
Excellent | Pioneers of Sand Dams

# ROTARY FUNDED SAND DAMS

KENYA, 2015/16

Photo: Mumbuni SHG's completed dam and pump

# 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 45 self help groups in Kenya to develop water and food security.

**Patron**
Sir Edward Clay

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# INTRODUCTION

Over 200 Rotary Clubs across 20 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 51 sand dam projects, enabling communities to become food and water secure, through a combination of Rotary Foundation Grants and direct contributions from Rotary clubs and districts throughout the RIBI area. Thanks to Rotary support, over 101,364 people now have access to clean water.

Rotary provided the following funding for these projects:

**£59,312 to fund the construction of three sand dams and support three farming communities for a year (October 2016 – September 2017).**

This report details how funds were spent:

- **Wendo wa Matoki Self Help Group**
  Construction of one sand dam and support for farming activities
- **Kyeni Kya Syatu Self Help Group**
  Construction of one sand dam and support for farming activities
- **Mumbuni Self Help Group**
  Construction of one sand dam
- **Kyuasini Self Help Group**
  Support for farming activities

Above top: Wendo wa Matoki SHG at their completed sand dam
Above bottom: Members of Kyeni kya Syatu with the vegetables they are able to grow now

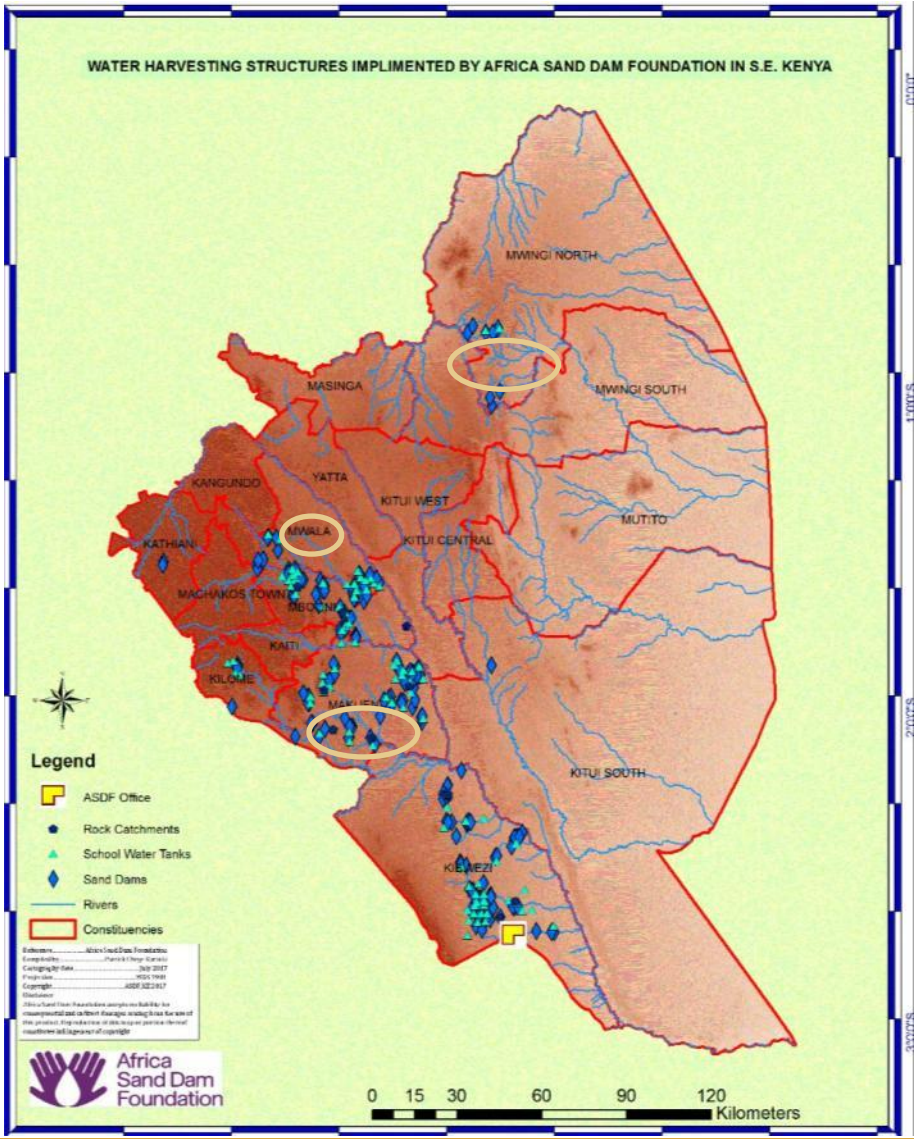
# CAUGHT IN A DRYLAND TRAP

The Ukambani region, southeast Kenya 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 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 into 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.

Communities supported by this project are located in the **Kathonzweni** District in Makueni County, **Mwala** District just outside Makueni County, on the Machakos Border, and **Mwingi Central** District in Kitui County.



# THE COMMUNITIES

**Wendo wa Matoki SHG** consists of 35 active members (23 of whom are women), based in Yumbe and Kulya Villages. The combined village population is 1,410 people. This group is based in Mwambui sub-location in Mwingi Central. **Rotary support enabled them to build a new sand dam and learn improved farming techniques.**

**Kyeni kya Syatu SHG** has 18 active members (8 of whom are women), based in Thavu village, with a population of 313 people. They are based in Thavu sub-location in Kathonzweni District. **Rotary support enabled them to build a new sand dam and learn improved farming techniques.**

**Kyuasini SHG** has 18 active members (13 of whom are women). The group are based in Kimundi village, which has a population of 214 people. They are located in the Kimundi sub-location in Kathonzweni District. **Rotary support enabled them to learn improved farming techniques.**

**Mumbuni SHG** has 36 active members (27 of whom are women), based in Maiani and Isooni villages, with a population of 690 people. They are based in Matulani sub-Location in Mwala District. **Rotary support enabled them to build a new sand dam.**


Above: GPS locations of the 4 communities supported

