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**Poverty and Deforestation
around the Gazetted Forests
of the Coastal Belt of Tanzania**

Godius Kahyarara
Wilfred Mbowe
Omari Kimweri

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Research Report No: 02.3

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DEDICATION

This work is dedicated to Omari Kimweri who died on 17th November 1999 following a tragic car accident soon after completing his Masters Degree in Economics at the University of Zimbabwe. He was one of the authors of this study and he made a substantial contribution in supervising the field work, data entry, and report writing. May God rest his soul in Eternal Peace. AMEN.

ABBREVIATIONS

CEDR	Centre for Environmental Economics and Development Research
DANIDA	Danish Development Agency
DoE	Department of Economics
ERB	Economic Research Bureau
ESRF	Economic and Social Research Foundation
GDP	Gross Domestic Product
IDS	Institute of Development Studies
IRA	Institute of Resource Assessment
NEMC	National Environment Management Council
REPOA	Research on Poverty Alleviation
SPSS	Statistical Programme for Social Scientists
URT	United Republic of Tanzania

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Abstract

This study examines the relationship between poverty¹ and deforestation² around the gazetted forests³ of Kazimzumbwi, Pugu, Mabwe Pande, Kongowe and Pongwe in Dar es Salaam and Coast regions. It examines pressure exerted on the reserved forests by the nearby population and economic forces in the surrounding towns.

The research findings show that, there is a profound and vicious-cycle between poverty and deforestation in the studied areas. Low-income people dominate the studied areas, where there is low investment in human capital (the majority of the people did not complete even the primary school education). As a result, there is low productivity in economic activities. Agriculture, for example is done using poor methods such as slashing, burning, and shifting cultivation. Many people in the surveyed areas have limited alternative, hence tend to rely on easily accessible forest resources to earn a living. Incomes from forest related activities seem to be stable and double the household income. Such a situation accelerates deforestation, which subsequently reduces resources available to the society.

Further, findings show that although legally reserved, the forests have been exposed to continuous pressure for competing economic uses. As access to the reserved forests, management of the forests becomes extremely important. Despite the fact that the majority of the people have some knowledge about the effects of deforestation, the knowledge seems to be insufficient, and is uncoordinated and effected. It is observed in the report, that off-farm activities in the studied areas have been rising. Returns from these activities do complemente those from farm activities.

Notes

- 1 It is defined as the state in which a person or community has very little money or resources to cater for their basic needs, high illiteracy level, high mortality rate and limited ability to fight against the vices.
- 2 Defined in this study as an act of cutting down or burning trees and/or other vegetative cover (with little or no replacement) in an area.
- 3 “Forest” is defined as in Hawthorne (1993) to mean closed woody vegetation, over 8 metres tall. In this case a “Reserved (gazetted) forest” is an area of forest where the plants and animals are protected by Tanzanian laws.

1.0 INTRODUCTION

1.1 BACKGROUND

The Tanzania coastal forests support species rich in biological communities, yet they are extremely vulnerable to exploitation by man and land use pressure (Ndangalasi, et al, 1995). These forests include the Pugu Forest Reserve, which is one of the unique forests in Tanzania with rare species of flora and fauna. Other forests are Kazimzumbwi (4,862 hectares), Masanganya (2,899 hectares), Bana Kola (14,022 hectares), Pongwe Msungula and the Kongowe forests. According to Anon (1995), relatively impoverished rural communities surround the coastal forests with a high and growing demand for, and dependence on, forest products. Of great concern is, however, the fact that unplanned forest utilisation by the local populace threatens the existence of these forests (Howell, 1981; Stuart, 1990; Shell, 1992 in Matilya 1995). Much of the original forests has been cleared for wood fuel, building poles, subsistence agriculture and other economic ends. This has occurred despite the fact that these forests are legally reserved.

According to Anon (1995), there is a relationship between poverty and deforestation of the coastal forests. However, the kind of existing poverty-deforestation relationship is poorly understood. Understanding the nature and extent of the relationship between these two concepts on the selected forests is crucial for policy makers and implementors, especially currently when Tanzania and the world at large are determined to eliminate poverty and ensure environmental conservation.

This study examines the link between poverty and deforestation around the gazetted forests of Kazimzumbwi, Pugu, Mabwe Pande, Kongowe and Pongwe in Dar es Salaam and Coast Regions. It examines the pressure exerted on the reserved forests by the neighbouring population and economic agents in the surrounding towns. The study draws the experience and observation from nine villages of Kola Kisanga, Kongowe, Goba, Mabwe Pande, Mlingotini Mwendapole, Pongwe Msungula, Msumi, Mbezi and Kwembe.

The report is organised as follows: Part One offers study objectives, hypotheses and research questions. Part Two presents the methodology of the study. Part Three gives a description and assessment of the profile, poverty levels and environment of the areas under study. Discussion, evidence and research emerging issues are presented on Part Four, while Part Five concludes and presents policy recommendations.

1.2 STUDY OBJECTIVES, HYPOTHESES AND RESEARCH QUESTIONS

The primary objective of this study is to understand how social-economic conditions, forest product procurement and consumption behaviour of the people

around the gazetted forests of the coastal belt of Tanzania are linked to increased encroachment into these forests. The study assesses and reviews the relationship between deforestation and poverty level in the studied villages.

In undertaking this study the following questions are addressed: Do price, population size and income levels influence deforestation? Are there alternative products that have less impact on the environment? What factors make people prefer to use forest products? Will the poor be ready to consume alternative products that have less impact on the environment? And does deforestation have any effect on the quality of life of the people in the degraded areas?

The study hypothesised that the low-income¹ (poor) people rely heavily on forest products to earn a living and as such poverty causes deforestation. The second hypothesis is that depletion of forests will exacerbate poverty as the majority of the people depend heavily on these resources for income generation and other domestic uses. The third hypothesis is that there is a negative relationship between price and the quantity of forest products demanded by poor people; and an inverse relationship exists between income and quantity of forest products poor people use.

2.0 METHODOLOGY

2.1 OVERVIEW

This study assumes that factors influencing deforestation have a long-term impact on poverty level. And these may later accelerate deforestation due to exhaustion of natural resources relied upon by most poor people. Here it is envisaged that depletion of forests starts with tree felling for various reasons. These include clearing land for agriculture and felling of trees for timber, charcoal and firewood. It also assumes that poverty is the cause of deforestation.

2.2 APPROACH AND STRATEGIES FOR DATA COLLECTION

A number of questions were raised to guide the collection, verification and analysis of information and data to attain the research objectives and test the study's underlying hypotheses. To attain the study objectives, individuals in areas bordering or adjacent to the studied gazetted forests were selected for information gathering. A structured questionnaire, covering issues relevant to the study, was prepared and administered on randomly selected individuals. Focus group meetings and conversation with knowledgeable and experienced people such as ward and village leaders, and elderly people in the surveyed areas were taken to supplement formal interviews. In addition, the study made use of existing secondary information and literature on the area of study mainly from the surveyed village offices, Coast Regional Commissioner's Office, the Bureau of Statistics, the Institute of Development Studies (IDS) - University of Dar es Salaam,

the National Environmental Management Council (NEMC) and the Ministry of Natural Resources and Tourism (MNRT).

2.3 SAMPLING AND CHOICE OF STUDY AREA

The research covered nine villages, Table 1, near/around Kazimzumbwi, Msanganya, Bana Kola, Pongwe Msungula and Kongowe forests in Dar es Salaam and Coast regions. The villages were chosen because of their proximity to the selected forests. From each of the nine villages, a representative sample of 35 households was randomly selected in each of the nine villages for interview. However, in some villages it was difficult to interview all households selected because of the rural settings characterised by, among other things, poor communication difficulties. The field survey constituted 268 respondents, 207 and 61 for men and women respectively whose distribution is shown in Table 1.

