FORESTRY RESEARCH INSTITUTE OF MALAWI

PROGRESS REPORT
JANUARY TO JUNE 2012

OUTCOME 1: IMPROVED CAPACITY OF COMMUNITIES IN TARGET AREAS TO SUSTAINABLY MANAGE FOREST AND WILDLIFE RESOURCES.

OUTPUT 1.1 THE MANAGEMENT OF DEGRADED FORESTS IN TARGET AREAS IS IMPROVED

Activity 1.1.2: Facilitate tree planting and management of forests

TREE PLANTING WITH COMMUNITIES IN THE LAKE CHILWA BASIN, THUMA AND CHIRADZULU COMMUNITY AND FOREST AREAS

During the reporting period a total of 958,315 seedlings we planted under the Programme. Local communities in the Lake Chilwa Basin were supported to plant 545,315 seedlings in an area estimated to be about 290 hectares and an additional 24 km along various rivers in selected critical sites of the Lake Chilwa Basin. On average, about 89% of the planted trees survived in all the districts by June 2012. The highest survival was recorded in Zomba and Phalombe Districts. In addition, the Programme purchased and facilitated planting of 413,000 trees in districts that surround Thuma Forest Reserve namely Dedza, Lilongwe, Dowa and Salima as well as Chiradzulu districts under Thuma livelihood project. Areas that were planted include river banks, woodlots, farmlands and homesteads.

Figure : Tree planting in Chimutu in Salima district

Summary of Tree Planting and Survival in the Lake Chilwa Basin

	Planted	Ha	Survival	Survival %
Machinga	116,842	46.73	87,650	75.02
Phalombe	92,604	35.92	89,890	97.07
Zomba	129,869	51.74	114,459	88.13
Zomba Mountain Forest	203,000	154.6	198,940	98.00

Riverbanks (Km)	Na	40km		Na
Miscellaneous*	59,000		**Na**	Na
Sub-total	**601,315**	**288.99**	**Na**	**Na**
Mean	**0**			**89.55**
****Salima**	35,000	Na	Na	Na
****Dowa**	60,000	Na	Na	Na
****Lilongwe**	82,000	Na	Na	Na
****Dedza**	90,000	Na	Na	Na
****Chiradzulu**	90,000	Na	Na	Na
Total	**958,315**			

*Includes planting by Chancellor College Students and other stakeholders at Chirunga and communities in various sites
*** Data to be collected end August or early September 2012
Na= no data or not applicable

INDIGENOUS FINE HARDWOD TREE TEST PLANTATION

FRIM through the Programme established 2.7ha of *Khaya anthotheca* and *Afzelia quazensis* during the 2010/2011 planting season in Zomba Mountain Forest Reserve. In the 2011/12 planting season, a further 1.04ha was planted with *Trichilia emetica, K. Anthotheca, Parkia flicoidea* and *Albizia adiathfolia*. The objective of this activity is to evaluate the potential of selected indigenous tree species for plantation forestry and provide a site for research in the management of fine hard wood tree species as well as a learning site. During the reporting period, assessments were conducted on the trees that were planted in 2010/11 season. The following is a summary of the major findings;

Root collar Diameter (RCD) increment is one of the main indicators of tree performance in a given environment. The mean root collar diameter for *K. anthotheca* was 2.29cm (±76) while for the *A. quanzensis* was 1.14 (±0.57). There were some diameter differences between blocks of the same species, suspected to be caused by soil drainage differences.

There was a direct relationship between RCD and tree height. The mean height for *K. anthotheca* was 0.8m (±0.36) while that for *A. quanzensis* was 0.32m (±0.17). Slow initial height growth of *A quazensis* has been observed in similar studies in Tanzania where it was reported that during the first years, growth of seedlings is between 50 and 60 cm per year (Gérard, J. & Louppe, D., 2011). The slow growth rate of *A. quanzensis* limits its prospects as a commercial plantation timber tree. However, the high value of its wood makes it economically attractive and warrants research on its genetic diversity and breeding for superior characteristics, as well to take the pressure from wild populations.

The mean crown diameter for *K. anthotheca* was 0.49 (±0.28) m while that for *A. quanzensis* was 0.27 (±0.22)m. Crown diameter differences were observed in *K anthotheca* between trees at different positions of the slope. This was attributed to the deeper and well drained soils downhill as compared to

the more compacted soils uphill. Future plantings will have to ensure that the pits for planting on the site are deep enough to allow for quick root development and growth of the planted trees.


