



Greening the Desert

Water Solutions for West Africa

September 2012

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Introduction

Water is an essential ingredient to life. It is not only essential for human survival but also necessary for nearly every sector of human activity.

Often, it is easy for those of us living in the western world to take for granted the water that falls freely from our taps. Yet according to the World Water Council, 1.1 billion people live without clean drinking water¹ and 3,900 children die every day from water-borne diseases.² And despite doing the least to cause it, poor people are experiencing the full impact of climate change – including a depletion of water resources in drought-stricken areas.

Throughout West Africa, the impact of climate change has been strongly felt over the last 40 years, with increased desertification, cyclical droughts and flooding. As a result, the people of West Africa are suffering from repeated outbreaks of diseases, persistent malnutrition and currently one of the worst cases of food insecurity in the world.

Currently, the region is experiencing the worst drought for 15 years.³ Poor access to clean water and sanitation are major problems in countries such as Sierra Leone, Ghana, Niger and Guinea – all of which fall short of their millennium development goals in this area. As of August 15th 2012, more than 19,000 people have contracted cholera because water and sanitation provision is inadequate.⁴ Droughts can last for long periods of time and outbreaks of torrential rain can cause widespread flooding, destroying homes and crops.

Islamic Relief has always aimed to be effective in alleviating poverty. This can only be achieved if disasters such as droughts and floods are controlled and mitigated.

Islamic Relief believes that much poverty is linked to problems with water. With effective provision of water, communities can get cleaner water and through this they can attain a better diet, improved income generation, better health care, education and much more.

In the past, aid agencies have focused on what they thought was appropriate for the people of Africa to deal with climate change adaptation. This included water provision methods such as boreholes and planting trees to combat environmental degradation. In the main, however, many such measures have failed to make a positive impact in the long term. Some, like boreholes, have in places actually contributed towards over-grazing and increased land degradation.

It is now time for this approach to change: we need to listen more to people's past experience with water projects, and gain a better understanding of what will work best for them in the long term.

Islamic Relief has been on the ground in West Africa providing emergency relief to tens of thousands of people affected by climate change. We have also been at the forefront of listening to communities to determine ways to improve their livelihoods and lift them out of the devastating situation they are currently experiencing.

We listened to what communities had to say about water and food problems. We discovered that rain water harvesting and maintaining food security were the main problems faced by individuals and households across the West Africa region. Current and past methods to deal with these challenges have largely failed, resulting in harsher conditions for the people, increased tensions between communities and outbreaks of diseases and malnutrition.

There are a number of ways in which we can implement solutions to tackle water access and food security in the long term. This report puts forward effective long-term water provision and food security solutions that are already leading the way in some communities across Africa. The use of micro-dams, reservoirs and lakes can be more effective than the current borehole dominated approach. The use of the plant sisal can be effective for generating income and enhancing food security. If these emerging techniques can be implemented across the region, they have the potential to transform people's livelihoods and save lives on a large scale.

We aspire not only to provide, support and set up sustainable development projects for these communities, but also to empower them by ensuring that they have real ownership of the projects we initiate and their future direction. It is only if communities play a part in managing their own water and food supplies that there will be any real prospect of lasting change.

1 World Water Council, <http://www.worldwatercouncil.org/index.php?id=25>, accessed 23/8/12

2 World Health Organisation, http://www.who.int/water_sanitation_health/publications/facts2004/en/, accessed 23/8/12

3 See: <http://www.sacbee.com/2012/08/22/4748286/corporate-individual-donations.html>, accessed 22/8/12

4 See: <http://www.guardian.co.uk/global-development/2012/aug/20/west-africa-toilets-slums-cholera>, accessed 22/8/12

Inside West Africa's Water Poverty

In rural Africa, 'water poverty' can destroy lives and livelihoods. While those in richer countries can afford the luxury of turning on their taps to get clean water, for millions across West Africa this kind of convenience is far out of reach. Their water currently comes from rivers, wells or water projects run by aid agencies and others. While a broken pipe may leave us with the inconvenience of no water supply for a couple of hours, a failed well in West Africa can be a catastrophe leaving villages without water for months.

Women and children tend to be the ones hit hardest by water supply challenges. They are the ones who have to walk up to eight hours a day to fetch water. Sometimes it can take up to one full day to fetch and return home with the water. And yet this water is usually unsafe and unsuitable for drinking. They have no other choice. Water is needed for survival for them and their families and if there is no water, it can lead to conflict and chaos. In dry periods, if there is no water provision, families tend to move out to areas where they can find water. This means that children are taken out of schools and away from friends for long periods of time.



