

# **Transaction Costs of Community Based Forest Management: Empirical evidence from Tanzania.**



**EXTERNAL PLACEMENT REPORT SUMMER TERM 2003  
Masters of Research in Ecology & Environmental  
Management**

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# **Transaction Costs of Community Based Forest Management: Empirical evidence from Tanzania.**

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## **Summary**

1. A case study was conducted to examine the transaction costs impact of community based forest management, on three economic groups of four selected adjacent forest communities in the Ambangulu mountain forests of north east of Tanzania. The focus of the study was to assess the costs and benefits of community based forest management to the rich, medium and poor groups of forest users.
2. Wealth ranking exercise was done with the local people to identify the three groups according to the local perceived criteria, followed by administering questionnaire to 120 households. Costs of forest management were classified as participation in forest monitoring and time spent in meetings. Benefits included all materials from the forest consumed at household level.
3. Analysis of 120 households adjacent to Ambangulu forest revealed that transaction costs for community based forest management was higher for the poorer households compared to medium and richer households. Where as the richer income groups obtained high net benefits followed by medium and poorer households obtained the lowest.
4. The empirical study shows the general indication that, community involvement in forest management may lower transaction costs incurred by the government but these costs are borne by the poor members in the community. If they are not incorporated into the policies and legislation they may become critical factors in the success or failure of Community Based Forest Management.

Key words: Tanzania, Ambangulu, costs and benefits of forest, income groups, and wealth criteria

## Introduction

Transaction costs have been an important subject in natural resource management in recent years (Adhikari & Lovett 2002). The original concept of transaction costs comes from seminal articles “The nature of the Firm” (Coase 1937) that stresses the major role of transaction costs in the organization of firms and other forms of contracts. Coase (1960); Alchian & Demsetz (1972) and Cheung (1983) are the various scholars who have developed the Coase’s theory. Wallis & North (1986) and North (1990) extend the implications of transaction costs and incorporate them in a theory of economic history.

Including transaction costs in an economic study may help us to examine the nature of costs and benefit, and their impact on different stakeholder groups. However, measurement of transaction costs is not so direct. Benham & Benham (2000) point out four factors that make empirical measurement of transaction costs difficult. These include; lack of clear cut definition of transaction costs, difficulties in separating transaction costs from production costs since they are often jointly determined, where the cost of transacting is very high many forms of transaction may not take place, and many estimates may be required since individual and groups in any given society face various opportunities and thus transaction costs. This suggests that, in understanding why any particular transaction is likely to be adopted by an individual require knowledge of the opportunity costs faced by that individual (Benham & Benham 2000). Hanna (1995) also observed that in many field settings, efficient management of common property resource (CPRs) is often challenged by the various sources of uncertainty that result in high transaction costs.

Despite variation in the concept of transaction costs, a number of useful definitions are available in the literature (Coase 1960; Cheung 1969; Randall 1972; Williamson 1973; Williamson 1981; North 1990; Holloway *et al.* 2000). Transaction costs are the costs of arranging, bargaining, monitoring or enforcing agreement; the cost associated with all the exchanges that take place within an economy (Eggertsson 1990; North 1990). Veltheim & Kijazi (2002) consider transaction costs as the costs of resolving situations where involved parties have conflicting interests such as forest boundary and villages. Under this study transaction costs are defined as the costs that is

incurred by individual household in attending meetings and voluntarily participating in various activities of community based forest management.

Despite the importance of these costs to sustainable functioning of natural resource management institutions and their role in determining the division of power and access; there are few empirical analyses of transaction costs and very limited comparative estimates of costs and benefits (Aggarwal 2000; Falconer 2000; Adhikari 2001; Adhikari & Lovett 2002). For instance, Crocker (1971) conducted an empirical analysis of the role of transaction costs in natural resource transfer using the case of the impact of air pollution on agricultural land use. He observed that the transaction costs to affected farmland owners of bargaining with polluters were very high.

