

RESEARCH PROPOSAL

TITLE: IMPROVING SMALLHOLDER LIVELIHOODS THROUGH WOODLOTS MANAGEMENT: AN ADAPTATION TO CLIMATE VARIABILITY & CHANGE IN MAKETE DISTRICT, TANZANIA.

By

1. Prof. R.E. Malimbwi¹ – Senior Researcher (PhD, Resources Assessment)
2. Mr. J.Z. Katani¹ – Researcher (MSc. Forest Management)
3. Dr. E. Zahabu¹ – Researcher (PhD, Participatory Resources Assessment)
3. Mr. W. A. Mugasha² – Researcher (BSc, Forestry, 2nd year MSc. Student in Forest Biology)

1 Department of Forest Mensuration and Management,
Sokoine University of Agriculture,
P.O.Box 3013,
Morogoro.

2 Department of Forest Utilization,
Tanzania Forestry Research Institute.
P.O.Box 1854,
Morogoro.

February, 2009

Summary

Unfavorable climatic conditions and poor soils have contributed to poor crop production to some parts of Makete District. As a result food security and the wellbeing of rural people of Makete have been threatened. Responding to this situation which is a consequence of climate change, local people of Makete District have established tree woodlots as an alternative source of household income. This is essentially a climate variability & change adaptation strategy, although globally it has a contribution to climate change mitigation. Makete rural area is among the Southern highlands of Tanzania reported to have successful woodlots. These areas are well afforested with trees especially of cypress, pines, eucalyptus and wattle. The woodlots range from 0.25 to 3 hectares. Unfortunately there is little information on the total forest area covered under individual ownership, the contribution of individual woodlots to the income of smallholder and poverty alleviation as a whole and how the benefits are distributed to all stakeholders involved in the industry. It is therefore not clear how much woodlot management is contributing to climate change adaptation. Much as the communities are harvesting and getting income from their woodlots, their management practices including marketing strategies are far from being sound. The purpose of the study is to assess management practices of smallholder woodlots and marketing of timber in order to recommend improved practices for effective climate variability & change adaptation in Makete district.. It is emphasized that the research component will be participatory with the villagers such that training for good practices will be conducted simultaneously based on the researchers experience. At the end of the project the following will be achieved: (1) Quantifiable baseline of the current status of the woodlots and their contribution to household economy will have been established. (2) Knowledge and skills for good forest management practices will have been imparted to the communities. Since the share of woodlot management to household income will have been established, this can be integrated into policy planning and development for climate change adaptation. The impact of the training will enhance this adaptation. It is therefore expected that after the implementation of CC DARE project the communities will practice improved: management techniques to produce high quality wood, wood harvesting, transportation and sawing techniques. Profitable market channels will have been identified and pursued and hence household income generation and rural economy improved. This will make woodlot management more effective as a climate change adaptation. Due to the short duration of the project (6 months), it may not be possible to evaluate the immediate impact of the improved technologies to climate change adaptation. A follow up project after at least six months is recommended. A total of \$ 50,365 will be needed to accomplish this research work.

Background and rationale of the study

The climate of Makete District has two major climatic zones, the highland and the lowland regions. The highlands are found at the altitude 1500-3000m a.s.l. and receive an annual rainfall of 1300mm. This area has an average temperature range between 4-20°C, sometimes the temperatures falling sharply and causing frost that occurs in scattered and variable pattern in the highlands. These low temperatures affect agricultural production, damaging crops such as maize when still on the farm, and therefore household food

security. The lowlands occupy a relatively smaller area of Makete District lying between 900-1500 meters a.s.l. and receives an annual rainfall of between 500-800mm. These lowlands sometimes experience localized droughts which result to poor crop production. The climate of Makete like other parts of the world are experiencing, is not stable rather is variable with some extreme occurrence of drought and rainfall. As Makete people depend on agriculture to make their living, the situation has made them to be vulnerable to food insecurity due to shorter growing seasons, more uncertainty about what and when to plant crops. To adapt to this situation, the local people must build their resilience including adopting appropriate technologies while making the most of traditional knowledge and diversifying their livelihood to cope with current and future climate stress.

