Rotary
Great Britain & Ireland

Excellent | Pioneers of Sand Dams

ROTARY FUNDED SAND DAMS

KENYA, 2016/17

Photo: Wendo wa Matoki SHG's completed dam

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 30 communities 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 your support, over **101,364** people now have access to clean water.

Rotary provided the following funding for these projects:

£41,527 to fund the construction of two sand dams and support two 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
- **Kinuvu Self Help Group**
  Construction of one sand dam
- **Sindano wa Wia Self Help Group**
  Support for farming activities
- **Wikwatyo wa Muuini Self Help Group**
  Support for farming activities

Members of Wendo wa Matoki SHG (top) and Kinuvu Self Help Group (bottom) at their completed sand dams

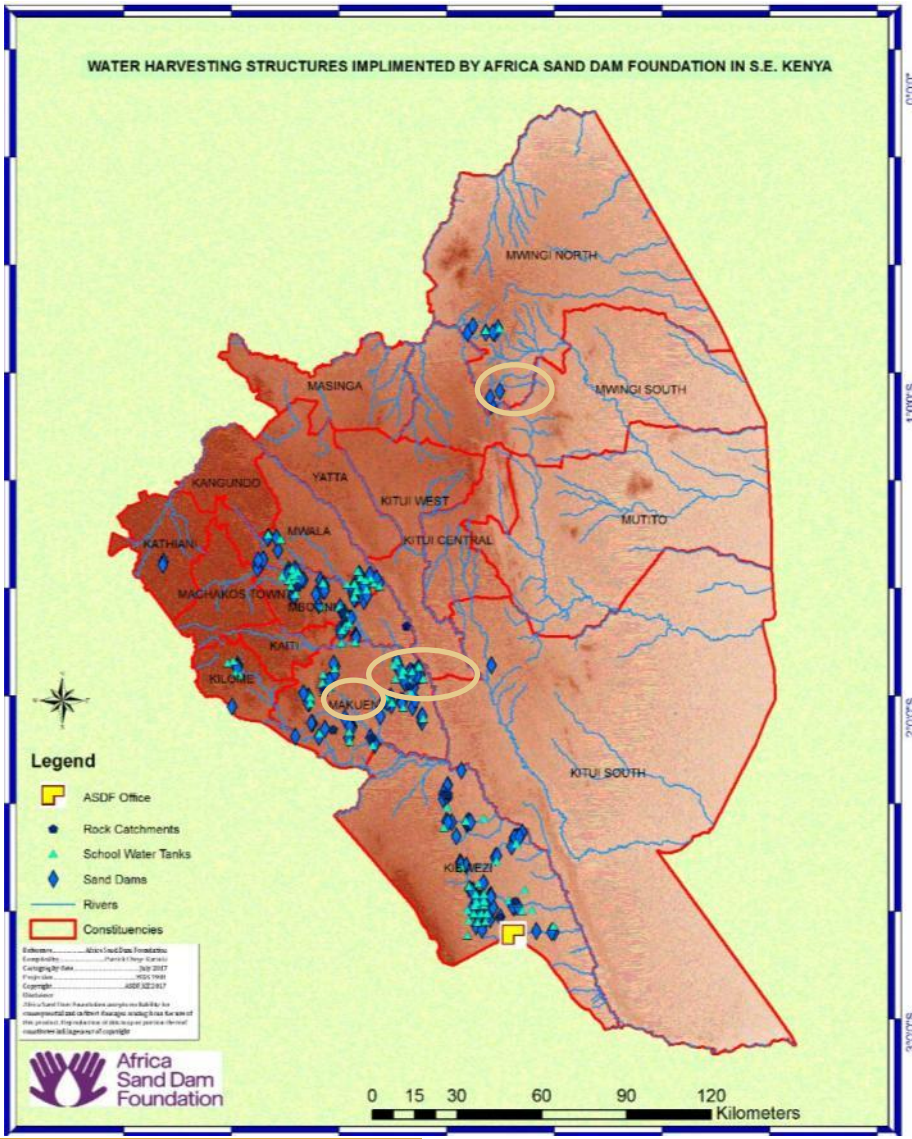
CAUGHT IN A DRYLAND TRAP

Ukambani region, SE 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 **Mwala** District, Machakos county, the **Nzaui** district, Makueni county and **Mwingi Central** District in Kitui County



