



ROTARY GLOBAL GRANT PROJECT 1416770

KENYA, 2014-15

 **Excellent** | Pioneers of Sand Dams

Photo: Members of Kumina Wauni SHG

ABOUT EXCELLENT DEVELOPMENT

Excellent Development supports subsistence farmers and their families to gain access to clean water and grow more food to eat, store and sell. We support communities to build sand dams which provide clean water and the potential to invest time in sustainable agriculture.

In Kenya we work with our partner the Africa Sand Dam Foundation (ASDF) to build sand dams and implement food production activities with local communities.

We are proud to be working with Rotary to support communities in Kenya to transform their lives through local, reliable and cost-effective water supplies. Since 2010, Rotary have supported 27 communities in Kenya to develop water and food security.



Patrons

Lord Joel Joffe CBE
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INTRODUCTION

Around 200 Rotary Clubs across 15 districts in RIBI came together in a major RIBI wide project to address the problem of drought and food shortage in rural drylands worldwide.

To date, their fundraising efforts have supported the construction of 27 sand dams, one school water tank and have supported 9 farming communities to work towards food security, through a combination of Rotary Foundation Grants and direct constructions from Rotary Clubs and districts throughout the RIBI area.

This report details the construction of three sand dams in 2014 as part of a Rotary Global Grant project that also continues to support three farming communities with a range of improved food production initiatives.

The principal objective for building these sand dams was to create year-round access to water for each of the SHGs and their wider communities.

The SHGs supported by this project are:

- the **Mutethya** SHG who are being supported to build a sand dam
- the **Ngulai** and **Wasya wa Athi B** SHGs who are being supported to both build sand dams and developed their food production activities,
- the **Kumina Wauni** SHG who are being supported by this grant to increase their food production.



Top: Mutethya SHG's completed dam
Bottom; Kumina Wauni SHG receiving drought- resistant seeds for their seed bank