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Conflict and violence as a result of lack of water

In the village of Tienga Noura, in Mauritania, a wealthy farmer living nearby decided he would establish a small livestock farm for himself. He built a well in Tienga Noura for the sole purpose of providing water for his own animals. He hired two guards to protect the well from the villagers.

The village already had limited water access and when the news of the well spread, conflicts and violence erupted as villagers tried to use it. Imagine if there were just two more water points for these villagers to access water. No one would care about the wealthy man as there would be alternative sources of water.

In West Africa water is just as important for animals as it is for people. In most communities livestock play a vital part in food security and income generation – so much so that people will ration water for themselves to ensure their animals have enough. This is because of the food and the economic benefits that farm animals can bring.



“This woman travelled for hours with her donkey to a water point in Haouchi-eastern Tchad. On fetching the water, the first thing she did was give water to the animal. Then, she took a sip of water for herself from the same bowl”

Islamic Relief Field Officer

The provision of safe water has the potential both to greatly improve quality of life for communities and to contribute to other long-term improvements. The benefits include income generation and better health. With continuous access to water, children can go to school, health centres can be built and communities can thrive and be lifted out of poverty. However, this potential can be undermined if water services are provided in a way that aggravates tensions or conflicts in the beneficiary communities. Conflicts such as disputes over which land to use for water facilities, disagreements over maintenance arrangements and competition between different communities are just some of the consequences when provision of water facilities is mishandled.

5 Saferworld Reports (2008), <http://www.isn.ethz.ch/isn/Digital-Library/Publications/Detail/?ots591=0C54E3B3-1E9C-BE1E-2C24-A6A8C7060233&lng=en&id=90989>, accessed 30/8/12

Boreholes

Currently, groundwater provides most of the domestic water supply in rural Africa and supports poverty reduction through irrigation. Until recently, the primary focus of aid agencies was constructing boreholes to provide a water supply for communities across Africa.

The idea of a borehole is to provide easy access to clean and safe water for an entire village or a number of villages.

A borehole is a deep narrow well, usually connected to a motorised or hand pump that taps into underground stores of water held in permeable rock known as aquifers. Boreholes require constant maintenance and the demands and costs of providing such maintenance are often overlooked.

Boreholes are widespread throughout Africa, and are often the main or even the only sources of water available during the dry season.⁶ This method has proved effective in the short term but in the long term it is failing. According to the International Institute for Environment and Development (2009), approximately 50,000 water supply points have effectively died across Africa. In a survey carried out by Water Aid, in Mali, 80% of wells were dysfunctional while in Ghana 58% of water points required repair.⁷



A borehole in Niger, West Africa

Why Boreholes Fail

Boreholes fail for a number of reasons. Usually, it is because of a lack of maintenance. Aid agencies are usually the instigators, funders and project managers of the construction of boreholes. Their projects are most successful where the local community is fully involved from the start. Usually, a committee is formed and the village chief leads the management of the borehole. Community members pay a fee to the committee which is tasked with managing the fund to carry out maintenance and repairs. Faults that may occur to cause boreholes to fail include clogging of pipes, mechanical faults with pumps and breakdowns in dry periods when the water supply is intermittent.

In most instances, those that install the boreholes train members of the community to develop the skills needed to maintain them. But those

who receive this training may move out of the village to find work. There may be no one appropriately trained to fix a fault, and no money to finance repairs.

When Boreholes Fail

When a borehole fails, it means that the water supply to an entire village (sometimes a number of villages) will cease. This can continue for months. Often, it is women and children who have to deal with the repercussions. They are tasked with the burden of walking several hours a day to rivers or other water points to collect water. Often, this water is contaminated and unsafe for drinking. The time spent fetching water often prevents women from being economically active and stops children going to school.

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⁶ British Geological Survey

⁷ Water Aid (2008) http://www.wateraid.org/documents/plugin_documents/think_local, accessed 23/8/12

Islamic Relief in West Africa: Doing Things Differently

“We can discuss, write reports and come together for conferences to discuss the most effective way of providing water through enhanced technology. However, this approach is failing to make a long-term impact in communities. This is because the international community is not listening to the people of West Africa”

Elias Fon, Islamic Relief

Islamic Relief wants to be effective in alleviating poverty. This can only be achieved if disasters such as droughts and floods are controlled. In the past aid agencies, including Islamic Relief, have focused on providing emergency relief to the millions of people affected by severe drought and other manifestations of climate change, without necessarily coming up with long-term solutions. Boreholes are a case in point – popular as a quick fix when there is no alternative water source but often problematic in the longer term.

