

The World Bank

**Study on Growth and
Environment Links for
Preparation of Country
Economic Memorandum (CEM)**

**Part 2: Uncaptured Growth Potential –
Forestry, Wildlife and Marine Fisheries**

Final report

May 2005

The World Bank

**Study on Growth and
Environment Links for
Preparation of Country
Economic Memorandum
(CEM)**

**Part 2: Uncaptured Growth Potential – Forestry, Wildlife
and Marine Fisheries**

Final report

May 2005

Report no. 2
Issue no. 2
Date of issue 2 May 2005

Prepared KEP
Checked TNH
Approved

COWI

Table of Contents

1	Introduction	7
2	Forestry	8
2.1	GDP Contribution	9
2.2	Forest Resources	10
2.3	Sector Financing and Spending	15
2.4	Production and Consumption	22
2.5	Exports and Domestic Trade	24
2.6	Employment	27
2.7	Unaccounted Forest Services and Externalities	27
2.8	Future Growth and Recommendations	35
3	Wildlife	38
3.1	Policy Framework	39
3.2	GDP Contribution	40
3.3	Wildlife Resources	41
3.4	Contribution of Consumptive Wildlife Resources Use	42
3.5	Wildlife Division Income and Expenditure	44
3.6	Live Animals Export	50
3.7	Wildlife Resources and Poverty Reduction	52
3.8	Sustainability	55
3.9	Conclusions and Recommendations	58
4	Marine Fisheries	60
4.1	Contribution of Fisheries to GDP	61
4.2	Sector Financing and Spending	63
4.3	Marine Fisheries Resources	66
4.4	Revenue from Marine Fisheries	71
4.5	Marine Resources and Poverty Reduction	73
4.6	Sustainability of Marine Fisheries	75
4.7	Policy framework for Marine Fisheries	77
4.8	Recommendations	79

List of boxes

Box 1	Key estimates on the economic contribution of Forests	9
Box 2	Facts and figures on charcoal production	30
Box 3	Monetarizing the contribution of forests to water supply	31
Box 4	Contribution of Eastern Arc Forests to water and energy supply	32
Box 5	Ways to increase revenue from the Forestry sector	36

List of charts

Chart 1	Overall GDP and contribution of Forestry	10
Chart 2	Regions in Tanzania, Road density and forest reserves, 2002	13
Chart 3	Regions in Tanzania, Income and forest reserves, 2002	14
Chart 4	Forestry sector revenue, 1987/88 - 2003/04	15
Chart 5	Distribution between sources of revenue, 2003/04	17
Chart 6	Revenue collected and retained at source, 2002/03 – 2003/04	18
Chart 7	Development budget, 2003/04	20
Chart 8	Recurrent versus development spending, 2001/02 – 2003/04	21
Chart 9	Degree of self-financing of FBD	22
Chart 10	Composition of Forestry exports by product, 2001/02	24
Chart 11	Beeswax exports, 1988/89 -2003/04	25
Chart 12	Honey exports, 1988/89 – 2003/04	25
Chart 13	Trend in gum and resins export and revenue, 1997 - 2003.	27

List of tables

Table 1	Forestry reserves in Tanzania by type and land area	11
Table 2	Forest revenue by Forest type	16
Table 3	Revenue collection by source, 2002/03 – 2003/04	17
Table 4	Budget of MNRT, distribution by sub-sector, 2002/03 – 2003/04	19
Table 5	Industrial wood consumption, 1988, 1989 and early 1990s.	23
Table 6	Inputs of forests to Tobacco production	29
Table 7	Projection of charcoal production impact on forests, 2002-20	30
Table 8	Sources of income in villages, Tanzania, 2002	34
Table 9	Areas occupied by National Parks in Tanzania.	41
Table 10	Value of Tanzania's Wildlife Resources in regional comparison	42
Table 11	Tourist hunting and live animals export earnings, 1994 – 2003	43
Table 12	Revenue collection by source, 2002, 2003, 2004	46
Table 13	2003 Revenue by selected District Councils from Game Licenses	46
Table 14	Export of Government Trophies, Live Animals and Birds	51
Table 15	Export of Live Animals and Animal Tusks/Teeth	52
Table 16	Marine Fisheries resources and their value (base year 2000)	67
Table 17	Management advice from the IOTC	70
Table 18	Catch and Value of Tuna and Tuna-like big pelagis in EEZ, 2004	70
Table 19	HDI and HPI for coastal regions	74
Table 20	Contribution of fish to household subsistence in coastal areas	75

List of abbreviations and acronyms

CEM	Country Economic Memorandum
CFR	Catchment Forest Reserve
DWFN	Distant Water Fishing Nations
CITES	Convention on International Trade in Endangered Species
EEZ	Exclusive Economic Zone
ENR	Environment and Natural Resources
FA	Fisheries Agreement
FBD	Forestry and Beekeeping Division (under MNRT)
GDP	Gross Domestic Product
GoT	Government of Tanzania
GRT	Gross Registered Tonnes
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, Unreported and Unobserved
LMDA	Logging and Miscellaneous Development Account
MNRT	Ministry of Natural Resources & Tourism
MSY	Maximum sustainable Yield
NFP	National Forest Programme
NTFP	Non-Timer Forest Products
PER	Public Expenditure Review
PFA	Private Fisheries Agreement
RFO	Regional Fisheries Organisation
SPM	Southern Paper Mill
TFCMP	Tanzania Forest Conservation and Management Project
TIC	Tanzania Investment Centre
Tsh.	Tanzanian Shilling
TWICO	Tanzania Wood Industry Corporation
URT	United Republic of Tanzania

1 Introduction

This paper is Part 2 of the Study on Growth and Environment Links for the preparation of the Country Economic Memorandum (CEM) of Tanzania by the World Bank.

While Part 1 discussed the relevant literature and provided comments on the draft concept note of the CEM, Part 2 provides background data on the Forestry and Wildlife Sectors, both of which are excluded in the early drafts of the CEM. Part 2 also includes Fisheries with particular focus on Marine Resources. Part 3 of the study discusses the Mining, Freshwater Fishery, and Tourism sectors and potential externalities of the recent 'success stories' of growth in these sectors. Part 3 is presented in a separate paper.

The Forestry and Wildlife Sectors combined contributed on average 3.3 percent to national GDP over the last ten years, which largely under represents their potential contribution to the national GDP, economic growth and rural wealth. While this under-valuation is partly due to under-accounting in the System of National Accounts, corruption and inefficient administration and management in both the Forestry and Wildlife sectors lead to losses in government revenue and livelihoods benefits for the local population.

This report is a secondary data analysis, aimed at compiling quantitative information on the contribution of Forestry and Wildlife to economic growth as an input into the CEM. Data availability and quality were constraints to the analysis. The sources of information are statistics from the Ministry of Natural Resources and Tourism, Bureau of Statistics, existing literature and project reports. The examined literature is listed in Annex 2 of this report, while the Terms of Reference for this assignment are annexed to the separate Part 1 report.

The report presents first in Chapter 2 the Forestry sector, in Chapter 3 the Wildlife sector and then in Chapter 4 the Fisheries Sector. While Chapter 4 presents some general data on the contribution of Fisheries to GDP and Sector Financing and Spending, it focuses primarily on Marine Fisheries in the remaining Sections.

2 Forestry

The difficulty of examining Forestry in the context of economic growth arises through the fact no markets exist for many of the sectors contributions to the Tanzanian economy and population. Hence there is no objectively verifiable monetary value in which these services could be measured. Water services, biodiversity, climate regulation, and cultural values are examples of such forest services. Although these ‘ecosystem functions’ of forests can be determinants to growth in other sectors, via the water and energy supply chain, these values are usually not reflected in the GDP. Many transactions related to forest products and services, although markets exists, fall within the informal sector or are undertaken illegally and are hence not recorded either. These are for example, the sale of non-timber forest products or illegal logging for timber and charcoal production. Official GDP figures, on which the analysis of economic growth, and so the CEM, is usually based, do not reflect the ‘true’ economic importance of the forest sector to the national economy.

The reason why this ‘under valuation’ matters is that the contribution to GDP and its growth determine decision making by the Government of Tanzania and also to some degree its development partners. Pearce describes an ‘asymmetry of values’ (1991), in the sense that economic decision making is typically biased in favour of development options which can be calculated. Thus, unless incentives are devised whereby the non-market benefits of forests are ‘internalized’ into the land-use choice, eco-system benefits will be downgraded.

In the absence of monitoring data, reliable statistics and forest inventories, the valuation of the sector’s economic contribution remains speculation. National estimates exist, but it is questionable how reliable they are.

There are a few comprehensive studies that have tried to quantify the contribution of the forest sector. These include Aku et al. (2000) who is estimating the economic contribution for the Kilimanjaro Regional Forest Sector, Monela et al. (2004) who calculate the total economic value of catchment forest reserves, Mkanta and Chimtembo (2002) with a study on the contribution of natural forests to national income, and Norconsult (2004) with their attempt to calculate the externalities of charcoal production. Other major studies in the context of forest economics are Salmi and Monela (2000) who present an overview on Forest Sector Financing as an input into the preparation of the NFP. The collection of data in “Forestry in Figures” by the Forestry and Beekeeping Division presents a useful overview on some hard data, is however not up-dated on a regular basis.

Box 1 below summarises some key estimates on the contribution of forests to the Tanzanian economy, provided by these sources:

Box 1 Key estimates on the economic contribution of Forests

- Tanzania's Forests provide
- Employment to about 1 million people officially and about 5-10 times more unofficially and part-time.
- 10-15 percent share of Tanzania's registered export earnings.
- 2-3 percent of GDP for officially recorded forest products with the major cash value being derived from timber, customary products and fuel.
- 95 percent of Tanzania's energy supply through woodfuels.
- Potential for tourism, the pharmaceutical industry and carbon sequestration, which is not captured presently. The value of Tanzanian forests for recycling and fixing carbon dioxide is estimated to be US\$ 1,500 per ha by Salmi and Monela (2000) and US\$ 664 per ha by Turpie (2000).
- around 75 percent of building materials.
- 100 percent of indigenous medicinal and supplementary food products.

(Source: Norconsult 2002:14)

The quantitative data collated for this report aimed to include those contributions to the economy and peoples' livelihoods which are quantified and reflected in official government statistics as well as those not yet officially recorded as far as quantitative data could be found in the existing body of literature.

This Chapter is divided into 8 sections. Section 2.1. will provide information on the GDP contribution of the country's forest resources. Section 2.2. presents an overview on the country's forest resources. Section 2.3. presents officially recorded data on forest sector financing and spending. Section 2.4 investigates production and consumption of forest products, followed by Section 2.5. on export and trade and Section 2.6. on employment. Section 2.7. deals with unaccounted forest services and externalities and lastly, Section 2.8. with the future growth potential of the sector.

2.1 GDP Contribution

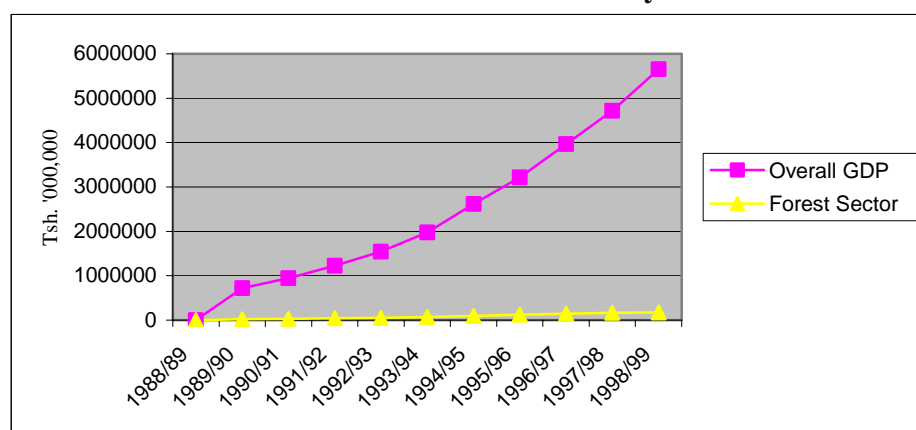
The estimates of the contribution of the forest sector to GDP differ. Most estimates are between 2 (Mushi 1999) and 3 percent (Salmi and Monela 2002, URT 2004b) of GDP.

The Economic Survey (URT, 2004c) quotes an average percentage contribution for Forestry and Hunting combined to the GDP of 3.3 percent over the period 1995 to 2002. In comparison Agriculture contributed 35.3 percent, Tourism 13.0 percent and Fisheries 2.5 percent during the same time period.

Chart 1 below compares overall GDP to the monetary contribution of the forest sector to GDP. It shows that while GDP has been increasing constantly between 1990 and 1999, the contribution of Forestry remained around 3.5 percent on

average. Its contribution to growth has hence been constant at 1 percent over the period of 1988 to 2003 as reflected in the assessment of recent growth performance of Forestry and Hunting in the context of the CEM (Utz 2005).

Chart 1 Overall GDP and contribution of Forestry



(Source: based on MNRT 2000)

Studies that try to take non-industrial Forestry into account, present higher values. For example, a World Bank study conducted by Sharma in 1992 values the contribution of the forest-industry, non-industrial Forestry and logging to be 13.9 percent of GDP in 1989. The amount of uncounted wood-fuels alone is estimated to be more than 30 million m³ per year (FOSA Country report).

In the system of National Accounts, Forestry is added up into an aggregate value with Hunting and then summarized under the 'Agriculture GDP' with Fisheries, Livestock and Crops. Furthermore, the GDP undervalues the contribution of Forestry to the national economy. Forests and woodlands that support commercial industry are included in the national accounts. However, values of forest goods and services are often underestimated, wrongly attributed to other sectors, or entirely omitted. These include non-market timber, non-timber forest products, tourism and recreational services, and ecosystem services such as positive influences of forests on agricultural production, water and energy, carbon storage and biodiversity protection. Tanzania is in the initial stages of developing a system of Forest Accounts with support from the CEEPA Natural Resource Accounting Program for Eastern and Southern Africa, 2003-2006.¹

While Sections 2.3. to 2.6. describe recorded contributions of Forestry, Section 2.7. deals with the unrecorded ones. The next Section provides an overview of the resources of the Forest Sector.

2.2 Forest Resources

There are a number of estimates of Tanzania's total forest cover and its rate of change. In 2001, the National Forest Programme estimated the country's forest and woodland resources at 33.5 million hectares, which constitutes 38 percent

¹ Centre for Environmental Economics and Policy in Africa at University of Pretoria.

of the total land area of Tanzania (URT 2001: 19). One of the many published estimates of the deforestation rate is 91,276 ha/year (MNRT, 2002).²

Government forest reserves

According to official statistics from 2002, the country's 815 forest reserves³ cover about 15 million ha of Tanzania's land area, the majority of which is productive forests, totalling approximately 13 million ha or 74 percent of the entire forest estate. The remaining 26 percent are protected forests (MNRT 2002). Table 1 below shows the Forestry estate in Tanzania by type and use.