Table 1: The List of Respondents and Location

Location	F	M	Grand Total	Total (per cent)
Goba	6	29	35	16.0
Kazimzumbwi	6	24	30	6.8
Kola Kisanga	3	32	35	16.0
Kongowe	14	21	35	16.0
Kwembe	4	14	18	2.7
Mabwe Pande		23	23	10.5
Mbezi – Luis	5	15	20	9.1
Mlingotini/Bagamoyo	4	10	14	2.7
Msumi – A	2	11	13	4.6
Mwendapole	11	14	25	11.4
Pongwe Msungula	6	15	9	4.1
Grand Total	61	207	268	100.0

Note: F= Female, M= Male

Source: *Field data, 1999*

2.4 METHOD OF DATA ANALYSIS

Quantitative and qualitative data were collected and analysed. Descriptive statistics were used to analyse the data (that is, frequencies, means and standard deviations). The Statistical Programme for Social Scientists (SPSS) was used in data processing.

3.0 PROFILE OF THE STUDY AREA

3.1 COASTAL FORESTS OF TANZANIA

The coastal forests of Tanzania are located at an altitude of less than 600m above sea level (Evers, 1994) covering an area estimated to be between 350 – 800 square kilometres (Burgess and Muir, 1994). These forests, including those under study, support many endemic genera and species of plants and animals (Hawthorne, 1993). The conservation of the coastal forests has become a highly

prioritised area in the development of Tanzania. However, such prioritisation has not been fully operationalised partly because of differences in the perception of forest values by diversified interest groups comprising local farmers living adjacent to the forests, the local governments and the central government. Each interest group values the forests differently with, at certain times, conflicting views (Mgeni and Lulandala, 1995).

As confirmed by this study, Anon (1995) argues that relatively impoverished rural communities with a high and growing demand for, and dependence on, forest products live around these forests. The forests are individually distinctive, with a high level of local forest endemism, a great array of different communities and very little protection by government agencies (Anon, *ibid.*).

3.2 REFLECTIONS FROM THE SURVEYED VILLAGES

The research found limited value added in the activities in areas around the forests². In most cases the forest products are sold as raw or semi-finished products (Plate 1). There are small-scale firms engaged in wood related activities such as furniture making, preparation and sale of building materials made from wood and timber extraction. These firms are located in Msanga, Kisarawe, Kondo Bay, Mtambazi, Picha ya Ndege, Kongowe, Mlandizi, etc.

Plate 1: Remains of Tree Trunks after the Cutting-down of Building Materials from the Forest.



Interviews and observations in the field indicate that some forest products are processed at the input sources, as it is cheaper to do so. Flow chart of forest products from these forests to Dar es Salaam is shown on Chart 1 in this report.

Unemployment in the Coast and Dar es Salaam regions is increasing, and is exacerbated by the government's withdrawal from doing businesses leaving the infant private sector as the main employer. In fact, a decline in formal employment has given way to informal activities with far-reaching environmental effects.

The research results and observations made during the fieldwork reveal that the villages under study are occupied by a number of people identified along different income levels. The high-income class group represents people who, in most cases, are not involved in the day-to-day activities in the areas. These are people mainly working in Dar es Salaam who, due to their relatively better financial positions, can afford to build houses or rent residential houses (at cheaper rates than in the city centre) in these areas. Most medium income class people are also employed or doing business in Dar es Salaam. Farmers and petty traders constitute the low-income class category some of whom are active in forest-related activities. The research noted that such people live close to the forests and in some cases they do have houses inside the forests (Plate 2).

Plate 2: A House within a Forest.



It was noted that the villages have limited access to social services like education, health, water and alternative energy sources such as hydropower, kerosene. Increased exploitation of the forests is partly exacerbated by declining productivity in agriculture, increased demand for forest products, relatively high income from forest related business, and the low cost involved in obtaining and processing the forest products.

The interviews revealed that over 72.8 per cent of the respondents had not attended formal education. Further results indicate that only 19.4 per cent of the respondents had primary school education, Table 2, only 7.8 per cent of the interviewees had secondary education and none had attained college, vocational or university education. The results are consistent with the Coast Region Socio-Economic Profile Report for 1997 that highlights low level of schooling in the areas. The low literacy level leads to poor productivity and economic backwardness.

Table 2: Education Level of the Respondents

Level of Education	Frequency	Per centage
None	195	72.8
Primary	52	19.4
Secondary	21	7.8
College/Vocational	0	0
University	0	0
Total	268	100

Source: *Field survey data (1999)*

4.0 FURTHER FIELD EVIDENCE AND EMERGING ISSUES

4.1 THE STATE OF POVERTY AND DEFORESTATION IN THE SURVEYED VILLAGES

Deforestation in the coastal belt has reached a critical point. About half of the Kazimzumbwi forest has been degraded over the past few decades and over 20,000 hectares of the Pongwe forest have been lost through unmanaged activities such as charcoal making. The black East African wood in Pugu forest is also under threat due to over harvesting contributed to by easy access to the forest. Connected to the factors is the proximity of these forests to the urban areas of Dar es Salaam and Kibaha.

Dar es Salaam region, the most populated urban centre in Tanzania, has a big number of poor people who are mostly the main users of the forest products as their main source of energy. Most of these low-income people are employed in the informal sector.

Despite the fact that the coastal belt forests are not the single suppliers of forest products to Dar es Salaam region, there is clear and indisputable evidence that large quantities of products from these forests end up in the region. For example, the Coast Region's Socio-Economic Profile Report for 1997, singled out Dar es Salaam Region as the major destination of over 80 per cent of all charcoal and firewood harvested in the studied forests. Lorries full of firewood, building poles and charcoal sacks heading to Dar es Salaam could easily be seen during the conduct of the study.

4.2 FORESTS, USES AND CAUSES OF DEFORESTATION

4.2.1 Uses of Forests

The research results reveals that all the six forests covered in the study are subjected to two major forms of utilisation: first, by local communities largely for subsistence purposes; and secondly, by outsiders mainly for commercial purposes. For a long time the two groups have been undertaking legal and illegal economic activities in these forests.

The local communities are specifically engaged in charcoal burning, felling trees for timber extraction, making beehives, clearing forests for farm land and constructing houses around or in the forests. The outsiders are mainly involved in timber extraction, charcoal making business, trading in building poles and firewood.

4.2.2 Accessibility to the Forests and Forest Products

a) Access to Forests

Easy access to the forests enables forest product traders and farmers to unlawfully cut down trees (Box 1). This was one of the major assumptions of this study. The field findings support the hypothesis. Some forest wardens claimed, for example, that despite their efforts to protect the forests it has been difficult to meet this obligation. Easy access to the forests is partly attributed to a weak regulatory framework and absence of well defined forest boundaries. Moreover, lack of funds and physical facilities complicate the problem. Kulindwa and Shechambo (1995) argue that the expenditure cut advocated under the economic reforms resulted into smaller share of expenditure being allocated for conservation purposes and thus persistency in environmental problems.

Box 1: Forest Accessibility: Mr. Sultan Kilimba's Experience

Mr. Sultan Kilimba is 64 years old resident of Mbezi village. He was born in this area and has long experience on the Mabwe Pande forest. During the colonial era, it was impossible to access this forest, as one would face imprisonment, says Mr. Kilimba. He insists that it was frightening even to pass near the Mabwe Pande Forest because the forest wardens have confused a passer by for a poacher. He remembers that imprisonment was one of the major factors that prevented people from encroaching the forest. Mr. Kilimba says that things started changing after independence and particularly in the late 1960s. The strictness was relaxed. People slowly moved close to the forest mainly for hunting and looking for hardwood for carving. By the 1970s and 1980s, access to the forest was very pronounced and was intensified during the late 1980s to date. The major driving force for the intensification is:

- Migration of people from other ethnic groups from other parts of the country who come and establish permanent settlement in the areas. These include the Wangindo and Wamakonde who are expert hunters and carvers.
- Increased demand for farmland in the vicinity. With the growing population, villagers keep moving near or inside the forest in search for farms and trees for charcoal making, building poles and other non-timber forest products.

