



Integrated Assessment of Trade Liberalization and Trade-Related Policies

A Country Study on the Forestry Sector
in Tanzania



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NOTE

The views and interpretation reflected in this document are those of the author(s) and do not necessarily reflect an expression of opinion on the part on the United Nations Environment Programme.

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EXECUTIVE SUMMARY

Project overview and background

Assessment of environmental impacts of trade policies has become enormously popular in recent years. Governments are now especially keen to collaborate with research institutes, universities, the private sector, NGOs, international organizations and other stakeholders in identifying and quantifying these impacts. The motivation behind the collaboration and interest is due to the experts' projections and empirical evidence which reveals that apart from possible gains from changes in trade policies there are adverse effects_ which, if uncontrolled, can jeopardize not only the country's trade position, but also pose a threat to sustainability both at national level and in some cases globally. This study is one such development in this area. With the financial and technical support of the United Nations Environment Programme (UNEP), the Centre for Environmental Economics and Development Research (CEDR) has undertaken an impacts assessment of trade liberalization in the forestry sector of Tanzania.

Importance of the forestry sector of Tanzania

The social, economic and environmental importance of the forestry sector in Tanzania's economy is significant. Although in absolute terms the sector's contribution to total GDP is claimed to be underestimated, current statistics reveal that during the past ten years the contribution has increased by about 35 per cent, from 2.6 to 3.4 per cent of GDP.¹ Covering 37.8 per cent of the total landmass, which is about 33.5 million hectares, the country's forests contain such a high level of biologically diverse resources that Tanzania is one of the richest countries in terms of biodiversity in the world, and among the 12 most diverse countries. Tanzania has Africa's largest number of mammals, second largest number of plants (10,000 species), third largest number of birds (1,035 species), fourth largest number of amphibians (123 species) and fourth largest number of reptiles (245 species), all harboured by the country's forests. In addition, the forests provide over 92 per cent of the energy resources, support development of other important sectors (such as agriculture and tourism) through provision of water sources and catchments, maintain hydrological balance and soil protection, recycle atmospheric gases, provide construction materials, employment sources and others.

Trade liberalization and development of Tanzania's forestry sector

Following large financial imbalances and the deteriorating external payments situation during the 1970s and early 1980s, trade liberalization has been one of the major

¹ Due to methodological problems a large part of the activities within the sector are not reflected in the GDP figures. Underestimation has been estimated at 35-60 per cent (see Bagachwa, 1992).

preoccupations of the economic reform measures Tanzania adopted during the mid 1980s. The forestry sector is among the sectors that have been influenced by trade liberalization. Specific trade liberalization measures that have directly or indirectly impacted the forestry sector include the elimination of official prices and introduction of market-based prices, resulting in price increases (of 40-60 per cent) of forest products, and consequent increased profitability of activities. This is one of the incentives for increased volume of production within the sector, which has tended to accelerate deforestation. In one study (Reed, 1996) it was found that trade liberalization and the related policies were responsible for increased land use by 13 per cent.

The other specific measure of trade liberalization was the abolition of export tax. Prior to trade liberalization Tanzania imposed an export tax on various exports including forest products. Such a tax has been one of the crucial barriers to exporters as it reduced their international competitiveness. Since forest products have unlimited domestic markets, producers tended to avoid the tax by domestic selling. With the abolition of export tax actors in the forestry sector who can export are now able to do so more competitively. This would also imply that more production is now required as the markets have expanded. The environmental consequences may be increased deforestation. Abolition of the export licensing system and elimination of the registration requirement for exporting companies are other specific trade liberalization measures introduced which have had similar effects to the abolition of export tax as they have removed anti-export barriers and facilitated export of forest products.

Apart from the specific measures elaborated above which have mainly affected the flow of forest products, there are other trade liberalization measures which have mainly affected the inputs used in the sector, and enhanced importation of finished wood products. Such measures include: the introduction of a retention scheme in the late 1980s which allowed exporters to retain an increasing share of their export proceeds to finance their imports, rationalization of import tariff rates, and abolition of import licensing. These measures ended the restrictive trade policy regime that Tanzania maintained for over two decades. Given that over 90 per cent of inputs used in the forestry sector (machinery and other equipment) are imported, these measures have facilitated the acquisition and access to imported inputs and technology, which are essential for forestry sector development. One of the effects associated with these measures is relocation whereby the increased competition of imported products has made domestic manufacturers switch to less costly inputs and technology that uses less wood thereby representing a positive environmental effect. Furniture making illustrates an example of this effect and details are given in the report.

In summary, following trade liberalization, there has been an increase in the production, distribution and marketing of forest products of Tanzania. This is reflected in the increased growth of trade in forestry products (both domestic and foreign trade) from 2-3 per cent prior to liberalization to about 10 per cent of total exports recently. The ultimate result of this change is increased foreign exchange contribution from the sector and growth in income in the sector. More companies are getting involved in the production and marketing of forest products. The second-round effect of this is seen in the increasing change in

production techniques such as use of modern sophisticated equipment for felling trees, extraction and production. The level of employment in the sector has generally increased as more people have become involved after liberalization. However, in the process the rate of deforestation has also increased.

Deforestation trends in Tanzania

The most comprehensive measurement of deforestation in Tanzania is based on the assessment of tropical forests and woodlands conducted more than two decades ago by the Food and Agriculture Organization of the United Nations (FAO)² within the Global Environment Monitoring System (GEMS). The assessment revealed an estimated deforestation rate for the period of 1978-1980 at 130,000 hectares per year. Another assessment was conducted in 1983 by the Forestry Department, which came up with the figure of 300,000-400,000 hectares of forest lost annually through deforestation. By the early 1990s estimates had gone up to 500,000 hectares of forests lost annually. Other studies (Naho, 1995, Bagachwa, 1995, National Forestry Programme (NFP), 1999) have confirmed that trade liberalization has partly increased the rate of deforestation through expanding activities within this sector and related sectors such as agriculture.

Methodology, approach and techniques

In undertaking this study, the aim was to conduct a social, environmental and economic assessment of the trade liberalization policies in the forestry sector, using cost-benefit analysis and other quantitative and qualitative approaches. In addition, a national steering committee with members from the public sector, private sector and academia was formed to guide project development and implementation. As part of their capacity-building programme, UNEP developed and provided an assessment manual which has been an important tool for providing a menu of options for developing in-country methodology for this study.

Environmental economics techniques have been adopted as part of in-country methodology for carrying out the assessment. The techniques employed carry out valuation of the economic, environmental and social costs of the production and consumption of forestry sector products, namely market and non-market valuation methodologies. These aim to reveal a value of the costs and benefits of the impacts associated with changes caused by activities within the sector in responding to trade policy adjustment. In addition, the qualitative approach to sector analysis of integrated assessment, as given in the UNEP reference manual was used. Both primary and secondary data were collected. Questionnaires were used to collect primary data, and search and source visits were used to collect secondary data. Focus groups and brainstorming sessions, meetings and on-site observation were also used.

² FAO (Food and Agriculture Organization of the United Nations): *An interim Report on the State of Forest Resources in the Developing Countries*, FAO, Rome 1988.

Study findings

The study findings have revealed that there are positive and negative social, environmental and economic impacts of trade liberalization policies on the forestry sector of Tanzania. The positive impacts include: increased export value of finished products; importation of machines used in the sector; technology impacts in the form of increased availability of equipment which has resulted in changing production patterns; increased market price of traded forest products; scale impacts in the form of the sector's increased total contribution to GDP; increased investment growth; and increased sector employment. Other positive impacts are: changing production, management and technology trends which are reflected by increased value added following improved market realization, and encouragement of exports of finished products through fiscal incentives such as lower corporation tax, minimum custom duty on capital goods, zero sales tax on capital goods, and minimum withholding tax for investors in forestry projects that have a significant impact on the economy.

In implementing trade liberalization measures, there has been a reduction of trade-weighted average tariff rates and removal of prohibitive tariff rates, which before liberalization were ranging from 0 to 300 per cent,³ measures that have resulted in a dramatic fall in the effective rate of protection in various economic sectors including forestry. This study has attempted to make a conservative estimate of the economic value of all benefits accruing from the positive impacts of trade liberalization. These benefits have been estimated in terms of trade effects and fiscal effects. The total monetary value of these benefits is about US\$ 44 million.

In the same way the costs of implementing the trade liberalization policy in the forestry sector has also been estimated. It is again worth noting that the estimates are conservative, giving an implicit valuation of what may have been the costs and do not necessarily reflect the true costs involved. Related to this point, there are other negative impacts that cannot be easily valued and are not considered in the estimates. The negative impacts valued are those relating to the increased intensity of the economic activities in the sector that have been triggered by trade liberalization such as: changes in the hydrological cycles due to declining forest density; loss in soil fertility; and decline in productivity particularly in the agricultural sector. A total cost of US\$ 8 million was calculated as a conservative estimation. These costs are externalized by actors in the sector; hence the need for adopting economic instruments for internalization of these costs and enhancing the positive impacts is called for.

Policy implications

Based on the study findings, a number of policy implications arise which include:

³ The bulk of imports were subject to tariff rates of 0,25 and 60 per cent. There were 15 other rates ranging between 15 and 200 per cent.

An effective environmental management framework in the forestry sector is crucial for attaining sustainable forest production;

- Transformation and/or restructuring of the existing institutional framework to protect the sector properly will be required;
- Adoption of policies for improved marketing of the forest products;
- Value added maximization by encouraging sales of less material?intensive forest products, mainly manufactured products (i.e. finished products) in an attempt to add to their value;
- Adopt appropriate fiscal policy instruments to enhance revenue collection in the sector as an important source of revenue required for management of the sector's resources;
- Review legal and regulatory systems to ensure that they are in line with the existing requirements of the liberalized forest sector;
- Ensure that production in the forests is carried out with due regard to environmental standards.

Recommended policy packages

In order to minimize the negative impacts of trade liberalization and the related policies in the sector, and at the same time enhance the positive impacts of the same, this study recommends some policy packages which include the following instruments;

- Pollution Control Agreements
- Forest Product Charges
- Control of Licenses issued to operators in the forests
- Forest Product Certification
- Increased fines/penalties to reflect the magnitude of the damage.

Implementation strategy for recommended policy packages

It is proposed that a Task Force is formed under the technical guidance of UNEP to scrutinize and where possible, harmonize policy formulation strategies for maximizing the economic gains of the trade liberalization and minimizing the negative effects of these policies.

The Task Force should include members from the Forestry and Beekeeping Department, the Vice- President's Office (Environment Division), the Ministry of Trade and Industry, the Ministry of Local Government, the National Environmental Management

Council, the Centre for Environmental Economics and Development Research and other stakeholders such as representatives from the private sector.

The major tasks of the Task Force shall be:

- To review various policy action proposals for forest management including the economic instruments;
- To advise on design and implementation of the recommended policy instruments for forest management;
- To liaise with the key institution(s) responsible for implementing the proposed instruments;
- To assist (the Forestry Department) in the implementation of the identified economic instruments;
- To identify the modalities of implementation e.g., establish a pilot forest area.

ABBREVIATIONS AND ACRONYMS

CBA	Cost-benefit analysis
CBD	Convention on Biological Diversity
CEDR	Centre for Environmental Economics and Development Research
CVM	contingent valuation method
CO ₂	carbon dioxide
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GEF	Global Environmental Facility
GEMS	Global Environment Monitoring System
GDP	gross domestic product
ha	hectare
IMF	International Monetary Fund
MIGA	Multilateral Investment Guarantee Agency
NGO	non-governmental organization
NMV	non-market value
NPV	net present value
PHRD	policy and human resource development
REPOA	Research on Poverty Alleviation
SAP	structural adjustment programme
TAZARA	Tanzania Zambia Railway Authority
TCM	travel cost method
TFAP	Tanzania Forest Action Plan
TRA	Tanzania Revenue Authority
TRIPS	Trade-Related Intellectual Property Rights
TWICO	Tanzania Wood Industry Company
WHO	World Health Organization
WTO	World Trade Organization
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
URT	United Republic of Tanzania
VPO	Vice-President's Office

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United Nations Environment Programme

The United Nations Environment Programme (UNEP) is the overall coordinating environmental organization of the United Nations system. Its mission is to provide leadership and encourage partnerships in caring for the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations. In accordance with its mandate, UNEP works to observe, monitor and assess the state of the global environment, and improve our scientific understanding of how environmental change occurs, and in turn, how such changes can be managed by action-oriented national policies and international agreements. UNEP's capacity building work thus centers on helping countries strengthen environmental management in diverse areas including freshwater and land resource management, the conservation and sustainable use of biodiversity, marine and coastal ecosystem management, and cleaner industrial production and eco-efficiency, among many others.

UNEP, which is headquartered in Nairobi, marked its first 25 years of service in 1997. During this time, in partnership with a global array of collaborating organizations, UNEP has achieved major advances in the development of international environmental policy and law, environmental monitoring and assessment, and our understanding of the science of global change. This work has, and continues to support, successful development and implementation of the world's major environmental conventions. In parallel, UNEP administers several multilateral environmental agreements including the Vienna Convention's Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (SBC), the Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention, PIC) and most recently, the Cartagena Protocol on Biosafety to the Convention on Biological Diversity as well as the Stockholm Convention on Persistent Organic Pollutants (POPs).

Division of Technology, Industry and Economics

The mission of the Division of Technology, Industry and Economics (DTIE) is to encourage decision-makers in government, industry, and business to develop and adopt policies, strategies and practices that are cleaner and safer, use natural resources more efficiently and reduce pollution risks to both human beings and the environment. The approach of DTIE is to raise awareness by fostering international consensus on policies, codes of practice, and economic instruments through capacity-building and information exchange and by means of pilot projects.

Economics and Trade Branch

The Economics and Trade Branch (ETB) is one of the Branches of the Division of Technology, Industry and Economics (DTIE). The work programme of the Branch consists of three main components, economics, trade and financial services. Its mission is to enhance the capacities of countries, particularly developing countries and countries with economies in transition, to integrate environmental considerations in development planning and macroeconomic policies, including trade policies. UNEP's mission in this field is also to address the linkages between environment and financial performance and the potential role of the financial services sector in promoting sustainable development. The trade component of the Programme focuses on improving countries' understanding of the linkages between trade and environment and enhancing their capacities in developing mutually supportive trade and environment policies, and providing technical input to the trade and environment debate through a transparent and a broad-based consultative process.

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FOREWORD

Implementation of trade liberalization and the related policies in the forestry sector of Tanzania challenges the country's ability to take advantage of the opportunities offered and at the same time counter the negative forces of trade liberalization. While the policies have succeeded in raising the sector's economic contribution, the negative consequences of such policies are frequently highlighted and observed. The positive impacts of trade liberalization in the sector are estimated to be worth around US\$ 44 million by this study. However, this does not take into account the negative consequences in terms of the environmental costs of trade liberalization. The negative impacts are reflected in terms of the socio-economic effects of increased rates of deforestation, decline of rare tree species (e.g., African Blackwood), destruction of water resources, soil erosion etc. The positive impacts of trade liberalization are thus undermined by the social and environmental costs associated with implementation of these policies; hence policies to minimize the negative impacts and enhance the positive ones are called for.

The existing environmental policies and institutional framework of the country's forestry sector have not been able to adequately address the negative impacts of trade liberalization policies. For many years management strategies in the sector relied on command and control principles, which have not succeeded very well in mitigating adverse impacts in the sector. However, the findings of this study indicate that the use of economic policy instruments such as pollution control agreements, forest product charges, proper control and monitoring of licenses issued to operators in the forests, establishment of forest product certification and other management measures, will enable Tanzania to mitigate the negative impacts and enhance the positive ones.

The total economic benefit of implementing the proposed environmental policy action is estimated at US\$ 158 million which is about 7 per cent of the country's total gross domestic product (GDP). It is apparent that the obligation of sustainability cannot be left entirely to a single entity. Government should take responsibility for ensuring sustainability of economic activities by adopting policies such as environmental taxes and regulations which could adapt the incentive structure in a way that protects the environment. Individuals and other stakeholders in the sector on the other hand should take part in forest conservation.

1. INTRODUCTION

1.1 Overview

The United Republic of Tanzania which includes the islands of Zanzibar and Pemba, lies on the east coast of Africa. It has a common border with eight countries: Kenya and Uganda in the north; Rwanda, Burundi and the Democratic Republic of Congo to the west; Zambia, Malawi and Mozambique to the south.