600,000 ha of forest were owned and managed by local governments in 2001 (MNRT 2001a: 20).

Table 1 Forestry reserves in Tanzania by type and land area

Use Category	Quantity	Total Land area (ha)	%
Productive	394	11,134,558	74
Protective	421	3,956,210	26
Total	814	15,090,769	100

(Source: MNRT, 2002. Note: Protective includes two different categories of protective forests, which were not specified in the source and hence aggregated here. Furthermore, declared and proposed reserves have also been aggregated)

Industrial plantations

In 2001 about 83,000 hectares of forestland was in government owned industrial plantations, distributed in 16 units throughout the country (MNRT 2001a: 23). Major plantation species are pines, cypress, eucalyptus and teak. The annual cutting potential is estimated at about 1 mill m³ (MNRT 2001a: 23).

The potential of industrial plantations to contribute to the national economy is presently not realized. The reasons for this are summarized (based on government sources) as:

- Insufficient supply of quality wood to support modern forest industry. A plantation wood production and supply forecast by the FBD estimates the gap to approximately 930,000 m³ per year for the period 2000-2010 (MNRT 2002).
- Lack of incentives to increase productivity and maximising net revenue.
- Net planting area and stock are declining in area and quality.
- Poor management, leading to outdated management plans and inventories causing under stocking and overstocking in certain areas.
- Shortage of skilled staff and investment capital.

² About 8 other estimates were found during the course of this study only.

³ Out of which 608 declared reserves represent close to 14 mill. ha and 207 proposed reserves, 1.2 mill. ha.. MNRT (2002).

Private Forestry

In 2001 the area under private and community Forestry was estimated to 70,000 – 150,000 ha including community woodlots of small sizes (MNRT 2001a: 20). This is only about 1 percent of the country's total forest reserves.⁴

Private plantation management is promoted by the new Forest Policy and Act, and is still a fairly recent phenomenon in Tanzania. Based on TIC (2001), there are currently three privately managed plantations, including

- Kilombero Teak company (Kilombero District), which plans to expand its plantation area from 2,900 ha (2001) to 10,350 ha by 2011,
- Its subsidiary Tanganyika Wattle Company (Njombe District) grows besides wattle also pine and eucalyptus. These joint ventures with the government have been financed by the Commonwealth Development Corporation,
- Escarpment Co/Kilombero Forest Ltd.(Mufindi) with 1,800 ha of pine and eucalyptus plantations. The main objective is to sequester CO₂ and generate revenue from trading carbon credits. It is reported that 22 Tshs per tree per year are being paid to about 4,000 farmers.⁵

Private Forestry by individual farmers and communities is taking place throughout the country, although generally on a small scale. The HASHI project in Shinyanga reports that communities have recently reforested about 350,000 ha of woodland.

Investment in tree growing is limited to household use. Restricting factors to commercial tree growing by individuals have been lack of capital, poor land tenure arrangements and long term time horizon before returns will be realized (Salmi and Monela 2000). In addition the supply of 'free' wood produce from forests on general lands, makes it difficult to price wood products from private farms competitively.

Forests on general land

Forests on general lands are classified under the Forest Policy, Land and Village Land Acts and were estimated in 2001 to cover 19 million ha (MNRT 2001a). Due to the pressure on these forests for competing land uses (agriculture, livestock grazing, settlements and industrial development) the loss of forest cover is estimated to be high. Lack of clear ownership, tenure and user rights have provided little incentive for sustained management of these forests by the villagers. Due to imperfect property rights, forest resources on public lands are incorrectly priced leading to a financial incentive for investments in conservation. The establishment of village forest reserves, a category introduced by the new Forest Act, is considered an instrument to solve this degradation problem.

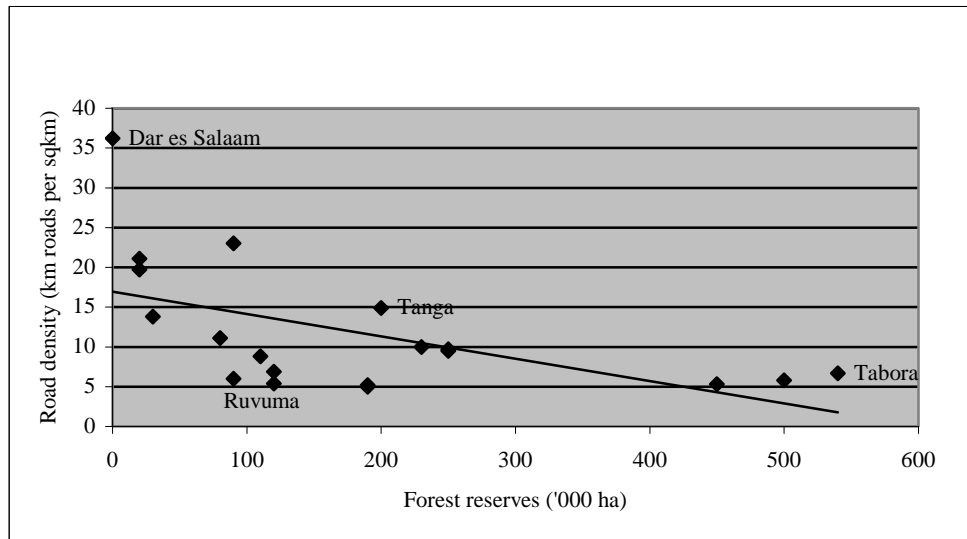
⁴ 150,000 ha of private and community Forestry is about 1% of the 15 million ha of forest reserves.

⁵ Comments received by A. Boehringer, FBD-FOPIS project

Regional distribution of forest resources

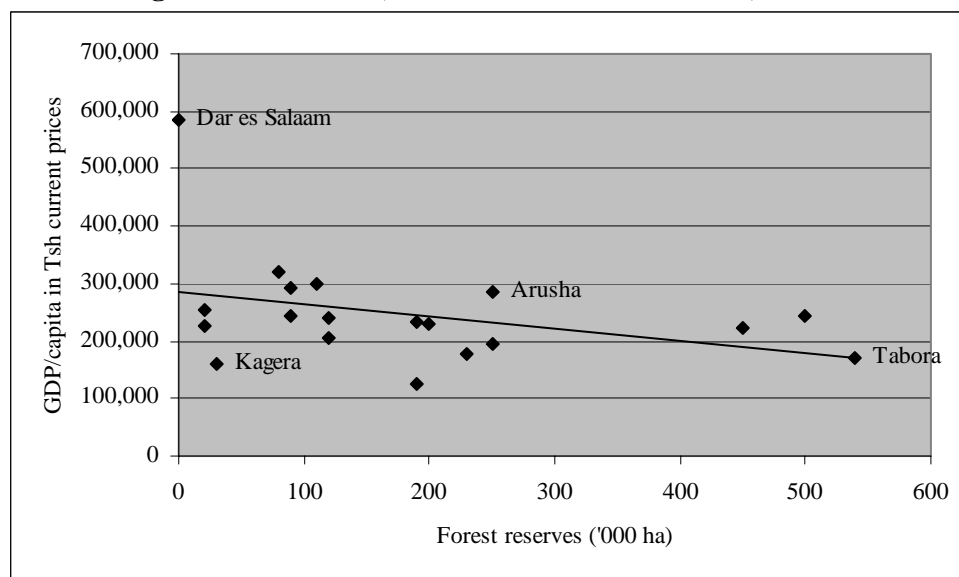
The regional distribution of the forest resources in the country varies considerably. Table A in Annex 1 groups 19 Regions based on the forestland cover. The three Regions with the largest forest reserves are Tabora, Rukwi and Lindi, which all feature 450,000 ha or above.

Chart 2 Regions in Tanzania, Road density and forest reserves, 2002



(Source: Ministry of Communications and Transport, and Author based on Forestry on Figures, 2002, Pearson correlation coefficient -0.55)

The forest coverage is plotted against road density in Chart 2 above. The Chart shows a negative correlation between these two variables, indicating that the regions with high forest coverage are at the same time regions with limited infrastructure development (using road density as indicator for infrastructure development). Two extreme examples are Dar es Salaam (no forest combined with high road density) and Tabora (extensive forest coverage coupled with low road density).

Chart 3 Regions in Tanzania, Income and forest reserves, 2002

(Source: NBS and Author based on Forestry on Figures, 2002. Pearson correlation coefficient -0.36)

Similarly, Chart 3 above reveals a (less significant) negative association between forest area and income per capita for the regions. This association suggests a negative relationship between forest cover and economic growth: Higher growth regions have less forest coverage and vice versa.

Policy framework for the management of forest resources

The reform of the Forestry sector over the last decade included the policy and legal framework, with a revision of the Forest Policy (1998) and the Forest Act (2002), which was enacted in 2004. Procedures and regulations for implementing the Act are currently under preparation. The Policy advocates private and community based Forestry and provides legal basis for Joint Management of Forest reserves with catchment or biodiversity values. In 2003 a forest area of 1,085,306 hectares was under co-management in public lands while 1,863,623 hectares were in the forest reserves (URT, 2004c).⁶

Institutional changes are underway with the transformation of the Forestry and Beekeeping Division into an Executive Agency. Privatization has also been introduced in the sector with ten companies involved to date (TIC 2001).

Centralised forest management has contributed to both market and policy failures in the sector. The NFP describes the low capacity of government institutions to control and manage the forests as a central constraint. The country's forest reserves have been suffering from degradation due to encroachment, over-utilization, fires, unclear boundaries, lack of systematic management and inadequate resources for controlling illegal harvesting as well as inefficient revenue collection system (MNRT 2001a: 23).

⁶ These figures do not match the data in Table 2 on page 5 although both data sets originate from government sources. Differences could not be clarified.

The NFP also argues that inadequate development of economic activity to absorb increased labour surplus from agriculture and livestock increase pressure on the country's forest resources. The 2004 logging scandal in Rufiji demonstrated that ineffective control systems and government corruption are still by far the greatest challenge that the forest sector has to face.

Lack of data and monitoring of forest resources has been a major constraint faced by the Forest Administration both centrally and in the Districts. Efforts are currently underway to streamline existing elements of monitoring into a comprehensive national monitoring system under the National Forest Programme.

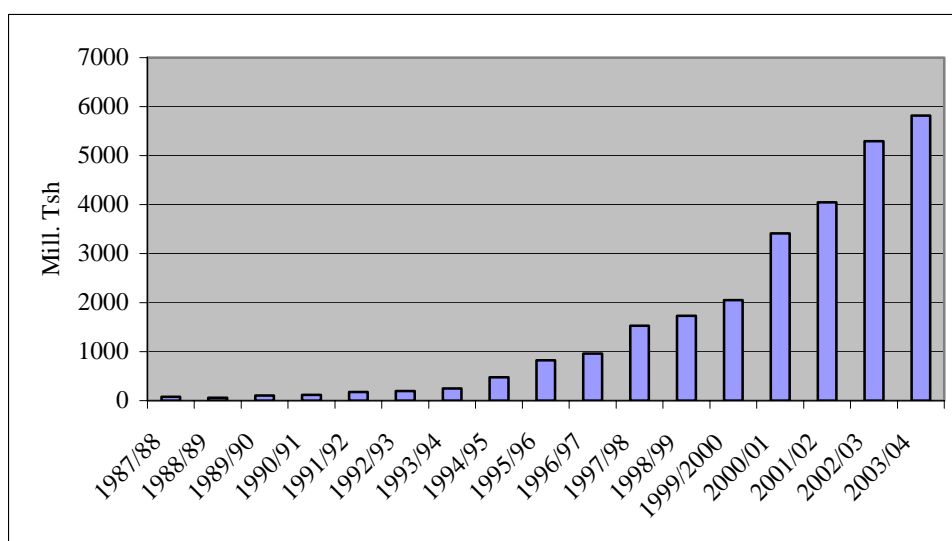
2.3 Sector Financing and Spending

National income from Forestry is generated primarily through the collection of revenue from fees, royalties and licenses charged or issued in respect of forest reserves by the Forestry and Beekeeping Division (FBD) under the Ministry of Natural Resources and Tourism. Local Governments also have mandate to collect revenue from forest produce in local authority forest reserves. The 2002 Forest Act, provides legal basis for the allocation of management responsibilities of national forest reserves, including collection of revenue, to the designated forest manager (Forest Act 2002, part V, section 27).

Revenue collection

Chart 4 below shows that the revenue collection in the forest sector has been steadily increasing from Tsh.77 million. in 1987/88 to 5,818 million in 2003/04.

Chart 4 Forestry sector revenue, 1987/88 - 2003/04



(Source: MNRT 2002 up-dated with data for later years collected directly from FBD containing revenue from natural forests, royalty and LMDA (Logging and Miscellaneous Development Account) from plantations)

Comparison of the data with Salmi and Monela (2000) reveals that for the years

1995 to 1999 the total figure presented in the Chart above reflects only the revenue from Central Government Forest Reserves. It could not be verified if this is also the case for previous years. If so, then the total revenue is even higher.

Additional revenue collected for charcoal production amounted to Tsh.662 million or 19.4 percent of total collection in 2001/02 while revenue from collection of firewood was Tsh.89 million or 2.6 percent of the total collection (URT 2004b: 24).

Sources of revenue

Table 2 below shows the distribution of revenue between Local and Central Government Forest Reserves and Plantations for 1995 to 1999. Central Government Reserves earn by far the largest proportion of government forest income, followed by plantations. The proportion of income of Local Government Forest Reserves is comparatively small, but has been steadily increasing between 1995 and 1999, while plantation Forestry shows a downward trend during the same period. Revenue accrues also from forests on general land, for example from charcoal licenses, as quantified above.