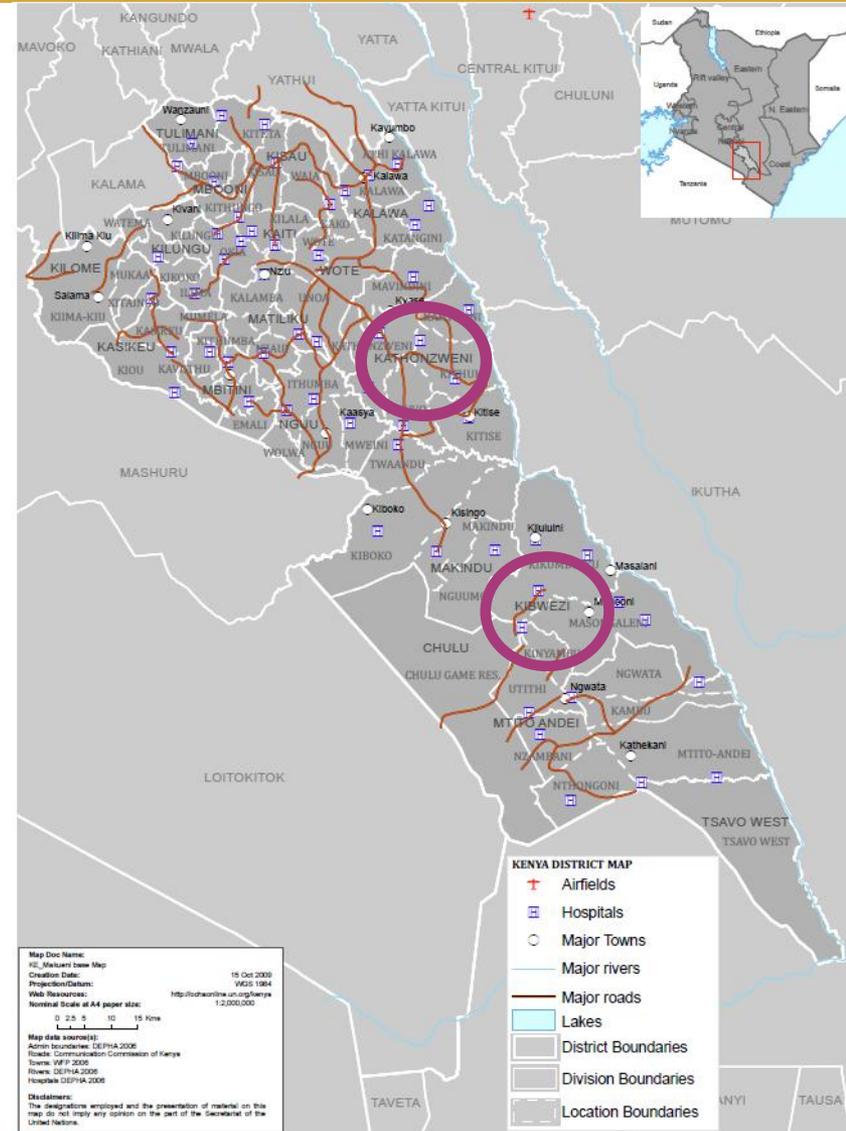
CAUGHT IN A DRYLAND TRAP

Makueni County is a tough place to live. 95% of the population (more than 840,000 people) are rural farmers living below the national poverty line. Water shortage is a serious problem since they depend on rain-fed agriculture to survive.

Typically, nearest water points in Makueni County are a shocking 10km away. Despite annual rainfall similar to the UK, rains are concentrated into only one or two short flood periods. Most of the rain runs off bone dry land and disappears to the ocean, taking fertile soil with it. To make things worse, climate change is causing more unpredictable rains, longer droughts and heavier floods.

The burden of water collection traps people in a vicious circle of drudgery and poverty – especially women and children who spend on average six hours per day collecting water. During extended droughts, this can take up to 12 hours per day. Children, especially girls, often miss school to help their families collect water. This steals time away from more productive activities like farming and education.

The four communities supported by this project are located in **Kathonzweni** and **Kibwezi** Districts in Makueni County.



THE COMMUNITIES

This global grant supported four communities. The new sand dams **directly benefit 117 active SHG members**, their families and the people living in the villages where the new sand dams are built. A total of **1,918 people**.

In addition, the sand dams are intended to create a ripple effect of benefits for people living further away – typically the sub-location populations: an average of 8,662 people per SHG, either because they too will collect water from the dams, and/or because the dams reduce pressure on other overstretched water sources in the area, particularly during drought periods.

SHG	Members	Village/s	Village Population	Sub Location	Sub Location Population	Activities
Mutethya	26	Kiiuani	507	Muthingiini	13,093	Improved water supply
Ngulai	16	Makutano	544	Utithi	9,981	Improved water supply & food production
Wasya wa Athi	26	Utumo Mutheke	207	Ivinga Nzia	2,870	Improved water supply & food production
Kumina Wauni	49	Kinzuu	660	Kathyaka	8,705	Food Production

WHAT ROTARY IS ACHIEVING FOR THE GROUPS

Before this project, the communities were collecting water from shallow wells, open rivers and pipelines, often located several kilometres from their homes. Communities often complain that these water sources quickly run dry because of the scarcity of other water points, and/or become dirty and unsafe from contamination by animals and other pollutants. Sand dams will change all of this.

The primary benefit of the sand dams is the provision of local, reliable water supplies. This reduces the distance the groups had been walking in search of water and saved them time and energy to work on their farms. SHG's now have a local water source within 30-90 minutes of their homes

Improving food production: Having a local, year-round water supply not only means people have more time to spend on farming but the water stored in the sand dams can be used to support farming activities such as tree planting and vegetable growing, and even provide new water points for people to take livestock. Rotary's support has enabled three communities to implement a range of sustainable farming and food security activities and build further sand dams.

