

Sand Dams

Sand dams are a cost effective, innovative solution to water shortages in semi-arid areas, which also transform environments beyond recognition. Despite being built successfully in Africa, Asia and South America for the last 50 years, they are still an under-utilised solution for providing clean water and improving the environment.

Prof. Mugambi, University of Nairobi – *'Sand dam technology is amazing in the sense that it adds value to nature. Adds value to nature in the sense that water which would otherwise have run to the Indian Ocean and got wasted, is harvested, and having been harvested, it's going to be used to raise the water table, and also to be used by the communities here - it's amazing.'*

But what exactly are sand dams?

Built as reinforced concrete walls across seasonally dry river-beds, they initially fill up with water – but after 1-3 seasons, fill with sand. Carried in the soil, the sand collects behind the dam whilst the silt is taken further downstream.

Water stored below the sand prevents parasites and evaporation, as well as providing a filter for the water stored beneath. With about 40% of the volume behind a dam being water, sand dams can hold an incredible 2-10million litres of water. So even during droughts, water is available in fact Excellent's oldest dams have never dried in 20 years. They therefore provide a year round water supply for up to 1,200 people and their animals – saving women and children 2 hours a day and up to 8 hours during droughts walking to fetch water.

Rhoda, farmer - *'30 years back we used to live a very, very bad life, because we used to go a long, long, long way to collect water. We used only to have one meal per day because we used to go very early in the morning to fetch water, and make lunch only, and go for water in the evening.'*

Sand dams, however, have a much more far reaching impact. Communities in semi-arid Africa have to walk 1-5km to collect water – up to 10km during dry periods – extending to 20km during droughts. Because of this, dams provide a permanent, local clean water supply for one community, as well as improving water availability in a 20km radius – that affects up to 100,000 people.

It's easily accessible too. Water is collected either from a pipe on the lower side of the dam, or more traditionally by digging holes in the sand to access the water.

Harold Miller, Excellent Supporter – *'Sand dam is really a part of the renewing of the local water resource. It is not only saving water, it is actually recharging the surrounding area. So in theory, and this has not been demonstrated through research, a*

series of dams in a river over time, once they're mature, will have so much water in the whole region that basically you have solved your water problem.'

Experience tells us that successful sand dams depend on two key factors; correct design and implementation, and community ownership to ensure sustainability. Africa is scattered with washed away dams, but Excellent Development's co-founder, Joshua Mukusya, has refined his designs to such an extent that he's built over 450 successful dams.

Simon, Excellent Development co-founder –

'The communities come to us to ask for support and generally speaking the best solution for them is a sand dam, so after the process, the sand dam is owned by the community themselves. Sand dams are the one part of our work that cost the most money – it's the biggest input of money – cement is very expensive, the steel is very expensive, we also provide skilled labour for them. But if you actually add up the real cost of the dam, people are spending – communities of 50 people are spending 40 or 60 days of work building that dam. So the cost actually is 50/50. They've contributed half of the cost.'

The benefits of sand dams are staggering. We know children go to school more often – not just because they don't collect water themselves, but because they don't have to stay at home looking after children whilst their mother takes 8 hours to collect just 20 litres of water. The time saved allows them to spend more time on their farms growing food – vital for life and income to pay school fees.

Instances of diarrhoea due to dirty drinking water reduce – a major cause of child deaths in Africa.

Joshua, Excellent Development co-founder –

'In Meka self-help group which is in Mbitini location, it was one area where we had seen people die. The major issue, everybody died, everybody's speculation was they had AIDS, but it was because they took dirty water from the river, which was flooded with all sorts of diseases. After making those dams, we hardly hear of any people dying, because they are getting clean water, they are getting also success from other sources of water like the water tank we have made there – you have seen it. So they are getting clean water and the death rate has reduced, tremendously.'

However, the benefits extend beyond water supply. By creating a new micro-climate sand dams enable trees to grow naturally and communities to start vegetable and tree nurseries – creating sustainability in firewood provision and food supply. As one environmental scientist said to us recently, "sand dams are nothing short of a miracle". A miracle Excellent Development hopes to replicate in many suitable semi-arid lands.

Now, in case you were wondering, here's how you build a sand dam:

- First you need to find a site where the rock is close to the surface across the dry river bed (this avoids having to dig down too far).
- Then you dig into the sides of the valley down to the rock to give the new dam a firm foundation.
- Sand and stones have already been collected by the community, so it's time for work to begin.
- Wooden shuttering is placed across the dam so that the reinforced concrete wall can be formed.
- Cement is mixed – 10 to 20 bags at a time – and then put into the wooden shuttering.
- Big stones and medium stones are then placed in the dam to reinforce it – not forgetting the steel bars that are drilled into the rick base.
- Between each layer barbed wire is wrapped across the dam to add even more strength – this dam is going to control a lot of water.
- The dam is then layered up to the required height – moving the shuttering as you go.
- The heights of the walls are carefully designed – spill ways are made to ensure this the river carries on flowing as it did before.
- Hey presto – you've got a sand dam!

All we need now is the rain to fill it with water – and then sand after 1-3 seasons.