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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 . **Your support enabled them to build a new sand dam**

Kinuvu SHG has 22 active members (12 of whom are women), based in Mulangoni village, with a population of 1800 people. They are based in Makueni County in Nzaui District. **Your support enabled them to build a new sand dam**

Wikwatyo wa Muuini SHG has 22 active members (15 of whom are women). The group are based in Katumani village, which has a population of 412 people. They are located in Machakos county in Mwala District. **Your support enabled them to learn improved farming techniques**

Sindano wa Wia SHG has 25 active members (24 of whom are women), based in Muangoni village, with a population of 132 people. They are based in Machakos county in Mwala District. **Your 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 communitites 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 for people to 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: Joseph, a member of Wikwatyo wa Muuini 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. Bedrock protruding from the riverbed surface was used, reducing the quantity of steel, cement and labour required, as the community needed to collect less sand, stones and water. During this process the SHGs also decided on the abstraction methods they preferred to use. ASDF then drew up designs and bill of materials for each 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 dam site to ensure permanent access to the dam. Once constructed , ASDF then helped the SHGs to register their dams with the Water Resource Management Authority (WRMA).

Wendo wa Matoki SHG excavating bedrock (above) and mixing cement (below) in preparation for their sand dam

CONSTRUCTION PROCESS

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

Above: Members of Wendo wa Matoki mixing cement for their sand dam
Top right: Members of Wendo wa Matoki collecting rocks needed for their sand dam
Bottom right: Members of Kinuvu constructing their sand dam

HOW THE DAMS ARE BUILT

Above top: Kinuvu SHG mixing cement for their sand dam
Bottom: Wendo wa Matoki SHG mixing cement for their sand dam

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 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 dam is watered to 'cure the cement' for 4 weeks after construction. Keeping the dam hydrated in this way lets the cement and sand particles bond together.

Above: Timber shuttering provides the framework for Wendo wa Matoki SHG's sand dam

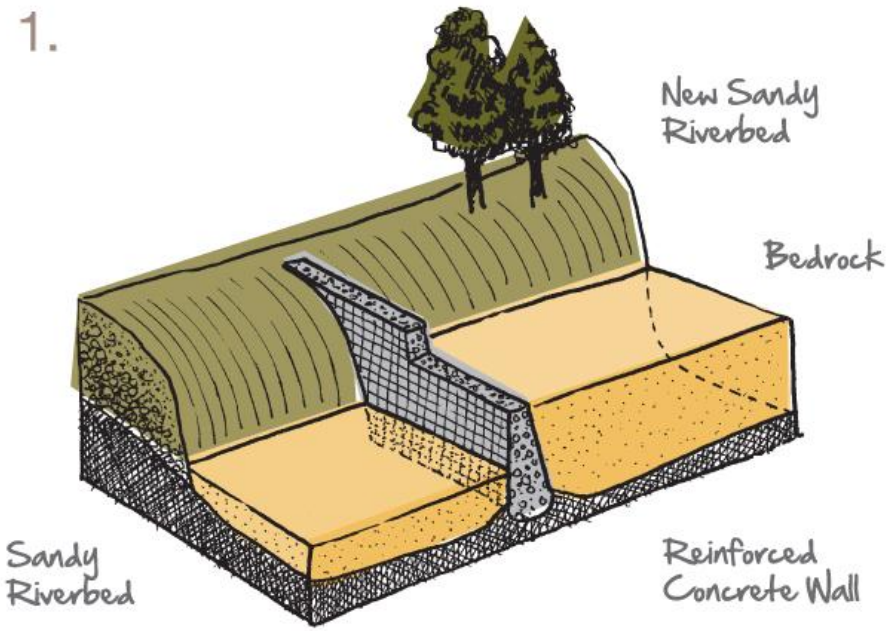
HOW THE SAND DAMS WILL WORK

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.