Benefits to children: The availability of water provides real benefits to children. Initially many children in the communities miss classes because they need to help their parents with water collection. With the new sand dams, parents will be able to fetch water from sources that are closer to their households enabling children to attend school more often.

Also, as a result of the closeness to water sources and the availability of fruits and vegetables from the food production activities that will follow this project, children will grow up in a better environment with healthier nutrition. This will improve their health as well as concentration at school.

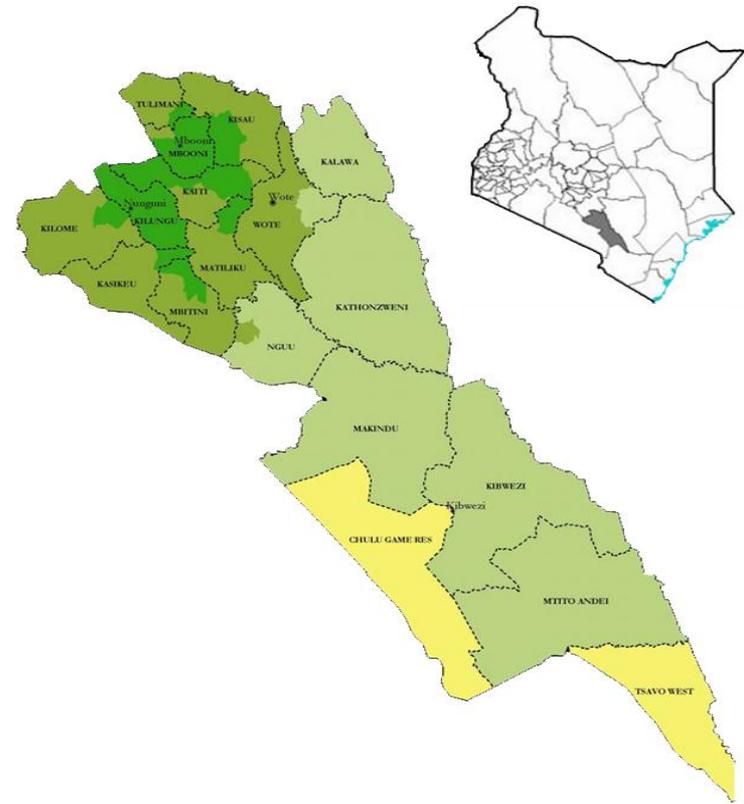


Above: Mutethya SHG's completed dam collecting water after the rains

SITING AND DESIGNING THE DAMS

The first stage in the project was for the members of the SHGs to discuss with ASDF Field Officers their specific water needs and preferences for where to site their sand dams from a practical perspective. Input from female members is especially important for choosing suitable sites because the responsibility for collecting water typically falls to women and then to children.

ASDF then assessed these sites from a technical perspective to agree on the best site for each sand dam. During this process the SHGs also decided on the abstraction methods they preferred to use. Once all these details were agreed, ASDF drew up designs and bill of materials for each dam which became the blueprints for construction.



GPS locations of the four communities supported.

CONSTRUCTION PROCESS

This grant enabled Muthethya SHG, Ngulai SHG and Wasya wa Athi B SHG to construct a sand dam each.

In order to build their dams, the groups first needed to collect all of the local materials (sand, stones and water), and they needed to terrace the valley on either side of the site for the dam to prevent soil being washed into the dam during the rains.

Once completed, ASDF's Dam Coordinator visited each site to check the quantity and quality of materials collected and ensure that the terracing has been completed satisfactorily. Only then were specialist materials ordered (cement and steel) for construction to begin.



HOW THE DAMS ARE BUILT



The construction work itself was all done by members of the SHGs, guided by craftsmen who are responsible for building the timber framework, and by ASDF's field staff and dam coordinators. The day after construction is completed, the timber shuttering is removed. Barbed wire used to reinforce the structure is trimmed and any holes or exposed rocks are plastered with mortar.

