

Maintaining handpumped wells in Tanzania

by M.B.E. Mtunzi and Nicholas Lombardi

Tanzania's new National Water Policy is attempting to put maintenance into the hands of the community, and one successful initiative has been the establishment of village water funds.

TANZANIA RECEIVES over US\$10 million a year in assistance from aid agencies and NGOs for rural water development programmes, nearly all of which supports appropriate technologies, most notably shallow well technology. The development of shallow wells in the country has a long but intermittent history. Many hand-dug, concrete-lined open wells were constructed throughout the country in the fifties and early sixties. The means of extraction was, in most cases, a rope and bucket. While operational costs were practically nil and maintenance required minimal effort, many of these wells fell into disuse because the water was not protected from above.

In 1971 the Tanzanian government established an ambitious long-term programme for rural water supply development. The target was to provide a piped water supply to the rural areas by 1991, providing all people with access to a public domestic waterpoint.

This 20-year water development objective was supported by the United Nations Habitat Conference held in Vancouver, Canada, in 1975, and endorsed again in 1977 by the Mar del Plata water conference held in Argentina. Although the original target was a noble one, the sheer magnitude of this task combined with limited finances, especially in the area of operation and maintenance, forced the government to abandon the programme. The emphasis was then shifted from piped water supplies to shallow wells with handpumps.

The development of shallow wells with handpumps started in Shinyanga Region in 1974, on a project funded by the Dutch Government and implemented by DHV Consulting Engineers. Following that success, the technology was later adopted by other rural water supply agencies, notably in the regions of Mtwara-Lindi, Ruvuma and Kigoma, the Lake Regions of Mwanza and Mara, and finally in Singida, where the Tanganyika Christian Refugee

Service has guided the project since 1985. The range of technologies includes hand-excavated wells, hand-augered wells, and machine-drilled medium-depth boreholes.

Manufacture of handpumps

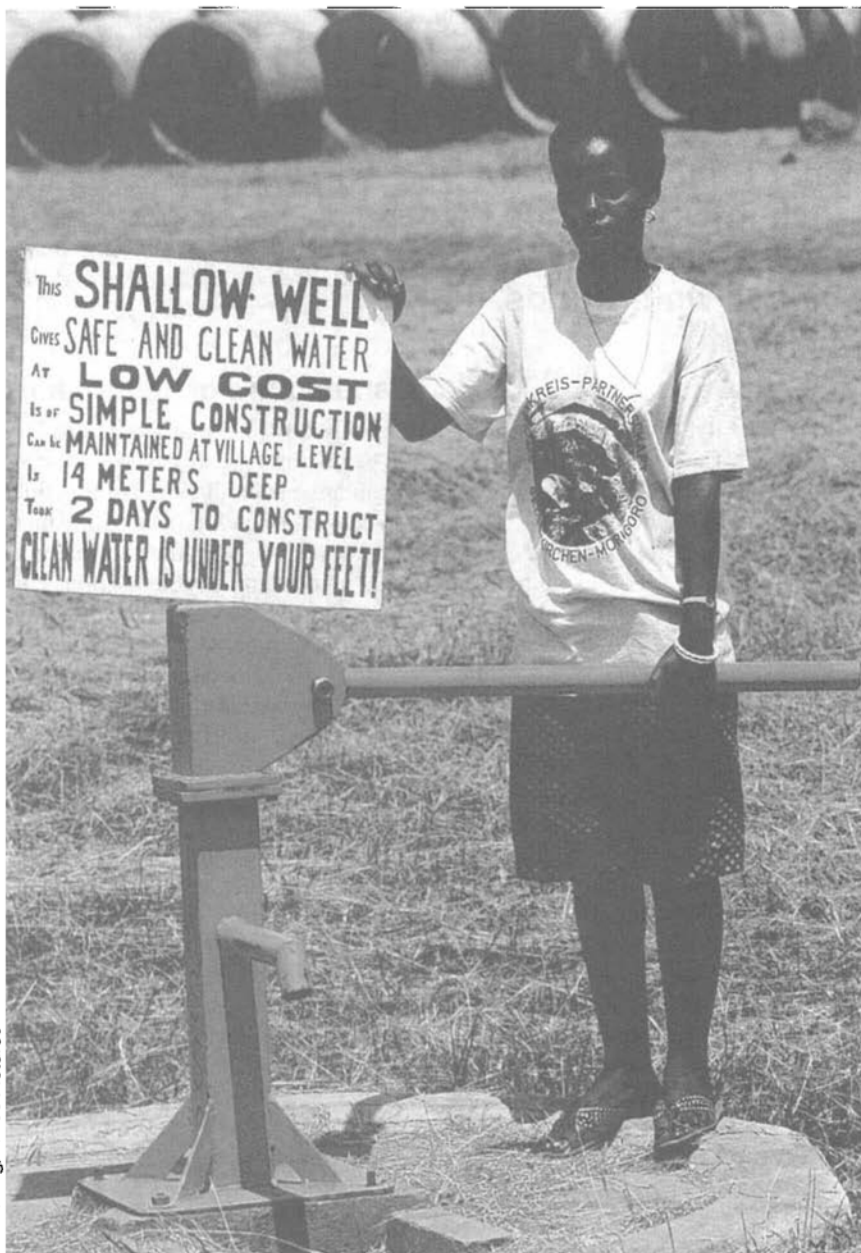
It is only now that many policymakers are beginning to realize how importing handpumps from the industrial nations can hinder a handpump project, making sustainable operation and maintenance almost impossible without continued donor assistance. In 1985 the Dutch government, after it had successfully assembled *en masse* SWN 80 and 81 handpumps (manufactured by Van Reekum in Holland), agreed to convert the Morogoro Rural Water Supply Project workshop into a handpump factory. A joint venture company was formed between a Dutch firm and a Tanzanian firm. The factory at Morogoro now manufactures the Tara direct action and Afridev deep-lift handpumps along with the SWN pumps, as well as fabricating equipment and tools for surveying and hand-drilling.

