REPOA

Research on Poverty Alleviation

THE THIRD RESEARCH WORKSHOP

LINK BETWEEN POVERTY AND ENVIRONMENT IN TANZANIA: A CASE OF POVERTY AND DEFORESTATION

G. Kahyarara
W. Mbowe
O. Kimweri

Presented at the Third REPOA Research Workshop held at the White Sands Hotel, Dar es Salaam, April 15-16, 1998

The Link Between Poverty and Environment in Tanzania; the Case of Poverty and Deforestation.[1]

Abstract

The link between poverty and environment is complex and the relationship between these concepts remain poorly understood. Only in recent years, it has been widely accepted that, activities performed by the poor are responsible for increased environmental problems, which we think in turn precipitate poverty. For the case of Tanzania, both poverty and environmental impacts are notable. Understanding the nature and extent of the relationship between these two concepts is crucial for policy effectiveness, especially currently when Tanzania government and the World at large are determined to eliminate these problems.

This paper gives further development in this area and form a proposal for the study on the link between deforestation and poverty, in Dar es Salaam and Coastal Region which have one of the highest demand of forest products in the country. The study is justified on the high increase in both environmental degradation and poverty and , the importance of the forest resources in Tanzania i.e provide 90% of the energy source to Tanzanians, protect and enrich the soil, provide hydrological cycle and protect the climate. The study will use the theory of demand, and the vicious spiral relationship between poverty and environment framework. Both quantitative and qualitative analysis will be employed. The results are expected to assist in poverty alleviation and environmental conservation efforts by the government, particularly the implementation of AGENDA 21 of the UNCED.

---

[1] Research paper presented at REPOA Third Annual Research Workshop by, Kahyrara Godius, Mbowe Wilfred and Omari Kimweri, on April 15-16, 1998 at Whitesands Hotel.

Background

There has been a debate in recent years over the link between poverty and environment, particularly, the destruction of rain forest. In some cases it has been assumed that there exists a link between poverty and the state of natural environmental through interaction between people and their surroundings when they perform various economic activities. As a vicious circle of interactions, the effects of poor environment, sends back through the same channels, the signals that further precipitate the poverty problem.

Conversely the causes and/or characteristics of these phenomenon vindicate the existence of the linkage between these concepts. Poverty for example, a complex and multifaceted problem, is caused by deprivation of resources from individuals i.e. lack access of the right quality and quantity of the basic needs. But environmental degradation according to this definition, might caused such resource deprivation thereby increase poverty. Resource decline may force the society to degrade the environment due to lack of alternative and reduced flexibility in resource use. This type of analysis can result to a conclusion that, there is a direct link between poverty and environment. However in some literature it is argued that the causal-effects of poverty and environment are much more complex, especially in developing countries including Tanzania, hence such an analysis should be handled more cautiously.

Despite the complexity in defining the direction of the link between poverty and environment, it has in recent years been widely accepted that, activities performed by the poor people are responsible for increased environmental problems, which in turn precipitate poverty; for instance, the use of charcoal or fuel-wood for energy by the poor people contributes to the increased rate of deforestation. The higher rate of deforestation leads to shortage of not only the fuel-wood but also to the scarcity of rain. Consequently, the shortage of rain may further lower land productivity, thus less agricultural output

which in turn affect the nutrition standards of the agro-based population. Poor nutrition engenders low productivity; thus, entrenching poverty.

For the case of Tanzania, both poverty and environmental degradation are notable. Six major problems of environment, namely land degradation, lack of accessible water supply and poor water quality, environmental pollution, deterioration of aquatic systems, loss of wildlife habitats and bio-diversity, and deforestation have been identified by the national environmental action plan. Manifestation of these problems is to a large extent evident that the type of economic activities undertaken by the large section of population are responsible for these problems. Some of the evidences are given below;

(i) A number of economic activities by a large section of Tanzania population , especially in rural areas has resulted into loss and deterioration of soils, degradation of water resources and damage to ecological process and life support systems and deforestation. It is currently estimated that about 35% of Tanzania is threatened by desertification.

(ii) Over 80 percent of Tanzania labour force earn their life through agriculture, and majority of these are in crop cultivation. This cultivation is to a large extent marked by poor methods of farming inform of failure to conserve the soil and water, urban agriculture with improper disposal of animal wastes, improper use of fertilizers (and overuse of pesticides, herbicides and fungicides), pressure by peasants to extend agriculture, search for wood fuel, timber etc have resulted to severe environmental problems especially land degradation , loss of water sources.

(iii) Poor methods of livestock keeping has resulted into overgrazing of animals in the semi-savanna areas of northern and central part of the country has resulted into the exceed of regions carrying capacity by 200%(DANIDA's 1989). About two fifths

of the livestock population in Tanzania is concentrated in three regions of Shinyanga, Arusha and Mwanza out of 25 regions in the country.

