

Handpumps in the Himalayas for the first time

by D.G.T. Rees

Experiences in India have underlined the importance of establishing a strong local organization before any engineering works are carried out. The elimination of outside project staff has allowed the Kassar Trust to spend all of its resources on training local people, thereby enriching the local skills base and providing for the future.

THE KASSAR TRUST in Uttar Pradesh, India, has developed a simple technique for installing handpumps on Himalayan mountain slopes, high above the rivers. This article is not about the techniques for installing handpumps, or how these were first developed in 1986, but about how this programme has been implemented and how the handpumps are being maintained in remote and inaccessible places. To understand how this programme works, one needs to know something of the environmental situation in the Central Himalayas, and particularly how these problems are perceived from a local village perspec-

tive. This is because the drinking-water programme is part of a wider environmental programme.

The most fundamental and basic environmental property of steep mountains in monsoon climates is the ability of the slopes to retain water, as all life ultimately depends on this factor. The amount of water that is stored this way is difficult to assess, but as infiltration decreases, run-off increases, leading to increased erosion. Thus although the huge soil loss in the Himalayas over the past 100 years is a serious problem, specific areas of soil loss are, paradoxically, a good indicator of the basic health of a catchment.

It is widely reported throughout Kumaon that *naulas* (local water resources above the spring line, see photo, page 23) are either becoming seasonal or drying up altogether. The practical problem on a village level is that village lands can fulfill certain needs, including water, and can carry a given quantity of animals and people. The situation has deteriorated because the population has increased significantly, so that today hardly any upland holding produces grain for more than six to eight months of the year, forcing one or more family members to leave the hills in search of work.

How does this relate to the installation and maintenance of handpumps? The flows of the underground sources are slow, about 12 litres per minute, and too small to be considered in typical engineering schemes. The villagers understand that the origins of the source are critically important. They understand that there is a catchment, and they also know that a forested catchment is better, so an interest in handpumps leads to plantation programmes, and so on.



A typical scene, with badly degraded village lands in the foreground and forested government lands in the background.



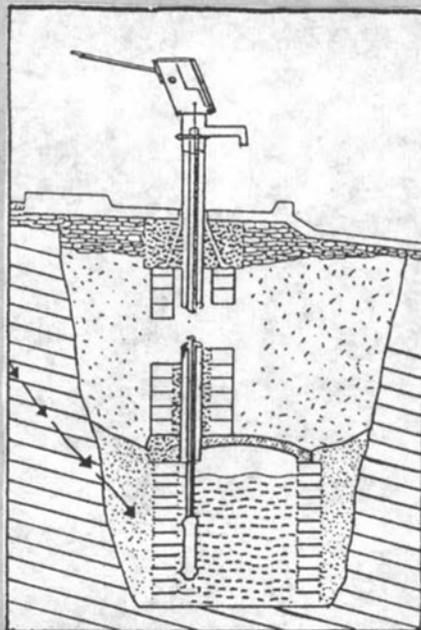
A naula, a traditional drinking water source that has been used for centuries.

Technology options

In some cases it has been possible to install a standard handpump, such as the India Mark II. (A modified standard has been created to the Trust's specifications, the India Mark II Kumaon Model.)

One alternative developed by the Trust is to build an infiltration well, an underground structure that intercepts and stores small underground seepages of half a litre per minute. The structure consists of a porous well at the bottom of the pit, capped by a lid, usually made of ferro-cement. A column rises from the lid to the surface, where a handpump is mounted on a platform. The platform has to be constructed to prevent water from the surface returning to the well, and so has a drain to the downhill side. The well can also be modified to pump the water to a higher elevation if needed, through a pipe. It was found in practice that the maximum practical vertical head through which water can be pumped by hand is around 60 metres.

The other type of installation is for extremely small and difficult sources, usually in hard rock. In these conditions, a very small infiltration well is put on the source, and the water is drained directly to a ferro-cement tank at a lower elevation by gravity, either for use there or possibly for further pumping uphill.



Section through infiltration well with handpump.