Table 2 Forest revenue by Forest type

	1995/96		1996/97		1997/98		1998/99	
	Value Tsh.	%	Value Tsh.	%	Value Tsh.	%	Value Tsh.	%
Gov. plantations	386,685,332	31.8	777,171,338	44	558,707,684	26	681,445,550	26
Central Gov. FR	822,878,000	67.7	961,938,000	54	1,528,270,000	71	1,733,540,000	66
Local Gov. FR	6,079,370	0.5	26,202,000	1	73,974,800	3	228,385,850	9
Total	1,215,642,702	100	1,765,311,338	100	2,160,952,484	100	2,643,371,400	100

(Source: author, based on Salmi and Monela 2000)

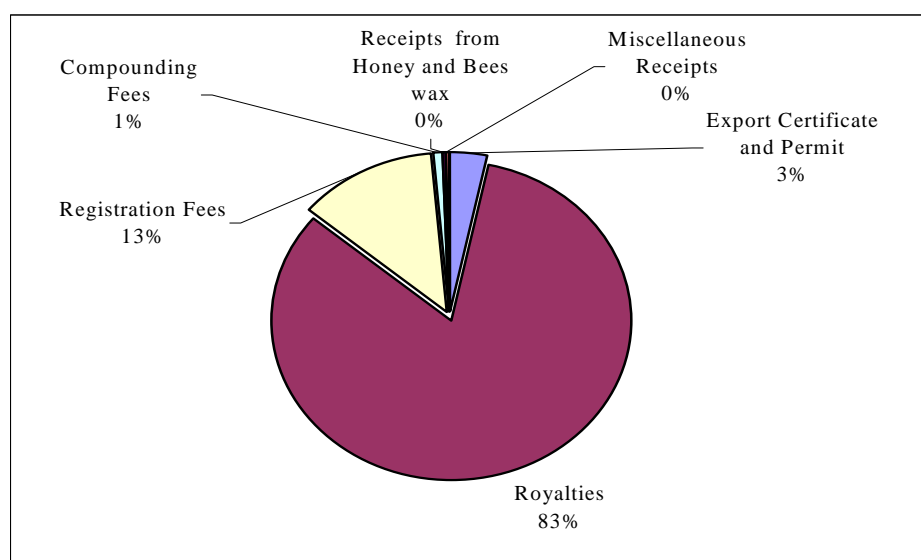
Royalties from timber sales are the most important source of income for the sector. Chart 5 below shows the various sources of revenue collection and their relative importance. Royalties hold a share of 83 percent equal to Tsh.4.5 billion in nominal terms without the revenue collected and retained at source. Similarly, as Table 3 below outlines, in the previous financial year, Royalties constituted 87 percent of the total revenue. Registration fees for dealers of forest products were the second largest source of revenue. Revenue from registration fees has been increasing steadily over the last three years.

Table 3 Revenue collection by source, 2002/03 – 2003/04

Revenue Collection by Source				
Source	2002/03		2003/04	
	Amount in 1000 Tsh.	%	Amount in 1000 Tsh.	%
Export Certificate and Permit	35,000	0.74	155,239	3.41
Royalties	4,106,410	87.13	3,762,014	82.69
Registration Fees	261,440	5.55	570,001	12.53
Olmotonyi FTI	65,600	1.39		
Compounding Fees	118,339	2.51	39,761	0.87
Receipts from Honey and Bees wax	1,668	0.04	6,687	0.15
Tree Seed Program	123,500	2.62		
Recovery of stores and public money	2	0.00		
Miscellaneous Receipts	1,000	0.02	16,073	0.35
Total	4,712,959	100.00	4,549,775	100.00

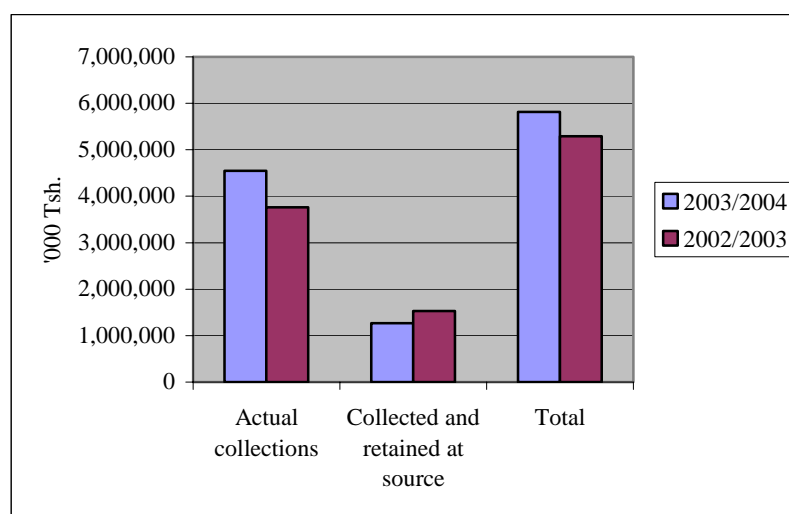
(Source: MNRT (2004). Note: this does not include revenue collected and retained at source)

Royalties have in the past been fixed arbitrarily with no recognition of market values (Salmi and Monela 2000). The 2002 Forest Act, provides the basis to determine the level of royalties based on market value of the produce, accessibility, profitability and principles of sustainable harvesting (Section 78, the 2002 Forest Act). Furthermore, the Act authorises villages to sell timber from their own forest reserves, which will provide a new and additional source of forest revenue, directly accruing to the communities.

Chart 5 Distribution between sources of revenue, 2003/04

(Source: MNRT, 2004. Note: this does not include revenue collected and retained at source)

Chart 6 shows that while total revenue collection and actual collections have increased over the last 2 years, the amount retained at the source has decreased.

Chart 6 Revenue collected and retained at source, 2002/03 – 2003/04

(Source: MNRT 2004)

Constraints to revenue collection

Various sources report revenue under-collection in the Forest sector during the past decades (URT 2004b, Salmi and Monela 2000). The NFP estimates that only 5 to 10 percent of the revenue due from forest reserves and general lands is collected (p. 23). There have been several studies assessing the forest sector revenue collection in Tanzania, notably Kowero (1990 and 1991), Silviconsult (1991), Chatterjee and Mushi (1994), Buys et al. (1996), Koppers (1998), and Mushi (1999).

The authors seem to agree that the reasons for the low performance are the poor management of FBD and recommend the development of transparent and accountable forest management without corruption (Salmi and Monela 2000). Corruption is still a problem in the forest sector, accounting for large revenue loss and destruction of the forest estate.

While forest staff carrying out revenue collection have low salaries (around Tsh.30,000 per month, data based on the year 2000), corruption does not always originate within the forest sector itself. Under the local government decentralization reform in Tanzania, the forest sector has been severely affected in the sense that all Forestry staff based in the districts is not answerable to FBD anymore but to the President's Office Regional Administration and Local Government. The FBD is understaffed to monitor the management of the country's national forest reserves, while decentralized management is far from being fully operational throughout the country.

While forest sector revenue is one of the most important sources of income to many district councils, very little has been invested by local governments in developing the sector to secure future income. The lack of capacity at the district level is well recognised and documented. Local governments may not be the right entities to carry out profitable business in primary or secondary Forestry production. The 2002 Forest Act provides for contracting out of opera-

tions to private sector, and different types of competitive concessions and leases may be appropriate means for local governments to continue earning revenue from their forests, while keeping their own staff adequately small and affordable. A constraint to competitive bidding is the current lack of capacities for tendering, procurements and monitoring and evaluation, which contributes to the high levels of under-spending of the foreign development budget in Forestry (see below).

Public financing

National Budget Allocations to the Forest Sector have generally been inadequate and subject to fluctuation. During the 90s FBD received 0.1-0.2 percent of the annual budget of the GOT. Allocations in real terms have been increasing more than four-fold during the same period (Salmi and Monela 2000).

While FBD's allocation was 50 percent of the total MNRT budget in 1996/7, it decreased to 18 percent in 1998. This was due to the introduction of the Forestry Retention Scheme.

Forestry and Wildlife each received 29 percent of the Budget in the last financial year. This was followed closely by Fisheries (18 percent) and Tourism (11 percent) (see Table 4 below).

Table 4 Budget of MNRT, distribution by sub-sector, 2002/03 – 2003/04

Sub-sector	2002/03		2003/04	
	'000 Tsh.	%	'000 Tsh.	%
Forestry and Beekeeping	4,897,656	24	7,633,912	29
Wildlife	6,593,025	33	7,586,736	29
Fisheries	3,688,280	18	4,648,202	18
Tourism	2,208,073	11	2,880,761	11
other				
Total MNRT	20,243,165		26,257,352	

Note: The Total includes other sub-sectors not listed here. The amounts are only recurrent expenditures. Based on MNRT 2004.

The retention scheme allows the MNRT to retain 70 percent of the revenue collected from Forestry. The remaining 30 percent is submitted to the Treasury. After deductions of 14% of the retained revenue for the Ministry's central administration and other divisions, the remaining 56 percent of the originally collected revenue is allocated to FBD. With this income, the FBD finances all its recurrent (except for staff salaries which are paid by Treasury) and some development expenditures, though donor financing covers most. Local Governments are allowed to retain for their own purposes 5 percent of the sum above Tsh.1 million of collected revenue.

There are indications that that the forest sector suffers from under-financing, not only at the central level but also at the local administrative level. The approved local government budgets are much lower than the requested budgets and actual disbursements still lower. According to Kaduvage (2000), the actual disbursements were only 27 percent of the requested budgets in Mwanza Region during the past four financial years. In 1999/2000 about Tsh.0.5 billion of

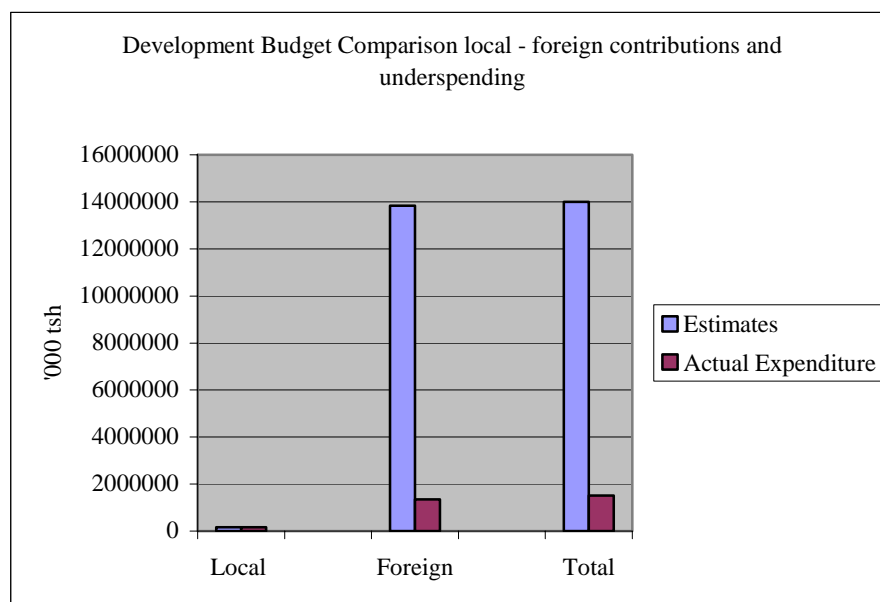
retained revenue was returned to the regions and districts by FBD (Salmi and Monela 2000).

Foreign financing

Chart 7 below illustrates the high degree of donor financing in the development budget of FBD with foreign allocations to FBD's development constituting 99 percent in 2003/04. This reflects a long-term trend. During the past two decades, donor agencies have been providing the bulk of forest sector financing with contributions around 90 percent (FBD statistics; Kobb 1999). However, it is reported by the Development Partner's Group that this situation will change dramatically in 2007 when most partners will cease their support.

Secondly Chart 7 below demonstrates the high degree of underspending of the development budget in the Forestry sector. Only 10 percent of the total budget allocation was spent. This reflects low capacities to absorb foreign funding and institutional inefficiencies, often induced through uncoordinated policies of the development partners. To tackle this problem, the Government and its development partners have developed a sector wide approach for the Forest Sector, being implemented this year for the first time. Yet, a SWAP capacity building and human resource development plan is missing to cater for restructuring in the medium term.

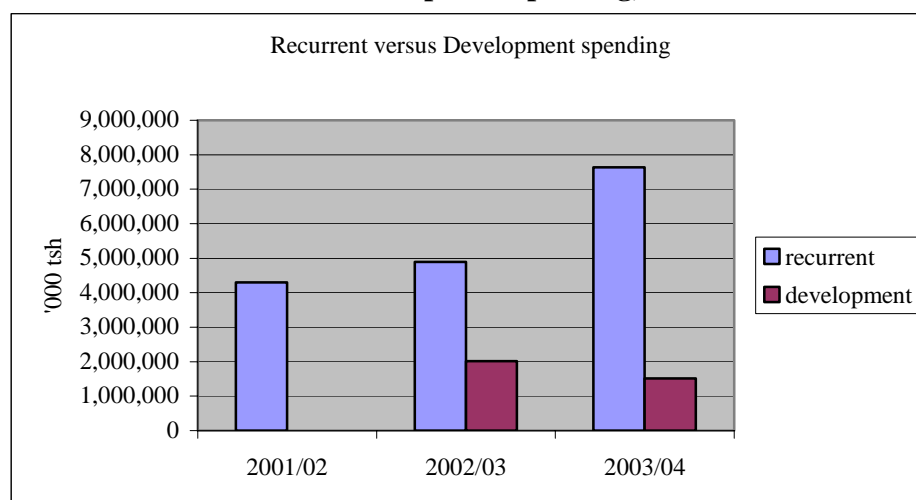
Chart 7 Development budget, 2003/04



(Source: Author based on MNRT 2004)

Sector spending

The comparison of recurrent and development expenditures over the last 3 years in Chart 8 shows that recurrent expenditures are much larger than development related expenditures and have been steadily increasing over the 3 year period. In contrast, development expenditures were negligible during 2001/02, but increased to 29 percent in 2002/03 and decreased again to 16.5 percent in 2003/04. The nominal values are shown in Table B in Annex 1.

Chart 8 Recurrent versus development spending, 2001/02 – 2003/04

(Source: Author based on MNRT 2004)

Chart A and Chart B in Annex 1 show the allocation of the FBD budget in broad terms: The development budget is dominated by service delivery expenditure (92 percent), while the recurrent budget is dominated by capacity building expenditure (61 percent) (see also Chart D in Annex 1 for allocation in the past two years)

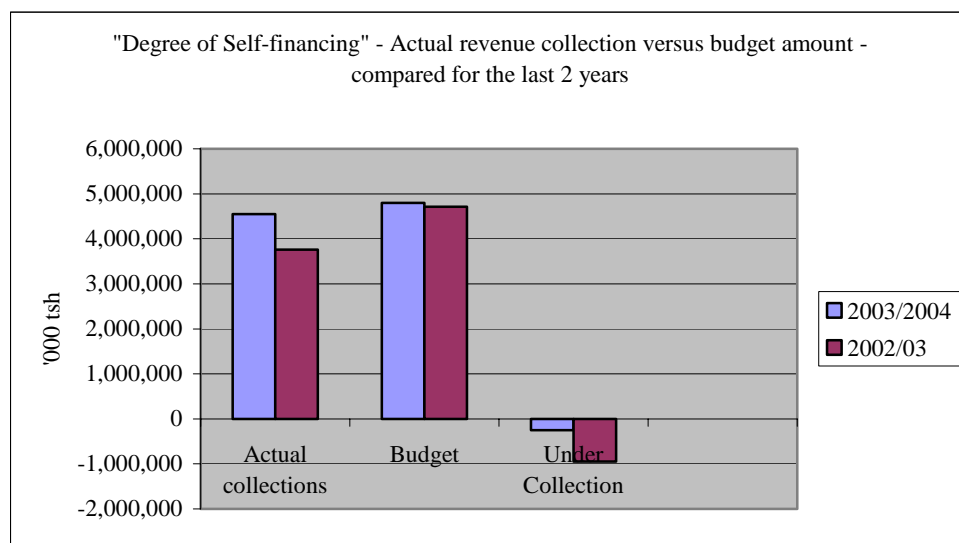
Over a two-year timeframe, the amount spent on service delivery in the recurrent budget has even gone down further vis-à-vis the capacity building component (see Chart C in Annex 1). Similarly the component of service delivery has increased in a 2-year time frame within the development budget (see).