(iv) Water sources in Tanzania are threatened by pollution posing hazards to life. Industrial effluents and sewage, turbidity and bacterial contamination are common in these water sources. Some aquifers contain excessive amounts of fluoride, salt, or objectionable minerals.

(v) Poor management of wastes and emissions in many parts of Tanzania poses serious environmental problem. It is estimated that only 15-20% of the urban residents in urban areas benefit from sewerage services, including septic tanks.

(vi) The pressure exerted by increasing poaching and encroachment endangering wildlife and genetic resources is one of the manifestations of environmental problems. Tanzania's elephant population recorded a decline from 316,000 in 1979 to 85,000 in 1987 and 52,400 in 1991 - an average loss of 60 elephants a day (Bagachwa and Naho, 1995).

(vii) Overfishing and destruction of fish habitats, through the use of very small mesh sizes in freshwater fisheries, uncontrolled dynamite fishing and illegal sand quarrying in the river beds close to the coast are observable in Tanzania.

(viii) Motor traffic, exhaust fumes, industries and solid waste burning have resulted into high concentration of Carbon monoxide, Sulphur Dioxide, Suspended Particulate Matters, Nitrogen Oxides Hydrocarbons and atmospheric lead in Tanzania's air.

Increased poverty is one of the factors that have been referred to as the cause of these environmental problems in Tanzania. Other factors included population pressure, physical and biological aspects. The Tanzania's population has more than tripled since 1960s and significant proportion of the population live below the poverty line consuming the type of goods and services that are produced using technology that is detrimental to the environment. Since majority of the Tanzanian are poor they are said to lack the resources to avoid degradation of their environment and/or sometimes lack knowledge on the cause and consequences of environmental degradation they cause in the various economic and social activities. This state make the environmental degradation to increase and persist and later result into lack of /or resource decline and the state of poverty tend to increase and persist.

Concomitantly measurements have indicated that Tanzania is among the poorest countries in the world. The World Bank using GDP per capita criterion, ranked Tanzania the second poorest country in the world in 1991. On the other hand, the UNDP in 1992 using the Human Development Index [HDI], which combines adjusted real GDP with life expectancy and educational attainment, ranked Tanzania the 16th from the bottom. Likewise, the ILO's Jobs and Skills Programs for Africa [JASPA] that considered the availability of medical data; concluded that there was about 40 to 60 percent of prevalence rate of nutrition deficiency related weight deficit in Tanzanian community. Tinios *et al* [1993] calculated the levels of rural and annual incomes necessary to provide a minimum of 2,000 calories per day in 1991. The figures arrived at were Tshs. 27,721 for the rural areas and Tshs. 54,950 for Dar es Salaam. On the basis of a household expenditure survey, the authors concluded that 59 per cent of the country's rural households and 27 percent of the households in Dar es Salaam fell below the respective poverty line. In 1991 when the poverty line was drawn at 46,173 as the basic minimum expenditure for the basic necessities per month, over 50% of the population fell below the poverty line.

These measurements signify that a large section of population in Tanzania is vulnerable to environmental degradation because with low level of development, and high incidence of poverty the majority will lack adequate social services including education, hence lack of information about environmental impacts and how to avoid it. In connection to that distortion through subsidizing the poor in energy supply and other services is likely to be part of the catalysts to the problem. Lastly the decision on the resource utilization is likely to be influenced by the short- term behaviour and economic uncertainty which are the general characteristics of the poor. Through such behaviour the poor are said to underestimate the cost of degradation through clearing of forests for cultivation, fuel wood and other purposes. In many parts of Tanzania for example forests are regarded as common resources and sometime are obtained free of charge, hence the tragedy of the common resource problem is obvious.

Statement of the Problem

Tanzania being one of the poorest nations in the world is facing severe environmental problems. Some people believe that there is direct relationship between the state of poverty and environmental damage that are facing Tanzania. They argued that the modes of production and consumption adopted by the poor people normally do not meet the environmental standards. Majority of the Tanzanians depend on cheap sources of energy, and thus rely on natural resources for the supply of energy for cooking and lighting. Woodfuel accounts for over 80% of total energy consumption in Tanzania. Lack of appropriate and alternative cheap source of energy coupled with higher poverty level, and lack of information have resulted into unproductive forest depletion practices and activities which have negative effects to the environment. However there is an argument that environmental problems of Tanzania have tended to accelerate poverty as they lead to resource decline, which make the society in degraded areas poor. It is generally acceded that the relationship between the state of natural environment and poverty is on who suffers most when the environment is damaged. Since

majority of the Tanzanians are poor with limited opportunities, low level of education and lack of financial resource they lack capacity to conserve the damaged environment hence are the sufferers. It is argued further that the deterioration of nature, pastures and forests in the poor countries have greatly affected the local population and the economies leading to the reduction in the world's agricultural potential. This situation is notable in Tanzania as well. Since the link between poverty and environment remains poorly understood, without a sufficient and clear understanding on the nature and direction of such link, policies for poverty alleviation and environmental conservation cannot be very effective. The major attempt of this study is thus identification the direction of the link between poverty and environment with reference to deforestation in Tanzania.

