



Making REDD work for communities and forest conservation in Tanzania

TFCG Technical Report 26

Analysis of the drivers of deforestation and stakeholders in the Lindi project site

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About the project 'Making REDD work for Communities and Forest Conservation in Tanzania'

The project 'Making REDD work for communities and forest conservation in Tanzania' aims to reduce greenhouse gas emissions from deforestation and degradation in Tanzania in ways that provide direct and equitable incentives to communities to conserve and manage forests sustainably. The project will achieve this by supporting the development of a Community Carbon Cooperative hosted within the existing Network of Tanzanian communities engaged in participatory forest management. The Cooperative will aggregate voluntary emission reductions from its members and market them according to internationally recognised standards. A proportion of project funds and carbon market revenue will be channelled directly to the communities on a results-based basis thereby maximising incentives to maintain forest cover and reduce deforestation. The project includes an evaluation and communication component designed to capture the lessons learnt in order to inform project implementation and share them with the national and international community including sharing lessons learnt during project inception at the UNFCCC meeting in Copenhagen. The project also focuses on building in-country capacity with regards to REDD at both local and national governmental levels. This is linked with a strategic advocacy component aimed at forging a smooth path for REDD in Tanzania by engaging in the formulation of REDD frameworks and processes at national and international level.

The project is a 5 year project that will run from September 2009 to August 2014. It is a partnership between TFCG and MJUMITA, (the Tanzanian Community Forest Network).

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Executive summary

1. Introduction

TFCG in partnership with MJUMITA is implementing the project 'Making REDD work for communities and forest conservation in Tanzania'. The project aims to reduce greenhouse gas emissions from deforestation and forest degradation in Tanzania in ways that provide direct and equitable incentives to communities to conserve and manage forests sustainably. The project will achieve this by supporting the development of a Community Carbon Cooperative hosted within the existing network of Tanzanian communities engaged in participatory forest management. This study relates to an analysis of the deforestation drivers and stakeholders in the two districts, as set out under Activity 2.1 in the project document.

The objectives of the study are to:

- Identify and describe drivers of deforestation and forest degradation within the landscape.
- Identify and describe stakeholders within the two landscapes with a particular focus on their relationship to forests and their roles in causing or avoiding deforestation.
- Identify groups who might be vulnerable to REDD and to understand the nature of their vulnerability and ways to mitigate that vulnerability.
- Provide a description of the role of women within the landscapes with a particular focus on their relationship to forests and areas of vulnerability in relation to REDD.

2. Methodology

Five representative villages were selected for the study. In each village we met village government representatives and village elders and drew a map with them, which formed the basis of the discussions and helped us target our subsequent work, usually involving a trip to a subvillage and discussions with a group of women, or other important stakeholders. Interviews were also held in town with officials.

3. Findings of the study

3.1 Drivers of deforestation

Agriculture – this is the main driver of deforestation, in the form of shifting cultivation, which is practised by most farmers. Farmers choose an area of the forest (untouched forest is better than regenerated forest), clear it and grow their crops there for a number of years, then abandon the shamba and go and clear another place. Mostly food crops are grown on these shambas, but also sesame, a cash crop. Most farm a shamba for 2-3 years, and the move is because of too many weeds - it is easier to clear a new shamba than to weed. Also new shambas are more fertile. Shambas are usually about 2-3 acres. People estimated that a shamba takes around 10-15 years to regenerate. Many people have a permanent shamba, on which they cultivate permanent crops, and some annual crops.

Charcoal - In most villages, although many trees are cut down during the process of shifting cultivation, they are mostly burnt and very few people make charcoal (small amounts are made in Mkombamosi and Mkanga 1). But in Likwaya almost everyone makes charcoal and it is the main source of income for many, while some make it when they need extra cash.

Fire - Fire is a secondary driver of deforestation in the areas of dense closed forest – it is not easy for dense forest to burn, but recently cleared forest burns easily and holds back regeneration. Fires are mainly caused by burning shambas in preparation for cultivation. There are no laws about fires, no fines or penalties and no awareness raising.

Forest products – In most villages poles are cut for domestic use only, for house building, but in Ruhoma some people cut and sell poles. Timber was extensively harvested in the past, but now the forests have been closed so there is no official harvesting, although it is clear that some illegal harvesting goes on. There is not much timber left in the forests.

Distance - Distance is an important factor influencing whether a forest is under pressure or not.

Attitude - One of the most important contributions to deforestation is people's attitudes towards their forests. Many feel the forests are in better condition than in the past and are blind to the fact that many more people cultivate in the forest than previously. In some villages they regret the closure of the forests for timber harvesting, because of forfeiting a source of income. In addition, until recently, people have been able to live relatively easily with abundant resources at hand. Now a change in many practices is needed which will take effort.

3.2 Stakeholders

Farmers – Everyone farms and many people practise shifting cultivation in the forests, where they plant a range of food crops and sesame as a cash crop. Most other cash crops are grown on permanent shambas in the lowlands. Sesame is a good cash crop and not difficult to grow. It is more productive if pesticides are used, but most people can't afford to use them. A good crop can yield 600kg from one acre, although the average may be more like 250kg. Farmers sell their sesame to the cooperative societies who pay 1000TSh per kg. But private businessmen also buy it, especially when the cooperative society is late with their payments. Other cash crops include oranges, coconuts, cashew and to an extent cowpeas and pigeon peas. Cashew used to be more important, but the price has slumped and many people no longer tend their trees.

Charcoal makers and transporters - In most of the villages little or no charcoal is produced, since people either don't have the expertise, or don't have time to make it. In Mkombamosi and Mkanga 1 a small amount is made. In Likwaya large amounts of charcoal are made. There are two types of charcoal producers – there are those who do it for a living and there are those who do it when times are lean and they need some extra cash. It is very hard work and takes a month to produce and can earn the maker around 20,000TSh. Other people buy the charcoal and transport it to Lindi where they sell it. Several people said that if there was a good cash crop which would bring in money they would stop making charcoal.

Ming'oko gatherers - Ming'oko is a small tuber which grows in the mountain forests, between March/April to December. Women collect ming'oko. They eat it at home as a snack and sell any surplus. It can be a good business for a woman. Ming'oko is less plentiful now than it was and more distant.

Path – there is a path from Kinyope to Mkombamosi which passes through Noto forest.

Domestic use of forest products – firewood is still plentiful but in several villages women said that it is available further away than in the past. Poles are also becoming more difficult to find. There is little timber left since it was extensively harvested in the past. Forests are closed for harvesting but small amounts take place for doors, tables, etc.

Commercial use of forest products - There are few commercial users of the forest for products apart from cash crops and charcoal in Likwaya. In Ruhoma some cut poles and sell them as a business. There is some illegal commercial harvesting of timber, especially on the part of carpenters.

Hunters - In each village we heard that there are people who hunt wild animals in the forests. Traps are used. Hunters consume the meat at home, and will sell any surplus in the villages. People prefer the taste of bush meat. There is not much livestock in the villages as an alternative.

Users of non-wood forest products – fruit and mushrooms are mostly collected by women or children. Honey is harvested but by very few people. A few also have their own hives. Grass, rope and medicinal plants are collected and used at home.

Ilulu Cooperative Society - Ilulu Cooperative Society was initially set up in the 1960s and buys three crops in this area – sesame, cashew and pigeon peas. There are representatives in each village who buy the crops over a 2 month period. The cooperative doesn't supply any inputs yet. There are advantages to farmers to sell their crops to the cooperatives rather than to private buyers, but the cooperatives are still experiencing problems which mean that they don't function as efficiently as they should.

Agriculture department – Ward extension officers exist but don't come to the villages. The department are promoting sesame, as well as new cash crops, but trying to discourage shifting cultivation. They have worked together with the cooperative society.

Organisations - There do not appear to be any organisations operating in any of the villages, apart from Likwaya, where several organisations have come over the years – Concern, which dealt with land issues and food security, has recently left. FAO brought cassava seeds and OG Paper in Mtwara planted Eucalyptus seedlings.

Aga Khan Foundation – the Coastal Rural Support Programme (CRSP) is an eight year programme under the Aga Khan Foundation. They are just beginning operations in many of the villages where TFCG work, increasing production of crops and linking farmers with markets, focussing on conservation agriculture.

Groups - There are virtually no economic groups in the villages. Concern set up a few groups in Likwaya.

Village governments and VNRCs – these lack training and often are unaware of their roles and responsibilities. Bye laws which have become standard in other parts of the country are not in existence in these villages. It is likely that lack of good governance is an issue which could contribute to deforestation.

Outsiders – traders come in to buy cash crops. The roads in the area are in fairly good condition.

Zain mobile phone company - On the top of the Noto plateau in Ruhoma village there is a Zain mobile phone tower. Three guards work up there and have cleared a large area of important forest for their shambas.

The role of stakeholders in causing or avoiding deforestation

The stakeholders causing the most deforestation are farmers and charcoal makers and thus these two groups are the most important for the project at village level. Other stakeholders use the forest, but there do not seem to be unsustainable levels of exploitation, mainly because the products are largely for domestic use. Zain has indirectly caused the destruction of a large area of once dense forest. It is important that the company understands that there should be some limits on where towers can be located, and that there is more to putting up a tower than simply building and maintaining it.

Sesame and food crop farmers are the ones who are causing the most deforestation, but they could equally be decisive in preventing more deforestation, if they changed their ways of cultivation and farmed the crops more intensively with greater expertise and a higher level of inputs. The cooperative and the agriculture department would also be important for the project, since they would be key to introducing new concepts and crops, and assisting with marketing. The Aga Khan Foundation project would also be key in this respect.

3.3 Groups vulnerable to REDD and ways that this might be mitigated

Farmers practising shifting cultivation – mitigation measures could include:

- awareness raising about the negative impact of shifting cultivation on forests
- introduce new techniques to intensify cultivation of food crops and sesame,
- link with Aga Khan Foundation project, the agriculture department and the cooperative society

Charcoal makers – they claim they don't like making charcoal.

- Introduce cash crops with a more attractive income and good markets

Those harvesting poles for houses

- Introduction of alternative income generating opportunities for those who harvest poles as a business
- The establishment of specific rotated areas for coppicing for poles under managed forests
- The introduction of houses built from bricks

Ming'oko harvesters – this group consists entirely of women.

- Introduction of alternative income generating activities for women
- A survey of the abundance of existing ming'oko and some sort of controlled and rotated harvesting of it

Hunters

The introduction of livestock in greater numbers, targeting in particular the hunters



3.4 Women in the landscape

Women have been identified as being particularly vulnerable to REDD. For this reason groups of women were sought and discussions were held with them. Women generally cultivate with their husbands, but sometimes the proceeds from cash crops are not shared with the wives. The only independent income for some women is the sale of ming'oko.

Women are represented on village governments and were present at our meetings and many spoke out, but it is hard to know if they have a voice when they are not being directly facilitated.

In all the villages we visited, the main problem faced by most women was lack of water. It is particularly acute from July to December when the water generated by the rains dries up. There is little piped water and most people depend on traditional wells or digging temporary wells in dry river beds. The water in these wells becomes increasingly scarce as the dry season progresses. Most women told us that in the past the problem of water was not so acute and there were rivers which flowed close to the villages all year round. The health system was also mentioned as a problem by women. Most of the villages don't have a dispensary and they have to walk long distances to reach one. The service is not usually good and they might have to go on to Lindi. The main diseases in this area are malaria and diarrhoeal diseases. Women complained about the problems of childbirth, saying that the choice was often difficult, whether to try to reach a distant dispensary in time, or to use the services of the village midwives, who can't cope with complications.

We asked about the quality of women's lives. In three villages, women felt that life is better now than in the past, especially because it is now possible to make good money and buy things. In two villages life was said to be worse, mostly because of the problem of water. We asked women about how they felt about the condition of their forests. In most villages, they explained that nowadays the forest is getting thicker, since there are fewer people living in the forest. Women's opinions about forest conservation were mixed. They were afraid of hunger if they couldn't cultivate in the forests, but they have also seen the effects of deforestation and would welcome something which would mitigate it. In the form of agriculture, women are as dependent as men on cultivating in the forests, since they all cultivate together. They are also dependent for firewood on the forests, but so far, it was not seen as a major problem for women. The main area where forest conservation would impact on women and not men would be in their collection of ming'oko, on which many depend for a little additional income. However, since women's most significant problem is lack of water, it would seem that women are more vulnerable to REDD not being done in the long term, since the ever increasing destruction of the forest will only intensify the scarcity of water.

4. Conclusion and recommendations

This area is characterised by small communities with huge areas of land, mostly forested, which they are exploiting as they always have done, with little understanding of the fact that their resources are finite and are becoming depleted. People tell you that 'the forest will never finish!' but if pressed, they have an awareness that things are changing. There is little severe poverty in the area – hunger rarely happens. But there is 'poverty' of opportunities.

There is a variety of stakeholders present in the area, but most from the communities themselves. There are not many outside stakeholders, and almost none dealing with the forests. The pressure on the forests comes from the local people, who practise shifting cultivation and make charcoal – these are the two groups

most important for the project. Although initial reactions to mention of forest conservation were negative, many actually understand the importance of some sort of conservation.

Recommendations

More research could be done on:

- Permanent vs. shifting cultivation
- Alternative cash crops for the area
- Any forest areas of cultural significance,
- Pigeon peas and coconuts

Awareness raising

Training for village governments and VNRCs

Land use planning and PFM

Links should be forged with various institutions and organisations:

- Aga Khan Foundation
- Concern
- Ilulu Cooperative Society
- The Agriculture department
- Zain

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List of acronyms / glossary

CCM	Chama cha Mapinduzi
CRSP	Coastal Rural Support Programme
CUF	
DALDO	District Agriculture and Livestock Development Officer
DfID	Department for International Development
DNRO	District Natural Resources Officer
FAO	Food and Agriculture Organisation
GHG	Greenhouse gases
MJUMITA	Community Forest Conservation Network
PFM	Participatory Forest Management
REDD	Reducing Emissions from Deforestation and Forest Degradation
TFCG	Tanzania Forest Conservation Group
VEO	Village Executive Officer
VNRC	Village Natural Resources Committee
Swahili terms	
fungo	small pile of four or five pieces
khanga	cloth worn by women
tenga	large wicker basket

1. Introduction

1.1 Background to the study

The Tanzania Forest Conservation Group in partnership with the Community Forest Conservation Network of Tanzania (MJUMITA) is implementing the project 'Making REDD work for communities and forest conservation in Tanzania'. The project aims to reduce greenhouse gas emissions from deforestation and forest degradation in Tanzania in ways that provide direct and equitable incentives to communities to conserve and manage forests sustainably. The project will achieve this by supporting the development of a Community Carbon Cooperative hosted within the existing network of Tanzanian communities engaged in participatory forest management.

The project includes a component aimed at addressing the underlying drivers of deforestation at the two pilot sites in Kilosa and Lindi Rural districts.

Output 2: Replicable, equitable and cost-effective models developed that are designed to reduce leakage across project sites and provide additional livelihood benefits to participating rural communities.

This study relates to an analysis of the deforestation drivers and stakeholders in the two districts. The project document describes this activity as follows:

Activity 2.1 Analyse drivers of deforestation and forest degradation.

How to avoid or reduce the leakage problem is one of the most critical challenges in ensuring that REDD projects are achieving real reductions in GHG emissions at a national and global scale. A first step in addressing leakage is to carry out a detailed analysis of the drivers of deforestation and forest degradation within a landscape. By understanding the drivers of deforestation it will be possible to determine the kinds of activities that may be displaced by improving forest conservation and management i.e. primary leakage. In Tanzania, key drivers include demand for agricultural land, timber, fuelwood, fodder, poles and charcoal. Wild fires are also a key threat. For each site, these drivers need to be further analysed to determine, for example, whether forests are being cleared for subsistence agriculture or for commercial agriculture such as for biofuel production. Whether timber is for local markets or for more distant markets such as China. For each site the project will analyse the drivers of deforestation and other threats to the forest and this analysis will help to determine the most likely leakage scenarios. The analysis will look not only at the pressures on the forests and the drivers behind those pressures but will also look into the reasons why response strategies to date have failed to prevent deforestation and forest degradation. This would include analysis of the shortcomings of participatory forest management in the respective forest areas. This will build upon the considerable work that TFCG and other institutions have already undertaken on participatory forest management which has already identified some of the key challenges in relation to costs vs revenues, communication and governance. In addition, as part of this analysis, the project will carry out a stakeholder analysis for each landscape with a particular focus on identifying forest user groups and those most dependent on resource extraction from natural forests.

1.2 Objective of the study

The objectives of the study are to:

- Identify and describe drivers of deforestation and forest degradation within the landscape.
- Identify and describe stakeholders within the two landscapes with a particular focus on their relationship to forests and their roles in causing or avoiding deforestation.
- Identify groups who might be vulnerable to REDD and to understand the nature of their vulnerability and ways to mitigate that vulnerability.

- Provide a description of the role of women within the landscapes with a particular focus on their relationship to forests and areas of vulnerability in relation to REDD.

