Building on peace — upgrading water and sanitation technology in Mozambique

by Zvidzai C.N. Zana

Thirty years of fighting left Mozambique with a displaced population and a crumbling infrastructure. The Government and NGOs aim to increase rural water-supply coverage by 40 per cent. Can they build on existing systems?

WITH THE 1993 POLITICAL settlement, Mozambique became more stable, and the people who had been confined to safer areas, such as the Beira Corridor, began to return to their homes. Those who settled in Manica Province, in the north-east, near the border with Zimbabwe, appear to have settled where water is available, and the soil is fertile.

The GTZ-MARRP programme, an initiative set up by the German agency GTZ and the Mozambique Agricultural Rural Reconstruction Programme, aims to help the villagers of Manica improve their living standards. Area studies were carried out by the Government, with technical support from GTZ, between 1987-8. Information was collected on agricultural systems, and farmers' problems and needs. The MARRP infrastructure project, which concentrates on the construction of rural roads and buildings, on village appropriate technologies and on household water-supply, has been in operation since June 1989.

The objective of the Village Appropriate Technology (VAT) project is to develop and promote improved household techniques through training village artisans and general users. By using traditional technology as its base, VAT workers have been able to introduce many ideas which, although new, are strongly rooted in traditional culture and, therefore, have great strength.

National water and sanitation policy

The Mozambique Government's water policy states that the capacity of the Provincial Water Departments should be strengthened to serve the rural population and returning refugees, necessitating a water-supply coverage increase to 40 per cent by 2000. The level of service envisaged is a shallow well or borehole equipped with an operational Afridev handpump — serving 500 people — within a radius of no more than 500m. The water policy states clearly that 'beneficiaries' should participate at all stages of the process; from selecting the appropriate level of service, through to planning, construction, operation and maintenance.

Although current national policy does not explicitly include low-cost options for the supply of domestic water, the VAT Project specifically promotes low-cost technologies to small groups of farmers, especially those living in dispersed settlements.

