

SGG-ROTARY TROPICAL TREE-PLANTING AND CONSERVATION PROJECT

INTRODUCTION

This is the final of a series of reports, which describe the purposes, the implementation, and the outcomes of an SGG four year programme to promote tree-planting and forest restoration in East & Southern Africa. Many of you will have seen earlier progress reports i.e.

[SGG-RotaryTP+Cproject\[1.2.2021\]](#) which covered the initial stages of this project, and the [TTP+CREvisedReport\[15.11.22\]](#), which included information gained mainly during SGG's May 2022 field visit. If you have not had the opportunity to read these documents, they are both available at <http://www.sustainableglobalgardens.org.uk>. This particular report concerns details of tree conservation implemented after May 2022 and before the end of this four-year programme on 31st December 2022.

This is also a suitable opportunity to draw some general conclusions from the implementation of this programme as well as acknowledging the many donors who have made the project possible.

PROJECT PURPOSE

The overall aim of this programme has been to promote an increase in tree cover in Africa South of the Sahara primarily for the benefit of small-scale farmers in those regions, but also as a contribution to improved biodiversity and climate change mitigation which can benefit us all.

Most of the trees planted so far have been planted on small-scale farms and have been directly useful to the farmer, such as fruits [e.g. mango, avocado, pawpaw, bananas, citrus fruits] or multipurpose species [e.g. *Grevillea robusta*, *Azadirachta indica*, *Markhamia lutea*, *Moringa oleifera*]. The main purpose of such tree-planting has been improvement of the environmental conditions & production on the farm, together with improved socio-economic status for the farming household. The work contributes to UN Sustainable Development Goals [SDGs] no 1 and 2, the eradication of extreme global poverty and hunger, which are the foundation aims of SGG. Such activity also falls within Rotary's 'economic and community development' and 'support for the environment' areas of focus. The strategy of working directly with small-scale farmers means that SGG contributes to UN SDG no 17, international cooperation & partnerships, at grassroots level. Most of SGG's tree schemes continue to be of this sort.

After 2019 SGG began tree-planting for an additional two purposes. One was for climate change mitigation and adaptation. SGG field monitors have noticed increasing concern about climate change in all our project locations. This is illustrated in the case of Southern Malawi. In addition to the customary long seasonal drought, this region has suffered the impact of 4 tropical cyclones during the 4 year period of this project [i.e. Idai in March 2019, Ana in January 2022, Gombe in March 2022, and Cyclone Freddy in March 2023]. By 27th March the official figures for damage related to Cyclone Freddy included 676 dead with a further 530 missing, while 213,259 children under 5 years old are expected to experience 'acute malnutrition' during the rest of 2023. This type of meteorological devastation makes development progress much more difficult, so climate change mitigation has become one of SGG's action priorities.

We also note that our African partners are increasingly aware that they suffer from weather extremes associated with increased atmospheric carbon – a problem which originates from Europe and other developed economies. SGG accepts the ‘polluters should pay’ principle. This implies that, although we view reduction of carbon emissions in developed economies as the priority action to reduce climate change, we also accept support for African small-scale farmers as justified compensation. Investment in tropical tree-planting not only provides such recompense in rural Africa but also aids climate change mitigation to benefit us all. SGG’s tree-planting for carbon capture contributes to UN SDG no 13.

A second new purpose for SGG is the reversal of biodiversity loss, which has occurred in several project locations. These locations often have spare land available for wildlife habitat restoration without significant damage to local farming. On such land forest restoration offers a solution which provides not only improved habitat but also a ‘carbon sink’, a more reliable water supply, and new employment opportunities outside traditional agricultural work. Some of SGG’s new planting schemes are found in such locations. Furthermore SGG partners experienced in such forest regeneration work have often concluded that natural regeneration, or ‘rewilding’, can be a more effective process than simple tree-planting. Thus, this action of forest regeneration is included in SGG’s tree project portfolio and contributes to UN SDG no 15.



These trees [see above left] were planted in 2014-5 to divide a maize plot into smaller sections, so they have not been counted as part of this project. However, the farmer is now looking for individuals who wish to offset their carbon emissions through SGG’s carbon capture network. Carbon capture will be a major component of SGG’s next tree project. This ‘mini-forest’ [see above right] has been developed by a single widow in memory of her late, environmentalist husband. It provides a marked contrast to the open cultivated fields which surround it. It is home to a family of monkeys, plus birds. The owner has a series of beehives for honey and income from the occasional sale of timber. She also claims more than 300 trees suitable for carbon capture.