Aggarwal (2000) carried out a case study of group-owned wells in Southern India in an attempt to understand the possibilities and limitations to cooperation in small groups by looking at the transaction costs associated with these activities. She observed that costs of negotiating are likely to be higher in the case of well expansion activities, particularly in groups where heterogeneity among members in terms of their endowments and needs is high. Richards *et al.*, (1999) conducted a participatory economic analysis of community forestry including transaction costs of management in Nepal. They found that in the case of groups more dependent on forests, people devoted much of their time to forestry-related activities; therefore the transaction costs were relatively low as a proportion of total costs, usually less than 5%. However, in a situation in which forestry is just one of many livelihood activities, transaction costs as a proportion of total costs can be significantly higher, up to and sometimes above 20% of the cost. In their efforts to quantify the transaction costs of fisheries co-management, Kuperan *et al.* (1998) conducted a study on San Salvador Island in the Philippines. They observed that monitoring appears as the activity that accounts for more than 50% of the total costs of all the activities involved in co-management. It consumes the bulk of the time as it is a continuous day-to-day activity and it is an important activity for institutional maintenance.

Community Based Forest Management (CBFM) has become the most important program within the Tanzania's forestry sector, following the approval of National Forest Policy in 1998 and the enactment of Forest Act 2002 and Community Based Forest

Management guidelines (Government of Tanzania 2001a). The move towards CBFM has been driven by two factors. Firstly, recognition that neither central government nor local government have the capacity to manage the nation's forest resources in sustainable way without the support of the communities living close to the forest, ineffective management has already resulted in widespread forest loss. Secondly, there has been a political move to decentralize government functions to the lowest level of government capable of taking them on (Willy 2002). By the end of year 2000, it was estimated that Tanzania had 318,335 ha of forests under CBFM and 70,135 under Joint Forest Management (JFM) mainly in Catchment Forest reserve (Masayanyika & Mgoo 2001). To date more than 600 communities are managing community forest in the country (Wily 2002).

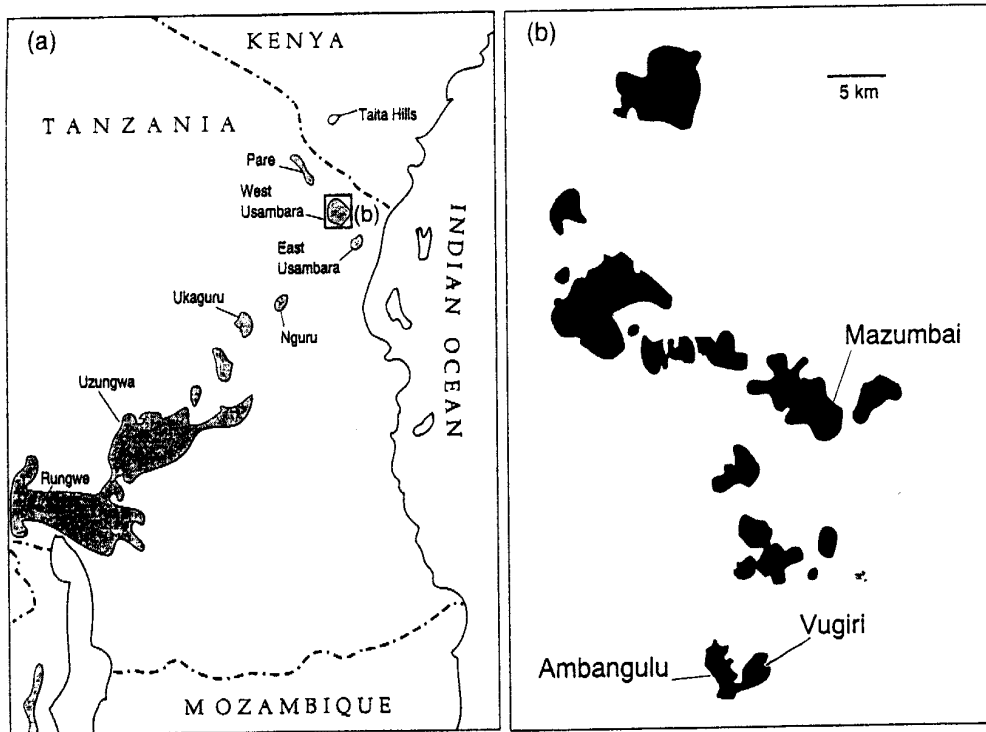
Forests are the main natural resources occurring in the study sites. Basically, there are three categories of forests: forests under community forest reserve, forests under ownership of Tea estate and government forest reserves, the latter has the management objective of catchment forest reserves (Fig. 1 & 2). Through joint forest management with communities, the district government and the Ambangulu Tea Estate, Tanzania Forest Conservation Group (TFCG) is leading the process to protect this important site (Mosha & Doggart 2002). The key management activities carried out include monitoring through patrol, provision of extension service, alternative sources of forest resources and facilitation of forest management plans and by law development. Implementation and success of these activities depend heavily on the involvement of communities.