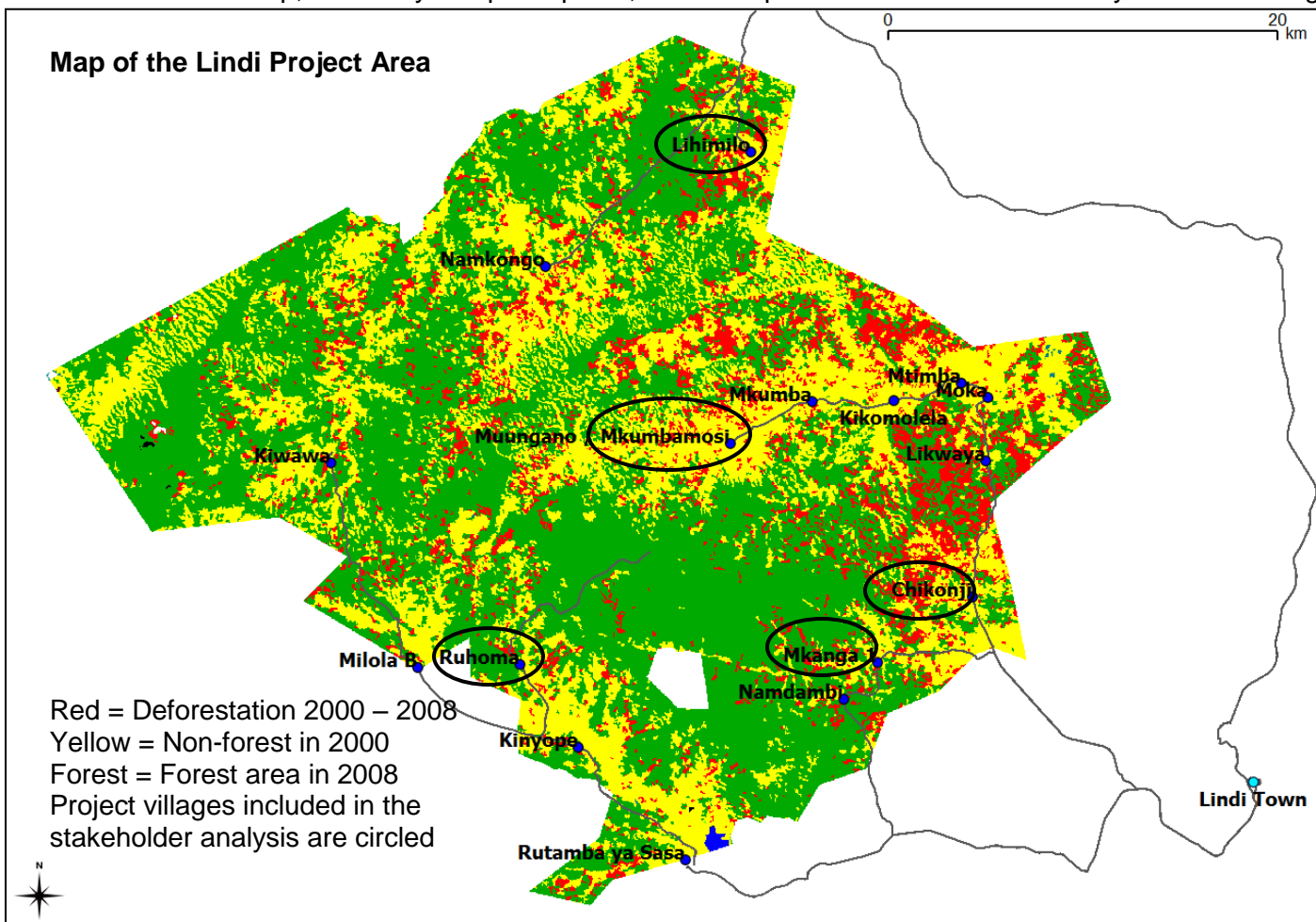
1.3 Organisation of the report

The report begins by describing the methodology used to gain the information which follows. It then discusses the drivers of deforestation, summarised from all five villages. This is followed by a description of the stakeholders present in the area, an analysis of their role in causing deforestation, or preserving the forests, and their importance for the project. This is followed by an overview of groups vulnerable to REDD and ways in which this vulnerability might be mitigated and in particular an examination of women in the landscape. Recommendations for additional research come at the end, and profiles of the individual villages appear in the appendix.

2. Methodology

Five villages were selected for the study. A representative sample was chosen, e.g. villages in different geographical areas (from the south, from the east and from the northern parts of the project area), villages near to the different forest areas, villages with different characteristics – much shifting cultivation, significant charcoal production, different cash crops, etc.

In each village, we began by meeting with a mixed group of village government representatives and village elders, both male and female. This meeting had been set up in advance. In this meeting the discussions centred around a map, drawn by the participants, which helped us to understand the layout of the village



and in particular the location of the forests and the relation between the forests and the people's activities. During these meetings much information was produced, and as a result we were able to target our subsequent activities, e.g. a walk to a well with a group of women, a walk through the forest to a distant sub-village, a walk or a drive up the escarpment to the forest on the plateau. These walks and drives provided us with an opportunity to observe the state of the forest, the extent of forest degradation through shifting cultivation, fire, etc, and any other issues which might not have come out through discussion alone. In every village we talked to a group of women, usually in one of the subvillages, and often also talked to another group, e.g. young men, older men, cooperative society representatives, charcoal makers. These meetings were more informal – there was no prior notice and often we arrived in a subvillage and talked to those who we found there.



A summary of those we spoke to is as follows:

- Five village government and elders groups which in total included 63 men and 32 women
- Groups of women, 39 women in total
- Groups of men, 20 in total
- Groups of young men, 22 in total, including charcoal makers and sellers
- Zain tower guard on Noto plateau
- Village cooperative representatives

Interviews were held in town with officials who could provide us with background or an overview of the situation in the villages, or who could help to answer questions which had come up from discussions in the villages. A summary of the interviews was as follows:

- DNRO (District Natural Resources Officer)
- DALDO (District Agriculture and Livestock Development Officer)
- Cooperative Society Manager
- Harbour Manager
- Timber dealer

3. Findings of the study

3.1 Drivers of deforestation

3.1.1 Agriculture

The main driver of deforestation in this area is agriculture, in the form of shifting cultivation. Some generalisations about shifting cultivation can be made, but there are also many variations, e.g. in the number of people practising it, how many acres they cultivate, how long they cultivate for and what they grow on the shambas.

Farmers choose an area of the forest, clear it and grow their crops there for a number of years, then abandon the shamba and go and clear another place. A shamba is chosen on the basis of what is already growing there. In Mkombamosi, a group of men told us that they choose the site of a new shamba on the basis of the tree species growing there which indicate that the soil is right for the crop, e.g. mkwanga shows that the soil is good for maize, sorghum, pigeon peas, mtalawanda indicates that it is good for rice, maize, sorghum, mnyenye is good for rice. In other villages people said that if there was grass growing under the trees, then it was not a good place for



cultivation. The unanimous opinion was that untouched forest was much better than forest which had fairly recently regenerated.

Although there were different estimates of how long people cultivate one shamba before moving on, the average length of time seems to be between 2-3 years. Some stay longer on one shamba, up to 4 or 5 years but this is not usual. The main factor which motivates a farmer to move on is the growth of weeds. We heard repeatedly that on a new shamba weeding only has to be done twice or even once, but on an older shamba this can increase to four times. In Lihimilo, we heard that sometimes farmers have to weed between cultivating and planting, i.e. by the time they have finished clearing an old shamba to make it ready for planting, weeds have sprung up again. And again, the unanimous opinion was that it is easier to clear an area of forest to make a new shamba than it is to weed. One of the factors which may contribute to this is that they use small hoes rather than the more standard (for the rest of the country) large hoes – it is clear that it takes more effort to weed with a small hoe than with a large one. Reasons given for using the small hoe include that it is easier to weed amongst tree roots and that they don't have to dig deeply so they don't need a larger hoe. Another reason given for opening new shambas is the loss of fertility, but this does seem to be secondary to the issue of weeds. Farmers say that after a few years the fertility begins to decrease. In Mkombamosi we also heard that the number of pests attacking the crops increases the longer a shamba is cultivated.

The number of acres cleared from the forest varies according to the size of a family and the capacity for cultivation. However, in general people said that shambas tend to be between 1 to 5 acres. Often a new shamba is extended after the first year of clearance - In the first year, 2-3 acres may be cleared, and the following year another acre or two may be added. It is rare to see more than five acres cleared. After another year or two the entire shamba is abandoned, along with the house which may have been built on the cleared shamba.

In some villages we heard estimates of how many farmers practise shifting cultivation – in Ruhoma the village government group said that only 10-20 farmers are involved with shifting cultivation (out of the population of 669), but this may be a low estimate, since in other villages it seems to be higher, e.g. in Lihimilo the village chairman thought that around 75% of farmers cultivate in the forests (out of a population of 2500). In Mkombamosi we heard that most farmers practise shifting cultivation.

Everyone told us that untouched forest is better for crops than forest which has been cultivated in recent years and left to recover. We asked farmers how long the forest takes to regenerate after being cleared for agriculture – in general the reply was between 10 to 15 years, although some felt that the forest would regenerate after only five years. One man in Mkombamosi, however said that big trees such as mninga take 100 years to grow. The guard at the Zain tower, who had cleared a large area of very tall thick forest on the top of the plateau pointed out some large mango trees which he said indicated that the forest had been cultivated in the past, and trees planted.

Most of the crops grown on the shambas cleared from the forest are food crops, including maize, cassava, pigeon peas and rice, although if there is a surplus some may be sold, e.g. maize and cassava. However it is not large scale sale – cassava tends to be sold to nearby villages by young men on bicycles, small scale traders from Lindi may come in to buy maize if the harvest has been good. The only cash crop grown in the forest is sesame, sometimes on a shamba of its own, sometimes mixed with other crops. In Lihimilo, they told us that they would start a shamba with maize and cassava and then in the second year would plant sesame. There is little expertise concerning the cultivation of sesame and for this reason it is not cultivated intensively.

Many people have a permanent shamba, on which they cultivate permanent crops, such as coconuts, cashew and orange trees. Annual crops are also cultivated on permanent shambas, in particular cowpeas.

3.1.2 Charcoal

In most villages, although many trees are cut down during the process of shifting cultivation, they are mostly burnt (which people say enhances the fertility of the soil for a couple of years) and very few people make charcoal. This is not the case in Likwaya, where charcoal is widely made by almost everyone in the village at some time or other, making it as destructive to the forest as shifting cultivation which is also practised in Likwaya.

The group of village government representatives in Likwaya estimated that 95% of the people in the village know how to make charcoal. It is the main source of income for many people – one woman said, ‘if we stop making charcoal, then we are dead, because we have no alternative!’ Men and women make charcoal, and even old women and young boys. As well as people in Likwaya, people come from other villages too – from Chikonji and Moka. No licence or other form of permission is required, ‘you just take your panga and start cutting,’ we were told. Older people may make charcoal only once or twice a year, when the need for cash arises, but many young people are engaged in charcoal production full time. A group of young men estimated that out of their school class of around 30, ten people gain their livelihoods entirely from charcoal. And such people would make around 5-6 mounds of charcoal a year, if this is their main source of income.

In Likwaya, almost all charcoal is made in Mbalu Kwasululu forest. Kisanga forest is too distant. The lowland area where most people cultivate is regularly cleared for shambas, but the soil is clay and it is difficult to make charcoal using clay soil – sandy soil is better. People estimated that it takes the forest three years to recover sufficiently for it to be cut for charcoal again.

Small amounts of charcoal are made in other villages. In Mkombamosi it was estimated that around ten people, living in the outlying subvillages, make charcoal, but since no charcoal is sold outside the village, the market for it is limited. The species favoured are mtanga, mwembe, mtachi and mnepa. In Mkanga 1, people told us that if a shamba is cleared from the forest, charcoal is sometimes made from the trees which are felled. There is some expertise of making charcoal in the village, and in addition, charcoal burners occasionally come into the village forests from other villages. The charcoal is sold to traders who take it to Lindi. However, men in Mandanje subvillage said that making charcoal as a by-product of clearing a shamba wastes time – it is more profitable to do other things, like taking cassava or coconuts to Lindi.

3.1.3 Fire

Fire is a secondary driver of deforestation in the areas of dense closed forest. The guard at the Zain tower in Ruhoma told us that he burns his cleared shamba, but the fire doesn’t spread to the rest of the forest because it is so thick - ‘you can’t burn that forest even if you try!’ he explained. But fire is a critical factor in holding back the regeneration of forest which has previously been cleared – cleared land is left to regenerate but when fire sweeps through, the grasses which have grown tall burn and new tree growth is killed back.

Fires are mainly caused by burning shambas in preparation for cultivation. The fire spreads to the grassy understorey of less dense areas of forest. Fires may also be caused by hunters flushing out animals into their traps. In the woodland areas fire is more common, since it is a less dense type of forest. In Ruhoma, people explained that it is for this reason that the woodland doesn’t grow, since the fires kill trees, especially small ones.

Most people informed us that it is not possible to put out fires once they have started. There are no laws in the village about controlling fires, or penalties for those who start them, and there has been no awareness raising around the issue – for this reason farmers don’t take any precautions or make fire lines at the time of burning their shambas. They claim that this is a very busy time and they are too busy to think about preventing fire since it is too time consuming. Most of the village governments didn’t think that fire was a

big issue, although on further discussion some thought that some laws might be a good idea. One isolated group had a different story – a small group of women in Likandilo subvillage said that when they burn their shambas having cleared them, they try to pile as much in the middle, leaving firelines around the side to prevent the fire spreading into the forest – ‘If you burn the whole forest down, where would we cultivate next time?’ demanded one woman.

3.1.4 Forest products

Poles – In most villages, poles are cut for domestic use only, although in Ruhoma, we heard that some young men cut poles as a business to sell in the village, while people come in from other villages to cut poles. However this is not on a large scale. Poles are generally used for house building. Estimates in various villages put the number of poles needed for an average house at between 120-150 for the walls, and 100-300 for the roof.

Timber – in the past there was extensive harvesting, but now the forests have been closed by the government so there is no official harvesting. People are allowed to go to cut down trees to make doors, windows, beds, etc but only for domestic use. It is clear that there is some illegal harvesting – we spoke to a woman who deals in timber in Lindi town who had mninga and mkola wood on sale – she says she gets it from the local villages, and also we saw a carpenter’s workshop with several beds being made, and although we were not able to verify the details, it seems likely that they would have been ordered by people in Lindi. However, timber harvesting cannot be regarded as a significant driver of forest destruction.

There is not much timber left in the forests.

Firewood – in most villages, firewood is collected from nearby wooded areas and shambas, rather than from the forests. It is not a problem in most of the villages, although in Lihimilo and Mkanga 1 some women said that it was becoming more scarce, and they put it down to more people collecting it than in the past.

3.1.5 Distance

Distance is an important factor influencing whether a forest is under pressure or not, e.g. in Likwaya, Mbalu Kwasululu forest is heavily used, but Kisangi forest, on the other side of the village and much further away, isn’t. However, inroads are beginning in Likwaya – poles are now scarce in Mbalu Kwasululu and people are now going to Kisangi to harvest them. In Lihimilo women in the nearest subvillage to Noto forest told us that there was no reason to go to Noto for anything, since it is so far away and there are plenty of forests nearer to the settled areas of the village which can be used for all their needs.

3.1.6 Attitude

One of the most important contributions to deforestation is people’s attitudes towards their forests. When asked how they viewed the condition of their forests, almost every group explained that the forest is now in better shape than it was in the past. They explain this by saying that in the past every family lived in the forest on their own shamba, but since 1974 they have all come out of the forest and are now settled in the villages. Group after group told us this as a justification for the forest being in better condition, without realising that there are more people now than there were in the 1970s and the majority still cultivate in the forest, even if they don’t actually live there (which many do on a seasonal basis). There is a sort of collective blindness about the state of the forests. Some people did express individually that there might be problems, e.g. in Lihimilo the Msikitini subvillage chairman said that he was worried about the forest on Ukwene hill because he was afraid it was affecting water sources. We discussed the point with the groups we met and several were brought round to consider the viewpoint that forest destruction was on the increase, and admitted that it might be true. But in general most people continued to insist that it was a valid point that its condition was better. In Ruhoma, while discussing shifting cultivation, one man reassured us - ‘There is so much forest – we will never finish it!’. This was echoed in Mkombamosi too. In two villages (Ruhoma and Mkombamosi), the village government representatives told us that it would be better if the government would open up the forests again for timber harvesting, since it brought much needed income

into the village. People's perceptions of the woodland areas (jangwa) were that it was 'useless' – they said that beyond the collection of firewood they can't use these woodlands for anything.

In Lihimilo, we approached a group of young men, who were quite hostile and began accusing the project of trying to buy the forest from the village which would mean that they would lose that land. They were not mollified when we explained about forest conservation, arguing that even if their own village government agreed to protect the forest with the assistance of the project, 'isn't this just another way of stealing our land? – we still can't do anything with it if it's protected. You might as well just buy it.'

However, there were those who were more aware of the importance of forest conservation. Village government representatives in Mkanga 1 and Likwaya commented that closing the forests for timber harvesting was a good move on the part of the government – 'although we forego the duty payments, in the long run it is good for us and our forests – otherwise we would be left with no timber at all.' Explained a man in Mkanga 1. A man in Mkombamosi man pointed out, 'These timber species take 100 years to grow, so it will be a long time until we see big trees again.'

Another significant point connected to attitudes is that until recently, people have been able to live relatively easily with abundant resources at hand. The constant refrain we heard was 'it's too hard to...', e.g. it's too hard to weed a permanent shamba (therefore they clear a new one), it's too hard to make charcoal from felled trees (therefore they are burnt), it's too time consuming to prevent fires (therefore fires continue to devastate regenerating areas of forest), a large hoe is too heavy to use (therefore they use a small one, which makes weeding more arduous). Some effort is required to begin to ensure the protection of the environment, and this is difficult to convince people about (as is the case in more developed countries where people are being encouraged to use their cars less, to use less electricity and water, etc all of which takes some effort and sacrifice of ease). A woman in Mandanje subvillage in Mkanga 1 was the only one who volunteered this point without prompting, saying 'the only reason people are cultivating in the forest is because they are afraid of the work of weeding. Everyone has a shamba in the valley in the village. There is no real reason to clear the forest. All they need is educating.'

3.2 Stakeholders

This section provides a description of the stakeholders present in the area and a detailed examination of what they do and how they do it, together with an indication of their role in causing or avoiding deforestation.

3.2.1 Farmers

Everyone farms. And many people farm in the forests, practising shifting cultivation. The main cash crops are sesame, as well as coconuts, cashew and oranges. The main food crops are maize, cassava, sorghum, rice, cowpeas, pigeon peas and bananas. In Mkombamosi in the wetlands areas, sugar cane, coconuts, tomatoes, spinach, onions and cabbage are grown, some also in the dry season where water continues to flow. Many families farm shambas both in the mountains and in the lowlands, typically with permanent crops, perhaps mixed with cowpeas in the lowland shamba, and food crops and sesame in the upland shamba. On average, each family farms between 1 to 5 acres. The food produced lasts all year and seasonal food shortages are rarely experienced. Most people plant several crops on the same shamba, e.g. a line of sesame, a line of sorghum and cowpeas in between. Or a shamba will be split into sections with different crops in each section.

Cash crops

The main cash crops which farmers grow in this area are sesame, coconuts, cashew and oranges. Coconuts, cashew and oranges are grown on permanent shambas, often in the lowland areas. Sesame, on the other hand, is extensively grown in the forests, sometimes on a shamba of its own, sometimes mixed with other crops.

Sesame

People in several villages told us that sesame is an excellent cash crop which is not difficult to grow if the rain is good. The DALDO also reiterated this point, saying that it is relatively easy to cultivate successfully, although it can be susceptible to blight if cultivated in the same place for more than two years. In some villages as many as three quarters of the people cultivate sesame, and out of the study villages, it was only Likwaya where it wasn't the most important cash crop. The average acreage for sesame is 1-3, and there are even some who cultivate five acres. Farmers emphasised that fertilisers aren't needed, especially since most people cultivate it on recently cleared land. Pesticides, on the other hand, are important, since there are beetles which can decimate a crop. However, the pesticides cost 5000TSh per bottle, and for this reason, most people don't buy it. The cooperative societies have not yet started to provide these pesticides for farmers. The DALDO explained that there are several stages where they need to be used - the seeds need dressing with pesticide (Gaucha) before planting – the effects of this last 21 days and give the plant time to grow strongly. Then the crop needs spraying another two times with pesticides (Karate) – the plant is attacked by snails which eat the leaves. As well as the application of pesticides, success with sesame depends on several factors – early preparation of the shamba, planting at the right time, planting in rows, and weeding at the right time and often enough. People generally keep back some of their traditional sesame seeds to plant the following year, although there is an improved sesame seed (Lindi white) developed by the research station in Mtwara. However this isn't widely available yet.