TREE COUNT METHODOLOGY

SGG views this 2019-2022 tree programme as a great success. We have recorded 191,118 trees, mostly planted on farm as agroforestry but with more than 12% growing by natural regeneration. SGG has recorded more than 700 individual plantings, with some farmer partners planting on a regular annual basis. However, the tree counting methods used need to be considered when analysing these recorded figures.

An important consideration here is that SGG wishes to encourage an increasing number of small-scale African farmers to plant an average of 10% of their land with trees. Thus, where there is a general scarcity of tree cover, we have been inclined to be generous [e.g. Rusinga island, Kenya]. There are some additional reasons which may give an overestimate of tree cover i.e.

- farmers and our local coordinators are often inclined to exaggerate the number of trees on a plot. This can come in the form of counting seedlings too small to be considered trees, or including saplings so close to each other that one will die or be harvested well before it grows into a tree. This latter problem often occurs with *Markhamia lutea*, where there can be a scattering of 20-30 immature seedlings/saplings below a mother tree. This tendency is hardly surprising as farmers are paid according to the number of surviving trees and have an underlying optimism about progress;

- there will be some problems of double-counting, especially among Busia farmers who were visited in both May 2022 and February 2023. However, this would not be a problem in Tanzania, which was visited in November 2019 and again in March 2023. Only one farm was visited on both occasions. Nor was this a problem in Malawi where SGG has made only one tree count;

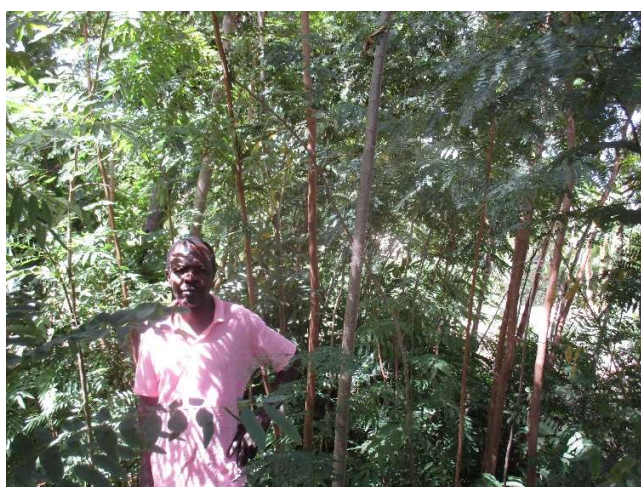
- there is a potential problem of trees being felled after being counted. SGG thinks this generally limited, except where thinning is needed and in the case of *Sesbania sesbans*, because we are offering further payments through the carbon capture scheme. However, concerning this issue SGG asserts the right of African farmers to use what they have grown.

There are also some factors which would result in these tree counts being underestimates e.g.

- there were some areas which were ignored, especially patches of natural regeneration on the slopes of Zomba plateau, Malawi. It was the rainy season when Malawi was monitored, so apart from the inconvenience of heavy showers there was often thick undergrowth which the conservation groups had not yet cleared. These factors made precise counting impossible so an ‘at least’ figure was recorded;

- as a general policy I recorded on the conservative, minimum side – partly to counter SGG’s perceived overcounting by local farmers;

- tree counting can be physically demanding or tiresome, with often limited time available in a tight schedule which required visiting scores of locations. When twilight approached it was often necessary to simply stop.



This farmer on Rusinga [see above left] has planted a small woodlot of mainly *Markhamia*, *leucena* and *ayeko*. Not all of these will survive to maturity, so our recorded count is probably an overestimate - but we were concerned to encourage this farmer group. We estimated that this conservation area, known locally as Hyena Rock [see above right], probably has an estimated 5,000 trees growing by natural regeneration. However, on the day of SGG’s site visit there was prolonged rain, mist and dense undergrowth where clearing was incomplete. SGG recorded 2,500 trees – a good example of ‘minimalist counting’ and almost certainly an underestimate.