With the expansion of CBFM, a question of equity in sharing the benefits from, and costs of community based forest management has been more pressing than ever before. The government through the district largely dominates community decision-making forum. The communities are rarely in a position to voice their arguments for forest management activities that maximize their net benefits from the forest and fulfill livelihood needs. As a result, the situation of the poor and the disadvantaged users is more likely to get worse in the community.

Under this context, a study was carried out to assess the transaction costs and benefits of Community Based Forest Management of four communities at the local level (rich, middle and poor) and then analyze the net benefit of each of these economic groups. Specifically, the study had three objectives:

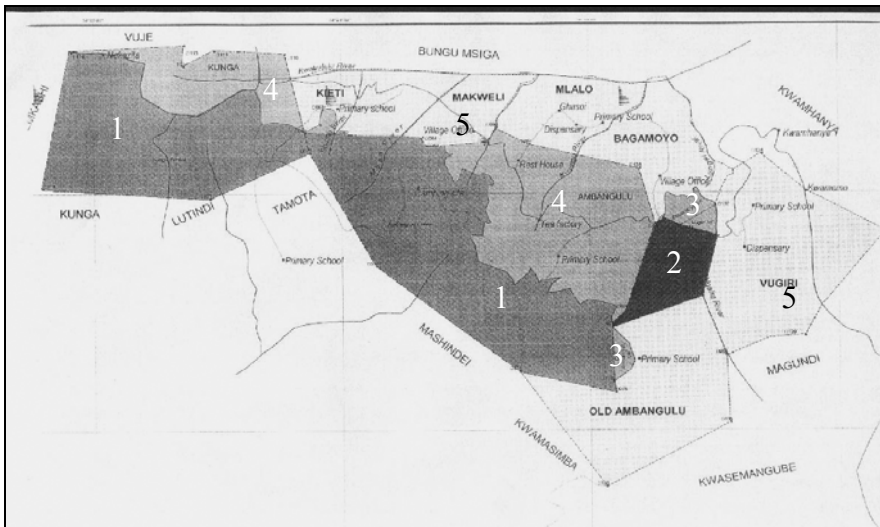
- Identify the items of costs and benefits of community forest management processes to the rich, middle and poor groups of users.
- Quantify such costs and benefits for these sub-groups based on the prevailing economic conditions.
- Assess the comparative flow of benefits and costs for each income group.

The overall aim of the study is to contribute to the understanding of the transaction costs impact of CBFM and make suggestions for more equitable community forest management practices in Tanzania.



**Fig. 1** Map of Tanzania showing: (a) various Eastern Arc Mountains forest; and (b) various areas of forest in the West Usambara Mountains.

**Fig. 2** Map of Ambangulu showing forest under different ownership



1. Ambangulu forest under Private Tea Company
2. Vugiri Forest under central government
3. Declared community forest under village government
4. Ambangulu Tea Estate
5. Sample study villages of Vugiri and Makweli. Other villages of Ngulu and Muheza are not shown.

## Methods

### Study site

The study was conducted in four out of 20 villages, which border Ambangulu forest, which is situated at (5° 09' S 38° 45' E). The forest is located in Vugiri ward in Korogwe District, Tanga Region in north east Tanzania (Fig. 1a, b & 2). The main ethnic groups are the Wasambaa with a population of about 30,000 found in twenty villages. Ambangulu forest is one of the few remaining tracts of natural forest between 800 and 1250m in the West Usambara Mountains of Tanzania (Fig. 1a & b). Ambangulu is home to a number of Eastern Arc endemic species including the frogs *Arthroleptides martiensseni* and *Callulina krefftii* (Mosha & Doggart 2002). Over the last twenty years the forest has been reduced by illegal felling of timber trees, grazing, and collection of fuel wood and building poles (Lovett 1991; Newmark *et al.* 1995). Agriculture and animal husbandry, both of which supported by forestry systems, form the backbone of local economy. Ambangulu forest area is about 20km<sup>2</sup> and is under various ownership regimes that include Ambangulu Tea Estate (16km<sup>2</sup>), government Forest Reserve (2.8km<sup>2</sup>) and communities (1.2km<sup>2</sup>) (see Fig. 1a, b & Fig.2).