Tanzania boasts the highest mountain in Africa, Mount Kilimanjaro at 5,895 metres above sea level, a highland plateau and narrow coastal plain. With a land area of 945,087 square kilometres and an annual population growth rate of 2.8 per cent, the country's population stands at 28 million. The annual trade balance has been negative for the past three decades, and statistics indicate a huge negative trade balance of US\$ 450.9 million for 1999, an export value of US\$ 761.7 million (1999) and an import value of US\$ 1,212.6 million (1999). The total external debt according to these statistics was US\$ 6.4 billion while GDP was US\$ 2,294 million. GDP per capita was US\$ 198.

Covering 37.8 per cent of the total landmass, which is about 33.5 million hectares, the country's forests contain such biologically diverse resources that Tanzania is one of the richest countries in terms of biodiversity in the world, and among the 12 most diverse countries. Tanzania has Africa's largest number of mammals, second largest number of plants (10,000 species), third largest number of birds (1,035 species), fourth largest number of amphibians (123 species) and fourth largest number of reptiles (245 species), all harboured by the country's forests. Most of these have high market value and if properly developed can offer a greater contribution to the country's economy, which is one of the poorest in the world. In addition, the forests provide over 92 per cent of the energy resources, support development of other important sectors (such as agriculture and tourism) through provision of water sources and catchments, maintain hydrological balance and soil protection, recycle atmospheric carbon dioxide, provide construction materials, employment sources and others.

Social and economic development of Tanzania

Tanzania has undergone a social and political transformation process over the past few decades. These changes inter alia, have included going from a market economy to state control in 1967, i.e. six years after independence. Following poor performance of the state controlled economy there was a shift back from state control to a market economy in the mid 1980s. Specific economic changes during that period include adoption of structural adjustment programmes (SAPs) under IMF/World Bank supervision and financing. Other significant changes include an end to single-party rule and adoption of multi-party

democracy in 1993, end of public sector monopoly in production through encouragement of the private sector, and limiting government role to policy formulation and provision of a conducive economic environment. All these changes have created a new Tanzania—a Tanzania that is poised on the threshold of the 21st century to transcend its past and develop into a liberal, outward looking economy.

1.2 Trade policy and structural adjustment programmes in Tanzania

Trade liberalization as part of the overall economic liberalization has been one of the major preoccupations in the country's strategy to ensure attainability of an outward-looking economy. During the implementation of structural adjustment programmes (SAPs), the Government of Tanzania has given prominence to the expansion of trade in the development effort, in order to remove constraints that might otherwise be imposed by the limitations of the domestic market.

On multilateral and bilateral agreements and rules, Tanzania is a member of the General Agreement on Tariffs and Trade (GATT) and maintains bilateral trade agreements and protocols with over 23 countries in Africa, the Middle East, Latin America and Asia. In addition Tanzania has joined the World Trade Organization (WTO). Tanzania was a signatory to the Convention on Biological Diversity (CBD) at the Earth Summit in Rio de Janeiro, Brazil, in 1992, alongside more than 150 countries, and ratified it in 1996.

While it is now over a decade since Tanzania adopted trade liberalization and the related policy measures, the expectations and the optimality aimed at are yet to be attained. Further implementation of trade liberalization and the related policies and agreements in the future will be required.

A challenge ahead

Implementation of trade liberalization policies has not been smooth. In practice it has experienced social, economic and environmental impacts some of which are adverse. There have been costs (negative impacts) and benefits (positive impacts) appearing simultaneously. The question which must concern Tanzania under such circumstances is how can the country both prepare itself to take advantage of the opportunities offered by trade liberalization, and at the same time counter the negative forces of trade liberalization. In order to answer such a question, it is imperative to know what position in the economy various sectors occupied before and after the adoption of trade liberalization policies. This can be achieved through an integrated impacts assessment with a view to quantifying and assessing the impacts. Specifically it involves conducting a cost-benefit analysis to assess the magnitude of the impacts. This study thus attempts to assess and analyse the environmental impacts of trade liberalization on the forestry sector of Tanzania.

1.3 Study problems and limitations

The study's main task was to examine the environmental impacts of trade liberalization in the forestry sector of Tanzania. This entailed an investigation into the extent to which specific trade liberalization measures introduced into the forestry sector as part of the National Economic Reform Programme impacted on the environment. Given that

changes observed in this area cannot be entirely attributed to trade liberalization alone, the major problem of this study was how to isolate the effects of trade liberalization from other measures implemented along with trade liberalization. In addition, there are first-order and second-order effects of trade liberalization, or direct and indirect effects, factors that make quantification difficult. The other limitation of the study concerned data—there is a lack of consistent and comprehensive data in the forestry sector and the related economic variables in almost all sources of forestry statistics.

Despite these problems, the existing information available and further evidence collected (through fieldwork, stakeholders' meetings, national steering committees, consultations with well-informed individuals in the sector etc.) reveals that there is enough evidence to link the recent changes in the sector with trade liberalization and the related policy measures. The specific trade liberalization measures considered by this study are: elimination of official prices and introduction of market-based prices; removal of export taxes; abolition of the export licensing system; abolition of the import licensing system; rationalization of import tariff rates; elimination of the registration requirement for exporting companies; and introduction of a retention scheme in the late 1980s which allowed exporters to retain an increased share of their export proceeds to finance their imports.

Following the introduction, the rest of the report is organized as follows: Section 2 provides background to the project and elaborates on the relevance of the sector to the national economy, outlines project objectives and outputs; Section 3 provides an integrated assessment of trade liberalization impacts; Section 4 provides the valuation of such impacts; Section 5 offers policy implications for mitigating the negative impacts; Section 6 suggests packages for mitigating the negative impacts by enhancing the positive ones; Section 7 proposes an implementation plan and strategy. The last section summarizes project experience and main conclusions.

2. BACKGROUND TO THE PROJECT

2.1 Relevance of the forestry sector to Tanzania's economy

The forests of Tanzania cover 37.8 per cent of the total landmass which is about 33.5 million hectares. The main vegetation types include Afro-alpine heath and moorland, forests, woodlands, grasslands, bush and thickets, swamps, mangroves and man-made forests. About 13 million hectares of this total forest area have been gazetted as forest reserves. Over 80,000 hectares of the gazetted area is under plantation forestry management and about 1.6 million hectares are under water catchments management. These forests have social, economic and environmental importance not only for Tanzania but also for the world at large.

Tanzania has an agrarian-based economy, dominated by peasant farming which is very susceptible to factors like change in rainfall pattern, soil erosion and desertification. Forests play an essential role in maintaining the hydrological balance and soil protection through retaining run-off of the water from rainfall, important for agricultural development in Tanzania. In addition the forests are important for recycling carbon dioxide.

The forests of Tanzania are also an important factor in the development of other sectors like tourism. These forests offer food and habitat for wildlife, particularly in the four designated World Heritage sites of the Kilimanjaro and Serengeti National Parks, the Ngorongoro Crater and the Selous Game Reserves—all found in Tanzania. Other important resources in the forests are bees, unique natural ecosystems and genetic resources.

Forests and woodlands in Tanzania also provide 95 per cent of domestic energy resources, and several materials for food and medicine. The World Health Organization (WHO) estimates that over 60 per cent of the rural population in developing countries including Tanzania depend on medicinal plants from the forests. The forest also provides construction materials in terms of timber, building poles, ropes, roofing materials etc.

The sector is an important source of employment for Tanzanians, especially in rural areas. Various estimates indicate that over 1.5 million people are employed in the forestry sector, but official statistics (which are over ten years old) indicate that in 1989 the sector employed 730,000 people.⁴ This number by far exceeds the employment provided by any other sector of the economy except agriculture. Employment is provided through forest industries, forest plantations, government forest administration and self-employment in forest-related activities. The real contribution is underestimated due to unrecorded labour in the collection of fuel wood and other forest-based products consumed by households.

Trade in forest products has been on the increase and the sector's contribution to total trade has recently more than doubled. Export earnings from the forestry sector account for

⁴ Tanzania Forest Action Plan (TFAP), 1989.

over 10 per cent of total exports, forest products are among the three most important sources of foreign exchange, and the highest contributor to non-traditional exports.

This sector has been liberalized along with other economic sectors, and very recently, natural resources experts have raised concern that uncontrolled utilization of forest resources is a tragedy marked by loss of habitat, jeopardizing the advantages gained by trade liberalization policy measures. A critical analysis of the environmental impacts of trade liberalization on the sector is thus called for, and this study is one such attempt.

Trade liberalization and the forestry sector

Like all economic sectors of Tanzania, the forestry sector has been influenced by the trade liberalization policies introduced in 1987. These policies have specifically aimed at:

- Encouragement of private sector participation in various activities in the sector. Prior to the trade liberalization measures, parastatals had monopoly in wood and timber production and trading, but currently private companies are involved.
- Enhancement of exportation of forest products to boost the country's overall export growth.
- Encouragement of investment in the sector—the national strategy to promote investment for achieving growth and development has been a top priority after trade liberalization.
- Removal of distortion in the production and marketing of forest products by ensuring effective prices that are market determined.
- Removal of fiscal and non-fiscal barriers in forest trade.
- Promotion of forest-related sectors.

Since trade liberalization and other policy measures were introduced in the Tanzania forestry sector, the following has been observed:

- Growth in trade of forest products (both domestic and foreign trade) has been rapid, characterized by the increase in its share of total trade. This share has increased from 2-3 per cent to over 10 per cent recently. The ultimate result of this change is increased foreign exchange earnings as well as growth in income within the sector.
- Increase in production, distribution and marketing of forest products of Tanzania. More private companies are increasingly getting involved. The second-round effect of this change is change in production techniques such as the use of modern sophisticated equipment for felling trees, extraction and production.
- Trade and investment liberalization policies in other sectors and a general change in economic activities have also influenced activities in the forestry sector: construction activities in Tanzania depend on significant quantities of forest products as input and materials. In recent years such activities have increased, triggering increased production of forest products and exerting pressure on forest resources.

- The level of employment in the sector has generally increased.
- Loss of forest resources through over-harvesting has intensified. Over the last two decades, projections have shown deforestation in Tanzania to have jumped from around 250,000 hectares annually to around 500,000 hectares at present. Although the true rate of deforestation may be different from these estimates, the rapid increase of the phenomena is indisputable.
- In terms of usage of forest products, various estimates have indicated that fuel wood extraction represents the greatest use of forest products (estimates average over 60 per cent). The rest is distributed among the manufacturing sector which uses forest products as intermediate input (e.g., furniture and fixtures, timber extraction, wood products etc.) and the construction industry. The share of each of these is hard to compute due to limited data.

2.2 Project objectives and outputs

The study aimed at fulfilling the following objectives:

- To assess the positive and negative environmental impacts of trade liberalization policies and multilateral trade rules on the Tanzanian forestry sector, taking into account social and economic impacts.
- To elaborate country- and sector-specific methodologies to assess these impacts, and establish a long-term policy development process in the sector to address future trade-related environmental and social impacts of sectoral activity.
- To enhance coordination between Tanzania's stakeholders and increase the country's expertise in the use of integrated assessment tools in order to identify and quantify both negative and positive environmental, social and economic impacts of trade liberalization.
- To develop a policy package (a set of standards, voluntary private sector initiatives, regulations, and economic instruments, or a single economic instrument) to correct the negative and enhance the positive environmental, social and economic impacts of trade liberalization in the forestry sector of Tanzania.
- To perform a cost-benefit analysis for implementing the policy packages recommended by the study.
- To enhance and support national capacity in international trade policy research, strengthen human and institutional capacity in the selection, design and implementation of economic instruments which can assist in addressing the negative impacts of trade liberalization policies in the sector.
- To enhance national stakeholders' understanding of the implications of multilateral trade rules and trade liberalization on national sustainable development and the environment.
- To enhance national negotiating capacity and support the development of cost-effective national and international solutions to achieve environmental objectives.

The study aimed at producing the following outputs:

- An inception report to include: focus of the study, methodologies used, work undertaken, approach followed, institutions involved in the project, and sources of data.
- A report on the national stakeholders' workshop to launch the project.
- A country report to include:
 - Report of consultations with decision-makers
 - Report of consultations with stakeholders (civil society organizations, labour unions, local authorities, and private sector)
- A report on the national workshop where project results and recommendations are conferred.
- A brief report providing an assessment and evaluation of the project.
- Status report on the implementation of the policy package.

Project approach and process, methodology and data type

A participatory approach that ensured the active participation of all key stakeholders was adopted in the course of implementing this project (see annex 1 of this report). For carrying out the integrated impact assessment, both primary and secondary data were collected. A multidisciplinary team of experts was formed by the national institution for carrying out this study. UNEP provided technical and financial support to the national team in project implementation. In terms of methodology, various techniques have been adopted by this study as part of in-country methodology (see annex 1). Specifically the techniques employed are for carrying out valuation of the economic, environmental and social costs of the production and consumption of forest products. The methods adopted can be classified into market and non-market value methodologies. In addition the qualitative approach to sector analysis of integrated assessment, as given in the UNEP reference manual was used.

3. INTEGRATED ASSESSMENT OF TRADE LIBERALIZATION IMPACTS ON THE FORESTRY SECTOR

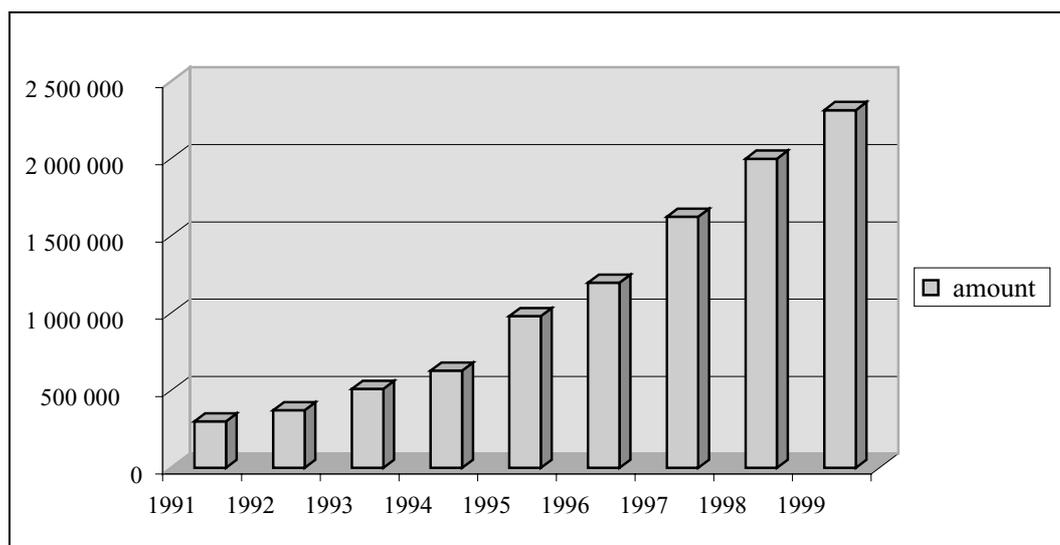
3.1 Economic impacts of trade liberalization

In assessing the economic impacts of trade liberalization, qualitative analysis of sectoral approach as presented in the reference manual of UNEP was adopted. The analysis is focused on; product impacts, technology impacts, production, management and technology trends and scale impacts.

Product impacts

In undertaking product impacts assessment, change in trade volume of products related to the forestry sector was considered. The analysis reveals a positive product impact in the form of increased trade of forest products which are environmentally beneficial (see the graph below). Prior to the adoption of trade liberalization measures, most forest product exports were composed of raw-form products particularly logs, followed closely by hardwood and softwood carvings. The trade liberalization policies encourage domestic processing of the forest products before they are exported, in order to add more value and discourage quantity-intensive harvesting blamed for increased deforestation.

FIGURE 1
Export of finished products in US dollars



Source: Tanzania Revenue Authority (TRA) and Official Trade Statistics.

The graph above reveals that exportation of finished forest products has been rising at greater magnitude since the beginning of the implementation of the trade liberalization policies and shows an upward trend throughout. The rate of growth in export of these products has averaged about 15 per cent annually from the early 1990s. The year with the largest growth rate was 1995 when the export of finished products increased by 35 per cent compared to the previous year. There was a ban in the exportation of hardwood in raw form as a measure to rescue hardwood species, some of which have been said to be near extinction. The trade statistics show that Tanzania's processed forest products are increasingly fetching a market in many parts of the world including the European Union, Asia, Africa, the United Arab Emirates, the United States and the Far East.