There was a variety of opinions about how much one acre of sesame could produce. A group of men in Mkanga 1 were pessimistic, saying that they only harvest 60-100kg per acre since they farm without inputs or expertise. In Ruhoma we heard that one acre if tended well can yield 250-300kg, and other farmers in Mkanga 1 said that they can harvest six 100kg bags from one acre. The cooperative society representatives in Lihimilo who were buying sesame at the time informed us that one acre farmed in an expert way should yield between 7-15 80kg sacks, while the DALDO claimed that one acre, if planted with improved seed and cultivated properly, could produce 2000kg??.

Farmers sell their sesame to the cooperative society which this year is paying 1000TSh (with the possibility of an extra 200TSh at the end of the season). This means that at current levels of production, there are farmers who can make more than 700,000TSh per acre from farming sesame. The previous day, the cooperative representatives told us in Lihimilo, one farmer was paid 500,000TSh for his sesame, and he had cultivated it without any pesticides. And a young woman in Mkanga 1 confided that she had made 600,000TSh from her one acre of sesame that year, and more money from coconuts, which she hadn't finished selling yet. But it is more normal for farmers to harvest 250kg from a shamba of two acres, with sesame mixed with other crops.

Everyone sells their sesame immediately since it can't be stored. The district says that it is mandatory to sell all sesame to the cooperative society, but private businessmen come in to buy it unofficially. The cooperative society holds a meeting at the beginning of the season and gives an estimate of that season's price. This year it is 1000TSh per kilo. The cooperative society sells the crop on to the sesame board. In Mkanga 1 a group of men explained that the cooperative society promised that they would pay 1200TSh per kilo for sesame, but give the farmers 1000TSh on the initial sale, and bring the remaining 200TSh at the end of the season. This is the first year that this has happened, so the men were sceptical about whether they would get that extra money or not

Sometimes the cooperative is late with the money, so it is often at this time that the sesame is sold to private buyers, who offer the same price. Although farmers are required to sell their sesame to the cooperative society, there are also private traders who come to the village to buy it. They sometimes pay more – e.g. 1100TSh, but it is generally known that their system of measurement is inaccurate, to the benefit of the traders, so customers realise that they are probably being cheated. But when the cooperative

society doesn't have the money to make immediate payments, for those who need instant cash, they sell to the private traders. 'If you need the money now, you have no choice,' one man complained. While we were in Lihimilo, the village chairman and executive officer spotted a private sesame buyer and went and demanded a payment of duty from him.

Seasonal calendar

In June, a new shamba is cleared and in some villages, charcoal is made from the felled trees. This takes around 1-2½ months, until August or September. In October the shamba is prepared for cultivation by burning. In the past the rain started in November, but these days it doesn't come until December or even January. In January, as soon as the rain has started, food crops are planted – maize, cassava, cowpeas, rice, pigeon peas, etc. In February, sesame is planted, usually in the forest area. In March-April cowpeas are harvested. If improved seeds are used (they are available in Likwaya) which mature quickly, another crop is planted. The other crops are harvested around May to June.

Other cash crops

Oranges - many people have orange trees as a cash crop. There is no expertise around orange cultivation, and the trees in the village are not special cultivars – they are generally grown from seed. Oranges are bought by young men who live in the villages and the surrounding villages. They transport them to Lindi usually by bicycle to sell them.

Coconuts – in Mkanga 1, coconuts are an important cash crop which bring in a good income. One family may have around 30 trees. We were told by the group of village government representatives that in their village, each tree can produce 1000 coconuts a year. One coconut sells for 100TSh, so one tree can produce 100,000TSh per year and 30 trees can bring in 3 millionTSh. Coconuts sell in Lindi for 200TSh. Traders come to the village to buy them.

Cashew - this used to be much more important, especially in Likwaya, but since the price has slumped, people don't tend their trees as well as they did, and in addition, the pesticides? needed to spray on the trees are expensive. There is a blight/mildew which retards production. Women in Ruhoma told us that many people have cut down their cashew trees because the price is so bad and because there is no-one to motivate them to tend their trees. Cashew is sold to the cooperative society in the village. The price is 350TSh per kg, although sometimes it rises to 400TSh. In the past the price was much better, e.g. in 1997 it sold at 760TSh per kg. Older women in Likwaya said that they prefer cashew since they are used to it, and also because they already have the trees – 'even the trees our grandfathers planted keep producing if you tend them' an older woman told us.

Cowpeas – several farmers told us that they would like to sell their surplus cowpeas, which grow well in this area, but they say that there is no market for them, and no traders come to the village to buy them. However, some people take them to Lindi by bicycle where they are able to sell them easily. The DALDO said that the farmers lack initiative and should get out and look for a market, because there are always buyers for cowpeas.

Pigeon peas – the cooperative buys these, but not as systematically as sesame, and there is no data about them.

Farmers from outside

In Lihimilo we came across farmers who had come into the village from other villages. There are many shambas cleared from the forest on the way to Namkongo village, and many of these shambas are farmed by people from Namkongo who come in to find land. We saw two families walking home to Namkongo with all their belongings having completed the agricultural season and harvested their crops. If land use

planning is done and boundaries measured, Lihimilo village may begin to prevent Namkongo people from coming in to cultivate which could bring conflict between the two villages.

As well as people from Namkongo, there is one farmer who has migrated to the village from Mandawa, a village further along the road. He has cleared a huge shamba from the forest, estimated at around five acres, along the road to Namkongo. We heard that he has capital and can therefore pay people to help him clear and cultivate. The men we were with say that they are nervous that he might bring others with him to clear more of the forest, although this hasn't happened yet in the two years that he has been farming in the village.

It is likely that in other villages there are farmers who shift around looking for good land in the forests, as in Lihimilo, although we didn't hear of any other examples.

3.2.2 Charcoal makers and transporters

In most of the villages little or no charcoal is produced, since people either don't have the expertise, or don't have time to make it. In Mkombamosi and Mkanga 1 a small amount is made:

- Mkanga 1 - if a shamba is cleared, charcoal is sometimes made from the trees which are felled. Several men know how to make charcoal. They then take the charcoal to Kineng'ene village, a neighbouring village, and people from Lindi come to buy it from there and take it to Lindi. They receive 1500-2000TSh for a bag of charcoal. One shamba can yield 20-40 bags of charcoal. Charcoal burners also occasionally come into Mkanga 1 from other villages, but this doesn't happen often.
- Mkombamosi - A few people make charcoal – it was estimated about ten, who live in Chelewani and Likandilo subvillages. But since it isn't sold outside the village there is not a large market for it – most people use firewood. The charcoal makers sell a sack of charcoal for 3000TSh, which lasts an average family for around two weeks. One mound of charcoal can produce between 10-100 sacks of charcoal, depending on its size.

But the village where large amounts of charcoal is produced is Likwaya. For many people, this is their main income generating activity. There are two types of charcoal producers – there are those who do it for a living and there are those who do it when times are lean and they need some extra cash, or as a by-product of clearing a new shamba. The charcoal producers we spoke to said that it is hard work to produce charcoal – there is no daily income and when they make it during the rainy season, their crops suffer from neglect, so they often don't produce enough food to last the year.

Charcoal producers described the process of making charcoal. In total, it takes one month to produce charcoal. The trees are cut down, and then collected into a pile. Grass is put on the pile of wood, then it is covered over with earth, and then it is lit, and any holes plugged with more earth. The charcoal burns for a week. The charcoal producer then sells the charcoal to people who will transport it to Lindi by bicycle. For one bicycle load of four bags, the customer pays around 4000TSh, although this can go up to 4500TSh in the rainy season, or if charcoal is scarce. One average mound of charcoal produces around five bicycle loads, so for a month's work, a charcoal maker earns around 20,000TSh. The village government group told us that people make around 5-6 mounds of charcoal a year, if that is their main source of income.

The people who produce the charcoal are not the ones who transport it, so once the charcoal is ready, customers, mostly young men from the village or occasionally people coming from Lindi, come to buy it, and transport it to Lindi town. It takes 2½ hours to cycle to Lindi with a load of charcoal, and when we were driving to the village, there was a constant stream of charcoal-laden bicycles going to Lindi. One bicycle can take four bags – two large bags piled on the carrier and two smaller ones hung at the side as panniers.

In all the meetings we held, we heard that if there was a good cash crop which would produce an adequate income and enough food to feed a family all year, then most people would stop making charcoal – ‘it’s not in our blood,’ explained an older man. A young man who makes charcoal said wistfully that he would much rather buy and sell crops, because he would get a daily income, and the total monthly income would be almost double what he can make producing charcoal.



3.2.3 *Ming'oko gatherers*

Ming'oko (*Dioscorea* sp.) is a small tuber which grows in the mountain forests, between March/April to December. Women collect ming'oko. They eat it at home, as a snack rather than a staple, although it helps in times of hunger, but if they collect a lot then they will sell the surplus - it can't be stored and has to be eaten immediately. It is a good business for women, one of the few income generating opportunities open to them. One fungo (four pieces) costs 100TSh, but there is also a market for it in Lindi. Women

sell it in the villages, but it tends to be the men who take it to Lindi - some women sell the ming'oko to their husbands who then sell it in Lindi. One bowl of ming'oko sells for 3000TSh, while the same bowl can be sold in Lindi for 5000TSh.

- In Ruhoma, women told us that one person can make 5000TSh at a time from the sale of ming'oko, and that this is women's money which she is entitled to keep for herself if she likes.
- In Mkombamosi, a group of women estimated that perhaps 50 women a day go to dig ming'oko in the season, both from this village and from other neighbouring villages. Occasionally buyers come from Lindi to the village to look for ming'oko - they will fill a tenga (large basket) for which they pay 10,000TSh. But the ming'oko in the tenga is generally sold by several women – it is not easy for one woman to harvest that much ming'oko.
- In Lihimilo, ming'oko is mostly found on the Likonde plateau, and so they only really go to look for it in times of hunger, because the plateau is very distant.

Most of the women we spoke to were in agreement that in the past ming'oko used to be very plentiful, but recently it has become harder to find, and they have to travel further into the forest to find it. Various reasons were put forward for this – some said that it was because of drought, whereas women in Mkanga 1 felt that previously it just used to be for eating at home, but now it has become a saleable commodity. In addition many women come from Chikonji village to look for it in the forests of Mkanga 1. In Likwaya, however, women said that there is a lot of ming'oko in the forest.

3.2.4 *Path*

In Mkombamosi, we encountered a path from Kinyope to Mkombamosi which passes through Noto forest, along the top of the plateau. It is often the only reason why women would go into that forest. We met two groups of people walking over from Kinyope.

3.2.5 *Domestic users of forest products*

Apart from commercial production of cash crops and charcoal from the forests, most other uses of the forest is domestic:

Firewood – this is still plentiful in Mkombamosi, and in Ruhoma women collect firewood from the woodland areas near to the village. In other villages, women complained that nowadays there is still plentiful firewood, but it is more distant than in the past

- In Lihimilo we heard that for those who live on their shambas during the farming season, firewood is easily available but for those who live in the village, the supply of firewood is receding year by year. A

group of women in Msikitini subvillage said that one load of firewood lasts for around four days. They claimed it took four hours to collect firewood, although others estimated it as a one hour round trip.

- In Mkanga 1 women look for firewood in the various wooded areas in the village, although nowadays it is less easily available – women felt that this was because there are more people collecting it than in the past. Most women say they cover around 2-3km in their search for firewood. A round trip may take between 1-2 hours.

Poles

- In Mkombamosi and Mkanga 1 people collect their own poles, no-one harvests them for sale and no-one comes in from outside to harvest them.
- In Ruhoma, a few people come for poles from Milola, Kinyope and Legezamwendo. For people from Ruhoma, one trip for poles to Noto forest takes around 3-5 hours, and poles are becoming more difficult to access nowadays.
- In Likwaya, most people now get their poles from Kisanga forest, which is relatively unused, since there are so few remaining in Mbalu Kwasululu forest.

Timber – in most of the villages, people told us that there is little timber left, except in remote and inaccessible locations. The government has closed all the forests for harvesting, but local people are still extracting small amounts of timber for domestic use, such as doors, tables and other items of furniture and building. In Ruhoma and Mkombamosi, there are still timber trees in Noto and Likonde forests, including mvule, mninga, mninga maji, mkongo and mbambakofi, but they have largely disappeared from accessible areas.

3.2.6 Commercial users of forest products

There are few commercial users of the forest for products apart from cash crops and charcoal in Likwaya.

Poles – in Ruhoma we heard that there are people in the village who cut poles in Noto forest as a business to sell in neighbouring villages, and there are also people coming from other villages who cut poles to sell.

Timber – commercial harvesting of timber is illegal in all the forests in this area, but it is clear that some stealing of timber trees goes on, and also that some people harvest timber and run carpentry businesses, selling beds and tables in Lindi.

3.2.7 Hunters

In each village we heard that there are people who hunt wild animals in the forests. In some villages, such as Mkombamosi, many people hunt, whereas in other villages, e.g. Mkanga 1, there are a few (estimated at 20) specific hunters. In Lihimilo, however, people didn't admit to there being many hunters, saying that they usually eat goat and chicken. Traps are used and no-one uses guns, since it is necessary to obtain a permit for a gun. In Mkanga 1 we heard that occasionally hunters burn the forest to flush out the animals into their traps. In some villages (Mkombamosi) mostly various types of antelope are hunted, in Likwaya they hunt mbawala, paa, rabbits and monkeys (tumbili, kima) and in Ruhoma buffaloes, elephants, wild pigs and antelopes are hunted. In Ruhoma, it was claimed that only Christians hunt elephants and wild pigs. Hunters generally eat the meat at home and sell any surplus. Most of the people we spoke to in the villages prefer bush meat to goat or chicken – they think it tastes nicer, it is cheaper, selling at 2-3000TSh per kilo and few livestock are kept in the villages, e.g. in Liwaya it was estimated that fewer than a quarter of the population keep goats and no-one owns cattle. In Ruhoma, we heard that hunters sell their bush meat as far away as Ndanda and Masasi.

3.2.8 Users of non-wood forest products

Fruit and mushrooms - Children mainly collect and eat fruit growing in the forest, or occasionally women on the way back from their shambas or the forest. The main types mentioned include vitolo, usofu, angadi (only eaten during times of hunger), mabungo, andi, mipamo, makung'u, mabwagai, matopetope, mpokoro.

Women collect mushrooms, although they say that they would never go specially go look for them. They encounter them on the way back from their shambas or from collecting firewood. They consume them at home, and if there is a surplus, they can sell them for 100TSh per fungo.

Mushrooms are found in the rainy season and only occur around certain trees. People in Mkanga 1 told us that it is harder to find mushrooms nowadays, giving several reasons – because of the drought (which has come about because of god), because of cutting down too many trees or because of carbon emissions. One man pointed out that since mushrooms only grow around certain trees, if those trees are cut down, then they won't grow any more.

Honey - There are very few people who have an interest in honey in this area. There are a few people in each of the villages we visited who collect honey from the forest, by smoking out the bees, which can subsequently cause fires. In Mkombamosi, Mkanga 1 and Lihimilo we heard that there are one or two people with beehives who locate them in the forests. Those who have honey use it at home, or may sell some in the villages. In Likwaya, a group of men said that because of the drought all the bees in the village have disappeared, and the old men who used to keep bees have all died, so there is now no honey available in the village.

Grass, rope and medicinal plants - Grass is collected in the forest, often the woodland areas, for roofing. People told us that it is still abundant. Rope is collected by men in the forests and is only used at home. Everyone told us that there are people who collect medicinal plants in the village, but no-one had any more specific information about availability, location, type, etc.

3.2.9 Young men (Likwaya)

We spoke to a group of young men who told us the sort of work that they do:

- Buying and selling on bananas or coconuts in Lindi
- Buying and selling cassava to other villages – one man said that he could make 2000TSh a day
- Transporting water by bicycle from the well and selling it in the village
- Transporting charcoal by bicycle to Lindi
- Making charcoal – one young man said that he can earn around 20,000TSh per month (they can make one mound of charcoal per month)

3.2 10 Ilulu Cooperative Society

Ilulu Cooperative Society was initially set up in the 1960s and buys three crops in this area – sesame, cashew and pigeon peas. The most important are sesame and cashew, since pigeon peas have a low market value. In 2008 they bought 10000 tons of sesame, while in 2009 this dropped to 3000, since there were cash flow problems which meant they were unable to buy as much as was available. Sesame is exported to Japan, Turkey and China, as well as sold within Tanzania, but all in unprocessed form. The cooperative works in the whole of Lindi region. At village level they train two local people to be their representatives, and they hire transport companies during the season to transport the crops throughout the region. Since 2008 the cooperative has adopted a new form which has given the authority to members to be more involved in decision making.

In Lihimilo, we heard that the village cooperative societies buy sesame over a two month period. Lorries are hired by the cooperative society to take the crop to town to sell – usually in the two month period, ten lorries will come to the village for the sesame, e.g. the previous day five tonnes of sesame was transported from Lihimilo to Lindi. Last year a total of 32 tonnes of sesame was sold. The cooperative does not supply inputs for crops, 'although in an ideal world we would – we don't have enough money yet.' explained the cooperative society representatives.

The manager told us that there are advantages for farmers to sell their produce to the cooperative, although sometimes, it seems that private buyers may be a better bet:

- The cooperative society has scales at the go-downs where they collect the crops, and thus they can be accurately weighed. Private buyers use containers, which may often be larger than the weight of the crop.
- The cooperative can give a second payment if the market is good – they have already done that for cashew in some places.
- Cooperatives have standards of quality control, e.g. ensuring that there is no sand or other substances mixed with the crops. Private buyers don't do this.
- In future the cooperative society will make inputs readily and relatively cheaply available to members. They already supply dressed sesame seeds, but they are often beyond the reach of farmers.

The manager told us that one of the biggest problems they are experiencing is the question of education about the function and advantages of the cooperative societies. The government is assisting them to raise awareness but their capacity is very limited. There are other problems:

- The cooperative societies at village level don't collect crops from the shambas – they wait for them to be brought to the village go-downs where the scales and ledgers are. Private buyers go directly to the farmers' shambas to buy crops.
- The government collects duty from the cooperative society, but private buyers usually manage to avoid this tax and take their produce straight to Dar es Salaam, so on occasion they can offer a better price.
- Farmers need education to understand the advantages of dressed seeds – the crop matures in three months and the production is much increased.
- The cooperatives doesn't offer any inputs for pigeon peas. However, they are intending to look into this, since pigeon peas have potential.

3.2.11 Agriculture department

There are ward agricultural extension officers but they come to the village no more than once a year. People confirmed that they never see them in the villages. There is no other source of agricultural expertise. The DALDO (District Agriculture and Livestock Development Officer) confirmed that they have just employed 13 new ward based agricultural extension officers since they want to have a more forceful presence in the villages.