# 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 communities have to walk in search of water and saves them time and energy to work on their farms. Communities now have a local water source within 30-90 minutes of their homes.

**Opportunity to improve 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 to which people can take livestock.

Thanks to Rotary's funding for these sand dams, Excellent Development is able to lever funding from other donors, including the UK Government, to support these 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, by having nearby 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 more nutritious diets. This will improve their health as well as concentration at school.

Above: A member of Kyuasini SHG putting into practice the training on improved farming techniques

# 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 regarding 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 assessed these sites from a technical perspective to agree on the best site for each sand dam, taking natural landscape features into account, the presence of bedrock upon which the sand dam is constructed being particularly important.

During this process the SHGs also decided on the abstraction methods they preferred to use. ASDF then formulated designs and a bill of materials for each sand dam which became the blueprints for construction.

The groups were responsible for ensuring the necessary legal agreements were in place. This involved signing an agreement with landowners adjacent to each sand dam site to ensure permanent access to the sand dam. Once constructed, ASDF then helped the SHGs to register their sand dams with the Water Resource Management Authority (WRMA).



Top: Wendo wa Matoki mixing cement in preparation for their sand dam
Bottom: Mumbuni SHG during preparation of their dam

# CONSTRUCTION PROCESS

To build their sand 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 sand dam to prevent soil being washed into the sand dam during the rains. ASDF's Dam Coordinator then visited each site to check the quantity and quality of materials collected and ensure that the terracing had been completed satisfactorily. The specialist materials were then ordered (cement and steel) for construction to begin.

Above: Members of Wendo wa Matoki collecting rocks needed for their sand dam
Above right: Members of Mumbuni constructing their shallow well;
Below right: Members of Kyeni kya Syatu constructing their sand dam

# HOW THE SAND DAMS ARE BUILT

The construction work is 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 sand 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 sand dam to reach its maximum strength and to prevent shrinking and cracking, the sand dam is watered to 'cure the cement' for 4 weeks after construction. Keeping the sand dam hydrated in this way lets the cement and sand particles bond together.