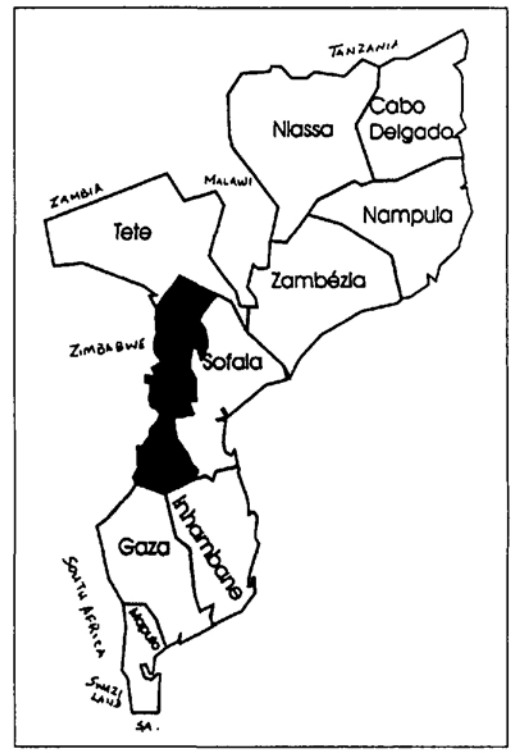


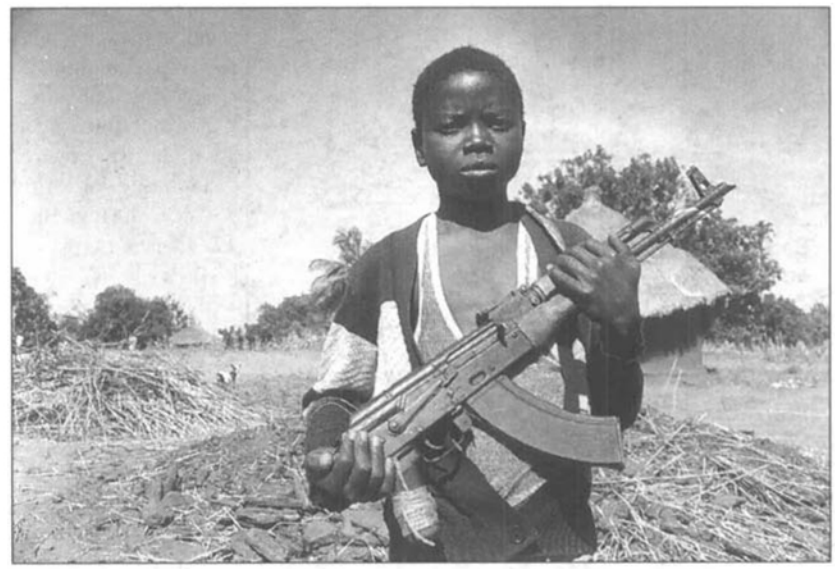
Figure 1. Manica in relation to the rest of Mozambique's provinces.

The VAT strategy

VAT promotes privately owned neighbourhood or household family wells which are provided on a subsidy basis. The material subsidy is kept as low as possible in order to keep costs down, but is high enough to put the technology within reach of a significant section of the community. This promotion of protected family water sources is combined with the encouragement of sanitary measures such as simple fam-

War in Mozambique

1964 —1975: Liberation struggle between Mozambicans and Portuguese: Independence declared in 1975.
1975 – 1992: Civil war between Flerimo and Renamo parties.
In consequence, many families were displaced internally or across national borders. By the end of 1992, 75 per cent of the population of Manica Province lived in the Beira Corridor. As a result, rural water-supply activities became concentrated here; now there are enormous disparities between districts.



Carlos Mhula/Panos Pictures

This traditional Nondwana spring in Dacata was originally protected 16 years ago.

ily latrines and washing slabs. The material subsidy is provided on the understanding that a significant — but realistic — contribution of materials and labour is made by the owners. They are, of course, solely responsible for the maintenance of household facilities.

Traditional techniques

Traditionally, the people of Manica have relied on water from streams, lagoons, natural springs, scoop-holes, and hand-dug wells; contamination can be considerable, and a threat to health. Interestingly, with no government or donor intervention, traditional methods of improving water sources have already been developed and adopted.

Springs

The people of Manica normally protect local springs simply by lining the water-collection point with stones or logs. Water sources are covered with timber to prevent damage by stray animals. Natural springs and traditional wells are regarded as sacred, and they are usually maintained by the elderly women of the community.

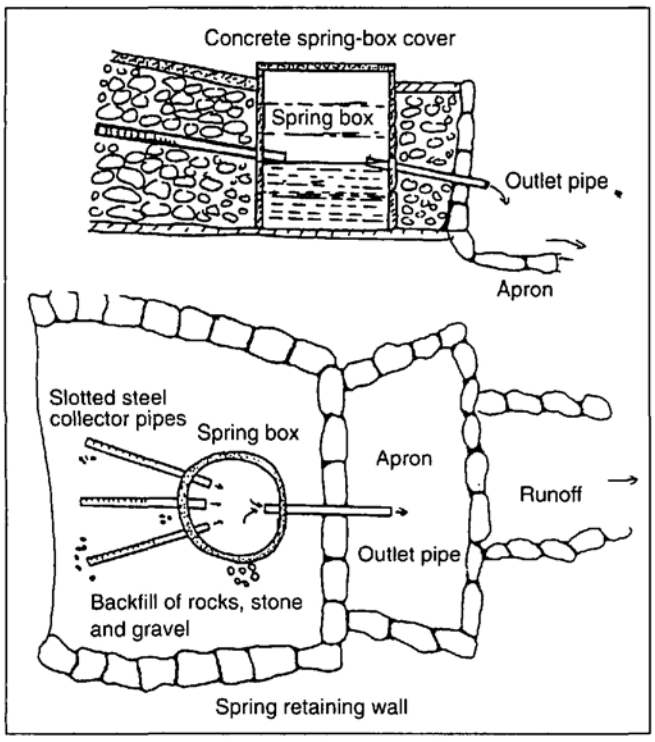


Figure 2. Cross-section and plan for larger protected spring.