### Data collection

Data were collected from four villages of Makweli, Vugiri, Ngulu and Muheza, which are adjacent to the Ambangulu forest (Fig. 2). A non governmental organization called Tanzania Forest Conservation Group (TFCG) has been supporting community forestry process for the past few years. These communities were selected for two reasons: first, a variety of forest management activities are carried out in the forests; and second the three distinct classes of forest users were easily identified. The study was conducted between mid June and early July 2003. Ten percent of the total households were sampled for the study per village and a total of 120 households were studied through administering questionnaire. Participatory wealth ranking was done to identify the three economic groups (Pretty *et al.* 1995). Representatives of all the three groups were involved in assessing costs and benefits using techniques that they could understand. Economic status of rural households could not be measured by a single criterion, participants were asked



to categorize households based on some criteria. The main criteria included amount of land owned, number of livestock owned, and income from business and off-farm agricultural activities (see Table 1). Data was also collected from interviews with village government and through field observations.

Two types of costs incurred by users were identified for analysis. Firstly, were forest management activities that included, protection (monitoring and patrol) forest boundary clearing and planting and fire line clearing. Secondly, transaction cost that covered time spent in meetings, assemblies for planning and management of CBFM, by law formulation, environmental awareness and conflict resolution. To get the total costs for each economic group these two costs were added in each case (Table 2).

The benefit in this study was defined, as all those perceived by the users. All harvested materials or products from the forest were considered as benefits. In this study, the valuation of the products was calculated by listing the products and then determining the monetary value of each item, from consensus among the participating groups. Then to get the gross total value, all the items were added (Table 3). Using costs and benefits thus obtained; net benefit was calculated for each of the above-mentioned stakeholders.

#### Data analysis

The data analysis for this study was done using SPSS where each questionnaire was passed for data entry; they were edited for corrections and consistency. The codebook and a data code sheet were first prepared manually. Arrangement of questionnaires containing data along some criteria was done to avoid confusion and for good management of data during the analysis process. Preparation of a code book (variable code names, variable labels and value labels) in the computer was done. The information from open-ended questions were entered and post-coded during report writing and the relevant information was compiled to respond to the objectives of this study.

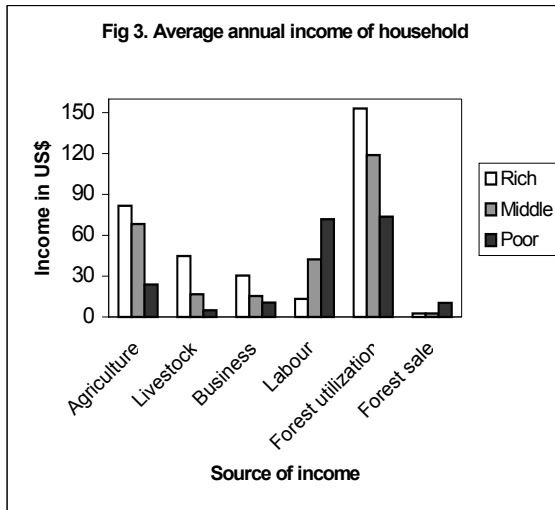
#### Limitations to the study

The most important constraints to the study included; the challenge of recall of past information due to failure of farmers to remember clearly unrecorded information about their past income. To minimize the challenge more time was spent per respondent and only detailed data for the previous one year was collected.

## Results

### *Background of household respondents on gender, education, age and source of income*

Information on household respondents by gender, education level, age and source of income were collected. This information is important in understanding the general background of respondents.



The Ambangulu forest site has a population of more than 30,000. A sample of 120 households was used in the survey. 61.7% of respondents were male and 38.3% female. The average number of people in household in the study area is seven persons per households. This is above the average of rural households in Tanzania (Tanzania Government 2001b).

Education level of respondents was generally low. About 9% of respondents were illiterate, that is they had not gone to school, 41% were below standard seven that is they had attended school but had not completed primary education and around 39% have completed primary education but had not gone on to secondary school. Respondents with secondary education accounted for 11% of the respondents.

Age of respondents was categorized into three groups, which were 18 to 40 years, 41 to 60 years and above 61 years. Results revealed that 42% and 32% of the respondents were between the ages of 18-40 and 41-60 respectively. The rest (25%) were above 61 years.