Above left: Kyeni kya Syatu SHG mixing cement for their dam
Below left: Mumbuni SHG mixing cement for their dam
Above right: Timber shuttering provides the framework for Wendo wa Matoki SHG's sand dam

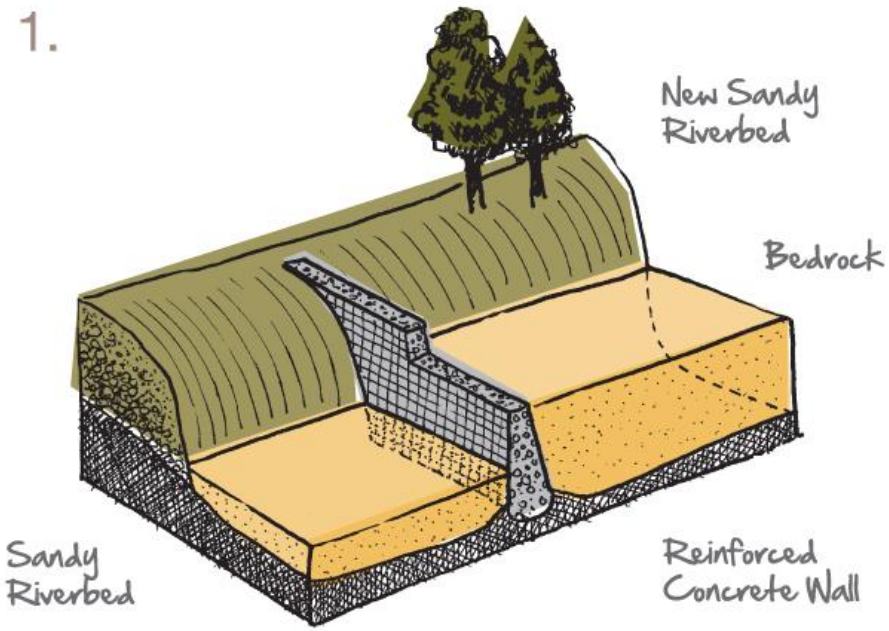
# HOW THE SAND DAMS WILL WORK

**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.

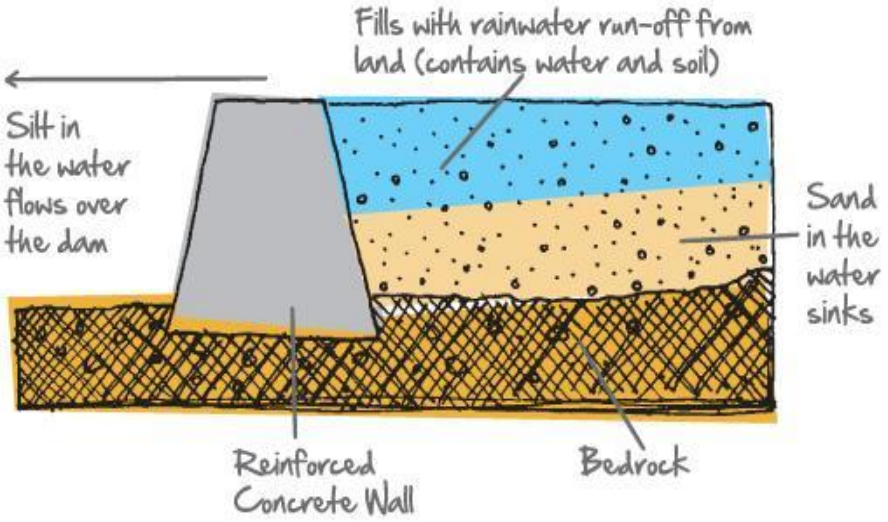
They can store up to 20 million litres of water and are widely suited to dryland regions of the world.

