

## **Rehabilitation and Landscape Restoration Project in the Kimbunga Community**

Volunteers report 31/10/05 – 10/02/06

By Alistair Grubb

### Introduction

To keep this report as concise as possible, it is intended that it should be read as an addendum to the existing monthly reports compiled over the period of 31/10/05 – 10/02/06 by Gabriel Ndeje, the Community Mobiliser. These reports give a comprehensive account month by month of the projects development, and the activities carried out by Gabriel, myself and the community at large over this period.

Also, it is fair to assume that anyone reading this report will be familiar with the background of the UNDP/BT Kimbunga Project, so it is unnecessary to go into any further detail over the situation that lead to the inception of the project, or its objectives.

### November – February

Coming as I did, at the beginning of November, I caught the tail end of the Short Rains. Even in these so-called 'short' rains, I soon noticed the sheer volume of rain that could fall in such a short period, and the dramatic effect it could have on the dry dusty soils of Kimbunga.

On several occasions the footpaths were so washed-out as to become impassable, and we had to abandon our attempts to get up to the demonstration plot. Even with a 4WD vehicle, at certain times during heavy rains the roads are unusable – effectively isolating the community from the nearest town, Kiembeni.

During our first meeting, we were given the main objective of making progress with soil conservation on the demonstration plot, and afterwards the surrounding slopes, over the coming 3 months.

Whilst seeking experience in afforestation and forest management was one of my reasons for coming to Kenya, it became evident that without viable and relievable soil coverage on the slopes, no planting was going to take place!

Although at first I found it frustrating that I would be doing little actual afforestation, I understood that tree planting before the impending dry season, on land with erosion prone soil would be a wasted venture.

Coming from a country that 'enjoys' rain all year round and without serious erosion problems, it takes time to adjust to Kenya's tropical climate and seasons; and to learn about the specific advantages and disadvantages associated with them.

It soon became clear that in Kimbunga one of the problems that must be addressed as soon as possible is that of soil erosion, especially from an agro forestry perspective.

A lot of planning and physical work has gone into the last 3 months to make inroads into soil conservation on the plot and surrounding slopes. Come April and the Long Rains it will become evident as to how successful this has been, giving an opportunity to re-evaluate the different systems used, and how they may be more effectively used over the next year.

Soil erosion is a constantly changing process, and it is likely that to be effective, soil conservation as a practice must also be regarded as constantly changing. What was an

effective method one year may not work 5 years down the line. It is important that soil erosion is constantly monitored, and the system used to combat it is easily adaptable.