There are two illustrations which demonstrate very clearly the lack of precision in these tree counts. One example is bananas. Where these are abundant with most farmers having 50-plus plants [eg. among the Chagga on Kilimanjaro] they were not counted, but where they were much less common [eg. Rusinga, the slopes of Zomba Plateau] they were recorded to encourage increased planting & food security. The other example is Sesbania sesbans. SGG is involved in a Rotary project to promote this species, which provides good fodder and is a soil improver, so figures for this species were recorded in May 2022. In January 2023 when SGG visited farm sites around Busia which previously had Sesbania we often found the bush missing. The problem here is that Sesbania provides nutritious livestock fodder and also excellent kindling, so it is of little surprise to find these recorded bushes often absent at the end of a long dry period.

RECENT PROGRESS

The original plan was to launch this agroforestry, carbon capture, forest restoration project in 2019, with a planting target of 100,000 in that year. However, SGG and much of the world was severely disrupted by the coronavirus crisis in 2020-2021, and SGG was unable to undertake the key task of tree monitoring. The project was therefore rearranged as a four year programme, with closure for new tree-planting in December 2022. However, that meant that there were many trees planted in Tanzania, Malawi, and between June & December in Kenya that had not been confirmed by field visits and recorded. The purpose of SGG's fieldwork in January-March 2023 was to include those trees.

As the Malawi project had not previously been visited, I spent half of my two month fieldwork at two locations near Zomba.



This field [see above left] is a 3 acre plot owned by a church in Thondwe village. It is given over entirely to the monoculture of maize, with trees occupying less than 1% of the land. This is understandable as maize is the staple food crop, but maize rapidly depletes soil nutrients and requires a costly input of fertiliser. Furthermore, after a crop is harvested a field is left bare, and is vulnerable to soil erosion – even a field this flat. Nearby [see above right] another farm illustrates a much more environment-friendly and more profitable use of a similar area. SGG supports the policy of diversification away from entire dependence on maize monocropping.

With population growth above 2.5% pa. Malawi has lost most of its forests in the last 50 years. One result of this is that heavy rains, especially on hillslopes make soil erosion inevitable. It should be noted that steep but treeless hillsides are very vulnerable to landslides & mudslides during events such as Cyclone Freddy.



This lone tree [see above left] is located next to the track between Zomba Forest Lodge and Nankhunda village. This photo was taken midway through the rainy season, so it is safe to say that the harvest from the maize in the foreground will be minimal, a failure. A more profitable use of the land can be seen in the left background where there is a large eucalyptus plantation. Of more concern is the background area to the right of the tree. Here on the upper grounds the slopes are often steep [this photo is rather deceptive!] but the cultivation is mainly maize monocropping. Here [above right] is a completely different land use strategy just across the track to the right of the lone tree. Local villagers have been paid to prevent dry season fires and also clear weeds during the rainy season to encourage natural regeneration of the former forest.



How successful is natural regeneration compared to simple tree-planting? The photo on the left shows members of the Happy Hammers sports club clearing land in January 2020. The photo on the right shows the same area three years later. On the basis of these photos and several other plots around Zomba Forest Lodge, I think that natural regeneration is an excellent and badly needed strategy, especially in areas of mountainous terrain where extensive slopes have been cleared of trees. However, to be fully successful this type of regeneration requires regular clearance of weeds, probably 3 times a year. This requires much labour & community participation, but it also offers villagers the opportunity for additional income in what is a semi-subsistence economy. Another aspect is the need to reduce pilfering of wood, perhaps best done by greater use of stoves which require much less fuelwood. There is also the need for spot-planting to introduce and care for slow-growing indigenous species to create greater biodiversity in the new forests. SGG considers that there are two other elements necessary if this type of natural regeneration is to succeed in the African context. One is that government authorities need to shift from a traditional timber-extractive approach to forestry to a policy which considers the long-term value of forests in terms of carbon capture potential, greater biodiversity [a tourism asset], and security of water supplies. The other requirement is that local communities have stakeholder 'ownership' of the forest, to be developed for their benefit.



There are two improvements which could be implemented fairly rapidly around Nankhunda. Here [see above left] two neighbouring farmers have agreed to leave a rocky area between their farms as a small conservation 'copse' of about 250 trees. SGG will pay these neighbours a small fee to maintain this type of land use. Around this village there are several other similar copses, where biodiversity could be maintained on land ill-suited for farming and where farmers would appreciate additional income. Where the forest has not been cleared [see above right] recently there is considerable scope for carbon capture. This particular forest already has sponsors willing to give an additional small income on the proprietors' assurance that these trees will not be felled in the next 10 years.