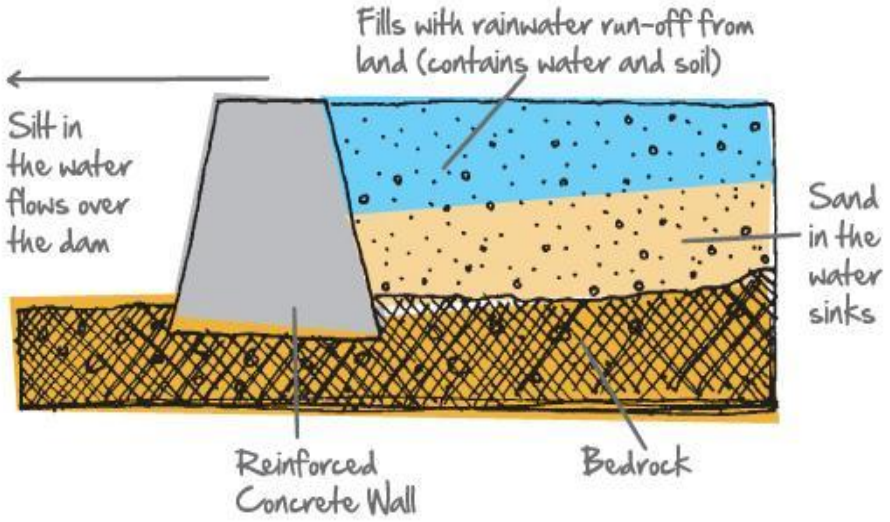
They can store up to 20 million litres of water and are widely suited to dryland regions of the world.

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.

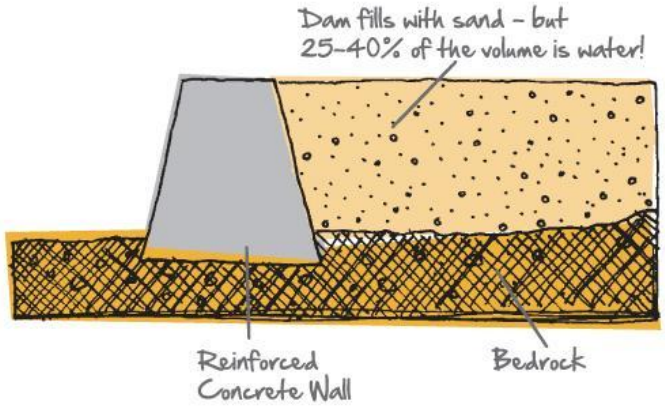
1.



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 Wikwatyo wa Muuini, and Sindano wa Wia 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-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 withdraw

Above: Wikwatyo wa Muini SHG members with produce they are now able to grow .

WENDO WA MATOKI SELF HELP GROUP'S ACHIEVEMENTS

Thanks to Rotary Clubs of Easthampstead, Crowthorne and Sandhurst, Elthorne. Hillingdon, Pangborne, Wokingham, and Basildon, Wendo wa Matoki SHG were able to build their sand dam in September 2017.

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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, so 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 sleeplessness 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, therefore 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 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

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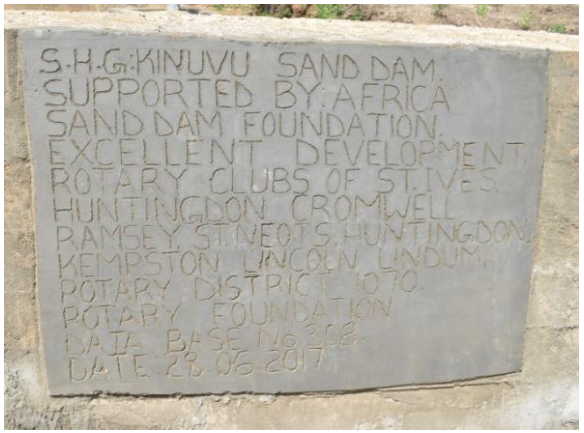
KINUVU SHG'S ACHIEVEMENTS

Thanks to Rotary Clubs of St Ives, Huntingdon Cromwell, Tamsey, St Neots, Huntingdon, Kempston, and Lincoln Lindum, Kinuvu SHG were able to build their sand dam in May 2017.