The DALDO told us that his department are promoting the cultivation of sesame, but at the same time trying to discourage shifting cultivation, by suggesting the rotation of crops as an alternative. At the same time they are interested in increasing yields, by promoting the use of improved seeds. They are also looking into the practice of mixing crops on the same shambas – he says that some combinations are not good, but others, e.g. maize and cowpeas, cashew and cowpeas, work well. He mentioned some cash crops which they would like to introduce more widely, e.g. sunflowers – dairy cattle have been brought into the area, and they need a local source of seed cake, groundnuts and beans. However, he said that markets are a problem since people do not have the know-how to find them or stimulate them.

The agriculture department has worked with the cooperative society in Lindi, giving them training in financial management. The DALDO emphasised that cooperatives are the way forward, although they suffer from their previous reputation. Much awareness raising needs to be done, however, before farmers come to realise that there are benefits to be gained from the cooperatives, e.g. a second payment later in the year, a supply of inputs early in the season.

The DALDO told us that there was a company (Biomassive) interested in the cultivation of jatropha in the area, but they disappeared suddenly. He was enthusiastic in his support for other investment opportunities of that nature, however.

3.2.12 Organisations

There do not appear to be any organisations operating in any of the villages, apart from Likwaya, where several organisations have come over the years:

- Concern operated here for three years, and have only just recently left, although people in the village told us that they are hoping to continue with another phase. They deal with land issues and food security. They brought in improved ground nut and cassava seeds and provided training on the best way to cultivate them. Women told us that the cassava and groundnut seeds were good and produced well. They also brought a cassava milling machine for one group. Part of it was given three years ago, but the remaining parts have only recently been delivered, and they haven't managed to install it yet. They say it will start working soon. The machine is designed to grind cassava to make flour suitable for biscuits and chapattis. The flour has a good market in Dar and Mtwara. We were unable to talk to Concern staff, since their office in Lindi has closed.
- FAO brought cassava seeds in 2008 but then never came back. The seeds arrived too late to plant.
- OG Paper in Mtwara, a Japanese owned company, brought Eucalyptus seedlings in December 2008 and planted them as a trial plot on 2ha in Lumumba subvillage. They occasionally come and check on their trees, but the people we spoke to didn't know what their plans for the future were.

3.2.13 Aga Khan Foundation

We spoke to the Programme Director of the Coastal Rural Support Programme (CRSP), which is an eight year programme under the Aga Khan Foundation and funded by DfID. They have an office in Lindi and work in three district in the region. They are just beginning operations in many of the villages where TFCG work. CRSP are aiming to work with rice and sesame farmers, to increase their production and to link them with markets, as well as getting more people accessing financial services – if yields are increased and markets improved, then farmers will need somewhere to put their extra cash. They are particularly focussing on conservation agriculture (e.g. increasing land use efficiency, water retention techniques, composting) and through this they believe that they can triple farmers' yields. For the financial services, they are working with Financial Sector Deepening Trust, supported by DfID, establishing banks, saccoes, savings groups, Vicobas, and getting people into the basic system of saving. No capital is required for this from the organisation – it is all generated on a small and gradual scale by the people themselves.

3.2.14 Groups

There are virtually no economic groups in the villages. Some people, particular women, mentioned vaguely that there had previously been groups set up in the villages by outsiders, but most couldn't remember who, and the groups have all collapsed anyway. The exception is Likwaya, where Concern has set up a small number of groups – however, most of the village haven't been involved. Concern cultivated a demonstration plot, then the group members cultivated their own plots. People felt that the results had been good, but said that they didn't have access to those seeds. They also assisted a group with a milling machine and a sorghum milling machine, in order that they can mill sorghum to sell for biscuit making in Mtwara.

3.2.15 Village governments and VNRCs

We always began by talking to groups of village government representatives. They were knowledgeable about their villages and willing to provide us with information, but it is clear that many of them are poorly educated and have little or no training in their roles and responsibilities, e.g. not understanding why the forests had been closed by the government, being largely unaware of the processes of land use planning and where their villages had got up to in the process. As an example, in Likwaya, the village government representatives told us that in 2007 government officials from the ministry came, facilitated by Concern, to carry out land use planning. They started the process, all the areas were set aside, but the process was never continued through to receiving the title deeds. It has all taken so long that the area set aside as forest has already almost disappeared through being harvested for charcoal. Bye laws which have become

standard in other parts of the country, e.g. about preventing fires in the forests, are not in existence in these villages, and there is no PFM in any of the villages included in the study. It is likely that lack of good governance is an issue which could contribute to deforestation.

Some of the villages have VNRCs. In Ruhoma, the village decided to institute this committee themselves. They have had no training and are not sure what their role is, although they said that they are the ones who should catch illegal timber harvesters. They say they check people in the forest to see if they have a licence. In Lihimilo there is a VNRC, but in the village government meeting, not everyone was aware of this. There was some discussion about what this committee does, and in the end it was decided that they measure the land to define the village boundaries. It is clear that where they exist in other villages, they are not effective institutions since they are generally unaware of their function, roles and responsibilities.

3.2.16 Outsiders

Traders come in to buy maize, sesame, oranges, coconuts, tomatoes, mangoes and pigeon peas. Government officials rarely come except just before an election. We saw private sesame buyers in Lihimilo, whom the village chairman and VEO stopped to extract duty from, for doing business in the village.

The roads to the villages are generally in fairly good condition, especially in the southern part of the area, although some of the villages are remote and take much time to reach. Mobile phone access is also generally good, thus facilitating communication

3.2.17 Zain mobile phone company

On the top of the Noto plateau in Ruhoma village there is a Zain mobile phone tower, built in 2007 and guarded by three guards on rotation. It is the highest point of the plateau in that area, and is an important catchment. The guards have all built small houses for their shifts of 12 days at a time, and their wives live with them. Their salary is 80,000TSh per month. A Zain car comes up once a month to bring fuel for the generators and sometimes it will help to bring some water up for them. All water has to be collected from the bottom of the escarpment where the springs come out. They all cultivate around the tower, which has involved clearing a large tract of dense tall forest. We spoke to one guard who says that he has cleared three acres so far, but when he needs more he continues to clear more forest. He cultivates maize and rice and remains in this patch for 2-3 years, then he will clear another area and leave the previous patch to regenerate. When he clears the forest, he leaves the large trees, because they are hard to cut down, but often they are killed during the subsequent burning of the shamba. He showed us old mango trees which he says is an indication that the forest, although seeming so thick and dense has obviously been cultivated before. All the felled trees are burnt – they don't have the expertise to make charcoal and there is no market for selling it.

3.2.18 The role of the stakeholders in causing or avoiding deforestation

The stakeholders causing the most deforestation are farmers and charcoal makers and thus these two groups are the most important for the project at village level. The role of farmers in causing deforestation has been discussed above. Their role in deforestation is considerable, particularly in the cultivation of food crops and sesame, which tend to be cultivated in the forests under the system of shifting cultivation. Permanent crops are generally planted in the lowland areas and do not affect the forests. The non-intensive way of farming and the disinclination to weed mean that larger areas of than necessary are used. Charcoal makers in most places produce charcoal as a by-product of agriculture. However, in Likwaya, it is a cause in itself of extensive deforestation and is not even compensated for by all of the land subsequently being used for agriculture.

Other stakeholders use the forests, but there do not seem to be unsustainable levels of exploitation, e.g. those who harvest poles say that they are increasingly difficult to find – this is probably more because of the

forest clearance for shifting cultivation and charcoal making rather than an overuse of poles, since they are chiefly for domestic use. Hunters do not often contribute to deforestation, unless they set fires to flush out animals. However, the decline of many animal species in the forests, as reported in the villages, can at least in part be attributed to them.

Zain, the mobile phone company with the tower on the plateau, has indirectly caused the destruction of a large area of once dense forest, important for water sources. There is only one tower in the area, but it may not be the last, and it is important that the company understands that there should be some limits on where towers can be located, and that there is more to putting up a tower than simply building and maintaining it.

Sesame and food crop farmers are the ones who are causing the most deforestation, but they could equally be decisive in preventing more deforestation, if they changed their ways of cultivation and farmed the crops more intensively with greater expertise and a higher level of inputs. Their incomes would then increase and there would be less incentive to exploit the forests. This would particularly apply in Likwaya. The cooperative and the agriculture department would also be important for the project, since they would be key to introducing new concepts and crops, and assisting with marketing. The Aga Khan Foundation project would also be key in this respect.

3.3 Groups vulnerable to REDD and ways that this might be mitigated.

Farmers practising shifting cultivation – the frequent cry was ‘but where will we cultivate?’ when forest conservation was mentioned. Mitigation measures could include:

- Carry out awareness raising about the negative impact of shifting cultivation on forests, building on the current slight understanding that forests have a crucial role to play in water supplies
- Introduce new techniques to intensify cultivation of food crops and sesame, and bring in the use of rotation on existing shambas
- Link with Aga Khan Foundation project which is promoting conservation agriculture and developing markets
- Link with the agriculture department which is aiming to introduce new cash crops
- Link with the cooperative society which wants to provide inputs to farmers and which sees more potential in pigeon peas.

Charcoal makers – they wholly depend on being able to clear areas of the forest in order to make their charcoal. Mitigation measures could include:

- Charcoal makers claim that they don’t like making charcoal – it is hard work and ‘it isn’t in their blood’. Introduce cash crops with a more attractive income and good markets, in cooperation with the Aga Khan Foundation project.
- Demand needs to be addressed too, to tackle the issue of leakage. Look at CARE’s initiative to bring gas to Zanzibar to reduce charcoal consumption in Lindi town???

Those harvesting poles for houses – these people fall into two categories – the few who collect poles as a business and those who only harvest poles when they need to build a house. Mitigation measures could include:

- Introduction of alternative income generating opportunities for those who harvest poles as a business
- The establishment of specific rotated areas for coppicing for poles under managed forests
- The introduction of houses built from bricks

Ming’oko harvesters – this group consists entirely of women. Ming’oko is mostly collected for domestic use, and is not an important staple, but many women will sell a surplus, bringing in a small amount of extra income which is entirely theirs. Mitigation measures might include:

- Introduction of alternative income generating activities for women
- A survey of the abundance of existing ming'oko and some sort of controlled and rotated harvesting of it

Hunters – they depend on trapping bush meat in the forests, either to enhance their diets or to sell. Mitigation measures could include:

The introduction of livestock in greater numbers, targeting in particular the hunters, although people say that bush meat is nicer than meat from domestic animals, e.g. hens, goats, rabbits.

3.4 Women in the landscape

As the project aims to demonstrate a pro-poor approach to REDD, a particular focus should be placed on understanding the more vulnerable and marginalised groups. Women have been identified as being particularly vulnerable to REDD. For this reason groups of women were sought and discussions were held with them.

Women say that generally they cultivate together with their husbands – a woman would not have her own shamba unless she was a widow or unmarried. But in the case of cash crops, although some women maintained that they share the proceeds with their husbands and decide how the money is to be used, others said that their husbands are entirely in charge of the sale of the crops and will use the money as they please, and not always for the benefit of the family.

The only real source of independent income for a woman seems to be the sale of ming'oko, gathered from the forest, and to a much lesser extent, the sale of mushrooms. Women in Ruhoma told us that even if they have planted orange trees, their husbands would be the ones to sell the oranges and pocket the proceeds. However, a woman's income would tend to be used for the family, rather than being used entirely for herself

In Lihimilo women explained to us that having many children was seen as an 'insurance' strategy for their old age – they feel that there is a greater chance that at least some of them will help them out in later life. Nowadays so many young people migrate from the villages that it is as well to have a lot of children so that some might stay. However, younger women in Mkanga 1 were of the opinion that this is an outdated idea – it is hard to look after and educate a large number of children, so it is better to bring up a few well and responsibly. Even if they leave, they will get good jobs and will be able to help their parents out later.

We spoke to several women who were members of the village governments and who were often articulate and held interesting opinions. In some villages the female members of the village government meetings were reluctant to take part in discussions, whereas in others they contributed freely. However, they were directly facilitated to contribute their opinions, so it is not clear how much they would participate in normal government meetings.

In all the villages we visited, the main problem faced by most women was lack of water. It is particularly acute from July to December when the water generated by the rains dries up. There is little piped water and most people depend on traditional wells or digging temporary wells in dry river beds. The water in these wells becomes increasingly scarce and dirty as the dry season progresses. Most women told us that in the past the problem of water was not so acute and there were rivers which flowed close to the villages all year round. The situations in the villages are as follows:

- Ruhoma - One tap was installed in 1991, which is for the use of the whole village. It still works but not well, and there is not enough water for everyone in the village – there are always queues. In addition, the water is salty. There are other sources, particularly streams in the rainy season, but they are far away. There are a few distant springs at the bottom of the escarpment. Some people go there by bicycle.

- Mkombamosi - A pump was installed many years ago in the village, but it is broken, so now women collect their water from rivers and wells. Nangaro river is dry in the dry season – it used to run all year round but now that the forest is being destroyed it dries up once the rains have finished. But Likandilo river still runs throughout the year and women said that its water is clean and good for dry season agriculture. However, it takes two hours to collect water from the Likindilo river from the village centre. In Likonde Chini sub-village on the top of the plateau, there is no water, so women have to walk up and down the escarpment to collect water.
- Lihimilo - Water is extremely scarce in Lihimilo in the dry season, from July to December. The water for the whole village comes from one well, Limilo, which is in a dry river bed. The river flows during the rainy season and the well fills up, but once the rain stops, gradually the amount of water decreases. We saw the well in June and it was already only a small pool of water. It takes around 30 minutes to get to the well from the village centre. The water is salty and is reduced to an increasingly small pool in the dry season. There is always a queue of buckets at the well, waiting for there to be enough water to collect. Women say that sometimes they have to spend the night at the well, waiting for water. A group of women told us that there used to be water in the riverbeds all year round, but now these have dried up. The well used to be full all year too. The subvillage chairperson explained to us that the well is attended by guardian spirits. The spirits may be present in the large trees which surround the well so it is not safe to cut any of them down. Any snake or other creature seen near the well could also be one of the guardian spirits so it is also not safe to kill anything in the vicinity of the well. 'If you kill something,' he added, 'you can die right on the spot, or be afflicted by terrible troubles.' The subvillage chairperson also said that they are trying to keep the woodland in the wider area around the well intact, in an attempt to protect the water source.
- Mkanga 1 - There is a well in Mtandi. The water is very nice and tastes good, but it takes an hour to get there. In the dry season the water becomes dirty and women have to wait for a long time for there to be enough water. There is another well on the other side of the village - Chakalala – but the water is salty and it is only good for washing dishes. There is a pump with taps several kilometres down the road, but the water is sold for 60TSh per bucket which people don't like to pay.
- Likwaya - Water is an enormous problem in Likwaya. There is only one well in the village – Pangani – which takes an hour to reach. Water is abundant in the well, and people do their washing and even wash themselves there. In the past there was more water – one young man we spoke to said that he remembered as a child collecting water very near to the village, from a river which flowed all year round. Now it is nothing but a dry hollow.

The health system was also mentioned as a problem by women. Most of the villages don't have a dispensary (apart from Mkombamosi, and in Lihimilo the site for a dispensary has been cleared and building work will begin soon) and have to walk long distances to reach one. Women told us that it can be a struggle to reach a distant dispensary and then it is often the case that dispensaries have no facilities for emergencies, so they have to go further to Lindi. Often the only transport available for such journeys is a bicycle. Most women were not enthusiastic about the service received in the local clinics, saying that sometimes the doctor is not present, or is unable to help them, or there are too many patients waiting, or the drugs have run out. In Likwaya, however, women said that the service at the dispensary in Moka is adequate and the medical staff will refer patients to Lindi if there is a serious case, although transport is a problem.

The main diseases in this area are malaria and diarrhoeal diseases. Older women in Likwaya told us that the time of eating fresh maize is the worst time for malaria. Eye problems were frequently mentioned too. Women complained about the problems of childbirth, saying that the choice was often difficult, whether to try to reach a distant dispensary (e.g. 6 hours' walk from Lihimilo) in time, or to remain in the village and make use of the services of traditional midwives, who are present in all villages. They do a good job for

routine deliveries, but if there are complications, they can't cope and then it is much more complicated to travel to the dispensary.

A woman in Mandanje subvillage told us that a group of people came to the village from Ifakara (from the IHRDC (Ifakara Health Research and Development Centre)) several years ago to raise awareness about malaria prevention. One woman said she was selected to be a health worker and worked with the community to help to introduce bed nets and carry out the awareness raising. She feels that many more people now use bed nets, although it is hard to know what people have in their bedrooms.

We asked all the women we spoke to about the quality of their lives and whether this had improved or got worse in comparison with the past. We received a variety of replies. In Ruhoma, Mkanga 1 and Likwaya, women felt that life is better now than in the past. In all three villages this was attributed to the recent possibility of making significant amounts of money through agriculture. Women explained that if people were prepared and able to work hard, they could make money and live well. In addition, many things are now available which were not in the past, e.g. khangas, clothes and shoes, a variety of food stuffs, building materials, all obtainable in Lindi and even in the villages. The roads are better and lorries come to the villages to buy produce. In Mkanga 1 the women emphasised that young people could get on quickly through their own efforts, build their own houses, and don't have to depend on their elders as in the past.

In Mkombamosi and Lihimilo, however, women were more negative, complaining that their lives are made more difficult by the scarcity of water, which in the past was more readily available nearer to the villages. Women in Mkombamosi felt that they don't have any new ideas coming in from outside, and for that reason they continue to do the same things as they always have.

We asked women about how they felt about the condition of their forests. In most villages, they explained that nowadays the forest is getting thicker, since there are fewer people living in the forest than there was in the past. In Mkanga 1, although the men maintained that the forest was in better condition, the women disagreed, arguing that the forest is receding since the population is now greater and so there is more pressure on the forests than in the past, especially in the shape of people clearing shambas.

Women's opinions about forest conservation were mixed. Often the first reaction to the suggestion that forests might be protected was a horrified cry of 'but where would we cultivate? What would we eat?' In Likwaya, a group of older women assured us that forest conservation would mean certain death for them, since they wouldn't be able to cultivate or prepare charcoal. But in all the villages, a subsequent consideration of the proposition brought a more favourable response, with all women reflecting that the destruction of the forests had a direct impact on water supply, which most had acknowledged as their most important problem. Others mentioned changes of weather and felt that the forests brought them more rain in the past – now that they are disappearing, droughts are more frequent and prolonged. Women in Likwaya also linked less rain and hotter weather to a greater incidence of malaria. A woman in Mkanga 1 was adamant that people in her village need education to help them to understand the importance of protecting their forests. Many were prepared to think about alternative ways of cultivating in order to reduce pressure on the forests.