This study will investigate the direction of the link between these two concepts, by concentrating on the relationship between increased deforestation and poverty in Dar es Salaam and Coast Region. Being the most populous urban centre in Tanzania, Dar es Salaam is selected due to a number of social and economic activities taking place in the city that have direct bearing on the use of forest products which ultimately accelerate deforestation and impoverishment of the people in the areas producing these forest products. For instance fuel-wood and charcoal are mainly the source of fuel for both commercial as well as household activities in these regions. Per capita consumption of fuel-wood is estimated at over one cubic metre. The Coast Region is included in the sample because of its proximity to the Dar es Salaam city, and because the city dwellers demand for forestry products are partly supplied by the people engaged in the activities related to forests within Coast region; as a result, affecting forests both in Dar es Salaam and Coast. In recent years there have been an increase in demand for forest products in Dar es Salaam resulting from over expanding population (estimated at over 2 millions at the moment), increased construction activities, and trade of forest products especially timber, wood and charcoal. Dar es Salaam has the largest number of social and economic institutions like school and colleges, hospitals, restaurants and hotels, bakeries,

wood works and joinery and other numerous informal sector activities which rely heavily on forest products as fuel source and raw materials.

The Objective and Justification for the Study

Forests are very important natural resources for Tanzanians as apart from providing energy timber, etc. to the majority of the population, they provide a wide range of other benefits in social and economic sphere, which include protection and enrich of the soil, provision of hydrologic cycle, and affecting the climate through evaporation. Through their impact on soil and climate protection, forests play an important role to the economy of Tanzania because, the country is an agrarian economy and the sector provide employment to over 80 percent of the total labour force, provide over 50% of total foreign exchange, and is the source of food to the entire population hence agriculture form the country's backbone. A study like this is therefore one of the important attempts to rescue such an important resource for sustainable development of Tanzania.

Generally the type of forest products used in Tanzania, and Dar es Salaam and coast regions in particular are largely the cheapest alternative to other types and their demand has been at increase. Forest products are the cheapest because they can be obtained free of charge, they fetch low prices in the market when compared to their substitutes, and they require simpler technology to process; and the technology can be easily applied by the most people, including the most poor. In some parts of Tanzania, forests are publicly owned, hence are vulnerable to the tragedy of the common resource problem. But a more important factor is that, increased demand of these products has resulted in severe environmental impacts. In some cases forests are disappearing, and in others the population is in severe shortage of energy and other requirements due to such disappearance. Water sources have been seriously damaged including the water supply to the national hydroelectric power station at Kidatu. Deforestation is chosen because of it being the strongest and one of the six major environmental problems confronting

Tanzania. It is estimated that forests are depleted at a rate of between 300,000 and 400,000 hectares per annum; Danida (1989:18). The forest and woodland declined from 44 million hectares to 38 million hectares in the period between 1983 and 1987. This implies a loss of 1.7% of the total land area per year

Both environmental degradation and poverty alleviation have received special thrust in recent years. Emphasis is given on the use of economic instruments for enhancing environmental management, mainly in the form of incentives such as pricing, tax relief and subsidies and disincentives such as environmental taxes and resort to a polluter pays' principle. Such instruments among others have great impact on the welfare of the majority in the population. In addition they can play a major role in poverty alleviation by mitigating resource decline and give an indication on the right welfare development policy for Tanzania (Kahyarara, 1997). The identification of the direction of the link between deforestation and poverty will to a large extent assist policy makers to come up with appropriate multiple objective policies for both, environmental degradation and poverty alleviation.

Tanzania was represented in the 1992, Conference on Environment and Development held by the United Nations (UNCED) in Rio de Janeiro, and participated in the preparation of AGENDA 21 which recommends a global plan of action for achieving sustainable development. This study will thus provide some strategies which will add to the implementation of the AGENDA 21. Specifically, the mitigation of deforestation and reduction in poverty will mean efforts to ensure sustainable utilization of natural resources, with the aim of encompassing the goals and strategies of the AGENDA 21. In addition Tanzania is currently preparing the long term development plans i.e. the vision 2025 for Tanzania and vision 2020 for Zanzibar. All these advocate attainability of increased and sustainable development. But in order to achieve development with such characteristics, ecological sustainability is necessary and sufficient condition. Efforts to conserve forests in Dar es Salaam and the cost region inform of

agroforestation can provide an alternative source of income to people in these areas, thereby reducing poverty. In connection to that currently farmers in these regions lack reliable cash crop after the decline of cashewnut and coconut. Since the market for these forest products for the two regions is the widest in the country agroforestation is likely to be a very important instrument of poverty alleviation in Dar es Salaam and the Coast regions hence the study is justified.