SGG's visit to Zomba Forest Lodge and Nankhunda village was part of a 5 year programme, now in its second year. During this visit 96 sites were visited for tree counting and an estimated 22,509 trees recorded. For reasons mentioned earlier SGG regards this figure as a significant underestimate. Some of the 'conservation areas' where natural regeneration was underway were not counted [e.g. Hyena Rock, the Happy Hammers area, Umwozi Youth Group area etc] as clearance of weeds had not taken place by the time of SGG's visit. Furthermore there are probably about 100 farms where agroforestry trees have yet to be counted. Thus, the four weeks spent at Zomba Forest Lodge proved to be insufficient for a full tree count, especially as some 10 days out of the month were occupied with horticultural activities and visits at Thondwe. We are fairly confident that a full tree count would produce a minimum of 30,000 trees.

With considerable work left unfinished by February 2023, it is SGG's intention to return to Zomba in 2024 to continue tree-planting and reforestation activities. One aspect will be the completion of a comprehensive tree count, which SGG hopes will establish the importance of the natural regeneration strategy. We would hope next year to extend these conservation areas, both in the Zomba Forest Lodge concession area but also in the small copses on village land. Another aspect will be the promotion of agroforestry planting. It is very noticeable that many of the maize plots are devoid of trees, [see Thondwe church plot & the 'lone tree' photos] especially where cultivation is away from the home or on the upper slopes. Thus, we plan to establish tree nurseries to encourage more local farmers to adopt an agroforestry approach to their land management and to provide additional employment outside the traditional farming activities. All of this will, of course, require capital expenditure, so one of SGG's main tasks for the rest of 2023 will be the search for further sponsorship. With regard to this it is hoped that many rotarians and others will consider using tropical carbon capture as an appropriate way to reduce their carbon footprint. Details on how this can be done through SGG's network of contacts will soon be available on the SGG website i.e. www.sustainableglobalgardens.org.uk.

The core area for SGG agroforestry projects has been Busia county, West Kenya where we have contacts with about two hundred small-scale farmers. The majority of this group have been planting trees with SGG support for several years, so the common pattern now is for those farmers to plant whatever species they prefer at a time convenient to them and then wait for remuneration for 'environmental services' during SGG's next monitoring visit. Although only two weeks were spent in this location, we managed with the help of SGG's coordinators to record a total of 10,696 trees planted by 84 of our partners. Perhaps some of SGG's counters were overgenerous in their counting, but this would probably be counterbalanced by the fact that many farms were not counted on this occasion [eg. the Temakho group]. The above total was rather higher than we expected, but one reason for this is that, as farmers hear from neighbours that they can receive additional income from tree-planting, some of those farmer groups are gaining new members.



Many farmers in Busia have been SGG partners and tree-planters for several years. These farmers can now gain an income from timber & fruit sales and also from carbon capture payments. Here [see above left] is an example of such trees belonging to a member of the Siritanyi group. Some of the farmers have now gained sufficient experience of tree-planting that they are ready to try new species. Here [see above right] a member of CIF shows his agroforestry planting of *Sesbania sesban*. This bush is grown primarily as a fodder crop and as a soil improver. SGG is continuing to promote *Sesbania* in this locality.

One of the most pleasing aspects during SGG's Kenya visit was the tree count on Rusinga for the Kasiwe Farmers Association. As this was the first time such a tree count had been made by SGG, we expected to count approximately 5,000 trees in a two day schedule. The actual count for 33 farmers in the group was 9,611. This latter figure will be an underestimate, because one member of the group had a eucalyptus plot where 5,000 seedlings had been planted. We did not have time to confirm this number, so SGG recorded a minimalist estimate of 2,000. Before we left we noted that there were other farmers wanting to join Kasiwe and show us their trees.

Most of the other Kenya farmers captured on SGG's datasheet this year are located around Kitale where we are partnered by two Friends church groups. Despite lengthy dry periods since the last tree count in May 2022, our records show that 6,155 trees had been planted by 45 partners in the latter part of 2022. Furthermore, as several members here have been committed to annual tree-planting for several years there are many trees suitable for carbon capture payments. What we urgently need now are clients wishing to pay to offset some of their carbon footprint through increased tree cover in Africa.