In the form of agriculture, women are as dependent as men on cultivating in the forests, since they all cultivate together. The same applies to charcoal making in Likwaya, since many women also make charcoal, although not generally on a regular basis. They are dependent for firewood on the forests, but so far, although it was mentioned in some of the villages that firewood was now more distant than in the past, it was not seen as a major problem for women, especially for those who live on their shambas in the forests during the cultivation season. And in other parts of the country, even when forests are protected, there is the possibility for women to enter to collect dead wood for firewood. The main area where forest conservation would impact on women and not men would be in their collection of ming'oko, on which many

depend for a little additional income. However, since women's most significant problem is lack of water, it would seem that women are more vulnerable to REDD not being done in the long term, since the ever increasing destruction of the forest will only intensify the scarcity of water.

4. Conclusion and recommendations

This area is characterised by small communities with huge areas of land, mostly forested, which they are exploiting as they always have done, with little understanding of the fact that their resources are finite and are becoming depleted, something which has never happened before. People will tell you that 'the forest will never finish!' but if pressed, on reflection they do have a certain awareness that things are changing, that there is pressure on the forests, and in particular that water regimes are different, and that there is less rain than in the past, both of which they connect to deforestation.

There is very little government interference in these forests. There is no form of forest management, and seems to be little contact with the government forest authorities. There don't seem to be any village by laws concerning the forests, e.g. about fire, and thus people do what they want in the forests, which includes harvesting timber for domestic use, without any sort of permit. The forests have been closed for timber harvesting by the government, so there are no customers coming to harvest timber, but there is probably some illegal harvesting. It wasn't mentioned as an issue, however, so it may not happen much, or people may not see it as a problem.

There is little severe poverty in the area. Of course poverty is relative, but 'hunger' (food deficit) does not occur except in extreme years and most farmers cultivate a wide range of crops which provides an insurance policy for the failure of one crop through e.g. pest attack. And the combination of sesame and coconuts as cash crops can be seen to provide a good income in some of the villages. However, there is 'poverty' of opportunities, of alternative activities for people to engage in, to vary their livelihood strategies.

There is a variety of stakeholders present in the area, but most from the communities themselves. There are not many outside stakeholders, and of those that come to the villages, few are involved in the forests – most come to deal in crops. The pressure on the forests comes largely from the local people, who practise shifting cultivation and in one village, make charcoal. There is little commercial exploitation of the forests – only for charcoal in Likwaya, and for sesame, often cultivated in the forest. These two groups – farmers practising shifting cultivation and charcoal producers in Likwaya (and any other village where there may be commercial charcoal production) are the two groups which are particularly important for the project. Although initial reactions to mention of forest conservation were negative, and in the case of the young men in Lihimilo, hostile, many actually understand the importance of some sort of conservation, and say that they would require an alternative means of cultivating their crops if they were to make a start on forest conservation. Changing habits and attitudes, and especially introducing activities which will take more effort (for little immediate and tangible benefit), is always difficult, but we felt that people will be positive about being involved in the project, partly because they do acknowledge problems already occurring connected with the forest (lack of water) and partly because there have been so few projects working in this area that they are ready to welcome anyone who they perceive as bringing some sort of benefits and new opportunities.

Recommendations

Some recommendations are included in the mitigation measures suggested under section 3.3.

More research could be done on:

- Permanent vs. shifting cultivation in order to better target approach – the crops involved, the decision making process behind where to cultivate, perhaps mapping the forest areas in the villages to identify which areas are particularly exploited and for what reasons
- Alternative cash crops for the area
- Any forest areas of cultural significance, e.g. sacred sites (not covered in this study) which could be the basis for a forest reserve.
- Pigeon peas – they were not mentioned as a significant crop but they grow everywhere, and there are markets for them. They could be another potential useful cash crop
- Coconuts – they are not planted in the forests, but they provide a good alternative income to crops planted in forest areas.

Awareness raising – people are afraid that they will starve if the forests are protected. Awareness raising should be done together with reassurance that alternative strategies will be provided

Training for village governments and VNRCs on roles and responsibilities, governance , laws and law enforcement

Land use planning – continue with the process started in some villages.

PFM – identify forests to start up PFM. Ensure that people understand the implications of PFM – in other parts of the country, villages have set aside very small areas of forest since they weren't quite sure what PFM would entail in the future. Study tours could be conducted to places (e.g. Kilwa) where people are more confident about PFM.

Links should be forged with various institutions and organisations:

- Aga Khan Foundation – they are starting work in many of the same villages. Share ideas with them, link in with their conservation agriculture activities and marketing strategies. They have indicated a willingness to share out activities, e.g. if TFCG/MJUMITA carry out training and awareness raising, they will implement agricultural activities.
- Concern – to hear about what they have done in any of the project villages (Likwaya, but there may be others) and whether they are intending to carry on working in those villages.
- The Cooperative Society – to explore ways of working with them, e.g. in building the confidence of people in the cooperative movement
- The Agriculture department – to explore ways of working with them over e.g. the introduction of new cash crops and new technology, e.g. improved seeds.
- Zain – to meet them and discuss with them the implications of siting their towers and explore ways in which damage to forests could be mitigated.

Annex I. Village profiles

Ruhoma village

Ruhoma is a village to the south of Noto plateau, with a population of 669 and three subvillages (Shuleni, Mkundi and Mchati). The main tribes in the village are the Wamwera and the Wadondwe. The village was created in 1974 when people were brought in from the plateau and surroundings to live. There is no dispensary in the village. The main political party is CCM, but there are many who favour CUF. Sub-committees are in place for health, agriculture and economy, water, natural resources, HIV and land.

The forest

There are two main areas of forest – Ng’engwa, which is referred to as ‘jangwani’ (literally ‘desert’) which is an open miombo woodland with much grass, and the thick closed forest of Noto which is called ‘msitu’ (forest). The woodland is dismissed as almost useless, and only supplies people with firewood and some mushrooms. In addition, no-one farms in this area, since the soil fertility is poor (hence the term ‘desert’). For all other forest needs, Noto is used. Shifting cultivation is widely practised in Noto forest and can be seen to be the main cause of deforestation.



On the top of the plateau there is a Zain mobile phone tower, built in 2007 and guarded by three guards on rotation. It is the highest point of the plateau in that area, and is an important catchment. The guards have all built small houses for their shifts of 12 days at a time, and their wives live with them. They all cultivate around the tower, which has involved clearing a large tract of dense tall forest. We spoke to one guard who says that he has cleared three acres so far, but when he needs more he continues to clear more forest. He cultivates maize and rice and remain in this patch for 2-3 years, then he will clear another area

and leave the previous patch to regenerate. When he clears the forest, he leaves the large trees, because they are hard to cut down, but often they are killed during the subsequent burning of the shamba. He showed us old mango trees which he says is an indication that the forest, although seeming so thick and dense has obviously been cultivated before. All the felled trees are burnt – they don't have the expertise to make charcoal and there is no market for selling it.

Most people we spoke to were very optimistic about the state of their forest. In discussions about shifting cultivation one man reassured us - 'There is so much forest – we will never finish it!'. The group of women felt that the forest on Noto plateau was in good condition and no worse than it was in the past, and the village government group explained that there are now fewer people living in the forest than in the past – in the past every family was in the forest with their own shamba, but since 1974 they are all now in the villages. So it is clear that the forest is in a better condition.

People didn't have strong views about forest conservation. The village government group thought that it would be good for water supplies if the forest was protected, and also that it would help to protect animals. The guard at the Zain tower said that it was important to protect the forest because there are many springs coming from the mountain forest. In addition it is a place where many animals live – if their habitat is removed, they will come out of the forest and raid shambas instead .

Fire

Fire is a regular occurrence, but usually only in the woodland area. For this reason, people explained, the woodland doesn't grow, since the fires kill trees, especially small ones. They told us that it is not possible to put out the fires. There are no laws in the village about controlling fires, or penalties for those who start

them. The village government group considered the issue and said that it would be good if they were to bring in some by-laws about fire.

The guard at the Zain tower told us that he burns his cleared shamba, but the fire doesn't spread to the rest of the forest because it is so thick - 'you can't burn that forest even if you try!' he explained.

Forest products

Firewood

Women say that firewood is not a problem. It comes from the woodland area, and it takes them around half an hour to collect.

Poles

Poles come from Noto. Everyone collects their own poles. A few people come from other villages to cut poles in the Ruhoma area of Noto – from Milola, Kinyope and Legezamwendo, and there are people in this village who cut poles as a business. It takes around 3-5 hours for one trip to collect poles from the forest.

Timber

There are timber trees in Noto forest. People in the village mainly use it for doors and tables and other items of furniture and building. The main trees used are mvule, mninga, mkongo and mbambakofi.

From around 1970-2000 people from Zanzibar came to cut timber in the forest and take it away. When they finished all the timber, they left. The guard at the Zain tower told us that in the 1970s TWICO harvested timber here, and also an Indian businessman, but only selected trees. In 2000 there was another businessman who came to harvest timber but he has not returned since. Nowadays people have to get a licence from the district, and the village charges a levy for anyone coming in from outside to harvest – 300TSh for large poles and 300TSh for each cut plank. However, in the past few years, the forest has been closed by the district authorities, so no-one now comes to harvest. Women told us that the only ones harvesting timber nowadays are thieves on the fringes of the village, where no-one will see them.

The village government group felt that it would be good if the forest could be opened up and more people encouraged to come and harvest, since there is still much timber in the forest. It would be good for the income of the village. Women, on the other hand, said that there is no timber of any size left in the forest, so no-one would be interested to come to harvest. The guard at the Zain tower was of the opinion that it was good to close the forest to protect the remaining timber trees, and that no-one has been hurt by the closure.

Ming'oko

Ming'oko is a small tuber which grows in the mountain forests, on Noto plateau and its slopes. Women collect ming'oko. They eat it at home, as a snack rather than a staple, but if they collect a lot then they will sell the surplus. One fungo (four pieces) costs 100TSh. One person can make 5000TSh at a time from selling ming'oko. This is women's money which she is entitled to keep. The season for ming'oko is March/April to December. A group of women told us that there is less ming'oko than there was in the past, and now it is found further away from the village.

Mushrooms

Some women collect mushrooms, but they would never go specially to the forest for them – they are picked on the way back from the shamba, from collecting firewood, etc. If there is a surplus, they can be sold, for 100TSh for a fungo. They are available in the dry season.

Animals

There are buffaloes, elephants, wild pigs, and various types of antelopes in the forest. People hunt them and sell them as far as Ndanda and Masasi. The people in the village eat the antelopes, but we were told that Christians will eat elephants, wild pigs, monkeys and baboons. The people we spoke to explained that these Christians were from Mozambique, but it seems that they are actually members of the Makonde tribe. The guard at the Zain tower says that elephants, wild pigs and monkeys come and eat their crops.

Agriculture

The main crops cultivated are maize, cassava, sorghum, cowpeas, pigeon peas, sesame and choroko. Many people cultivate on the mountain slopes where it is cooler – it is more suitable for cassava, maize, mountain rice, pigeon peas and sesame. Tree crops include coconuts and cashew.

Many people practise shifting cultivation, although it was not easy to estimate what proportion of the population do. The village government group estimated that there are only 10-20 farmers who farm using shifting cultivation, while everyone else has permanent shambas in the lowland parts of the village. Shifting cultivation only occurs in Noto forest. The maximum area that a farmer will clear is five acres, but most clear less than that. Some cultivate for one year then they clear a new shamba, others carry on for two years. Women say that they cultivate one shamba for four years before moving on to clear a new shamba. The forest is not cleared systematically – farmers look at the potential fertility of a new area, gauging it from what trees are growing and whether there is any grass in the understorey. The forest is therefore dotted with patches in varying states of regeneration. A group of men said it takes around ten years for the forest to recover. The main driving force behind shifting cultivation seems to be the concentration of weeds, with fertility as a secondary factor. Everyone told us that clearing a new shamba is easier than weeding three or four times a year. When trees are felled, they are burnt – no-one makes charcoal in this village, since there is no expertise, no-one uses it and there is no outside market for it nearby. Some large trees are left, because they are too hard to cut down, but they are often killed when the shamba is burnt.

The main cash crop in Ruhoma is sesame. The representative of the cooperative society in the village estimated that about $\frac{3}{4}$ of the people in the village cultivate sesame, and the average acreage is one acre. Fertiliser isn't needed, especially since most people cultivate it on recently cleared land, but pesticides are necessary, since there are beetles which can decimate a crop. However, the pesticides cost 5000TSh per bottle, and for this reason, many people don't buy it. One acre, if tended well, can yield 250-300kg. There is an improved sesame seed (Lindi white) developed by the research station in Mtwara, but it isn't widely available yet, so people still keep back some of their traditional seeds to plant the following year. Success with sesame depends on several factors – early preparation of the shamba, planting at the right time, planting in rows, weeding at the right time and often enough. Sesame is not stored - it is too risky because of rats and insect damage. Everyone sells it immediately. The district says that it is mandatory to sell all sesame to the cooperative society, but private businessmen come in to buy sesame unofficially. The cooperative society holds a meeting at the beginning of the season and gives an estimate of that season's price. This year it is 1000TSh per kilo. The cooperative society sells the crop on to the sesame board. Sometimes the cooperative is late with the money, so it is often at this time that the sesame is sold to private buyers, who offer the same price. The reason given for farmers not cultivating sesame is that they say they don't have enough money, for labour or for the pesticides.

The cooperative society also buys cashew nuts, at 750TSh per kilo??, but few people have any cashew to sell. The price is not good and there is no-one to motivate people to make an effort to tend their trees. Women told us that many people have cut down their cashew trees because the price is so bad.

Many people have orange trees as a cash crop. There is no expertise around orange cultivation, and the trees in the village are not special cultivars – they are generally grown from seed. Oranges are bought by young men who live in this village and the surrounding villages. They transport them to Lindi usually by bicycle to sell them.

There is a ward agricultural extension officer but he comes to the village no more than once a year. The group of women confirmed that they never see him in the village. There is no other source of agricultural expertise.

VNRC

There is a Village Natural Resources Committee. The village decided to institute this committee themselves. They have had no training and are not sure what their role is, although they said that they are the ones who should catch illegal timber harvesters. They say they check people in the forest to see if they have a licence.

Water

One tap was installed in 1991, which is for the use of the whole village. It still works but not well, and there is not enough water for everyone in the village – there are always queues. The water is salty. There are other sources, particularly streams in the rainy season, but they are far away. There are a few distant springs at the bottom of the escarpment. Some people go there by bicycle.

Health

There is no dispensary in the village. The nearest dispensaries are in Milola, Mahangala and Rutamba. The main health problem in the village is malaria.

Groups

There are no projects or groups in Ruhoma.

Outsiders

Traders come in to buy maize, sesame, oranges, coconuts, tomatoes, mangoes and pigeon peas. No government officials ever come except just before an election.

Quality of life

The group of women we spoke to said that life is better now than in the past. They say that if you have the means to earn money, which now is a possibility through cash crops like sesame, you can live well – this was not possible in the past. They can now buy clothes and khangas in Lindi and in the villages. In addition, there is now a good road, and as a result there has been some development in the villages.

Mkombamosi village

Mkombamosi is a traditional village, although there was an influx of people in the 1970s. At this time Mkombamosi split from Muungano to become two separate villages. In the past people used to live on their shambas dotted around the forest. They started coming to live in the village in the 1960s and many more arrived in 1974. The population is 2250 and there are six subvillages. One of the subvillages is Likonde Chini, which has been there since colonial times. At the time of Ujamaa, people living in Likonde Chini were asked to come down. But most farmers returned very rapidly. The main tribe is the Wamwera, who are mostly Muslims. There are also Wamakonde, who are generally Christians, Wamaginge and Wadonde present in the village.

Since colonial times the village has had a dispensary and a primary school. The condition of the road has also not changed much since colonial times.

A land use plan has not yet been prepared, although the neighbouring village of Muungano has one, but the village boundaries have been demarcated with beacons. Officials from the Ministry of Lands came in 2008

to carry out this activity. However, no map has been returned to the village by the Ministry of Lands and they have not yet received a Village Land Certificate.

Forest

There are two forests, one on either side of the village – Noto and Likonde, both of which are used for various purposes. It takes two hours to walk to Noto, and two hours to walk to Likonde. There are also areas of miombo woodland. Women in Likandilo subvillage said that the woodland is theirs, but that Noto belongs to the government and they have no rights over it.



Shifting cultivation is extensively practised, largely on the Likonde side of the village. Men in Mwenge subvillage explained that they choose the site of a new shamba on the basis of the tree species growing there which indicate that the soil is right for the crop, e.g. mkwanga shows that the soil is good for maize, sorghum, pigeon peas, mtalawanda indicates that it is good for rice, maize, sorghum, mnyenye is good for rice. Many people have their main house in the village, but during the cultivation season they build a small house on the shamba (much like pre-villagisation days) where they live as long as the shamba is cultivated. When the shamba is abandoned after 2-3 years, so is the house.

The village government group said that the forest takes around 10-15 years to regrow after being cleared. One man explained that it is not a problem that so many people are clearing the forest – ‘the forest won’t finish,’ he said. And as a whole they judged that the forest is in better condition than in the past, because there are fewer people living in it, in the way that they were before 1974, when they were scattered around the forest with their shambas. But there were other viewpoints - women in Likondilo subvillage felt that the forest near their village is getting smaller, partly because of shifting cultivation and partly because they think that trees are dying inside because of drought. A group of men in Mwenge subvillage said that there are big differences in regeneration and that most of the shambas that have been cultivated in the past have not become large thick forest yet. It is often fire which prevents regeneration. And when we walked up to Likonde Chini village on the top of the plateau, we found a thin band of forest along the rim of the plateau, but beyond it the forest had been cleared and there is extensive cultivation.



The village government group were not enthusiastic about forest conservation, saying that they were not happy that timber harvesting has been stopped – the village has been deprived of a source of income through the duty that would be paid.

Fire

Fire is a problem in this village, although it wasn’t emphasised as a big issue, only in the way that it affects regeneration after clearance for shambas. Women in Likandilo subvillage said that when they burn their shambas having cleared them, they try to pile as much in the middle, leaving firelines around the side to prevent the fire spreading into the forest – ‘If you burn the whole forest down, where would we cultivate next time?’ demanded one woman.

Firewood

Firewood is collected from shambas, or from the woodlands areas, which are scattered around the village. Women said that it has not yet become a problem, and it is not different from the past.

Timber

The main timber trees in the forest are mvule, mninga and mninga bonde. In the past there was a lot of mvule and mninga, and also msufiri pori but they have mostly disappeared now from the more accessible areas, although they are still found in the high dense places such as Noto and Likonde. One man pointed out 'These species take 100 years to grow, so it will be a long time until we see big trees again.'