Types of processed and semi-processed wood products exported

The major products exported are; lamp and light fittings, mattress supports and articles of bedding, furniture and furniture parts, wood marquetry including inlaid wood caskets and ornaments, tableware and kitchenware, builders' joinery and carpentry, tools, tool bodies and broom brushes, wooden frames for painting, casks, wooden barrels, cable drums in wood, packing cases, veneer sheets and plywood sheets, and other related items. Products of this nature are more environmentally sound as they use fewer inputs and realize more value in the market. The financial impact resulting from exporting such items increases the capacity to manage the environment.

Global trends in international trade of forest products

The markets for forest products have been variable. According to an FAO report,⁵ global trade in primary forest products has risen substantially, reaching US\$ 126,000 million in 1998. Export volumes have varied since 1990. According to the same report, sawn wood exports have increased by 27 per cent while export of wood chips and particles have increased by 60 per cent. The report further highlights that tropical woods account for 70 per cent of plywood export. These international developments would suggest that Tanzania stands a good chance to expand her forest products exports. Forests being a natural resource, forests products are products which a developing country like Tanzania can produce at lower domestic cost and easily compete in international markets. This is therefore an area where Tanzania has high growth opportunity.

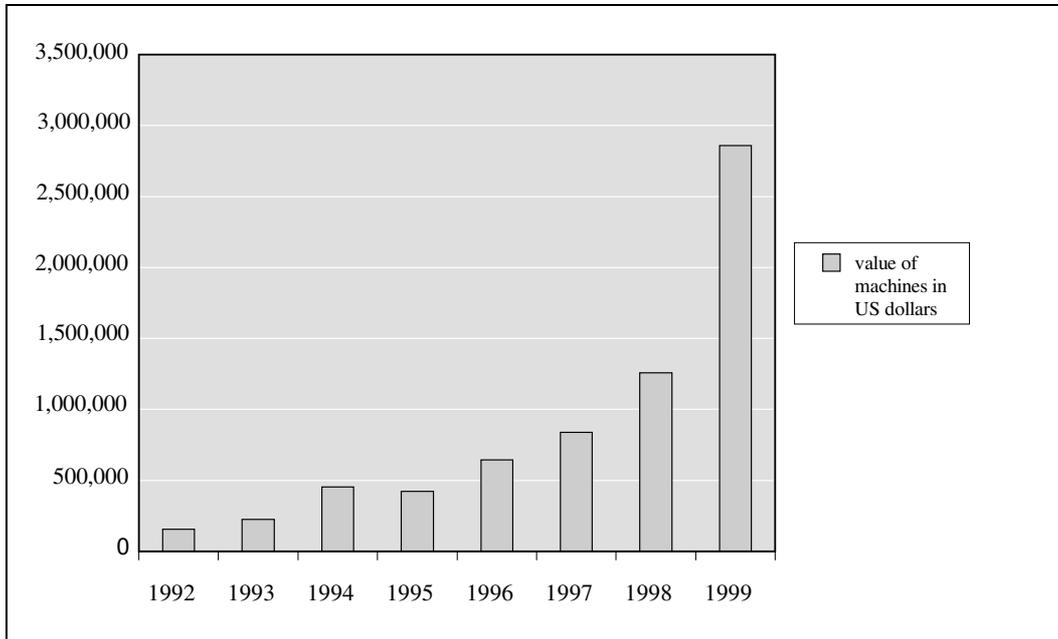
Increased importation of machinery for the forestry sector

Since trade liberalization, the machines used in the sector (such as forks, axes, hand saws, circular saws, chain saws, straight saws, blade saws and sawing machines) have been easily imported. This is a response to the removal of the protective and almost prohibitive import duties that existed prior to trade liberalization. According to the National Forestry Programme⁶ individuals and private companies have increasingly acquired imported technology i.e. mobile sawmills and woodworking machines. The existing trend is depicted in Figure 2 below.

⁵ Food and Agriculture Organization of the United Nations, Forestry Department) 1998-1999), *Commodity market review*, Viale delle Terme di Caracalla, 00100 Rome, Italy.

⁶ URT (1999), National Forestry Programme, Ministry of Natural Resource and Tourism, Dar-es-Salaam.

FIGURE 2
Value of imports of machines in the forestry sector in US dollars



Source: TRA and Official Trade Statistics.

However, there are some negative impacts associated with importation of some machines where forest harvesting is not environmentally sound. Following rationalization of import tariff rates, removal of restrictive import procedures such as the abolition of import licensing and others, producers in the sector can import various machinery and equipment required for the production process. Some large timber companies are blamed for acquiring heavy machinery that destroys small trees and other plants in the forests. In this connection, a concern was raised during the stakeholders' meeting that the increased importation of machines used in the sector has not succeeded in bringing more of the modern machines that minimize waste during production. The percentage of waste generation has remained stagnant which implies increased environmental problems due to increased scale of production.

Technology impacts

The technological impact of trade liberalization is indicated by the change in type of technology used that is induced by changes in trade policies. In this study it was revealed that large furniture manufacturers located in Dar es Salaam admit that trade liberalization has changed their behaviour for mainly two reasons: increased competition with imported furniture, and rise in the price of wood due to higher demand. Interviews with dealers in the wood sector in Dar es Salaam confirm that there has been an increase in prices of all types of timber, especially after trade liberalization. When comparing current prices with those before trade liberalization was adopted, the increase confirmed by this survey is between 40 to 90 per cent (depending on the type of timber).⁷ This has forced manufacturers to adopt a production technology which uses less wood to produce modern products. The type of furniture most affected is made from hardwoods.

⁷ For details on the prices changes see Figure 10 of this report.

There has also been relocation whereby some of the furniture produced now uses more softwood and other materials like metals and plastics. This is one example of the technological impact of trade liberalization. The other example is seen in increased use of charcoal-saving stoves. As in furniture manufacturing, liberalization of the forestry sector has resulted in increased price of fuel wood and charcoal partly due to exportation of such products. This state of affairs has triggered the development of charcoal-saving stoves and consumers are increasingly adopting these stoves.

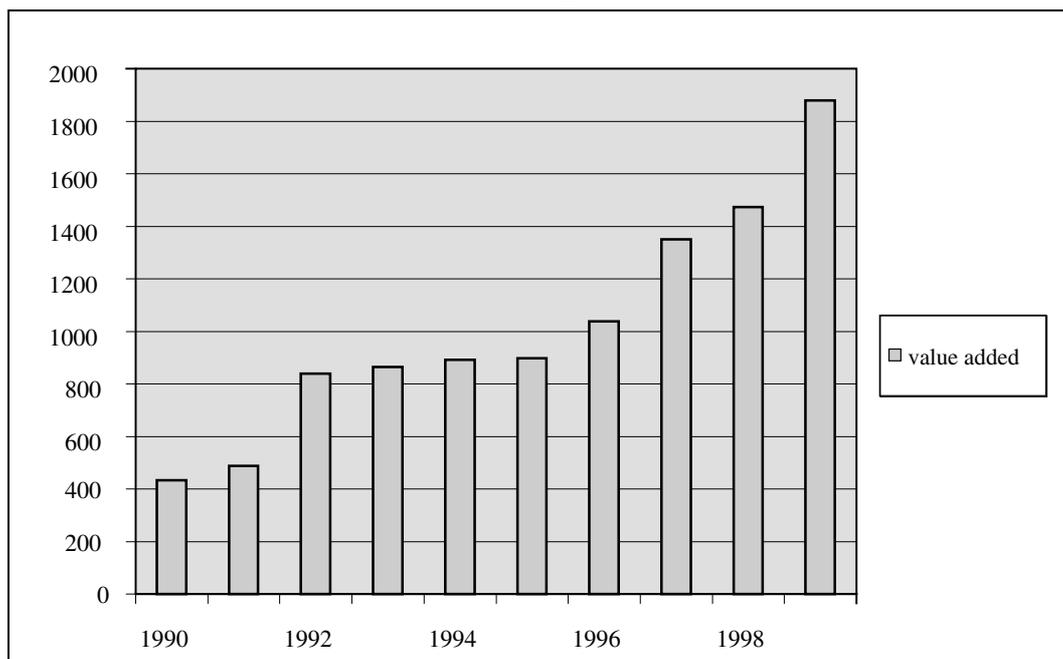
On the negative side, no clear evidence is visible but it has emerged very clearly that the extent of technological advancement in the sector is rather small. The trade-off here is that trade liberalization has allowed for increase in tools rather than the introduction of new tools which were not in use before. The net effect is thus an increased rate of deforestation resulting from expansion of the production capacity.

Impact on production, management and technology trends in the forestry sector of Tanzania

The impact of trade liberalization on production, management and technology trends in the forestry sector of Tanzania is another important aspect of economic impact considered. The analysis looks into the technology and management systems employed by the production units that have been carrying out trade and investment in the forestry sector. Important variables investigated are; inputs, production technology, physical technology, management standards, product characteristics and prices.

In carrying out this analysis it was assumed that the production, management and technology trends could be measured in terms of productivity and contribution to the economy.

FIGURE 3
Value added of the forestry sector in US dollars



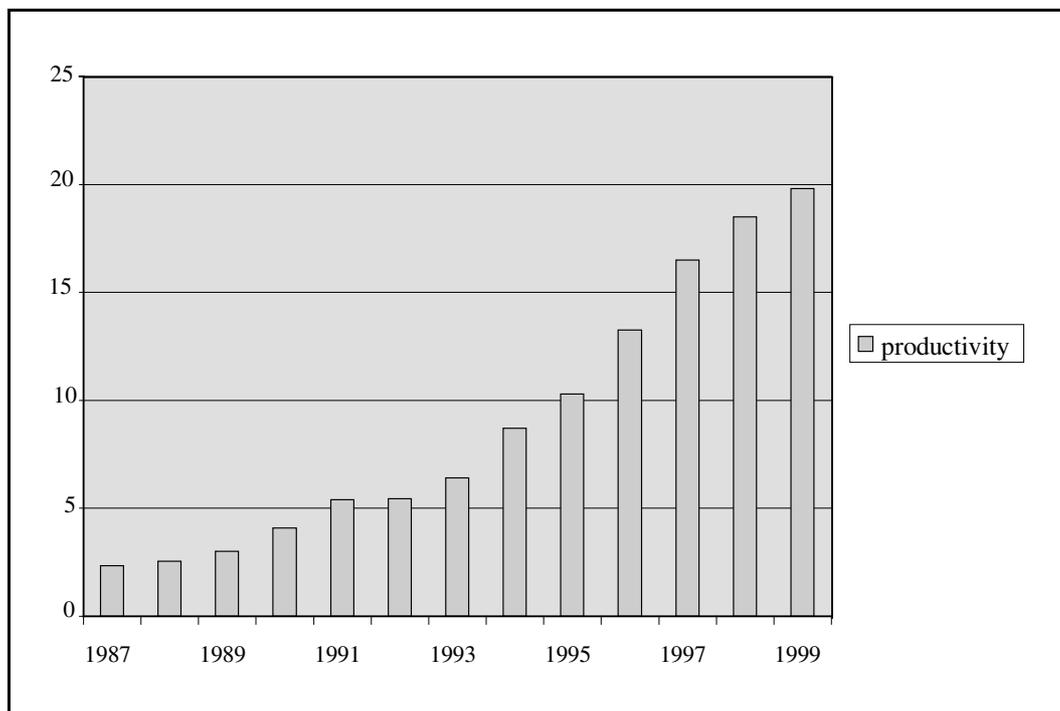
Source: Bureau of Statistics, 2000.

According to the figures above, the value added of the forestry sector of Tanzania has been positive and increasing from the time trade liberalization measures were adopted. This is evident from a four-fold increase between 1990 and 1999. The fieldwork has revealed that there has been an increase in profit following liberalization of the sector as price distortion has been removed and production and management systems have been improved to ensure profit. Due to the fact that private sector participation is encouraged, increased competition in production has forced firms to adopt management and production systems which are efficient and capable of maintaining production needs at reasonable costs.

Apart from the value added, the study also investigated the trends in productivity in the forestry sector. For simplicity, the labour productivity was considered as indicated in Figure 4 below.

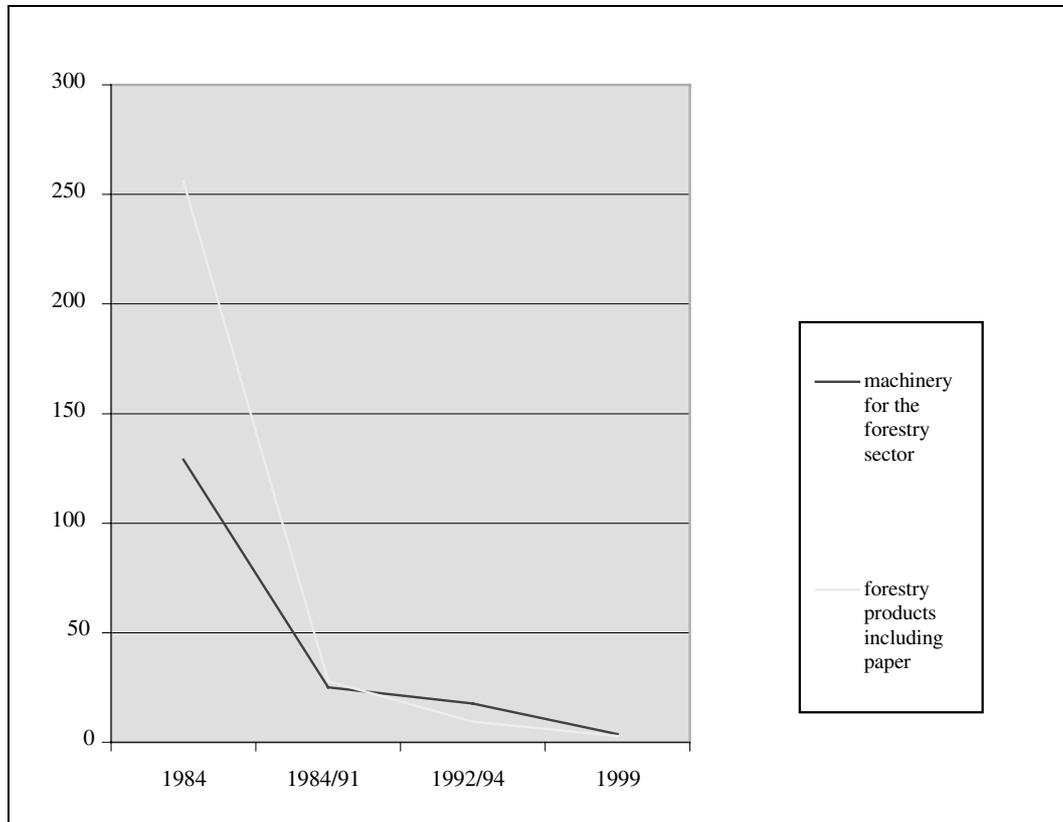
Productivity considered in this section is the measure of output per hours worked. This is used as a yardstick for efficiency and product competitiveness. Figure 4 summarizes such a trend and reveals that labour productivity has been increasing throughout the period investigated. The increase is high and rapid, almost 10 fold since 1987 when trade liberalization was at its initial stage, up to 1999. Following trade liberalization, importation of machinery and technology has been enhanced. Increased competitive pressure from liberalized markets has forced producers to adopt techniques that ensure more efficient use of labour power, i.e. output per man-hours, which may be translated into increased profitability. This is partly an indication of change in production and management systems, assuming other things are constant.

FIGURE 4
Trend of productivity in the forestry sector



Source: Bureau of Statistics, 2000.

FIGURE 5
Trends in effective rate of protection (in percentages) in the forest sector



Source: Computed using bureau of statistics data for relevant years.

The effective rate of protection in the sector was very high and almost prohibitive before the trade liberalization era, but recently the trend has shown a dramatic decline. Figure 5 above shows a falling trend in all machinery used in the sector as well as in forest products. In Tanzania's forestry sector, almost all machinery used in the woodworking industry and sawmills (such as mobile tractors, chainsaws, lathe machines and others), are imported. During the 1970s, the country attempted a basic industrial strategy intended to assist infant domestic industries such as Kilimanjaro Machine Tools which supplied tools to the sector, but due to various difficulties it was not successful in its intentions. With high effective rates of protection existing before trade liberalization was introduced, importation of machinery and technology was adversely affected, but currently the rates are lower, allowing for increased sector openness.