Left: Well developed crown of *K. anthotheca*; Right: Crown development of *A. quanzensis*

Pests and diseases were observed on less than 10% of the trees for all species. The most prominent pest problem was curling of *K. anthotheca* leaves in a few trees. The disease is often caused by a fungus of the genus *Taphrina* or virus, especially of the genus *Begomovirus* within the family Geminiviridae. When a virus is the cause of leaf curl in a plant, usually an insect will be involved as a vector that carries it to the plant. The problem is managed by application of pesticides and good husbandry including mixing of species but does not significantly affect tree growth.

Deformed foliage of 2 year old *K. anthotheca*

Activity 1.1.5 Develop and implement management plan (Thuma)

Thuma Forest Reserve Management plan is in the final draft and will be ready for circulation in September 2012. Wildlife Action Group (WAG) input is very crucial especially on part of wildlife and

has been asked to participate in the development. Anytime a review workshop will be conducted on the developed plan involving concerned stakeholders.

OUTCOME 2: CAPACITY OF COMMUNITIES TO PLAN, IMPLEMENT AND MONITOR INTEGRATED ADAPTIVE MEASURES AND INITIATIVES IMPROVED AMONG TARGET COMMUNITIES AND THEIR STAKEHOLDERS

OUTPUT 2.2: CONSERVATION AGRICULTURE IS PROMOTED AND UP-SCALED IN LAKE CHILWA BASIN HOTSPOTS

Facilitating uptake of conservation agriculture in the lake chilwa basin hotspots

During the reporting period, farming households have been mobilized, trained and supported to practice CA in their fields and pass on the technology to other farmers in the basin. Farmers that will be used as lead farmers in 2012/13 have been identified around Chancellor College Technology Learning Centre, Malosa and Ngwelero EPAs in Zomba; Nsanama and Domasi EPAs in Machinga; and Tamani, Naminjiwa and Kasongo EPAs in Phalombe. In these areas, demonstration fields have been identified whose land size and GPS coordinates are recorded. Soil samples were also collected for baseline laboratory analysis to ensure that future changes in soil chemistry due to CA intervention are captured. Twenty hectares (20ha) across the basin have already been put under CA demonstrations which involve 128 farmers. It is expected that more farmers will be able to learn the CA practice from these demonstration fields. Meanwhile land preparation is in progress and procurement of farm inputs for demonstration fields has been completed. The input package support to a farmer include, basal and top dressing inorganic fertilizer, hybrid maize seed, herbicides, sprayer, agro-forestry (*G. sepium and F. albida*) seed and extension service. Outside the demonstration sites, some 315 farmers are expected to be reached covering 63 hectares though CA out/ up scaling drive across the basin in the coming season.

Number of farmers and hectares per EPA for CA demonstrations in 2012/13

District	EPA	Target Ha	Area Ha	No of farmers
Zomba	Ngwelero	4	4	20
	Malosa	2.5	1.8	7
	Chancellor College	0.5	0.5	30
Sub total		**7.0**	**6.3**	**57**

District	EPA	Target Ha	Area Ha	No of farmers
Machinga	Domasi	2	2.01	10
	Nsanama	3.5	4.1	**20**
Sub total		**5.5**	**6.11**	30
Phalombe	Naminjiwa	2.5	2.7	15
	Tamani	2.5	2.8	16
	Kasongo	2.5	2.3	10
Sub total		**7.5**	**7.8**	41
Total		**20.0**	**20.2**	**128**

Field days have been one of the ways to enable lead famers to showcase successful CA practices and attract other farmers. Conservation Agriculture demonstration fields were used in the field days in the three Extension Planning Areas of Nsanama, Ngwelero and Kasongo in Machinga, Zomba and Kasongo.

Figure : Mr Duncan, CA Lead farmer explaining to visiting farmers (Left) and a cross-section of people who came to appreciate CA (Right)

FRIM facilitated a meeting of the Task Force in May 2012. The meeting deliberated on among other issues, including the following;

- Conservation Agriculture Challenges, Opportunities and Lessons over the just ended cropping season,
- LCBCCAP implementation strategy for CA in 2012/13.
- CA implementation strategy for different players in the basin, including Total Land care (TLC),
- Performance Assessment of CA during the dry spell,

At the end of the meeting, task force endorsed the CA implementation strategy with minor changes.