Scoop-holes

Scoop-holes are common throughout the province; people refer to them as *chitsime* or *muchera,* and dig them out of marshland where the water lies near the surface. As water-levels fall, the holes near the edge of the marsh are progressively abandoned, and new holes are dug further out into the areas which are covered in standing or flowing water during the wet season.

Wells

In densely populated areas and small towns like Vanuzi, Messica, Sussundenga and Guro, traditional hand-dug, unprotected shallow wells are a common sight. Unlined, these wells are covered by poles, with an opening left in the middle, over which a bottomless drum is placed. Soil is built up and compacted around the central drum, which is covered with a tin lid or board. Small containers of water are pulled up with a rope or long stick. In the very remote areas of Tambara, Macossa, Mossurize and Machaze, villagers make very little attempt to construct improved water sources close to homesteads. The lack of recognition of the benefits of improved water is a major constraint, and a major challenge to the project.

Cisterns

In Machaze District, most families rely on traditional cisterns. These are hand-dug steep-sided holes dug in the ground, lined with a thin sand-cement mixture. They vary in size between 5 and 18m^3. The surrounding catchment area collects rainwater. In most cases, log covers are fixed over the cistern.

Latrines

In peri-urban and densely populated areas, constructing open-pit latrines is a common practice. This is mainly for privacy as well as the result of mobilization campaigns organized during the introduction of the — often overcrowded — communal villages (*aldeias comunais*) in the late 1970s. The basic pit latrine consists of an unlined pit covered with logs, surrounded by a simple grass-and-timber structure for privacy; most have no roof. These latrines contribute significantly to the increased breeding of flies. In remote areas, latrines are rare as, in general, people defecate in the bush.

The VAT approach to upgrading

Upgraded wells

Upgrading traditional wells calls for several steps to improve both the safety and the quality of the water:

- awareness campaigns, run by Ministry of Health (MOH) personnel, to educate people about the importance of safe water;
- training local builders in well construction: done 'on the job' by qualified trainers;
- deepening wells so that the water is always at least 2m deep; this is done by the owner, or a hired well-digger;
- lining the well chamber with properly fired bricks — which require little mortar — making sure that the section of wall under water is lined

with very strong bricks and stones; the bricks or stones are procured by the well-owner;
- constructing a raised neck, fitted with a cover;
- the construction of headworks of pillars with a windlass, apron and water runoff. The project subsidizes the cost of the cement (three bags); one lid, one bucket, and a chain and a windlass. The lid, bucket and chain are made by locally trained tinsmiths;
- supplying hygienic buckets, tin covers, and chain.

MOH agents monitor people's use and maintenance of the wells, periodically. As each well is owned by an individual family, rather than by the community, people have a strong sense of responsibility.

Simple improved springs

The improvement of traditional springs is always done in collaboration with local leaders; their approval is essential. The improved spring is a slight upgrading of what the local people already practise. Over-zealous improvement of simple springs and use of concrete or masonry work is avoided because it can lead to a situation where the original water sources may be blocked or diverted. Here are the five stages of construction:

1. cut a shallow basin into the soil within the seepage area;
2. line the basin and surroundings with stones to stabilize the water-collection site and improve hygiene;
3. open out a water channel from the water-collection site, 5 to 10m further downhill. The channel should be lined with stones to ensure stabilization;
4. cut out a second channel basin at the end of the channel, and line with stones. This forms a running pool for water collection; and
5. dig a further channel below the second pool to serve as a drain for overflow water.

Protecting larger springs

The basic concept of this design is that after a suitable site has been chosen by local leaders — normally a generously flowing spring on a hillside or riverbank — the area is modified so that water from the spring is diverted through a series of collector pipes which flow into the spring box. Water passes from the spring box to an outlet pipe (see Figure 2 on page 22).

The aim of this design is to protect the original site of the spring from human contact by covering the entire collection area with stones and light concrete. The spring box itself is constructed out of rocks and cement mortar. The technology is simple and robust, and has no moving parts; it runs by itself and requires very little maintenance — the ideal appropriate technology for a rural water supply.

