

Pump Aid and the Elephant Pump in Zimbabwe

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Introduction

Pump Aid works to relieve poverty by providing communities with reliable access to clean, safe water for drinking and irrigation in rural Zimbabwe and neighbouring countries. The focus of the work has been to provide appropriate, sustainable technology water systems using the Elephant Pump to schools and communities. The first pumps were built in the early 90's and Pump Aid was officially founded in 1998.

Shallow aquifers are an important source of drinking water in several parts of Southern Africa throughout the year and especially during the dry season. While the water can still be obtained naturally through springs in a few areas, most people are faced with the challenge of digging wells or boreholes through varying depths of earth and rock. Smallholders in Zimbabwe often use open wells to collect water for domestic needs, but open wells can be contaminated easily and are potentially hazardous to use. The installation of the Elephant Pump, which is fully enclosed and sealed, on such open wells gives families access to water of a much higher quality.

The Elephant Pump

The Elephant Pump is based on an ancient Chinese design that was in use over 2000 years ago. This design has been greatly modified and improved by Pump Aid in Zimbabwe since 1996 resulting in the Elephant Pump. This pump is a member of the rope pump family with similarities to rope pumps used in Nicaragua for example. It has been designed to be strong, easily repaired and sustainable in an Africa context with full enclosure of the water source. At a school, one pump commonly provides for over 600 people. A diagram and video clips showing this pump can be found at www.pumpaid.org. The key features of the Elephant Pump are:

- Fully protected water source, providing clean drinking water
- Rate of extraction of approximately 1 litre per second at 20m head
- Low cost of construction (about one tenth inc cost for Afridev)
- Ease and extremely low cost of maintenance
- Ease of operation for children and the elderly
- Suitable for extraction from depths of up to 30 metres.

Several technologies for extraction of water from wells and boreholes are in use over the world. Many of these mechanisms are often abandoned because the pumps cannot easily be repaired or the broken parts cannot be found locally or are not affordable to poor communities. In comparison, the Elephant Pump is made with cheap, locally available materials. There is very little routine maintenance that needs to be carried out on an Elephant Pump. Maintenance training for pump breakdown is given at the time of construction and community-based maintenance advice is given as part of a workshop programme. In various inspections with sample sizes up to 600 over 95% of pumps were found to be working.

Pump Aid's participatory approach

Pump Aid's field personnel are members of the local community in Zimbabwe. Their knowledge of cultural considerations and the needs of the community have facilitated a fully participatory approach in the development of Pump Aid's programme. Community meetings, recruitment of local staff, advice from traditional leaders and involvement of the Rural District Councils have also been essential components of Pump Aid's programme. As a young organisation, Pump Aid believes in consultation with other NGOs and GOs at every stage of its development, in order to gain advice

and assistance and to share experiences with other organisations working in related fields. More recently, Pump Aid has begun developing partnership links with other NGOs such as Plan International.

Mrs Sara Muzopa had an Elephant Pump installed in 1999. In 2003 it was connected to drip feed irrigation system provided by a partnership of LEAD International and Plan. This enabled her to increase the size of her garden from 20 square metres to 100 square metres in 1999, and now 200 square metres with the drip feed system.

AREX and Plan have advised her on agricultural techniques that combine horticulture with permaculture. The former provides required nutrients and the latter provides an affordable source of herbal medicines. Mrs Muzopa supplies her community with the herbal medicines.

The high extraction rate of the Elephant Pump, combined with water storage and the water efficiency of the drip-feed system has meant that Mrs Muzopa has reduced the time she spends watering her garden from 12 hours a week to half an hour per week. With the time she has saved she has been able to start a catering business and to do some sewing, some of which is for her family of 5 children, and some of which is sold.

The approach that Pump Aid takes when introducing its operations into a community is as follows: a demonstration pump will be built in a school following an application and site survey, then local villagers are encouraged to make a formal application for a pump if they have been convinced of its usefulness and have a strong need for a pump. The Operations Manager will then do a series of site surveys to determine which site would benefit most from a pump.