Based on data provided by the Public Expenditure Review for Environment (URT, 2004b), about 31.8 percent of the recurrent budget is spend by FBD on afforestation, 18 percent on administration and 8 percent on research. The balance is allocated to Districts, training, beekeeping and other environmental activities (p.25). The PER does not detail for which financial year these figures apply. In 2003/04 the allocation by FBD to Districts was Tsh.265,955 (MNRT 2004).

Degree of self-financing

Although Forestry is a productive sector, it is presently not a net contributor to the treasury. Chart 9 below shows how, during the last two years, the revenue collected by FBD has been insufficient to cover its budget, although the financing gap has decreased recently.⁷

⁷ The actual collections do not include revenue collected and retained at source.

Chart 9 Degree of self-financing of FBD, 2002/03 – 2003/04

(Source: Author based on MNRT 2004)

The 2000 Forestry Sector Financing study assesses that the forest sector could become self-financing with limited potential to provide net contribution to the government income, mainly through secondary and multiplier effects (Salmi and Monela 2000: 23).

2.4 Production and Consumption

Although the new Forest Policy and Act promotes private investment in the forest industry, through incentives and credit facilities for private investments and joint ventures, local and foreign private investment in the sector has so far been limited.

A state owned company, Tanzania Wood Industry Corporation (TWICO), was responsible for harvesting and sealing wood products up to the early 1990s. To date ten logging companies previously owned by TWICO have been privatised (TIC 2001). Southern Paper Mill (SPM), the only large scale pulp and paper factory in Tanzania, East and Central Africa, was closed in 1997 and has been advertised by TIC for privatization (TIC 2001).

Harvesting of forest products is carried out in both natural and plantation forests by private companies, pit sawyer and small-scale companies.⁸

The Forestry industry is dominated by wood processing through sawmilling, furniture marts and joinery. There are also small-scale paper and board production, matches manufacturing, poles production, chipboard, fibreboard, black-board manufacturing and tannin extraction (MNRT 2001a: 27).

⁸ Currently the main large operators include, Sao Hill Timber Ltd., TANSCAN Timber Company, Escarpment Forestry Ltd, Kilitimber Ltd, Mena Wood Ltd, and United Lamber Ltd.

Table 5 Industrial wood consumption, 1988, 1989 and early 1990s.

Type	Annual consumption in m3					
	1988	%	1998	%	Early 1990s annual average	%
Industrial saw-milling	533,000	92.5	944,000	95.6	382,500	51
Pitsawing	-		-		150,000	20
Wood based products (1990s), panels and matches (1988, 1989)	14,000	2.5	13,000	1.4	22,500	3
Pulp and paper mills	29,000	5	30,000	3	157,500	21
Joinery and furniture industry	-		-		37,500	5
Total	576,000	100	987,000	100	750,000	100

(Source: based on NFP: 27 and MNRT 2002, adjusted by author.)

Table 5 above provides information on the industrial wood consumption in 1988, 1998 and the annual average in the early 1990s. The data source did not specify if consumption data refers to domestic production or if imports are included.

The industrial consumption of wood is predominantly for saw milling, although there has been a decline from over 90 percent in 1988 and 1998 to around 50 percent in the early 1990s. According to Ngaga (1998) private sector holds a 78 percent share in saw milling through small-scale units (1,000m³/annum). Similarly, wood working units for furniture and joinery are mainly owned by individuals and families.

Productivity in small-scale saw milling is low due to the use of traditional methods, e.g. mobile sawmills, saw benches and handsaws (pitsawing). Pitsawing organized by individuals and accounts for 40 percent of the country's sawn wood (Skage and Naess 1994).

In addition, there are problems with transportation due to poor infrastructure. The Forest industry also suffers from lack of information on material availability, market statistics and skilled labour (MNRT 2001a: 27).

Since the closure of SPM there has been an oversupply of plantation grown softwood from the Sao Hill plantations. The National Forest Programme estimates the sustainable long-term supply of saw logs from industrial plantations at 540,000-600,000m³ a year (URT 2001:27). The long-term supply of saw logs will decline unless new planting and re-planting schemes are initiated. The quality of logs is considered to be poor (same source). Based on the 2003 Economic Survey, the total harvest of logs increased quite significantly from 4,556

m³ in 2002 to 334,873 m³ in 2003 (315,853 m³ in plantations and 19,020 m³ in natural forests).⁹

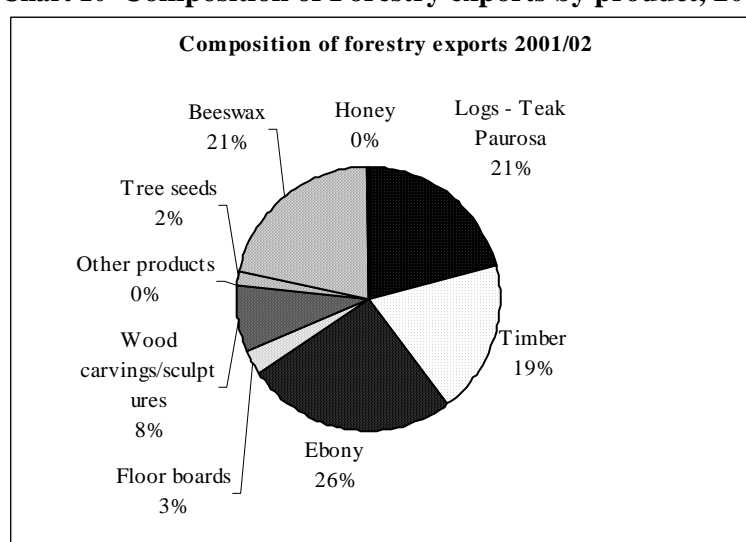
Due to declining stocks and increasing royalties, the harvesting of hardwoods from natural forests is going down. There is a declining availability of acceptable log sizes of hardwood species, in particular Mninga. Machine cut hardwood is becoming rare. A number of hardwood sawmills have been closing down, which has resulted in increased pitsawing. Due to ineffective control and management of natural forests, harvesting is mostly carried out illegally.

2.5 Exports and Domestic Trade

It is difficult to establish the contribution of the Forestry sector to exports as each source consulted present different figures. According to data in Table C in Annex 1 the value of export of Forestry products was around 4,5 million US\$ in 2002/03. The data presented is showing some fluctuations, which are not explained. Also, the narrative part of the Economic Survey describes that the total value of exports of forest and bee products increased between 2002 and 2003 by 20 percent from Tsh.6 to 7.2 billion, which differs from the data in the Table.

A similar table contained in a FBD source (MNRT 2002), establishes the total value of exports of Forest Products for the three years 1998/99, 1999/00 and 2000/01 at US\$4,9m, US\$5,9m and US\$2,1m respectively. Other sources (see FOSEA Country Report for example) argue that the Forestry sector contributes 10 percent of official foreign exchange earnings or 11 percent of the total merchandise exports.¹⁰

Chart 10 Composition of Forestry exports by product, 2001/02



(Source: author, based on URT 2004c)

Chart 10 above shows the composition of Forestry exports by product on the basis of the financial year 2001/02.

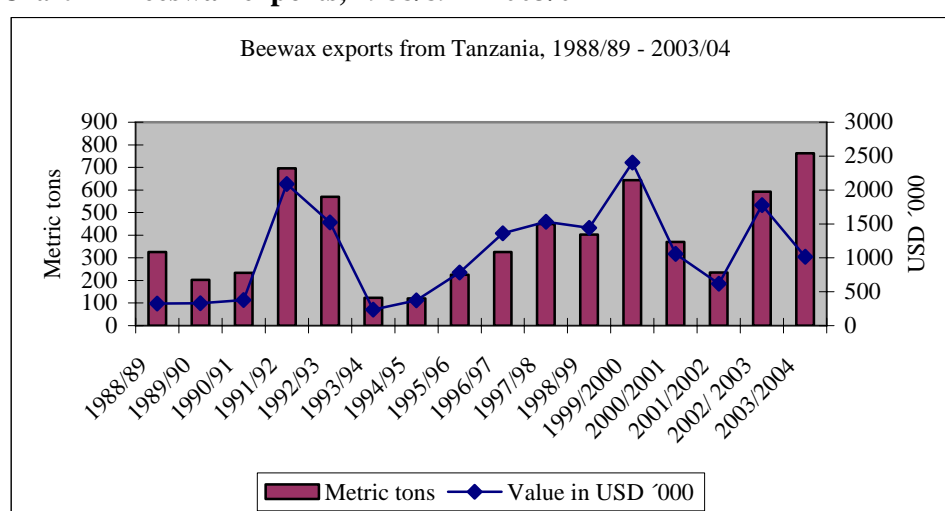
⁹ The reliability of these data is questionable.

¹⁰ The year of these values is not specified in the source.

Some of the fluctuations in the data might be due to a changing policy environment, such as the liberalisation of trade. Also, exports of some individual forest products such as some types of logs, flooring and blackwood have decreased whereas the value of honey exports has increased substantially. Exports of logs and unprocessed products of some valuable species have been banned in 2000 (Salmi and Monela 2000).

Official Beekeeping Statistics of the FBD are presented in Charts 11 and 12 below, showing the trend of **beeswax and honey exports** in Tanzania between 1988 and 2004. Statistics of the FBD summarize that the average annual export of honey between 1993-2003 was 348.8 tons of honey and 187 tons of beeswax, which generated an average of US\$ 1,158,220.3 for honey and 211,393.2 for beeswax in export earnings (FBD 2003).

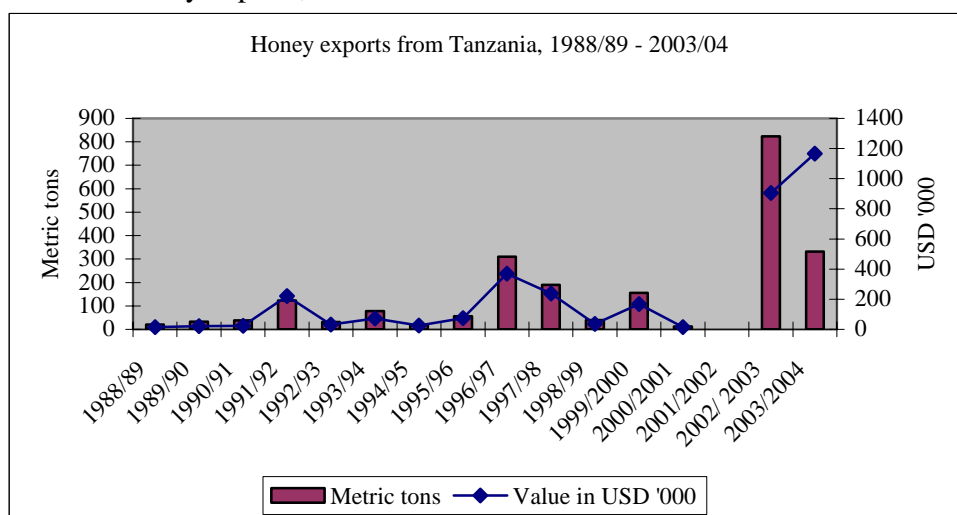
Chart 11 Beeswax exports, 1988/89 - 2003/04



(Source: author based on FBD data)

Presently, Tanzania produces about 4,860 tons of honey and more than 750 tons of beeswax per year. According to the National Beekeeping Programme 2001-2010 (p. vii) the current production is only about 3.5 percent of the country's potential production from honeybees, which is estimated to reach Tsh.138 billion annually. The sudden increase of honey exports in 2002/03 is due to an EU export ban on honey imports from China, which led to an increase in world prices and opened an opportunity for Tanzania. This ban has been lifted and prices seem to have fallen back.¹¹

¹¹ Comments received by A. Cauldwell, DPG.

Chart 12 Honey exports, 1988/89 – 2003/04

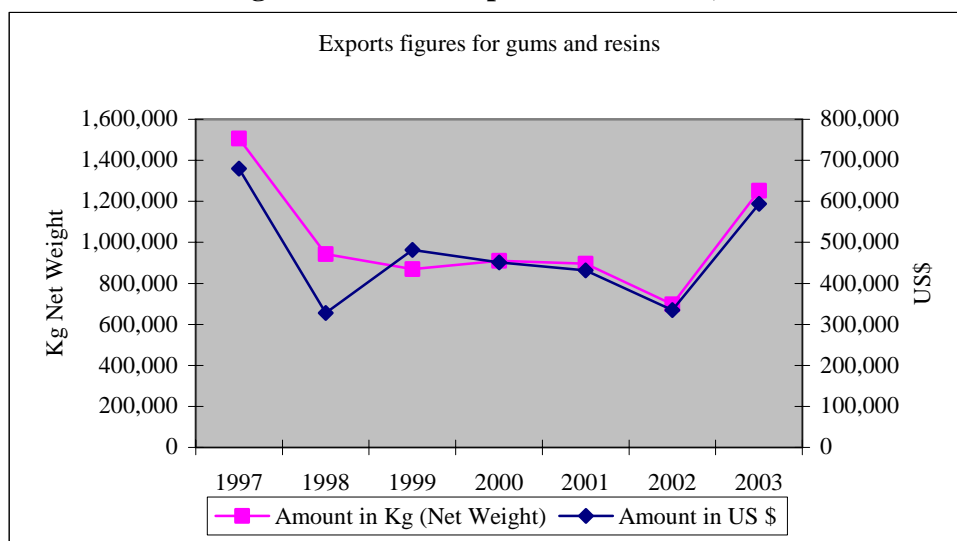
(Source: author based on FBD data)

Salmi and Monela (2000) estimate that the farmer income from honey and other forest produce from miombo woodlands is as much as Tsh.1,050 per ha. Based on a study conducted by Aku et al (2000:5), between 1990 and 1998 76m litres of honey and 780 tons of bees wax were extracted in Kilimanjaro Region. A total of Tsh.333,746,000 was accrued from sales of honey. Issango (2001) has done similar study on honey production and sales along the Dar es Salaam – Morogoro Highway. He found that between 1995 and 2000 a total of Tsh.584 million was accrued from selling 751 tons of honey and Tsh.2.5 million from selling 2 tons of bees wax.