Improved traditional latrines

To improve a simple open latrine:
- make sure the shape of the pit has a minimum depth of 3m and minimum diameter of 1m;
- place a ring beam round the pit and raise the level of the latrine base to avoid flooding;
- use a simple cement slab;
- place a simple cover plate over the squat hole;
- construct an easy-to-clean latrine floor;
- erect a stable superstructure out of timber and mud or bricks;
- fit a roof of timber and grass; and
- train communities in proper use and maintenance.

The story so far

Since the project was launched, more than 180 village builders have been trained, and are now participating in the construction of improved household techniques in four districts. A total of over 850 family wells and 6000 simple family latrines have been supported by this project in the last seven years. An average of six people use a family latrine, 25 use a family/neighbourhood well, and 100 people use a protected spring. The total cost per family-well unit is roughly US$150 to 170. This represents an average cost per user of between $5 and 6.

The success of the VAT Project lies in its strategy of basing improvements on existing traditional techniques and local materials, experience, and labour. There is no doubt that the people of Manica think highly of the technology innovations, which contribute greatly to improving hygiene within the homes.

Whilst the concept of so-called family wells has not yet been officially recognized by the Mozambican Government, it has considerable merits, and is particularly suitable in areas where village communities are scattered across a wide area. And, if an area is covered by family wells, the pressure on handpumps is reduced, leading to reduced maintenance costs per pump.

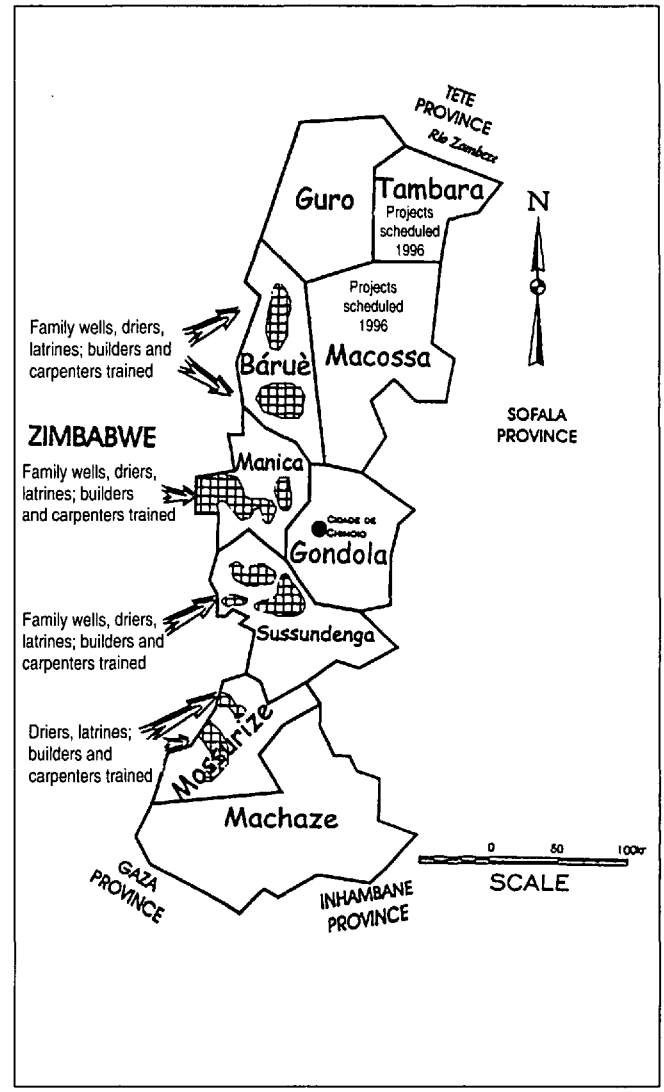


Figure 3. VAT's achievements in Manica (1989-1995).

Zvidzai Zana is a mechanical engineer specializing in Village Appropriate Technology. He is currently working with a GTZ programme in the Manica Province of Mozambique. Contact him at MARRP, Provincia de Manica, Chimoio, Mozambique. Fax: +258 51 23430.

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