TREES FOR CARBON CAPTURE

INTRODUCTION

Sustainable Global Gardens has had a programme promoting tree-planting in East Africa for several years. Nearly all 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. For 2020-1 most of SGG's planting will continue to be of this type.

SGG has noticed in recent years that many East African farmers have become aware of the changing climate in their locality. Streams that once flowed are now dry beds. Other localities seem to be increasingly affected by erratic, unpredictable rains and flash floods. Some towns, such as Moshi, are now experiencing unprecedented high temperatures. Many in North-East Tanzania can only watch as the glaciers on Kilimanjaro continue to shrink. Many of those farmers are also aware that

- their lifestyle makes a relatively small contribution to the emission of greenhouse gases which have caused global warming and climate change. The main contributors to greenhouse gas emissions are the prosperous industrialised economies of Europe, North America and East Asia. Thus, on the basis of 'the polluter pays principle', it is reasonable to expect [or at least hope] that the more prosperous will be willing to donate some compensation to those suffering most from climate change;
- personal visits within their own East African communities quickly establish that places with good tree cover are more comfortable for living and more productive for farming than those places which are treeless. In addition there is also the widespread perception among African farmers that 'trees can bring more rain';
- thus, there are many who are prepared to plant trees inside & outside their own farms, along river banks, on steep, rocky terrain unsuitable for agriculture or restore degraded forest areas in an effort to halt rapid climate change.

SGG's current project, therefore, allows anybody who wishes to make a personal contribution to climate change mitigation to sponsor East African farmers who are able to plant trees on their behalf. The arrangements for this partnership will be made by Sustainable Global Gardens [UK charity reg. no. 1116243]. Any funder who wishes to have further information about Sustainable Global Gardens [SGG] is invited to browse the website www.sustainableglobalgardens.org.uk .

RELEVANT INFORMATION

The original plan was to launch this 'carbon capture' project early in 2020. However, SGG and the whole of Europe have been severely disrupted by the coronavirus crisis. At the time of writing, late March, it looks likely that the project will not get fully underway until November 2020 when SGG hopes to undertake a field visit to East Africa, make agreements with African planters, finalise the locations suitable for planting etc. Before next November, SGG's main efforts will be focussed on raising awareness about tropical tree-planting for carbon capture and securing sponsorship for this activity. However, we do not quite know what the future will bring!

As SGG is in the preparation stage of this project with neither all the stakeholders nor the available budget yet known, the formal writing of all relevant project details is not yet done. However, the formal version of the project will include the following points:

- the fundamental aims of SGG are poverty & hunger alleviation within locations where incomes are typically below $2/day. We strive to contribute to UN Sustainable Development Goals 1 [i.e. end poverty in all its forms everywhere] and 2 [i.e. end hunger, achieve food security, improve nutrition and promote sustainable agriculture]. Most of the projects we support are located in rural regions of Eastern Africa,
- SGG's general strategy is to partner with small-scale, semi-subsistence farmers and to promote various innovations which can increase farm productivity and household incomes. Such innovations have included microirrigation, improved composting, use of natural pesticides, permaculture methods, microfinance, and agroforestry. For the last 5 years agroforestry has been by far the most important innovation as we have clear evidence that this is one of the most effective methods of enabling poor farmers to move out of poverty,
- SGG has several years' field experience of tree-planting in Kenya, Tanzania and Malawi. In 2017-8 SGG registered 41,475 trees newly planted in those locations as part of a Rotary International initiative. Under SGG's present circumstances we believe SGG has the capacity to arrange through our local African partners the planting of up to 100,000 trees. This scheme with an initial planting target of only 10,000 trees is only a small component of the much larger tree-planting programme,

The location of carbon capture trees will be significantly different from SGG's previous planting locations. Until 2020 virtually all tree-planting was located on farms or on school grounds within those farming communities. These locations will continue to account for most SGG planting, but we are now looking also for planting sites where trees can continue to grow with limited interference from neighbouring villagers.

Good planting sites for carbon capture include:

- remnants of forest which can be restored or extended. Ngarasero forest *[see left]* near Usa River in Tanzania is a good illustration of this;
- riverine sites, especially where riparian land is steep & unsuitable for agriculture. Tanzanian farmers are not supposed cultivate within 20m of streams to protect water supplies;
- summit & watershed sites where soil is stony after previous soil erosion;
- within 50m of springs.