The new Forest Policy and the National Beekeeping Programme foresee the establishment of village beekeeping reserves. In 2003 villages in five districts have established such reserves, from which they will accrue direct cash income (unpublished FBD URT, 2004c).¹²

The **export of gums and resins**, another non-timber forest product besides honey and beeswax, amounted to more than 7,000 metric tonnes in the period 1997-2003, corresponding to an average of 1,011 tonnes a year (Kagya 2004). See Chart 13 below for recent export figures. Industrial use of gum arabic is as an additive in a variety of foods, such as confectionary and beverages, pharmaceutical, cosmetics, lithographic inks, paints and dye, adhesive in postage stamps. In addition, there are a number of local traditional uses, which include nutritional and medicinal purposes.

¹² These are Kibondo, Tabora, Manyoni, Kondoa and Handeni districts.

Chart 13 Trend in gum and resins export and revenue, 1997 - 2003.

(Source: Tanzania Revenue Authority, Customs Statistics Section)

According to the export statistics, the price offered by the world market for gum coming from Tanzania is low compared to other countries. The reason is, according to Kagya (2004), poor quality of gum resulting from mixing gums from different sources and exporting without grading. Furthermore, exporters may be paying a low price so that they can evade taxes. There is no local industry consuming gum, and therefore 99 percent of the collected gum is exported.

With regard to the industrial use of NTFPs, common problems are lack of local value-added processing facilities. Hence products are exported in raw form at low prices. Also, marketing is usually weak.

2.6 Employment

According to the Integrated Labour Force Survey 2000/01 Agriculture, Forestry and Fisheries combined provide 82.1 percent (13.8 million people) of employment in Tanzania.

Additional employment in the informal sector related to Forestry is most also likely to be significant. The Labour Force Survey accounts 0.4 percent of total informal employment to agricultural and forest services and 6.7 percent to furniture making and manufacturing of non-metallic mineral products.

The National Forest Programme estimates that the sector employs about 3 percent of paid labour and an even bigger proportion of people in informal Forestry related sector activities (NFP). Salmi and Monela (2000) estimate that the sector provides 730,000 person years of employment.

2.7 Unaccounted Forest Services and Externalities

In addition to the contributions of the Forest Sector that are accounted for in the previous chapters, forests provide goods and services that are not accounted for.

These are the provision of energy sources; protection of watersheds; store of carbon dioxide; micro-climatic functions; provision of habitat to fauna and flora of high biodiversity values, recreational/tourism and cultural/religious values. These services are not readily calculable as they do not have directly associated cash flows.

Over the last two decades a wide body of international literature has developed attempting to value various aspects of tropical forests and the goods and services they are supplying. Various methods have been used to place monetary value of forest services within environmental economics to capture spillover effects and intangibles not included in private economic valuations. These are for example, travel cost methods, contingent valuation, hedonic pricing etc. In Tanzania, most attempts to value these unrecorded forest goods and ecosystem services originate from site-based case studies. The few exceptions have been named in the introduction.

The main products and services Tanzania's forests provide to the economy are as follows:

Energy supply

Forests contribute to the energy sector in two major ways. First, as a direct source for biomass energy, namely fuelwood and charcoal. Second, more indirectly, via water catchment and storage for the hydropower sector (discussed in the subsequent paragraph). All these forest inputs are basically provided as 'free goods' to the national economy and population.

Biomass energy or *woodfuel*, which comprises fuelwood and charcoal from both natural forests and plantations, accounts for 93 percent of total energy consumption in the country.

The estimated per capita consumption of woodfuel is 1 m³ roundwood per annum. This amounts to more than 30 million m³ per year. If valued with 3000 shilling per m³ (the November 2000 royalty rate) this amounts to 90 billion shillings per year (Salmi and Monela 2000). The NFP (MNRT 2001) estimates that 95 percent of Tanzania's total wood consumption was consumed by wood fuel in 1999 (40.4 million m³). Out of this 26 million m³ was consumed in the rural areas as fuelwood and 13.4 million m³ in urban areas, mainly as charcoal.

A large number of rural industries rely on the use of woodfuel in their production processes. These are in order of priority, tobacco curing, fish smoking, salt production, brick making, bread baking, tea drying, pottery, lime production and processing of beeswax. Additional large sinks for fuelwood in rural areas are beer brewing and alcohol distillation. Mostly, these are non-farm activities and one needs to keep in mind their 'environmental cost' when promoting increase of non-farm activities in rural areas as a means of economic growth. Surprisingly, the NFP predicts that the annual woodfuel consumption is not expected to increase, but to remain at 40 million m³, the level of 1999 (MNRT 2001a: 28). This estimate does not seem to take population growth into account.

Table 6 Inputs of forests to Tobacco production

Tobacco Production and impact on forests, Tabora Region			
Year/Season	Tobacco production in tonnes	Estimated fuelwood consumption m³	Estimated area cleared 1000 ha
1985/86	9,673	173,529	4338.2
1986/87	6,614	118,641	2966.0
1987/88	6,176	110,803	2770.1
1988/89	5,641	101,186	2259.7
1989/90	4,633	83,112	2077.8
1990/91	5,961	106,947	2673.7
1991/92	12,123	217,485	5537.1
1992/93	14,443	259,114	6477.9
1993/94	11,499	206,301	5157.5
1994/95	17,133	307,371	7664.3

(Source: Mkanta and Chimtembo, 2002)

A study on Tobacco Production in Tabora Region conducted in 2001 revealed that forests deliver significant input to tobacco production. The area cleared for tobacco growing has for example been increasing yearly in the period 1985/86 – 1994/95 (see Table 6 above).

The National Forest Programme (MNRT, 2001a) estimates that around 27 percent of residents in Dar es Salaam use firewood, while over 86 percent use charcoal as a source of energy.¹³

Charcoal provides significant inputs both to rural and urban economies. It provides employment and income to the rural producer and a source of energy for cooking to the rural and urban consumer, as well as a source of government revenue. It is difficult to quantify this contribution as much of the charcoal trade is undertaken illegally and only a fraction is captured through the official road blocks. Malimbwi et al. (2000) found that about 6,000 bags of charcoal are transported daily to Dar es Salaam. Other estimates are much higher, between 15,000 and 20,000 bags every 24 hours (Norconsult 2002). Dar es Salaam's charcoal intake converts 2 million tonnes of wood per year and presents about 50 percent of the urban demand (same source).

In a study conducted by Lusambo in 2002 in Kilosa District, charcoal contributed Tsh.175,765 to household annual income. Noah (2002) found that households realize an income of Tsh.50,000-62,000 monthly from sale of charcoal. Malimbwi et al. (2000) likewise estimate that charcoal production provided 38 percent of the household income in six villages surveyed (converted into US\$ 445 in cash).

¹³ The NFP does not explain why the total exceeds 100 percent, but it is assumed that this is due to the fact that some households use both energy sources at the same time.

However, the environmental trade-offs of this economic contribution are high. A study "true cost of charcoal" (2002) provides data on charcoal consumption in the country and the associated environmental cost. Some of the key figures are presented in Box 2 below.

Box 2 Facts and figures on charcoal production

Facts and Figures on Charcoal Production

- 15,000 – 20,000 bags of charcoal enter Dar es Salaam every 24 hours, 365 days a year. Equal amount enter other major Tanzanian cities combined. This adds up to about 1 million tonnes of charcoal per year.
- To produce this charcoal tree had to be cut from 3320 km² of forest, most of which will not regenerate as it is converted to other land uses.
- Charcoal is subsidised by ineffective collection of dues, while liquefied petroleum gas is penalized by higher import duties. Due to incorrect pricing charcoal users are externalising the negative impacts of their fuel choice on the environment. Government policies would need to correct this market failure through fiscal policies.
- Forests are declining by 11.5 percent annually, 99, percent of which is for fuelwood and charcoal.
- Burning charcoal provides high volumes of carbon dioxide, carbon monoxide and CH₄. It adds to the load of carbon dioxide, while at the same time reducing carbon sinks.
- The efficiency of charcoal consumption is very low. Charcoal stoves has an efficiency of 20-35 percent energy conversion compared to for example 45-65 percent for LPG.

(Source: Based on Norconsult 2002)

To the extent that charcoal production competes with other forest uses, it reduces growth potential in the forest sector as it leads to a decline of the total stock. In many parts of Tanzania, e.g. Dar es Salaam, Morogoro, and Iringa, the sustainable yields seem to have been exceeded and thus the country's natural capital is sacrificed for charcoal production. Charcoal is hence being produced at a cost to society in terms of its present and future availability to meet wood biomass needs and wood needs for other purposes.

A projection of the impact of charcoal production on the country's forests and woodlands, is provided by Norconsult (2002) and re-produced here in Table 7 below. It illustrates a possible scenario of present trends of charcoal production were to continue.

Table 7 Projection of charcoal production impact on forests, 2002-20

Year	urban charcoal consumption in tonnes	woodland area needed for sustainable production, in km ²	woodland remaining in km ²	woodland surplus or deficit in km ²
2002	926,000.00	98511	300000	201489
2005	1,071,961.00	114038	218700	104662
2010	1,368,124.00	145545	129140	-16405
2015	1,746,111.00	185757	76256	-109501
2020	22,285,529.00	237078	45028	-192050

(Source: Norconsult 2002:18)

Water catchment, storage and filtration

Forest reserves known as catchment forests, occupy only 2 percent of the country's land area. However, besides wetlands, they provide important watershed area for rural and urban water supply in Tanzania. The largest catchment forests are found on the volcanic and crystalline mountains of Tanzania and in lowland forests, such as Rau in Moshi, Minziro in Kagera Region and Kimboza in Morogoro (MNRT 2001a: 26).

The interaction between forests and water quality and supply is complex but it is understood that forest loss reduces watershed moderation. Deep soil moisture storage and rate of aquifer recharge are usually enhanced through reduction in evapotranspiration. Woodland clearing may also increase overland runoff, erosion risk, flash floods in bottom areas and reservoir siltation. Many formerly perennial rivers in Tanzania now desiccate for several months per year, a phenomenon more likely to be caused by deforestation of the catchment than by climate change.

Hydropower is besides petroleum and coal the major source of commercial energy supply in the country. Hydroelectric energy has a potential of installed capacity of 4.7 GW of which only about 10 percent is developed (TIC 2001). The inputs of forests into hydropower generation are indirect, through their ecosystem service of providing water catchment and storage as described above.

An attempt to provide a monetary value for the role of Forestry to water supply provided by Norconsult (2002) is based on the cost of water and summarized in Box 3 below.

Box 3 Monetizing the contribution of forests to water supply

Monetizing the contribution of catchment forests to water supply

- Based on existing studies a working figure of US\$ 100 as average cost of water for domestic use per urban household per year is used to derive a conservative estimate of US\$ 100 million current annual value of Tanzanian urban water supplies.
- With reduction of water availability per capita on the basis of population growth, the cost of maintaining the same volume of urban water supply to each household as now is likely to double at least by 2020.
- The predicted reduction of woodland coverage by 2020 would impair the water catchment (interception, retention and slow release) function by an estimated 50 percent, thereby quadrupling the cost of water in 2020. **Impairment of the water catchment function will therefore impose a cost rising to US\$ 300 million per year by 2020.** An estimated 10% of this cost (US\$ 30 million per year) is attributed to charcoal production.
- Engineering replacements of the lost natural storage of water in catchment basins could augment the cost to absurd figures, 1000 times higher at least, but such infrastructure would not be affordable.
- Tanzanian urban dwellers will pay more for less water and will forgo the development and health benefits of an adequate water supply

(based on Norconsult 2002, p. 26-27)

Monela et al. (2003) estimated the total economic value of Tanzania's Catchment Reserves, which is comprised of Use Values and Non-use values, at US\$

620.4 million.¹⁴ Box 4 below summarises some facts on the contribution of the Eastern Arc Forests to water and energy supply in the country.

Box 4 Contribution of Eastern Arc Forests to water and energy supply

- Major Rivers are flowing from the Eastern Arc Mountains, e.g. Pangani, Sigi, Wami, Ruvu, Parts of Rufiji and part of Greats Ruaha as well as smaller tributary streams.
- At least 10 percent of the total population of Tanzania gets their water from these rivers.
- Seven major hydropower plants using Eastern Arc Water are Kihansi, Kidatu, Part of Mtera and part of Pangani Falls.
- Hydropower is 62 percent of the total energy supply of Tanzania (559 MW of 892 MW) in large part derived from water flowing from the Eastern Arc Mountains
- In total at least 50 percent of Tanzanians' electricity is coming from water flowing from the Eastern Arc Mountain Forests.
- Water from the Eastern Arc Mountains feeds large irrigation schemes, such as Liovu Sugar Company and various rice schemes.
- The forested mountains maintain a suitable microclimate for growing vegetables, spices and fruits. Major export from mountains to Dar es Salaam and other cities of: banana, potato, peas, cardamom, cinnamon, pears, apples, plums, leeks, tomatoes. Provides boost to local peoples livelihoods.
- Eco-tourism possibilities exist but are largely under explored.

(Source: Eastern Arc Conservation Strategy Component on TFCMP)

Soil conservation

Tanzanian Agriculture depends largely on soil fertility, as the application of fertilisers is too expensive for most farmers. Tree loss on and around farmland premises deprives the soil of leaf-fall, thereby reducing fertility and accelerates soil erosion by wind and water. Rainfall runs off soil hardened by exposure much faster than before, removing humus and animal droppings, and carrying away the most fertile top layer of soil. The value of crops grown in what is effectively sub-soil, after serious erosion, is greatly reduced, impacting negatively on agricultural productivity. Norconsult (2002:27) estimates a 50 percent reduction in output, equivalent to 25 percent of GDP. However, no timeframe or basis for this calculation is provided.

Estimates for the East African Region are that typical erosion rates are 0 in mature woodland, 5 tons per ha per year in wooded savannah, 30 tonnes/ha/y in maize fields, and 50-100+ tons/ha/y in degraded land. Soil formation occurs at about 1 ton/ha/y in the region, however rapidly eroded soil is not replaced within a human generation. (Norconsult 2002).