The total count for SGG's 162 partners in Kenya 2023 is 26,462. This means that West Kenya is now the core region for our agroforestry activities. We expect this to continue in SGG's next tree project, and discussions are already underway concerning where new planting schemes could be established in Kenya.

The large number of trees to be considered in Kenya and a fixed date for a return flight to the UK meant that we had very little time to consider tree projects in Tanzania. The visit was more about reconnecting with former contacts, not seen since November 2019, than close monitoring of trees on individual farm visits.



The Tanzania fieldwork included visits to 6 farmers around Mamsera village in Rombo District where tree-planting has continued on already crowded plots [see above left]. Two changes were very noticeable. One was a much greater interest in planting avocado, which accounted for 451 out of a total tree count of 1,175 for recent planting. This is a consequence of new marketing opportunities and export to China. This has encouraged some new techniques, including the grafting of avocados [see left]. Another development which has been happening for at least a decade is that farmers are establishing new farms either on the lower dry areas or on steep slopes which are also very dry. This often requires a different set of crops and tree species, although bananas seem to be grown wherever possible on Chagga farms. Here [see top right] is an example of a new farm established on steep, dry ground

Another interest in Tanzania was the promotion of *Tephrosia vogelii*, a bush which produces a natural pesticide. This programme is being led by Dr Mkindi of Nelson Mandela African Institute of Science and Technology, which is near Arusha. Carole and I spent a day visiting one of Dr Mkindi's farmer groups where we counted some 445 *Tephrosia* bushes on 6 farms. In addition there were an estimated 366 *Tephrosia* on farms we were unable to visit in the time available.

There was insufficient time to visit most of our former contacts, even though some of them had a significant number of trees to be confirmed and recorded. One contact we did manage to visit was Faye Cran of Moshi Rotary Club, who escorted us to two sites which had a total of 785 trees, most of which were fruits. We also visited the site of Ngarasero Forest near Usa River but not SGG's contact person there. These trees were not counted as this had been previously done in 2019.



Tephrosia vogelii is often interplanted with another crop as it is leguminous and so improves soil fertility. Here [see above left] it is planted in a line between the farmer & myself and in between rows of coffee bushes. The trees around Ngarasero estate continue to grow. Along some of the paths through this forest there are signs of casual cutting of branches for firewood and also some damage from livestock. Elsewhere, especially away from pathways, trees are getting taller and the forest more dense. Furthermore, there are patches where the forest is beginning to grow by itself. These [see above right] are self-seeded Grevillea robusta saplings in a cluster below the mother tree – an example of natural regeneration.

A total tree count of 2,940 for 37 locations in Tanzania in 2023 sounds rather disappointing, but it must be remembered that most of our contacts were not visited even when we knew they had trees to show SGG. The conclusion here must be to allocate much more time to planters in Tanzania during the 2024 monitoring visit.

SUMMARY AND FUTURE PROSPECTS

Are there any conclusions which can be drawn from SGG's field experience during this four year programme? I would suggest the following are the salient points:

- there is an enormous potential in Africa South of the Sahara for tree projects, both by agroforestry and natural regeneration. Even in areas where the rural population density is quite high, there is abundant poorly used land available. From SGG's field experience in Tanzania, Kenya and Malawi there is more than a sufficiency of farmers looking for additional income and willing to plant/care for trees -provided they receive some benefit/financial reward for their 'environmental services'. The more serious obstacles to increasing African tree cover are government policies & practice concerning land & forest ownership. Another major difficulty is the slowness of potential donors & investors from the Developed World to appreciate the full value of African tree projects ie. not just as an environmental improvement but also as a core strategy for poverty and hunger eradication
- African tree projects can make a major contribution to climate change mitigation, both through conservation areas and agroforestry systems on small-scale farms, and SGG has scores of contacts who have agreed to use their trees for carbon capture. Some of these are in small patches of forest [see the photos around Nankhunda on p5-6, and the 'miniforest' on p2] but many are well established trees on small-scale farms [see p2 and 7 for examples];
- one of the criticisms against using a tree-planting mechanism for climate change mitigation is that trees take a few years to grow before they capture significant carbon. For this reason SGG is implementing carbon capture where the landowner has 50- plus

trees which are all at least 3 years old and have a trunk circumference at head height of at least 35 cms. We have a simple measuring test so that farmers can quickly judge whether or not a tree will be accepted by SGG for carbon capture: “put your hands round the tree trunk at head height. Have your two thumbs touching on one side of the trunk and see if two of your fingers can touch on the other side of the trunk at the same time. If they cannot, that tree is suitable for SGG’s carbon capture scheme”. Of course, as can be seen from the photos mentioned above, many of trees in question far exceed these minimum threshold figures;