Later in 1990 another factory was established in Dar es Salaam, this one a joint-venture between a Finnish firm



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and a local partner, to manufacture the direct action Nira AF-85, a pump that achieved great success in the Finnida water project in Mtwara-Lindi.

Though there are now two factories making handpumps in the country, there is still no clear government policy on standardization. With so many donors in the field and almost as many types of pumps, there are serious operational problems and the availability of spare parts is very uncertain. The most common pumps are the India Mark II and Grundfos GHP 250/180, though there are many others from a variety of manufacturers, who are usually based in the countries of the donors concerned.

Operation and maintenance

The operation and maintenance of handpumped wells is now a major

concern of many donors as well as the government. The recently inaugurated National Water Policy spells out some strategies, the very basic ones being that every village should form a village water committee to deal with water supply issues and establish a water fund at the bank, with the District Water Engineer as one of the signatories. The aim is obvious — to give the community the task of operating and maintaining their own water supply. But the policy leaves open the *modus operandi* of both the water fund and the committee.

Selection of target villages The residents of the target villages must ask for the water project themselves. They must hold a meeting (preferably on their own initiative) during which they select a water committee and initiate a water fund drive, and then send the minutes of this meeting to the District Water Engineer (DWE). As the Na-

tional Water Policy is fast becoming very well known, this is happening more often, and in at least 11 cases in the last year villages have opened up water funds at the bank without any prompting or the promise of a water project, seeking aid only *after* the establishment of their fund. These villages are given priority for assistance, and they are becoming so numerous that the existence of the water fund is almost a prerequisite for project implementation. (Ten new villages were chosen this year for assistance, all on the basis that they had already opened water funds.) The initial willingness of the community to take charge of their water supply usually leads to successful post-construction operation and maintenance.

Health education A health education programme must be implemented either before or to run concurrently with the water project. Understanding the relationship between cleanliness and health can increase appreciation of the new improved supply, and encourage proper management of the system. In Singida, an average of 25 to 30 village health workers are chosen from each village to attend a three-month course, and where villages have not yet recognized the need for clean, uncontaminated water, they can act as animators and mobilizers to help raise community awareness of the problem.

Self-help In Singida the emphasis is on shallow well projects, in which the villagers survey and construct the well themselves under the supervision of a district technician. The involvement of the community from the beginning is a necessary component in all rural water supply schemes, and should not be restricted to the post-construction phase only.

Financing operation and maintenance The financial aspects of running the water-supply system are the responsibility of the community. At the time of writing, 70 per cent of the project villages have a water fund, a total of 91 villages in Singida Region.

Training The technical skills required to keep the handpumps operating are taught during an intensive training course of pump attendants chosen by the village. These village pump attendants, nearly half of whom are women, are sometimes village health workers as well. The people who live closest to each particular well are designated 'well caretakers', and they clean the surroundings and ensure proper well use and care. A village-based training programme which aims to improve the