Estimates from the West Usambara Mountains in Tanzania are that the land value under agroforestry was raised by 126.6 Euro per ha, using a time horizon of 20 years one would arrive at an increased land value of 6.3 Euro/ha/year (undiscounted and assuming equal value for all 79,000 ha of land converted).¹⁵

¹⁴ Use values include direct, indirect use values and option values. Non-use values include existence values and bequest values.

¹⁵ Study "Ten million Trees Later". Comments received by A. Boerhinger, DPG.

Provision of habitats and conservation of biodiversity

Tanzania is among the four countries in the world, classified as ‘megadiversity’ nations,¹⁶ due to the variety of habitats found in the country. The biological diversity has been described in a number of studies and academic papers, including the Tanzania Country Study on Biological Diversity (1998).

In the context of the discussion of economic growth, biological diversity of forest resources is of relevance, as it is a so far uncaptured economic potential. Apart from global existence values, biodiversity is of national value for medicinal use. Other values associated with biodiversity are pharmaceutical and genetic resources.

Ngaga et al (2003:56) shows that some local communities in Arusha Region ranked medicines as the third most important good or service derived from the forest reserve after ‘water for consumption’ and ‘firewood’ (between 71.4 and 57.1 percent in the surveyed villages responded like this). People in Nkoanekoli village send the medicines to Arusha town for sale and hence derive a direct income. These preferences and dependencies of communities on the forests will vary according to the local conditions.

Attempts to monetarize biodiversity values contained in Tanzanian forests have been made by a number of studies. Norconsult (2002:27) estimate that forest products are worth at least US\$ 100 per rural dweller per year in nutritional and medicinal value.

According to conservationists, Tanzania’s biodiversity is under severe threat. For example, the country’s coastal forests are remnants of some of the world’s oldest forests. Burgess et al (1992) describe the biodiversity potential hosted by these forests. Collectively they support many rare and poorly known plant species, including around 50 believed to be endemic to a single forest, seven bird species and subspecies of global conservation significance. They also contain several rare mammals, reptiles and amphibians, and an invertebrate fauna with many rare species. All Tanzanian coastal forests are currently being destroyed at a rate leading to complete removal of forest cover and biodiversity loss, following a sequence of a) logging for timber; b) pole-cutting for building, c) wholesale burning for charcoal; and d) wholesale conversion into farm land.

Non-timber forest products

Direct income can also be achieved from forests through the sale of other forest products such as fruit, nuts, rubber, meat, honey, oils etc., summarized under the term non-timber forest products (NTFPs). NTFPs have a large potential to contribute to the local economy, only some of them – as far as they are traded through the formal sector – are recorded in the GDP. Some figures for gums and resins were for example provided in Section 2.4 above.

To date, FBD does not address issues related to non-wood forest products apart from beekeeping. Hence, data to assess supply and demand as well as income

¹⁶ Other countries are Republic of Congo, Brazil, and Indonesia.

generation potential of NTFS is not available on a national scale through official statistics, but only through individual case studies conducted by independent or government commissioned research.

Monela et al. (2000) estimate that honey, charcoal, fuelwood, and wild fruits contribute 58 percent of the cash incomes of farmers in six villages surveyed. Honey alone accounted for one third of all cash income in these villages. According to the surveyed farmers, agriculture has become less profitable, thus inducing them to find other means to earn a living, e.g. collecting and selling forest produce. Infrastructure improvements have made it easier for them to bring their forest products to the markets of sale.

Table 8 below illustrates that, among the income sources derived from the CFRs, NTFPs contribute the largest share followed by fuelwood.

The contribution of forests to food security is indirect via soil quality services provided as an input to Agricultural production. A direct contribution to food security is through NTFPs that have nutritional value such as mushrooms or gum (used by pastoralists and hunter gatherers).

Table 8 Sources of income in villages, Tanzania, 2002

Sources	Lushoto District	Kilimanjaro District	Meru District	Sample averages
Crop production	157,704	138,010	360,000	218,571
Livestock	38,038	417,061	590,000	348,366
Off-farm	296,304	718,233	420,000	478,179
Env. incomes reserves	72,186	71,266	123,261	88,904
-NTFP	45,036	21,427	62,708	43,057
-Timber	1,200	2,100	504	1,268
-Poles	106	13,581	4,374	6,020
-Fuelwood	21,168	33,345	49,600	34,704
- Whithies	4,676	813	6,075	3,855
Sum	564,232	1,344,570	1,493,261	1,134,021

(Source: Field data , 2002 and Ngaga et al., 2003).

According to Kagya (2002), 94 percent of households surveyed in a study conducted in Shinyanga utilize wild vegetables as relish. Theostina (2003) demonstrates that 51 percent of residents in Morogoro use money accrued from sales of NTFPs to purchase food in times of food shortage. Forests hence also have a 'safety net' function to poor people. In addition to NTFPs forests provide habitat to small mammals, hunted for protein supply, in particular in poorer villages, such as for example in Linzi, Uluguru South, and Morogoro Rural District (same source).

Several studies evaluate the contribution of agroforestry to rural livelihoods (for example Idda 2003, Mwanahija 2003, Eustack 2003) and there seems to be consensus that agroforestry provides increased income compared to households not practicing agroforestry, and provides an important source of food in time of food shortage. For farmers, forests can also have positive value by reducing

risks of total crop failures in annual crop production (e.g. due to droughts or floods). Farmers often see trees as an insurance against unexpected cash needs, or as capital banks.

2.8 Future Growth and Recommendations

So far Forestry has not been a very important part of the Tanzanian rural farm economy and the national economy at large. With long production cycles Forestry can hardly compete in profitability with agriculture or animal husbandry. At national scale GDP contribution is far below other sectors.

However, there are number of competitive advantages associated with the Forestry sector:

- labour input needs which are low;
- timing of labour input which can take place outside the agricultural production season;
- land and soil requirements which are generally much more modest for trees than for other agricultural crops; and
- the combination of right tree species with agricultural crops (agroforestry systems) can increase the combined yields.

The private sector, both national and foreign, provides the largest potential for future economic growth of the Forestry sector. This prognosis includes not only wood exploitation and timber and non-timber forest product processing and marketing, but also afforestation and sustainable forest management, and various other forest-based economic activities such as tourism (Salmi and Monela 2000). Also, local communities and individual farmers represent a valuable resource which under right incentives can be mobilized to grow trees on a large scale and cost-efficiently.

The domestic private sector may have a considerable potential for Forestry, if the structural barriers for profitable Forestry are removed.¹⁷ Pre-conditions for increasing private investment in the sector, include clarification and security of tenure rights to farmers, good road infrastructure and market development. However until corruption and policy and market failure are effectively tackled, it is unrealistic to expect major private capital flows into the sector.

The bottlenecks for entry of foreign companies into the Forestry business are similar to other sectors, as identified in the CEM. In addition, the Forestry sector has high transaction cost due to permit and license acquisition and limited knowledge of foreign investors of the local environment. The 2000 Study on Financing the Forestry Sector assessed that among others Malaysian and Chinese companies are among the likely investors due to the logging bans in China. As the 2004 logging scandal in Rufiji revealed, this prognosis came true as many of the illegally felled and exported logs were shipped off to China. The

¹⁷ Timber-traders, NTFP product producers, agro-industry, energy sector, tourism industry etc.

value of the illegally harvested logs was valued at Tsh.382.65m (DPG Policy Brief: The Forestry Sector in Tanzania).

Salmi and Monela (2000) suggest possible ways to increase revenue gained through the Forestry sector¹⁸. They are summarized in Box 5 below.

Box 5 Ways to increase revenue from the Forestry sector

- 1. Reduce revenue loss**
 - Resolving of competing revenue claims between central and local government.
 - Administrative strengthening of the revenue collection section in FBD.
 - Increase in transparency and accountability; eliminate corruption.
 - Improved reporting and monitoring of revenue.
 - Simplify licences and improve control check points, stock registers and transit passes
- 2. Increase revenue**
 - Introduction of new revenue sources, i.e. watershed management fees from hydropower stations, eco-tourism fees, sale of carbon sequestration credits (CDM of Kyoto Protocol), sale of genetic resources etc.
 - Better enforcement of collection of royalties and fees from wood using industries and inclusion of exempted industries such a tobacco, fishing, army etc.
 - Introduction of taxes for wood lot and plantation owners, in particular an income tax based on timber sales, as well as a property tax based on average productive capacity of different land categories. In addition, research could support the use of timber from lesser-used species.
 - Improvement of Forest Produce Pricing System through market-base pricing of forest produce; public auctions or tendering for timber lots; cheaper royalties to lesser-known species.
- 3. Increase domestic and foreign private sector investment**
 - Reduction of bureaucracy in licensing system.
 - Clear investment guidelines.
 - Clearly defined ownership of all forestland.
 - Improving infrastructure.
 - Tax incentives; credit facilities, and technology transfer.

(Source: Salmi & Monela, 2000)

The Tanzania Investment Center makes the following observations about the economic opportunities in the Forest Sector (TIC 2001):

- Domestic and foreign demand for wood products exceeds supply.
- Potential for manufacturing of plywood and abundant supply of plantation softwood, such as Cyprus and Pines.
- Low capacity utilization of the sector, despite great forest potential.
- Potential for non-wood forest products, e.g. tourism, game, bee which are undeveloped.

¹⁸ The study also describes the optimising of foreign assistance to the forest sector, which is not considered a 'genuine' revenue source in this report.

- Establishment and management of bee reserves by private operators. The estimated potential of bee products is about 138,000 tons of honey and 9,200 tons of beeswax per annum from an estimated potential of 9.2m honeybee colonies. This prognosis does not match with the bee export data provided by FBD (see Section 2.5).
- Opportunities for carbon sequestration projects. So far one Tanzanian company, Kilombero Forestry Ltd. is among the three companies in the world certified in November 2000 to engage in carbon trading with greenhouse gas pollutant companies in developed countries.

In order to capitalize the growth potential of Forestry now and in the future, this Chapter has emphasized the importance of policy measures that ensure management on sustained-yield basis, as well as correct pricing of traded economic goods and services that rely on Forestry resources and services.

3 Wildlife

This Chapter examines Wildlife's role and importance as a source of economic growth and rural development and whether its potential could be developed more fully. It focuses particularly on the wildlife hunting industry, drawing on available, yet limited sources. As such, it cannot be conclusive.

The non-consumptive utilization of wildlife resources through trophy hunting industry and game viewing ('safari' tourism) are the two most important sources of wildlife related income in the Tanzanian economy. Game viewing tourism is discussed in the Tourism chapter in Part 3 of this report.

Other wildlife-based activities are, with the exception of capture and trade of live animals, under-developed in Tanzania. These include trade in bushmeat, skins and other products such as biltong, and farming of specific wildlife species. These products could offer potential growth opportunities, but markets, production facilities and the necessary policy framework do presently not support expansion of these activities.

As this Chapter will illustrate, there are concerns about the governance regime regulating the hunting industry, which leads to losses in terms of growth and poverty reduction. Due to a lack of transparency and competition, wildlife resources are priced below the true market value, resulting in revenue losses and unsustainable exploitation. While there are a few powerful winners through this situation, the large majority of the population is losing out.

The hunting industry is one of the few non-farm industries with potential for economic development in remote rural areas of Tanzania. However, at present rural communities only see minimal benefit from an industry that operates on their land. Various sources quote, that there is resistance to reform of the industry both within the Wildlife Division (WD) and the private sector. Vested interests between the Government and foreign private sector, lead to sub-optimal decision making that deprive the rural population of economic potential for growth and wealth.

As in Forestry, studies quantifying the contribution of wildlife to the economy are scarce. Baldus and Cauldwell (2004) provide the first and only comprehensive empirical study with data for tourist hunting in Tanzania. This study is confidential and copies have been presented to the WD. Box 6 below summarizes some estimates on the economic contribution of wildlife.

Box 6 Key estimates on the economic contribution of wildlife:

- Total income of the Wildlife Division generated from tourist hunting is about US\$ 30 million p.a., based on 20,500 hunting days sold to 1,370 clients. The leasing companies generate about an additional US\$ 9 million (Baldus and Cauldwell 2004);
- Gross value of wildlife (other than timber and fisheries) to the Tanzanian economy is estimated to US\$ 128.50 million per year (IUCN 1989);
- Illegal wildlife hunting for wild meat is estimates to some US\$ 50 million annually (IUCN 1989);
- Well over two-thirds of people eat wild meat, with up to 95 per cent of the rural population claiming it is their most important meat protein source (Barnett 2000); and
- During 1989 to 1999 at least 1.68 million birds, 521,000 reptiles, 148,000 amphibians and 12,000 mammals were exported from Tanzania (Roe 2002).

(Source: Baldus and Cauldwell, 2004; IUCB, 1989; Barnett, 2000; and Roe, 2002)

3.1 Policy Framework

The policy framework in Tanzania focuses mainly on wildlife conservation and not on utilization. The tradition of wildlife conservation in Tanzania dates back to the colonial era and the principle was manifested by former President Nyerere in the 1967 Arusha Declaration.

The National Tourism Policy stresses wildlife conservation, due to the fact that Tanzania's tourism is largely wildlife based. It states that "... the government vows to ... improve and implement wildlife conservation regulations, and to protect other tourist attractions for the benefits of present and future generations".

Administration of wildlife resources in Tanzania falls within the Ministry of Natural Resources and Tourism. The two lead bodies under the Ministry are Tanzania National Parks (TANAPA) and the Wildlife Division (WD). Other institutions and parastatals include the Ngorongoro Conservation Authority, the Tanzania Wildlife Research Institute (TAWIRI), the Tanzania Wildlife Corporation (TAWICO) and the College of Wildlife Management at Mweka. In addition there is also administration through the district and regional administrative structures.

The national legislation guiding the management of protected areas in Tanzania are the Wildlife Policy (1998) and the Wildlife Conservation Act (1974). The Wildlife Conservation Act is currently under revision.

The WD is responsible for wildlife conservation in Tanzania in game reserves, game controlled areas, open areas and district game reserves. The two main functions of the division are regulation and co-ordination. Regulatory functions include safari quotas and other consumptive use of wildlife, licensing, prosecution of offenders against the wildlife Act, gazettement of wildlife areas and supervision of photographic tourism in their areas.

TANAPA is responsible for the management, conservation and use of all national parks in Tanzania. TANAPA is a parastatal and corporate body under a Board of Trustees. They provide guide services, community conservation activities and anti-poaching in the national parks.

3.2 GDP Contribution

The 1998 Wildlife Policy lays down a vision for the next 25 years, which is to raise the contribution of the Wildlife sector to GDP from about 2% to 5% and to contribute to poverty reduction and improvement of peoples' quality of life.

