

# THE WATER WORKS 'ABAKUS' PUMP

## A Sustainable Water Pump for Rural Communities

### Introduction

The 2010 United Nations Millennium Development Goals report states that, "the World will meet or even exceed the MDG drinking water target" of "halving, by 2015, the proportion of the population without sustainable access to safe drinking water" (UN 2010:58). However, many water pumps are falling into disrepair shortly after their installation, which makes this claim questionable. The Rural Water Supply Network (2007) suggests that, on average, 35% of hand pumps are non-functioning in sub-Saharan Africa. In June 2009, the British charity Water Works conducted a rural water point sustainability survey in 35 villages across Malawi. In the villages that had an improved water point, almost all had the Afridev hand pump, a typical 'Village Level Operation and Maintenance' (VLOM) pump. The government or an NGO had installed the pumps, but the communities were given the responsibility of managing and maintaining the resource. However, in many rural communities, the pumps had fallen into disrepair because the villagers did not have the specialized knowledge and / or could not locate or afford the spare parts for the pumps' maintenance. To address that lack of sustainability, Water Works designed the 'Abakus' pump.



Photographs of broken VLOM water pumps.  
Taken by Water Works during a rural water point sustainability survey in Malawi, 2009.

### The 'Abakus' Pump

The Abakus pump is based on the traditional rope pump, which can be made from locally available and affordable materials. The principle behind the pump is water lifting. The action of turning the handle pulls a loop of rope around a wheel, through a guide at the bottom of the well and up a plastic pipe (rising main) that is submerged under water. The rope has equally spaced circular disks (washers) along its length. These disks trap water in the rising main and lift it into the outlet spout. The simplicity of the pump means that with a short training course, communities are capable of installing and maintaining it by themselves. All the components of the pump can either be found or made locally, or bought at low cost from local markets. It is made from a bicycle wheel, a plastic pipe, a rope, a bicycle tire and some wood. It is as efficient and provides as clean water as the modern VLOM pumps but it can be easily funded, made and maintained by rural communities, unlike the VLOM pumps.