Finally, in order for the dam to reach its maximum strength and to prevent shrinking and cracks after constructing, the dam is watered to 'cure the cement' for 4 weeks. Keeping the dam hydrated in this way lets the cement and sand particles bond together.



All three sand dams were completed prior to the arrival of the October-December rains and have subsequently filled with water that is being use for drinking, domestic and farming purposes as well as enabling people to support their livestock.

HOW THE SAND DAMS WILL WORK

What is a sand dam?

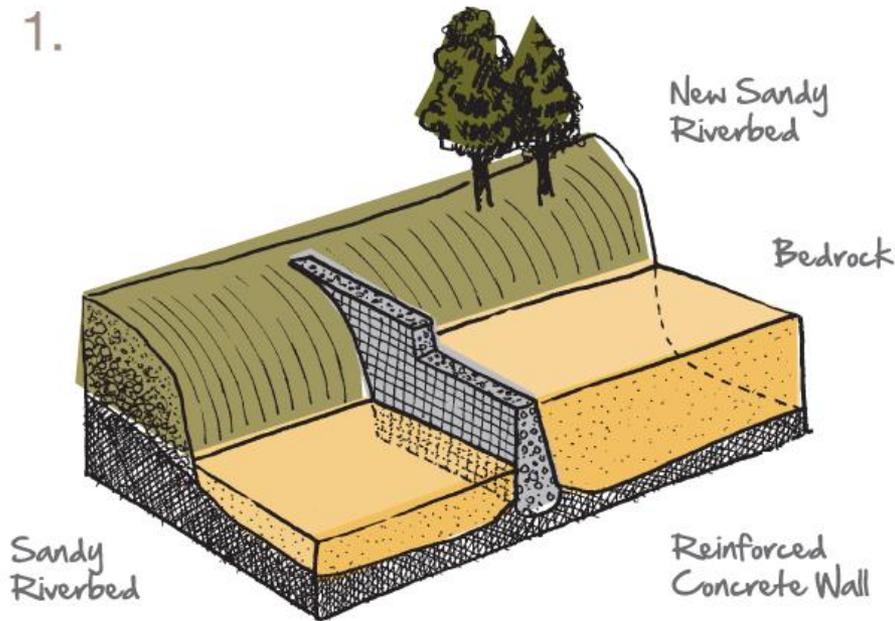
A sand dam is a reinforced concrete wall built across a seasonal sandy river. They are a simple, low cost and low maintenance technology that serves to retain rainwater and recharge groundwater.

They can store up to 20 million litres of water and are widely suited to dryland regions of the world.

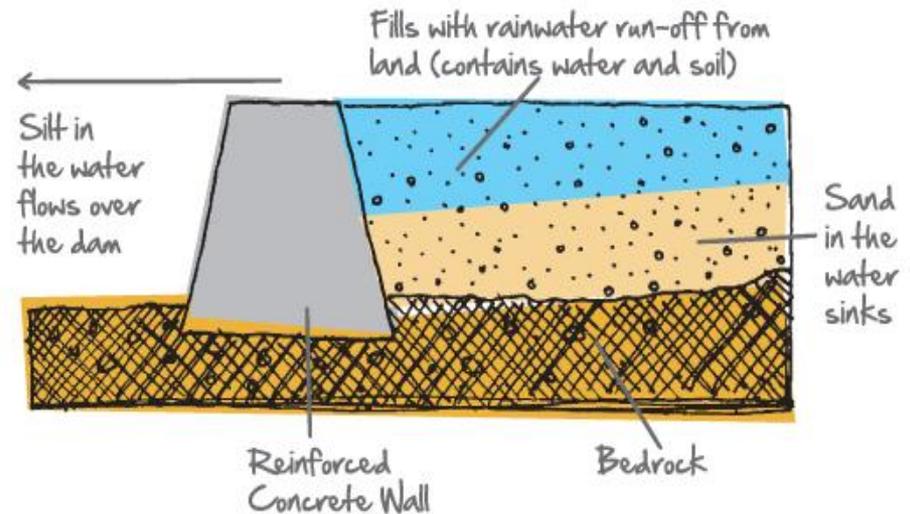
How do sand dams work?

