Hygiene			
1	Proper disposal of solid waste (cow dung/other) (%)	25	100	60
2	Use of sanitary latrines for defecation (%)	76	100	100
3	Proper disposal of infant faeces (%)	47	100	100
4	Proper cleaning of public places (%)	52	100	100
D.	Overall Impact			
1	No. of diarrhoea cases	26	0	0
2	Immunization through vaccination (%)	45	100	100
3	No. of people suffering with other waterborne diseases	88	0	0
4	Pre and post natal care of mother (%)	54	100	100
5	Community empowerment/capacity enhancement (%)	25	100	100
E.	Other Impacts			
1	Distance Covered	2 Km.	30 mt.	50 mt.
2	Water Availability (In lpcd)	15	40	40
3	Time spend on Fetching water	2.6 hr.	20 min.	20 min.