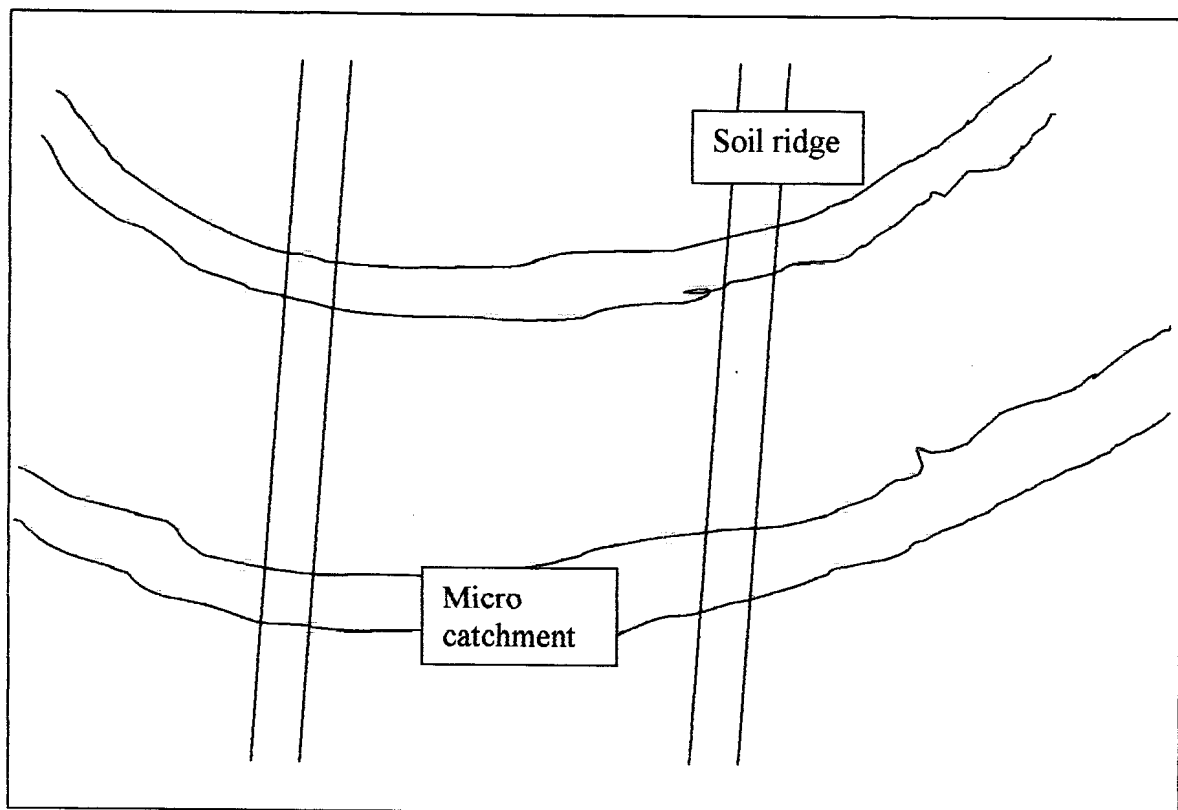
### Soil Conservation

There are 4 methods of soil conservation that have been practiced up at Kimbunga, until the rain falls it will be hard to tell which, if any, system is most effective. It may well be that no one system has all the answers, but that a combination of several methods may work best:

#### *Micro-catchments*

This system is probably going to be the most effective however. Using an A-frame to measure the contours along a slope at 1.5m height difference, trenches are dug parallel to the slope. Each trench should be 60cm wide and 30cm deep. The length of the trench is normally determined by how far the worker can throw the soil, usually around 6m, but no more than 8m so as to remain effective.

*Fig. 1. Sketch of micro catchment contour trench system (MCCTS)*



Unlike traditional trench systems, the soil from the trench is not piled above or below the trench (see fanya chini/juu) but at a right angle to the end of the trench. This in effect creates a line of trench along the contour of a slope, but in short sections, divided by ridges. The benefits of this system are the elimination of the need to remove excavated material from the site, and that the bottom of each trench does not need such attention to ensure an exact level, as would be the case on a system that relied on one long single trench.

Most important is that the run-off from rains flowing down the slope will in effect be caught by individual 'micro-catchments' – thus reducing the speed and force of the run-off, and dissipating it into multiple water catchments. The water will be caught in the trenches, and slowly filter down, keeping water and eroded soil in each micro catchment for longer, the trenches providing an ideal place for crops and trees that require a lot of water. Trees and 'cash crops' can be planted along the ridges running up the hill, utilizing all available land, as well as adding to soil stability.

A few criticisms of this system would be that of the 4 systems tried, it is by far the most labour intensive; some care must be taken when throwing the soil to make the ridges, as opposed to simply piling the loose soil above or below where the worker is digging. The micro-catchments left are usually of random size and shape, as they must fit the contour, and farmers may find the small plots awkward to tend, as opposed to the long strips of land that would occur from using the fanya chini/ fanya juu methods.

Also, and probably most serious, is the need for a stabilizing grass, shrub or tree as soon as possible using this method. As the soil is deposited as ridges at right angles, the edges of the trench are at risk of collapsing in, and filling the hole, also reducing the size of usable land on the catchment. The ridges of soil are also susceptible to erosion, and will need protection, ideally by a stabilizer such as vetiver, or else compaction to minimize soil loss.

These disadvantages are not difficult to overcome however, and with careful planning and hard work, micro catchments may well be the most successful soil conservation system implemented at Kimbunga.

