



# ROTARY FUNDED SAND DAMS

*Kenya, 2015/16*



# 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.



## Patrons

Lord Joel Joffe CBE  
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 36 sand dam projects, 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. Thanks to your support, over 73,800 people now have access to clean water.

Rotary provided the following funding for these projects:

**£28,396 in June 2015 to fund the construction of two sand dams and support one farming community for a year.**

The principal objective for building these sand dams was to create year-round access to water for each of the Self Help Groups (SHG) and their wider communities.

This report details how funds were spent:

- **Tukile Self Help Group**  
Construction of one sand dam
- **Sindano Wa Wia Self Help Group**  
• Construction of one sand dam
- **Wasya wa Athi Ivinga Nzia Self Help Group**  
Support of farming activities (July 2015- June 2016)



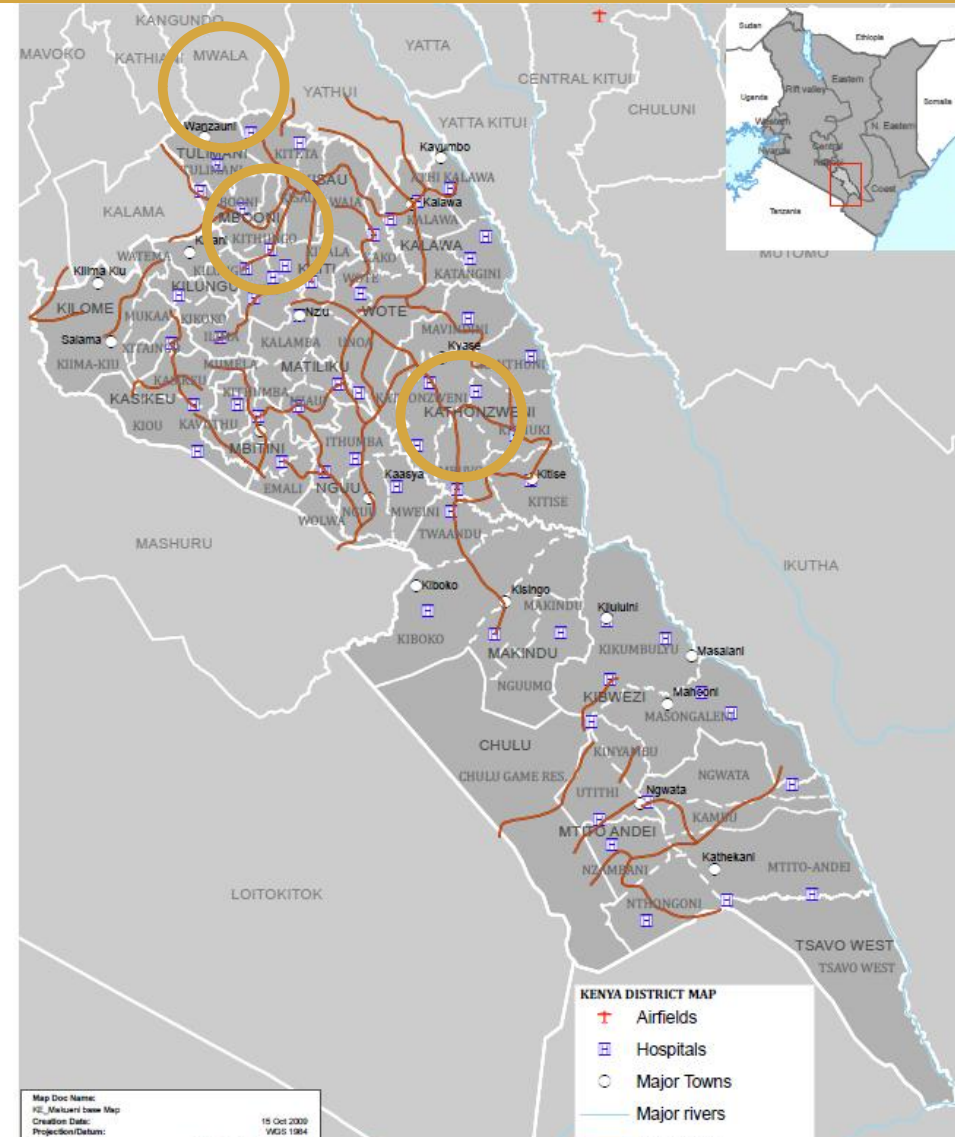
# CAUGHT IN A DRYLAND TRAP

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.

Communities supported by this project are located in the **Kathonzweni, Mbooni East** Districts in Makueni County, and **Mwala** District just outside Makueni County, on the Machakos Border (see map on right).