■ The forest entry and exit points are not well defined and controlled. In the past, there were forest wardens in well-defined entry and exit points, but it is no longer the case nowadays. There is a weak protection mechanism and in some cases the wardens are responsible for assisting intruders to illegally access the forests.

■ There is a large group of charcoal makers who moved from Bagamoyo areas and other parts of Dar es Salaam into the area.

On the link between poverty and increased encroachment into the forest, Mr Kilimba confirms that there is a direct relationship between the two phenomena. Most people living around the forest are of low-income. They have limited economic activities and agricultural production is limited to small-scale production of cassava, rice and coconuts which are mainly for subsistence. In this case, he proposes that both poverty eradication and deforestation measures need to be effected and should be comprehensive and inclusive.

Source: *Field Survey, 1999*

b) Access to Forest Products and Deforestation

An investigation of the extent to which forest products are exposed to the people reveals that about 62 per cent of respondents confirm that forest products are easily accessible. Furthermore, about 60 per cent of the respondents reveal that prices of harvested forest products do not have a significant influence on the quantity of such products; forest products could be harvested without paying any royalties. This can partly be explained by the fact that out of 2.5 million hectares of forest cover in Coast region, only 349,523 hectares equivalent to 14.7 per cent, are reserved. The remaining 2.13 million hectares or 85.3 per cent of the forests in Coast region do not fall under such restriction.

Table 3, shows that uncontrolled access to the forests is also evident through the probe for modes of obtaining farmland. Four options were asked namely, acquisition through buying, inheriting, clearing or others. It is revealed that acquisition of farmland through forest clearance is the major mode of acquiring farms in the surveyed areas. This poses a major threat to the forests' existence, and also reflects a lack of mechanism for the protection of the forests.

Table 3: Mode of Land Acquisition for Farming

Mode	Frequency	Per centage
Bought	63	32
Inherited	41	21
Cleared Forest	75	38
Others	16	9

Source: *Field survey (1999)*

4.2.3 Farming Practices and Forests

Poor farming techniques constitute another reason for increased deforestation. Extension officers and some respondents mentioned shifting cultivation as one of the factors. More than one-third of the respondents (34.6 per cent) confirmed that they have cleared forests for the purposes of acquiring land for farming. Further investigation during the field survey revealed that it takes about 3-5 years of farming on a piece of land before it is discarded for another virgin piece of land mainly due to exhaustion of important minerals (e.g. phosphorous and nitrogen) in the soil. Other factors include little application of modern farming techniques and the practice of planting crops that demand same type of minerals on the same plot of land (inter-cropping).

About 90 per cent of respondents indicated that farm plots are of small size (not exceeding five hectares), and inter-cropping is usual. All respondents confirm that they use simple farming tools such as hand-hoes, axes, *pangas* and the like.

4.2.3.1 Magnitude of Shifting Cultivation

Table 4 provides evidence of shifting cultivation practices among respondents in the surveyed villages.

Table 4: Origin of the Respondents

Origin	Per centage
Born there	40.2
From town	7.1
From another village	16.5
From another region	35.3
Others	0.8

Source: *Fieldwork data (1999)*

The results in Table 4 indicate that about 60 per cent of the respondents were not born in the areas they were found during the field interviews having moved from areas close to or even far from their current villages. The researchers were interested to know the reason for shifting (for those who were not born in the area). About 50 per cent (47%) moved into the areas in search for forest products and farmland. It was also not surprising to note that about 20.5 per cent of the respondents moved to the new areas after a decline in productivity in agriculture in their former areas.

4.2.4 Population, Poverty and Environmental Degradation

According to Leach (1987), most African societies with high income households tend to have large household size because they usually attract distant relatives or employ servants thus consuming more wood fuel. Smaller households are often characterised by young couples, bachelors and elderly people who tend to generate small incomes and consuming less wood fuel. This situation abounds in Dar es Salaam where demand for forest products is very high.

The survey results also confirmed that there has been a tremendous rise in population size in the surveyed villages within the last two decades. Table 5 summarises responses on family size trend.

Table 5: The Trend of Family Size in the Surveyed Areas

Number of children			Number of dependants		
Number	1980 (%)	1999 (%)	Number	1980 (%)	1999 (%)
5+	9.5	25.0	5+	4.3	5.0
4 or 3	18.3	33.0	4 or 3	7.5	13.7
2 or 1	28.0	24.0	2 or 1	21.3	37.0
0	43.2	16.4	0	66.9	44.3

Source: *Field survey data (1999)*

The results shown in Table 5 indicate that in 1980 only 9.5 per cent of these respondents had more than five children and 43.2 per cent had no children at all. However, in 1999 the number of those with more than five children had more than doubled to 25 per cent, while those who had no children were only 16.4 per cent. These results suggest that the fertility rate in the studied areas is high. The trend of dependants has also been on the increase thus contributing to increased population size. During focus group meetings, it was discovered that most dependants are mainly grand children whose parents migrate to the nearby Dar es Salaam region, or are left to stay with their grandparents when the parents opt for polygamy.

The increase in the size of families is an important catalyst for forest depletion and, may be an indication of poverty. It is well documented that demand for forest products is determined by such factors as total population, household size, cooking methods, prices and availability of alternative fuels, and household income.

4.3 THE IMPACT OF DEFORESTATION ON INDIVIDUAL WELL BEING

4.3.1 Forest Depletion Effects

This study hypothesised that most people living around the study areas depend heavily on the forests for income generation and other household uses. In this case the effects of wood fuel shortage on the socio-economic well being of the people are numerous. Opiro (1997) for example, reveals that people may need

more time to search for wood fuel resulting in the reduction of labour time available for other household activities. In places where wood fuel (including charcoal) is sold, an increase in price of the product, due to its shortage, may force some families to spend extra money in obtaining it. In Dar es Salaam, for instance, the price of charcoal has increased from an average of Tshs 2,500 per sack in 1998 to about Tshs 4,000 per sack in 2001.

Field results show that about one-third of all respondents have been dealing with activities that involve use of forest products. About one-half (47 per cent) have been doing the same activity within the last ten years and the remaining have been doing so within the last five years.

Table 6: Usage of Wood Fuel

Wood fuel	Frequency	Per centage
Charcoal alone	47	17
Charcoal and others	53	20
Firewood alone	30	11
Firewood and others	60	22
Kerosene alone	20	7
Kerosene and others	38	14
Some electricity	20	22

Source: *Field survey (1999)*

Furthermore, as indicated in Table 6, the majority of people depend on forest products as energy source. The results reflect the national energy trend where wood fuel provides over 98 per cent of energy in rural areas. Such heavy reliance on the forests as a source of energy and other products can, if carelessly done, have a devastating effect on the people of the surveyed villages.

4.3.2 *Income Generation*

4.3.2.1 *Existing Economic Activities*

The field survey attempted to trace the type of economic activities that are common among the surveyed areas. The investigation involved the occupational categories before and after shifting into the present locality. The results are shown in Table 7.

The results indicate that the majority (73.7 per cent) of the respondents were farmers before moving to the surveyed villages. Another dominant activity is trade. During the focus group meetings it was revealed that in all villages there were petty traders of agricultural and forest products. An inquiry into their current occupation revealed that the majority (63.7 per cent of the responses) still identify themselves as farmers. The trading activity has more than doubled to about 31.4 per cent.