The timber in the forests is mostly used for domestic purposes within the village, for doors, tables, etc. There is no system of licences - people just go in and cut down a tree. For commercial purposes, however, there is a system. This involves the customer meeting with the village government to make a request to harvest timber. If the village agrees, the customer goes to the district to get a licence, then returns to the village and is guided to the trees in the forest which they can cut down and pay duty on. The village used to charge 100TSh duty for a plank of 12x1x1½ " and for a pole of 12x4x3". However, the last time anyone came in for timber was in 2008 – this is because the district has closed this area as a harvesting block, so no customers are sent here. This also applies to large building poles. This means that no duty from timber comes into the village any longer.

Building poles

These are collected from both forests. The main species favoured are mkala, mkongole, mtalawanda and mng'onga. Only people from Mkombamosi collect them – there are no outsiders coming in for poles. In the past, Zanzibaris come here for large poles to make jahazi but they haven't come since 2008. No licence is needed for poles, or any sort of payment. Most people go to collect their own poles when they want to build a house. Four or five poles can be carried at a time. There were various estimates about how many poles it takes to build a house. Men in the centre of the village said that it takes around 120 poles to build a house and takes 2 weeks to collect them, whereas men in Mwenge subvillage said that 150 poles are required and that is only the walls – the roof takes around 300 poles.

Charcoal

A few people make charcoal – it was estimated about ten, all men, who live in Chelewani and Likandilo subvillages. But since it isn't sold outside the village there is not a large market for it – most people use firewood. Unlike firewood, which is dry wood, charcoal is made from green wood. The species favoured are mtanga, mwembe, mtachi and mnepa, and also cashew trees. The charcoal makers sell a sack of charcoal for 3000TSh, which lasts an average family for around two weeks. One mound of charcoal can produce between 10-100 sacks of charcoal, depending on its size.

Ming'oko

Women harvest ming'oko from May to December, and also a similar tuber – mipama. A group of women estimated that perhaps 50 women a day go to dig ming'oko in the season, both from this village and from other neighbouring villages such as Chikonji. It is mostly eaten as a snack, but can also help in times of hunger. There is also a market for it – people sell it in the village for 100TSh per fungo, and may also take it to Lindi to sell. It tends to be the women who sell it in the village and men who take it to Lindi. Occasionally buyers come to the village to look for ming'oko. They will fill a tenga (large basket) for which they pay 10,000TSh. But the ming'oko in the tenga is generally sold by several women – it is not easy for one woman to harvest that much ming'oko.

Women told us that in the past ming'oko used to be very plentiful, but recently it has become harder to find, and they have to travel further into the forest to find it. They said that the main reason was drought.

Fruits

Vitolo, misofu and njekechange are all collected in the wet season. Angadi is eaten during times of hunger, otherwise no-one eats it.

Honey

There are only about ten people in the village who have any expertise in honey and bees. They either find honey in the forest, or they put their own hives in the forest. They use the harvested honey at home or sell it in the village.

Grass

Grass for roofing is collected in the forest.

Animals

The animals found in the village include paa, swala, mbawala, buffalo, elephants, wild pigs, monkeys, lions, leopards and hyenas. 'Christians' (i.e. members of the Makonde tribe) eat elephants and also wild pigs, monkeys and baboons. However, there are not many elephants, and they can only be killed with a licence. It is forbidden for Muslims to eat elephants. There are still many lions, but fewer leopards because people used to hunt them for their skins. Lions aren't hunted. They sometimes come into the village – the last one that came in was in March, in the night. But if they cause trouble, e.g. if they kill a person or livestock, then the village will call in an expert to hunt them down. The last time a lion killed a person was in 2006 and the last time they killed livestock was in 1983.

There are specific hunters in the village – it was estimated that about 100 people hunt - but they use traps, not guns. Women don't hunt. They mostly hunt the various types of antelope. The best time for hunting is in the rainy season when they can see animal tracks more easily and at this time they go out almost every day. They generally use the meat at home or if a large animal is caught they will sell some of the meat. Most of the people we spoke to think that bush meat is nicer than chicken or goat. There is very little livestock in the village.

Path

There is a path from Kinyope to Mkombamosi which passes through Noto forest, along the top of the plateau. It is often the only reason why women would go into that forest. We met two groups of people walking over from Kinyope.

Agriculture

The main crops grown are sesame, cashew and coconuts as cash crops, and maize, sorghum, rice and cassava as food crops. In the wetlands areas, sugar cane, coconuts, tomatoes and spinach are grown and in the dry season, in the area around Likandilo river, onions and cabbages are grown. Each family on average farms around 2½ acres a year. The food produced lasts all year, except in extreme years, e.g. of drought. Many traders come to the village to buy the crops according to the season. Each trader has their own speciality.

Some people have permanent shambas with permanent crops – cashew, oranges, mango and coconuts, but most practise shifting cultivation in the mountains – for food crops and sesame. In the woodland areas people cultivate sesame, cowpeas, pigeon peas, cassava, groundnuts, coconuts and bananas. Everyone has a lowland shamba and a mountain shamba. The mountain shambas are all on the Likonde side – no-one cultivates on the Noto side because it is too far away. In the mountains, people clear a new shamba every two or so years. If a farmer continues to cultivate that shamba for longer, there will be too many weeds, and the fertility will be reduced. A sign that the shamba is exhausted is a particular red flower. When looking for a new shamba, initially farmers look for a patch of thick forest. If there is grass in the understory it won't be a good shamba. Untouched forest is better than forest which has been cultivated in the past. In October the trees are felled and the farmer sets fire to the shamba – this also helps to boost

fertility. Few people use the felled trees to make charcoal since they lack the expertise. If there is a timber tree on the site of the new shamba, it is left. Once the shamba is abandoned, it takes around 10-15 years to regenerate. Farmers use small hand hoes, which means that they are not able to dig very deep and it is a lot of effort to weed. Farmers may select new fields in groups of 10 – 20. The farmers then farm together and can help each other. The group will then move all together to another area.

An example was given of a typical upland shamba. It covers 3.5 acres and was cultivated in 2008 and 2009 before being abandoned. It produced twelve sacks of maize and five sacks of rice per year. Half of the rice and maize was sold and half was consumed by the family. The sale of the maize brought in 20,000TSh per sack and that of rice brought 30,000TSh per sack..

Women in Likandilo subvillage said that they don't have access to vegetable seeds – they would like to cultivate a wider variety of vegetables in their wetlands area.

Fishing

Some people catch fish from the natural ponds at Nangaru.

Groups

There are no groups in Mkombamosi. Women in Likandilo said that someone appeared one year and made some promises to come and start up women's groups, but never reappeared.

Water

A pump was installed many years ago in the village, but it is broken, so now women collect their water from rivers and wells. Nangaro river is dry in the dry season – it used to run all year round but now that the forest is being destroyed it dries up once the rains have finished. But Likandilo river still runs throughout the year and women said that its water is good and clean and good for dry season agriculture. . It takes two hours to collect water from the Likindilo river from the village centre. In Likonde Chini sub-village on the top of the plateau, there is no water, so women have to walk up and down the escarpment to collect water.

Quality of life

A group of women in Likandilo subvillage complained that life is harder nowadays. They said that there is no-one here to contribute new ideas, so they go on doing the same as they always have done, with no variation or innovations.



Lihimilo village

Lihimilo is a traditional village with a population of 2500. There are four subvillages (Lihimilo, Namtamba, Msikitini and Mbuyuni). The village is situated in a valley like a bowl, surrounded on all sides by mountains. The main tribe is the Wamwera. Everyone is Muslim except for civil servants. At Ujamaa some people moved into the village from Ulemba. There is no dispensary in the village. There is no land use plan and thus no land certificate and the boundaries haven't been measured. The village government consists of a combination of CCM and CUF members.

Forest

There are several areas of woodland and of forest in the village. The woodland is sparse and there are many patches of grass between the trees. Shifting cultivation is extensively practised in the forests, and appears to be the main cause of deforestation. Farmers assert that areas of untouched forest are better for farming, rather than shambas left to regenerate, since the fertility is richer. Some people said that it takes five years for the forest to recover, but others said that they wouldn't choose to cultivate an area that had been cleared as recently as five years ago. Trees felled are burnt – there is no tradition of making charcoal in this village.

The village covers a huge area, most of which is forested. There are a lot of shambas cleared from the forest on the way to Namkongo village, and many of these shambas are farmed by people from Namkongo who come in to find land. We saw two families walking home to Namkongo with all their belongings having completed the agricultural season and harvested their crops. If land use planning is done and boundaries measured, Lihimilo village may begin to prevent Namkongo people from coming in to cultivate which could bring conflict between the two villages.

Most people were adamant that all forests are in good condition – the village government group told us this, and a group of women said that the forest is getting thicker. However, one subvillage chairman told us later that he is worried about the forest on Ukwene mountain – 'there are many water sources,' he explained, 'and the forest is needed to protect them, but people don't understand this or just don't care.' When the subject of forest conservation was broached in the village government meeting, the members of the group informed us that it is not possible to stop clearing the forest, since their valley is too narrow for everyone to cultivate in it, and also the rivers are dry so there is no water. But they did admit eventually that forests are useful because they bring rain and water, and water is a particular problem in this village. When we suggested forest conservation to the group of women they immediately gasped, 'but where would we cultivate?!' However, others said it is good to manage the forests sustainably in order that in the future they can receive benefits.

When we approached a group of young men, they were quite hostile and began accusing the project of trying to buy the forest from the village which would mean that they would lose that land. They were not mollified when we explained about forest conservation, arguing that even if their own village government agreed to protect the forest with the assistance of the project, 'isn't this just another way of stealing our land? – we still can't do anything with it if it's protected. You might as well just buy it.'

Fire

People here don't take any precautions or make fire lines because at the time of burning their shambas they are very busy and have too many other things to do. It is too time consuming. Therefore sometimes fires spread into the forests, but the village government group we spoke to didn't seem to think it was a big issue.

Firewood

Women told us that they collect firewood from their shambas. For those who live on their shambas during the farming season, it is easy and close by, but for those who live in the village, the supply of firewood is receding year by year. A group of women in Msikitini subvillage said that there is still plenty of firewood, but it more distant now than it used to be. One load of firewood lasts for around four days. They claimed it took four hours to collect firewood, although others estimated it as a one hour round trip.

Building poles

Building poles come from any of the forests in the village. To build a house, 150 poles are needed for the walls, and 200 for roof if it is to be roofed with grass, or 100 if iron sheeting will be used. Everyone who needs them collects their own poles and no licence is required. People told us that there are fewer poles available now in the forest than in the past.

Grass

Grass is collected in the forest for roofing. It is still abundant.

Timber

The main timber trees in the village mvule, mninga, mkongo, mlidu and msufi pori. These trees are still present in the forests, but there are a lot fewer than there were in the past, and are further away, because of harvesting in previous years. People can go and harvest a tree for domestic use such as a table or a door, but for commercial harvesting a licence is needed. But at the moment, there is no commercial harvesting since the government stopped it in 2008. The village government group regretted this, since they said it was a good source of income for the village, at a duty of 300TSh per piece of timber.

Ming'oko

Women dig up ming'oko and sell it in the village - 'It gives us the money for a little bit of cooking oil,' said one woman. However, they said that it is mostly found on the Likonde plateau, and so they only really go to look for it in times of hunger, because the plateau is very distant.

Animals

The main animals which they encounter in this village are wild pigs, blue monkeys, vervet monkeys, baboons, elephants and warthogs, all of which can destroy their shambas, and lions, leopards, elephants, buffalo and various types of antelopes. Leopards catch goats and dogs. In 2005 a lion attacked a person. They don't have weapons in the village to shoot marauding lions. People didn't admit to much hunting, saying that they mostly eat goat and chicken.

Honey

A few people collect it locally, using fire for harvesting. A very few make traditional beehives and put them in the forest.

Fruit

Types of fruit collected include mabungo, vitoro, usofu, andi, mipamo and nzangadi. Children mostly collect and eat the fruit from the forest. Mipamo is sometimes sold.

Medicinal plants

These are collected by traditional herbalists.

Rope

Munungo, mkwanga, mngola, manjale, mnepa and mbuyu are used for rope which is collected by men. It is for domestic consumption and not for trade.

Agriculture

The people of Lihimilo mostly cultivate in the lowland valley area, but there is much forest in this area. They say that they don't cultivate much in the mountains, because they are too steep and rocky. The valley bottoms around the rivers, e.g. the Mwalii river, although they dry up in the dry season are fertile and are much cultivated, and almost everyone has a shamba there. Crops grown include maize, sorghum, cassava, cowpeas, sesame, bananas, rice, tobacco and sweet potatoes. Tree crops include mangoes and coconuts. Everything grows, according to a group of women. Most people plant several crops on the same shamba, e.g. a line of sesame, a line of sorghum and cowpeas in between. Or a shamba will be split into sections with different crops in each section. Or since sesame is a cash crop, farmers may plant it separately on its own shamba. In general farmers cultivate 4-5 acres.

Shifting cultivation is extensively practised – the village chairman estimated that around 75% of the people in the village practise shifting cultivation. The remaining 25% (around 150 households) cultivate the same

shamba every year. Farmers mostly clear an area of forest, usually 1-2 acres at a time. In January the rain comes and then people plant their food crops. Sesame is often planted in February when the rain has reduced in intensity. On a newly cleared shamba, farmers cultivate maize, sorghum and rice in the first year, then in the second year they plant sesame. Farmers are not systematic in their choice of location for their shambas – shambas are dotted around randomly from year to year, depending on the quality of the forest which the farmers choose. At the same time as clearing a shamba, farmers also build a house on it, and live there as long as they continue to cultivate. The shamba and the house are abandoned at the same time. It is possible to cultivate in the same place for around five years, but most farmers move after 2-3 years. Several reasons are given for this – because the longer the shamba is cultivated the more weeds start to grow, because the number of pests increase and because the fertility declines. If farmers cultivate an old shamba they have to weed four times in the season, and they have to cultivate the shamba twice before planting because of the weeds. Small hand hoes are used, because of tree roots.

There is one farmer who has migrated to the village from Mandawa, a village further along the road. He has cleared a huge shamba from the forest – around five acres, the group of men with us estimated - along the road to Namkongo. But they explained that he has capital and can pay people to help him clear and cultivate. The men we were with say that they are nervous that he might bring others with him to clear more of the forest, although this hasn't happened yet in the two years that he has been farming in the village.

Sesame is the main cash crop in Lihimilo. The best place to cultivate sesame is on the lowland plain. Most people plant sesame without any sort of pesticides, but for a successful crop, there are several stages where they need to be used. The seeds need dressing with pesticide (Gaucho) before planting – the effects of this last 21 days and give the plant time to grow strongly. Then the crop needs spraying another two times with pesticides (Karate) – the plant is attacked by snails which eat the leaves. We spoke to a sesame farmer and also to the cooperative society representatives in the village who were buying sesame at the time. They told us that one acre farmed in an expert way should yield between 7-15 sacks. (one acre farmed with no pesticides generally produces only around three sacks). One sack weighs 80kg. Farmers sell their crop to the cooperative society which this year is paying 1000TSh (with the possibility of an extra 200TSh at the end of the season). This means that there are farmers who can make more than 700,000TSh per acre from farming sesame. The previous day, the cooperative representatives told us, one farmer was paid 500,000TSh for his sesame, and he had cultivated it without any pesticides. But it is more normal for farmers to harvest 250kg from a shamba of two acres, with mixed crops, not sesame alone.

The village cooperative societies buy sesame over a two month period. Lorries are hired by the cooperative society to take the crop to town to sell – usually in the two month period, ten lorries will come to the village for the sesame, e.g. the previous day five tonnes of sesame was transported from Lihimilo to Lindi. Last year a total of 32 tonnes of sesame was sold. The cooperative also buys pigeon peas and cashew, although these are not so extensively cultivated in the village – the price of cashew is low at the moment. The cooperative does not supply inputs for crops, 'although in an ideal world we would – we don't have enough money yet.' explained the cooperative society representatives.

Although farmers are required to sell their sesame to the cooperative society, there are also private traders who come to the village to buy it. They sometimes pay more – e.g. 1100TSh, but it is generally known that their scales weigh inaccurately, to the benefit of the traders, so customers realise that they are probably being cheated. But when the cooperative society doesn't have the money to make immediate payments, for those who need instant cash, they sell to the private traders. While we were in the village, the village chairman and executive officer spotted a private sesame buyer and went and demanded a payment of duty from him.

There is a small area of wetlands where some vegetables are grown, e.g. tomatoes, sweet potatoes, and some coconuts. Often it is women who cultivate these, for some extra cash. Generally women harvest the

food crops, while both women and men harvest the sesame shamba. The man of the family will always sell the sesame himself. Food lasts all year, until the next harvest, and hunger is rare.

Traders

Traders come to buy sesame, pigeon peas and cashew – these are all bought by the cooperative society, although some private traders also come in to buy these products.

Water



Water is extremely scarce in Lihimilo in the dry season, from July to December. A group of women explained to us that the scarcity of water started in 1952 when there was a big storm and rivers changed their characters and didn't produce sufficient amounts of water any more.

The water for the whole village comes from one well, Limilo, which is in a dry river bed. The river flows during the rainy season and the well fills up, but once the rain stops, gradually the amount of water decreases. We saw the well in June and it was already only a small pool of water. It takes around 30 minutes to get to the well from the village centre. The water is salty and is reduced to an increasingly small pool in the dry season. There is always a queue of buckets at the well, waiting for there to be enough water to collect. Women say that sometimes they have to spend the night at the well, waiting for water. A group of women told us that there used to be water in the riverbeds all year round, but now these have dried up. The well used to be full all year too.

The subvillage chairperson explained to us that the well is attended by guardian spirits. The spirits may be present in the large trees which surround the well so it is not safe to cut any of them down. Any snake or other creature seen near the well could also be one of the guardian spirits so it is also not safe to kill anything in the vicinity of the well. 'If you kill something,' he added, 'you can die right on the spot, or be afflicted by terrible troubles.' The subvillage chairperson also said that they are trying to keep the woodland in the wider area around the well intact, in an attempt to protect the water source.

There is a small lake in the village, which dries up in the dry season. There has never been a tap in the village.

VNRC

There is a Village Natural Resources Committee, but in the village government meeting, not everyone was aware of this. There was some discussion about what this committee does, and in the end it was decided that they measure the land to define the village boundaries.

Projects

There are no projects in the village, and no outsiders carrying out any sort of activities.

The group of women in Msikitini subvillage told us that a few years ago a poultry keeping group was set up with the help of people from outside but the women didn't know who it was and the group no longer functions.

Health

The nearest dispensary is 6 hours' walk from the village in *which village??*. There are plans to build a dispensary in the village and a site has already been selected and cleared.

There are local midwives in the village, who do a good job but can't cope in some situations.

The main diseases are malaria and many people have eye problems.

Quality of life

The group of women we spoke to in Msikitini subvillage decided that life is harder than it was in the past, and this is because of the lack of water for half the year and the struggles that this entails.

Mkanga 1

This village is situated to the east of the plateau area. (*Why is it called Mkanga 1? Why the 1??*) Its population is 798 and there are four subvillages. There is a large lowland valley in the middle of the village. Three quarters of the population are Wamwera, the rest are Wamakonde and Wadondwe. The village was established in 1974 – although there were many people living in the area, they were only brought together as a village in 1974. The nearest dispensary is in Chikonji.