Trends in value of forestry exports as a percentage of the sector's contribution to GDP

Trends in the value of the forestry sector viewed as a percentage of the sector's contribution to total GDP is one of the crucial indicators of the change in degree of openness of the sector and the tradability of forest products over time. As indicated above, the sector's contribution to total GDP has shown an upward trend as a response (among other factors) to trade liberalization. This trend has been coupled with an increase in production

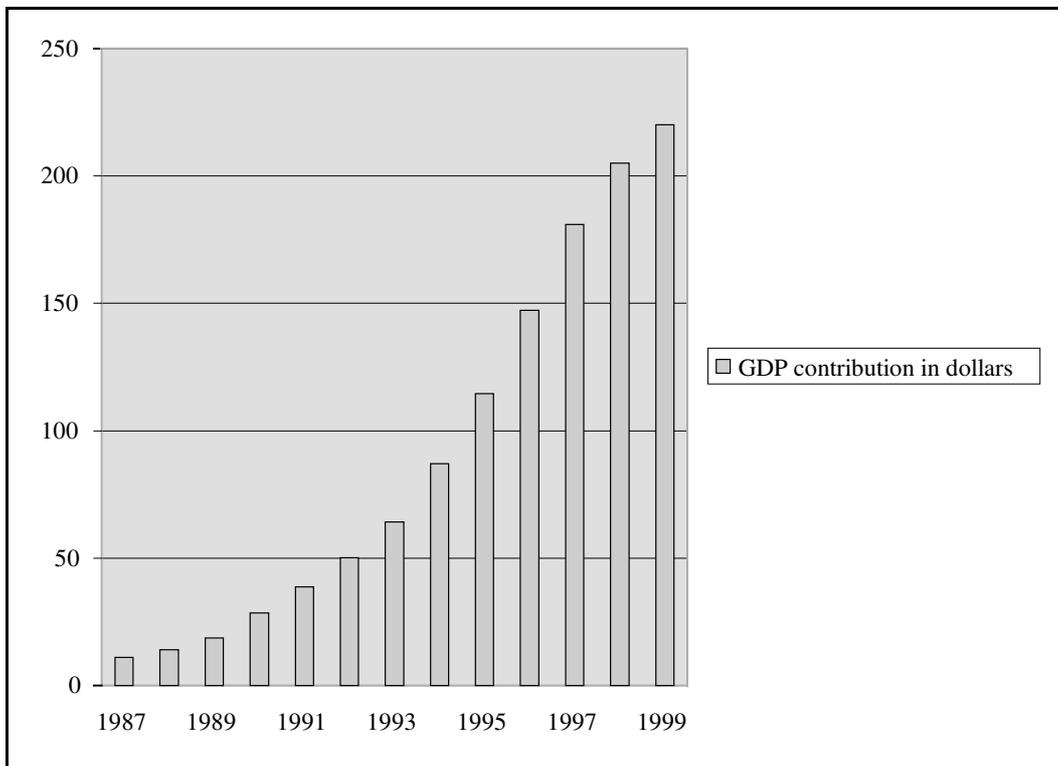
and trade in forest products. The assessment of this study reveals that sector contribution to GDP has also shown a tremendous increase. A comparison of GDP and trade statistics for 1994 and 1999 reveal that there was a hike in percentage from 7.5 per cent in 1994 to about 32 per cent in 1999, signifying a huge rise in trade volume.

Scale impacts of trade liberalization in the forestry sector of Tanzania

In analysing the scale impacts of trade liberalization in the forestry sector of Tanzania, impacts on economic growth, financial gains and related aspects were considered. The analysis looked at the contribution by the forestry sector to GDP, national employment and investment. Figure 6 below indicates the contribution of the forestry sector to total GDP from the time trade liberalization was proposed in 1987 to its implementation era of the 1990s. However, during the same period, investment promotion measures were implemented to encourage more participation of the private sector so as to enhance overall growth. It is therefore worth mentioning that the increase in GDP contribution is partly a reflection of trade liberalization measures, but also of other reform measures such as investment promotion.

Figure 6 indicates an impressive record in the overall contribution of the forestry sector to total GDP of Tanzania. Before the adoption of trade liberalization and other reform measures, the sector's total contribution was small. In 1987 the contribution amounted to 35,750 million Tanzanian shillings or about 178 million US dollars using the constant prices of 1992. By the 1990s the sector's contribution to GDP shows an upward rise and by the mid 1990s it reached 40,908 million Tanzanian shillings or about 204.5 million US dollars (using the

FIGURE 6
GDP contribution of the forestry sector in millions of US dollars



Source: Economic Survey, various years.

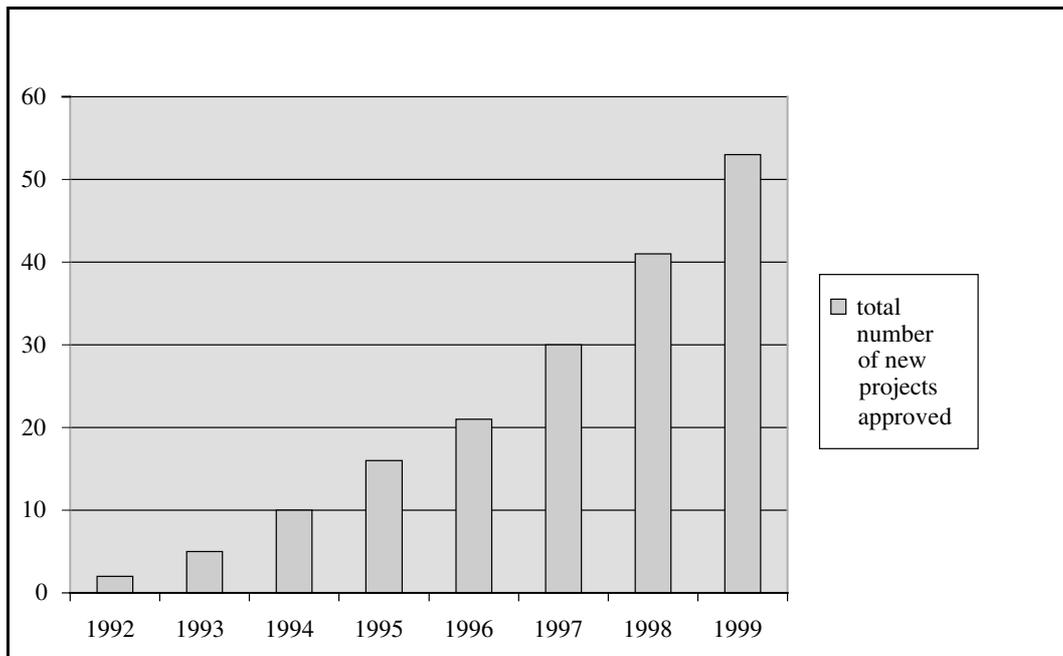
constant prices of 1992). By the end of the 1990s contribution to GDP reached 48,000 million Tanzanian shillings or about 240 million US dollars. This is about a 35 per cent increase in value of GDP contribution. In absolute terms of the sector's contribution to GDP, there has been concern that the contribution is underestimated due to lack of reliable figures and methodology, but given the statistics available, before liberalization, the sector was contributing about 2.7 per cent and currently stands at about 3.3 per cent of the country's total GDP. All this shows some positive scale effects of trade liberalization in the sector.

Trends in investment growth in the forestry sector

In analysing the scale effects of trade liberalization in the forestry sector of Tanzania, trends in investment growth were also considered and the results are shown in Figure 7 below. According to the graph, it is clear that there has been a sharp increase in investment growth from 1992 through 1999. Since 1992, the Tanzania Investment Centre has been attracting and approving investment, including forestry sector investment. From 1995 through 1999, the Centre approved about 30 large to medium-scale projects in natural resources sectors, including a significant number of forest-related projects. These had a value of 177,192 million Tanzanian shillings or about 221.49 million US dollars (using an exchange rate of 800 shillings per one dollar). In addition there are other projects established in the sector which are not captured by the Tanzania Investment Centre statistics. Although the increase in growth may partly be a reflection of an overall improved investment climate, removal of market distortion and opening-up of the sector through trade liberalization has equally been a driving force behind the observed growth. There are several advantages tied in with the increased investment and the important one is the increase in employment. This is shown in Figure 8.

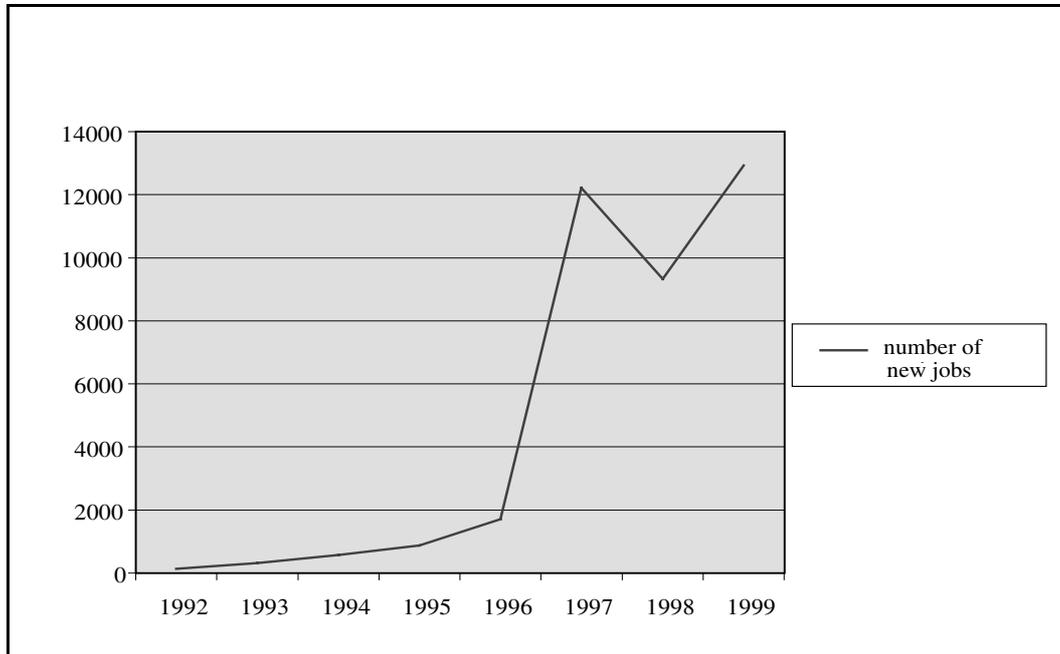
FIGURE 7

Total number of new projects approved



Source: Economic Survey, various years.

FIGURE 8
Number of new jobs created in the forestry sector



Source: Economic Survey, various years.

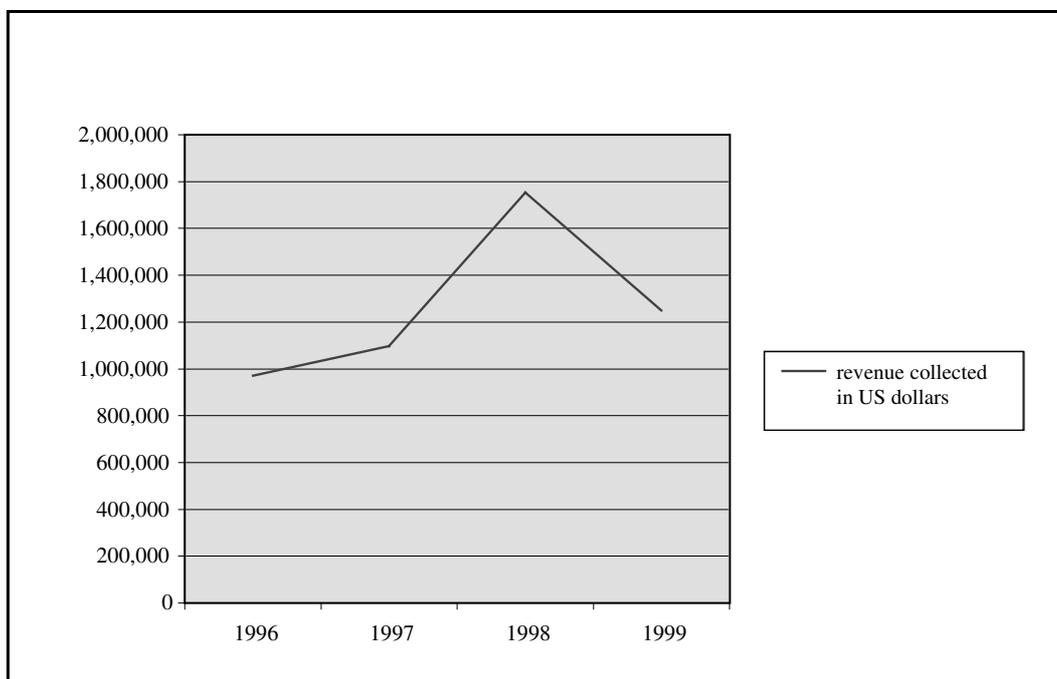
Figure 8 above indicates that there has been an increase in contribution to national employment through new investment growth in the forestry sector. These figures are cumulative over the last ten years. In 1992 few new jobs were created but by the end of 1999 new jobs had reached 37,377. This is a significant scale impact given existing unemployment in Tanzania.

The financial gains impact of trade liberalization on the forestry sector of Tanzania

The other scale effect analysis carried out was to check whether financial gain impact has materialized. This exercise started by investigating whether producers have a separate budget for mitigating deforestation. It was revealed that forest rehabilitation is mainly done by central Government, or local governments depending on who owns the forests. For the forests open to the public there is no specialized agent for rehabilitating the forests once damaged. Recently some NGOs have shown an interest and commitment to assist in the issue of forest rehabilitation. It is therefore clear that the agents of deforestation in Tanzania are not necessarily involved in mitigating it. However, producers in the forestry sector are at different levels required to pay fees and royalties which are, among other objectives, used to facilitate the exercise of mitigating deforestation. Due to data limitation it was only possible to get figures for 4 years of financial gains to the Government, starting from 1995.

The revenue referred to here includes the amount collected by central Government in the form of royalties. The figures reveal a slightly stagnant trend with marginal increases annually. Apart from the central Government collections, local governments in forest areas also collect a substantial amount of revenue in terms of local taxes, fees and royalties. Due to statistical problems their figures are not indicated. Despite this data problem, different reports in this area (e.g., REPOA, 1999) have indicated that the revenue contribution of the sector through these taxes, fees and royalties is significantly higher and increasing.