- preferred tree species will also be somewhat different from previous schemes. For this carbon capture project SGG favours the planting of large indigenous species [eg.Albizia schimperiana, Cordia Africana, Maesopsis eminii, Milicia excelsa, Trichilia emetica etc.], although onsite conditions will have a considerable influence on which particular species is planted. SGG will continue to promote certain tree species [e.g. pawpaw, moringa] but not for carbon capture: these species are suitable for farms but have soft wood and limited carbon capture potential.

Close to Ngarasero forest there are various smaller patches of land where the forest could be extended, sometimes with the possibility of linking together two areas of forest. Such linkage can establish 'wildlife corridors' and help maintain the biodiversity of the forest. Here *[see above left]* is an example of Ngarasero forest extension with trees planted in the last 3 years. Different species are best planted according to different site conditions *[see above right]*. To the left of the path is level terrain and farmland where more than 100 Grevillea & Casuarina have been recently planted around a banana shamba. To the right of the path is very steep ground & a river. Here 'mikuyu'/fig species and 'loliondo'/Olea capensis have been planted.

Even in areas of high population density, it is possible to find small pockets of relic forest being conserved. Here is a plot of land near Matayos, Busia in West Kenya *[see below left]* with mature indigenous species. There are now many farmers who enjoy the pleasure of living among trees. Here is another patch of forest near Matayos *[see below right]*. Both of these situations where the land owner has no desire to fell trees for economic gain offer suitable sites for carbon capture.

- SGG has received many donations & small grants in support of tropical tree-planting. The justification for planting in East-Southern Africa is threefold : a] young seedlings are much cheaper to buy in African markets, so SGG advertises on the basis of "plant a tree for 20p" and a donor plants many more trees than could be planted in the UK where a young 'whip' with protective sleeve & stake typically costs about £2.50p; b] trees grow much faster in the humid tropics; c] tropical trees have all the environmental benefits of trees in the planted in the temperate world but also much greater 'humanitarian benefits' as they are often used as a 'reserve bank' to cover educational/medical/other occasional costs,
- thus, this particular scheme has two aspects. One is to provide a tree-planting mechanism for those who wish to reduce their carbon footprint. The second aspect is to implement tree-planting in various African locations as a strategy for both income-generation and on-farm environmental improvement. The overall purpose of this scheme is to contribute to climate change mitigation by carbon sequestration,