Table 7: The Occupation of Respondents before Coming into the Area and Current Activities

Activity before Shifting	Per centage	Activity Engaged Now	Per centage
Farming	73.7	Farming	63.7
Fishing	0	Fishing	0
Hunting	0	Trading	31.4
Trade	14.7	Service	3.6
Construction	4.7	Others	1.4
Civil Servant	3.1		
Local Govt Staff	2.3		
Others	1.6		

Source: *Fieldwork data (1999)*

4.3.3 The Linkage between Off - Farm and Farm Activities

Off-farm activities are becoming important in poverty alleviation in the surveyed areas, and are generally associated with absolute poverty. Although assessing economic contribution of forest activities in the surveyed areas was not central to this study, an assessment of income generated from various sub-sectors (especially from agriculture and forest related off-farm activities) is done in the subsequent sections. Off-farm activities sourced from the forests include procurement of timber, building poles and charcoal making. Other activities are those that use forest products as raw materials like furniture making, building industry and food preparation.

During the field survey it was clearly revealed that an increase in off-farm activities was not meant to displace farm activities but rather to complement them. Farm and off-farm activities are linked by income generated from the activities. The income is used to cater for daily expenditure for example on food, shelter, education expenses for children and health services. Part of the income is ploughed back in support of agriculture or off-farm activities or both. In this case, supporting development of these activities is vital in poverty reduction initiatives.

4.3.3.1 Income from Economic Activities

An attempt was made to study the average income received from various economic activities through capturing the average sales per day. In the case of farmers it was revealed that they could sell their agricultural outputs in a maximum of three months in one year, using the rest of the months to procure the products. Charcoal makers indicated that it takes time in procuring and processing forest products such that they can sell charcoal for about 6 months in a year. The summary of the sales per day is given in Table 8.

Table 8: The Average Sales per Day for the Forest Related Products

Amount (TShs)	Per centage
300-1,000	31.4
1,150-5,000	41.6
6,000-10,000	21.2
10,000+	5.8
Total	100

Source: *Fieldwork data (1999)*

Table 8 shows that the minimum sale per day is TShs 300. Taking this as the minimum for the 31.4 per cent of the population, and assuming that it is for farmers who estimate three months as the average trading time, the average sales will average TShs 27,000 in one year. A maximum of TShs 1,000 per day would give TShs 90,000 for one year and an average sale of TShs 600 per day would give an average annual sale of TShs 54,000. If the people with the same sales per day are engaged in forest related activity the estimated income would double. Similar income levels can be computed for the people with sales per day of between TShs 1,150 and TShs 5,000, TShs 6,000 and TShs 10,000, and above TShs 10,000. The conclusion from these results is that income generated from forest-related activities is higher and may be twice the income generated through agricultural activities.

4.3.4 Trend and Use of Generated Income

The income generated from forest related activities is used to provide for various needs, which vary among individuals but mainly include food, clothing and shelter. Other needs include payment for health services, education, and to some people, water services. Following Tanzania's severe economic crisis during the second half of 1970s and part of 1980s, and subsequent introduction of comprehensive economic reforms in 1990s, people were obliged to pay for social services (e.g. health and education) and meet the full cost of the then subsidised commodities like farm inputs and other basic commodities including sugar, water and electric power.

The effects of cost sharing were to spread peoples' meagre income over a myriad needs. This payment for services which were previously free implied looking for alternative sources of income (after the failure of agriculture) to meet the basic needs and other developmental ends (see Box 2). Such activities are not limited to off-farm activities (some of which are forest related) alone, but include such activities like food hawking (*mama lische*), petty business, furniture making as seen in Mlandizi, Kongowe, Kisarawe and Dar es Salaam.

Plate 3: Grass and Shrubs Left from the Over-exploitation of Kazimzumbwi Forest.



Checking on the effect of continued harvesting of forests showed that, three out of four (75 per cent) respondents who deal with activities involving forest products claimed that the supply of forest products as a source of raw material for making furniture and building materials has been declining. Two major reasons are given for the decline. The first one is increased government's efforts to curb or reduce illegal harvesting of the forests. The second reason is that the forests are over-harvested and require more resources including time to obtain the same type and quantity of forest products (Plate 3).

The study sought to capture the effects of prices and other reasons on the observed trend. Respondents were directed to indicate whether prices of the forest products (charcoal, building poles, etc.) have been increasing, are constant, decreasing or don't know (as shown in Figure 1).

The results showed that the view of majority of the respondents was that supply of the forest products has been declining which indicates a tragic end in the future. The price of the products serves to confirm the trend of supply of the forest products. The researchers asked respondents on the observed trend of prices of various forest products and got a confirmation that there has been an increased price of almost all the forest products at the exit point partly attributed to increased transportation costs to Dar es Salaam, and the general decline in the availability of trees.

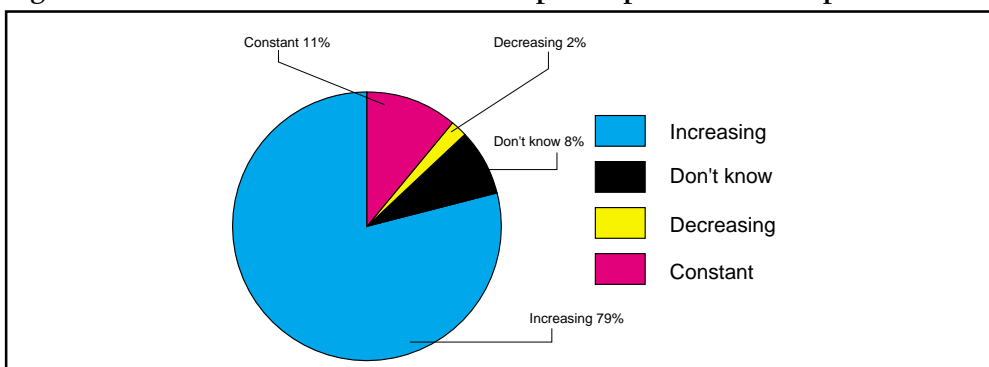
Box 2: Cost sharing: An Incentive to Deforestation?

Mr. Abubakar Mwalimu (42) lives adjacent to the Kisarawe Forest and is a former local government leader. He agrees that there is a link between deforestation and poverty. He is of the opinion that forest related activities earn more income compared to other economic activities like agriculture in Kisarawe. In this case, poverty-reducing initiatives need to seek out the manner in which poverty can be reduced by exploiting the forests sustainably. It is common for the villagers surrounding the Pugu and Kazimzumbwi forests to use forest products for building purposes, charcoal and woodfuel, and in other instances for selling to earn a living, he hinted. The forests play a considerable role in the peoples' well being.

The government's move to redefine and extend the Kazimzumbwi forest boundary, for example, denies the villagers such forest products and more so farmland for agriculture. This may bring about conflict of interests between the forest managers and the villagers tempting the latter to illegally exploit the forests. Joint management of the forests, which takes into consideration interests of both parties, is important, noted Mr. Mwalimu. According to Mwalimu, despite the fact that the income level for an average person has not improved significantly, socio-economic changes taking place in the Tanzanian economy require people to share costs in many aspects of social services (e.g., education, health, water, etc.). This makes it impractical to bar these people from accessing the forests as an alternative means of income earning since agriculture is characterised by low and inadequate productivity. As there are good reasons for the people to access the forests, he proposes that modalities need to be worked out to ensure sustainable use of the existing resources, that is land use for farming; forests exploitation to provide products like timber, wood for building, wood fuel and the need to maintain the ecosystem.