FIGURE 9
Forest royalty collected in US dollars



Source: URT, Financial Statements and Revenue Estimates Volume 1. 1999

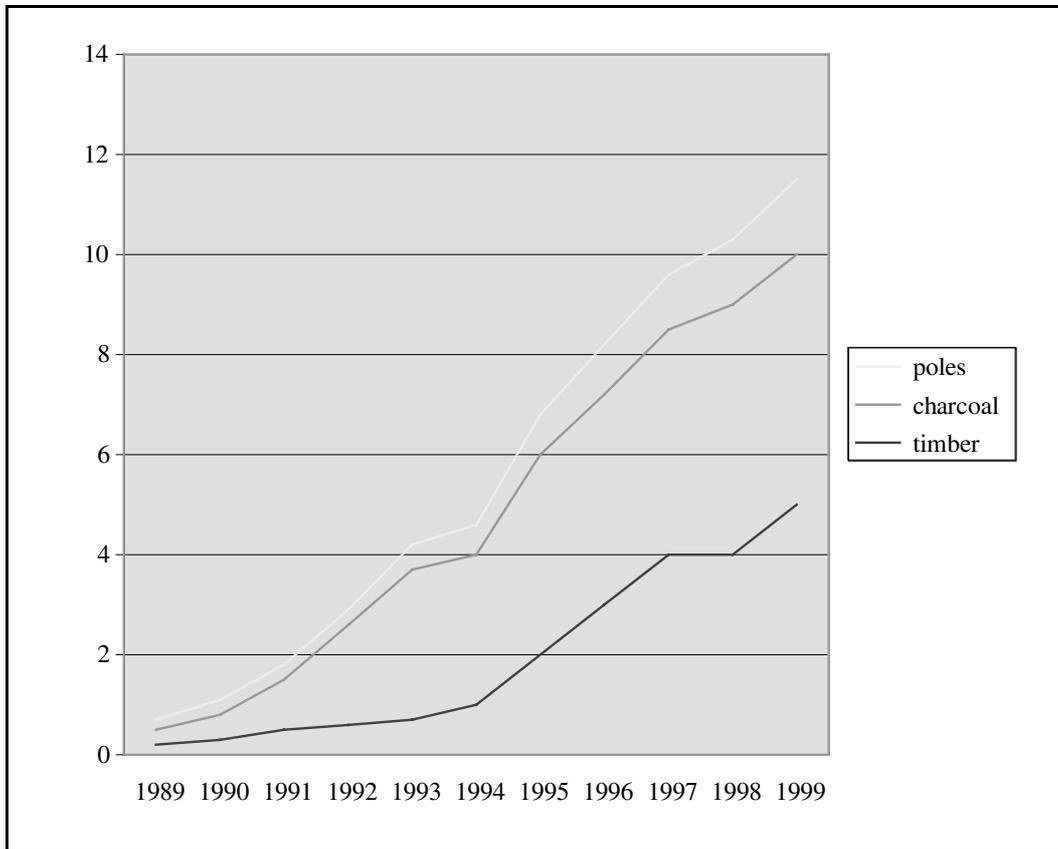
Other impacts of trade liberalization measures on the forestry sector of Tanzania

Structural impacts of trade liberalization measures on the forestry sector are another of the impacts considered. Such impacts consist of microeconomic effects resulting from trade liberalization. The intention was to analyse whether trade liberalization measures have promoted an efficient allocation of resources and efficient patterns of production and consumption within the forestry sector. The study reveals that trade liberalization in this area has resulted in two major effects on the product market. The first effect is encouragement of importation of high quality finished products and the second effect is a change in domestic prices of raw materials and finished products. These changes have intensified competition in production especially for the domestic producers.

The survey revealed for example that the price of timber has increased by 40-60 per cent (depending on the size and type of timber). Similarly charcoal prices have increased from US\$ 3 to US\$ 5 per bag from the early 1990s to the late 1990s respectively. The price of a bundle of firewood has increased from US\$ 0.5 to US\$ 1.5. One building pole is now sold on average at US\$ 1.2, up from US\$ 0.5 during the early 1990s (all prices quoted in Dar es Salaam). The increased price of timber has raised the cost of furniture production. A set of furniture made of hardwood which cost US\$ 37.5 to US\$ 40 during the early 1990s, currently costs US\$ 50 to US\$ 70. According to the furniture manufacturers, it is difficult to compete with imported furniture. The price trend is depicted in Figure 10 below.

There has been relocation where a lot of furniture produced now uses more softwood and other materials like metals and plastics. This has a positive impact on the environment because hardwood is endangered when compared with softwood. Other evidence in this area from the furniture makers interviewed indicate that they use other cheaper materials

FIGURE 10
Trends in domestic prices of timber, poles and charcoal



Source: Computed using survey interview statistics (CEDR, 2000).

like cardboards and papers to make high quality expensive furniture, in reaction to the ever increasing price of wood products. There is also the introduction of charcoal-saving stove technology. This cuts down on the quantity of charcoal consumed. Institutes of higher learning, hospitals and the like which are known to be major consumers of fuel wood are increasingly adopting this technology

Physical infrastructure impacts of trade liberalization on the forestry sector

This relates to the character and environmental impact of the physical infrastructure that supports site-specific production units and connects them to their inputs, customers and stakeholders. In the transport sector for instance, Tanzania has 5,000 km of roads and a railway network of 2,580 km linking the major ports of Dar es Salaam and Tanga to the central and northern parts of the country, and linking Kenya and Zambia to the two international airports of Dar es Salaam and Kilimanjaro. During implementation of structural adjustment programmes, apart from sector improvement programmes such as road repair, railway rehabilitation projects and other reform measures, liberalization of transport trade was also carried out. Private sector participation has been especially on the increase in road transportation.

In this connection, following increased trade in forest products, the TAZARA railway company introduced a special cargo train for transporting timber to Dar es Salaam where a large volume of timber is traded at the railway station. Apart from this development there is also the impact of increased transport of equipment to the areas. Following transport sector liberalization, there are more investors who have joined the transport routes to the forested areas. According to the Economic Survey of 2000, 14,810 licenses were issued to private operators, 61.5 per cent being for cargo transportation, including those operating in the forestry sector during 1999. There are hundreds of trucks carrying huge volumes of forest products to the markets of Dar es Salaam, Mwanza, Arusha, Tanga and other big towns.

All this has increased the intensity of trade in forest products. Whereas the increase in trade per se is regarded as a positive impact, increase in deforestation caused by infrastructure developments will be regarded as a negative effect. It has been revealed for example that lorries full of timber and charcoal bring at least 2,000-3,000 bags of charcoal and almost the same amount in bundles of firewood every day to Dar es Salaam alone.

Regulatory and policy impacts of trade liberalization on Tanzania's forestry sector

This study has confirmed that Tanzania has responded positively to the changed production sphere by adopting new policies and regulations in the forestry sector. The changes started with revising the National Investment Policy in 1997 which aimed to assure protection of investors and abide by the Multilateral Investment Guarantee Agency (MIGA), and also offer a wide range of incentives and guarantees to investors. The National Environmental Policy was also revised in 1997 to reflect the existing production environment. In this policy it is acknowledged that command and control alone will not solve the environmental problems of Tanzania especially given that market forces have taken the lead in production, replacing the planned economic system that existed before adoption of structural adjustment programmes. Market-based instruments such as economic instruments are proposed in various sectors of the economy.

Apart from these changes, the government of Tanzania has also adopted the new National Forestry Policy of 1998 which encourages private sector involvement and increased trade in forest products.

3.2 Environmental impacts of trade liberalization

The analysis of environmental impacts of trade liberalization has revealed increased rates of forest product extraction thereby fuelling deforestation. Increasing deforestation has resulted in adverse impacts in the country. Such consequences will increase even more dramatically in the near future if production and management practices continue in the way they are currently undertaken. These impacts are observed in the following forms.

3.2.1 The greenhouse effect

Both the consumption and production processes of forest products have resulted in increased atmospheric carbon dioxide particularly through burning forest products for fuel or as a result of uncontrolled fires during the process of production. In areas surveyed it was found that following liberalization, trade in forest products including charcoal has increased. The techniques used in the production of charcoal are associated with burning tree

products for several days, and in most cases the fire is hard to control especially during the nights and when it is windy. The process is associated with huge amounts of smoke which spreads to a radius of up to one kilometre, sometimes to the residential areas close to the forests and the roads passing near the forests. There is also the possibility of causing forest fires, especially at night when the actors are tired and they fail to exercise proper control. The other effect is in terms of increased production of fuel wood, which means more burning and increased deforestation, implying less ability of nature to control itself (given the fact that forests are important absorbers of CO₂). All this leads to increased concentration of CO₂ in the atmosphere.

Quantification of the extent to which trade liberalization has contributed to this problem is difficult to compute because there are other factors fuelling deforestation. However, there is clear evidence that production intensity fuelled by trade liberalization has significantly accelerated deforestation (see Bagachwa, 1994 and Reed, 1996).

3.2.2 Changes in hydrological cycles

Like other forests in the world, forests in Tanzania play an essential role in the maintenance of the world's hydrological balance. This includes maintaining rainfall patterns and retaining the run-off from rainfall. Forests of Tanzania also play an essential role in the transportation of water vapour through cloud movements into the areas around. The coastal forests of Tanzania for example (considered in this study) are influenced by the oceanic climate, and receive moisture from the Indian Ocean. These have been the major source of rainfall in the coastal parts of the country. Being influenced by the easterly monsoon winds they have historically provided two rainy seasons i.e. March-May and October-December. The rainfall of over 1200 mm has supported the growth of the rich African Blackwood found in these forests and make the forests rich in several unique features.

A threat to growth of rare tree species

The African Blackwood is a member of the rosewood family, with taxonomic classification in the family leguminosae, genus dalbergia, species melanoxyton. This type of wood constitutes one of the unique features of the east African forests. It takes 70-200 years to attain a usable size. It is a protected species in Tanzania, but has suffered from illegal and over-harvesting due mainly to its high demand. Tanzania is one of the two major sources of these trees in the world—the other is Mozambique. In this connection, protection of a specific species is very difficult in the case where harvesting of unprotected trees has a secondary effect on climate. It is thus clear that changing climatic and hydrological conditions will further threaten the existence of these rare wood species. In recent years there have been frequent shortages of rainfall and in some years the rains have not come in the expected dates. Notwithstanding the effect, this cannot necessarily be entirely attributed to trade liberalization, although there is evidence that trade liberalization is a major contributor to this sort of problem.

Water availability

In addition to the effects mentioned above, recently there have been increased problems in hydroelectric power supply due to a decline in river regimes. The weather experts confirm that the region is currently hard-hit by insufficient rain which causes rivers to

suffer from decline in water levels over long periods especially during dry seasons. This has resulted in increased water shortages and unreliability of water supply to the main hydroelectric power plant. The water levels in the major rivers of Wami, Rufiji and Ruvu have been unpredictable. The problem was intensified in the early 1990s when for the first time there was power rationing. Again a careful interpretation is needed because the effects are not entirely attributable to trade liberalization alone as there are other factors. Nonetheless it is unrealistic to assume that trade liberalization has not contributed to the problem. The available estimates of the cost of water and electricity rationing during the water shortage crisis have been estimated at US\$ 40 million.

3.2.3 Impacts on soils and agricultural land

Farming in areas near the forests has encroached up to the slopes of the mountains which are steep in nature. With increasing deforestation, soil is exposed to erosion and loss of important nutrients. Farmers interviewed in areas near Pugu, Mabwe Pande and Kazim-zumbwi forests confirm that they are seriously affected by the loss in soil fertility. Extension officers in the surveyed areas assert that nutrients, particularly phosphorous and nitrogen contents, are lacking in the soil in many areas. This is said to have encouraged poor farming practices and shifting of cultivation to within the forests, further damaging them. Fieldwork findings have revealed that productivity of new land is 3 to 5 years before being abandoned.

Forest fires caused by activities in the forests such as charcoal making, brick making, and uncontrolled fires are also said to be responsible for changing soil quality since some of the nutrients in the soil are affected by the burning process. Though exact figures are not available, it is estimated that over 20,000 hectares of forest have been destroyed by fires on the western side of the coastal forests mainly by charcoal burners and farmers who use fire to clear their land.

3.2.4 Impacts on forest productivity

Increased harvesting of forest products has resulted in a sharp decline of forest productivity in a given area. Specifically this trend is reflected in the decline of some tree species and the loss of biological diversity in the forests. The coastal forests have a long history of high levels of biodiversity, with 3,000 species of plants, some 500 of which are not found anywhere else in the world, 470 types of birds of which one type is not found anywhere else in the world, and several species of reptiles and animals some of which are endemic.

The forests have been harbouring east African Blackwood which is a very valuable tree used for African carvings. The survey has revealed that increased activities in the forest have badly affected availability of these products. Even actors in the forests have confirmed that it is near impossible to find a mature east African Blackwood in the forests at present. These trees take up to 100 years to reach maturity and have, since the early 1990s, been harvested without replacement. Also it has been confirmed that birds and reptiles endemic to the forests are currently traded as live products. Some of the species are killed in production processes such as fire, or die due to the changing environment. The practice of forest dealers of establishing permanent settlements in the forests has increased and sometimes they hunt the animals for food or commercial purposes.

Due to the declining availability of matured trees, there is also harvesting of non-matured trees to be turned into charcoal products. Actors interviewed admit that very young trees are being converted into charcoal, but they have to continue production since charcoal making is their single reliable source of income. The other products harvested prematurely are small-sized building materials known as fito.

3.2.5 Increased rate of deforestation

It is indisputable that there is an increased rate of deforestation as a result of increased production and trade in forest products. Various studies in this area (Bagachwa, 1995 and Reed, 1996) have confirmed that the implementation of trade liberalization has been responsible for increased rates of deforestation. The other indication of the increased trend of deforestation is that over one third of the Kazimzumbwi forest was destroyed within just 10 years after people invaded the forest and established permanent settlements.

3.3 Social impacts of deforestation

3.3.1 Social migration and invasion of the forests in search of productive land

Declines in productivity particularly in the agricultural sector, and increased activities in and around the forests tend to encourage populations to move to the forests in order to secure more productive land or find alternative activities for earning their daily bread. During the early 1990s, groups of people invaded the Kazimzumbwi forest reserve which is part of the 'biodiversity rich' coastal forests of Tanzania. These people established permanent settlements inside the forest and initiated various economic activities, mainly forest-related activities including charcoal making, harvesting and selling of firewood, farming, hunting etc. By 1998 it was realized that the number of invaders was increasing dramatically, and they had already destroyed about 50 per cent of the forest. These people were removed in October 1998. However in other parts of the coastal forests there are again signs of invasion and in some areas there are no clear forest boundaries as they are erased by the settlers. This study has found that most of the charcoal makers and other dealers in forest products tend to move with their families either near the forests or within. Here again a careful interpretation of trade liberalization impact is required. This may either be indicating the second-round effect of trade liberalization, or the fact that trade liberalization is among the factors influencing the observed invasion.

3.3.2 Health problems in society

Deforestation can have social effects in terms of increased human health problems. The effects are especially evident in the production sites and communities close to the forests. The possible manifestation of health problems caused by deforestation can be felt as a result of increased consumption of less environmentally sound forest products. During fieldwork, efforts were made to link the effects of deforestation with increased health problems. Data limitations made it difficult to capture strong evidence.

However, it was found that an implicit partial link could be established. Trade liberalization and the related policy changes in the sector have resulted in increased activities in the forestry sector. The intensification of activities in the sector is responsible for increased practices which may be the source of health problems in the society and the actors them-

selves, for example, increasing contamination of the water sources near or within the forests. It was found during fieldwork that two rivers—the Minaki and Mzumbwi in the Pugu and Kazimzumbwi forests—have traditionally been known for directly bringing safe water to over 10,000 people, but are no longer reliable. The increased movements of people and activities within the forests are responsible for contaminating these water sources. Apart from these two rivers, the coastal forests are also the major source of the three biggest rivers which are important for water supply in the regions of Dar es Salaam and coastal regions. These contaminations contribute to the spread of water-borne diseases such as diarrhoea, cholera, typhoid, and bilharzia, which are leading causes of high morbidity and mortality rates in the area.

Attempts were made during the survey to measure the extent of the problem using the cases reported in hospitals. There are no reliable statistics that can be used to make a clear estimate of the effect. But in general, water-borne diseases are among the major types of illness in the coastal forests—over 40 per cent of all illnesses in the area can be attributed to water-borne diseases. However, as has been pointed out, there is no substantial evidence to link these problems with trade liberalization in the sector although the persistence and intensity of the problem can be implicitly linked to the increased activities in the sector triggered by those policies.

3.3.3 Social organization impacts of trade liberalization

The social organization impacts of trade liberalization on the forestry sector of Tanzania were also analysed. The purpose was to check the way that social networking of stakeholders has been influenced by trade liberalization measures. Specifically this analysis has aimed at investigating how environmental enhancement flows from well-developed networks of social organizations that can add important environmental, cultural and public values to economic and market logic.

With the introduction of trade liberalization measures, an enabling environment for private sector involvement in forestry was created. This involves cooperation between forest administration and relevant private sector associations. Establishment of joint ventures by the private sector is being encouraged. Opportunities are provided to the private sector for training and transfer of technology.

Other measures being encouraged are establishment of forest village reserves, community-based organizations for joint forest management, exchange of information and awareness raising. Local communities are involved in forestry-related planning and decision-making through promotion of participatory extension methods and approaches. Forestry activities of local communities and farmers are promoted through extension services, technical assistance and establishment of appropriate financial incentives. Women's involvement in forestry activities is also promoted.

Local environmental conservation groups are also being formed by villagers who are concerned that activities within the forests around them are not being carried out in a sustainable manner and the water sources are being contaminated and destroyed. The groups have been running patrols near all water sources and do not allow production close to these areas. There are more local groups being formed to carry out similar work.