There were six main sources of household income in the study area: agriculture, livestock, business, labour, forest utilization and sale of forest products. Forest utilization are the forest products collected freely from the forest and consumed at household level. Their monetary value was determined according to household consumption per year. Where as forest sale are the products collected freely from the forests for the purpose of selling them so as to obtain income. Forest utilization was found to be main source of income with average annual income of about US\$ 150, US\$ 118 and US\$ 73 for rich,

middle and poor income groups respectively. Where as daily labour work was also the main income source for poor group with an annual average of US\$ 72 (Fig 3.). Forest utilization included forest products such as fuel wood, thatch grass, building poles and fodder in which their monetary value was determined basing on local market. Poor groups also obtained income from the sale of forest products where they collect forest products such as fuel wood and grass fodder and sale to the people owning small restaurant and livestock. Data on other non wood-products collected free by villagers were difficult to interpret. For example it was difficult to quantify the amount of fruits and vegetable products obtained from the forest, so they were not included in the analysis.

Table 1. Wealth criteria that were used to classify the three income groups in the study area.

Income group	Wealth criteria
Rich	Productive lands (7-10 acres), business (kiosk, brew local liquor, restaurant) modern house roofed with corrugated iron, cash crops, and livestock.
Middle	Productive land (4-6 acres), ½ of the above criteria
Poor	Productive land (1-3 acres), mud house with thatched grass, has one or two goats/sheep, sells forest products, depend on casual labour.

#### *Transaction cost days by different Income groups*

Table 2 indicates the transaction cost days spent in forest management for different categories of users. These data were obtained by asking households to recall their participation of how many days they spent annually either directly or indirectly for transaction costs related tasks. Of the four villages studied, transaction costs of forest management are lower for the poorer households in two villages of Makweli and Vugiri. Transaction costs for rich households were high up to 74 labour days in Vugiri village (table 2). The difference of poor households in participation of forest management activities may be due to the value the poor groups attach to the forest. However the transaction days for poor income groups were high in the villages of Ngulu and Muheza (Table 2). This means that poor households are more active in forest management activities for Ngulu and Muheza villages where the forest is not so close as opposed to Makweli and Vugiri villages. This is partly due to the opportunity cost of labour for the

poor groups (as they have to spend their time on generating cash for daily subsistence needs).

Table: 2 Annual Transaction Cost Days Differentiated by income groups per village.

	Poor	Middle	Rich
Makweli	23	58	47
Vugiri	51	64	74
Ngulu	35	32	27
Muheza	57	36	46

*Transaction Costs related to forest management.*

Table 3 shows the breakdown of transaction costs of forest management on the different forest management activities. Only those households participating in these activities are included in the analysis. There are two types of costs, first costs related in attending various meetings (transaction costs) and second is participation in voluntary forest management activities. So I have taken average farm labour wage rate (pay per day in a study site is equivalent to US\$ 0.7) prevailing in study sites to calculate the transaction costs of forest management incurred by households. The total annual averages for the transaction costs of forest management are higher for the poorer households than that of rich and middle groups (Table. 3). This indicates that poor households participate more in forest management activities compared to their counterparts. Attending meetings such as environmental awareness, discuss forest management plans, by law formulation account for higher transaction costs in all of the three groups (Table 3).

Table 3. Quantification of forest management activities and Transaction costs of forest management for three income classes in US\$ (1 US\$ = Tsh 1000). ! Voluntary forest management activities, \*These meetings include environmental awareness, conflict resolution, forest by law formulation, forest management plans (transaction costs) etc and \*\* Include activities such as planting trees by the road.

Activities	Income groups			Total
	Poor	Middle	Rich	
Protection (watching, monitoring etc.)!	15.4	6.3	16.1	37.8
Forest boundary clearing!	1.4	5.6	0.7	7.7
Tree planting!	2.1	2.1	2.1	6.3
Attending meetings*	30.8	34.3	30.1	95.2
CBFM related development activities**	6.3	4.9	5.6	16.8
Fire line clearing!	3.5	0.7	0	4.2
Total Annual Average Costs	59.5	53.9	54.6	168

### Benefits of forest management

Table 4 highlights the product type and monetary values of the benefits for each income class. The table indicates that none of the income groups benefit from timber harvesting, this may be due to the halt of timber harvesting from the forest. However, all groups obtain benefit from fuel wood. This means that the three groups compete for the same sets of products from the forest. Rich group obtains more benefit from fodder grass than other groups (Table 4). This shows that rich groups have livestock that consume a lot of fodder grass. Benefits from thatch grass was generally low for almost all groups, this indicates that, most groups do not use thatch grass from the forest, alternatively it was observed that they use palm leaves found in their farms.

Table 4. Quantification of Benefits from forest utilization in US\$ (1 US\$ = TSH 1000).