Source: *Field Survey, 1999*

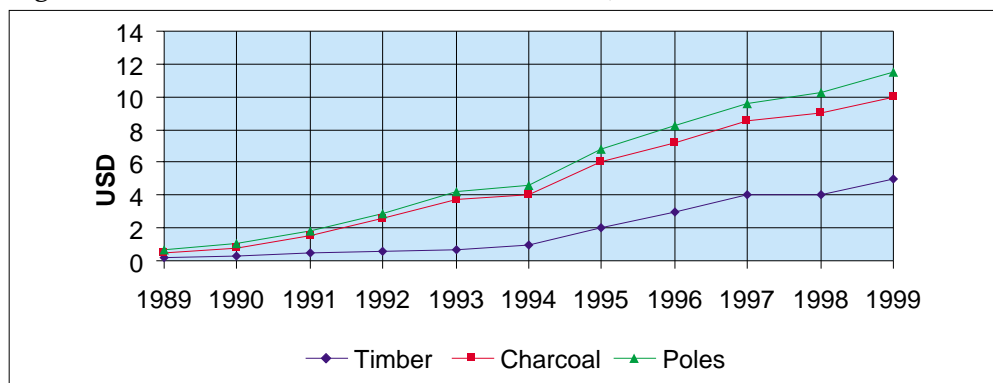
Figure 1: Price of Forest Productions as per Repondents Perception



4.3.4.1 Evidence of Price Increase from Other Studies

Most recent studies, such as, the CEDR, 2000, indicate that the structural impact of trade liberalisation measures on the forestry sector includes an increase in the price of timber by 40 per cent to 60 per cent (depending on the size and type of timber). Similarly charcoal price has increased from \$ 3 to \$5 per sack between the early and late 1990s. The price of a bundle of firewood has increased from \$ 0.5 to \$ 1.5. The price trend according to the UNEP study is depicted in Figure 2 below.

Figure 2: Trend of Domestic Prices of Timber, Poles and Charcoal



Source: CEDR, (2000)

4.3.5 Deforestation: Impact on Water and Rain Availability

In assessing the effects of deforestation on the supply of water, a complex interplay of forces emerges. In the first place the majority of respondents get their water either from water-tap or from wells and a few get water directly from rivers. Over one-half (53.2 per cent) of all respondents claim to get water with difficulties and the remaining without much difficulties. Most of those claiming to get water with difficulties are in Goba (16 per cent) and Mabwe Pande (9 per cent), Kongowe and Kisanga (6 per cent each). The problem is partly due to the effects of deforestation and, on the other side due to weaknesses of the water supplying authorities. For those who have access to tap water the sources are the Lower and Upper Ruvu pumping stations which are unreliable and inadequate.

Some evidence relate to clearing of forests with the degradation of water sources in the study area. The forests particularly Pugu and Kazimzumbwi contain part of the sources of river Msimbazi that flows through the forests to the Indian Ocean, connecting many parts of Dar es Salaam region. Another river is Mabizi, which starts from the northern Pugu reserve near Mabizi village. The rivers are responsible for filling several small rivers flowing to various villages, some of which are covered by this study. Local people in these areas believe that most of the water streams are increasingly becoming seasonal because of deforestation.

The respondents were further asked whether they are satisfied with the quality and quantity of water. This was also one way of having an insight into the extent of social development in the area. Results are summarised in Table 9 below. As it can be observed, the majority of respondents indicated their dissatisfaction with both the quantity and quality of water emphasizing that boiling must precede every use of water. They also indicated that water rationing for the tap water is very common; they get water about once a week. This therefore, forces many people to depend on well water, which is salty, untreated and potentially unsafe.

Table 9: Availability of Safe Water

Degree of Satisfaction	Frequency	Per centage
Not satisfied	155	64
Satisfied	87	36
Total	242	100

Source: *Fieldwork data (1999)*

4.4 REVIEW OF THE SALIENT FACTORS FOR FOREST DEPLETION

4.4.1 *Increasing Demand for Forestry Products in Dar es Salaam*

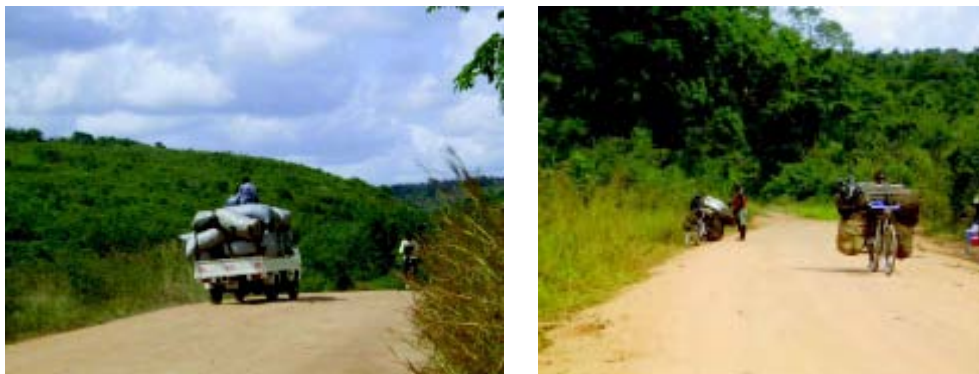
Proximity of the five forests covered in this study to Dar es Salaam threatens their existence (Maltilya, 1995) as mounting poverty and rising unemployment have resulted into over expansion of the informal sector in Dar es Salaam and Kibaha. Also, the technology employed in many informal activities relies heavily on forest products as source of raw materials. For instance, Dar es Salaam possesses a large number of food vendors, “*mama lishe*” (petty food vendors), local brew producers, foundries, timber extraction enterprises, furniture making and the expanding building industry. The informal sector survey of 1991, for example, reveals that there are about 1,715 micro enterprises making furniture in Dar es Salaam alone. These enterprises use substantial quantities of wood as raw material, some of which originate from the study area. The vast majority of these enterprises are very small, one-man firms or partnerships, making furniture on order for clients against an advance payment and also for display (Wells *et al*, 2000). Moreover, Dar es Salaam’s population is growing at a significant rate to the extent that within the last two decades where it has almost doubled e.g., the 1988 census showed population to be 1.8 million people, but currently various estimates put it at about 3 million people. Migration of people into urban areas, Dar es Salaam, in particular, from rural Tanzania is one of the social problems facing Tanzania despite government attempts to arrest this trend. The majority of the migrants live in squatters in the suburbs of Dar es Salaam city practising typical rural life. Consumption of forest products by these people is high particularly as a source of energy.

Using data from the Household Budget Survey (1991/1992) and adjusting for population growth and inflation, (Wells *et al*, 2000) estimate that around 48,000 cubic metres of sawn timber (50 per cent of hardwood and 50 per cent of softwood) would be required in 1998 for furniture purchased by households in Dar es Salaam and that the second major household demand for forest products is for house building. Traditional mud and pole construction, common in Dar es Salaam, requires significant quantities of poles although this type of construction is giving way to conventional construction of sand/cement blocks. The traditional mangrove pole and *makuti* (grass) roofing is being replaced with iron sheets resting on sawn timber roof trusses.