The District occupies an area of 580,000 sq km, of which 72% is arable land, 9,000 ha is covered by game reserve, 11,812.1 ha are under natural forest reserves and 7,313 ha are plantation forest. Of the total arable land, only 62,000 ha are under cultivation, 24,459 ha are grazing land, representing 20.3% of the total arable land (MDC, 2004). Unfavorable climatic conditions and poor soils have contributed to poor crop production to some parts of Makete District. As a result food security and the wellbeing of rural people of Makete have been threatened. Responding to this situation, local people of Makete District have established tree woodlots as an alternative source of household income. This is essentially a climate change adaptation strategy, although globally it has a contribution to climate change mitigation. Makete rural area is among the Southern highlands of Tanzania reported to have successful woodlots. These areas are well afforested with trees especially of cypress, pines, eucalyptus and wattle. The woodlots range from 0.25 to 3 hectares (Malimbwi, 2001). Currently, the individual smallholders in Makete rural areas have a significant role in supplying softwood timber in commercial centres including Dar es Salaam and Arusha and to the neighbouring country of Kenya. Reliable transport systems by road and railway have also contributed much to this trend.

Unfortunately there is little information on the total forest area covered under individual ownership, the contribution of individual woodlots, including agroforestry systems, to the income of smallholder and poverty alleviation as a whole and how the benefits are distributed to all stakeholders involved in the industry. Much as the communities are harvesting and getting income from their woodlots, their management practices including marketing strategies are far from being sound. Sound managed forests plantation requires knowledge of credible seed source, tending practices in terms of proper thinning, pruning and weeding practices to ensure fast growth and quality wood. In Sao Hill plantations one hectare of mature pine trees has an average value of TShs 9,200,000/= at a rotation age of 18-20 years, excluding income from intermediate thinning. This would be a farmer's income of more than TShs 500,000/= per year per ha for a well managed woodlot. Farmers cannot realize this income due to poor forest management. Some of the woodlots are characterized with crooked stems poor seed source, severe competition due to lack of thinning and vulnerable to fire due to lack of pruning. Such woodlots are counterproductive and hence undermine farmers efforts. Kajembe and Luoga (1996) and Luoga et al. (1996) revealed that different villages in southern highlands have attained different levels of tree farming hence require different management interventions.

During a visit to the Southern Highlands, the District Commissioner for Makete raised a concern that there is no proper information on the impact of community participation in forestry and whether proper management practices to ensure efficiency and reduced drudgery are being practiced (see attached letter as appendix 1). Also softwood timber prices from government plantation are now up and as such there will be more pressure on smallholders' sources. The questions are, are the smallholders aware of this? As a result how are they coping with this situation? The contribution of smallholder woodlots to household income can be improved only if the marketing channels for forest products are identified and their profitability are determined. Most of the smallholders in Tanzania can not make informed decision on what price they should sell their forest products because they lack information on the benefit distribution among the stakeholders. Also farmers sell their standing trees to dealers by only estimating the size of individual tree by looking at the diameter or estimating the number of trees within an area and negotiate the price. This kind of pricing does not give real compensation to farmers because the dealers buy a whole tree and sell the timber in cubic meters. Milledge *et al.* (2007) in the TRAFFIC report showed that while the Freight on board (FOB) market price for timber/logs is \$300-1200, villagers get \$3.5 (hundredth) and as such dealers get a lion share while villagers are left poor. Therefore there is a need of coming up with a simple way farmers can use to estimate the size of a tree in terms of cubic meters which is the basic unit for negotiating sales.

This should be built on existing local knowledge about forest management in face of climate variability. The findings of this research will provide information that will aid in the planning and development of sound forest management practices for improved livelihoods through capturing the current timber market. It is anticipated that on its completion this project will enhance employment creation, improved livelihoods for sustained rural economy while maintaining environmental protection. It will also provide alternative adaptation strategies to climate change. This is in line with millennium and NSGRP (National Strategy for Growth and Reduction of Poverty) goals among which poverty reduction, improved livelihoods and environment conservation are emphasized. The project answers to the United Nations Framework Convention on Climate Change (UNFCCC) strategy on climate change adaptation.

Expected outcomes and evaluation

Overall objectives

To assess management practices of smallholder woodlots and marketing of timber in order to suggest alternative adaptation strategies to improve forest management and livelihoods of local communities in Makete District.