"I am so happy because it now takes less than 15 minutes to get water. I am currently digging tree holes and planting trees in my farm, now that water is close by" **Ndunge Nzovila**

KINUVU SHG INTERVIEW

The Africa Sand Dam Foundation started working with Kinuvu in 2015 and so far have built 5 dams, including this one supported by the Rotary clubs of St Ives, Huntingdon Cromwell, Tamsey, St Neots, Huntingdon, Kempston, and Lincoln Lindum

We recently spoke to members of the community who explained:

“I am planning to start farming and make full utilization of this available water resource, this will help me generate family income in payment of children’s school fees as well as improving living standards” – Susan David, mother of seven

“The Sanitation training has been a great eye opener to many of us, hand washing has now become a culture and a daily practice thus improving community health and hygiene standards. Risks of disease have decreased and our health is much safer.
“Water availability is also bringing a tree planting culture with many farmers investing in seedlings to plant during this rainy season, this will go a long way in environmental conservation and beautification” – Francis Somba, Kinuvu SHG Chairman

Top right: Susan David, mother of seven children and member of Kinuvu SHG
Bottom right: Members of Kinuvu SHG celebrating the completion of their new sand dam

SINDANO WA WIA SHG'S ACHIEVEMENTS

Thanks to their previous Rotary funded sand dam providing greater water access, Rotary club funds were used to support Sindano wa Wia SHG with learning improved agricultural techniques

"We now have 300 seedlings that we are currently watering using the same water, after they are grown we will share among our members and plant at our homes for our environment. Trees could not survive here without sufficient water," **Mule Nzoka**

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WIKWATYO WA MUUINI SHG INTERVIEW

Thanks to Rotary Club support Wikwatyo wa Muuini SHG were supported with learning improved agricultural techniques .

We have been working with Wikwatyo wa Muuini since 2015, completing 3 sand dams. Based in the Katumani village in Machakos County, most of the community are reliant on small scale farming to provide for their basic needs.

Joseph Kioko, 48, is the vice chairman of the group, he has been working hard in his farm to provide food for the family as well as earn income.

"*I received cow peas, green grams, sorghum and pigeon peas seeds which I planted in my farm. They are all doing well and are slightly past the flowering stage. I am expecting to get good yields as the future of my crops looks bright even in the low rainfall and hot sun. Through ASDF farming trainings, I have been able to learn important facets of farming such as inter cropping and tree planting.*"

Joseph Kioko (top right) and Veronica Ndunda (bottom right), members of the Wikwatyo wa Muuini SHG, implementing their improved agricultural techniques

HOW FUNDS WERE SPENT

Two Sand Dams & Two Farming Communities, Ukambani Region, Kenya	Budget	Total	Variance	Comments
Project Mgt & Fieldwork	£ 9,288	£ 9,288	£0	
Finance & Admin Costs	£ 3,121	£ 3,121	£0	
Transport	£ 1,951	£ 2,478	-£527	The communities were further from ASDF HQ, therefore higher transport costs were incurred
Sand Dams	£ 17,680	£ 15,793	£1,887	The dams used less cement than originally estimated
Participatory Learning & Training	£ 1,386	£ 1,386	£0	
Food Production	£ 539	£ 1,651	-£1,112	The cost of seed and manure for the demo plots has increased since the budget was submitted
Seed Banks	£ 1,304	£ 1,456	-£152	The cost of seed was slightly higher than originally budgeted
Tree Nurseries	£ 444	£ 1,368	-£924	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
Total Charitable Expenditure	£ 35,713	£ 35,713	£0	
Fundraising & Communications	£ 4,153	£ 4,153	£0	
Governance	£ 1,661	£ 1,661	£0	
Total Budget	£ 41,527	£ 41,527	£0	

The budget above shows the actual expenditure of the project- there was a slight variance in material costs, particularly material transport cost more than planned. This did not affect how your funds were spent.

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 the Rotary clubs of:

St Ives, Huntingdon Cromwell, Tamsey, St Neots, Huntingdon, Kempston, Lincoln Lindum, Easthampstead, Crowthorne and Sandhurst, Elthorne. Hillingdon, Pangborne, Wokingham, Basildon

And the Rotary Foundation.

THANK YOU FOR YOUR SUPPORT

Members of Sindano wa Wia SHG

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