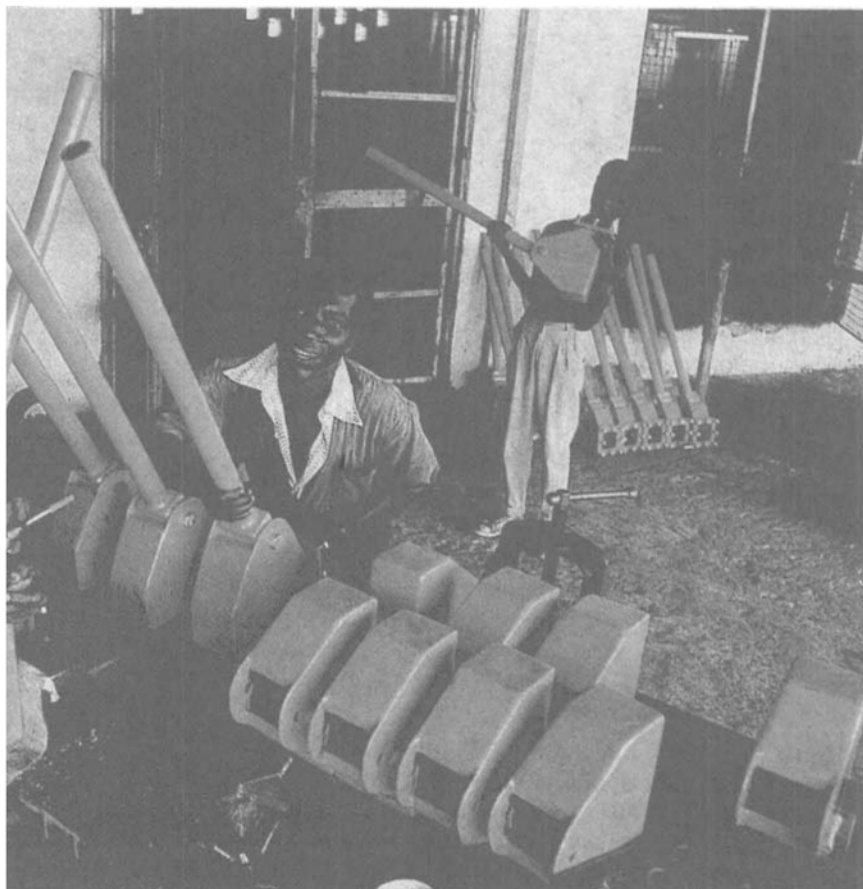
management skills of the water committees has also recently begun.

Choice of pump No matter what strategy is employed, any approach to operation and maintenance is doomed if the handpumps that are installed are not suitable. A water fund account, no matter how well-endowed, cannot help the village maintain its system if spares are not available locally. Villagers, no matter how well-trained, are not likely to service pumps that require many sophisticated tools and special lifting equipment. Village and district level institutions, no matter how well-managed, will not be able to cope with a large variety of pumps, each with specific tools and spares and incessant logistical headaches.

The Tanganyika Christian Refugee Service, a major NGO in the region, has standardized on two handpumps, both of which are manufactured or assembled in Tanzania by the factories already mentioned, and therefore present no problem in the procurement of spares. For shallow applications down to 15m the direct-action Nira AF-85 pump is installed, while the Afridev is used on medium-depth boreholes with lifts of 15 to 50m. These pumps, each of which are serviced with only two tools, are easy enough for women and schoolchildren to repair, and the plastic and stainless steel components can withstand the corrosive groundwater of East Africa. The tools are bought by the village at an affordable price, while the price of either of the pumps is roughly \$700.

Monitoring and evaluation To strengthen the operation and maintenance aspects of rural water supply, a participatory monitoring and evaluation programme has recently begun in eight pilot wards (thirty-one villages) where pump attendants, village health workers, and village water committees report monthly on the status of water and health in their respective villages. Officers at ward-level in the health, water, and community development departments are responsible for going to these districts to collect the reports, copies of which are submitted to the districts. This system is loosely based on a strategy developed by DHV Consultants in Morogoro and Shinyanga.

Because this scheme is still in its early stages, it is difficult to assess its impact yet, but at least it is an attempt at a systematic approach to monitoring and evaluation. Because of the size of the intervention area, sending out regional or even district teams to the villages concerned would be too



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costly, both in terms of expense and logistics. Random sampling is often anything but random, and visiting different villages during different times of the year blurs any interpretation of the data collected. Participatory monitoring and evaluation can eliminate many of these problems.

Rehabilitation

In 1990 a rehabilitation programme began in villages where wells were constructed prior to the National Water Policy. These rehabilitated wells, along with the newly constructed ones, would make the results of an overall regional assessment appear too favourable in terms of operation and maintenance because they have only been built or rehabilitated in the last three years. All of the pumps originally installed were the lever-action SWN 80, except for two which were direct-action Kangaroo pumps. A small sample was taken recently of 10 villages with wells that are seven years old or more and which have yet to be rehabilitated. It found that:

- 13 of 37 pumps were functioning (35 per cent).
- 42 per cent of malfunctions were a result of rod-riser disconnection; 31 per cent a result of completely worn bush bearings; and 22 per cent of pumps had been removed for undisclosed reasons.

- All wells visited had broken covers, poor drainage, and no fences.
- Water samples from all wells showed both a faecal coliform and total coliform count of 'too numerous to count'.

Careful attention should be paid to the last two results, because it shows that even wells with functioning handpumps are contaminated. The end result is the same as for a broken pump, and if the expense of a handpump does not lead to improved water quality then time and money have been wasted. This shows that operation and maintenance should not be measured by pump statistics alone, but on the conditions of sanitary seals, drainage, and well surroundings. The periodic plastering and repair of the headwork is just as important as pump maintenance, and should be included in the village training.

The above results reflect the conditions that existed before the formal adoption of the National Water Policy 1990, and are the baseline from which we are now working. We trust that with increased training, health education, and participatory monitoring and evaluation, the wells constructed after 1990 will not fall into the same state of neglect and disrepair. ●

M.B.E. Mtunzi is a Regional Water Engineer in Singida, and Nicholas Lombardi is a TCRS Project Water Engineer, TCRS, Box 365, Singida, Tanzania.