Specific objectives

- (i) To assess silvicultural management practices and conduct qualitative and quantitative assessment of the current growing stocks in the woodlots

- (ii) To identify existing marketing channels and practices for softwood timber from smallholders woodlots and workout profitability for each channel and practice
- (iii) To assess the contribution of smallholder woodlots to household income and poverty alleviation
- (iv) To propose management and marketing strategies that will aid in the planning and development of improved woodlots productivity and household income for poverty alleviation
- (v) To identify alternative adaptation strategies to climate variability & change that can reduce dependence on woodlots and forests
- (vi) To examine the role of gender, local knowledge and tenurial arrangements for land to enable planning and development of alternative adaptation strategies and forest management practices

Outputs

- Baseline information on the extent of woodlots in Makete district and their contribution to climate change adaptation
- A guideline on sound woodlots management to enhance its effectiveness as a climate change adaptation strategy.
- A project implementation report with relevant recommendations such as mainstreaming woodlot management into local and national policy as a climate change adaptation strategy

Outcomes

Expected that at the end of the study it will be possible to realize the following:

- Mainstream of woodlot management into local and national policy as a climate change adaptation strategy
- Adopt improved management techniques to produce high quality wood
- Adopt improved wood harvesting, transportation and sawing techniques
- Pursue profitable market channels
- Integrate local knowledge with scientific knowledge, gender and tenurial arrangement to adopt alternative adaptation practices to climate change
- Adopt alternative adaptation strategies to climate change
- Develop alternative harvesting systems and empower smallholders and communities to buffer woodlots against climate related disturbances like “improving fire management to reduce the risk of uncontrolled wild fire.

Indicators for evaluating the success of outcomes

- Woodlot management mainstreamed in local and national development plans as a climate change adaptation strategy.
- At least 25% of woodlots owning farmer will adopt the technique
- Purchasing power of at least 25% of woodlot owning farmers will increase
- At least 25% of farmers practicing alternative adaptation strategies to climate change will emerge

Due to the nature of the project, verification of some of the indicators will only be possible after its completion. However, stakeholders meetings and the level of attendance and participation can be used to gauge acceptability of the technologies.

Design of the research and implementation

A cross sectional design will be adopted whereby data collection will be done at one time. Multistage sampling will be adopted whereby three wards with many smallholder woodlots will be selected followed by purposely selection of two villages from the selected wards. Structured questionnaires will be used to collect socio-economic data from sampled households in 6 villages. Most of the questions in the structured questionnaire will be closed and few open ended (Appendix 2). The questionnaires will be administered to 5% of the total households in the village. If the village does not have enough households to give at least 30 households as 5%, then 30 households will be selected.

In addition to household interviews, a different questionnaire (Appendix 3) will be administered to timber dealers will be interviewed in order to get the cost and profit estimate in the timber marketing trade. Timber dealer will be identified in the villages and traced to their selling points in urban centres. A sample size of at least 30 timber dealers will be interviewed.

Woodlots of different ages will be visited to assess: planting stocks, planting techniques, tending operations (weeding, pruning, thinning), harvesting, transportation and sawing techniques. Stand parameters such as area, age, mean diameter and height, stem form and per hectare estimates of number of stems, basal area and volume will also be determined to assess the quantity and quality of the woodlots. Silvicultural condition of the woodlots will be assessed as a measure of management level practiced. Woodlot assessment form will be used to record this information (Appendix 4). Age class distributions will be determined to assess sustainability of wood supply. The monetary value of individual woodlots will be determined. Harvested trees will be measured for volume before and after sawing (sawn timber) in order to determine the recovery rates. It is emphasized that the research component will be participatory with the villagers such that training for good practices will be conducted simultaneously based on the researchers experience. For example in a woodlot which is due for thinning the trees to be thinned will be marked in the presence of the farmer. Similarly, pruning will be demonstrated where it is due.

Representative woodlot smallholders will be given opportunities to visit each other to learn how they manage woodlots and market timber. The well established and managed smallholder woodlots if any will be identified and be used during the visits to demonstrate best practices to other farmers. After the visits, meetings will be conducted in the researched villages to give feedback of the research findings and discuss way forward. This exercise is very important because it provides opportunities for researchers to validate their research findings. Guidelines for appropriate techniques and practices in tree farming and marketing of timber will be produced and made available to farmers.

Also these research findings will be disseminated to policy makers at local government and ministerial level through a brief meeting with them. In the local government it will include district commissioner, district executive director, head of natural resource, land and environment, heads of departments of district council and environmental committee member of the counselor assembly while at ministerial level it will include director and heads of departments in the Ministry of Natural Resource and Tourism. Furthermore, the research findings will be published in journal and local news letter plus Swahili brochures having guidelines to be distributed to farmers.