The study will investigate and assess in detail the characteristics, activities and consumption behaviour of the poor in the Coast region and Dar es Salaam's poverty stricken areas like Mbezi Luis, Kibamba, Pugu and Kisarawe villages and others, with an intention of estimating the extent of consumption of timber, building poles, fuel-wood and its causal effect on environmental degradation in terms of forest depletion and the subsequent impact of these on the life of the people living in the areas. Specifically, the study will find out:

1. The way pricing system as well as income levels and population size have influenced consumption of forest products;
2. The ways the type of economic activities carried out by the poor people have contributed to increased rate of deforestation in Tanzania, with a focus in Dar es salaam and Coast regions;
3. What has been the impact of deforestation on the life of the people in the respective areas.
4. The ways of curbing deforestation and poverty for the betterment of both current and future generations.

The Research Questions

The over-riding question is concerned with the relationship between poverty and the environment i.e. deforestation. To arrive at establishing whether there exist any relationship between poverty and deforestation, several questions have to be answered. The questions are specifically will include;

1. Do price, population size and income levels influence deforestation?
2. Are there any alternative products which have less impact on the environment?
3. What factors make people use more of forest products and less of others?
4. Will the poor be ready to consume the alternative products which have less impact on the environment?
5. Does deforestation have effect on the life of the people in the degraded areas?

Hypothesis.

The following hypothesis will be tested;

(1) The poor rely heavily on the use of forest products because of easy access to the products, poor methods of farming and lack of knowledge on the impact of such clearing, hence poverty cause deforestation.

(2) Depletion of forests will result into poverty as, majority of the people depend heavily on these resources for income generation and for other domestic uses.

(3) There is a vicious cycle link between poverty and deforestation. The poor peoples' over using of the forest resources causes deforestation which in turn leads into the impoverishment of the people and subsequently, further deforestation.

(4) There is a negative relationship between the quantity of forest products demanded and their price and the income of the poor people.

Literature Review

Literature on the environment and poverty is immerse. Overtime, the focus has been on four aspects; first aspect considers the rapidly growing field of environment versus poverty. In this case, poverty is seen as the major cause and effect of global environmental problems. Second aspect of literature includes the REPOA initiated body of literature that focuses more on Tanzania. The third aspect of the body of literature focus on issues pertaining to agricultural and social structure in relation to poverty and environment. Finally, there is a body of literature by several institutions like the Institute of Resources Assessment [IRA], NEMC, CEEST, the International Forum on Environmental protection in Tanzania, and many others. A variety of these studies have already indicated about the nature, characteristics and consequences of deforestation in Tanzania and how poverty has been the contributing factor towards the problem on the one hand, and how deforestation and general disappearance of forest has affected the population.

Kulindwa and Shechambo [1995] attempted to examine the implication of economic reforms on soil erosion and deforestation. Using secondary data, survey data, and regression analysis, they found that the economic policies pursued by Tanzania under the structural adjustment programs have exerted pressure on the use of land, and the extraction of natural resources. The authors also revealed that the expenditure cut advocated under these economic reforms have resulted to lower share of expenditure allocated for conservation purposes thus causing persistency to the environmental problems.

Naho (1995) constructed an econometric model to investigate the determinants of demand for forest products in Tanzania, hence infer the factors influencing deforestation rates. The author found that the demand for these products is responsive to own prices, and prices for their substitutes.

The work of Openshaw, (1971) describes and analyses results of a wood consumption survey carried out under the auspices of FAO. The survey covered consumption of wood for fuel, poles, sown timber, panel products and paper products. Consumption of wood was considered to be a function of population, its growth rate, gross national product (GNP), and wood availability. The survey concurred with earlier findings that fuel-wood and charcoal accounted for the largest end-use of wood raw material and that there was a rapid switch from firewood to charcoal in urban areas and a slow but steady change in rural areas. Per capita consumption of fuel-wood in Dar es Salaam was estimated to be 1.08 cubic metres while in other towns it was 1.49 cubic metres. The data for the cited survey were obtained by actual visits to industries and consumption points as well as use of the 1969 household budget survey data.