Assessment of Conservation Agriculture Performance During The 2011/12 Dry Spell: A special study was conducted to assess the performance of CA fields during the dry spell of the 2011/12 cropping season. The main objective of the study was to compare the performance of CA with conventional farming during the dry spell that hit the Lake Chilwa basin. The sample comprised 106 household respondents across the Lake Chilwa Basin districts of Zomba, Machinga and Phalombe. Random sampling was used to identify household respondents from a village listing which was drawn from a purposely sampled Extension Planning Area. An interview guide was used to collect data from respondents. In addition, field observation and secondary rainfall data recorded at EPA were used in the study. The study determined that the basin experienced 'false starts' as the rains that fell between October and part of December did not provide minimum moisture required maize growth which led to maize wilting. Results show that Conservation Agriculture performed better than conventional farming during the dry spell. Most respondents (83.9%; n=106) observed better looking maize crop under conservation agriculture than under conventional farming. Majority of correspondents attributed the improved crop to CA (CA= 52%; Soil type=16.1% and Time of planting= 25.5%).

Figure : Conventional maize farm (Left) and conservation agriculture maize farm (right)

These findings vindicate the already existing evidence (Kassam, *et al*., 2009) that CA improves soil nutrients, increases the soil's ability to retain water (which also makes it more resilient to droughts and climate change), reduces surface water run-off and erosion, increases yields and reduces farming input costs through reduced labour time and amount of fertilizer applied in the long run. Studies from elsewhere have confirmed increased average maize yield from CA with production of up to 4.5 MT per hectare compared to 1.5 MT per hectare realized from conventional maize farming system.

OUTPUT 2.3: ALTERNATIVE INCOME GENERATING ACTIVITIES ARE IDENTIFIED AND PROMOTED IN THUMA FOREST RESERVE AND ITS BUFFER ZONE

ACTIVITY 2.3.3: SCALE-UP AND/OR PROMOTE IGAS ON BEEKEEPING, PIGGERY AND CANE FURNITURE MANUFACTURING (EQUIPMENT, INITIAL STOCK, FEED, KHOLAS, STORAGE FACILITIES)

Value addition on cane furniture making around Thuma Forest Reserve

A rapid survey was initiated to evaluate whether bamboo can be a viable option for climate change mitigation around Thuma Forest Reserve and to establish areas which can be supported immediately. Focus group discussions and interviews were used to generate enough information for informed decision making. Some of the issues which were targeted in the moderated discussions and interviews were: the existing expert knowledge on bamboo usage, availability of bamboos, efforts being made by users to ensure continued supply of bamboos, methods being used to add value to the products made from bamboos, type of products being made, marketing of bamboos and bamboo products, challenges and opportunities being faced in marketing of bamboo and bamboo products and organizations that are helping them to market their products.

The investigation revealed that there is high harvesting pressure for the bamboos of all ages throughout the year. The products being sold include chairs, tables, sofa sets, baskets, bottle carriers, and cupboards. It was also indicated that cane furniture is an emerging forest based SME and the status of bamboo as a livelihood. In order to add value to the furniture, one cooperative (Katengeza Cooperative specialized in Cane Furniture Manufacturing) has been supported with a fabricated processing equipment and oils needed to develop cheap pretreatment methods that prolong life of the furniture. Currently, bamboo management manual is being developed for use by communities growing and managing bamboos in the area to ensure sustainable management.

OUTPUT 2.4: ALTERNATIVE AND EFFICIENT ENERGY TECHNOLOGIES AND SOURCES ARE IDENTIFIED AND SCALED UP

ACTIVITY 2.4.1: PROMOTE EFFICIENT AND ALTERNATIVE ENERGY SOURCES AND TECHNOLOGIES (BRIQUETTE PRODUCTION, CHARCOAL FROM OTHER SOURCES)

Training communities on use and making of energy saving stoves

Village Natural Resources Management Committees (VNMRCs) and Forest Assistants attended a two-day training in Dowa District on the use and making of an energy saving stove under the Thuma Project. A total of 34 farmers drawn from 12 VNRMCS and 7 Forest Assistants attended the trainings. There were 14 women and 27 men that attended the training. The trainings were very successful in that all the expected outputs and objectives were met. The recommendations for the trainings were to: Train the

communities in making of the kiln for firing the stoves, extend the trainings to other sites around Thuma Forest Reserve, an energy revolving fund establishment in areas around Thuma forest reserve, Establishment of woodlots to be used for firewood, and to intensify in follow-up visits to the trained farmers.