**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.

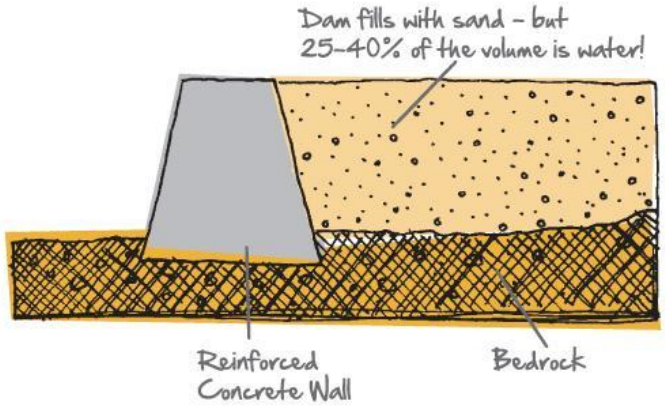
1.




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



# HOW THE SAND DAMS WILL WORK




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.

**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.

# CLIMATE SMART AGRICULTURE SUPPORT

**Rotary's support also enabled Wendo wa Matoki, Kyuasini, and Kyeni Kya Syatu SHG's to develop food production activities for a year and focus on climate smart agriculture.** 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, timber and a source of income.

**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.

**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.

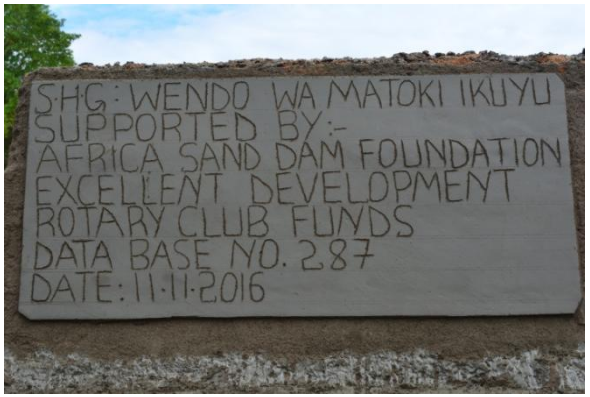
**Workshops and peer-learning:** We provide workshops and peer-learning exchange visits to enable community members to learn improved farming techniques to support and motivate each other. Workshops were provided to the SHGs on specific food production and income generation topics including: post-harvest 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-tolerant 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: Kyuasini SHG members with produce they are now able to grow .

# WENDO WA MATOKI SELF HELP GROUP'S ACHIEVEMENTS

Thanks to Rotary Clubs of Banstead, Croydon East, Fleet, Hart, Kew Gardens, Rushmoor, and Twickenham-upon-Thames Wendo wa Matoki SHG were able to build their sand dam in November 2016.




"*Because we are accessing water at a short distance, it is now possible to [...] engage in other activities for extra income*." **Rebecca Syumbua, Chairwoman, Wendo Wa Matoki SHG**

# WENDO WA MATOKI SELF HELP GROUP MEMBER INTERVIEW

The Africa Sand Dam Foundation (ASDF), Excellent Development's partner in south-eastern Kenya, has recently expanded their project area to Mwingi, and in February 2017, we met one of these groups, Wendo wa Matoki to see the results of their ongoing, hard work. The region is one of the driest in the country, with the small rainfall that does come being washed away with any fertile soil.

Water has been a problem here for decades, but recent years have been close to impossible, with the only water source located ten kilometres away. Group member Japheth Mwangangi explains "*I am seventy-three. Even at my age, because of the problem of water that we faced, we had to wake up at three in the morning to fetch water. You can see the faces of our women shining this much now, but if you came during that time...you could not have known the difference between a young and old lady because of the sleepless on their faces.*"

The group had to overcome a number of challenges, including the mammoth task of collecting water for construction. Rebecca Syumbua, Chairlady, explains how group members had to give up more time and resources, some contributing their donkeys to the effort, and walking twenty kilometres to bring back water. "*We did it in shifts. If one member volunteered to use their donkey today, they would rest the next day and another member would take on the task*."