Fleuret. A and Fleuret. K (1978) attempted to measure fuel-wood consumption in one village in Lushoto district and found that per capita consumption was about 2.4 cubic metres. This rather high figure may reflect relative abundance of wood in this village and the fact that location of the village in a high altitude area implies that fuel-wood is needed for heating the home in addition to other normal domestic uses. The relationship between the charcoal industry and deforestation is quantitatively provided by Mashalla (1979) in a study of vegetation change in a woodlot at Msua in the Coast Region. This study clearly shows the negative impact of charcoal consumed in urban areas on the surrounding areas. This should be expected since charcoal consumed by Dar es Salaam Development Corporation in 1982 revealed that of late, charcoal is supplied from as far as Morogoro and Tanga regions (Mnzava, 1983).

Further evidence on the impact of the Dar es Salaam charcoal consumption on the Coast region is provided by Havnevik (1979). In a study based in Rufiji, he found charcoal making was competing with, if not in some cases, replacing cashewnut farming. In some areas farmers were abandoning or actually cutting down cashewnut trees in favour of charcoal - making. The main reason for the shift in production decision is that, relatively, returns from the charcoal industry were higher than the returns from cashewnut farming. Such a development is, for sure, unfortunate considering the fact that Tanzania badly needs to boost output of cashew nuts in order to earn foreign exchange. The work by Kilahama (1983) outlines the fuel-wood problem in Tanzania and offers suggestions of how to increase supply of wood and check its demand.

The question of increasing the supply of wood through afforestation is considered in the study of Kaale (1983). In a report of the Ministry of Natural Resources and Tourism edited by Kaale, an outline of the five year national afforestation program for the period 1982/83 to 1986/87 is provided. The plan outlines present supply and demand situation and gives figures of regional targets for tree planting based on estimated fuel-wood needs to the year 1995. The work by Mnzava (1983) entitled Tree Planting in Tanzania: voice from villagers identifies and discusses problems related to villagers' perception of the fuel-wood crisis. He argues that, far from the conception that villagers are not responsive to tree-planting campaigns; he found that villagers were aware of the environmental problems, and therefore he proposes that, if villagers were given conducive environment, they could make village's afforestation programmes a success. The author believes that the fuel-wood crisis should be viewed within a wider context of the food-fuel-wood-income linkage.

Mwandosya and Luhanga (1983), deal with energy resources, flows and end uses in Tanzania in general, and Mbeya region in particular. They describe the present and future trends regarding coal, fuel-wood, charcoal, electricity, petroleum, wind and biogas.

Relevant policy options for each energy sources were suggested and finally, the authors propose for a sustainable energy policy in Tanzania.

A situation in semi-arid areas of Tanzania is reviewed by Mascarenhas, Kikula and Nilsson (1983). The survey covered thirty-three (33) villages in Arusha, Dodoma, Mwanza, Shinyanga and Singida and examined fuel-wood needs for domestic purposes, processing activities, fish-smoking, building, pottery, brick making and local beer brewing. The usefulness of this study is that it goes beyond fuel-wood because it examines other socio-economic environmental factors that surround the use of wood. Actual measurements of wood consumption revealed that average consumption varied from 0.5 cubic metres (r) to 1.8 cubic metres (r) in the wood scarce areas and relatively better off places, respectively. The severity of the fuel-wood crisis is further manifested in the use of cow-dung and crop residues for energy in some villages. Although the survey did not cover fuel-wood consumption in urban areas as such, its relevance to this study lies in being able to situate the charcoal industry in the context of the rural-urban linkage that is charcoal is produced in the rural areas but is consumed in urban areas; a situation that manifests "one way traffic" in the flow of resources between rural and urban areas. Shechambo (1986) attempted to measure the extent to which the demand for fuel-wood and charcoal in urban Tanzania is influenced by such factors as prices, income and population size. The author confirmed that all such variables greatly influence the demand for forest products.

Regarding the state of poverty in Tanzania, several studies have been undertaken to show its extent in the country in relation to environment. Poverty is seen to be characterized by low per capita income which makes the capacity to meet basic needs low [Chambers 1985]. Other characteristics of poverty include the prevalence of sickness due to ill health, indebtedness and inadequate supply of food. It is argued that poverty can be conceptualized as a standard of living whereby one lives below the minimum acceptable level.

Tibaijuka and Kaijage [1996] study shows that, attempts at assessing the poverty level in Tanzania have in general been made within the framework of the World Bank's construction which essentially relates poverty to income. The magnitude of poverty is adjudged on the basis of poverty lines constructed according to minimum level of income considered necessary to support a minimum standard of living. The definition of the minimum is, for most part, nutritional based as confirmed by the ILO's study referred earlier. In comparison to the rural poverty, urban poverty has received less attention, probably because of the general assumption that urban residents are more privileged than their counterparts [Tibaijuka and Kaijage, op cit]. Bagachwa and Naho [1995] argue for changing the attitude of paying more attention to the rural poverty in favour of urbanities because of the increased rural-urban migration which lead to high demand for labour and social services as reflected by the growing urban informal sector activities. This study accepts and therefore adopts the Naho's advise by focusing on the urban poverty with its link to the environment.