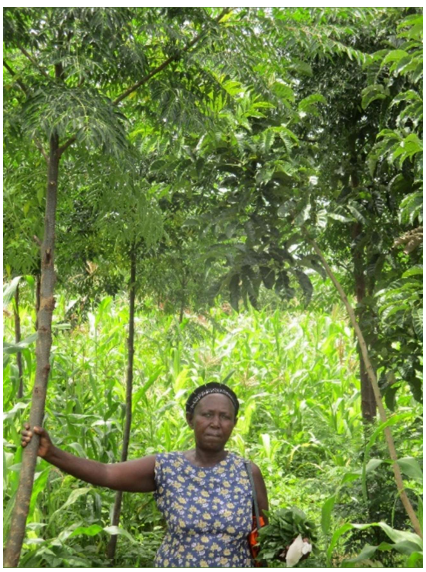
- the case for planting trees for carbon capture is so strong that SGG intends to incorporate carbon capture planting as a major new component within our tree-planting programme,
- this is a pilot scheme so the planting target is set at 10,000 for trees planted in tropical locations. There is an additional planting target of 5,000 for those who are prepared to pay a significantly higher premium to offset their carbon footprint but wish their tree-planting to be undertaken in the UK,
- the tropical tree-planting requires 100 farmers [this will not be difficult as SGG has had contact with more than 250 farmers for more than 5 years in Busia County alone] who will have 100 trees each registered for carbon sequestration. Each farm will be georeferenced so that strict monitoring, transparency and accountability can be maintained,
- each participating farmer will agree to take care of the registered tree for a period of 5 years. To ensure that farmers comply with this, they will be paid 20p when the young tree is first registered and 80p 5 years after the initial tree registration,
- participating farmers can join this project in two ways. They can plant a new seedling. That seedling will be checked after several months to ensure that the seedling has survived. If it is well established the farmer will be paid the initial 20p. As SGG has been promoting tree-planting for several years, most farmers we know plant seedlings at the time most suitable for themselves and then wait to claim their 20p when a SGG representative visits their farm. We anticipate such payments & registration beginning in October 2020,
- an alternative approach is to include well established trees which are 2 years old, have a height of at least 3 metres and a girth of at least 15 cms. SGG has detailed records concerning trees planted in a previous project, and these trees will be excluded. Eligible trees will be registered, farmers paid an initial 20p, provided the farmers can ensure that those trees will be maintained for another 5 years,
- after the initial registration in late 2020, most of the participating farmers will be visited on an annual basis, so SGG can produce regular progress reports for significant donors. However, all farms will be visited before the final payments are made after 5 years. At that time farmers will be offered further 'carbon payments' if they wish to maintain their 100 trees for another 5 years,
- SGG estimates that the likely number of beneficiaries is 480. This is based on 4.5 being the average farmer household size in Busia, West Kenya where many of these trees will be registered. This project will also provide work for several local tree nurseries, typically employing 2-3 persons so perhaps 20 persons in total. Most of the local fieldwork & monitoring will be undertaken by local coordinators, with whom SGG has worked for several years. SGG estimates that 10 coordinators will gain significant income from this occasional work,
- SGG's priority is to promote tropical tree-planting. This is based on: a] the low cost of African seedlings & labour, which enable several times more trees to be planted there than is possible with the equivalent funds in UK; b] the great value of trees for improving onfarm environmental conditions, farm productivity, and farmers' incomes, thereby contributing to UN. Sustainability Goals No 1 and 2 of poverty & hunger eradication; and c] the ready availability of suitable space in the regions where SGG partners live,
- SGG is also aware that some donors may wish to reduce their carbon footprint by tree-planting, but would prefer those trees to be planted in the UK. SGG does not want to deny such donors that option, so we would be pleased to fund environmental partners who are implementing tree-planting schemes anywhere in North Britain. Donors should indicate their preference for carbon capture in East Africa or UK.

PROGRESS SO FAR

One perhaps unusual aspect of this carbon capture scheme is that the tree planting will be undertaken mainly by African small-scale farmers, who are also at the same time growing trees for agroforestry purposes. This will require some extra work by SGG & the local farmer/landowner as it will be important to indicate by georeferencing or some other type of marking which trees are grown for which purpose. SGG does not think that this will be difficult work because tree species particularly suitable for carbon capture are often planted on different terrain to those used for agroforestry purposes. Furthermore, a single landowner/farmer growing trees for two broadly different purposes has the great benefit of allowing that person to make more sophisticated environmental investment decisions, which are more suited to the particular site on which the trees would be planted. It means that key decisions are being made by the local stakeholder rather than SGG. This usually happens as a matter of course in Europe, but in the African context fostering the decision-making role of the local partner is an important part of U.N. Sustainable Development Goal No. 17 i.e. to strengthen global/international partnerships.

SGG made a field visit to East Africa in October-December 2019 to monitor progress in a continuing tree-planting programme. The overall conclusion from that visit is that there are now very large numbers of local residents who want to plant trees to improve their local environment, and that the main constraints for them are the initial investment costs in terms of finance, labour etc. It is SGG's contention that a large number of relatively small grants & donations can stimulate extensive replanting of the Earth's vegetation cover, in Africa, Europe and elsewhere – for the benefit of us all.

Much of the work done during that field visit involved visiting farms, counting and registering trees for either agroforestry or carbon capture purposes.



Trees can be planted for a variety of reasons. The Mukwano Orphans group near Matayos, West Kenya have just established a kitchen garden to improve local child nutrition *[see top left]*. When it is fully developed they will plant among the vegetables 100 Moringa & some fruits for the same reason. This is agroforestry, but the landowner has sufficient spare land to plant trees suitable for carbon capture *[see below left]*. Bungoma Rotary Club invited SGG to visit some of their tree-planting projects. Here *[see top right]* we were visiting a meeting of hundreds of school parents. It was agreed that the Rotary club would provide 1,000 seedlings for parents to plant at their homes. Some parents will plant in an agroforestry system, but others wanting long lasting indigenous trees will prefer to plant for carbon capture. For this year Bungoma Rotary have pledged to plant some 3,600 trees during the next long rains. Large school grounds, such as above, can often provide good opportunities for carbon capture.