The Kassar Trust's objective is to create an understanding among the people in the villages about their environmental problems, and to help in the creation and operation of local village committees, called *samitis*, which can work at the village level to start solving some of these problems. The Trust started with drinking-water, and this continues to be the main area of work: most villagers in the Kumaon Hills cite access to adequate water supplies as their main problem. There are other problems of course, but all problems relate to the environment, so the solutions cannot be separated from each other either. The Trust's experience over 25 years is that environmental and development programmes only take root and inspire permanent change if they are village-based, and are not dependent on outside 'project staff'. When a villager needs a house, the village artisans build and maintain it, so why should not the same approach work in the area of water supply?

In practice, a village hears of a water-supply project in another village and approaches that village's *samiti*, who may then suggest a visit and present, with the help of the Kassar Trust, a slide show outlining the programme. The effect of this is that the visiting people see a village very

Training the *jal karmis*

Suitable trainees are first selected from their own region by the *samitis*. Experience has shown that young men who are not already trained artisans in any particular line are preferable; many experienced artisans, such as masons for example, are reluctant to learn new techniques and want to build the well the way they would build a wall, which is not satisfactory. The candidates are then sent to work alongside a trained and experienced *jal karmi* for an initial period of at least three months. This on-the-job training has proved to be the most effective, and the trainee then has some idea of what is involved, and can report back to his own *samiti* about the type of preparatory work required to begin a well. Either more on-the-job work can follow, or a handpump well can be undertaken in the trainee's own area, with support from one or more trained *jal karmis*. The trainee is not likely to be able to undertake well construction unassisted for about two years, because although the structure has to a large extent been standardized, the actual sub-surface conditions will vary with each excavation, and considerable experience is needed before the trainee will know how to deal with new conditions. Training in the construction of other types of well is given only to *jal karmis* who have constructed around 20 wells of the first type themselves.

similar to their own, with badly degraded village lands in the foreground, and behind that the forested government lands. This is what we have today and for future generations, explains the presenter. This is our environment — it gives us food, fuel, fodder, and water. Can we manage it better? What have we done in our village? The slide show then goes on to show different aspects of water supply and components of the Trust's programme.

The water in a *naula* can be contaminated when animals drink from it, and when people dip pots into it or wash beside it, but handpump water is not contaminated from the surface. Handpumps can also be used to lift water from the source to a higher elevation, where it can be stored and used when needed.

Where no underground source exists, 5000-litre and 10 000-litre tanks can be used for harvesting rainwater from roofs. Polythene-lined pits can be built to harvest rainwater from slopes, or to store water from small sources, mainly for vegetable cultivation. The slides also show sanitary latrines, nursery schools, improved agricultural practices, and other programmes.

The talk then comes round to the main issue: how can all this be implemented, managed, and maintained? Who is going to do all the work? This is the foundation on which all else rests. It is the Kassar Trusts' experience that the easy part is to train *jal karmis*, or water workers, to install and maintain handpumps! The difficulty is in training the *samitis* to manage and run the programmes effectively — to select beneficiaries, elicit contributions from beneficiaries, trans-

port materials to site, organize the work for each project, co-ordinate the projects, select the projects, and run awareness camps in villages both to introduce the programme and later on to demonstrate the proper use of programme components.

So the slide show ends with a discussion of how this work can only be carried out with the participation of the village. If the village is interested in these programmes, then they must first form a village *samiti* and be willing to contribute in cash and in labour and, for anything beyond one or two introductory programmes, the village must nominate one or more people who will be trained as *jal karmis*. Experience shows that some

small projects, like a few sanitary latrines, may be begun immediately, but it often takes one or two years before the community is ready for large drinking-water projects.

So when the time comes to consider the question of maintenance, the village-level structure is already there to handle it; they have usually managed a large part of the construction by then anyway. So it is not a question of 'how do we handle maintenance in remote areas'? That question only arises when operations are based on a situation where employed staff living in towns away from the villages. The question exposes the error. No one asks how villagers repair their houses, nor is it assumed that they are dependent on some far-off urban office with its gang of contractors in tow.

Creating this operational structure, with the *jal karmis* and the *samitis*, requires two different kinds of training programmes, and these programmes must only be for people living in the villages within the project area. Thus, the Trust's efforts can be directed towards training only local workers, and to dispense entirely right from the very beginning with all the intermediate 'office staff' and all the social problems such outside employed staff bring with them. Of course it takes more time but, once created, the local organizations could be there for good, and therein lies the long-term solution to many of the basic problems. ●

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Water from handpumps cannot be contaminated from the surface.