It is understood that the link between the spread of poverty and the problems related to environmental degradation is not so straight forward as has been assumed. It is argued that the causal-effects of poverty and environment are much more complex in developing countries including Tanzania. Similarly, since forest, woodlands and trees harbour a diverse of flora and fauna community, clearing forest for whatever reasons endangers bio-diversity, removal of trees removes the carbon sink and the absence of carbon sink leads to a build up of atmospheric levels of carbon dioxide. In all these studies above none made an attempt of defining the existence and the direction if any, of the link between the environment and poverty. These studies however have succeeded in portraying the state of deforestation in Tanzania and its contributory factors. To a large extent the studies have provided a starting point towards determination of the existence and the link between the environment and poverty as per the existing situation.

Theoretical Framework and Methodology

The study will use multidisciplinary approach in analyzing qualitative information and data collected from the field. It will however, use the theory of demand as a tool of analysis to determine the factors that influence the demand for forest products by the poor (by using secondary data). The assumption here is that to a large extent the poor use forest products because they are cheaper and easily accessible than other alternatives.

The other framework to be used is that of vicious spiral relationship between poverty and environment. Here it is envisaged that the factors that influence deforestation will have a long-term impact on the poverty level which later accelerates environmental degradation. This is due to the fact that natural resources on which most poor people greatly depend are depleted. The depletion of forests starts with tree felling for various reasons, including clearing land for agriculture, felling tree for timber and fire-woods, etc., The impacts of felling trees are manifested in the second-round of causal-effects. Felling trees leaves the land bare because of less forests cover, this in turn reduces agricultural outputs. The vicious cycle of low agricultural output, ceteris paribus, manifests itself in low incomes and food that engender lower labour productivity because of poor nutrition. Similarly, deforestation may lead into shortage of building poles which are significantly used by the most poor for housing and for selling to earn their daily bread, hence increased poverty. This implies that any impact on deforestation could have an effect on the availability of rain which is important for crops yield for the rural [poor] peasants.

The degree at which deforestation relates to poverty level will be examined through participatory field survey to the chosen sample.

Model Specification

Factors that influence the demand for any commodity will affect the demand for forest products. These factors include *inter alia* own prices, price of substitutes, population,

income, tastes and preferences. The proposed model to be used has two equations. The first equation of the model is the one specifying that the quantity of fuel-wood demanded is a function of its price; the price of other types of fuel which for the case of Tanzania are kerosene and electricity, the population size, and real incomes. Second, is the equation showing that, the quantity of timber (which includes building poles) demanded will be influenced by its price, price of its substitutes, growth in construction activities and real income of the consumers. In fact, the factors influencing the model are numerous, only the factors seen *a priori* to have a larger influence on the model are considered.

The model is stated as follows:

1. $\ln QWf = Ao - A1\ln 1Pwf + A2\ln Pk + A3\ln Pe + A4\ln Sp - A5\ln Ym + U1$
2. $\ln QT = Bo - B1\ln PT + B2\ln Pst + B3\ln Ca + B4\ln Rm + U2$

Whereby:

QW= Quantity of fuel-wood demanded

Pwf = Price of fuel-wood

Pk = Price of Kerosene

Pe = Price of electricity

Sp = Population size

Ym = Income of the low/middle men

QT = Quantity of timber demanded [including building poles]

PT = ← Price of timber

Pst = ← Price of timber substitutes (iron bars, glass, plastic products).

Ca = Growth in construction activities

Rm= Real income of consumers.

Ai and Bj (where i=0-6 and j=0-4 respectively) are parameters. U1 and U2 are the error terms which capture all the variables not taken in the model and satisfy all properties of

ordinary least squares such as zero mean and constant variance. Prices to be used will be in real terms.

In the first equation, it has been hypothesized that the quantity of fuel-wood will be negatively related to its price, implying that at higher price people will tend to substitute fuel-wood with other fuel types. The quantity of fuel-wood demanded on the other hand will be positively related to the prices of its substitutes namely Kerosene, Electricity and also the population size. The quantity of fuel-wood demanded and income of the poor are negatively related. It is expected that as income increases, poor people will tend to consume less fuel-wood, as it is regarded as an inferior good.

In the second equation, the assumption is that timber is a normal good, and the quantity of timber demanded is negatively related to its price, and positively related to price of timber substitutes, growth of construction sector and real income of consumers.