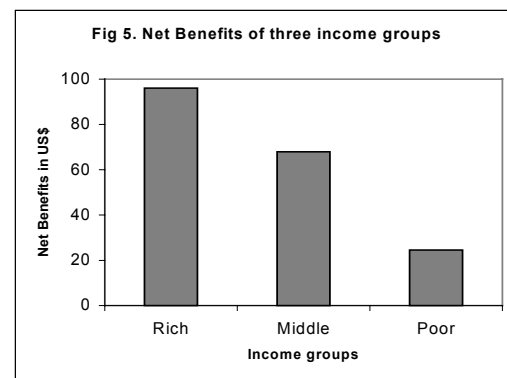
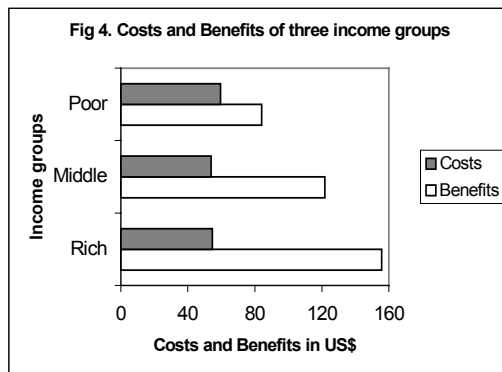
\*Direct benefits from the sale of forest products. Other listed items are consumed freely, where their monetary values were determined.

Items	Income groups		
	Rich	Middle	Poor
Timber	0.0	0.0	0.0
Fuel wood	64.3	65.8	63.3
Fodder grass	86.4	50.5	7.5
Thatch grass	1.6	0.6	1.7
Bush meat	0.8	0.0	0.0
Medicinal herbs	0.0	0.0	0.0
Building poles (beams,withies)	0.0	2.4	1.2
Forest products sale*	2.6	2.6	10.4
Total Annual Average benefits	155.7	121.8	84.0

### Cost and benefit of forest management

The relative balance between costs and benefits varies between income groups. The average cost of poor, middle and rich groups are US\$ 59.5, 53.9 and 54.6 respectively (Fig. 4). The average benefits are US\$ 84, 121.8 and 155.7 for poor, middle and rich respectively (Fig. 4). This means that, poor groups incur higher costs than other groups and benefits were low for the poorer groups and for the middle and rich income groups had high benefits.

Similar trend was observed for the net benefit where the rich obtain high net benefit compared to middle and poorer groups (Fig. 5). The net benefit received by the poor households is less than the other groups. Poor users give emphasis to use low value



products such as fuel wood and selling non-forest products in order to obtain income for livelihood security. The observed highest net benefits of the rich and middle-income groups show that, these households have many livestock, and consequently they consume more forest products. Apart from using fodder for feeding livestock, they also use more fuel wood for preparing local liquor and cooking in the restaurants as they have diversification of income activities. However, the use of timber from the forest has been stopped, until the management plan is developed.

### *The impact of Community Based Forest Management (CBFM)*

Respondents in the study area were asked, according to their ideas, what is the changing trend of the following indicators in the last five years whether it was increasing, constant

or decreasing? Table 5 summarizes the results, for instance 91% of respondents reported that illegal forest activities were decreasing, about 6% reported constant and 3% said it was increasing. Recalling in the past, one of the village government member of Vugiri said,

*“I remember in the past, by now you could hear a lot of noise of saws and axes in the forest reserve felling trees as if nobody owns the forest. You could also meet/see a number of lorries full of timber going down to town. We thank the project in involving communities in reversing the situation”.*

In the other hand, 70.8% of respondents mentioned that vermin was increasing in destroying crops in their farms, 20% mentioned that it was constant and 9.2% said it was decreasing (table 5). One farmer in a study area said,

*“ I like forest conservation but I do not like vermin conservation as I and my families spend most of the time in a year guarding farms and our crops”.* This means that improved conservation creates indirect costs to the households with farms adjacent to protected forests (Songorwa 1999).

Indicators	Increasing %	Constant %	Decreasing %
Crop Production	66.7	10.8	22.5
Illegal forest activities	3.3	5.8	90.8
Forest regeneration/cover	95.0	3.3	1.7
Tree species	90.8	6.7	2.5
Number of water source/spring	89.2	7.5	3.3
Time to collect fuel wood	10.8	20.8	68.3
Trees on private farms	89.2	5.8	5.0
Flooding or land slides	5.0	1.7	93.7
JFM related development	75.8	14.2	10.0
Time to fetch water	11.7	9.2	79.2
Vermin	70.8	20.0	9.2

Table 5. The percentage of respondents showing the impact of Participatory Forest Management in West Usambara Forest (Ambangulu) for the last five years.