# THE COMMUNITIES

**Tukile SHG** consists of 25 active members (20 of whom are women), based in the Kalimani Muthawani/Yoa Villages. The combined village population is 491 people. This group is based in Kalimani sub-location in Mbooni East District (population of 3,560). **Your support enabled Tukile SHG to build a new sand dam.**

**Sindano wa Wia SHG** has 36 active members (33 of whom are women). The group are based in the Muangeni Village, which has a population of 705 people. They are located in the Ngungi sub-location in Mwala District. (population of 3,086). **Your support enabled Sindano wa Wia SHG to build a new sand dam.**

**Wasya wa Athi Ivinga SHG** has 26 active members (20 of whom are women), based in the Utoumo Mutheke Village, with a population of 2017 people. They are based in the Kanthuni Sub-Location in Kathonzweni District. The group already have 5 sand dams. **Your supported Wasya wa Athi SHG to learn improved farming activities.**

The new sand dams directly benefit 61 active SHG members, their families and the people living in the villages where the new sand dams are built.

In addition, the sand dams are intended to create a ripple effect of benefits for people living further away – typically the sub-location populations, 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 period.



Above: GPS locations of the two sand dams supported  
(Pink: Sindano wa Wia sand dam; Blue: Tukile SHG dam)

# 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 have to walk in search of water and saves them time and energy to work on their farms. SHG's 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 healthier nutrition. This will improve their health as well as concentration at school.



Above: Transforming the environment so farms can thrive- Sindano wa Wia SHG with their completed sand dam



# 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 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. 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).

The sites are chosen by for their sand dam, and use the bedrock protruding from the surface. By taking advantage of this rock, less cement and steel were required, and the community needed to collect less sand, stones and water.





# 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 Sindano wa Wia collecting rocks needed for their dam



(Above) Materials collected by Tukile SHG in preparation of dam construction



# HOW THE DAMS ARE BUILT



Above top: Tukile SHG at the trench dug for the wing walls of their dam

Bottom: Tukile SHG putting up timber shutting for their 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 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 Sindano wa Wia SHG's sand dam

# HOW THE SAND DAMS WILL WORK

## What is a sand dam?

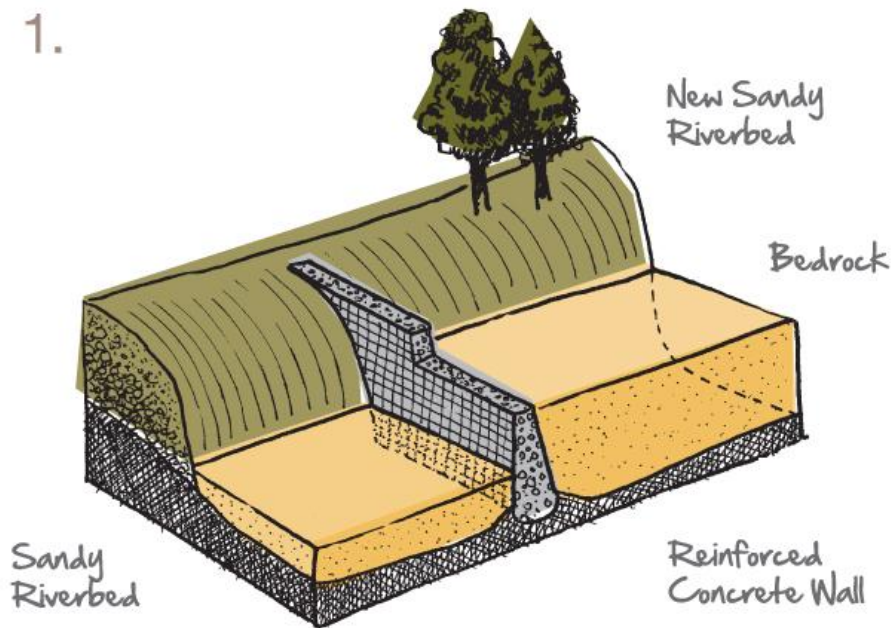
A sand dam is a reinforced concrete wall built across a seasonal sandy river. They are a simple, low cost and low maintenance technology that serves to retain rainwater and recharge groundwater.

