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SUSTAINABLE ENVIRONMENTAL SANITATION AND WATER SERVICES

Community Managed Drinking Water Systems

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Background

Drying-up of local water sources has created severe hardships for a majority of people residing in the central and western Himalayas. Traditional methods of intercepting shallow sub surface water capillaries (into naulas / baoris) are mostly inadequate, as the denudation of tree cover in the catchment areas has resulted in poor recharge of the primary water resource base. Alongside, the pressure of increased populations within the village jurisdiction has also been another significant factor for creating water shortages.

Chronic water shortage has resulted in diverting large sums of public funds for carrying piped-water over several miles from distant secondary, and even tertiary, water sources to the problem-villages. Such an approach does not meet the sustainability criteria on three major counts :

- The cost-benefit ratio is skewed due to per capita investment of over Rs.5000.
- It diverts the attention of the local people regarding the critical need to reforest and protect the village catchment area.
- And, in the long run, with increasing biotic pressure in catchment areas wherein secondary water sources are located, the problem of water shortages seem far from being resolved.

In view of this, since 1993, **Grassroots** has found it relevant to introduce an appropriate technology application – conceptualised and developed by Dr. Tim Rees, a geo-hydrologist, during his work in the Kumaon region – through the construction of Infiltration Wells (as a protected water intake structure) and installation of Handpumps, Power Lift Pumps and Gravity-Flow water supply systems.

This appropriate technology application has several advantages :

- It is based on local primary water sources and may assist villagers in realising the benefits of protecting the immediate catchment areas.
- Since deeper seepage lines are intercepted (from the traditional naula / baori of 5 – 6 feet to 30 feet in the case of infiltration wells), it is possible to harvest enhanced quantities of water.
- As the infiltration well is covered and constructed at least twenty feet below ground level, it enables the drawing-out of protected drinking water and eliminates the risk of external contamination.
- The per capita capital cost is typically Rs.500 and operation and maintenance costs are negligible.
- Construction of infiltration wells, installation of pumps, operation and maintenance could be viewed as local responsibility, albeit with appropriate training inputs.

The Spread Effect

Grassroots has been able to motivate over 3,500 households and thereby benefit over 20,000 people spread over 125 hamlets in the following areas:

Kumaon Region	:	8 Blocks spread over 3 Districts
Garhwal Region	:	3 Blocks spread over 1 District
Himachal Pradesh	:	3 Blocks spread over 2 Districts
2 States		**14 Blocks** **6 Districts**

The challenge, in the immediate future, would be to evolve mechanisms for accelerating the spread of this appropriate technology option in the drinking water sector of Uttaranchal, Himachal Pradesh and possibly other Himalayan states.

Community Management of Appropriate Technology

A. Panergaon village was part of a multi-village water supply scheme, based on a distant secondary source located in a Reserved Forest. Ironically, the state of the 'reserved' forest deteriorated, which led to the drying-up of the water source to the extent that the scheme was defined as non-functional. Collecting even small quantities of water was a regular chore for the people in the village, who had to trudge up and down to the hillside for over six hours daily.

During 1996, the villagers took matters in their own hands and prepared an ambitious planning document regarding water & environmental sanitation and decided to entrust the responsibility of implementation to a nine-member Village Water & Sanitation Committee (VWSC).

Over the next year, the VWSC sought necessary assistance from **Grassroots** and managed to accomplish the following :

- Construct an infiltration well which harvested over 20 litres of water per minute or close to 30,000 litres per day!!!
- Install submersible pump sets to lift the water up to the top of the village by 90 meters, into pressed steel pre-fabricated tanks lined with fibreglass.
- Provide enhanced quantities of safer water to the entire community through a network of gravity-fed pipelines, both as public stand posts and private connections.
- Reduce the drudgery of women regarding collection of water from over six hours to less than one hour daily and thereby empower women to spend 'released' time more meaningfully.
- Motivate every household to construct twin-pit waterseal sauchalayas in order to prevent contamination of water through open defecation and thereby improve village environmental sanitation as well as levels of personal hygiene significantly.
- Ensure that each household contributed ten percent of the capital cost of the project, including meticulous laying of pipelines one meter underground.
- Set in place a sustainable management system regarding operation and maintenance of the water supply system through regular collection of a water cess.
- And, finally initiate a process of protection and conservation of the critical catchment area of the village, through raising saplings and planting-out mature rootstock of native tree, shrub and grass species.

B. Chamni village had also been 'covered' by the state government with a gravity-flow water supply scheme; which unfortunately had been functional only for a short period of less than one year. This community – far removed from the motor road and with no electricity – also decided to take matters into their own hands, through the formation of a similar VWSC.

Once again with help from **Grassroots,** the community constructed an infiltration well right next to the defunct intake structure and harvested sufficient water for two overhead storage tanks. Thereafter, through a network of underground pipes, water was distributed to each and every household through a system of public standposts. Alongside, in order to further enhance the availability of water, the community decided to construct five more infiltration wells / handpumps and several individual household level rainwater harvesting tanks.

Soon after, every family in the village invested their meagre resources towards construction of sauchalayas in order to protect the quality of their water supply and improve the village environmental sanitation scenario.

Also of significance is the fact that drudgery of women reduced drastically, besides the average availability of water per household increased from 100 litres to over 200 litres per day.

The people of Chamni have realised the benefits of cooperation; to the extent that the entire catchment area is being protected. A nursery has been established at the head of the *gadhera* (water course) wherein the infiltration well is located, raising mature saplings of various indigenous species of trees, shrubs and grasses.

Several other communities have also adopted similar de-centralised drinking water systems through interactions with folks in Panergaon and Chamni. An example of Operation & Maintenance (O & M) in some of these villages is reflected below, in order to show the sustainability factor.

Economics of O & M in some villages for a typical month (in rupees)

Village	House-holds	Water Cess	Expen-diture	Surplus
1. Panergaon	50	2,785	2,485	300
2. Chamni	60	300	180	120
3. Bari	73	600	300	300
4. Dhamoli	78	780	300	480
5. Rawalsera	59	2,360	1,360	1,000
	320	**6,825**	**4,625**	**2,200**

It is significant to note that for a group of five villages the monthly O & M costs amounts to *only* Rs. 4,625 – which is borne by the communities. It is equally amazing to note that these communities have invested their surplus-savings as fixed deposits for a period of five years, ranging from Rs.10-30,000.

There could be no better argument than these figures regarding the fact that Reforms in the Drinking Water Sector ought to be accelerated in favour of promoting de-centralised community managed drinking water systems.

Institutional Arrangements

Grassroots is a small, lean, independent voluntary organisation that channels resources – managerial, technical and financial – directly to people and associations of the communities, working at the village level.

However, in order to enable the smooth and swift spread of various appropriate technology applications, including the Infiltration Well Technology, **Grassroots** has organised a group of over thirty local men into a well knit team of highly trained master masons – called

the **Kumaon Artisans Guild.** Members of this guild have been responsible for providing critical training inputs to various communities who have adopted the infiltration well technology discussed in this note.

The guild has not only acquired technical skills and knowledge regarding various appropriate technology applications, but also participatory management skills, accounting and the mindset of accepting the principles of social audit.

Grassroots is of the opinion that creation of such Guilds is of critical importance for the success of appropriate technology transfer programmes at the community level, especially in the drinking water and environmental sanitation sectors.

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