Deriving the contribution of Wildlife resources to the GDP is not straightforward. Within the System of National Accounts "hunting" combined with Forestry under the Agricultural GDP, is the closest proxy to measure the economic contribution of Wildlife resources. As outlined in Section 2.1 in Chapter 2 above, the average contribution of forestry and hunting combined to overall GDP has been 1 percent over the last 15 years and the average growth rate of the sub-sector has been 3.6 percent during the same period.

Based on these figures, one might derive the misleading conclusion that Wildlife, is not of major importance to the national economy. However, similar to Forestry, Wildlife's true value is not reflected in the GDP.

First of all, "hunting" is not the only way in which Wildlife contributes to growth. The Parks and Reserves attract high numbers of visitors each year for game viewing and photo tourism, all of which are non-consumptive activities that contribute significantly to the Tourism sector. In fact, the largest wildlife based income source is photographic tourism, which is not measured under the "hunting GDP", but under "Trade, Hotels and Restaurants", the closest proxy for tourism in the GDP. Secondly, even for hunting, the value recorded in the official statistics is largely under-representing the true income earned and the true value of the resource. The reasons for this are explained in this Chapter.

The primary measure of growth of the wildlife sector is the total income generated. This figure would need to be compiled of revenue from non-consumptive photo tourism, which provides revenue to TANAPA, primarily through park fees paid by international tourists and also, of revenue from tourist hunting and export of live animals, which accrues to the Wildlife Division.

Tanzania is experiencing some of the fastest tourism growth in the world. The international and local wildlife tourism industry makes considerable contributions to GDP, foreign exchange earnings, employment and to some extent the creation of related local business opportunities. The employment and local spin-off effects of tourism are discussed in part 3 of this study.

Tanzania's considerable wildlife assets combined with the anticipated growth of tourism, will provide the country with a long-term comparative advantage in wildlife-based tourism, provided the sector is well managed and cost can be kept down.

3.3 Wildlife Resources

Tanzania is endowed with attractive national parks occupying approximately 47,000 square kilometres (see Table 9).

Table 9 Areas occupied by National Parks in Tanzania.

National Park	Area (sq.km)
Ngorongoro	8,320
Kilimanjaro	750
Serengeti	14,750
Manyara	325
Tarangire	2,600
Katavi	2,252
Udzungwa	1,000
Mahale Mt. national Park	400
Rubondo	460
Arusha	117
Mikumi	3,230
Ruaha	13,000
Gombe	52
Total	47,256

(Source: MNRT)

Protected areas in Tanzania are habitat for a large variety of mammals, including the 'big five' (lion, elephant, leopard, rhino, cheetah), which attract tourists for game viewing as well as other species attracting national and international hunting tourism.

Data on the abundance of these mammals differs. Most animals migrate and aerial surveys and ground surveys combined are necessary to attain reliable figures for ecological monitoring. Estimates originate from wildlife conservation and research projects, however, regular and reliable ecological monitoring of wildlife resources on a national scale is not undertaken.

A rough indication of the value placed by Tanzania on its wildlife resources is the value of trophy fees presented in Table 10 below. The hunter pays the trophy fee to the Government after killing a respective animal.

Table 10 Value of Tanzania's Wildlife Resources in regional comparison

Animal	Tanzania	Trophy Fees (US\$)		
		Zimbabwe	Botswana	Zambia
Elephant	4,000	9,000	19,000	
Lion	2,000	3,420	5,500	2,750
Leopard	2,000	2,000	4,100	1,750
Buffalo	720	1,680	2,500	1,000
Zebra	590	680	1,000	600
Sable	1,200	2,000		2,700
Hartebeest	370	1,000		650
Waterbuck	440	1,200		1,000
Wildebeest	320	600	950	650
Impala	240	120	400	100
Warthog	320	175	300	300

(Source: Baldus and Cauldwell 2004)

Compared to Zimbabwe, Botswana and Zambia, Tanzania is offering its wildlife resources to the hunting industry at a low price. As a result buffaloes are heavily hunted in Tanzania. Income of the WD is heavily dependent on buffalo hunting and raising the fee would potentially have a large impact on the industry. Fee structures, restrictions and quota are a topic of on-going debate between the WD and the hunting industry (Baldus and Cauldwell 2004).

In the context of economic growth a crucial distinction needs to be made between the consumptive utilization of wildlife resources, in Tanzania presently predominantly by the tourist hunting industry and the non-consumptive utilization through game viewing and photographic tourism. The monetary contribution of the former is discussed in this Chapter, whereas the latter is discussed in the Tourism Chapter in Part 3 of this report.

3.4 Contribution of Consumptive Wildlife Resources Use

Land areas that offer consumptive wildlife use, include game reserves occupying approximately 95,000 km² and Game Controlled Areas, comprising 58,565 km² (Mabugu and Mugoya 2001).

Consumptive uses of wildlife resources in Tanzania are primarily hunting and animal trade, which have been contributing significant revenue to the Treasury.

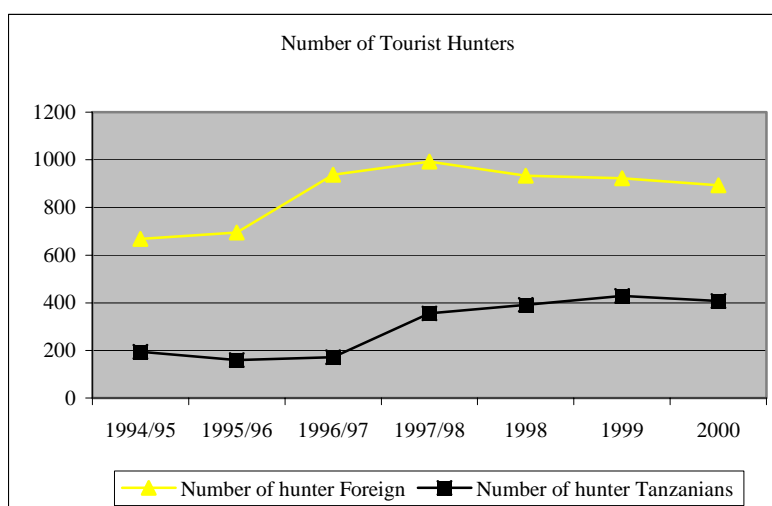
The export of live animals increased in revenue terms from Tsh 29.7 million in 1995 to about Tsh 167.4 million in 2001 (see Table 11). Likewise, revenue collected from hunting increased from a level of US\$ 6.4 million in 1995 to approximately US\$ 9 million in 2003 (see Table 11).

Table 11 Tourist hunting and live animals export earnings, 1994 – 2003

Year	Tourist hunting earnings (US\$ million)	Exports of live animals (Tsh. million)
1995	6.44	29.72
1996	7.31	25.49
1997	8.21	32.47
1998	8.56	40.99
1999	9.02	93.66
2000	8.53	136.97
2001	9.12	167.42
2002	9.30	N/A
2003	8.80	N/A

(Source: URT, 2004c)

While animal exports have increased over fourfold over the eight year time period, income generated through the tourist hunting industry has not even doubled during the same period. As Chart 14 below shows, the number of hunters has been almost stagnant since 1997. The number of hunting companies declined from 43 in 1994 to 39 in the year 2000.

Chart 14 Number of tourist and citizen hunters 1994-2000

(Source: URT, 2004c)

Some additional figures on tourist hunting from Baldus and Cauldwell (2004) are presented in Box 7 below.

Box 7 Some key figures on tourist hunting

- Trophy fees represent 60% of the income generated by the WD from hunting;
- Average income to the WD per hunting client is approximately US\$ 7,000;
- Income generation in the Selous Game Reserve has grown on average by 13.7% per year from 1988 to 2001. Income from trophy fees and conservation fees has grown by 14% and 17.5% respectively;
- Income generation per unit area from all hunting areas of Tanzania is approximately US\$40/km². Hunting income per unit area for the Selous Game Reserve is approx. US\$ 70.km²;
- Photographic tourism in the Selous Game Reserve generates approx. US\$ 130/ km². Photographic tourism generates nearly double the income, but at more than 50 times the tourist density per unit area;
- The number of hunting clients visiting Selous Game Reserve has grown by nearly 400% from 1988 to 2001. Income generation has however grown by only 250% over the same period, despite an increased utilisation of concessions. Income generated by the Wildlife Division per hunter day has remained at approx. US\$ 250 per hunter day; and
- 141 concessions are leased to 42 companies, which in turn have formed 32 groups. 51 concessions (36%) are leased to the 3 largest groups.

(Source: Baldus and Cauldwell, 2004)

3.5 Wildlife Division Income and Expenditure

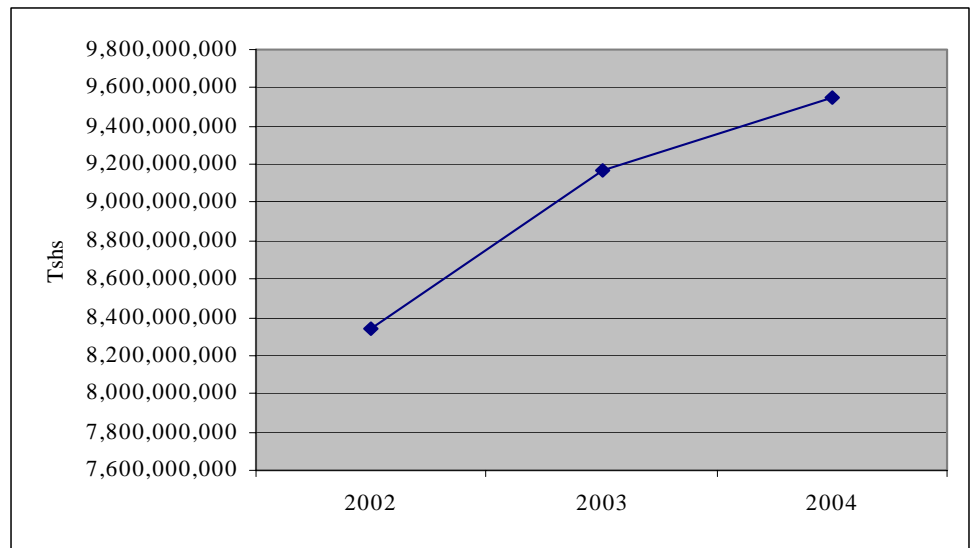
Funding sources of the WD are allocations from the Treasury, donor support and the Tanzania Wildlife Protection Fund (TWPF).

Chart 15 below shows that the total revenue collection by the WD has increased from Tsh. 8.3 to 9.5 billion over the last three financial years. There is inconsistency in the data presented in the MNRT Financial Statements and the data presented in Table 11 above originating from the Economic Survey 2003.

Likewise, the Guardian of 5 May 2005 disclosed that the Wildlife Division collected Tsh. 7.2 billion in 2000 and Tsh. 9.7 billion in 2004 through professional hunting.

Baldus and Cauldwell (2004) in an independent study, estimate income accrued to the Wildlife Division to roughly US\$ 10 million, equivalent to three times the level reported by the Authorities. The Author could not establish the exact reasons for this significant discrepancy.

Annual income from hunting is subject to fluctuations as tourism is affected by external events. For example the attacks in 1998 (Dar es Salaam and Nairobi) and 2001 (New York and Washington, D.C.) have caused an approximate 25% drop in income in the following years. Hunting quotas are set by the WD in advance of the season.

Chart 15 Wildlife Division Revenue 2002 to 2004

(Source: MNRT 2002,2003,2004)

Over the last three financial years, hunting licenses made up between 80 and 96 percent of the total revenue generated by the WD. Hunting Licenses consist of concessions (or blocks), each charged at US\$ 7,500. There are 130 hunting blocks (2001) covering areas in game reserves, Game Controlled Areas and open areas. (Mabugu and Mogoya 2001).

The second source of revenue between 1996 and 2000 were capture permits, which generated between US\$ 20,000 and 38,000 per year. Since the last two years, game licenses, which are trophy fees per animal, paid after the client shoots the animal and which are passed over to the government, have generated increasingly more revenue than capture permits.

Income from Game Licenses has increased from 1.6 percent in 2002 to 2.6 percent in 2004, which is still a relatively modest contribution. Other revenue sources, such as for example, Trophy Dealer's Licenses, Certificate of Ownership, Trophy Export Certificate, Capture Permits and various receipts contribute not more than about 1 percent of the total revenue (see Chart 16 below).

25 percent of the revenue generated through hunting licenses go to the Tanzania Wildlife Protection Fund, and 75 percent to Treasury.

Table 12 Revenue collection by source, 2002, 2003, 2004

Revenue Collection by Source				
Source	2002		2004	
	Amount in 1000 Tsh	%	Amount in 1000 Tsh	%
Trophy Dealer's Licenses	4,555	0.1	0	
Certificate of Ownership	549,872	16.8	1,627	0.0
Game Licenses	53,682	1.6	154,407	2.6
Hunting Licenses	2,573,523	78.5	5,622,347	96.0
Trophy Export Certificate	5,857	0.2	2,842	0.0
Capture Permits	62,675	1.9	47,298	0.8
Receipts from Compounding Fees	16,315	0.5	11,978	0.2
Receipts Ivory, trophies, Hippo Teeth	146	0.0	0	
Misc. Receipts	13,791	0.4	13,221	0.2
Total	3,280,416	100.0	5,853,720	100.0

(Source: MNRT 2004. Note: The Total does not include revenue collected and retained at source)

District Councils in turn receive 25 percent of hunting and game license fees collected by the central Authorities within the District's jurisdiction. See Table 13 below for amounts received by selected District in 2004. The balance accrues to TWPF, the WD, and finally the Treasury.

Table 13 2003 Revenue by selected District Councils from Game Licenses

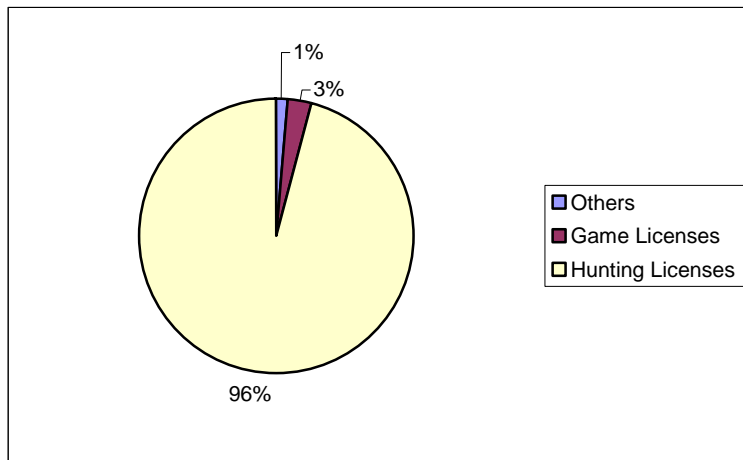
District	Amount received (Tsh.)
Monduli	47,029,337
Simanjiro	32,162,534
Mbarali	16,041,957
Kiteto	15,042,119

(Source: Wildlife Division 2005, unpublished)

District councils are supposed to use the allocated funds to finance wildlife management and social infrastructure. Many councils have not been able to direct funds this way and are dissatisfied with the amount they receive, saying that these are too little and they do not know how the revenue sharing arrangement is determined (Mabugu and Mugoya 2001).