4. VALUATION OF TRADE LIBERALIZATION IMPACTS ON TANZANIA'S FORESTRY SECTOR

4.1 Link between valuation and economic decisions

At the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992, Chapter 11 (Combating Deforestation) of the conference document, Agenda 21, emphasized that one of the major reasons for the widespread failure to practice sustainable forest management was the inadequate recognition and the under-estimation of the values of the total package of goods and services provided by forests at the local, regional, national and global level.

To the extent that quantitative measures of the impacts of trade liberalization policies on the forestry sector can be generated, Tanzania can improve the attractiveness of returns on forest investments encouraged by response to policy change. This study, for that purpose, considers key market and non-market goods and services as the products of actual investment decisions. However it should be noted that the purpose of the valuation undertaken in this section is to make the value of forest use explicit, *and not necessarily to put an actual value on these forests* given the many limitations of the existing methodologies, as the literature suggests.

Despite the possible limitations of the methods used for valuing natural resources, the results of estimates undertaken in other developing countries like Tanzania, have proved to be powerful in providing the true picture of existing patterns, and the extent and nature of the costs and benefits in the use of forest products. Specific thrust is given to the valuation of trade liberalization impacts on the forestry sector with a view to meeting the above-mentioned objectives. Economic, environmental and social valuation of activities in the forestry sector motivated by trade liberalization policies are thus undertaken.

4.2 Estimating the value of trade liberalization impacts

Value associated with forest activities was classified into two categories: change in direct use values and change in indirect use values.

Direct use values are associated with consumption use and non-consumption use. The consumption uses considered are:

- Commercial and industrial markets for forest goods and services (fuel wood, timber, pulpwood, poles, fruits, animals, fodder, medicines etc.)
- Domestic non-market goods and services (fuel wood, non-commercial wood products, poles, fruits, medicinal plants).

Non-consumption uses on the other hand include:

- Recreation
- Bio-prospecting, and other research activities in the forests.

Indirect use values of the forests include:

- Environmental protection
- Watershed protection, nutrient recycling and soil fertility, agricultural productivity enhancement
- Gas exchanges (e.g., carbon dioxide/oxygen), contribution to climate stabilization and carbon storage.

These values can be further categorized. While the direct use value is largely composed of economic values, the indirect use values consist, among others, of environmental and social values. For simplicity, the analysis is divided into three categories i.e., economic, environmental and social impacts which also are sub-divisible.

4.2.1 Valuation of economic impacts

In valuation of economic impacts, both benefits and costs were analysed. The analysis attempts to provide a monetary value to the changes that have been induced by trade liberalization measures within the forestry sector. It is worth repeating that the primary aim is not to provide explicit values of the changes identified, for it is not an easy task to accomplish, particularly in a developing country like Tanzania where traceable statistical data are limited.

Analysis of economic and environmental costs and benefits of trade liberalization on forest resources

Economic benefits

The benefit considered here is the monetary value of the positive effects of trade liberalization in terms of various macroeconomic effects such as trade effect, fiscal effect in terms of royalties collected by the Government, import duty from the imported inputs. There are other benefits such as increased non-monetary GDP contribution of the sector, employment income from increased activities, profit income and possible direct and indirect benefit to the communities around the forests. These benefits have not been valued in this study due to data difficulties and the problem of isolating trade liberalization impacts from the impacts caused by other changes in the economy. Where benefit valuation is possible, their magnitudes are presented below.

Export impact

In valuing the economic benefits in terms of contribution to international trade, exports were considered. The analysis entails an investigation into change in trade volume influenced by trade liberalization. The bottom line comparison was the real value of annual

total exports on average ex post and ex ante with trade liberalization as the reference point. Given that trade liberalization in Tanzania was introduced during the 1980s, the ex ante real values of annual exports correspond to the 1980s whereas ex post real values of exports considers the late 1990s.

TABLE 1
Ex ante annual trade value and volume of wood and related usage

<i>Item</i>	<i>Value (in \$)</i>	<i>Quantity usage</i>
Wood products	1,554,400	3450 m ³
Timber and its products	0	0
Processed wood products	0	0
Carvings	30,560	60,534 pieces
Others	6,878840	N.A
Grand Total	8,453,800	

Data source: Trade Statistics and Economic Surveys.

TABLE 2
Ex post annual trade value and volume of wood and related products

<i>Item</i>	<i>Value (in \$)</i>	<i>Quantity usage</i>
Wood products	21,110,000	7860 m ³
Timber and its products	8,000,000	10,823m ³
Processed wood products	2,000,0000	N.A.
Carvings	1,210,070	274,834 pieces
Others	17,160600	N.A
Grand Total	49,480,670	

Data source: Trade Statistics and Economic Surveys.

N.B.

Unit volume for some products is not available, but there are a number of products exported that may be in different quantity units. They include processed products and tree seeds. These products are grouped in two categories of 'others' and 'processed products'. They include the following items: lamp and light fittings, mattress supports and articles of bedding, furniture and furniture parts, wood marquetry including inlaid wood caskets and wood ornaments, tableware and kitchenware, builders' joinery and carpentry tools, tool bodies and broom brushes, wooden frames for painting, casks, wooden barrels, cable drums in wood, packing cases, veneer sheets and plywood sheets and other related items.

Net benefit of trade effect

$$\underline{\text{ex post trade value}} - \underline{\text{ex ante trade value}} = \text{US\$ } 41,026,870$$

Fiscal impact

In valuing the fiscal effect of trade liberalization on the forestry sector, changes in the annual collection of two major sources of revenue collection are analysed. The first source is trade tax. Prior to trade liberalization, Tanzania levied an export tax of about 3 per cent. But as part of liberalization of trade, the export tax was abolished. The other trade tax is import duty. Other sources are royalties collected by the central Government from forest products. The analysis follows the same logic used under trade effect i.e., comparison of ex post and ex ante values of revenue collection, whereby ex ante is the value of revenue collection before trade liberalization and ex post is revenue collected after introduction of trade liberalization. These changes are displayed below.

TABLE 3

Ex ante value of revenue collected from the forestry sector

<i>Item</i>	<i>Value (in \$)</i>
Estimates of royalties collected assuming a 3% of export value	470,000
As export tax	253,614
Grand Total	723,614

Data source: Trade Statistics and Economic Surveys.

TABLE 4

Ex post value of revenue collected from the forestry sector

<i>Item</i>	<i>Value (in \$)</i>
Estimates of royalties collected from exported wood products	2,474,033.5
Import duty (5%) on machinery	1,648,656
Grand Total	4,122,689.5

Data source: Trade Statistics and Economic Surveys.

N.B. The royalties collected from forest products vary from one forest area to another depending on the economic base of the area, and the purposes of the levy (TRA, 2000). However, on average the rate of royalty charged ranges between 3 per cent and 10 per cent of the value of the products. For the purpose of this study we have adopted an average of 5 per cent of the total value.

Net benefit of fiscal effect

$$\text{ex post revenue value} - \text{ex ante revenue value} = \text{US\$ } 3,399,075.5$$

Net total benefit

$$\text{\$ } 41,026,870 + \text{\$ } 3,399,075.5 = \text{\$ } 44,425,945.5$$

Analysis of environmental costs

In assessing the environmental costs of trade liberalization, the analysis was based on estimating the opportunity cost of increased trade volume of wood and its products after trade liberalization was implemented. This further entailed valuation of the opportunity cost of increased exports of forest products through a comparison of the forgone value of the alternative use of forest products. In literature on forestry valuation the alternative use values are either direct or indirect. Direct use values are associated with consumption use such as commercial and industrial market forest goods and services in the form of fuel wood, timber, pulpwood, poles, fruits, animals, fodder, medicines etc. The non-consumption uses along with indirect use include; recreation, bio-prospecting, environmental protection, watershed protection, nutrient recycling and soil fertility, agricultural productivity enhancement, gas exchanges (e.g., carbon dioxide/oxygen), contribution to climate stabilization and carbon storage.

Estimates of opportunity cost of wood trade at per hectare value

Estimates of the opportunity cost of the wood trade are arrived at by attaching a monetary value to each alternative use forgone. Several studies using the replacement cost approach and other methods of forest valuation have estimated a value of the sacrifice in carbon storage function of one hectare of forest in the range of US\$ 1,300-US\$ 5,700 (Frankhauser, 1994; IIED, 1994; Pearce, 1990; Pearce and Moran, 1994). The cost seems to be highest for the primary forests and lowest for open forests. The value of soil nutrient cycle function of tropical forests such as Tanzania's forests has also been worked out in various studies. Maltos, Uhl and Goncalves, 1992, implicitly use the replacement cost approach in suggesting that the social cost associated with leaching of nutrients is at US\$ 3,480 per hectare per decade or put differently US\$ 348 per hectare per year. The economic value forgone on the non-timber forest products such as food, medicines, and the related has been estimated at about US\$ 400 (for details see studies such as Schwartzman, 1989; Nations, 1992; Peters et al., 1989; Pinedo-Vasquez et al., 1992). The economic value of forest use for other purposes such as fuel wood, construction materials, and others that are not in trade or already mentioned above, are estimated at US\$ 400-US\$ 1000 per hectare (see Brown and Pearce, 1994, Pinedo-Vasquez et al., 1992; Barbier, 1992).

The total value of opportunity cost per hectare

Given the complexity and difficulties in making the above valuation (such as data availability, research methods and resources), this study adopts the already existing estimates to arrive at the cost of expanding trade in wood products in Tanzania. For the purpose of this study, average estimates were adopted in the case of the ranged estimates and in some cases the more conservative estimates were taken but were guided by the estimates that already exist from previous studies. Specifically, the total value of opportunity cost of sacrificing one hectare of forest is estimated at US\$ 5,248 (i.e. 4000 + 348 + 400 + 500).

The total change in deforestation induced by trade liberalization is estimated by taking the differences in wood usage ex ante and ex post as revealed in the above tables. The wood usage indicated above reveals that ex ante volume of wood usage was at least 3450 m³ and the ex post volume of wood usage for export is estimated at about 18,683 m³. The change in trade volume of wood products after trade liberalization is the difference between the two volumes, about 15,233 m³.

The total social and environmental cost

To arrive at the total environmental cost, first the average yield per hectare in m³ was estimated. The statistics used came from the Forest Harvest Plan of 1998 from the Forestry Department, as reported in the National Economic Survey of 2000. According to the report, 450,400 m³ of wood was the planned harvest from 80,000 hectares. This gives an average harvest of 5.6 m³ of wood products in one hectare. Similar results are obtained when using the 1999 plans which give about 6 m³ of wood from one hectare of forest. But it must be considered that these estimates are based on officially traded products and do not include estimates for wood used in making carvings, or other unofficial trade. For the purpose of this study a conservative estimate of 10 m³ per hectare is used. Computations suggest about 1523.3 additional hectares are needed to meet the demand of expanding trade in wood that has been fuelled by liberalization. The total social and environmental cost is the product of increased use in hectares of forest and the opportunity cost of sacrificing one hectare. The final value arrived at is US\$ 7,994,278.4.

It is therefore conclusive that a social and environmental cost estimated at about US\$ 8 million is externalized in the process of responding to the expanded volume of trade in the forestry sector after trade liberalization. But as mentioned above, this cost does not necessarily reflect the true cost and is based on conservative estimations. However, the methodology adopted has proved to be very useful in providing a general picture of the realities in different parts of the world faced with a similar situation (some of which are cited in this report). While it is clear that the cost may be greater or lesser than what is reported, it is an indisputable fact that the cost exists, and justifies implementing policy measures to mitigate it.

In summary, although the benefits of trade liberalization in the forestry sector of Tanzania appear to be very high and reversing this trend may be politically unfeasible, nevertheless some mitigating measures need be instituted for two reasons; one there is evidence that the trend is likely to increase because the implementation process is increasing, and two that the estimated costs are just a reflection of what may be happening but do not necessarily reveal the true costs. As stated above, there are some costs that are not included in the figures obtained due to difficulties in estimation caused by various statistical and methodological problems. Specifically, Tanzania will be required to institute various economic policy instruments to mitigate such environmental and social costs.

5. POLICY IMPLICATIONS AND PACKAGES FOR MITIGATING THE NEGATIVE IMPACTS AND ENHANCING THE POSITIVE ONES

Based on the study findings, a number of policy implications are evident and some policy packages are proposed for mitigating the negative and enhancing the positive impacts. The policies proposed are aimed at improving the environmental, economic, social, legal as well as the institutional sphere under which the production and trade in forest products is undertaken.

5.1 Policy implications

There are several policy implications which can be drawn from this study. Given the significant positive impact (estimated at over US\$ 100 million by this study) of trade liberalization on the forestry sector, there is a need to ensure that their use is economical and sustainable. In the same way, policy actions to mitigate the negative effects are required. Given the observation that there is a tendency for actors in the forestry sector to externalize the environmental costs, policies for inducing internalization of environmental costs in rapidly expanding forest activities need to be adopted. In addition to policy changes, norms for using these products in areas like the construction industry, fuel and the related areas need to be changed. Innovation in such areas is absolutely crucial in order to mitigate pressure on forests and encourage sustainable production and consumption, which is vital for achieving optimal trade liberalization policy impact in the sector. The existing practices of using substitutes such as metals and plastics instead of wood need to be enhanced.

Successful implementation of trade liberalization policy will depend on the laws governing land use and human settlement. This stems from the fact that after trade liberalization there has been a change in the volume of activities and the type of firms involved in forest activities. Private sector participation for example has increased and publicly owned companies are being privatized. These changes have also impacted on the accessibility of forest products as well as the nature of trade in the sector. It follows therefore that laws governing land use and human settlement need to be investigated to ensure that they can protect the forest from encroachment and uncontrolled access. This is also important for controlling illegal trading in forest products that do not issue from sustainable harvesting. In the same way, licenses and permits for various activities in the sector will need to be properly managed. This would be in terms of determining the desirable number of permits in each area, depending on the level of productivity and ensuring that those granted permits abide to the agreed terms of operation including practicing sustainable production.

The design and implementation of an effective environmental management policy framework for the forestry sector is also crucial for attaining sustainable forest production, in order to reap maximum advantage from trade liberalization. The framework must be able

to encourage environmentally sound activities in the sector through the safeguarding of all forest resources during production, thereby avoiding such problems as water source contamination, destruction and harvesting of pre-matured trees and other destructive practices.

Regarding the institutional framework, it has been noted that there are several institutions with interest in the forestry sector, ranging from central Government level to local government level. In order to be able to properly and effectively administer, promote, and service the forestry sector, policy actions are needed to establish and encourage an efficient and coordinated mechanism among the various government departments, local government, the local community and other relevant authorities. However, the Government of Tanzania is currently undertaking sectoral institutional reform and it is expected that the existing problems will be addressed.

An effective legal and regulatory system is necessary to achieve sustainable forest management that will enhance the positive impacts already realized and at the same time minimize the negative ones. Lack of effective access regulation, licensing requirements, ownership of the forest, and protection of the forest reserves, will discourage the positive achievements so far attained. It is very important for the Government to review all relevant legislation to ensure that it is in line with the sector's current needs, keeping in mind that the sector is now liberalized.

Other policy implications for enhancing the positive impacts and mitigating the negative ones outlined by the study include: policy measures to improve promotion of value added in all categories of forest products, policy measures to encourage production of high-value forest products that use less forest materials hence reducing pressure on deforestation; policy measures to improve revenue collection so as to maximize the positive financial impacts of trade liberalization; policy measures to encourage the establishment of health and safety regulations in all stages of production to protect the workers and the general public from avoidable diseases such as diarrhoea, typhoid fever and respiratory diseases which can be associated with forest activities.

5.2 Proposed policy packages for mitigating the negative impacts and enhancing the positive ones

Overview of the current status

For a long time now the Forest Ordinance, Cap. 389, has been the principal law safeguarding the forests of Tanzania. The law specifies fees for licenses, methods for marking and identifying timber taken from forest reserves, and permits for grazing, cultivating, building and residing in forest reserves. Certain domestic use is permitted on forest lands, such as harvesting timber for African arts and crafts. In addition, certain tree species may be reserved and require a license in order to harvest them. The penalties for violating the Forest Ordinance include a US\$ 7 fine or six months in jail, unless otherwise provided for by the Ordinance, by-laws or regulations.

However, the enforcement and/or implementation of various government laws, policies and regulations related to forest management appears hard to effect. In total there has been rampant encroachment on the forests. This is one of the reasons why the new Environmental Policy and the Forestry Sector Policy have specified a need to introduce other management approaches such as economic instruments among others.