As Islamic Relief’s regional desk coordinator for Mali, Elias Fon, says: “We can discuss, write reports and come together for conferences to discuss the most effective way of providing water through enhanced

technology. However, this approach is failing to make a long-term impact in communities. This is because the international community is not listening to the people of West Africa.”

Islamic Relief has been on the ground in West Africa and has seen at first hand the most effective and sustainable ways to provide access to reliable water for people, animals and agriculture. We have listened to the communities themselves, and they told us the most difficult problems they face are water harvesting and sustaining food security. We have adjusted our priorities and adapted our projects accordingly.

If water can be controlled and food production can be increased, communities can thrive. Based on

field work in West Africa and broader research in this area, Islamic Relief has identified what it thinks are the two single most important new initiatives that the communities where we are working need. These are growing the highly drought resilient and adaptable plant sisal to ensure increased food security is available and building reservoirs, lakes and micro-dams to harvest rain water. Investment in these activities has the potential to empower communities and lift millions out of poverty.

It is now time to look towards the future and do things differently.



Sisal: The Magic Plant

In East Africa it has already been demonstrated that sisal has strong earning potential—enabling thousands of people to make an income and feed their families even in drought conditions. The time has come to develop that same potential in West Africa to improve food security there.

How Sisal Works

Sisal plants are evergreen and need relatively little water, making them capable of withstanding the severest drought conditions.⁸

However, sisal plantations are not yet widespread and there is plenty of scope for expansion.

Sisal has a life span of seven to ten years. It is usually first cut after two or three years, and then at 6-12 month intervals.

A typical plant will produce 200-250 commercially usable leaves in its lifetime. Each leaf contains an average of around a thousand fibres.⁹

These fibres are what forms the basis of the plant and what brings in the income. The fibre is usually obtained by machine decortications in which the leaf is crushed between rollers. It is valued because of its strength, durability, ability to stretch, affinity for certain dyes, and resistance to deterioration in salt water. Sisal ropes and twines are widely employed for marine, agricultural, shipping and general industrial use. The fibre is also made into rugs, hats and brushes. In addition to using sisal to mark the boundaries of their homesteads and make fences, individual households have resumed extraction of sisal strands for commercial purposes to earn a livelihood.¹⁰



sisal as a life fence

Benefits of Sisal

Sisal can play a significant role in West Africa's economy. The plant is not labour-intensive and requires no fertilisers or pesticides to mature, making it a greener and simpler product for those who have limited access to fertiliser products. Along with income generation and ease of access, sisal can be used within the villages of West Africa in a number of ways:

- **As a life fence:** The fibres of the plant can be used to make fences to protect property, gardens and farmland.
- **Animal feed and mulching in farms:** The remnants of the extraction process are dried and used as animal feed and to provide a mulch that protects topsoil from erosion and enriches the soil as it decomposes
- **Access to green gas:** The green residue that is produced after fibre extraction can be used for green gas.
- **Holding back the desert:** As more sisal is planted, this can help resist the advancing desert, succeeding where tree planting has failed.
- Sisal plantations can help **maintain the humidity of the soil**, thus improving soil fertility.

The potential for sisal to be something bigger is growing. It has a promising future. The growing public awareness of environmental policies and incorporating natural ingredients into products means that the demand for sisal is set to grow in the years to come.

8 See: http://www.kenyanewsagency.go.ke/index.php?option=com_content&view=article&id=107:sisal-option-against-drought-&catid=37:development&Itemid=149, accessed 28/8/12

9 See: <http://www.wigglesworthfibres.com/products/sisal/sisalplant.html>, accessed 28/8/12

10 See <http://www.britannica.com/EBchecked/topic/546658/sisal>, accessed 28/8/12

Sisal in Kenya

In a small village in the Kitui West District in Kenya, residents have resumed extraction of sisal strands for commercial purposes to earn a livelihood. Famine, water scarcity, animal deaths and lack of enthusiasm in planting drought-tolerant crops have become an increasing burden for some, prompting a rethink about the best way forward for farmers. One individual, Elizabeth Mwende, has had enough of drought-tolerant crops and has decided to resort to traditional sisal growing, extracting the strands of the sisal plants to sell at the market.