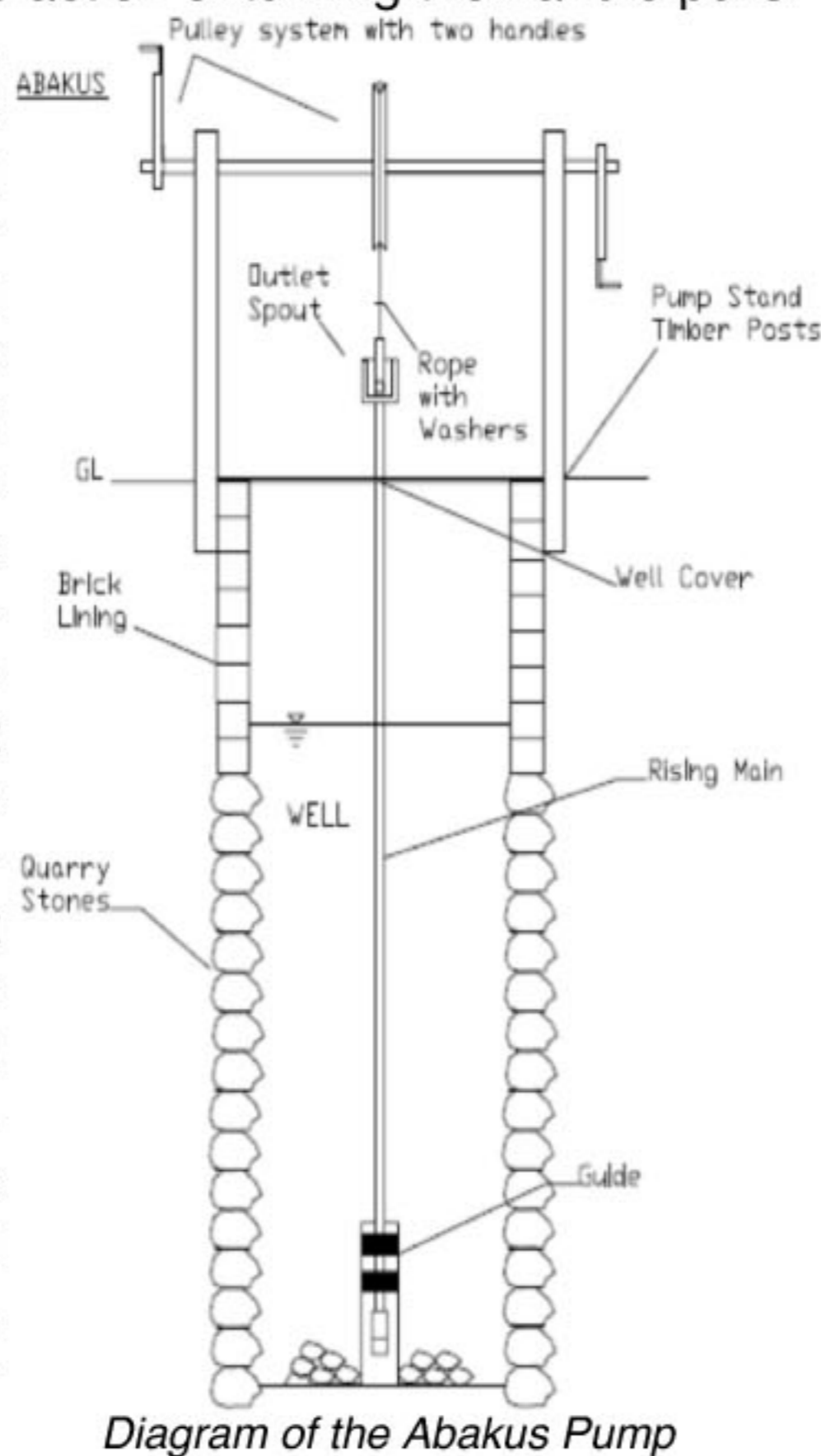


Diagram of the Abakus Pump



### The Pilot of the Abakus Pump

In August 2010, Water Works piloted the Abakus pump in a rural community called Likuni on the outskirts of Malawi's capital, Lilongwe. The community consists of eight villages that collected their water from unprotected shallow wells using a rope and a bucket. The water was of a very poor quality and likely to cause disease. Many people suffered from diarrhea and in the previous rainy season eight people died from cholera. The community was very aware of the health problems associated with the poor quality of their water and requested help to improve the water resource. It is very important that there is a demand for improved facilities, otherwise the communities may not maintain them.

The first stage of the project was to meet with the communities to plan the works. The community must be actively involved in the decision-making as this increases ownership of the project, which is the key to ensuring continued maintenance. As women are usually responsible for household water collection and hygiene, a particular focus must be placed on including their experience and expertise. Despite the fact that the community was very poor and would be unlikely to afford to maintain VLOM pumps, a choice of technology was given. The choice was between a Malda pump, a typical VLOM pump, and the Abakus pump. The community unanimously voted in favor of the Abakus pump due to the ease of maintenance. It was agreed that eight pumps would be enough to serve the population of 1200 people. The community elected a water committee that would be trained to install, manage and maintain the pump. The committee consisted of 16 people, eight men and eight women. Water Works and the committee then constructed a pilot project together.

Water Works trained the water committee how to install and maintain the pump but did not do any of the work themselves. The committee members were extremely capable of building the pump and enthusiastically completed the project without difficulty. Following the pilot project, the water committee built another pump without assistance from Water Works. The community-led pump ended up being far superior with the water committee making upgrades to Water Works' design. It had a more hygienic outlet spout and sturdier handles. It was easier to operate, had greater flow rate, was more robust and aesthetically pleasing. The first three pictures below show the Water Works pilot pump. The following four show the improved community led pump.



Photographs of The Abakus Pump Pilot Project



Photographs of the Community Led Project

The success of the community led project demonstrated that the water committee was capable of completing the remaining six projects without outside assistance. Four months after Water Works' departure, the community had built an additional four pumps and had started building the remaining two. Water Works are now planning to return to Likuni in June 2011 to perform an evaluation of the pumps sustainability.

#### References:

United Nations, 2010 The Millennium Development Goals Report 2010, New York, UN DESA  
Rural Water Supply Network (RWSN), 2007, Handpump Data, Selected Countries in sub-Saharan Africa

[www.waterworkscharity.org](http://www.waterworkscharity.org)

35th WEDC International Conference, Loughborough University UK, 2011

THE FUTURE OF WATER, SANITATION AND HYGIENE IN LOW-INCOME COUNTRIES

Poster prepared by: Simon Cohen - Water Works

Email: [simon@waterworkscharity.org](mailto:simon@waterworkscharity.org), Tel: +447582 141 492