Seasonal rainfall fills the dam with water containing eroded soil. The soil is made up of silt and sand. The heavier sand sinks behind the dam, whilst the lighter silt washes downstream.

1.

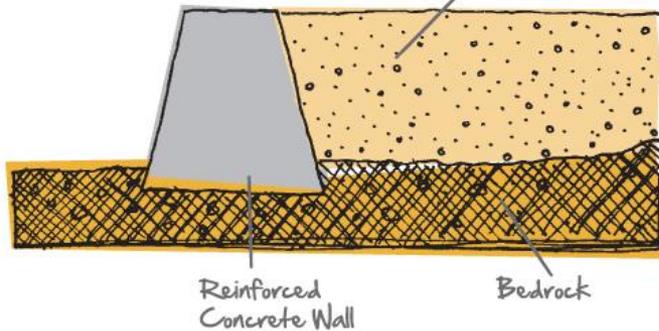


2. 1-3% of water flowing downstream is retained behind the wall



HOW THE SAND DAMS WILL WORK

Dam fills with sand - but
25-40% of the volume is water!



Getting Water from Sand Dams

1. People use traditional scoop holes to collect water from any point along the dam.
2. Infiltration galleries leading to pipes or taps enable water to be abstracted through the dam wall.
3. Infiltration galleries can also be linked to sealed shallow wells with hand pumps.

Sand accumulates behind the dam until it is full to the spillway. 25-40% of this volume is actually water, trapped in the spaces between grains of sand.

Because the water is stored within the sand, it is protected from evaporation losses.



IMPROVING FARMING TECHNIQUES

Three of the SHGs: Wasya wa Athi, Kumina Wauni and Ngulai, were supported by this grant to develop food production activities. This includes the following:

Establishing a tree nursery: We support SHG's to plant an average of 500 trees to fertilise the soil, prevent erosion and retain rainwater. Trees also provide food, fodder, fertiliser, fuel, lumber and a source of income. **Since the project began, the groups have planted 2,019 trees.**

Land Terracing: Terracing is dug to aid water and soil conservation. Terraces help to retain 95% of water run-off and up to 97% of top-soil so vital for agriculture. The increase in groundwater levels improves the conditions for growing crops, which enables increased food production. **Since the start of the project, the groups have terraced 2.7km of farmland.**

Demonstration farms are set up to enable farmers to test various crops, and farming techniques such as intercropping, before using these on their own farms

Workshops and peer-learning: We provide workshops and peer-learning exchange visits to enable community members to learn improved farming techniques to support and motivate each other. workshops were provided to the SHGs on specific food production and income generation topics included: post-harvest management, fish farming, techniques to improve crop production; organic farming and vegetable farming

Establish a seed bank: This is an essential part of sand dam projects providing the community with drought-resistant seed varieties and ensuring seed security for the next five planting seasons. We work with the Kenyan Agricultural Research Institute (KARI) to do this. Farmers return twice as many seeds to the bank as they withdrew



Above: Terracing by Kumina Wauni self help group and SHG members surrounded by their crops.

THE IMPACT OF SAND DAMS

Sand dams **save communities a great deal of time**. In drylands, women and girls spend an average of six hours each day walking long distances to fetch water. In dry seasons it can take up to 12 hours. Time for water collection reduces to 30-90 minutes with sand dams. Lack of water removes choice and control from people's lives, but when the burden of all-day walking for water is lifted, time creates opportunity. Women can work on their land and communities can build a future of choice and independence.

With water to irrigate their crops and for animals, **farmers can produce enough food** for their families, selling the surplus to develop an income. Their dependence on unreliable rainfall is reduced, their lifestyle and livelihoods are greatly improved and they can start to bring themselves out of poverty.

