Gravity Flow System Complementing Nature and Indigenous Traditions

The hilly population is among the identified hard-to-reach category of people who are under served and out of support. Aside the topographic distinction, a vast cultural and ethnic diversity, difficult communication and degrading bio-diversity due to deforestation, hill-cutting and drying up of rivers & canals are encountered by the hilly communities. Collecting drinking water from steep and distant hilly springs is a relentless battle for the hilly women and girls. Scarcity of water is high in the entire region and increasing with time. NGO Forum for Public Health has been working in the CHT region intensely; designing, initiating and implementing community-managed and demand-responsive programmes. It has worked with local NGOs and utilized local manpower that helped to gain better in-depth knowledge on the CHT region, geophysical characteristics, its diversity, its people, culture, socio-economic conditions, livelihood, etc. At the outset NGO Forum gained sufficient understanding on the mentioned features to make development appropriate fitting the needs and particular circumstances of these people under its Community-managed Programme Approach.

NGO Forum has been taking special initiatives like invention and promotion of new area-specific, situation-specific, environment-specific feasible technologies in the hard-to-reach areas instead of all-fits-one modern technology. Considering the soil texture, NGO Forum has promoted the Gravity Flow community water supply system as a feasible and scalable alternative water technology for the hilly region.

GFS Ends Hilly Families' Struggle for Water

Hilly indigenous families living in the slope of Chaichhari para in Ghilachhari union under Naniarchar upazila of Rangamati hill district had their greatest struggle for collecting water. Added to their misery was the fact that the water collected for drinking and household purposes remained untreated. Tragic incidents of loosing toddlers succumbing to diarrhea and cholera were common among the families. Pulak Chakma, a UP member of 2 no. ward of the union recalled those difficult times, "I have lost three of my younger brothers from severe diarrhoea at their very young age. Now the people have learnt about safe water use. This has made the difference."

Ghilachhari UP Chairman Amar Jibon Chakma inaugurating the GFS technology

In partnership with the Ghilachhari UP and local NGO Progressive, NGO Forum stepped in to the remote hills and completed the implementation of a-Tk.752,027 GFS ensuring water for the entire valley of 45 families under project provision supported by the European Union. Alongside, another 36 neighbouring HHs have made additional arrangements on their own to enjoy the GFS facility. Hundreds of metres of the valley is covered through HDP pipes arranged and maintained by the community people through their own initiative. They are also conserving the environment favorable for protecting the Source of the GFS, located around 2 kms far from the storage tank. Two years after the GFS has been in operation, the village appears being evolved centering the facility. "People from distant hills are coming to see our water facility. Already two new families have built their houses here leaving behind their para (village) where they grew up," mentioned Shanti Binoy Chakma of Chaichhari para.

Remote Ramju Reached by Safe Water

It takes one and half hour and trekking of three hills to reach the new Ramju para of Tankabati union under the sadar upazila of Bandarban district. Ramju Para is so remote where the general tourists will not be interested to visit. Since setting up of abode in Ramju para about 23 years ago, no government officer visited this para due to its remoteness. No locality is found from this para which remained reprieved of all necessary civic amenities. People of Mru community of Ramju para are different in appearance, dress-up and behavioural conduction. About 23 years ago, they built up their para centering a chhara named Damrak chhara. They usually collect water from this natural source which takes more than 1 hour to collect water from this source.

Having somebody beside them with services is a great surprise for this community

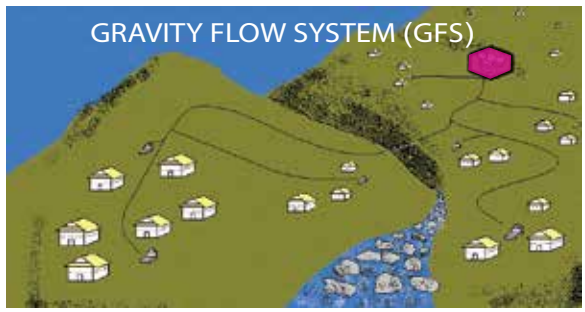
Geophysical and Socio-cultural Attributes of CHT

The general land feature of the CHT is composed largely of consolidated sand stone's, sandy shale's and shale's of tertiary geological age. These have been subjected to considerable folding, faulting, tilting and dissection. There are hills of lower height which are below 250 m generally; the height ranges between 42m to 80m and are formed mainly over unconsolidated sandstone of late Tertiary age. Almost everywhere in the CHT, slope is very steep.