Type and Data Source

The study will employ both primary and secondary data. Whereas the primary data will be obtained from households through direct interviews, the secondary data will be collected from the following main sources: Forest Department of the Ministry of Natural Resources and Tourism, National Environmental Management Council, Central Bureau of Statistics and the Environmental Data Bank of the University of Dar es Salaam's Library.

Research Instruments

Questionnaire will be used in collecting household level data and Library search and source visits will be applied for secondary data collection. The secondary data will be largely time series for the variables covering the period at least within 15 years time frame.

Sample and Sampling Procedures

A field survey will be conducted in Dar es Salaam and Coast regions specifically at Mbezi Luis, Kibamba, Pugu and Kisarawe villages where tree cutting for a number of uses has been rampant. In designing the sample the question of defining the population, the size of the sample to be used and the degree to which the sample is intended to be representative of the population will be taken into consideration. The aim is not only to capture the true sample but also to reduce time taken and the cost of resources and also making the survey feasible.

Data Analysis

The study will combine both qualitative and quantitative analysis techniques. The qualitative and quantitative methods which include direct interviews and use of secondary information and data are meant to understand the social and economic realities under study to come up with policy specific measures to curb deforestation and alleviate poverty. Whereas analysis techniques will include descriptive statistics and cross-tabulation, quantitative data is meant to support the qualitative assessment.

Tasks to be accomplished

The research team perceive various tasks to be accomplished during the conduct of the study as falling under four categories namely; Preparatory, Field Work, Draft Report Compilation and Brainstorming exercise between the research team and some key stakeholders .

Task 1: Preparatory Phase

The main tasks to be completed during this task phase are;

1. Interpretation of the research background to research assistants.

2. Further literature review and technical consultations on the assignment with experts in poverty and environmental issues as a way of sharpening the research approach.

3. Set out strategies for ensuring the best achievement during the conduct of the assignment.

4. Make appointments and accomplish all logistics required for undertaking this research.

Task 2: Field work phase

This task broadly involves addressing key questions related to poverty and environment; Specifically issues raised under the research questions, objectives and hypothesis will be tackled.

Task 3: On the basis of results generated under tasks (1) and (2) The draft report will be compiled.

This task, to be accomplished once the field works are completed, and data has been compiled validated and tabulated.

Task 4: On the basis of results generated under tasks (1) (2) and (3) brain storming will be conducted. Village leaders, some people in the study areas and other stakeholders will be contacted for discussion and focus group study.

The main intention in fulfilment of this task is polishing the report and get more practical solution from the affected people.

Flow Plan for Task/Time Budget

Task/Time	Week 1&2&3	Week 4-8	Week 9-14
1 Preparation, Research design sampling and Literature Reviews and questionnaire testing			
2 Main Field Work Survey			
3 Data Inputting, Cleaning, Analysis and Report Writing and Finalization			

This chart above describe the sequencing and time budget of various tasks to be fulfilled during the implementation of the study, which include participation research design and refinement, data collection, data inputting, cleaning, analysis and report writing. The study is expected to last for 14 weeks.

A period of two weeks will be set aside for bringing all the research participants into a brainstorming during which the research tools will be thoroughly discussed. Training for research assistants will also be provided during that period.

Data cleaning, analysis and report writing is expected to be conducted soon after the data collection has been undertaken. The main outputs of step 4 will be the draft Report . It is at this stage that the brainstorming session leading into a proposal for identifying ways through which forests around Dar-es Salaam can be better utilized for the betterment of the entire population in the areas will be done. Ways of alleviating poverty without affecting the environment will also be searched.

Project Personal And Management.

In order to ensure high quality and timely completion of the assignment the research team will be under a project co-ordinator who will be responsible for the overall coordination of the different components to the project assignment. Acting as a focal point, the coordinator will facilitate the research team and other engaged experts to work together for the common goal of strengthening the quality of the project. The specific functions for this position shall be:-

Managing and coordinating the administrative aspects of the project, including all field operations.

Monitoring progress on structured work plan with the research team and other engaged professionals, which includes careful monitoring of progress towards milestones and achievement of result.

Ensuring complementarity of activities of each assignment.

Ensure the timely procurement of supplies and services required by the research team.

Keep records to monitor and ensure that the research team deliver output according to the schedules agreed with REPOA

Providing technical direction of the assignments

Ensuring timely collection and analysis of data

REFERENCES

Bagachwa M.S.D and Naho, A. (1995), "Estimating the second economy in Tanzania", in World Development, Vol. 23, No. 8, pp. 1347-1399.

Bagachwa M.S.D and Limbu, F. (ed.) (1995); Policy Reform and the Environment In Tanzania. Dar-es Salaam University Press.