Communities' **health improves**. As water is stored in sand, it is safe from breeding mosquitoes and from contamination (including bilharzia-carrying snails, thus greatly reducing incidence of diarrhoea). Once farmers can produce a year-round and more diverse supply of food, even during drought, their families have a more balanced diet.

Children can attend school more often. They are healthier and better nourished, have water to wash and take to school, and no longer (especially girls) have to spend hours fetching water, or minding the farm and small siblings while their mother collects water. With income from their crops, parents can afford school expenses.

Sand dams transform the environment. These projects help to mitigate desertification and the impact of climate change, transforming rural drylands into places where people, plants and animals can thrive. Sand dams raise the water table, in the area both above and below the dam. In effect, this creates a 'permanent spring', keeping more water in the area. Biodiversity increases, as trees and indigenous species are able to survive. Vegetation regenerates on river banks. Erosion is reduced and soil quality improves, helped by terraces and natural composting. Less than 3% of water flowing downstream is captured by the dams, so water is not diverted away from downstream users.



Above: The land by a sand dam (see far right of photo) has been transformed now there is a reliable water supply.

MUTETHYA SELF HELP GROUP

Mutethya SHG is located in Kiiuani Village (507 residents) in the Muthingini sub-location (population 13,093). The SHG has 26 members, most of them women (18 women to 8 men). Muthingini covers an area of 125.98 square km within Kibwezi District.

The group were the first to build their sand dam in this project. With their design agreed in July construction of this dam progressed very swiftly and was completed by August. The photos below show the construction, the completed plaque and the completed dam.

Mutethya SHG's sand dam was enabled by funding contributed by the Rotary Clubs of Newark, Trent Bridge, Vale of Belvoir, from Rotary District 1220.



MUTETHYA SHG COMPLETED DAM



SHG : MUTETHYA
SUPPORTED BY
AFRICA SAND DAM FOUNDATION
EXCELLENT DEVELOPMENT
ROTARY CLUB OF NEWARK TRENTO
VALE OF BELVOIR ROTARY DISTRICT 1220
THE ROTARY FOUNDATION
DATA BASE NO. 157
DATE : 01.08.2016

MUTETHYA SELF HELP GROUP

Mutethya SHG's dam has filled with water after the rains enabling community members to invest time in sustainable farming to improve their food production. Viewed from the catchment behind the dam wall (see bottom left photo) which has become much greener since the dam was built and where livestock can now graze.

The group now have the opportunity to use the water from their dam to carry out improved agricultural activities, which has been funded by others.

Right: Mutethya SHG's completed dam filled with water after the rains.



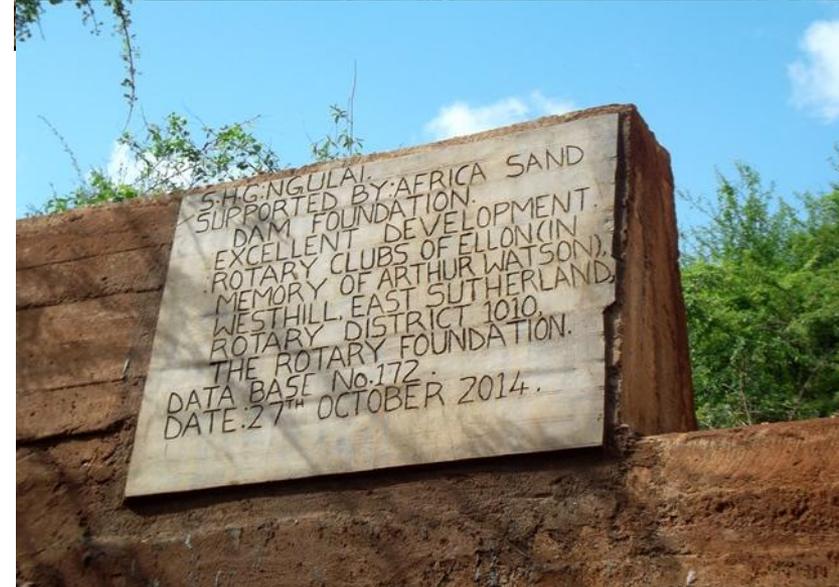
NGULAI SHG

Ngulai SHG members live in Makutano village (544 people) in the Utithi sub-location (population 9,981). Utithi covers an area of 55.63 square km in Kibwezi District. Ngulai is a small group who had just 16 members at the start of the project.