Beneficiary villagers/schools/clinics that are selected for assistance are required to provide bricks, pit sand, river sand and food for the pump builders. The contribution of materials and the beneficiaries' participation in the building process generates a sense of ownership from the outset. The beneficiaries are taught how to maintain and repair the pump during construction. After around 25 pumps have been built in a particular area, Pump Aid runs a 'maintenance workshop' to explain again how the pump works and is maintained. At these workshops AREX (the government-run agricultural extension service) and Environmental Health Technicians both give presentations on health, sanitation and the productive uses of land. Several beneficiaries can share ideas on how to maintain the pump between themselves, rather than needing to go back to the Pump Aid staff each time there is a problem.

Mr Makunike runs a successful, small-scale dairy project where cattle drink from a pond fed directly by an Elephant Pump. In addition, he grows vegetables under fruit trees (irrigated from the Elephant Pump) and feeds rabbits and chickens from low-grade vegetables. His chickens, which are tended for eggs and meat, need good quality water to ensure they are not wiped out by disease. Droppings from chickens can be used to fertilize the fruit trees and vegetables.

Multiple/Productive Use

Until now, a majority of the water projects in Zimbabwe have focused on providing clean water for drinking and domestic needs in the rural areas whilst others have

focused on water for irrigation. This is a false dichotomy typically; water collected from Elephant Pumps is used for domestic purposes (drinking, cooking, washing), irrigation (including livestock), building and micro-enterprise. Pump Aid perceives a pressing need for development of appropriate irrigation technologies and practices in order to offer greater food security to Africa's poorest rural families

- Mrs Mukwereza - germinates fruit and gum trees and then sells and gives away saplings locally. She has a thriving orchard of citrus fruits and a good yields of crops from her vegetable garden. Water for all these projects comes from an Elephant Pump.
- The Adventist Church in Manicaland had been conducting a tile making project, and before the Elephant Pump, they were paying for water. This used all of their profits. Having access to free water from an Elephant Pump has enabled them to develop a commercially viable tiling business.

When installed on a homestead well, the Elephant Pump and training provided by Pump Aid and partner agencies promote hygienic practices. Larger amounts of water can be collected for domestic needs and secondly sealing the water source ensures better water quality.

The high extraction rate of the Elephant Pump (1 litre per second for a head of 20 metres) makes it suitable for micro-scale irrigation. It is possible to achieve increases in irrigation capacity five-fold in most cases compared to irrigation using a bucket from a well. This gives

School Gardens - In the curriculum, children are required to study horticulture and animal husbandry. The Elephant Pump provides much-needed water for school gardens and small poultry and livestock projects. These projects generate income to ensure they are self-sustaining and a surplus can be taken home to help bolster the children's nutrient intake. Vegetable gardens have been set up at over 20 schools using water supplied by an Elephant Pump. These vegetable gardens are commonly used to raise funds for the school since labour (the children) is freely available.

small-scale farmers the opportunity to increase the size of their vegetable gardens and enable them to sell excess produce.

Micro-irrigation is especially important during the dry season and vital in years with poor rainfall, when the ability to irrigate becomes imperative for food security and economic survival. The Elephant

Pump can be used in conjunction with buffer tanks and hoses or drip-feed systems for irrigation. These increase the area which owners are able to irrigate and provide a valuable and reliable means for extracting water during the dry season.

Bringing a water source closer to people, means that they can divert time previously spent collecting water to other useful tasks such as marketing their produce. Children in schools can now spend more time in class rather than collecting water. If people have access to clean, safe water they are sick less often meaning that they have more time and energy to devote to the productive use of water.

AREX advise the beneficiaries on proper agricultural practices and how they can make best use of the Elephant Pump technology to irrigate land. They also provide advice on crop choices or introduce new crop ideas eg. paprika or starting tree nursery projects.

Mr Peter Rusare, Since he received an Elephant Pump in June 2002 he has used it for irrigation and domestic uses. He now has 1.5 acres under intensive cultivation all year round, and he practises crop rotation on the advice of AREX. His crops include tomato, orange, maize, bans, sugar loaf. He has trebled the size of his garden and can now produce a surplus which he sells at the local markets.