Chambers, R., (1994), "The Poor and the Environment: Whose Reality Counts," A paper presented at the conference on Poverty Reduction and Development Cooperation, Copenhagen (23-24 February).

Christiansson, C. (1986); "Land Degradation and its Control: The case of Tanzania". Background paper submitted to the conference on "Land degradation and desertification control in the SADCC region, Maseru, Lethoto, 27-29.

DANIDA (1989); "Environmental Profile: Tanzania". Ministry of Foreign Affairs, Copenhagen. Denmark.

Fleuret P. C and A. K Fleuret (1978); "Fuel-wood use in a peasant economy: A Tanzanian Case Study". Dar es Salaam.

Frederick Kaijage and Anna Tibaijuka[1996], "Poverty and Social Exclusion in Tanzania". Research Series. ILO Publications, Geneva, Switzerland

Hartley, B. J. (1938); "An Indigenous System of Soil Protection", East Africa Agricultural Journal. Vol. 4.

Havnevik, K. J. 91983), "Analysis of Rural Production and Income, Rufiji District, Tanzania IRA report No.3.

International Labour Organization. (JASPA) (ILO - JASPA) "Towards Self-reliance: Development, employment and equity issues in Tanzania", Addis Ababa.

Jambia, G., K. Kulindwa, and H. Sosovele, (1997), "Poverty and Environment: The case of Informal Sand-mining, Quarrying and Lime-Making Activities in Dar es Salaam, Tanzania". REPOA. Dar es Salaam.

Kaale, B. (ed.) (1983), Tanzania Five Year Afforestation Plan 1982/83 - 1986/87. Dar es Salaam: Ministry of Natural Resources and Tourism.

Kahyrara G(1997), "The Economic Instruments for Environmental Management in Tanzania: The Case of Environmental Taxes." A paper presented at a conference on Environmental Implications of Market-based Policy Instruments in Göteborg Sweden, November 1997.

Kikula, I. S. (1986); "Environmental Effects of Tanzania's Villagisation Programme". Ph.D. Thesis, Griffith University, Australia.

Kilahama, Felician (1983); "Wood as a Source of Domestic Energy in Tanzania". M. Sc. (For) Extended Essay Australian National University.

Kulindwa and Shechambo (1995); "Environmental Implications of Economic Reform policies for Agricultural Development of Tanzania", Policy Reform and the Environment in Tanzania. Dar es Salaam University Press.

Lunan, M.(1950); "Mound Cultivation in Ufipa". East Africa Agricultural Journal. Vol. 16.

Mascarenhas, A. C., I. Kikula, and P. Nilsson, (1983), Support to Village Afforestation. Institute of Resource Assessment (MITI Project) Report.

Mashala, Salome K. (1979); "Vegetation as a Source of Fuel in Tanzania". M. A Thesis University of Dar es Salaam.

Mnkeni, P. N. S. (1992); "Role of Soil Management in Enhancing Sustainability of Smallholder
cropping system in some Agro Ecosystems in Tanzania".): Ecology and Development Programme. Norway.

Mnzava, E. M (1981); "The wood Crisis In Tanzania: Policy Problems and Statistics". Ministry of Natural Resources and Tourism . Dar es Salaam. (mimeo).

----------(1983), Tree Planting in Tanzania: A Voice from Villagers. Dar es Salaam: Forest Division.

Mwandosya, M. J. and M.P.L. Luhanga, (1983), Energy Resources, Flows and End-uses in Tanzania. Dar es salaam: University of Dar es Salaam.

Naho, A. (1995); " The Link Between Public Policy and Deforestation: An Econometric Analysis of Tanzania". Policy Reform and the Environment in Tanzania. Dar es Salaam.

Openshaw, Keith (1971); "Present consumption and future requirements of wood in Tanzania". Rome: FAO (ESF/TAN Technical report No. 3).

Shechambo F.C., (1986); "An analysis of Demand for charcoal in Urban Tanzania: The Case of Dar es- Salaam and Mwanza" . Institute of Resource Assessment, University of Dar es Salaam.

Thornton, D. and N. V. Rause (1936); "Ukara Island and the Agricultural Practices of the Wakara". **East Africa Agricultural Journal**. Vol. 2.

Tinios, P. *et al.* 1993. "Households, consumption and poverty in Tanzania: Result from the 1991 National Cornell-ERB Survey", Seminar on policy and poverty in Tanzania, Dar es Salaam.

United Republic of Tanzania –URT, (1994); "The National Environmental Policy". First Draft, Ministry of Tourism, Natural Resources and Environment. Dar es Salaam.

United Republic of Tanzania, (1989); "Tanzania Forest Action Plan, 1990/91 - 2007/08". Ministry of Land, Natural Resources and Tourism, Dar-es-Salaam.