REFERENCES

- Kajembe, G.C. and Luoga, E.J. (1996). Socio-economic aspects of tree farming in Njombe District. Consultancy Report to the Natural Resources Conservation and Land-Use Management Project (HIMA-NJOMBE). Forconsult SUA, Morogoro pp103.
- Kaoneka, A.R.S. and Iddi, S. (1996). Past trends and future possibilities of marketing and utilization of softwoods in Tanzania. In Chamshama, S.A.O. and Iddi, S. 1996. Management of Forest Plantations in Tanzania. Faculty of Forestry Record No. 63: pp 252-256.
- Luoga, E.J. Hoen, H.F. and Munishi, P.K.T. (1996). Prospects of private forest plantations in Tanzania: a case of Tanganyika Wattle Company (TANWAT), Njombe, Tanzania. In: Chamshama, S.A.O. and Iddi, S. 1996. Management of forest plantations in Tanzania. Faculty of Forestry Record No. 63: pp 140-148.
- Malimbwi R.E., 2001. Forest extent and ownership in Tanzania. A consultancy report requested by Tanzania Conservation and Management Project (TCMP), Dar es Salaam.
- MDC (2004). District Agricultural Development Programme: 2004-2005. Makete District Council.
- Milledge, S., Gelvas, I., and Ahrends, A. (2007). Forestry, governance and national development: lessons learned from a logging boom in southern Tanzania. Cambridge: TRAFFIC, for United Republic of Tanzania, Ministry of Natural Resources and Tourism, and Tanzania Development Partners Group.
- MNRT (1983). Revenue and cost analysis of Meru and West Kilimanjaro plantations. Division of forestry and beekeeping, Dar es Salaam.

Ngaga, Y.M. and Kowero, G.S. (1992). Present consumption of sawn wood in the Municipalities of Arusha and Dodoma in Tanzania. Faculty of Forestry Record No. pp 56: 16.

Appendix 1

JAMHURI YA MUUNGANO WA TANZANIA OFISI YA RAIS TAWALA ZA MIKOA NA SERIKALI ZA MITAA		
Simu: 026-2740004		OFISI YA MKUU WA WILAYA S.L.P. 2 MAKETE.
Unapojibu tafadhali taja: Kumbu Na.DC/N.10/2VOL.1/13		28/11/2005
<hr/>		
PROF. MALIMBWI R.E., CHUO KIKUU CHA SOKOINE, S.L.P. 3013, MOROGORO.		
YAH: MAOMBI KWA IDARA KUFANYA NA KUGHARAMIA UTAFITI WA MANUFAA KIUCHUMI YA MAVUNO YA MISITU YA MBAO (MIPAINA) KWA WANANCHI WA WILAYA YA MAKETE		
<p>Tafadhali husika na kichwa cha barua hii, na Rejea mazunguzo yetu tuliyofanya ofisini kwangu tarehe 7.11.2005 mlipotembelea Makete kufanya tathimini ya mti wa Misandali .</p>		
<p>Wilaya ya Makete yenye wakazi 105,775 na ukubwa wa eneo la meta za mraba 5800 ina misitu mingi ya mipaina iliyopandwa na wananchi wenyewe. Wilaya ina miti ya kupandwa (mipaina) ya eneo la wastani wa jumla ya hekta 11,712 Eneo halipo mahali pamoja, bali ni maeneo mengi hapa na pale karibu wilaya nzima, hasa katika tarafa za Lupalilo, Ukwama, Bulongwa, Magoma na Matamba.</p>		
<p>Wananchi wamekuwa wakivuna miti hiyo kwa wingi hasa katika miaka hii mitatu kuanzia 2003, lakini katika kipindi hiki chote hakuna mtaalam yeyote aliyeweza kufanya utafiti ili kubaini kwamba pato litokanalo na biashara ya mbao ni kiasi gani kwa 'industry' yote, ni kiasi gani kwa wilaya na linagawanywa vipi na kwa namna gani kwa wadau wote husika: wanaomiliki na kuuza misitu, wanaokata misitu, wanaopasua mbao, wanaosafirisha mbao na wanaonunua na kuuza mbao.</p>		
<p>Kwa hiyo barua hii ina nia ya kufikisha kwako ombi la kupata wataalam na kugharamia utafiti utakaoiwezesha wilaya kujua mchango wa misitu ya kupanda katika pato lake la wilaya na mgawanyo wa pato hilo, litokanalo na misitu kwa wadau husika. Bila shaka matokeo ya utafiti huu yataweza kutuonyesha pia kwamba je katika biashara hii yote ni nani ananufaika zaidi na kwa sababu gani na kwa kiasi gani kati ya: muuzaji wa msitu, mkataji wa msitu, mpasuaji wa mbao, msafirishaji wa mbao au mnunuzi na muuzaji wa mbao?</p>		
<p>Nitashukuru ukilipokea ombi langu.</p>		
 O. M. Kapunga MKUU WA WILAYA MAKETE		