#### *Fanya Chini & Fanya Juni*

These two traditional systems are very similar, and as such can be grouped together. When using Fanya-chini, the soil from trenches is piled below the trench in a parallel line, whilst with the Fanya-juu method, the soil is piled above the trench.

The fanya-juu method has been used previously on community members shambas, but has not been tried by us over the last 3 months.

The benefit of these systems is that they produce long easily farmable strips of land running across the hillsides. These systems also require less manual work than micro-catchments, but as the result is one long continuous trench along the contour line, it is much more important that the bottom of this trench is an exact level, or else water will pool up and create a weak spot on the trench, before ripping through, causing more damage than if it has fell on an unprotected site.

Again, some type of stabilizing grass, shrub or tree (preferably vertiver) must be planted along either side of the trench, and perhaps along the top of the parallel ridge as well, in order to hold the side of the trench, and stop the soil from the ridge from being washed or blown away.

### *Trash Lines*

By far and away the most basic and easily implemented soil conservation system being practiced in Kimbunga are trash lines. These are lines of, literally 'trash'; sticks, twigs, lumps of soil, old crops, grasses etc – anything that happens to be lying on the slope is gathered together and laid out along the hillside. It is important to still use an A-frame to find the exact contour levels along the slope, even when using such a basic system. Some community members in Kimbunga have been laying the lines in an exact straight line across the slope, not following the contours, and this greatly reduces the effectiveness of the trash lines.

Whilst this is a low-tech system, and not as effective in catching and holding water on the slope as the others, I believe that there is a place for this system in the soil conservation 'portfolio' for Kimbunga. In its simplest form, by using trash lines in conjunction with fanya chini/juu - adding the lines either above or below the soil ridges running parallel with the trench, in order to hold the soil from being washed or blown away. These trash lines may hold some water or soil in them, and their close proximity to the ridges may help to improve the nutrient quality and water content of the soil, thus enabling the stabilizing grasses/shrubs etc on top of the ridges to grow faster and stronger.

There may be the possibility of planting vetiver, lemon grass, nappier grass or other such species in the actual trash line, producing in effect a living trash line or hedge. The trash line would protect the growing plants from wind and grazers such as goats, provide shade, and hold water and soil, thus improving the plants chances of survival.

### Vetiver

The best introduction to this little known grass and its uses can be found in *Vetiver Grass: A thin green line against erosion* by the National Research Council, along with various copies of the *Vetiver Newsletter*, published by the World Bank.

This section focuses purely on how it may be used to aid soil conservation in Kimbunga.

From reading various case studies about the use of this plant, I think it is imperative to the success of the above systems, to try and incorporate vetiver grass into them wherever possible.

Every exposed edge of trench and ridge should be planted up with vetiver grass as soon as possible, to help hold the soil when the Long Rains start. Trash lines should have vetiver planted in or along them, in order to stabilize and strengthen them in the future.

The planting of vetiver should not be restricted solely to trench systems though, any area of exposed soil that is not being farmed should ideally have vetiver or other such stabilizing grass/shrub/tree planted on it to maximize soil coverage, and slow erosion during the rains. The grass can always be pulled up at a later date and replaced with something more appropriate, when the area is at less risk.

Again, this applies to water catchment sites, such as coffer dams/spill ways, fish ponds, as well as natural erosion spots such as gullies. If vetiver or other such grass can be planted around these areas, it may help to reduce silting in areas that are designed to catch or hold water, and perhaps to slow or even halt the rate of erosion in problem areas such as gullies.

Obviously, all this will require a vast amount of planting material, so it is important that a vetiver nursery be established as soon as possible, suggestions for this can be found in a later section.

#### Related Activities/Achievements

In order to start implementing the soil conservation systems, I first had to learn how to make and use an A-frame. I found that with a little help this wasn't as complicated as I'd feared, which is important, as any technology used should always be appropriate to the situation. In this case that meant a measuring device that was effectively free to construct from available resources, and simple to use. Whilst using an A-frame to measure contours is no exact science when compared with the industrial lasers used on construction sites, it is a surprisingly accurate, fast and easy way of doing things.