- another concern related to tropical farmers involvement in carbon capture is that those farmers may accept a payment for carbon capture and subsequently fell and sell the timber. This is a legitimate concern. SGG’s solution to this problem is for farmers within the SGG carbon capture network to accept an initial 20p/tree payment when they register their trees [this figure is the normal SGG remuneration for the planting of most tree species], and then receive a further 80p at the end of the 5 year period. Thus, the full remuneration is £1/tree over a 5 year period. At the end of that initial 5 year period, participating landowners will be offered a further £1 for another 5 year period. A payment of only £2 for an already mature tree to remain in place and capture carbon seems a low price in comparison with European commercial market prices, but it seems to be an acceptable price to African farmers who currently receive nothing for care and maintenance of their trees. The delayed payment mechanism also seems acceptable to those farmers, probably because they understand that those trees left to grow are generally increasing in value by approximately £1 pa. Thus, a woodlot of carbon capture trees represents a significant “savings bank” for many of SGG’s partners;
- after the SGG visit to Zomba Forest Lodge and its neighbouring villages, we are impressed by what can be achieved through natural regeneration strategies. Accordingly, we intend to invest in the future more heavily in this type of development, especially when it engages/employs large numbers of local people. We hope our sponsors will perceive this type of tree project to be as valuable as agroforestry planting, particularly as such woodland cover offers the benefit of improved biodiversity;
- what can SGG achieve in 2024 as part of a new tree programme? In view of the many locations which have been ignored and where we know that there are landowners planning to increase their tree cover, we believe it within SGG’s capacity to facilitate the planting or regeneration of 100,000 trees by the end of 2024. In order to achieve this we shall need to raise a budget of approximately £25,000, most of which should be raised in 2023 so that our African partners can have greater assurance about how to proceed;
- SGG fieldworkers believe that we have appropriate strategies for a rapid and extensive increase in African tree cover. We believe our methods to be widely replicable outside the countries where SGG is active. However, we are a micro-development group with limited resources. We therefore call upon other larger entities within ESRAG, Rotary International, and other institutions to engage in similar activity elsewhere, everywhere that it is needed.

Paul Keeley

c/o Sustainable Global Gardens

7th April 2023

SUSTAINABLE GLOBAL GARDENS

Specialising in small-scale horticultural, environmental and social projects in support of UN Sustainable Development Goals 1 & 2, the eradication of global poverty & hunger, and also Goal 13, action against climate change.

We wish to acknowledge the following people and organisations who have contributed to the funding of this project and made it possible.

1. Newcastle Gosforth Rotary Club for Busia, Kenya & N E Tanzania
2. Sherwood Sunrisers Rotary Club for Rombo Mkuu, Tanzania and Busia OVCs
3. Newcastle Rotary Club for Jeremy Lowney in Boma Ng'ombe, Tanzania
4. Berwick Rotary Club for Siguli farmers, Busia
5. Robin Ashby Gosforth councilor
6. Wymondham Rotary Club for moringa planting
7. Oscar Moron Gomez
8. West Vancouver Rotary Club for Malawi
9. Tyneside Rotary Club for Mali Hai, Usa River + Mwika Rotary Club, Tanzania
10. Gill & Keith Brown for fruits
11. Milton Keynes Rotary Club
12. Barton-le-Clay Rotary Club
13. Simon Linnington
14. Robert Blakey of Stokesley Rotary Club
15. King's Lynn Rotary Club for Butula Cluster farmers Kenya
16. ev.energy + Alex McLarty for Kipsaina Crane and Wetland Conservation Group
17. Thornbury Rotary Club for Ndaswa group, Rombo District, Tanzania
18. Paul Jackson
19. Emma Keeley
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22. Tula Trust - as above
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27. Erimus Middlesborough RC
28. The Pat Newman Memorial Trust for Zomba, Malawi
29. The St Mary's Charity for Zomba
30. Brewdog PLC for Kenya, Tanzania and Malawi
31. The Ian Askew Charitable Trust for Zomba
32. The Camellia Foundation for Zomba
33. Jug of Oil for Zomba
34. The Hasluck Charitable Trust for Zomba

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