Economic instruments in the forestry sector

Recent studies (e.g., Sterner, et al., 1998) have confirmed that in a way there are signs of application of economic instruments in the forestry sector, although this is more of a coincidence than an actual policy objective. The Forest Ordinance, Cap. 389, mentioned above empowers the ministry responsible for forest management to collect various revenues in the form of fees, penalties and forfeitures, hunting licenses, tour operator services and other related charges. One of the major objectives of this revenue collection is for forest and environmental protection, and it has been shown that if well administered they can serve as economic instruments.

The fieldwork of this study has revealed that actors in the forestry sector, as in other economic activities, are required by government laws to pay various revenues:

- Business Licensing Act, 1972, for regulating business conduct in the country requires the operators to pay a license fee.
- Business Names (register) Act, 1930, requires operators to pay registration fees.
- Company Registration Act, 1973, imposes mandatory registration on all companies, and also to pay registration fees.

In addition to these central Government fees etc., the Local Government Act of 1982 and the Urban Authority Act of 1983 empowers any local authority to pass by-laws to charge local taxes and collect levies and fees within its jurisdiction. The type and number of taxes differ from one area to another.

Design of the economic instruments for forestry sector management in Tanzania

For forest management to be in line with the existing production and ownership structure, economic instruments are proposed. In the design of such policy instruments, environmental quality or desired forest standards need to be defined. This quality or standard will serve as a target to which all the policy instruments will aim. There may be different ways of viewing the desired forest quality, but in theory acceptable standards are based on individual judgement and often involve compromise. It is proposed here that development of sectoral sustainability indicators is a paramount task for all stakeholders and interested parties. Such indicators will form the standard on which to base the proposed economic instruments.

Information requirement for determination of forest quality

For the accurate design of environmental economic policies, there is certain information required, including:

- The accurate marginal deforestation produced by economic activities in the forestry sector.
- The marginal benefit obtained from economic activities in the forestry sector.
- The type and number of activities involved in the forestry sector.
- The number of persons affected by the damage and those who benefited.

Level of environmental tax in the forestry sector

In order to arrive at an environmental tax for the forestry sector of Tanzania, it is proposed that the tax be based on the current marginal damage and benefit. In turn, as outputs and damage levels are modified to the existing tax levels, the taxes themselves would readjust to correspond to the new damage level.

6. THE PROPOSED POLICY PACKAGES

Given the nature of the existing sectoral setting, the following instruments have an important role:

Pollution control agreements

The observed environmental problems created by actors in the forests during the production process will be minimized if: agreements between central Government or local government and the actors are arrived at before production, so that production will not lead to water contamination, forest fires, or harvesting of non matured trees etc. The actors on the other hand will need to convince the Government that they will take the necessary measures to control the problems. The other binding agreement should be to allocate a separate budget for forest rehabilitation. Connected to this, the on-going reforms in the insurance sector should consider the possibility of encouraging forest fire insurance.

Forest product charges

As indicated, there are already product charges at different stages and by different institutions. These are in the form of fees or taxes levied on forest products, mainly charcoal, firewood, timber, building poles etc. But the charges have been more for the purpose of revenue collection rather than forest management. It is thus proposed that environmental conservation rather than revenue collection reflects the objective of collection. This should specifically include revising the rates upwards to a sufficient degree of deterrence.

Licensing control

Since the operators are required by law to obtain permission before undertaking any activity in the forest, and in most cases are given permits or licenses, then there must be an optimum desirable number of licenses appropriate to a given area, and production levels should be specified and monitored. This should include export licenses, and in some cases the amount exported should be controlled to ensure a balance between domestic needs as well as sustainable forest management.

Forest product certification

Forest product certification is a system of forest inspection plus a means for tracking timber and paper through a “chain of custody”—following the raw material through to the finished product. This is in order to ensure that the products have come from forests which are well managed—meaning they take into account environmental, social and economic principles and criteria. This is among the proposed policy instruments for sustainable management of Tanzania’s forestry sector. It is recommended that a means of identifying

the sources of products on the market be designed to discourage illegal activities and unsustainable production practices.

Increased fines and penalties to reflect magnitude of damage

As explained above, a fine of US\$ 7 is insignificant compared to the market value of the forest products and the damage to society. It is therefore proposed that the fine be based on the number of hectares destroyed with a charge of at least US\$ 100 for every hectare destroyed.

7. IMPLEMENTATION PLAN AND STRATEGY

7.1 Implementation strategy for recommended policy packages

Given the nature of the institutional framework and administrative structure in the forestry sector, a participatory approach is crucial for implementing any serious policy change for environmental management and sustainable production. It is therefore recommended that a Task Force is formed under the technical guidance of UNEP to coordinate and advise on the design and implementation of the proposed policies.

The Task Force should include members from the key institutions that administer the sector, as well as other stakeholders. Based on recommendations from the National Steering Committee, and the experience drawn from the fieldwork in this study, the Task Force should be composed of representatives from the following areas: the Forestry and Beekeeping Department, the Vice-President's Office (Environment Division), the Ministry of Trade and Industry, the Ministry of Local Government, the National Environmental Management Council, the Centre for Environmental Economics and Development Research, traders and producers of forest products, NGOs active in forest management and other related fields.

Major tasks of the Task Force shall be:

- To review various policy action proposals for forest management including the economic instruments;
- To advise on the design and implementation of the recommended policy instruments for forest management;
- To liaise with the key institution(s) for implementing the proposed instruments;
- To assist (the Forestry Department) in the implementation of the identified economic instruments;
- To identify the modalities for implementation, for example having a pilot forest area etc.

Major tasks of the Forestry Department

The Forestry Department is the key government institution in charge of forestry sector policy formulation, planning, monitoring, law enforcement, and general management and administration. Since this department's mandate is forestry management including revenue collection in the form of royalties and fees, it is an important implementing agent for this study's proposed plan and strategy for forestry sector management. The major tasks of this department should be:

- The overall implementation of the proposed programme;

- To act as a focal point for all communication among the various participating institutions;
- To integrate the proposed instruments into forestry legislation, policy and sectoral planning;
- The enforcement of the proposed policy instruments.

Major tasks of the Vice-President's Office

The Vice-President's Office is currently the highest organ responsible for environmental management in Tanzania. Through the Division of Environment, the VPO is responsible for:

- Formulation of policy on environment;
- Coordination and monitoring of environmental issues;
- Environmental planning.

Its major tasks in implementing the proposed plan and strategy for forest management should be to integrate the proposed policy instruments into overall environment policy and other related plans and strategies coordinated by this division such as: the National Action Programme to Combat Desertification, the National Action Plan on Climate Change, the Coastal Biodiversity Conservation Strategy, the National Biodiversity Strategy and Action Plan, the National Environmental Action Plan, and National Plan for Agenda 21.

Major tasks of the National Environmental Management Council

The National Environmental Management Council (NEMC) was established by Act of Parliament, Number 19, 1983. Its main role is to advise the Government on all matters pertaining to environmental conservation and management. This should thus include:

- Advising the Government on effective forest management based on the proposed implementation strategy;
- Assessing, monitoring and evaluating all activities that have impact on the environment;
- Promoting environmental information, communication and capacity building during implementation of the proposed programme.

Major tasks of the private sector and other actors in the sector

The successful implementation of the proposed plan for forest management will depend on the participation of all actors in the forestry sector, particularly traders, distributors, local government and manufacturers of forest and related products. Their major tasks in this proposed programme shall be:

- To participate in the awareness and exchange of views sessions to enable the technical teams understand the current status and practical realities of the sector;
- To participate in joint management programmes should the need arise;

- To enhance investment in environmentally sound production technology in the sector;
- To facilitate sustainable harvesting and utilization of forest products as recommended by the proposed programme.

Major tasks of the Centre for Environmental Economics and Development Research (CEDR)

The CEDR is a research organization specializing in environmental economics research. Its vast experience in national and international economic, environmental and development research is crucial for carrying out the proposed forest management strategy. Specifically the Centre will play the following roles:

- Provide technical advice to the implementing agent based on the experience gained during the fieldwork for this study;
- Participate in the technical committees of the proposed programme including the Task Force;
- Carry out follow-up assessments should the need arise during implementation;
- Participate in evaluation and monitoring of the implementation phases;
- Other technical assignments.

7.2 Implementation plan

The plan for implementing the proposed policy instruments should adopt a stepwise approach, with immediate action taken depending on the resources available and other administrative factors. Some of the important actions might have already been implemented or at least started during the country study but for the sake of consistency a full menu of the actions necessary is given.

The first crucial stage is to identify and define the environmental problems associated with trade liberalization policies and other trade-related measures, quantification of the problems and in the same way identify the positive environmental impacts of the same policies.

Dialogue among the various stakeholders on the need for the proposed policy instruments and their objectives should be undertaken before the implementation stage as this forms part of public awareness that motivates support.

The design of the proposed policy instruments based on the existing institutional and administrative capacities of the sector as well as the national objectives in the sector, shall follow after the two stages outlined above.

Implementation of the proposed, designed and selected policy instruments shall follow after completion of the three stages above.

There must be room for periodic modification of the instruments proposed in order to cater to any future changes which cannot be known a priori, and this should be identified through evaluation from time to time.

ATTACHMENT 1

Framework for implementation of policy packages

Activity	2000-20001	2002-2005	Responsible	Remarks
Project inception				
To identify and quantify the environmental impacts of trade liberalization on the forestry sector			CEDR/UNEP	CEDR-conducted Country Study with UNEP support
To assess the existing policy packages for forest management			CEDR/UNEP	Country Study and stakeholders' meetings
Dialogue among the stakeholders on the need for effective management policy			CEDR and stakeholders with UNEP's technical guidance	Form a Task Force
Propose/design market-based instruments for forest management			CEDR, with technical guidance of UNEP	Partly covered in the country report
Further dialogue to select and adapt the instruments proposed			CEDR and the Task Force	Forest Department and local government representatives to be involved
To establish collaboration between NGOs, CBOs, operators in the forests and the Forestry Department/ related institutions			Forestry Department, and the Department of local government	Form strong networks for cross-referencing changes, exchange expertise and logistics
Identify the mode of implementation e.g. need for a pilot project			Forestry Department, CEDR and the Task Force	
Implementation phase to include periodic checking and modification of the effectiveness of the policy instruments being implemented			Forestry Department, local government and Task Force	

In summary, implementation of the recommended policy packages requires a multi-disciplinary and participatory approach that ensures the active participation of all key stakeholders in the forestry sector of Tanzania. It is through this participatory approach as described above that the various stakeholders will be given the opportunity to incorporate the proposed forest management actions and strategies into their own forest-related activities—a process that is key to ensuring the successful outcome of the proposed recommendations.

Stakeholders

Broadly, stakeholders (as defined in the National Forestry Policy) will include the forestry and beekeeping authorities, local communities, non-governmental organizations involved in forest management, the private sector (especially operators in the sector such as loggers, exporters, manufacturers of wood products etc.) specialized agencies, local government, and other relevant government institutions.

Implementing agent

For implementing this programme, the Forestry and Beekeeping Department is proposed. This is due to the fact that national policy identifies the following responsibilities as key to this forestry authority; policy formulation, law enforcement, revenue collection, management of strategic forests, monitoring and evaluation, research and training. But given the complexity in terms of institutional framework and stakeholders involved, it is hereby proposed that a participatory approach involving all stakeholders guide the forestry authority in its implementation.

Costs and benefits of implementing the proposed policy actions

Benefits

The benefits to be derived from implementing the policy actions recommended by this study can accrue both to the government and the communities around the forests, and also to the general public and global forest conservation efforts. In arriving at the community benefit of forest conservation this study undertook a contingent valuation. The method was used to estimate the value of the forests from the perspective of the local communities around the forests where proper management is instituted. A community sample of 226 was interviewed. They were provided with information on the alternating quality of the forests, and were asked how much they were willing to pay if there was a programme to improve the quality of their forest. The individuals sampled were asked their maximum willingness to pay (WTP) for an increase in the quality of the forest through sustainable management. For the purpose of creating a hypothetical market, respondents were told that the government was to engage in a programme for forest management and then shown the possible benefits of a well-managed forest after the programme is complete. Mean willingness to pay for improved forest quality containing all the forest resources was US\$ 16 annually. Given the population size of 1,350,511, this amounts to annual willingness to pay by the community of US\$ 21,608,176.

Scenario 1 represents a sub-sample who were presented with a hypothetical situation that does not encourage strategic behaviour. The opposite case was true for scenario 2. The

direction of change between the two WTP bids indicates that, on average, households who were given the chance to incorporate some strategic behaviour valued the forest products lower than the other group.

TABLE 5
Willingness to pay results

	<i>Scenario 1</i>	<i>Scenario 2</i>
Observation in each group	120	106
Mean WTP bid (in T. shillings) ⁸	12,896	12,560
Standard deviation	5,880	5,776
Mean of the full sample	12,744	
Standard deviation	5,816	
t-statistics	0,43	

Source: Computed from survey data (CEDR, 2000).

Benefits from realization of the market value of forest products

Well-managed forest harvesting, sustainable production and marketing will encourage the flow of products through the official market channels. In connection to that, the institutional framework and legal and regulatory mechanisms governing the production of forest products in Tanzania should be designed to ensure managed production. Where the quantity and quality is known, value is properly assessed and pricing of the products internalizes the total costs of production including all environmental, social and economic costs. Assuming that all this happens, there will be greater realization of the market value of the products, unlike in a system where poor management allows for illegal trading and improper valuation. In sum, higher market value is the benefit that will accrue through proper management and regulation of activities of the sector.

In estimating this value, which is a value besides what accrues to the community, the existing production capacity and consumption was also considered in order to arrive at a further possible benefit of implementing a policy for proper management as recommended by this study. It was revealed that consumption of charcoal is at least 0.6 bags per head annually. This however is the lowest estimate, as other studies indicate that annual consumption per head is up to 2 bags. Study estimates are based on 23 kg per head. Given the country's total population of 28 million, the maximum production would thus be 16,800,000 bags of charcoal annually. Using a market value of US\$ 5 per bag, the total value of charcoal consumed is US\$ 84,000,000. A 10 per cent environmental charge would raise US\$ 8,400,000. Official production statistics were used to estimate a similar figure for wood products.

For other products, according to the production figures of 1998, a total of 519,400 cubic meters of timber was harvested. The lowest estimated market value of US\$ 100 per cubic meter was used. This gave a total market value of US\$ 51,940,000. A 10 per cent environmental charge would result in an environmental revenue benefit of US\$ 5,194,000.

⁸ The exchange rate used is 800 Tanzanian shillings for one US dollar.

TABLE 6

Total economic benefits of implementing proposed policy action

Community-based benefit	= \$ 21,608,176
Recovered market value of charcoal	= \$ 84,000,000
Recovered market value of timber products	= \$ 51,940,000
Total market value	= \$157,548,176

The total economic benefit of implementing the proposed policy action is estimated at US\$157,548,176 which is about 7 per cent of the country's total GDP.

Economic consequences and price elasticity in demand for wood products

The economic and environmental impacts of introducing economic policy instruments for forest management are estimated using the price elasticity of demand. This is the ratio of percentage change in quantity of forest products demanded, Q_f to the percentage change in price of forest products, P_f .

This can be denoted as
$$e_{pf} = dQ_f/dP_f * P_f/Q_f$$

where

e_{pf} is price elasticity of demand for forest products

dQ_f is change in quantity of forest products demanded

dP_f is change in price of forest products

P_f and Q_f are as defined above.

The price elasticity of demand for forest products in Tanzania has been estimated in a few studies (Naho, 1995, Shechambo and Kulindwa, 1995). In the studies it was demonstrated that price elasticity for these products is inelastic in general although the degree differs depending on the type of product, availability of substitutes, levels of supply and extent of use. The value for the products estimated was between 0.1735 and 0.82. These results are similar to those found in Kenya (see Jama and Ayoo, 1998). This shows that the effectiveness of the proposed charges is expected to increase as the charge rates rise with increased elasticity.

Costs

As indicated earlier, there are costs which have already been incurred during the ongoing sector reforms. But there are also costs which will have to be incurred in the design and implementation of the proposed policy actions. Given the institutional framework of the sector, it is proposed that the costs aim at facilitating the activities of the Task Force and are indicated below.