Left: Demonstrating on how some of the materials are used in making the stove and **Right:** Participants preparing clay soils for the stove

OUTCOME 4: THE CAPACITY FOR MALAWI TO IMPLEMENT REDD+ AND OTHER PAYMENT FOR ECOSYSTEM SERVICES (PES) MECHANISMS IS ENHANCED.

OUTPUT 4.1: CARBON STOCKS IN THUMA FOREST RESERVE AND ITS BUFFER ZONE ARE QUANTIFIED

Activity 4.1.1: Conduct biomass and carbon baseline survey

BIOMASS AND CARBON ASSESSMENT IN THUMA FOREST RESERVE

Biomass and carbon assessment in Thuma Forest Reserve were conducted during the reporting period. The overall objective was to inform the REDD process in Malawi. The inventory used standard methods where the Forest Reserve was stratified based on the vegetation types (Pearson *et al*, 2003;

Penman *et al*, 2005). Allometric equations were used to convert DBH measurements to an estimation of the above ground biomass of each live tree. Existing equations that most closely matched the forest types present were used, and a Carbon content of 50% of biomass was assumed for all species. Carbon contents for Thuma Forest Reserve were calculated based on allometric equation developed by Grace *et al*., (2007) for biomass estimation in miombo woodlands under the N'hambita project in Mozambique. The N'hambita allometric equation gives the total carbon stock in a single tree as a function of diameter at breast height (dbh) of that tree. Below ground biomass was estimated using a factor of 0.25.

A total of 77 species were observed in Thuma Forest Reserve. *Piliostigma petersiana* was the most dominant species (11%), followed by *Combretum adenogonium* (8.8%) and the least was *Terminalia sericea, Pseudolachnostylis maprouneifolia* and *Vachellia galpini* with 3.74% and 3.52% respectively. The mean tree height in the forest reserve was 12.5 ± 7.8m and the mean diameter at breast height (dbh) was 22.1 ± 8.19m. Current stem density was 153 ± 34 stems per Hectare. Most trees were in the small diameter classes of 5 to 10 cm, 10 to 15 cm and 15 to 20 cm. This is typical of miombo woodlands which usually follow an inverse J shaped curve. This diameter distribution curve is evidence that the forest is recovering from past disturbance. The Reserve has a carbon stock of 13.66 (±7.9) tons of carbon per hectare. With continued protection of the forest reserve, the accumulation of carbon stocks is likely to increase. These carbon stocks are slightly lower than expected for miombo woodland, based on results from other regions of the world. For example, Grace et al (2007) estimated 27 (±13) tons of Carbon in Nhambita Forest Reserve.

Forest Type	Number of Plots	Stems Ha^{-1}	Mean DBH (CM)	Mean Height (M)	Carbon (tC/Ha.)	Below Ground Carbon (tC/Ha.)
Miombo Woodland	97	153 ±34	22.1±8.19	±12.5 7.8	13.66 ± 7.9	3.42 ± 1.97

Figure 6: Degraded site in Lilongwe side.

Remaining trees on the managed side by WAG

MALAWI'S ENGAGEMENT IN THE CARBON MARKETS

REDD+ Technical Training For Forestry Staff

Usually when new interventions are introduced to abate deforestation or any environmental problem, knowledge gaps exist just as in any discipline, which may become an impediment to the interventions' implementation. Reduced Emissions from Deforestation and Degradation (REDD+) is relatively new to most staff in the forestry department. A workshop was conducted for forestry staff at Mponela in Dowa from 22nd to 25th May. The workshop's objective was to enhance the staff's knowledge on REDD+ and technical requirements for a country or project to benefit from a REDD+ mechanism and other related financial mechanisms aimed at abating climate change. The workshop was attended by twenty-five (25) forestry personnel from the Forestry Department and FRIM inclusive. LEAD and FRIM facilitated the workshop and areas covered include: Background to REDD+, Basics about REDD+, Technical elements of REDD+, Approaches to REDD+ implementation, Standards for REDD+ and Other PES mechanisms and climate change

This was just an initial training and further trainings shall be conducted when need arises. The awareness campaigns shall not however cover only climate-related issues but also other emerging issues outside this that may affect implementation of programmes within the department.