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

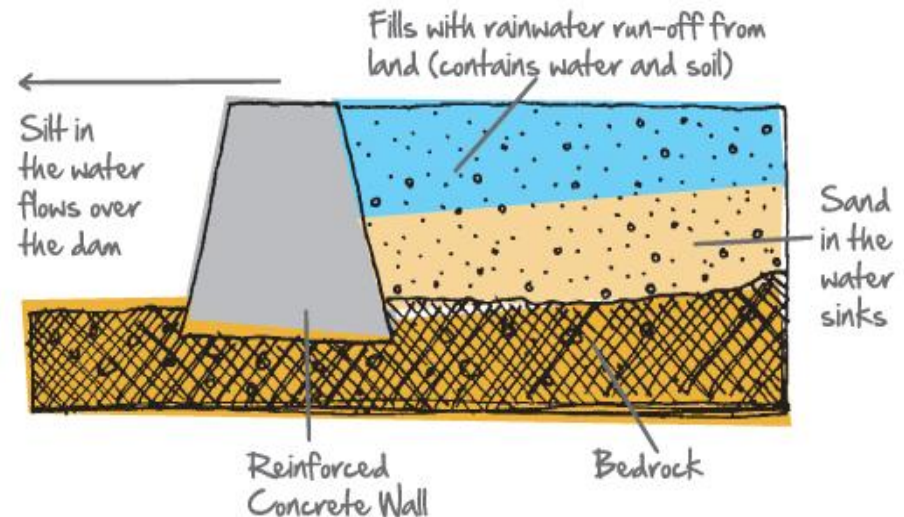
## How do sand dams work?

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.

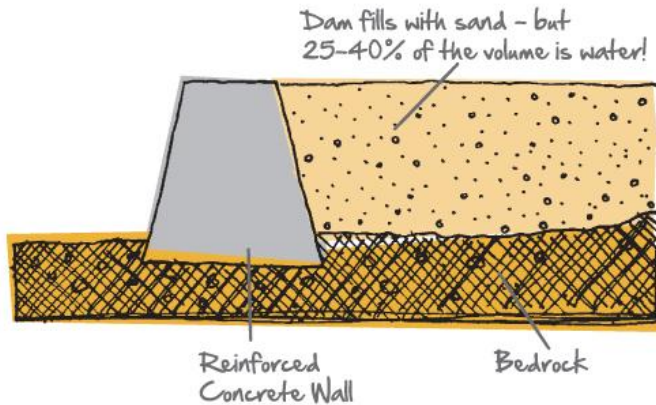


2. 1-3% of water flowing downstream is retained behind the wall





# HOW THE SAND DAMS WILL WORK



## 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.





# TUKILE SELF HELP GROUP

These photos show Tukile SHGs progress during construction of their sand dam:





# TUKILE SELF HELP GROUP COMPLETED DAM

Thanks to Rotary, Tukile SHG were able to build their sand dam in October 2015.

The photos show the completed sand dam, recognising **Rotary Clubs of Billericay and Rotary District 1240**.



Above: Tukile SHG's completed sand dam in October 2016

Top left: Dam plaque

Bottom left: Tukile SHG members standing on their new dam



# TUKILE SELF HELP GROUP COMPLETED DAM

The photo below shows Tukile SHG members standing next to their dams, after the rains, taken in February 2016. The dam has now filled with water and will become mature with each rainy season.





# TUKILE SELF HELP GROUP MEMBER INTERVIEW

In February 2016, we spoke to **Jane Kisulu**, a member of the Tukile self-help group about how her life, and the lives of her children and community members have been transformed following the construction of their sand dam.

Jane's children used to walk 2 hours every day to collect water. The sand dam built close to Jane's home has now cut down that journey to five minutes, giving her children more time for school. Her children (the youngest is currently 15 and the oldest is 33), could only carry so much water between themselves, sometimes having to sacrifice school work to invest in the journey and process of digging up and collecting water from scoop holes in river banks. The lack of water would also diminish the quality and quantity of farming Jane could do, as well as prevent Jane's fellow community women (responsible for the majority of farming) from being able to take daily baths and sustain household hygiene.

In 2015 following a presentation in their local market by ASDF, Jane and her community were sold on the idea of a local sand dam's potential to provide year in year out safe water supply and approached ASDF for support. After the construction of their sand dam in October, thanks to your support, Jane has already seen the benefits. She told us:

*"(Now) I walk 5 minutes from my home to get to our sand dam and clean water. My children have more time for work and school, and the community women feel more happy because their hygiene at home has improved".*

She added that due to the increased water supply her cattle, goats (to provide milk) and donkeys (to carry food and water) have become healthier and stronger to the extent they have been giving birth, expanding on Jane's livestock.

Moreover, Jane's trees are no longer dying like they were before the sand dam. As the sand dam not only provided water as an end product but training in terrace digging, farming and farming tools as part of the process, Jane and her community are now able to do large scale farming. During the harvest season, they do not only consume/use, but also sell surplus maize, beans, sorghum (a versatile grain that can be incorporated into a variety of food such as bread, cereal and pasta), cow peas (which can be grinded down to make dishes like soup and chapati), 40 fruit trees (a mixture of lemons and oranges) and 20 grevillea trees (a fast growing evergreen tree used by communities for timber which in turn can be used to build constructs such as granaries and food storages).