### *Food security*

Among the objectives of Community Based Forest Management (CBFM) is to create condition whereby adjacent communities can benefit from forest. However, meeting this objective is a challenge in the success of CBFM in the study area. Respondents in the study area were asked, how long the field crop production can meet their household food

demand. The majority (76.5%) of respondents from poor group mentioned that, food meets their household needs in the period of less than three months (table 6). This means that they have to buy food to meet their needs for the remaining period of the year.

Table 6. The main income class with the period that food meets the household needs

		The period that food meet the household needs					Total
		< 3 months	3 to 6 months	6 to 9 months	9 to 12 months	> than 12 months	
CLASS	Poor	13	5	17	4	1	40
		76.5%	26.3%	37.0%	13.3%	12.5%	33.3%
	Middle	3	9	14	11	5	42
		17.6%	47.4%	30.4%	36.7%	62.5%	35.0%
	Rich	1	5	15	15	2	38
		5.9%	26.3%	32.6%	50.0%	25.0%	31.7%
Total		17	19	46	30	8	120
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%



## **Discussion**

### Household income

This study has revealed that the principal source of cash income for majority of households is agriculture. Other significant economic activities are; livestock, petty business and casual employment (working in the Tea estate). Forest utilization and forest sale are supplementary source of income to agriculture (Fig. 3). This result is similar to what one would expect in much of Tanzania and African countries that free forest products utilization by households are additional source of income in rural areas and fuel wood is the main source of energy (Kaale et al. 2002; Roe et al. 2002). Although, majority of households in a study area practice agriculture, it was observed that 76.5% of the poor groups obtain food, which meet their demand in less than three months (Table 6). This has impact in terms of conservation as they have to find extra income presumably from the forest in order to buy food for the rest period of the year.

### Natural resource management

It is clear that, attending various meetings related to CBFM activities and protection through monitoring take up the bulk of costs as they are very important for conservation of the forest resource. In most income groups monitoring forest and attending community meetings that decide on various implementation activities remain major activities. Among the most evident transaction costs are initiatives and time spent in long discussions at the meetings and village assemblies. For instance the study carried out in Tanzania by Veltheim & Kijazi (2002) in East Usambara forest found that settling conflicts related to forest boundary not only took a bulk of time but also high cost.

It was observed that participation in forest management activities is carried out during the development days (days set aside by village to implement different tasks). Transaction costs days for rich households seem to be quite high and range up to 74 days, which is about 31% (240) of the total household working days. Interest in forest management seems to differ in many ways for various income groups. Poor households see forests as a resource for their livelihood, while for the richer households forests represent not only a source of forest products but also have environmental value.

Variation in transaction cost of different income groups can be explained by the forest conditions. The extent of transaction costs of forest management activities depends on the quality of the forest resource itself. For instance, the Ambangulu forest was threatened by illegal forest activities (timber harvesting), communities spent initially a considerable amount of time patrolling, forest boundary demarcation and clearing. In subsequent days they have spent on attending meetings in order to develop management plans and formulation of village forest by laws. Other related activities as a result of CBFM (not part of CBFM cost) include alternative income generating activities such as farm tree planting, fish keeping, constructing improved stoves and making bricks for house building. These activities aim to reduce pressure on protected forest (Mosha & Doggart 2002) and at the same time these interventions aim to empower primary users of forest in alleviating poverty.

#### The flow of benefits from the forest

The goal of CBFM is “to improve forest conservation and management to ensure equitable sharing of benefits among all stakeholders” (MNRT 1998: p.18). The utilization and management of such forests will be through approved management plans (Article 39 Forest Act 2002). In the study area, it was found that there is a net benefit for all income class (Fig 3) and communities appreciated that the forest is improving (Table 2) as a result of CBFM. In Tanzania, East Usambara forest, Veltheim & Kijazi (2002) point out that it is unrealistic to assume that villagers would take the burden of all forest management activities without any tangible benefits. This indicates that communities will only manage forest if it is in their interests to do so. Generally, this means that they must recoup their costs and be able to protect those values they consider important. In Nepal, Springate-Baginski et al. (2001) observed that conservation closure and regulated products extraction have led to reversal of degradation. Yet the focus on protection rather than production means a significant loss of potential income for Forest User Groups (Brown et al. 2002).