The CHT is one of the most disadvantaged and vulnerable in terms of various development indicators, including access to and ownership of land, income, employment opportunities, poverty, housing, health, water, sanitation, education, and inter-community confidence, etc. The use of safe water in the CHT is around 43% with higher concentration in the urban areas. The indigenous hilly people in rural areas normally depend on the natural water sources i.e. rivers, canals, hilly holes, lakes and springs for their drinking water. But with time being the population has increased and with the climate change & man-made disturbances to the nature, most of the surface water sources are becoming dryer and contaminated. Nowadays, water scarcity is steadily increasing in the CHT areas.

GFS- The Technology

The Gravity Flow System (GFS) is feasible in a topography featuring hilly, rural areas with steep terrain and where spring water is available. The technology is basically an alternative community piped water supply system. The GFS taps a spring or dam of a small unpolluted stream and the water flows downhill into storage tanks through pipe. Before storing, it is made free from any sorts of silt and debris by different stages of filtration unit. Raw water from the spring is pumped up using gravity force; the turbidity gets down through the roughing filter and then is discharged into the filtration unit. Fresh water is stored in the storage tank. The power of gravity allows the overall costs to remain low as there is no need for pumping. The flow in the transmission is maintained by gravitational potential available on account of elevation difference. When this flow is carefully channelized, it drives a fairly large supply network; because in a steep topography, gravitational potential maintains a pressure head in the water distribution system. The spring or stream is tapped, dammed and fenced off to prevent contamination.



Advantages of the GFS

- Applicable in steep topographical areas in the hill covering an entire community;
- Suitable technology for utilizing the spring water;
- There is no need for pumping as gravity pressure is the prime energy of GFS;
- No carbon emission and in turn no threats of environmental pollution;
- Volume of supplied water can be controlled;
- Water can be delivered to the close proximity of the users;
- Can serve for longer period in a sustainable manner;
- Overall O&M costs are low.

Over the past years, people were suffering from different water-borne diseases drinking this contaminated water. In 2009, NGO Forum from its commitment to be beside the excluded people had accomplished a tough task providing Gravity Flow System water technology at their door-step. The most difficult task was to carry construction materials at this para. But the community people got highly enthusiastic; they put their labour in carrying the construction materials and the GFS got its shape at a very demanding community. Viral fever, diarrhea, dysentery, jaundice, etc have been reduced remarkably. Seven years after the installation, the facility still remains fully functional in good condition. The community members themselves have been taking care of the System and placed iron sheets over the GFS as an extra protection.

GFS in Ramju para during the initial stage of operation

Present condition reveals the GFS to be still well-functioning

Scope of Scaling Up

The GFS has been broadly accepted by the hilly communities and administration as a feasible technology. Community ownership as well as collaborative support from the respective local government bodies also appears high as they value the facility as an asset for their healthy living in the hills. However, the sustainability of the GFS depends highly on the preservation of the natural forest surrounding the source. As long as the spring is alive, the GFS is likely to remain functional. Thus, it needs to ensure the protection of the natural habitat to set and sustain a GFS. Nevertheless, it is proven feasible water supply technology for the remote and scattered hilly households and currently is in high demand by the communities and the local administration.

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EUROPEAN UNION

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Photography: Joseph Halder, Abul Kalam Raja, **Graphic Design:** Rokibul Hasan
Printed by: Dana Printers Ltd.

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