*"The sand dam and work with our supporters has helped our group stay together, to achieve the same goals.. for these reasons, we are happier."*

**Jane Kisulu, Tukile SHG**

# SINDANO WA WIA SHG SAND DAM

The photos on this page show Sindano wa Wia SHG members during construction of their sand dam.





# SINDANO WA WIA SHG COMPLETED DAM

Thanks to Rotary, Sindano wa Wia SHG were able to build their sand dam in August 2015.

The photos show the completed sand dam, recognising Rotary Clubs of Haslemere, Ashted, Farnham, Bookham and Horseley, and, Rotary District 1145.





# SINDANO WA WIA SHG COMPLETED DAM

The photos on this page show photos of Sindano wa Wia SHG members standing next to their completed dam:





# WASYA WA ATHI SHG FOOD PRODUCTION

Rotary's support also enabled Wasya wa Athi SHG to develop food production activities for a year. The group already have constructed four dams and have been focusing 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, lumber 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 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: Wasya wa Athi SHG members with tomatoes they are now able to grow with water from their sand dam.



# WASYA WA ATHI SHG FOOD PRODUCTION

In March 2016, we met with SHG members of Wasya wa Athi SHG. We spoke to Elizabeth Kyalo and her mother-in-law Terecia Muleia (both pictured top right) about the impact of their sand dams on their farming.

Elizabeth told us before the sand dam they had nothing. After getting water from their dam (all SHG members now have water less than 1km from their homes), they are now being supported by ASDF in training and improved farming techniques in order to grow more food.

Thanks to Rotary's support, they are now able to grow a variety of drought-resistant crops including, pigeon peas, green grams, dolichos lablab and finger millet.

- Pigeon peas can be used as animal fodder as wells wood fuel- and fetched a higher market price, when harvested green- enabling the SHG to sell and increase incomes.
- Dolichos lablab can be used as a cover crop to repair degraded land and is a rich source of protein which encourages milk production.
- Finger millet is one of the most nutrition cereal crops in the world- high in protein, with the third highest iron content of any grain- ideal for porridge.

For the first time, Elizabeth and Terecia can grow mango trees. Elizabeth told us that she is very invested in this work as she has seen such a transformation since building their dams. She feels very happy and excited about her farm.

Terecia's family have owned this land for generations. She told us the biggest change since building their dams and shallow wells is having water nearby for their farms. When she was a child, they didn't have donkeys to help carry water and had to walk long distances but now they have water serving a bigger population than their village. She has seen the rewards of their hard work with their hands. Terracing has enabled her to grow grass, to cut store and sell. Before their dams, during drought, their livestock would die as there was no grass for lives. It makes her very happy to see all of their accomplishments.





# WASYA WA ATHI SHG FOOD PRODUCTION





# HOW FUNDS WERE SPENT

2 Sand Dams (Sindano Wa Wia & Tukile SHGs) 1 Farming Community (Wasya was Athi Ivinga Nzia SHG)		BUDGET	ACTUAL	VARIANCE
<b>Project Mgt &amp; Fieldwork</b>	£	6,163	£ 6,163	£0
<b>Finance &amp; Admin Costs</b>	£	2,071	£ 2,071	£0
<b>Transport</b>	£	1,295	£ 1,295	£0
<b>Sand Dams</b>	£	13,127	£ 13,204	£(78)
Cement	£	7,081	£ 7,004	£77
Steel and barbed wire	£	1,103	£ 971	£132
Timber Shuttering	£	892	£ 892	£0
Tools	£	212	£ 212	£0
Material Transport	£	1,357	£ 1,662	£(304)
Dam permits	£	241	£ 223	£18
Skilled Labour	£	2,240	£ 2,240	£0
Shallow Wells	£	-		
<b>Participatory Learning &amp; Training</b>	£	666	£ 666	£0
<b>Food Production</b>	£	259	£ 259	£0
<b>Seed Banks</b>	£	627	£ 627	£0
<b>Tree Nurseries</b>	£	213	£ 213	£0
<b>Pioneering Sand Dams</b>	£	-		
<b>Community Contribution</b>	£	-		
<b>Total Charitable Expenditure</b>	£	24,421	£ 24,498	£(78)
				£0
Fundraising & Communications	£	2,840	£ 2,840	£0
Governance	£	1,136	£ 1,136	£0
<b>Total Project Cost</b>	£	28,396	£ 28,474	£(78)

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:

Rotary Clubs of Billericay  
Rotary Club of Haslemere  
Rotary Club of Ashted  
Rotary Club of Farnham  
Rotary Clubs of Bookham and Horseley

Rotary District 1240  
Rotary District 1145

And, the Rotary Foundation.

THANK YOU FOR YOUR SUPPORT