The boundaries of the village have already been measured, but a land use plan has not yet been done.

Forest

There are large areas of woodland in the village, but only on the western side is what people are prepared to call a forest (msitu). Lidoo hill is covered with forest, which then continues to the forest on Noto plateau. There are other small patches of thick forest in other parts of the village too, 'and this helps to bring us good rain and fresh air,' pointed out one woman. Shifting cultivation is practised and is the main driver of deforestation in this village.

There were contrasting opinions about the condition of the forests. Men felt that the state of the forest continues to improve and it is getting denser since now people aren't living in the forest – since 1974 they have all come to live in the village. In addition, many people cultivate permanent crops on permanent shambas, so they don't clear the forest as much as in the past. However women said that the forest is receding, since there are more people in the villages, and thus more pressure on the forests and more people clearing shambas. But everyone agreed that it is a good move to protect the forest since it brings rain. Women added that the destruction of the forest is what brings drought – the forest brings water. A woman in the village government group said that people need education to help them to understand about the importance of preserving the forest. She said that she herself had learnt about this at school. A woman in Mandanje subvillage went further, saying, 'the only reason people are cultivating in the forest is because they are afraid of the work of weeding. Everyone has a shamba in the valley in the village. There is no real reason to clear the forest. All they need is educating.'

Fire

There are bare patches in the forest where regeneration hasn't taken place and this is because of fire. Fires don't happen every year – up to three years can pass with no serious fires in the forest. The last bad fire was in 2006. Fires are usually caused by people burning their shambas in the dry season in preparation for cultivation – the fire then spreads to the forest.

Building poles

Everyone cut their own poles. Estimates given about house building suggest that 150 poles are needed for the walls of a house, and 60-100 for the roof. Mkala, ngongolo, mtalawanda and nang'uva are all good species for building poles. There is no business in building poles, no-one comes in from outside to cut

them, no-one sells them out of the village. No licence is required to cut them – ‘we just take our pangas and go to the forest’ said one man. However, most people admitted that there are fewer poles available nowadays close by the village – a longer distance has to be covered to find poles.

Firewood

Women look for firewood in the various wooded areas in the village. Most women say they cover around 2-3km in their search for firewood. A round trip may take between 1-2 hours. Nowadays firewood is less easily available, and women felt that this was because there are more people collecting it than in the past.

Charcoal

If a shamba is cleared, charcoal is sometimes made from the trees which are felled. Several men know how to make charcoal. They then take the charcoal to Kineng’ene village, a neighbouring village, and people from Lindi come to buy it from there and take it to Lindi. They receive 1500-2000TSh for a bag of charcoal. One shamba can yield 20-40 bags of charcoal. However, men in Mandanje subvillage said that making charcoal as a by-product of clearing a shamba wastes time – it is more profitable to do other things, like taking cassava or coconuts to Lindi. Charcoal burners also occasionally come into Mkanga 1 from other villages, but this doesn’t happen often.

Timber

Timber is harvested, but usually only for school desks, or doors for houses. There are particular people who go in to harvest timber. Even for a door, people have to meet the village government and receive permission. There is also a system in place for outsiders coming to harvest timber commercially. The village government holds a meeting with people coming to do business. They are required to have a licence, and they pay duty - 50-100TSh per piece of timber. The village government can refuse permission to harvest, e.g. if the businessman is known to have a bad character and tends to steal extra trees, or if there aren’t enough trees left in the forest. However, there is no commercial harvesting of timber at the moment and the last time anyone came in was in 2005. Now the government has closed the forest for harvesting. A village government representative commented that this was a good move on the part of the government – ‘although we forego the duty payments, in the long run it is good for us and our forests – otherwise we would be left with no timber at all.’ However, there are people who cut timber in the forests around the boundaries of the village – this is stealing but it is almost impossible to control it.

Ming’oko

All women collect ming’oko. It is collected for domestic consumption, but it is also sold – there is a good market for it in the village, other villages, and as far as Lindi town. Some women sell the ming’oko to their husbands who then sell it in Lindi. One bowl of ming’oko sells for 3000TSh, while the same bowl can be sold in Lindi for 5000TSh. It is a good business for women, one of the few income generating opportunities open to them. But it is not as easy to find ming’oko as it was in the past. Previously it just used to be for eating at home, but now it has become a saleable commodity. In addition many women come from Chikonji village to look for it in the forests of Mkanga 1.

Honey

There are honey hunters who find honey in tree trunks and smoke it out. They may sell some, or eat it themselves. Only one or two people in the village have traditional beehives. They use the honey themselves.

Mushrooms

Mushrooms are found in the rainy season and only occur around certain trees. A few people sell them in the village at 200TSh per fungo but most are collected for consumption at home. People told us that it is harder to find mushrooms nowadays, giving several reasons – because of the drought (which has come about because of god), because of cutting down too many trees or because of carbon emissions. One man

pointed out that since mushrooms only grow around certain trees, if those trees are cut down, then they won't grow any more.

Fruits

Fruits mentioned included sofú, mabungo, makung'u, vitoro, mabwugai, matopetope and mpokoro. They are mostly found during the rainy season, and it is mostly children who collect them and eat them.

Herbal medicines

There are one or two people in the village who deal in this. No-one had any information about availability of the important plants and trees.

Animals

There are many animals found in Mkanga 1 village. People began by talking about destructive animals, mentioning elephants, buffalo, wild pigs and monkeys. Elephants can cause huge destruction by knocking down whole shambas of coconut trees and orange trees and eating and trampling crops. There are lions, which only come into the village at night, and leopards, which can come in at any time, and do very frequently – 'you won't have to sit here for very long before you see one,' we were advised by a group of women. Leopards take goats and eat them. Hyenas also occasionally come into the village. Animals hunted for meat include paa, mbawala and mbutuka (type of antelope). There are also rabbits, 'but they are usually too clever to allow themselves to be trapped', and guinea fowl. There are certain people in the village who hunt – around 20 of them. They trap animals – there are no guns in the village. They occasionally burn the forest to flush out animals into their traps. Bush meat is sold in the village by hunters, and the village government group was unanimous in its judgment that bush meat is nicer than goat or chicken. It is also cheaper, selling at 2-3000TSh per kg. But women in Mandanje subvillage said that they like bush meat, but 'chicken is really delicious too!'

People told us that there are fewer animals now than in the past. Their presence often depends on water – if there is a drought, they come nearer to water sources, but they mostly remain in the forest. Wild pigs, elephants and buffaloes come from the national parks/game controlled areas ('From Serengeti,' pronounced one man knowledgeably. 'Selous,' corrected another). One group reported that an elephant had been shot by a game department official just recently but that this doesn't usually happen – the game officers usually try to scare them away without harming them.



Agriculture

There is a large lowland valley in Mkanga 1 village, where everyone in the village has a shamba. Farmers cultivate coconuts, bananas, cashew and oranges there. In the hilly parts next to the valley (Mkalangomba), shifting cultivation is carried out. Here, maize, sorghum and sesame are cultivated, with some cassava and cowpeas. Sesame is often cultivated on a separate shamba from the other crops. In the hills the soil is clay and people said that this is good for their crops. In the lowland valley the soil is fertile and people can cultivate permanently, so there are some farmers who don't practise shifting cultivation.

The main cash crops are coconuts and sesame. The people in the groups we spoke to said that sesame is an excellent cash crop. One acre can produce six 100kg bags of sesame. The price paid by the cooperative society, which almost everyone sells to, is 1000TSh per kilo. This means that an acre can yield 600,000TSh. Some farmers cultivate 2-3 acres and there are even those who cultivate as much as 5 acres.

Some people cultivate sesame on the same shamba every year, while others rotate it, growing it on shambas in the forest. The village government group told us that sesame is not a difficult crop to grow if the rain is good. But a group of men in Mandanje subvillage were more pessimistic – they said that since they don't cultivate sesame in an expert way, they only harvest 60-100kg per acre. They also added that if farmers don't put pesticides on their sesame, the whole crop can be consumed by pests. This had happened to one man in the group. They say that in general they don't use pesticides on their sesame because they are too expensive, and the cooperative society hasn't started to provide them yet. However, a young woman in the same village confided that she had made 600,000TSh from her one acre of sesame that year, and more money from coconuts, which she hadn't finished selling yet.

The men in the subvillage explained that the cooperative society promised that they would pay 1200TSh per kilo for sesame, but give the farmers 1000TSh on the initial sale, and bring the remaining 200TSh at the end of the season. This is the first year that this has happened, so the men were sceptical about whether they would get that extra money or not. Some sell to private traders. The advantage is that they give immediate cash when they buy the crop – the cooperative society doesn't always have cash on the day the farmers deliver their sesame. But it is well known that traders cheat when weighing the sesame, since they don't use scales – they estimate the weight, and people are certain it is to the buyer's advantage. 'But if you need the money now, you have no choice,' one man complained.

Coconuts also bring in a good income. One family may have around 30 trees. Each tree can produce 1000 coconuts a year. One coconut sells for 100TSh, so one tree can produce 100,000TSh per year and 30 trees can bring in 3 millionTSh. Coconuts sell in Lindi for 200TSh. Traders come to the village to buy them.

People say that they would also like to sell their surplus cowpeas, which grow well in this village, but they say that there is no market for them, and no traders coming to the village to buy them. However, some people take them to Lindi by bicycle where they are able to sell them easily.

The people in this village did not admit to practising shifting cultivation on a large scale, but it seems likely that they do – in addition a young woman said that everyone here clears shambas in the forest from time to time for their agriculture. The men in Mandanje subvillage claimed that they don't like to cultivate in the forest because they are afraid of wild animals. The village government group estimated that only about ten people clear a new shamba every year. They farm that shamba for 2-3 years then they move to a new shamba. The factor which pushes them to clear a new shamba is the weeds – farmers have to weed three times in a season if they are cultivating an old shamba. They use small hand hoes most of the time – these are for weeding, and if they need to dig deep, they will use a larger hoe. When a shamba is cleared, the trees are generally burnt where they fall – not many people make charcoal in this village.

In the wetland valleys in the dry season people cultivate spinach, maize, cowpeas and sweet potatoes. They start cultivating in July. But the village government group estimated that only 10-15% of the village population cultivate during the dry season, since there is not enough space for everyone.

Everyone assured us that unless conditions are very extreme, this village does not experience hunger at any time during the year.

Health

There is no dispensary in Mkanga 1. The nearest one is in Chikonji. The service isn't good, and there is often a shortage of drugs. There are a great many patients and sometimes the doctor isn't there. The main diseases here are malaria and diarrhoea. Eye problems were also mentioned. Pregnant women also face problems if there is an emergency. There are no facilities for emergencies at Chikonji and transport to Lindi is difficult. Often the only possibility is by bicycle and that may take up to two hours.

A woman in Mandanje subvillage told us that a group of people came to the village from Ifakara (from the IHRDC (Ifakara Health Research and Development Centre)) to raise awareness about malaria prevention. One woman said she was selected to be a health worker and worked with the community to help to introduce bed nets and carry out the awareness raising. However, they no longer come. She feels that many more people now use bed nets, although it is hard to know what people have in their bedrooms.

Water

There is a well in Mtandi. The water is very nice and tastes good, but it takes an hour to get there. In the dry season the water becomes dirty and women have to wait for a long time for there to be enough water. There is another well on the other side of the village - Chakalala – but the water is salty and it is only good for washing dishes. There is a pump with taps several kilometres down the road, but the water is sold for 60TSh per bucket which people don't like to pay.

Groups

In 2005 there was a group set up by someone from outside (the women couldn't remember who) but it was badly organised. The group set up a shop, selling things like oil, rice, etc. It no longer functions now.

Quality of life

Younger women said that young people have been able to take a step forward. Because of agriculture and the possibilities to make money through it, people can now buy bricks and roofing materials to build their own houses. Older men, on the other hand, felt that life is much harder. They explained that they used to live in their clans, the older people had the shambas, the younger people cultivated and all food was shared and there was never any hunger. Now it's every man for himself. 'Nowadays a young man goes to sell maize to buy himself some trousers and a shirt, while his aged uncle goes hungry,' protested one older man.

Likwaya

Likwaya is located in the east of the project area. Its population is 662, divided between two subvillages (Mapinduzi and Lumumba). Although the population is small, the village occupies a large area in a valley between two forests. It is a traditional village. There is no school in Likwaya although they are now building one. Some children go to Nyanjanje village school, others to Moka school. The nearest dispensary is in Moka. The main tribes are the Wamwera and the Wamakonde. Since the tribes mix freely, people mostly speak Swahili, rather than their tribal language. There is a mixture of CCM and CUF in the village government.

The project team had already visited this village to do the Free Prior and Informed Consent work by the time we came to hold our discussions.

Forest

There are two forests, one on either side of the village – Mbalu Kwasululu and Kisangi. Mbalu Kwasululu is about half an hour away from the village centre, and people generally use this forest for all their needs. Beyond this forest lies Noto forest. Kisangi is a very large forest, which people rarely visit, and don't clear for agriculture, since it is so distant. There is no need to use that area for cultivation, since they have a large lowland area which is sufficient for everyone, and also the other forest. The main reasons for entering the forest are for clearing shambas for cultivation and for making charcoal. Women said that shambas and places cleared for charcoal regenerate, but every year there are fires, so the regeneration is often impeded.

The village government representatives said that Mbalu Kwasululu forest is in bad shape because it has been intensively exploited for charcoal and cultivation. Kisangi forest is still in good condition and is not often disturbed. They agreed that there is a need to protect both forests - Mbalu Kwasululu because it is so

badly degraded and Kisangi in order that it doesn't go the same way – and explained that if they could get some help with agriculture, particularly cash crops, then at least they could reduce the amount of charcoal produced. The immediate response of a group of older women in Lumumba subvillage to the question about forest conservation was 'but what will we eat?!' They protested that if they can't clear the forest for crops and cut down trees for charcoal then they will starve. But on further consideration, they did admit that it would be good if a way could be found to safeguard the forests – they described how in the past there was water everywhere in the village and it was not a problem to collect it as it is now. In addition, the weather has changed quite drastically – there is less rain and it is hotter, and also there are more incidences of malaria than there were. They put all this down to the destruction of the forests.

Firewood

There is plenty of firewood, which is mostly collected around the village and in the lowland shamba area. It has not yet become a problem.



Charcoal

This village is particularly noted for charcoal production. Almost everyone makes charcoal at one time or another - we heard that 95% of the people in the village know how to make it. It is the main source of income for many people – one woman said, 'if we stop making charcoal, then we are dead, because we have no alternative!' Men and women make charcoal, and even old women and young boys. As well as people in Likwaya, people come from other villages too – from Chikonji and Moka. No licence or other form of permission is required, 'you just take your panga and start cutting,' we were told. Older people may make charcoal only once or twice a year, when the need for money arises, but many young people are engaged in charcoal production full time. A group of young men estimated that out of their

school class of around 30, ten people gain their livelihoods entirely from charcoal.

Almost all charcoal is made in Mbalu Kwasululu forest. Kisanga forest is too distant. The lowland area where most people cultivate is regularly cleared for shambas, but the soil is clay and it is difficult to make charcoal using clay soil – sandy soil is better. People estimated that it takes the forest three years to recover sufficiently for it to be cut for charcoal again.

It takes one month to produce charcoal. The trees are cut down, and then collected into a pile. Grass is put on the pile of wood, then it is covered over with earth, and then it is lit, and any holes plugged with more earth. The charcoal burns for a week. The people who produce the charcoal are not the ones who transport it, so once the charcoal is ready, customers, mostly young men from the village or occasionally people coming from Lindi, come to buy it, and transport it to Lindi town. It takes 2½ hours to cycle to Lindi with a load of charcoal, and when we were driving to the village, there was a constant stream of charcoal-laden bicycles going to Lindi. One bicycle can take four bags – two large bags piled on the carrier and two smaller ones hung at the side as panniers. For one bicycle load of four bags, the customer pays around 4000TSh, although this can go up to 4500TSh in the rainy season, or if charcoal is scarce. One average mound of charcoal produces around five bicycle loads, so for a month's work, a charcoal maker earns around 20,000TSh. The village government group told us that people make around 5-6 mounds of charcoal a year, if that is their main source of income.

How much does charcoal sell for in Lindi?

There are two types of charcoal producers – there are those who do it for a living and there are those who do it when times are lean and they need some extra cash, or as a by-product of clearing a new shamba. The charcoal producers we spoke to said that it is hard work to produce charcoal – there is no daily income and when they make it during the rainy season, their crops suffer from neglect, so they often don't produce enough food to last the year. In all the meetings we held, we heard that if there was a good cash crop which would produce an adequate income and enough food to feed a family all year, then most people would stop making charcoal – 'it's not in our blood,' explained an older man. A young man who makes charcoal said wistfully that he would much rather buy and sell crops, because he would get a daily income, and the total monthly income would be almost double what he can make producing charcoal.

Timber

There are not many timber trees left, although there are quite a few misufi pori in the forest still. People used to come from outside to harvest the timber. One man had a licence to harvest timber – until 1992, he regularly brought his lorry and extracted timber. The only timber now harvested is for local use, for doors and tables.

Poles

Most people now get these from Kisanga forest, because there are so few remaining in Mbalu Kwasululu forest.

Ming'oko

Women collect ming'oko from both forests. If they collect a lot, they will sell the surplus, since it can't be stored – it has to be eaten immediately. It sells at 100TSh per fungo. Women say that they can earn up to 2000TSh at one go. This year, there is a lot of ming'oko in the forest.

Honey

Men said that because of the drought, the bees seem to have disappeared. The old men who used to put beehives in the forest have all died, so there is no longer anyone keeping bees or harvesting honey.

Animals

There are not many animals in the forests or the village. Wild pigs and monkeys come onto shambas and destroy crops. Rats are also a big problem – they eat the seeds as soon as they are planted. There are few elephants, but they don't constitute a problem. In a period of five years, they might pass through only once, silently during the night. There are no lions and one or two hyenas.

No-one hunts with guns, because it is necessary to obtain a permit, but many people set traps. They mainly catch mbawala, paa, rabbits and monkeys (tumbili, kima) which they eat themselves or sell to others in the village. In the past there were more mbawala and paa than there are now. There is little alternative to bush meat – fewer than a quarter of the people in the village keep goats, and there are no cows. 'Anyway,' added one woman, 'bush meat is nicer than goat.'