QUESTIONNAIRE FORM FOR SMALLHOLDERS

A: General Information

1. Household identification Number
2. Village name Ward Division
3. Name of interviewer Date of interview

B: Household Biodata

4. Name of household head
5. Age years
6. Sex: Male () Female ()
7. Ethnic group
8. Education level
 - a. No formal education
 - b. Primary school
 - c. Secondary school
 - d. Post secondary
 - e. Adult education
 - f. Other (specify)
9. Main occupation
 - a. Farmer
 - b. Civil servant
 - c. Self-employed (specify)
 - d. Employee in private company

C: Forest data

- 10 What is the size of your woodlot(s)?(ha)
- 11 What tree species planted?
- 12 What is the age of trees?(years)
- 13 What management practices do you carry out for your trees? (Tick the appropriate)
 - a. Pruning
 - b. Thinning
 - c. Weeding
 - d. Fire protection measure (mention)
- 14 Where do you get the tree seedlings?
 - a. Buy
 - b. Raise own seedlings
 - c. Others (specify)
15. How do you assure the quality of tree seedlings planted?
.....
.....

D: Marketing of forest products

16. What form of timber do you sell to customers? (Tick appropriate)

- a. Round log
 - b. Sawn timber
 - c. Poles
 - d. Fuelwood
17. At what age do you sell
- a. Round log yaers
 - b. Sawn timber years
 - c. Poles years
 - d. Fuelwood years
18. If sawn timber is sold to customers, what harvesting method do you use? (Tick appropriate)
- a. Pitsawing
 - b. Sawing on platforms
 - c. mobile sawmills
 - d. Chain saw
19. Who are your forest product customers?

20. How do you get customers?

21. What tree species are preferred by your customers?

22. What are the minimum size and quality requirement?
- a. Size (Height and diameter).....
 - b. Quality
23. How is pricing of your forest product done?

24. What are the undertakings for adding value to your forest products?

25. How much money do you earn per year by selling forest product from your woodlot? (TShs)
26. What are the constraints to tree farming and marketing?

Appendix 3

QUESTIONNAIRE FOR TIMBER BUYERS

1. Name of timber buyer/company
2. Place of business
3. Type of operation (Tick the appropriate answer)
 - a. Sawmill
 - b. Portable sawmill
 - c. Wood dealer
 - d. Others (specify)
4. Forms of wood purchased (Tick the appropriate answer)
 - a. Standing timber
 - b. Sawlogs
 - c. Lumber
 - d. Poles
 - e. Others (Specify)
5. What is the volume of wood purchased? (m³)
6. Which species do you prefer?
7. Who supplies the product? (Tick the appropriate answer)
 - a. Tree grower
 - b. Middlemen
 - c. Others
8. How contacts with your supplier are made?
.....
.....
9. What is the unit buying price of product purchased?
.....
.....
10. How do you negotiate the price with the supplier?
.....
.....
11. What are the minimum size (diameter and height) and quality requirements?
 - a. Diameter (m), Height (m)
 - b. Quality requirements
.....
.....
12. What are the product market destinations?
.....
.....
13. Who are your customers?
14. What is the selling price per unit product? (TShs/ m³)
15. What are your views concerning adequacy of supply?
.....
.....

Appendix 4
Woodlots Assessment Form

Name of the Village:Ward:..... Division: Date:

.....
Name of the Woodlot Owner:

Woodlot No.	Area (ha)	Species	Spacing	Planting date	Source of seeds/seedlings	Frequency of Management activities since planting till harvesting			General quality of trees in the woodlot				Expected age of harvesting	Customers satisfaction ²
						Weeding	Pruning	Thinning	Age (yrs)	Height (m)	Dbh (cm)	Straightness ¹		

¹1=Straight, 2=The first log is straight, 3=Crooked

² 1=Satisfied 2=Complained, 3=No comments