4.4.1.1 Forest Product Marketing Flow Chart

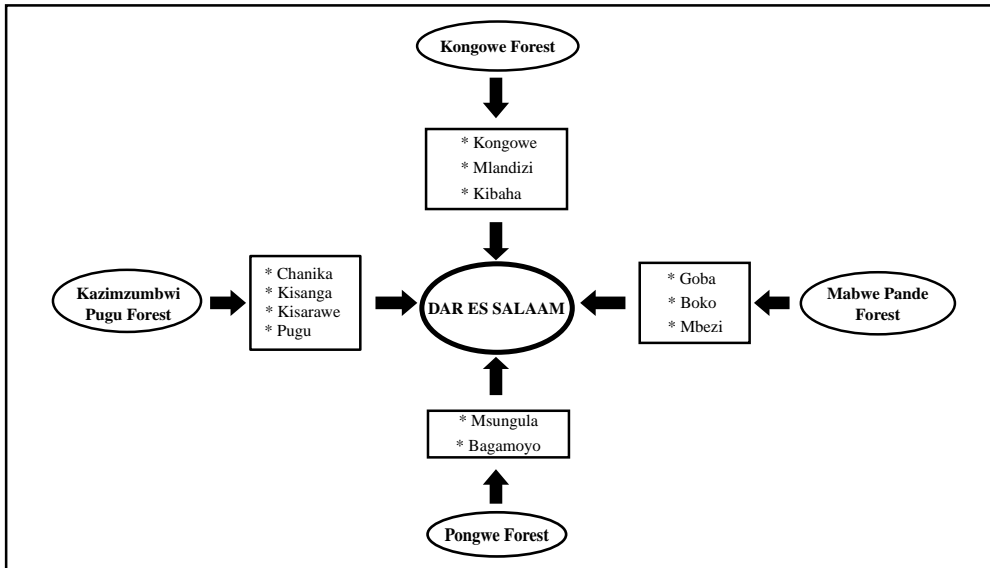
Forest products are moved from the studied forests to different destinations for consumption. It was revealed during field survey that more than 80 per cent of products mainly in the form of charcoal, building poles, firewood and timber are channelled to Dar es Salaam for retail and wholesale. Small business people constitute the largest group of traders who move these products along the marketing flow chart. Ferrying of the forest products to Dar es Salaam is done either directly from the forests or from local markets located in surrounding villages (see the forest product marketing flow Chart 1).

Plate 4: Different Means of Ferrying Charcoal from Kazimzumbwi Forest to Dar es Salaam and other Markets.



In most cases bicycles are used to transport forest products to the nearest local markets, but for longer distances, especially moving the products directly from the forests or local markets to the city, motor vehicles (lorries and pickups) are employed (Plate 4). In terms of the profit margin along the flow chart, general analysis made during the field survey suggests that profit margins increase as one goes towards the end of the flow chart. This implies that the locals who are the major suppliers of products fetch relatively low profit margins.

Chart 1: Forest Products Marketing Flow Chart



4.4.2 Decline in Agricultural Productivity

A decline in agricultural productivity is another factor associated with improper extraction of forest products. Despite the fact that agriculture is the major economic activity for the majority of the population in the surveyed villages the sector has performed very poorly in the last few years. This study confirms that the constraints which have adversely influenced agricultural productivity, include shifting cultivation that is extensively applied, on small scale, by most farmers; absence of financial assistance exacerbated by low incomes that limit the ability of farmers to purchase modern equipment and farming implement such as fertilisers and poor infrastructure in terms of lack of power, poor roads and transport equipment affecting production and marketing of agricultural products.

Another factor that engenders low agricultural productivity is the lack of modern farming techniques. In all villages surveyed, farming is still done using traditional tools and poor farm preparation (burning) methods. Without alternative economic activities, the decline in agricultural productivity pushes peasants down the scale of income and thus remaining poor. As a result, residents near the forests undertake forest related activities as an alternative to agriculture to meet their day to day needs (Box 3).

Box 3: Mr. Khalfan Mazengo Mwitula's Views on the Uses of Forests

Mr. Khalfan Mazengo is a 59-year-old charcoal maker residing at Mbezi Msumi near Mabwe Pande Forest. He has, for the past ten years, been involved in this activity. The main reason attributed to this is lack of other reliable economic activities. According to him commercial agriculture is not possible in the village because of low yields and lack of market. Wild animals destroy crops. He is of the opinion that there is a relationship between poverty and deforestation. Most farmers do business on forest products to supplement the meager income they get from farming. Mr Mwitula says that the Mabwe Pande Forest has been the major source of employment to people living around the forest because other sectors of the economy are less developed. He urges the government to allow the local population to exploit these forests. This could be one way of alleviating poverty in the area. This plea is repeated by Mr. Malela (67), an old farmer at Kazimzumbwi. Mr Malela also adds that forest boundaries are not clearly defined, which explains the rampant encroachments into the Kazimzumbwi forest.

Source: Field Survey, 1999

4.4.3 Non-Use of Alternative Source of Energy

Consumption behaviour of wood fuel in relation to alternative fuels, including electric power for heating, gas and kerosene, is well documented in the literature. Several authors (Ernst, 1978; Briscoe, 1979; Wiersum, 1982) argue that if prices of alternative fuel like kerosene, electricity or gas go down, they can substitute wood fuel and reduce its demand. However the level of substitution may be affected by the high prices of certain equipment for these energy sources. High price of equipments like electric cookers or heaters may hinder the substitution of wood fuel for alternative heating sources (e.g. electric power) even if the prices of these alternatives are dropped (Cecelski *et al.*, 1979).

Other literature reveal that sometimes there may be other factors than market conditions affecting the demand for forest products. Demand for forest products may be influenced by cultural factors. Harrison (1987), for example, argues that wood fuel may be preferred even if prices of alternative fuels fall because people may use it for reasons other than cooking including driving away wild animals, drying meat and treating seeds. It may not, therefore, be very easy to determine wood fuel demand on the basis of changing prices of alternative fuels alone. In Dar es Salaam and Coast regions, accessibility and use of alternative source of energy like hydropower and thermal source of energy is limited by high installation and operational costs.

4.5 FOREST RESOURCES VALUATION AND TREE PLANTING ACTIONS

Generally, the level of awareness and understanding of issues pertaining to deforestation and participation in forest conservation are very important to ensure

sustainable forest use. It was, therefore, important during the conduct of this study to investigate these issues and the results are as follows.

a) Adequacy of the Knowledge

The respondents were asked whether the knowledge they have on environmental issues was adequate. The results are summarised in Table 10.

Table 10: Age and Adequacy of Information

Age (years)	Knowledge Adequacy (by per cent)		Total (by per cent)
	Yes	No	
20-29	15.9	3.2	19.0
30-39	28.2	7.1	35.3
40-49	21.0	4.0	25.0
50+	18.3	2.4	20.6
Total Count	83.3	16.7	100.0

Source: *Field survey, 1999*

Table 10 reveals that the majority of the interviewed respondents had adequate knowledge and have heard about issues pertaining to the environment conservation. About 83.8 per cent of the respondents against 16.7 per cent confirmed to have heard about environmental degradation. The majority of respondents with the knowledge are between 30-49 years of age. This is the age group of young and energetic people who are also engaged in the charcoal making and building poles businesses. The 20-29 year age group indicated that they had little knowledge.

b) Local Community Participation in Forest Management and Conservation

Awareness of environmental problems can only be meaningful if it can be translated into effective management and conservation of the environment. An investigation into whether the community under study was active or had participated in forest conservation suggests that there are few environmental action groups in the study areas. The results reveal that only 20 per cent of the respondents confirmed that environmental action groups existed and they had been active members as opposed to 80 per cent who indicated lack of such action groups. About 47.9 per cent of the interviewed people indicated that they had attempted to plant trees as opposed to 52.1 per cent who have never attempted.

It pays to raise people's awareness on the issues of coastal belt forests and other ecosystems so that they understand the importance and consequences of whatever they do to them (Crees, 1994 in Maltilya, 1995). The survey investigated the role of various institutions particularly the local government, central government,

political leaders in mobilising people living around the forests to conserve the environment with particular emphasis on afforestation (tree replanting) [Table 11].