She produces an average of three kilogrammes per day and sells her crop to middlemen who sell the bulk produce to manufacturers of sisal bags.

The 42-year-old mother of four also makes baskets out of sisal fibres for her own use and for selling. The income is then used to buy food and provide her children with books, pens and school clothes.

Mwende says that she has been processing sisal since she was a child, and often the importance of the plant is underestimated by many.

The fence surrounding Mwende's Kauwi village home has plenty of sisal whose mature leaves she expertly cuts after removing the thorn at the end. After detaching the leaves from the main plant, she splits the broad leaf into two and further forms three pieces from each split section but leaving the convergence slim end intact. She has to hold the intact end with a piece of cloth to ensure the sap does not destroy her palm or enter into her nails.

Her home reflects multiple uses of sisal where its long poles have been split and used to construct a granary. The cowshed is also made from sisal poles while the entrance to the home has poles that are pulled sideways to allow access inside.

Source (Kenya: Department of Information and Public Communications¹¹)

Elizabeth and others who have discovered sisal are realising that instead of sitting back and waiting patiently for rain, they can use sisal to combat drought and provide for their families. This is one way of adapting to and controlling climate change.



¹¹ See http://www.kenyanewsagency.go.ke/index.php?option=com_content&view=article&id=107:sisal-option-against-drought-&catid=37:development&Itemid=149, accessed 31/8/12

Rainwater harvesting as an alternative to boreholes and shallow wells

Along with extended periods of drought, the region also experiences intense periods of heavy rainfall. These sometimes cause widespread flooding and damage to crops. There is an upside to this, however – some of this rainfall can be stored and used during dry periods.

Scientists predict that as a result of climate change, rainfall patterns will become more unpredictable and erratic across Africa.¹² After periods of intense rainfall, approximately 2-3mm of excess water tends not to be used. Channelling this water into reservoirs can store the excess for up to two months, extending the growing season and potentially saving the lives of countless livestock and people.

“On a field visit to Mauritania I saw a family who dug a hole under their home to collect rain water. This water was then used to provide basic household necessities as well as for farming and cattle. If small communities are collecting water, think of the potential that could be achieved if there was one huge rain water catchment for an entire village.”

Elias Fon, Islamic Relief

Islamic Relief is at the forefront of constructing rain water catchment reservoirs, lakes and micro-dams across Mali, positively changing the lives of millions. However, there is much more potential for this to be

rolled out across more villages to potentially improve the livelihoods of millions more. Projects like this have been successful in countries like Sudan and Malawi as well as Mali, improving access to water for drinking and farming and improving the earning potential of whole communities.

Rain Water Catchments (Micro-dams, Reservoirs and Lakes)

Rain water catchments can have a number of benefits. These are:

- Large quantities of water can be stored, which can be accessed during dry periods.
- Water can be channelled into smaller wells, providing more water points throughout the villages.
- Compared to boreholes, there is relatively little need for repairs and maintenance.
- Water that collects in ground reservoirs either evaporates or percolates into the soil, and if there are any functioning boreholes nearby, these may end up generating a little more water.
- Flooding can be controlled by the use of floodgates.
- In some instances, sisal is planted around the reservoir to make a protective boundary.
- As with the borehole method, there is community ownership of the project. The villagers themselves are in charge, with guidance from Islamic Relief field staff and others implementing these projects.

By using this type of water provision method, access to water for people, their farms and animals is effortless and unproblematic.

Having a constant source of water can provide many benefits to the people of West Africa, food security being the most important. If there is water, plants and crops can be tended to, health and sanitation can be improved and women can be more economically productive as the time taken to walk miles for water will be reduced. Children can focus on education. Schools can be built, health centres can be established and communities can thrive. The bottom line is that those entrapped in decades of poverty can be lifted out of it with the simple provision of what should be a basic human right- safe, abundant water.



¹² See: <http://www.sciencedaily.com/releases/2010/02/100226093238.htm>, accessed 30/8/12

Rain Water Catchment Reservoir Construction in Sudan

In North Kordofan, the average trip to fetch water can take between two and eight hours and is further extended by long waiting times because of big crowds at the water point. Accessible water is 15km away. The burden of collecting water falls on women and children who face harsh conditions and hazards. Water usually lasts only two days. Commercially supplied water, trucked in from outside, is expensive and unaffordable.