Among the partners known to SGG space for tree-planting is often more available in Tanzania than in Western Kenya. School grounds are often significantly larger, so that both agroforestry and carbon capture can be practised. Here at Mamba Secondary School *[see top photo]* 149 trees which had been planted since March 2019 were counted by SGG on 18th November. 92 of these were avocado, but many of the other species were suitable for carbon capture. At another local school visited by SGG there were an estimated 716 trees planted within the previous year. This school has sufficient space to plant more than 40,000 trees!

One of the most suitable sites for carbon capture is Ngarasero Forest near Usa River in Tanzania. Within this quite small forest *[see below]* 960 indigenous trees [e.g. mikufi, msesewe] have been planted since March 2019. This area is within the grounds of a tourist lodge where forest restoration and biodiversity enrichment bring the economic benefits of ecotourism. Below is the view from the front of my accommodation used during the last SGG field monitoring visit. What a beautiful location to use for carbon capture!

What is the overall situation in terms of tree counts & registration? During the Oct-November field monitoring, SGG registered 25,781 trees as part of SGG's current tree-planting project. We estimate that approximately 20% of these trees are appropriate for carbon capture. These were either already planted or reliably promised to be planted by April 2020. So far SGG has made agreements for 141 small schemes, 125 based on individual farms and 16 at various institutions/community groups - so the total number of beneficiaries is likely to be more than 1,000. Moreover, by December on my return to the UK I reckoned that we were less than halfway through the planting as the main planting period is the "long rains" of March-April. SGG has already spent some £2,743, with Gosforth Rotary Club being by far the biggest donor with a contribution of £1,735, but before our Covid-19 lock down SGG still had a £1,400 allocated for this budget - and this budget will increase. Thus, we have already made a significant start to this project.

THE CONTINUING PROGRAMME

The current Covid-19 lock down in the UK is certainly an obstacle to the smooth running of this project. Nevertheless, it is not the case that nothing can be done. The following is the anticipated schedule until December 2021:

- awareness-raising and initial publication of this project primarily through the Internet during the Covid-19 UK lockdown;
- fundraising by SGG as soon as Covid-19 restrictions on meetings & work are lifted within the UK. During this period various interested parties may wish to invest in this tree-planting programme. At this point, those donors & investors should indicate to SGG a] whether they want to invest in tree-planting in Africa or in temperate climate countries such as UK, and b] whether they intend to invest in tree-planting for carbon capture or for agroforestry purposes;
- when making these choices, it would be helpful to bear in mind the following current SGG prices- a] a multipurpose seedling suitable for African agroforestry costs 20p/seedling;
  b] a fruit tree for such agroforestry costs on average £1/seedling,
  c] a seedling intended for carbon capture in Africa costs £1 so that carbon capture payments can be made over a 5 year period,
  d] the cost of young trees in the UK is very variable, depending of the size of the tree when it is planted. One scheme to plant in the Yorkshire Dales, a scheme supported in the past by SGG, charges £2.50 for a young 'whip' with a stake & protective sleeve. The price of a young tree, however, can vary from being free to more than £100 each depending on the planting location and the wishes of the investor;
- many of SGG's African partners are now accustomed to planting tree seedlings at a time suitable for the individual farmer and then waiting to claim a payment during SGG's subsequent field visit. Thus, although the situation in East Africa is very uncertain at present, we expect there to be significant and widespread planting during the current 'long rains' there. SGG is in email contact with many of these planters, so we shall continue to remind them that tree-planting grants are available;
- SGG has no idea when current international travel restrictions will be lifted, but at present we have a provisional plan to undertake monitoring fieldwork, tree counting & payment in October-December this year. During that visit we shall also negociate agreements with planting partners wishing to participate in carbon capture;
- by the end of 2020 SGG plans to have a large group of stakeholders, either donors & investors from Europe or planting partners in Africa, intending to bring this project to fruition;
- it is hoped that the above programme can be implemented without major modifications until December 2021;
- SGG therefore invites anybody wishing to be a participant in this tree-planting partners to contact us through our website at www.sustainableglobalgardens.org.uk/contact .

Paul Keeley

SGG Director and President of Newcastle-Gosforth Rotary Club