Agriculture

The crops they cultivate include cassava, maize, sorghum, sesame, cowpeas, pigeon peas, choroko, ground nuts, mountain rice. Most of these are food crops. The main cash crops are cashew and sesame, although they say that they don't cultivate much sesame. Cashew used to be much more important, but since the price has slumped, people don't tend their trees as well as they did, and in addition, the pesticides needed to spray on the trees are expensive. Cashew is sold to the cooperative society in the village. The price is 350TSh per kg, although sometimes it rises to 400TSh. In the past the price was much better, e.g. in 1997 it sold at 760TSh per kg. Older women said that they prefer cashew since they are used to it, and also because they already have the trees – 'even the trees our grandfathers planted keep producing if you tend them' an older woman told us. A group of men said that sesame would be a better

cash crop than cashew, but the land isn't right for it – the soil is too clayey. It is attacked by snails and an entire shamba can be devastated. The pesticides to deal with the snails are too expensive. Sesame is also sold to the cooperative society. Some food crops are also sold if there is a surplus. Sometimes people take their crops to town and sometimes customers come in to look for crops.

The main areas of cultivation are the Mbalu Kwasululu forest and the lowland clayey area in the centre of the village (Matapata), although many prefer the lighter soils of the forest area. No-one cultivates in Kisangi forest – it is too distant. Both areas are huge and anyone who wants land can clear as big an area as they need. In both areas shifting cultivation is practised, although there are some permanent shambas, for cashew trees and coconuts. Most people clear between 2-3 acres. They cut down everything except the big trees, which are too hard to cut down. They make charcoal from the trees which have been cut down. They then might stay 2-3 years on one shamba, until the weeds start to be excessive, then they move on. A new shamba needs weeding only once, or possibly twice, whereas an old shamba needs weeding three times. They use small hand hoes – 'The large ones are too heavy!' said one man. Some people cultivate one shamba for many years and don't move on – it all depends on how an individual feels and how much labour they have. 'But it is easier to clear a new shamba than to weed an old one,' explained an older man. Older women in Lumumba subvillage said that they clear a shamba and plant maize. In the third year they expand that shamba, plant cassava in the old part and maize in the newly cleared part. In the fifth year they abandon the shamba completely and start afresh.

In June, a new shamba is cleared and charcoal is made from the felled trees. This takes around 1-2½ months, until August or September. In October the shamba is prepared for cultivation by burning. In the past the rain started in November, but these days it doesn't come until December or even January. In January, as soon as the rain has started, food crops are planted – maize, cassava, cowpeas, rice, pigeon peas, etc. In February, sesame is planted, usually in the forest area. In March cowpeas are harvested, since they have improved cowpeas seeds which mature quickly, and another crop is planted. The other crops are harvested around May to June.

Seasonal calendar

Water

Water is an enormous problem in Likwaya. There is only one well in the village – Pangani – which takes an hour to reach. Water is abundant in the well, and people do their washing and even wash themselves there. In the past there was more water – one young man we spoke to said that he remembered as a child collected water very near to the village, from a river which flowed all year round. Now it is nothing but a dry hollow.

Health

The nearest dispensary is in Moka. The service is adequate and the medical staff will refer patients to Lindi if there is a serious case, although transport is a problem. The most serious problem affecting people's health in this village is malaria. Older women told us that the time of eating fresh maize is the worst time for malaria.

Young men and their employment opportunities

We spoke to a group of young men who told us the sort of work that they do:

- Buying and selling on bananas or coconuts in Lindi
- Buying and selling cassava to other villages – one man said that he could make 2000TSh a day
- Transporting water by bicycle from the well and selling it in the village
- Transporting charcoal by bicycle to Lindi

- Making charcoal – one young man said that he can earn around 20,000TSh per month (they can make one mound of charcoal per month)

Organisations

Several organisations have come to the village over the years.

- Concern operated here for three years, and have only just recently left, although people in the village told us that they are hoping to continue with another phase. They brought in improved ground nut and cassava seeds and provided training on the best way to cultivate them. Women told us that the cassava and groundnut seeds were good and produced well. They also brought a cassava milling machine for one group. Part of it was given three years ago, but the remaining parts have only recently been delivered, and they haven't managed to install it yet. They say it will start working soon. The machine is designed to grind cassava to make flour suitable for biscuits and chapattis. The flour has a good market in Dar and Mtwara. We were unable to talk to Concern staff, since their office in Lindi has closed.
- FAO brought cassava seeds in 2008 but then never came back. The seeds arrived too late to plant.
- OG Paper in Mtwara, a Japanese owned company, brought Eucalyptus seedlings in December 2008 and planted them as a trial plot on 2ha in Lumumba subvillage. They occasionally come and check on their trees, but the people we spoke to didn't know what their plans for the future were.

Groups

Concern set up a small number of groups – most of the village wasn't involved. Concern cultivated a demonstration plot, then the group members cultivated their own plots. People felt that the results had been good, but said that they didn't have access to those seeds.

Land use planning

In 2007 government officials from the ministry came, facilitated by Concern, to carry out land use planning. They started the process, all the areas were set aside, but the process was never continued through to receiving the title deeds. It has all taken so long that the area set aside as forest has already almost disappeared. Village government representatives say that they need to revive the land use planning process in order to ensure their forests aren't destroyed.

Quality of life

The group of women we spoke to in Lumumba subvillage decided that life is better now than in the past. In the past there was no money, but now, if a person has the capacity to work hard, they can make money and live well.

Annex II. Terms of Reference

Tanzania Forest Conservation Group

Terms of Reference

Title: Analysis of the drivers of deforestation and stakeholders in the Lindi and Kilosa project sites for the project Making REDD work for communities and forest conservation in Tanzania.

Date: 8th June 2010.

1) Introduction

1.1 Overview

The Tanzania Forest Conservation Group in partnership with the Community Forest Conservation Network of Tanzania (MJUMITA) is implementing the project 'Making REDD work for communities and forest conservation in Tanzania'. The project aims to reduce greenhouse gas emissions from deforestation and forest degradation in Tanzania in ways that provide direct and equitable incentives to communities to conserve and manage forests sustainably. The project will achieve this by supporting the development of a Community Carbon Cooperative hosted within the existing Network of Tanzanian communities engaged in participatory forest management.

The project includes a component aimed at addressing the drivers of deforestation at the two piloting sites in Kilosa and Lindi Rural districts.

Output 2: *Replicable, equitable and cost-effective models developed that are designed to reduce leakage across project sites and provide additional livelihood benefits to participating rural communities.*

The work outlined in this terms of reference relates to an analysis of the deforestation drivers and stakeholders in the two districts.

The project document describes this activity as follows:

Activity 2.1 Analyse drivers of deforestation and forest degradation.

How to avoid or reduce the leakage problem is one of the most critical challenges in ensuring that REDD projects are achieving real reductions in GHG emissions at a national and global scale. A first step in addressing leakage is to carry out a detailed analysis of the drivers of deforestation and forest degradation within a landscape. By understanding the drivers of deforestation it will be possible to determine the kinds of activities that may be displaced by improving forest conservation and management i.e. primary leakage. In Tanzania, key drivers include demand for agricultural land, timber, fuelwood, fodder, poles and charcoal. Wild fires are also a key threat. For each site, these drivers need to be further analysed to determine, for example, whether forests are being cleared for subsistence agriculture or for commercial agriculture such as for biofuel production. Whether timber is for local markets or for more distant markets such as China. For each site the project will analyse the drivers of deforestation and other threats to the forest and this analysis will help to determine the most likely leakage scenarios. The analysis will look not only at the pressures on the forests and the drivers behind those pressures but will also look into the reasons why response strategies to date have failed to prevent deforestation and forest degradation. This would include analysis of the shortcomings of participatory forest management in the respective forest areas. This will build upon the considerable work that TFCG and other institutions have already undertaken on participatory forest management which has already identified some of the key challenges in relation to costs vs revenues, communication and governance. In addition, as part of this analysis, the project will carry out a

stakeholder analysis for each landscape with a particular focus on identifying forest user groups and those most dependent on resource extraction from natural forests.

2) Objective of the consultancy

The objectives of the consultancy are to:

- i. Identify and describe drivers of deforestation and forest degradation within the landscape.
- ii. Identify and describe stakeholders within the two landscapes with a particular focus on their relationship to forests and their roles in causing or avoiding deforestation.
- iii. To identify groups who might be vulnerable to REDD and to understand the nature of their vulnerability and ways to mitigate that vulnerability.
- iv. Provide a description of the role of women within the landscapes with a particular focus on their relationship to forests and areas of vulnerability in relation to REDD.

3) Scope of work

3.1 Drivers of deforestation

Understanding the drivers of deforestation and forest degradation are critical if we are to address those drivers effectively. This is at the heart of the project. Deforestation drivers are a subset of drivers of land cover change. These drivers are affected by various factors including the socio-demographic characteristics, biophysical and infra-structure attributes, presence of conservation units and local, national and international markets for forest products and other natural resources. In a recent paper by DeFries et al 2010, it was found that urban population growth and agricultural markets are key drivers rather than rural population growth. Similarly Rudel et al 2009 found that increasing areas under industrial agriculture were increasingly important drivers in some parts of the Tropics. Other studies have found that the socio-economic well-being of adjacent communities is positively correlated with increased deforestation (Alves and Hogan 2009).

Agriculture

At this stage the project has identified agriculture as an important driver of deforestation within both the Kilosa and Lindi project landscapes. There is thus a need to understand more about the nature of the agriculture that is being practised. Are the products consumed locally or are they sold? If products are sold who is buying them and who are the consumers. What kinds of agriculture are being practised and by whom? What are the crops? Is shifting or permanent agriculture being practised and if it is shifting, how long do farmers cultivate an area and for how long is it left as fallow? What criteria are used in selecting (or rejecting) sites for cultivation? What is the seasonality of agriculture? How much revenue do farmers earn from the different forms of agriculture?

Fire

In a visit to the area by a TFCG team in 2008, fire was the most frequently recorded sign of disturbance in the Lindi forests. Understanding more about the causes of fire is important. What are the uses of fires in forests in the two landscapes? Who is starting fires and for what reason?

Charcoal

Charcoal production has also been detected in both landscapes, albeit at low levels. It is thus interesting to know whether there are any signs of an increase in charcoal production and again, what is the market structure for this charcoal. Which areas are particularly vulnerable? Who is producing the charcoal?

Timber

Logging has been a factor in deforestation further North. It is unclear what the trends are within Lindi and Kilosa and further work is needed on this. Is there demand for timber in the landscape? If so, from where? How is the trade organised?

Land tenure

Are issues related to land tenure linked to deforestation in the two landscapes. And if so, in what ways are they linked?

Wild animal control

In some areas, forests have been cleared as a way to control animals such as bushpigs, rodents, baboons and monkeys who may cause crop damage.

Commercial agriculture

Have there been any initiatives or proposed initiatives to develop industrial agriculture such as biofuels or large scale timber plantations.

Livestock

In some areas, grazing of livestock is a cause of forest degradation. It can also be a cause of deforestation where fire is used to clear areas for pasture land.

Other

Other causes of deforestation that have been recorded in the Eastern Arc Mountains and Coastal forests include mining, human settlements, collection of fuel wood for domestic use and for brick making, and harvesting poles and timber for local construction.

It is envisaged that information about deforestation drivers will be collected through interviews with key informers; interviews with women's groups and interviews with stakeholder groups or individuals.

The information on drivers of deforestation will be an important component of the scenario analysis that will be developed as part of the process of defining the baseline scenario of the project.

3.2 Stakeholder analysis

According to (Gimble et al. 1995), the term stakeholder refers to "*all those who affect, and/or are affected by the policies, decisions and actions of the system. They can be individuals, communities, social groups or institutions of any size, aggregation or level in society*". The aim of this component of the work is to understand the individuals, communities, social groups and institutions that are affected by or who affect the project's aim of reducing emissions of greenhouse gases from deforestation and forest degradation in the project area.

The Consultant will identify all groups with a stake in the two Project Areas. This will include groups identifiable within the project villages such as hunters, herbalists, subsistence farmers, fisher people, bee keepers, loggers, village government officials, religious leaders, political party representatives, charcoal producers and shop keepers. It will also include groups outside of the villages with a stake in the area such as local government, traders, transporters of agricultural produce, development projects, commercial agricultural enterprises including biofuels companies, timber dealers, political parties and others.

The consultant will brainstorm with key informers in order to identify the communities, social groups or institutions with a stake in the area. The Consultant will also ask informers to categorise those groups according to their influence and importance to the project. The consultant will also categorise each stakeholder in terms of their motivation to engage in the project; their interest in the project and the effect of the project on their interests and their relationship with other stakeholders.

The information that is collected through this activity will inform various components of the project including the selection of a representative group to carry out the scenario analysis, developing appropriate project activities, informing the process of ensuring Free Prior and Informed Consent.

The Consultant will design a questionnaire that will include, but not be limited to, the following issues:

About the interviewee

Age

Gender

Education level

Tribe

First language

Other languages

Length of time in the area

Main livelihood activity

Other livelihood activities

Number of people in his / her household

Amount of land

Any information about the history of the area where s/he now lives

How does s/he currently use the forest

How frequently does s/he use the forest

Which forests does s/he use?

How important are forest products to his / her livelihood

Has s/he observed an increase in deforestation recently

What are the main causes of deforestation that s/he has observed? Who is doing this? Follow up questions to find out more about the activities that are causing the deforestation.

Would s/he support more protection for the forests?

If so why? If not why not?

How does s/he think that the project can stop deforestation?

What other kinds of people use the forest? Where do they come from? How frequently do they visit?

Does s/he trade any forest products?

Has s/he cleared any forest in the last 10 years?

If so, was it undisturbed forest? Or secondary forest?

What did s/he plant in the areas that were cleared?

Does s/he plan to clear forest in the near future?

If so why? If for agriculture, what will s/he plant?

Does s/he anticipate other threats to the forest in the future?

Agriculture

Seasonal calendar of crops.

Where does s/he sell her / his agricultural products?

Which crops are sold? To whom?

Does s/he receive any support such as technical advice from extension workers for his / her activities?

Has s/he planted any trees? If so, which species? For what purpose?

Health

Do s/he have access to a clinic?

Does the clinic meet her needs?

What are the main health problems in the village?

Water

Where does s/he get water from?

Is there enough water through the year?

Is the water clean?

Fire

Does s/he use fire to clear his / her land or for other purposes apart from cooking?

Has s/he observed forest fires?

Are forest fires increasing in frequency or intensity?

Who starts fires in forests? Why? When?

Conflict

Are there any conflicts within the village? If so between whom?

3.3 Vulnerability analysis

Through discussions with key informants identify groups who might be particularly vulnerable to restrictions on activities that result in deforestation; and those who might be vulnerable to restrictions on activities that cause forest degradation. Identify the nature and severity of that vulnerability and ways to mitigate the vulnerability.

3.4 Gender analysis

As the project aims to demonstrate a pro-poor approach to REDD, a particular focus should be placed on understanding the more vulnerable and marginalised groups. Women have been identified as being particularly vulnerable to REDD. As such the consultant should pay particular attention to understanding gender roles within the communities in terms of women's livelihood strategies, their involvement in decision making at household and community level, their dependence on forest resources and their understanding and concerns with regard to REDD and participatory forest management.

The consultant will undertake a discussion with at least one group of women in each village using the questionnaire included in Appendix I.

3.5 Training

As it is envisaged that the consultant will only be able to visit three villages in Lindi Region, she will provide training to one of the Project Staff in the methods required to undertake this work. The consultant will then assist in the collation of the data and the write up of the results.

3.6 Sampling strategy

It is envisaged that the survey will be carried out in 6 villages in each landscape equivalent to 50 % of the project villages. In five villages in Lindi District, the consultant will undertake the work herself whilst the remainder will be carried out by project staff.

5) Deliverables

- **Report on the deforestation drivers and stakeholders of the Lindi Project Landscape**

This report will include:

Executive summary

Table of contents

Acknowledgements

List of acronyms

Introduction outlining the objectives of the activities and providing some background to the study

Sampling strategy this will summarise the criteria for selecting the sample villages; a summary of the number of women and men interviewed; a summary of the kinds of stakeholders who have been consulted.

Description of the deforestation drivers in Lindi: this will provide a detailed description of the deforestation drivers that were recorded in Lindi.

Description of the stakeholders: this will describe the kinds of stakeholders present in the project area including an indication of their role in causing or avoiding deforestation; their level of importance to the project; and any other relevant issues.

Description of groups vulnerable to REDD: this will provide more detail on groups which are particularly vulnerable to REDD including a description of their vulnerability and ways that this might be mitigated.

Women in the landscape: this will describe the results of the interviews aimed at identifying the role of women in the landscape; their vulnerability to REDD and ways to mitigate their vulnerability.

In the appendices, detailed profiles of each of the villages that was surveyed will be provided including all of the interview results.

Conclusion and recommendations: this will summarise any key conclusions and make recommendations with a particular focus on areas where the consultant considers that additional research is required.

- **Report on the deforestation drivers and stakeholders of the Kilosa Project Landscape**

As above

Consultancy report

This report will describe the activities undertaken during the consultancy. This will include a detailed list of everyone who was consulted.

Reports will be presented in 11pt, arial, A4 with 0.6 inch margins.

5) Location

Field work and training will be carried out in Lindi Rural whilst the report writing will be carried out at the Consultant's place of work. Transport and accommodation will be provided for the Consultant whilst in Lindi.

6) Timescale

Preparatory work will be conducted between 25th and 26th June.

Field work by the Consultant in Lindi will take place between 28th June – 3rd July 2010 with additional villages being covered by the project team between 4th – 10th July.

Write up of the Lindi work will be carried out by 31st July 2010.

Field work in Kilosa will be carried out by the project team during the 1st two weeks of August with write up being completed by the end of August.

Activity	Number of days
Field work	6
Planning days	2
Data analysis and report preparation	9
Total	17

References

Ruth S. DeFries¹, Thomas Rudel², Maria Uriarte¹ & Matthew Hansen³ 2010 Deforestation driven by urban population growth and agricultural trade in the twenty-first century **Nature Geoscience** 3, 178 - 181 (2010)

Annex III. Schedule of work

Date	Village	Activity
28-6-10	Ruhoma	Meeting with village government representatives (9 men, 3 women) Drive up to Noto plateau and discussion with Zain tower guard and wife Discussion with women (6) Discussion with village cooperative representative
29-6-10	Mkombamosi Likandilo subvillage Mwenge subvillage	Meeting with village government representatives (10 men, 4 women) Discussion with a group of women (4) Walk through the forest Discussion with men (10)
30-6-10	Lihimilo Msikitini subvillage	Meeting with village government representatives (14 men, 7 women) Discussion with women (10) Walk to well Discussion with young men (8) Interview with 2 village cooperative representatives
1-7-10	Mchanga 1 Mandanje subvillage	Meeting with village government representatives and village elders Discussion with women (4) Discussion with men (10)
2-7-10	Lindi town	Interview with DNRO Interview with DALDO (Mr. Matunda) Interview with Cooperative Society Manager (Mr. Mkungula) Interview with Harbour Manager (Mr. Mikidadi) Casual conversation with timber dealer
3-7-10	Likwaya Lumumba subvillage	Meeting with village government representatives and village elders (8 women, 10 men) Discussion with women (15) Discussion with young men (14)