We hope to soon produce 2 separate information sheets, one for how to build an A-frame and another for how to use one. Both will be available in English and Swahili, and the illustrations will be drawn in a manner that means that even if the reader is illiterate, they will have no problem understanding the gist of the sheet.

Once all available space on the demonstration plot was taken up with the micro-catchment system, we moved out onto the adjacent slopes of community member's shambas and started practicing the fanya-chini system. By working on slopes that are visible from the road and major footpaths, it helps raise awareness of soil erosion, and what can be done to prevent it. Community members passing by always show interest in the work, and want to know why it is being done, and how it will help in the long run.

This also gives the opportunity to discuss farming methods, and to try and dissuade farmers from practices which are harmful to the soil, such as burning brush, and deep tilling, both of which are still used locally.

Other work that has been done on the demonstration plot is the creation of new drainage ditches and extension of existing ones, and enlargements of the coffer dam and fish pond. With a little time and careful observation, potential water catchment sites can be found around the community, as well as possible problem areas in the future. Over the last 3 months we have identified several areas on the surrounding hills and valleys that may make suitable sites for coffer dams and water catchments/fish ponds of varying sizes. We have also found and marked areas that are suffering from erosion, or are threatened by it. In the coming months before the rains fall, it is important that the problems on these areas are addressed, by whatever means possible/feasible, to prepare and stabilize them before April, to minimize future erosion. Areas such as these should be monitored on a weekly basis during the rainy seasons, to see how they are faring.

A large collection of old car tyres has been brought up to the plot, in an attempt to start the community using them either as small nurseries for seedlings, or as compost bins to dispose of all organic matter, and create free compost for future use. Presently, most families throw all vegetable waste into the bushes by their homes, throwing such waste away is a waste! This could all go into an old car tyre or two, and within a month or so there will be some good compost to put out on their shamba.

On the plot itself, we have started the construction of a large compost banda. This is divided into 3 sections, so that the compost can be turned and aerated before being transferred to the next section. By disturbing the compost twice before final use, the decomposition of the compost is speeded up, and a more nutrient rich compost results.

A demonstration plot can only really be deemed a success when people take away what they've seen and start implementing it on their own shambas, without prompting or financial incentive, but purely because they can see how it works, and that it works.

Problems, mistakes, areas with room for improvement...

As a community development project, the onus must always be on the community. At time this can be frustrating; as much as a job may need doing, it must be done by the community – it is no use Gabriel or myself going along and doing it without the help of the community, otherwise they will have no sense of 'ownership' or involvement. The project will stop being a community project and become a private venture.

For this reason things can run very slowly, as not all community members have the same sense of immediacy, or for that matter, organization.

Another problem in the community as a whole is pettiness. There is a lot of back-biting and complaining going on, and this too can be dispiriting. A lot of effort has to go into making sure that everyone is treated equally, fairly, and that there are no illusions of favoritism.

Sadly, there is little that can be done about this, as it is human nature. All over the world, wherever people don't have enough to do, they will always gather and talk too much.

Suggestions

*Short-term*

Vetiver nursery

-More fish ponds, start aquaculture systems

-Large coffer dam by road nursery

-wind breaks

-kiosk

-give every child their own tyre to take home and use.

-Environmental education.

-High-temp burner; useful to get rid of rubbish

*Long-term*

Adult literacy classes

Eco-tourism

Establishing rapport with tour companies who use the road, resulting in responsible tourists, and financial/material gain to the community

Wind breaks – banana trees?

Solar panels, mobile phone charging

Micro financing classes

kiosk

donkeys

forests!

-Sign to go on hut, and another by road.

-Establish sense of ownership.

-Donkey cart – charge money to transport water/material – money goes back to community.

-More trees

-Produce enlarged map of micro catchments on plot to plan crop planting & for next year.

Party every half a year/ or every harvest

- to build morale

Films in the hut once a fortnight – Kshs.

10/= entry