Table 11: The Source of Information about Environmental Conservation (in per cent)

	Neighbour	District Leaders	Politicians	Central Government Efforts	Others	Total
Response	69.1	11.1	2.5	4.3	13	100
Total	-	-	-	-	-	100

Source: *Field Data, (1999)*

Table 11 shows that people from various institutions play part in raising the awareness of the communities living around the forests on environmental problems. It is shown that a large section (69.1 per cent of the respondents) of those with knowledge on environmental issues have acquired it from the people living together with them or those referred to as neighbours against about 13 per cent who got it from other sources including training institutions, seminars, and the media. District leaders seem to have played little role (only 11.1 per cent of all respondents affirmed) in raising awareness on environmental issues including deforestation. This view is contrary to the expectation because the local governments in the surveyed regions are the major beneficiaries of the forests through taxes. Another implication is that the campaign against excessive exploitation of the forests is not well co-ordinated. About 85.3 per cent of the respondents with knowledge on deforestation effects contended that the knowledge on environment issues was inadequate.

4.5.1 Valuation of Forest Resources

Apart from probing for awareness on deforestation effects, the study also investigated whether people around the forests recognise that forests have a value for them and the general public. Table 12 indicates the distribution of the responses.

Table 12: Valuation of Forest Products by the Respondents

Knowledge about Forest Value	Frequency	Per centage
Have the knowledge	251	96
Have no Knowledge	6	4
Total	265	100

Source: *Fieldwork (1999)*

Over 200 respondents (about 90 per cent) who responded to the question on the value of the forests showed awareness that forests are of value. This therefore

implies that the majority of the people living around the forests are aware that forests form one of the important assets for their livelihoods. Deforestation, therefore, would mean depriving the community one of the sources of their livelihoods. This is also an important factor for policy makers to consider especially when introducing environmental taxation as a tool of forest management.

4.5.2 Willingness to Receive Payment and to Accept Clearing of Forests

The respondents were asked to value (in monetary terms) existing forests in a situation that the government intended to clear the forests with compensation. The results given by majority respondents were not encouraging. It varied between TShs 1,500 (US\$ 2.20) to TShs 40,000 (US\$ 60). Other respondents indicated that they would not require any compensation and would let the forest go free of charge. The low valuation reveals respondents' inability to value the existing forests for social benefits partly explaining why deforestation still goes on.

4.5.3 Tree Planting Initiatives

Extensive clearance of forests leads to regeneration dominated by woodland species (Sheil, 1992). This implies that there has been a reduction and/or change of biodiversity, which could be reinstated by afforestation initiatives. When asked as to whether they have ever participated in tree planting activities, 39 per cent of the respondents dealing with forest product related activities responded in the affirmative. On average, each respondent claimed to have planted 40 trees within the last five years. This claim should be taken with caution because the same respondents also complain that the forests they are working on have declined in size, the distance to which they obtain the input has increased and prices of forestry products are on the increase. The situation on the ground suggests that the forests under consideration have been harvested at a faster rate than their replenishment.

4.6 POVERTY, ENVIRONMENT AND SOCIAL NEEDS

There is an increasing recognition that the three phenomena mentioned in this subsection normally tend to go together. A society that destroys the environment should be prepared to harbour extraordinary pockets of poverty and a pressure on its social needs. This study therefore made an attempt to evaluate the social-economic cost and benefit of the forest resources by a rough estimation of the existing potential of alternative forest use and also value the cost imposed by the destruction of these forests on the society. Tables 13 and 14 show both potential and the costs as well as the needs in the context of the perception of the society through the responses of the focus group meetings and interviews of relatively more knowledgeable people in the study area.

Table 13: Social-economic and Environmental Costs of Forest Destruction

Serial No.	Item	Value, TShs
1	Eco tourism based on the travel cost method-average willingness to pay TShs 13,500 and estimated visitors annually 4,000	54,000,000
2	Loss in labour time for search of firewood and water is estimated at 180 workdays annually for the villages surveyed. One work day is valued at TShs 405, implying a loss of \$ 72,900 per person per year	72,900 (Per person)
3	Loss in productivity due to soil loss and rainfall drop The average change is 7.5 per cent of output.	

Row one of Table 13 indicates tourism potential of the forests, in particular, the Pugu Forest based on a minimum estimate of the willingness to pay by visitors. Through a guide by the forest officers and people in the survey areas, the forest could attract a minimum of 4,000 visitors annually thus generating approximately Tshs 54,000,000 that could be utilised to bring about development within the same areas.

The second row indicates that the destruction of the forest has the effect of decreasing the resources available for the rural poor as reflected by the time spent in search for firewood and water. In total the time wasted was estimated at 180 workdays and valued at TShs 72,900 per person. However, this is the activity mainly done by women and is unpaid labour. The decline in productivity was estimated at 7.5 per cent and this was specifically referring to a decline in agricultural output due to unreliable rains and soil destruction. In Table 14, respondents were asked to mention the amount of money they would need for acquiring adequate quantity and quality of various needs for their life and family support.

Table 14: Estimated Income Needs as per Respondents' Estimates in 1999

Item	Amount needed (in TShs)
Enough food	115,351
Education for children	93,160
Health	98,653
House	2,500,000
Radio	36,111
Bicycle	40,000
Electricity	300,000
Total	3,183,275

Table 14 shows that a substantial amount of money is required for one to acquire a house. Given that majorities of these people are poor, it explains why they

heavily rely on tree products for constructing houses (which are more affordable in their settings). Education and health for themselves and their families also require a substantial sum, which they admit they cannot afford. This explains the low investment in human capital and productivity in the areas surveyed. Electric installation is estimated at TShs 300,000 an amount that by far exceeds the average annual income of the surveyed population.

5.0 EMERGING POLICY ISSUES AND CONCLUSION

5.1 GOVERNMENT POLICIES ON FOREST MANAGEMENT AND AWARENESS ISSUES

Government commitment to rescue the forests appears to be genuine. There are laws, approaches and institutions in place to ensure the implementation. What is probably lacking is seriousness and the political will for maximum and effective enforcement of the existing laws and regulations. However, review and amendment of some laws and regulations to cater for the present market economy situation need not be emphasised.

5.2 ACCESS TO RESERVED FORESTS

Encroachment into the studied forests is considerable. Tight management of the forests is lacking either because there are no clear boundaries or the entry procedures are not clearly followed in cases where limited access is allowed with special permission.

5.3 DEFORESTATION AND POVERTY

There is clear evidence on the link between deforestation and poverty. Poor technology is applied in various activities, for example, shifting cultivation, over reliance on wood fuel, use of poor tools and lack of proper mechanism to replace the destroyed trees. Also, low usage of alternatives to wood fuel, as well as increasing unemployment (both in rural and urban areas) influence the trend of forest exploitation. Given such a situation, poverty alleviation and environmental rehabilitation programmes are not simple blanket solutions. Comprehensive strategy and policy approaches are needed. The approaches should encompass actions done in phases, some of which must be taken immediately to rescue the forests and quality of life of the population covered by the study. Other actions could be short, medium and long-term solutions or programmes to alleviate poverty and rehabilitate the environment.

The immediate programmes to alleviate poverty around the forests surveyed could consider the following:

- A political will to conduct an audit to establish the basic needs lacking in the villages e.g. education, health, water, roads, energy sources, consumer goods and others;

- Enhancement of the technological capability so that productivity can be raised to above the existing levels. For example, use of appropriate farming methods, irrigation, crop protection against wild animals, containing bush fires and others;
- Encouragement of civic societies and NGOs to open up their activities and extend poverty alleviation programmes to villages surrounding the forests;
- Promotion of more research efforts for identifying possible solutions to the problem;
- Ensuring that every tree harvested assists in raising the income of the local community; and
- Carrying out awareness campaigns so that leaders of both local and central governments, NGOs, donor communities, the public, interested parties and other stake-holders are informed of the actual picture, extent and characteristics of poverty in the villages.