The Ngulai SHG completed their sand dam in October (pictured right). This SHG struggled early on to bring enough of their members together at the same time to be able to do the work required. The reason for this was primarily drought, which resulted in poor harvests and made it difficult for people to commit as much time as they would have liked to working as a group. Therefore, to ease the pressure on the remaining group members, ASDF brought them together with another nearby SHG to build the sand dam together. Since both SHGs and the non-SHG members of their respective communities live close to this dam site both communities will benefit from using this new water source.

Working together with other SHGs is an effective way to share the burden of the work involved and speed along the process. Indeed, before beginning their own sand dam's preparation, Ngulai SHG members first worked with five other SHGs to help build a sand dam for a different community. This collaboration enabled Ngulai SHG to gain experience and confidence on the build process before they began the construction of their own sand dam.

Ngulai SHG's sand dam was enabled by funding contributed by the Rotary Clubs of Ellon (in memory of Arthur Watson), Westhill, East Sutherland, from Rotary District 1010.



The dam photographed on 14th November following just a few days rain.

NGULAI SHG COMPLETED DAM



NGULAI SHG- FOOD PRODUCTION

Rotary's funding also supported Ngulai SHG's food production activities for a year. Since the rains, the dam has collected water (see photo to right) and it is already transforming the environments to become greener and enabling members to grow more crops.

Ngulai SHG have set up a tree nursery, seed bank, demonstration plot and dug terracing to improve their food production. With training from ASDF's Field Officers, group members have been able to invest time in improved farming techniques.

Group members of Ngulai SHG were keen to grow a variety of vegetables, and thanks to Rotary's support they have secured a plot of land for members to use to grow a variety of vegetables using water for their dam. Surplus produce can be sold at the local market, improving household incomes.



"Personally, I also feel that I have benefited because I fetch water here for my home's needs and uses. We used to fetch water very far because we used to go to a dam constructed by another group called Mutethya SHG. [The new dam] is about 1km from here.

In the coming times, we have planned to start planting vegetables... We have also planned to start planting trees as a group. We will plant them in our homes so that they can look good and we can get shade."

Alphonse Mwanja, Chairman of Ngulai SHG

WASYA WA ATHI SHG

Wasya wa Athi B SHG is located in Utumo Mutheke village (207 people) in Ivinga Nzia sub-location (population 2,870). The group has 26 active members and like other groups, most of the members are women (20 women to 6 men). Unlike the other three SHGs, all located in Kibwezi District, Wasya wa Athi B SHG is based further north in Kathonzweni District where more than 79% of the population does not have access to an improved water source. The sub-location covers an area of 34.85 square km.

Wasya Wa Athi SHG built the largest of the three sand dams in this project. They had to grapple with a lot of exposed bedrock in excavating the site for their sand dam (pictured below). Although this in some ways made this an awkward site to use for construction, the bedrock was incorporated into the dam design providing a strong foundation for the structure and significantly reducing the amount of materials needed to build a sand dam of this size.

This SHG has been especially active over the course of the project. In addition to constructing their own sand dam, they also helped to build another SHG's sand dam and helped to build a rock catchment for a third SHG. The Wasya wa Athi sand dam was used as training experience for three other SHGs in the area who needed to practice and build confidence in the construction process. 70 members of these other three SHGs contributed two full days work between them to help build this large sand dam.