It is likely, that the forest benefit is underestimated, as the study did not consider the service that forests provide to the local, national and international level. These intangible benefits include water catchment, biodiversity value, carbon sink, etc. In other

words, the forests that contain high biodiversity value are worth more for the global than the local values they supply (Godoy et al. 2000; Myers et al. 2000). For instance Eastern Arc Mountains (Fig. 1a & b) are very important internationally hence tangible benefit for communities should be taken with great conscious in the process of CBFM. In the other hand, the transaction costs of scaring vermin from the farms were not included due to lack of data. However, it is worth to mention that as the forest cover improves, it also creates conducive environment for the biodiversity increase. This indirectly, creates costs to the households with farms next to forests such as crop damage (Songorwa 1999).

#### Implication for Policy and Implementation support

This study has observed that from the current practices of forest management, lower income class bears the high cost of forest management when all opportunity costs are accounted for in the assessment of costs and benefits. Any expectation that CBFM would prove a cheap way of obtaining benefits has not been realized. CBFM is a knowledge-intensive process and as communities demand for tangible benefits, the more work is required to study the impact of exploitation to the whole ecological system. Under the current forest laws in Tanzania, communities have none of the financial incentives from the forest products revenue collected (Lovett 2003). The existing example of revenue sharing is between the Wildlife Division and local communities and is hinged on revenue accrued from tourist hunting. The 25% of revenue from this industry is channeled through the districts council for funding development in villages where hunting takes place and this does not necessarily reach the targeted group (Junge 2002). Another example is a Joint Forest Management between Forest and Beekeeping Division and the six communities adjacent to New Dabaga/Ulongambi national forest reserve in Iringa where it has been agreed that 100% of benefits from the forest is retained in the communities. Veltheim & Kijazi (2002) suggest that, since the Eastern Arc forests are important for biodiversity conservation, government should continue paying for the intensive labour activities such as border maintenance by casually employing community members especially the poor groups to do the clearing. This would be considered as tangible benefit from CBFM.

To date, most of CBFM projects have had heavy external support (Veltheim & Kijazi 2002; Woodcock 2002; Lovett 2003). This raises the issue of the global trend towards reduced government involvement in forestry at the very time when communities require additional support to enable them to effect the CBFM process. Since Eastern Arc Mountains have global value interest, it is very important that conservation costs are shared among the stakeholders. The international community could play a role in providing support to the process of CBFM by funding some of the alternative strategies (Gunatilake 1998) for instance Conservation Development Project (ICDP) and promoting ecotourism.

## **Conclusion**

In conclusion, the study has revealed that forest utilization and forest sale are the main supplementary source of income to agriculture. Although majority practice agriculture, the food produced is insufficient to cover the whole period of the year, hence benefits obtained from the forest remains primary source of household livelihood security. It is clear that attending meetings related to CBFM and forest monitoring take a bulk of costs, as they are important in effective forest management. In average the poorer households incur the high costs of forest management and obtained lowest net benefit as opposed to the rich and medium class. From the current practice of forest management CBFM may reduce the transaction costs incurred by government however these costs are passed to the lower income class of the community.

## **Implication for Future Research**

Future research should focus on the distribution of most expensive forest product, timber and try to resolve the conflicts that could be brought by the timber benefits. Since this study observed that none of the groups obtained benefits from timber as timber harvesting has been currently stopped. This study was conducted at only one site of forest in the Eastern Arc Mountains and during a limited time of period. As such results are constrained by a sample from one site, this may not reflect the variability in other

Tanzanian forests where similar programs are being undertaken. It is important similar studies are replicated in other sites as well.

### **Acknowledgement**

The preparation of this paper, submitted for a Master of Research in Ecology and Environmental Management, University of York, UK was financed by CARE-Norway through the Misitu Yetu Project, a partnership project between Tanzania Forest Conservation Group (TFCG), CARE –Tanzania and Wildlife Conservation of Tanzania (WCST). I am grateful to my placement supervisor Ms. Nike Doggart, TFCG coordinator for her advice in helping to complete this paper. Thanks also to the village government and the villagers of Makweli, Vugiri, Ngulu and Muheza who were interviewed. Special gratitude goes to Mr. Simon Mosha TFCG Field Officer who sacrificed his time to accompany me during the field data collection. Finally, I wish to express my gratitude to both TFCG staff in West Usambara project and Headquarters for their cooperation during the whole period of this study.

**Word count, 4987**

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