TABLE 7
Costs of implementing proposed policy actions

<i>Serial number</i>	<i>Item</i>	<i>Cost (US dollars)</i>
1.	Five technical meetings of the Task Force (for ten members \$ 200 x 5 x10)	\$10,000
2.	Report production costs	\$3,000
3.	Transport and overheads (including postage)	\$2,000
4.	Stakeholders' workshop	\$6,000
5.	<i>Sub-Total</i>	\$21,000
6.	Other Costs	\$1,979,000
5.	Grand Total	\$2,000,000

Other costs

Given the institutional setting already described and the fact that there are already existing structures in the forestry sector which have at some point been implementing the proposed policy actions but in a different way, this study recommends that rather than starting afresh, it is important to utilize the existing resources and gradually expand depending on the phase to phase outcomes. Also as previously indicated, there are other reform programmes going on which have already been funded. But specifically for this programme, there must be reliable working tools especially transport facilities, communication, stationary and well skilled personnel.

8. PROJECT EXPERIENCES AND CONCLUSIONS

The implementation of trade liberalization policies in Tanzania has been marked by both positive and negative social and environmental impacts. On the positive side, trade liberalization policies in the forestry sector have encouraged the expansion of production and trade in forest products in Tanzania thereby accelerating the macroeconomic contribution of the sector. This is reflected in the very fast response of the sector to the policy changes and in fact is one of the potential areas where Tanzania's economy stands to gain. Prior to trade liberalization, for example, the sector's contribution to total trade was 3-4 per cent of the total exports but after adoption of trade liberalization, the contribution has jumped to about 10 per cent of the country's total exports. Other aspects of the positive results of implementing the trade policy changes and related measures are increased importation of inputs, growth in sectoral investment, increase in value added, increase in GDP contribution and increased employment.

Despite the positive impacts there have also been the negative effects of implementing these policies, in terms of increased deforestation and the associated problems such as soil degradation, watershed destruction, disturbed hydrological cycle and others. This study has found that there is a tendency for producers to 'externalize' the environmental costs, a burden that is shifted to the society. The negative impacts associated with implementation of these policies can be minimized through the adoption of appropriate policy actions—especially adoption of economic instruments. The specific policy instruments that will ensure Tanzania's successful implementation of trade liberalization are: pollution control agreements, forest product charges, control of licenses issued to operators in the forests, forest product certification and other measures such as use of fines and penalties etc.

Effective implementation of trade liberalization will depend on the institutional structures and capabilities. The field survey for this study has confirmed that the forestry sector needs a more coordinated institutional framework which will enable the implementation of policy management tools to ensure sustainable sector development. While in most cases the responsibilities of forest management are referred to the Government, this in practice means the Forestry Department, which is a very small unit with inadequate resources and little authority or power to command and control the sector. In connection to this there are other institutions, mainly local governments, which also have interest in the forestry sector but with varying objectives. This institutional structure makes monitoring of the sector difficult, especially when it comes to a question of sustainable management.

Forest access and ownership is another factor influencing adverse impacts of trade liberalization policies. Putting in place proper access and ownership regulations will minimize forest invasion. The forest areas open to the public are a common resource, and even in the reserved forests, mechanisms to control forest use are inadequate. This is part of the reason for the increased illegal trade and production in the sector because a product, once traded, cannot easily be traced back to its origins.

Under-valuation of forest products is another problem that perhaps creates less attention in the sector. There is a saying that the forest is the heart of Tanzania's economy because all the major economic sectors of the economy—agriculture, tourism and human resources—very much depend on the forests. If all the forests of Tanzania were cleared, the consequences in terms of opportunity costs and monetary value would be immense. However, there are few attempts to carry out economic valuation of the forestry sector's contribution to Tanzania's economy—even its contribution to GDP is said to be underestimated. Without proper valuation of the contributions, it may be difficult to convince policy makers to take the right actions at the right time. There is a clear need to encourage more economic valuation activities in this area.

In summary, there are both positive and negative impacts of implementing trade liberalization in the forestry sector of Tanzania. For optimal and successful implementation of trade liberalization, Tanzania will be required to adopt a number of economic instruments and other appropriate measures that will minimize the negative effects and enhance the positive. Given the existing institutional framework of the forestry sector, this study proposes that the Forestry Department with the technical guidance of UNEP, and a Task Force that includes national stakeholders, implement the proposed policy packages and other measures recommended to ensure proper forest management.

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Annex 1

Project approach, methodology selection, national team and UNEP

Project approach and process

A participatory approach that ensured the active participation of all key stakeholders was adopted in the course of implementing this project. In the process the National Steering Committee was formed which provided technical guidance to the research team. The committee members regularly met the research team to review project status and, where possible, suggest the way forward. Apart from the National Steering Committee there were stakeholders' workshops to discuss the draft reports. In addition, UNEP prepared international review meetings which provided a forum for technical discussions of the project.

Data type and collection

For carrying out the integrated impacts assessment, both primary and secondary data were collected. The primary data was collected in the areas around the coastal forests including Pugu, Kazimzumbwi, Mabwe Pande, Kongowe, and Pongwe Msungula. Questionnaires were used to collect primary data and search and source visits were used to collect secondary data. Focus groups, brainstorming sessions and site observations were also used to gather data.

For a detailed assessment and valuation, focus was directed on the coastal forests of Tanzania. These forests were chosen to enable site-specific estimations which could then provide a country-wide and sector-level picture, after careful generalization. These forests are part of the east African coastal plains situated at an altitude of 500 metres above sea level. The forests harbour a high variety of plant and animal life. Three thousand species of plant have been identified in these forests, 500 of which are not found anywhere else in the world. Pugu and Kazimzumbwi are among the most vulnerable of these forests remaining. The long-stable climate, together with varied geological features have resulted in an unexpectedly high variation in animal and plant life. These two areas contain a high level of endemic species compared to other coastal forests. Pugu alone is claimed to host some 2000 species of vascular plants. One hundred and fourteen different tree species have been identified in Pugu. Thirteen species of plant are believed to be endemic to the forests and 7 are identified as rare.

Proximity of these forests to the major industrial centres and rapid urbanization of the country as well as their proximity to the harbours, poses a threat to their existence. It has been admitted by forestry experts that harvesting in these forests is already far beyond sustainable levels and current demand for their products is unprecedented. The results of site valuations have been combined with those at aggregate level to assess the monetary valuation of the sector with respect to the trade liberalization impacts.

National institution, team members and UNEP

This study has been undertaken by the Centre for Environmental Economics and Development Research, a not-for-profit organization registered in 1999, to contribute to environmental and development solutions in Tanzania. The organization is responsible for the overall implementation of the project and has been the focal point for all communications with UNEP. In addition, it established a National Steering Committee (made up of representatives from the public and private sectors, and academia) to guide project development and implementation. The Steering Committee has been key in identifying the main issues and concerns that should be addressed by the study, defining project methodology, identifying local consultants and providing guidance on how project recommendations can be implemented.

CEDR has also been responsible for convening national stakeholder meetings to ensure that the project reflects the concerns and priorities of all stakeholders. The meetings were designed to raise awareness and build consensus, to promote stakeholder ownership in the project and to encourage wide stakeholder participation, particularly in local communities most affected by the implementation of the study's policy recommendations.

Team members

A multidisciplinary team of experts was formed by CEDR. The team members were under the leadership of Godius Kahyarara who is also programmes coordinator of the Centre for Environmental Economics and Development Research. The team members were; Isack Malugu, a senior researcher and forester, Razack Msuya, an environmental economist, Gaudence Nyamwihura, a socio-economist, Ignace Mchallo, a senior economist and Evance Mlelwa, a trade and fiscal policy analyst. Selection of team members was based on their past experience in forestry and trade issues.

UNEP

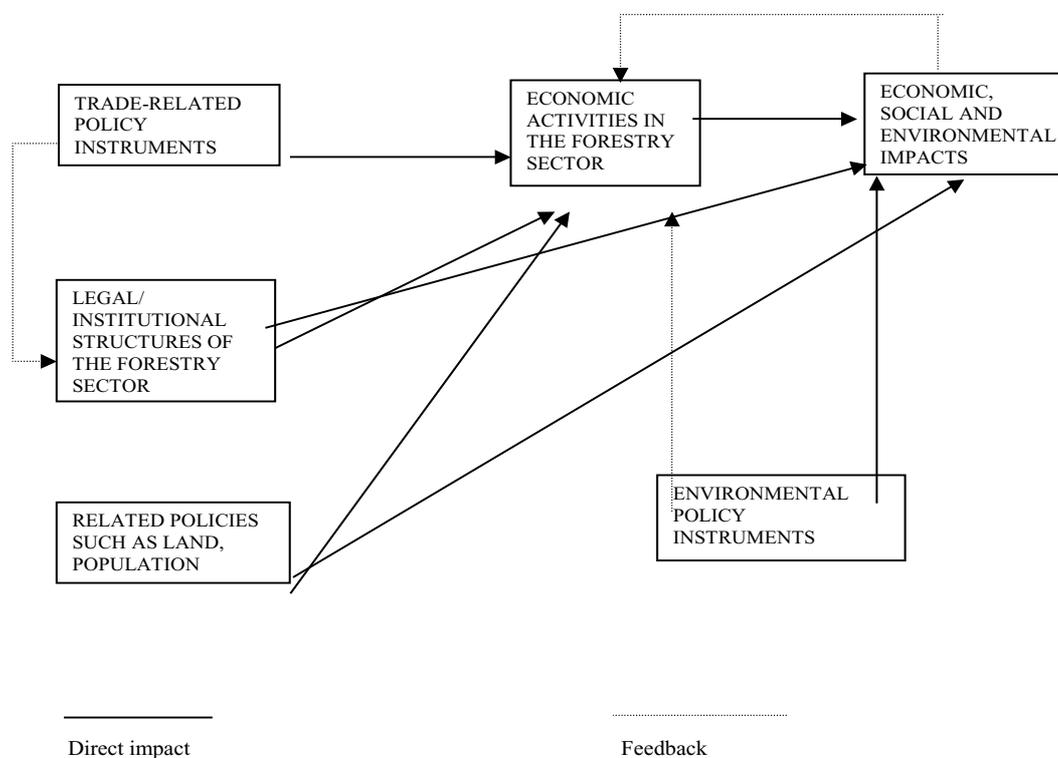
UNEP provided technical and financial support to the national team. This included providing input during the preparation of the terms of reference of the study, reviewing and commenting on work performed and participating in national workshops. UNEP also developed an assessment manual that has been an important tool by providing a menu of methodological options for solving the envisaged research problems. Additionally, UNEP will provide guidance on a pilot implementation of the study's recommended policies.

Development of in-country methodology

Overview of methodology selection

In selecting the in-country methodology, a broad range of methods and approaches to impacts assessment was considered. As the diagram below indicates, the analysis required a multi-sectoral and multi-disciplinary approach.

CHART 1
Framework for Country-Specific Methodology Selection



Methodology selection aimed at a cost-benefit analysis of trade-related policy effects on the forestry sector. Specifically, focus was given to: identifying the issues; describing and measuring variables; establishing linkages between trade policies and socio-economic variables; assessing the legal and institutional structures of the forestry sector; other related policies. The measurement/description of variables has been in terms of the economic, social and environmental effects of all economic activities, although greater weight was given to trade policy variables. The relationships are indicated in the diagram above by the unbroken lines, with their impact being classified as direct. The possibility of feedback from variables considered was not ruled out and this is indicated by the broken lines in the figure above. Finally, the existing environmental conditions and characteristics in which the study is conducted were carefully considered. Tanzania's forestry sector is found in a typical developing country where methodological difficulties and problems are encountered when it comes to research, such as data availability, reliability and accessibility. The awareness and general knowledge of respondents and the ability to share results among different stakeholders were also considered. After consideration of all these factors it was agreed that a country-specific methodology should relate to the current socio-economic situation of Tanzania but without affecting the project objectives. Specifically, the methodology selected:

- Holds that environmental impacts assessment of trade liberalization in the forestry sector be based on a solid understanding of cost-benefit dynamics—to clarify the relationship between activities and causes, and the relationship between activities and costs/benefits;

- Adopts a process-oriented approach to the assessment of net benefits and costs in order to overcome the problem of over valuation of forest products;
- Develops a criteria of measurement which integrates the financial and non-financial benefits and costs of all the activities in the forestry sector and related sectors;
- Should lead to the identification of environmentally unacceptable activities within the forestry sector, and propose mitigation measures necessary to maintain acceptable levels of environmental effects;
- Should capture social change arising from current trade policies and activities in the forestry sector focusing on individuals, groups, communities and sectors of society affected by such changes;
- Should encourage a mechanism for a participatory approach in identifying adverse impacts, and seek solutions through dialogue between the Government, the private sector, the community and other stakeholders.

Methodology

Various techniques have been adopted by this study as part of in country-methodology for assessing environmental impacts of trade liberalization on the forestry sector of Tanzania. Specifically the techniques employed are *valuation methodologies* of the economic, environmental and social costs of production and consumption of forestry products. The methods adopted can be classified into market and non-market valuation methodologies. In addition, the *qualitative approach* to sector analysis of integrated assessment, as given in the UNEP reference manual was used.

Non-market valuation methodologies

Non-market valuation (NMV) techniques have been used to assess the value of forest goods and services which do not have market prices ascribed to them currently. This valuation presents the value of such goods in monetary terms. Three main techniques were adopted:

Travel cost methodology (TCM)

This method uses travel costs as a proxy for the willingness to pay to visit a site in the forest. The higher the travel costs, the more people are willing to pay and the higher the site is valued. And the higher the travel costs, the fewer visitors to the site. The primary aim in employing this technique is to estimate the value of *un-priced* forests by treating increasing travel costs as a surrogate for variable admission prices. The transaction price for such goods was considered as an expression of the willingness to pay for the right to make one round trip into the forest if the existing services are improved. For the purpose of determining the present pattern of visits to the forests, a survey of the forest visitors was conducted. Questions were asked about the time and money spent travelling to the forests, the type and number of attractions visited and whether or not they were satisfied. However it is very important to note here that the travel cost does not give the value of the forest but rather it estimates the value of the site attractions within the forest.

Contingent valuation methodology

This is another non-market valuation technique that was used. A sample of people around the forests were asked how much they were willing to pay for protection of the forest. The expectation here was that people would reveal their true willingness to pay (WTP). However, this method has some limitations because it is based on a hypothetical market. The respondents' determination of their WTP is open to *strategic bias* as WTP might be overstated to show environmental awareness. On the other hand, understatement might occur if actual payment is feared and if it is hoped that the environmental benefit will be provided by others (free rider problem). Despite such limitations the method is still regarded as one of the most powerful non-market valuation techniques and efforts were made to reduce the effects of these limitations.

Cost-benefit analysis

Cost-benefit analysis (CBA) was used to compare the social impacts that are related to the profitability of different activities in the forestry sector. Here the social cost of forest use and the social benefits of outputs derived from the forests were considered. The social value of the forests was calculated using non-market valuation methodology when not already in monetary terms. All costs and benefits over the time frame were calculated into net present value (NPV). Like other methods, this technique also has some limitations, e.g. 'discount rates' vary not only depending on the general current economic situation, but also depending on how much future generations are considered, and can considerably alter the outcome. An adequate social 'discount rate' is particularly important in environmental decisions, because environmental damage is often irreversible.

Opportunity cost approach

This is one of the tools used for estimating the real cost differences between competing forest uses and may have implications for coexistence and environmental conservation in the forests. The premise of this approach is that the cost of utilizing forest resources for unpriced forest products can be determined by the level of foregone income that could accrue to the user had he utilized the resource in an alternative way.

Market valuation methodology

This approach considered the valuation of forest resources used for the enjoyment or satisfaction of consumers and can be relatively easily observed and measured. The prices for such goods are either referred from the market or can be directly computed. The approach further looked at both consumption use valuation and productive use valuation of the forest products. Consumption use includes the value placed on forest products that are directly consumed without passing through a market, such as food collected from the forests, construction materials, medicinal plants and others. A consumption use value was assigned by estimating market value if the product were sold on the market. Productive use valuation is assigned to products which are commercially harvested, and is often the only valuation of forest resources that are reflected in the national income accounts and trade statistics. Estimates of such values are usually made at the production end (landed value, harvest value, farm-gate value, etc.) rather than at the retail end, where values are much higher.

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