WASYA WA ATHI SHG

Wasya wa Athi B SHG's sand dam was enabled by funding contributed by the Rotary Clubs of Reigate Hill, Caterham, Oxted and Limsfield, from Rotary District 1250.

By April 2015, this sand dam has matured (see photo to right) and communities are now using the water for drinking, domestic and farming use, as well as for their livestock,

The photos below show the completed plaque and community members collecting water from their sand dam.



WASYA WA ATHI SHG COMPLETED DAM



WASYA WA ATHI SHG- FOOD PRODUCTION

This grant also supported Wasya wa Athi SHG's food production activities for a year.

They have established a tree nursery, seed bank and invested time in improving farming techniques such as terracing and inter-cropping.

Wasya wa Athi SHG have set up a communal vegetable garden and have dug irrigation furrows to make these more effective. Members have been able to sell surplus produce at the local market- improving incomes. Since the grant, Wasya wa Athi SHG have reported earning KSH 35,500 from vegetable sales (approximately £235).

The group have attended training and workshops, led by ASDF Field Officers, on crop production, organic farming and vegetable farming.



Above: Members of Wasya wa Athi SHG surrounded by their crops

KUMINA WAUNI SHG - FOOD PRODUCTION

Kumina Wauni SHG is the final SHG supported in this project. They are located in Kinzoo Village (660 people), in Kathyaka Sub-location (population of 8,705). This is a large group with 43 female members and 5 male members. Kathyaka covers an area of 104.6 square km.

Kumina Wauni SHG had already built their sand dams and were supported by this grant to increase their food production for one year. The group were able to use water from their dams for farming and learning improved techniques such as terracing and inter-cropping.

The group have set up vegetable gardens and dug irrigations furrows and attending training/workshops by ASDF Field Officers on post harvest management, fish farming and book-keeping. Attending workshops on governance and book-keeping helps SHGs to strengthen their leadership and financial management.



KUMINA WAUNI SHG - FOOD PRODUCTION



The photos show Kumina Wauni SHG receiving their allocation of drought tolerant seeds in September to enable them to plant ahead of the Oct-Dec rains. They use their seed banks to build up supplies of seeds for the group members to draw on as needed.

Following their harvest, the members will each return seeds to their 'account', helping to build up a reserve of seeds for future planting seasons, helping them to increase their food security.

KUMINA WAUNI SHG - FOOD PRODUCTION



The photos show Kumina Wauni SHG members and their surrounding crops- the group are now able to grow a rich variety of vegetables, providing their families with food to eat, store and sell for an improved income.

HOW FUNDS WERE SPENT

		BUDGET		ACTUAL	VARIANCE
Sand Dams	£	37,522	£	36,410	£1,111
Participatory Learning & Training	£	8,567	£	9,052	£(485)
Food Production	£	5,664	£	6,234	£(570)
Goat Programmes	£	539	£	-	£539
Seed Banks	£	3,607	£	3,804	£(197)
Tree Nurseries	£	1,860	£	1,987	£(127)
TOTAL	£	58,345	£	57,487	£(858)

THANK YOU FOR CHOOSING EXCELLENT FOR YOUR PROJECTS

Acknowledgements

Excellent Development is grateful to all of the Rotary Clubs and Districts who have contributed towards this work. We are also indebted to many individual Rotarians who have dedicated their time and support to helping promote Excellent's particular approach to sustainable development.

For the projects featured in this report, we would particularly like to acknowledge:

Rotary District 1220
Rotary District 1010
Rotary District 1250

Rotary Club of Newark
Rotary Club of Trent Bridge
Rotary Club of Vale of Belvoir
Rotary Club of Ellon
Rotary Club of Westhill
Rotary Club of East Sutherland
Rotary Clubs of Reigate Hill
Rotary Club of Caterham
Rotary Club of Oxted
Rotary Club of Limpsfield,

And, the Rotary Foundation.



Members of Kumina Wauni SHG



THANK YOU