Islamic Relief was able to construct two hafirs in El Moulieh and Um Ejeja villages – in North Kordofan – in 2007 and 2009. But there is more to this project than just building hafirs. Communities need to be able to operate and maintain these hafirs if they are to enjoy the maximum benefits. Not only did Islamic Relief build the hafirs but it also worked in partnership with the World Food Programme and the Department of Forestry to provide training on environment awareness. In this scheme, communities received an incentive in the form of food rations equivalent to the work they would do in excavation of their surface water reservoir. Hafir committees were trained in how to manage their water source and how to charge tariffs to ensure that water is used sparingly and wisely.

These hafirs have made a tremendous impact in the community. Individuals in these areas have been able to access clean and safe water all year round. The hafirs harvest 40,000 cubic metres of rain water and provide a year-round water supply for both people and their livestock. Around 15,000 people gained access to plentiful clean water for drinking and cooking. Water consumption per household went up from a meager 5-8 litres per day to a more civilised but still very modest 10 litres per day.

Along with this, the hafirs have contributed tremendously to improving health and livelihoods, especially among women and children. Women can now be more economically productive and children can attend school regularly.

During the rainy season, when the hafirs are full, community members plant vegetable gardens around the hafirs. The vegetable production enables the households to improve their diet, thereby providing essential nutrients to the children.



The hafir in North Kordofan is providing water all year round for communities.



The hafir has enabled the people El Moulieh and Um Ejeja villages to plant vegetables gardens.

What is a hafir?

Hafir is a large rain water catchment reservoir. It has an inlet canal that brings rainwater into the hafir, and an outlet fitted with pipes that take water to a hand-dug hole from which communities can collect water. It is usually constructed in arid lands that have no or unreachable underground water. It is mainly used to reserve water for both human domestic use and for animal consumption during summer times. The volume of water that a hafir can hold ranges from a few thousand cubic metres up to 30,000 cubic metres or above.

“The hafirs have made such a big difference to our lives. We can now access water all year round. We do not have to worry about when the water will run out. Our children can now attend school and we are seeing an improvement in their health due to the cleaner water they are drinking.”

Community Member

In Hope for a Harvest

The impact of climate change has been strongly felt over the last 40 years in Mali, with increased desertification, cyclical droughts and flooding. Over four million Malians are affected by the current food crisis and half of the population lives below the poverty line.

Islamic Relief built a micro-dam in Mana village Ouelesebouyou, in order to combat these effects of climate change. The short documentary below 'In Hope of a harvest' depicts Kadia Samake from Mana village, and the impact it was anticipated that the micro-dam would have on her, and her family.

When the documentary was filmed, the ground in Mana village was parched and suffering from drought. Six months on, and following the rainy season, the photos to the right show the successful impact of the dam and the lush, green vegetation which was made possible because of the collection of rainwater.

Like the hafir construction in North Kordofan in Sudan, Islamic Relief wants to implement water solutions like this across West Africa. These photos clearly show that water solutions can really work for the communities of Africa, and that drought and famine need not be inevitable.

The impact of the micro-dam after the rainy season.



Looking to the Future

This report shows us that there is hope for the people of West Africa. In a region where drought and famine are becoming a bigger danger with each passing year, we need to be looking to the future and thinking of long-term solutions that can tackle climate change and allow the possibility of lifting communities out of poverty.

All it takes to begin the transformation is improved access to water. With adequate and continuous water provision, many lives can be transformed. Lack of water is the source of many problems. With effective water provision, families can be healthier, safer, economically active and potentially free of the poverty that has plagued the region for decades.

The construction of hafirs and micro-dams to harvest rainwater in Sudan and Mali shows what a profound impact such initiatives can have on communities. The use of solar to provide income generation demonstrates that people like Elizabeth really can provide an income for their families. The fact that community ownership is emphasised in all of these projects also highlights how solutions like these can encourage peace building and empower communities.

Islamic Relief has a vision: a vision of a world in which poverty is eradicated. Continuous access to water can go a long way in lifting millions out of poverty. Simple solutions like reservoirs and micro-dams are helping to achieve this vision.

But we can't do it our own. We need the sustained support of our donors and partners. We also need other aid agencies to join the debate, to raise their game and to help find new solutions to age-old problems exacerbated by climate change. Let's start by listening to communities to see what they need. Let's observe and engage with them. They can tell us what they need. We can provide it in the most effective way. **And together, we can help green the desert and lift them out of poverty.**

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