The broad approach to poverty and deforestation in areas around the forests covered by this study should start by encouraging pro-poor development projects. The pre-condition, however, should be promotion of investment in skills and know-how of the people in the nine villages i.e., Goba, Kazimzumbwi, Pongwe Msungula, Mabwe Pande, Mlingotini Mwenda Pole, Kongowe, Kola Kisanga, Msumi, Mbezi and Kwembe.

The second step should generally aim at improved access to social services. During the field survey visits, it was obvious that the majority of the population in these villages had no access to quality of education, health, water and sanitation services. Secondary schooling and vocational training are lacking.

The last strategy should broadly aim at increasing output and income by availing credit facilities and farm input for micro enterprise growth. Lack of formal and informal financial support to low-income people in studied areas has greatly affected their ability to expand activities, and has limited use of appropriate technology and alternative products that may be considered as being environmental friendly.

5.4 CONCLUSION

The research findings show that there is profound and vicious-cycle involving poverty and deforestation in the study areas. Low-income people dominate the study areas, with low investment in human capital (the majority of the people have less than primary school education). This results into low productivity, with economic activities especially agriculture being carried out using poor methods such as slashing, burning and shifting cultivation. Many people in the

surveyed areas have limited alternative economic resources hence reliance on easily accessible forest resources as their major economic activity for earning a living. Incomes from forest related activities seem to be stable and double the agricultural income. Such a situation accelerates deforestation, which reduces resources available to the society. It is argued in the report that off-farm activities in the studied areas have been on an increase whose return has complemented that of farm activities. On the other hand, the introduction of “cost sharing” in most social services (healthy services, education, etc.), which were previously offered freely or subsidised by the government, has relatively stretched many peoples’ little income making them pay for more needs.

The study findings further show that due to over reliance on forest resources and the pressure exerted on the people from meeting basic needs, deforestation that occurs around the five major forests studied takes place at an unprecedented pace. Cutting down of valuable trees either for personal use and/or business purposes and transportation of charcoal in lorries to Dar es Salaam region was evident during the conduct of the study. The obvious manifestation of deforestation suggests that a necessary mechanism needs to be devised to avoid further impact of deforestation including degradation of the water sources, accelerated soil erosion, reduced soil moisture and ultimately disappearance of the coastal belt forests. There is a need for purposeful and deliberate actions to reduce the negative impact on the forests. It should be noted that the causes of deforestation around the studied forests are not limited to these geographical locations only, but they spread to other parts of the country as well.

At another level, a more aggressive stance on energy use in urban Dar-es Salaam is needed to slow down excessive use of forest products, in particular wood fuel. More investment in research and related activities on energy is needed to shift the current estimated 80 per cent reliance on wood fuel. The existing strategies for curbing abject poverty, and the role of the environment are not exhaustive largely because of the failure to recognise the direct link between these two phenomena, and limited human and financial resources.

APPENDIX 1: SUMMARY OF THE PROFILE OF THE STUDIED FORESTS

This section presents profile of the selected forests whose adjacent villages were surveyed. These forests have been affected in different ways by invasion by the surrounding population and others. Analysis given in the rest of sections takes into account human activities and behaviour of the people living near the forests.

PONGWE FOREST

The Pongwe forest is in Bagamoyo district. It forms one of the most natural attractions and beauties of Tanzanian vegetation. It harbours several habitats

including unique features and several water sources. Currently there are several people with direct access to the forest. The nearest population whose livelihood is directly connected to the forest is found in Pongwe Msungula village. During the survey, an attempt was made to know the exact number of people living in Msungula village, as well as the quality of life, characteristics of their economic activities and other features.

The first impression noted from this forest is that it is a common resource. There are several charcoal makers either employed by people from Dar es Salaam, or self-employed. The village is occupied by several thousands of low-income people. The Bagamoyo district authority estimates the village to be populated by 2,800 people. However, observation on the field suggests that actual population may be far above the stated figure. This is because there are many people from other parts of the village who are not permanent villagers. The Pongwe Msungula village is characterised by poor infrastructure and limited economic activities. Located about 64 kilometres away from the Bagamoyo district headquarter, it can be reached by road only during the dry season. As a typical rural village, peasants in Pongwe Msungula use simple farming method and tools such as hand-hoe and *pangas*, and also rely on rainfall and natural fertility of the land. They mainly grow some paddy, maize, some cassava, mangoes and cashew nuts. Productivity in agriculture is low and inadequate; production is at the subsistence level than commerce. Most mango and cashew trees in the villages are old, making them useful for charcoal making.

KONGOWE FOREST

The forest is found in Kibaha district. Although the forest is reserved, it has been vulnerable to frequent encroachments by people from the surrounding villages and other nearby areas of Dar es Salaam City and Coast regions. Kongowe and Mwenda Pole are the two major villages closest to the forest partly engaged in shifting cultivation for seasonal crops, some cashew nuts, mangoes and oranges. During interviews it was revealed that one big mango tree could produce up to 100 sacks of charcoal. This implies TShs 100,000 income (practically the local charcoal vendors get less than the posted figure due to lack of competition) when sold at the production site or TShs 300,000 when sold in Dar es Salaam City. The existing marketing problems for cashew nuts and mango-fruits tempt farmers to cut down the trees for charcoal making. Exhaustion of the existing cashew nuts and mango trees has forced the farmers and petty traders to encroach into the Kongowe forest.

KAZIMZUMBWI AND PUGU FORESTS

These two forests extend between Dar es Salaam and Coast Regions. The Kazimzumbwi, Masanganya and Kisanga Kola villages surround these forests.

Besides permanent dwellers of these villages, there are other people from distant villages who also disturb the forests to earn a living. For instance, in 1998 about 300 people from Chanika area invaded the Kazimzumbwi forest for opening farm-fields and/or searching for forest products such as timber, grass, charcoal making and building poles. Other activities, which are located in the forest, include brick making and railways. Like the rest of the other surveyed forests, limited economic activities and outdated production technologies (in farming and forest harvesting) have greatly contributed to persistent encroachment in to and depletion of the forests.

MABWE PANDE FOREST

Mabwe-Pande forest is found in Kinondoni district and it is the only remaining forest portion of the green belt that once extended from Dar es Salaam to some other parts of Tanzania. The forest is affected by activities of Goba, Mbezi and Mabwe Pande villages, which are located 33, 18 and 40 kilometres, respectively, away from the Kinondoni district headquarters. Most inhabitants in the villages are of low-income.

Population pressure in Dar es Salaam featured as a factor that contributes to encroachment into the Mabwe Pande forest to earn income and settlement. Population size within the three villages has almost doubled within the last ten years. For instance, Mbezi had 8,162 people in 1988, compared to 16,000 inhabitants in 1998; Mabwe Pande had 1,470 people in 1988 compared to 2,450 in 1998; and Goba had 4,768 people in 1988 as compared to 8,000 people in 1998. Declining soil fertility and struggle for self-employment increases demand for forest clearing.

Endnotes

- 1 It is defined as the state in which a person or community has very little money or resources to cater for their basic needs, high illiteracy level, high mortality rate and limited ability to fight against the vices.
- 2 Defined in this study as an act of cutting down or burning trees and/or other vegetative cover (with little or no replacement) in an area.
- 3 "Forest" is defined as in Hawthorne (1993) to mean closed woody vegetation, over 8 metres tall. In this case a "Reserved (gazetted) forest" is an area of forest where the plants and animals are protected by Tanzanian Laws.
- 4 In this report the words "low-income" and "poor" are used interchangeably.
- 5 Also, read Appendix 1
- 6 The products include charcoal, building poles, timbers, etc.

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