Morale was low, so ASDF arranged a visit to Kee self help group in a nearby county. They visited the group, witnessed their sand dams, and were shown the huge changes they had made to the community. Ana Munyoki, a group member, explains, "*When we went there we could not tell whether it was a dry or a rainy season because it was so green*." Filled with enthusiasm the group returned and tripled their efforts. "*We have to stand out from the rest who are not members...because they...were laughing at us during construction and telling us that we were doing a lot of work for nothing*."

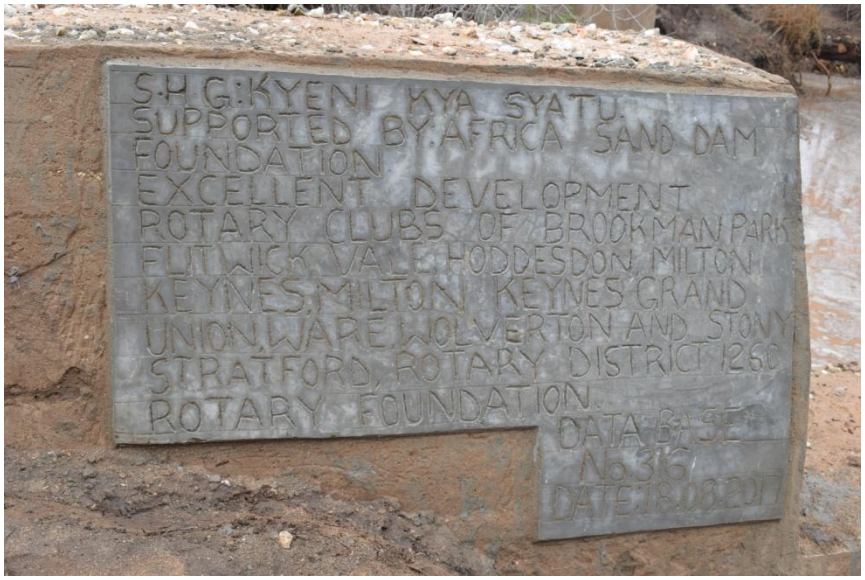
"*The plan is now to plant vegetables here, as well as to build another sand dam this year and construct two school water tanks*."

"*Now I sleep up until six. I have sufficient water for the household...We now have more time to spend with our husbands, our families*."

**Ana Munyoki, Wendo wa Matoki SHG**

# KYENI KYA SYATU SHG'S ACHIEVEMENTS

Thanks to Rotary Clubs of Brookman Park, Flitwick Vale, Hoddesdon, Milton Keynes, Milton Keynes Grand Union, Ware, Wolverton and Stony Stratford, Wendo wa Matoki SHG were able to build their sand dam in August 2017.




*"My children will benefit from this project we are doing with ASDF because if they work hard they will be far ahead of me"*

**Winifred Ndinda, Kyeni Kya Syatu SHG member**

# KYENI KYA SYATU SHG INTERVIEW

The Africa Sand Dam Foundation started working with Kyeni Kya Syatu in 2013 and to date they have built three sand dams, including this one supported by the Rotary Clubs of Brookmans Park, Flitwick Vale, Hoddesdon, Milton Keynes, Milton Keynes Grand Union, Ware, Wolverton, and Stony Stratford.

We recently spoke to Francis Mwaka Kasimba, the group's Chairman who explained:

"*Before the construction of these dams water was very scarce, we would dig scoop holes on this same river and they would dry up very fast but after the construction of the first dam water is plenty now*."

*"We use to take long at the scoop hole because we had to wait for each other to fetch the little amount of water; this would take from morning until sometimes 3pm. Some people would even miss getting water, as there was none left when it was their turn."*

*"Things have changed because we no longer queue for water as we used to, and we collect the water and go home quickly and do other activities at home."*

*We now have enough water to plant vegetable, trees, and water our livestock."*

# MUMBUNI SHG'S COMPLETED DAM

Thanks to Rotary Clubs of Skipton, Halifax Calder, Thirsk, York Ainsty, Otley Chevin, Leeds White Rose, Aireborough, Bradford, York Vikings and Rotary District 1040 , Mumbuni SHG were able to build their sand dam in June 2017.


# KYUASINI ACHIEVEMENTS

Thanks to Rotary Club support Kyuasini SHG were supported with learning improved farming techniques

# KYUASINI SHG INTERVIEW

Kyuasini Water Project S.H.G was formed in 2012, and have now built four sand dams, so their focus has moved to farming and food production with Rotary's very generous support.

This year, in addition to terracing and tree planting, the group have focused on their group farm, and planting drought-tolerant crops such as pigeon peas and green grams.

The harvest from this is stored in the group's seed bank and later shared among the members for timely planting during the rainy season. The group explain how working together and sharing in this way has helped to keep the group united, as well as enabling them to make the most of the rainy season.

"We have a group farm, about half an acre, where we plant cowpeas, green grams and other crops. We take the proceeds to our seed bank and share it when the rainy season comes," says Tabitha Wanza, the group vice chair.

# HOW FUNDS WERE SPENT

| **Three sand dams and three farming communities in south-east Kenya** (Wendo wa Matoki, Kyeni Kya Stayu, Mumbuni, Kyuasini) | | **Budget** | | **Actual** | **Variance** | **Comments** |
|---|---|---|---|---|---|---|
| **Project Mgt & Fieldwork** | **£** | **13,102** | £ | 13,102 | £0 | |
| **Finance & Admin Costs** | **£** | **4,403** | £ | 4,403 | £0 | |
| **Transport** | **£** | **2,752** | £ | 2,883 | £(131) | |
| **Sand Dams** | **£** | **25,243** | £ | 21,832 | £3,412 | Two of the dams used less cement than was originally estimated |
| School Water Tanks | £ | - | £ | - | £0 | |
| Participatory Learning & Training | £ | 2,079 | £ | 2,079 | £0 | |
| Food Production | £ | 809 | £ | 1,680 | £(871) | The cost of seed and manure for the demo plots has increased since the budget was submitted |
| Seed Banks | £ | 1,956 | £ | 2,788 | £(832) | The cost of seed and manure for the seed banks has increased since the budget was submitted |
| Tree Nurseries | £ | 802 | £ | 2,242 | £(1,440) | ASDF are purchasing more seeds for tree nurseries instead of using locally collected seed, as they are better quality and the seeds have a better survival rate, but this has increased the cost since the budget was submitted |
| Goat Programmes | £ | - | £ | - | £0 | |
| Cattle Programmes | £ | - | £ | - | £0 | |
| Fish Farms | £ | - | £ | - | £0 | |
| **Pioneering Sand Dams** | **£** | - | £ | - | £0 | |
| **Community Contribution** | **£** | - | £ | - | £0 | |
| **Total Charitable Expenditure** | **£** | **51,145** | £ | 51,009 | £136 | |
| | | | | | | |
| Fundraising & Communications | **£** | **5,931** | £ | 5,931 | £0 | |
| Governance | **£** | **2,372** | £ | 2,372 | £0 | |
| **Total Project Cost** | **£** | **59,312** | **£** | **59,312** | **£0** | |


## 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:

Banstead, Croydon East, Fleet, Hart, Kew Gardens, Rushmoor, Twickenham-upon-Thames, Brookmans Park, Flitwick Vale, Hoddesdon, Milton Keynes, Milton Keynes Grand Union, Ware, Wolverton and Stony Stratford, Skipton, Halifax Calder, Thirsk, York Ainsty, Otley Chevin, Leeds, Headingley, Calverley, Leeds White Rose, Aireborough, Bradford, York Vikings

And Rotary Districts 1145, 1260, 1040, and the Rotary Foundation.

# THANK YOU FOR YOUR SUPPORT

Above: Members of Kyuasini SHG

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