Conservation fees at US\$ 100 per hunter per day accrue entirely to the TWFP as do all other remaining fees.

Chart 16 Distribution between sources of revenue in 2004



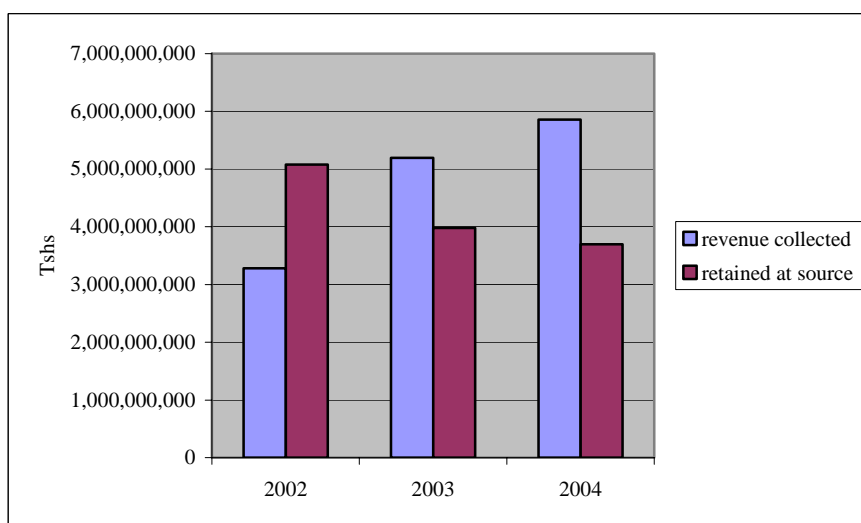
(Source: MNRT 2004)

Hunters are divided into three categories: International clients using local outfitters, Tanzanian citizens, and resident non-citizen hunters.

Fees for Hunting in open areas for citizens and non-citizen residents are payable to the district councils. For example, Monduli district council, a recipient of the biggest share of game fees from tourism for the period between 1992-93 and 1999/2000 collected from resident hunting activities Tsh. 4,8 million in 1998, close to 6 million in 1999 and 3,2 million in 2000 from these fees.

Chart 17 shows that while total revenue collection and actual collections have increased, the amount retained at the source has decreased. The author could not clarify why in 2002 a larger amount was retained at source than actual collections.

Chart 17 Revenue collected by WD and retained at source, 2002-2004



(Source: MNRT 2004)

Constraints to revenue collection

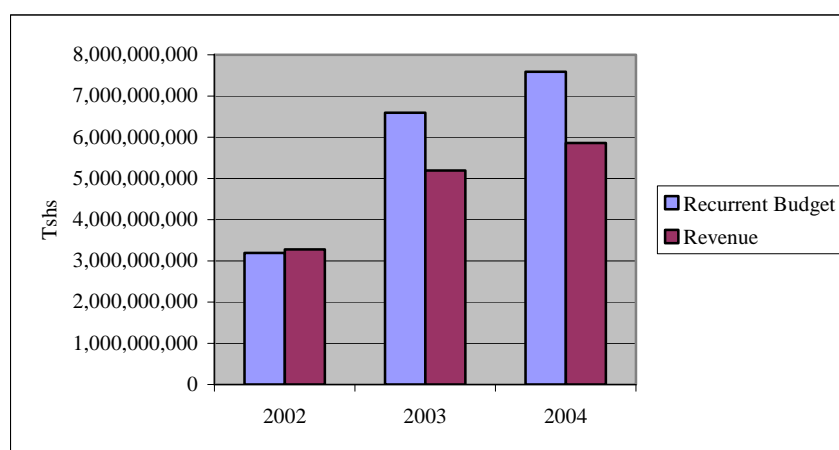
Several sources quote that revenue generation by the WD is sub-optimal. There is loss of revenue due to widespread subleasing of concessions. It is estimated that up to 70% of companies leasing concession are subleasing in various ways. Sub-lessees account to about 40% of the industry's income, yet there is no specific taxation controls on the sub-lessees who are gaining huge profits at the expense of the industry. Moreover, many foreign permit holders are bringing clients to sublet concessions, among these are permit holders entering as undeclared observers, paying neither observer fees nor private hunting licenses (Baldus and Cauldwell 2004).

As a consequence a considerable revenue loss may be incurred. Some observers suggest that the current system, with no transparent system for allocation of hunting concessions to the private sector, is being maintained by vested interests, including government officials and business agents. Furthermore, income generation from the concessions is dependant solely on hunting and is not conducive to the development of other sources of income.

Public Financing

As shown in Chart 5 in Chapter 2, Government recurrent budget allocation by the MNRT to the WD has declined from 33% in 2003 to 29% in 2004, in relative terms, but slightly increased in absolute terms.

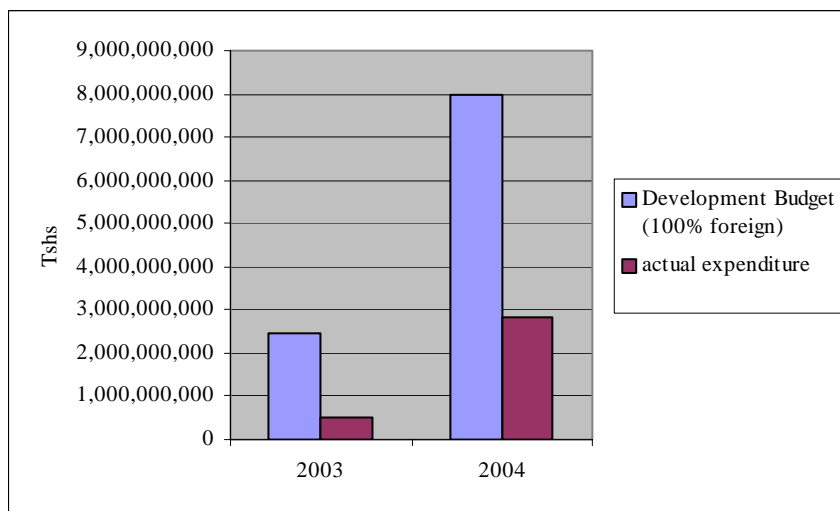
Chart 18 Comparison of Recurrent Budget versus Revenue 2002 to 2004



(Source: MNRT 2004)

While Forestry had a small government contribution to the development appropriation account, the development budget of the Wildlife Division is entirely foreign financed but equally characterized by under-spending. Chart 19 below shows the underspending of the WD development budget in 2003 and 2004.

Chart 19 WD Development Budget 2003 and 2004 and underspending

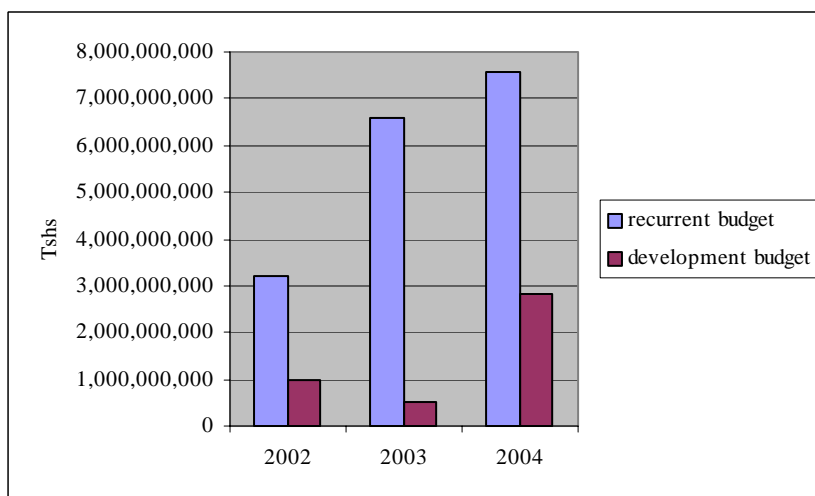


(Source: MNRT 2004)

Chart 19 shows that in 2004 only 35 percent of the allocated development budget was spent. The reasons for this underspending might be similar to Forestry due to low capacities to absorb foreign funding and institutional inefficiencies, often aggravated through lack of coordination among the development partners that jointly support the sector. In contrast to Forestry, no SWAP for Wildlife is being discussed.

Similar to Forestry, the comparison of recurrent and development expenditures over the last 3 years in Chart 20 shows that recurrent expenditures exceed by far the development expenditures and have been increasing over the time period. In contrast development expenditures were small in 2003 but increased again in 2004.

Chart 20 Recurrent versus development spending 2002-2004

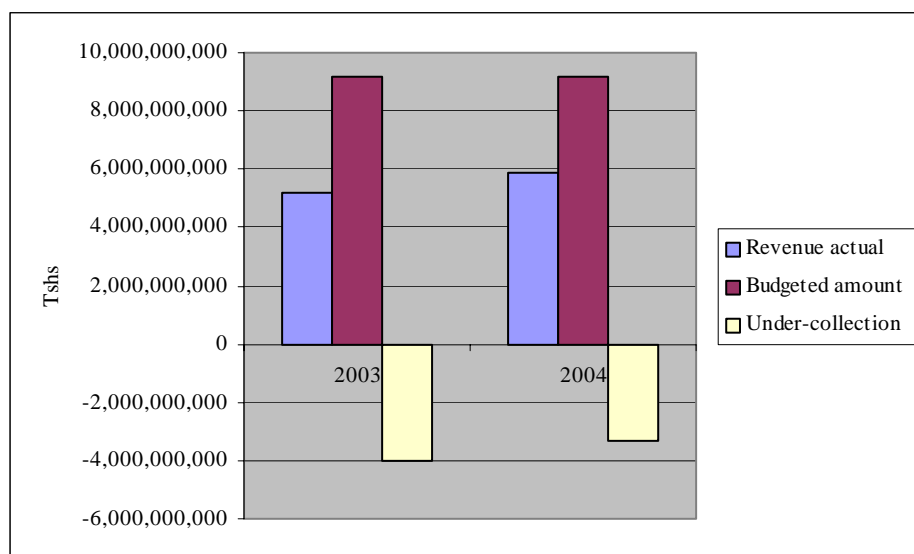


(Source: MNRT 2004)

Degree of self-financing

Although wildlife is a productive sector, it is presently not a net contributor to treasury. Chart 21 below shows how during the past two years, the revenue collected by the WD has been insufficient to cover its budget, although the financing gap has decreased recently.

Chart 21 Degree of self-financing of the WD, 2003 and 2004



(Source: MNRT 2004)

The main expenses of the WD are associated with management and protection cost, especially salaries, maintenance of wildlife areas, transport and equipment.

3.6 Live Animals Export

Live specimen form the majority of animal exports from Tanzania by quantity, although there is also a substantial trade in trophies and skins. During the period 1989 and 1999 at least 1.68 million birds, 521,000 reptiles, 148,000 amphibians and 12,000 mammals were exported from Tanzania.

The major mechanism by which the live export trade is controlled is through a system of licenses, permits and quotas. The issuance of TDLs and Trapper Cards determines the number and quantity of trappers and traders, whilst permits and certificates are the legal instrument that must accompany all live animals from the trapping ground to export. Trapper Cards and TDLs for trading in live animals are valid for one year and cost Tsh. 10,000.

Four types of permit/certificate are used in Tanzania: Capture Permits, Ownership Certificates, CITES permits and Trophy Export Certificate. Their issuance is normally restricted to license holders and the precise natural of the consignments follows strict annual national quotas. National quotas are usually divided equally amongst TDL holders. Every species has a capture cost which must be paid before capture and is normally less than US\$ 1, although it can reach sev-

eral hundred dollars for some mammals. After capture, the specimen details are transferred to Ownership Certificates, which cost Tsh. 500 each and are valid for six months, whilst non-CITES specimen are exported on a Trophy Export Certificate, which costs Tsh. 1,500.

The trade in animals has been affected by CITES regulations. In addition, a variety of local, national and international measures, including trade restriction and harvest control, have affected animal trade dynamics. One example is the impact of the export ban of Fishers' Turaco Bird: This bird was generating a high price (US\$ 20) in 1995 when it was an important income earner in some areas in the East Usambara Mountains, and then ceased to be traded due to an export ban.

Profit increases almost exponentially going up the trade chain. Middlemen may receive almost double the amount received by the collectors, whilst export prices are a further six times greater. For some species, US retail prices average 12 times the minimum export prices and 146 times the original collector's price.

A case study conducted by TRAFFIC in the East Usambara Mountains, revealed that regulatory and market changes have had the greatest impacts on animal trade and not species availability. Local prices in US dollar terms have continually declined since 1990 although the relative price of different species has changed little. Average income from animal traders dropped from US\$ 830 in 1995 to US\$ 125 in 2002.

Table 14 Export of Government Trophies, Live Animals and Birds

Type of Trophy	1993	1994	1995	1996	1997	1998
	Value (Shs.'000)	Value (Shs.'000)	Value (Shs.'000)	Value (Shs.'000)	Value (Shs.'000)	Value (Shs.'000)
Live animals and birds	28,013	16,672	18,120	16,934	22,672	22,900
Hippo teeth	18,729	7,319	4,509	1,600	1,200	..
Tortoises	..	523	106	..	..	..
Crocodile skins	1,200	660	5,000	5,000	5,000	5,000
Other product	340	1,185	1,990	..	..	..
Total	48,282	26,359	29,725	23,534	28,872	27,900

(Source: URT, 2004c)

Table 15 Export of Live Animals and Animal Tusks/Teeth

Type of animal	1999		2000	
	Qty/Weight	Value Shs. (000)	Qty/Weight	Value Shs.(000)
Primates	1,094.0	6,216.0	3,897.0	2,005.5
Other mammals	1,279.0	1,291.9	543.0	7,477.1
Birds	166,605.0	20,263.3	114,241.0	41,171.7
Amphibians	25,900.0	2,130.2	48,173.0	3,372.1
Reptiles	63,850.0	3,072.4	43,590.0	6,298.7
Insects	18,383.0	811.3	57,866.0	4,050.6
Animal Tusks and Teeth	1,739.0	5,217.8	23.0	1,929.6
Cropping problem animals			..	39,000.6
Miscellaneous e.g Export Certificates			..	6,625.6
Total		39,002.9		111,931.5

(Source: URT, 2004c)

3.7 Wildlife Resources and Poverty Reduction

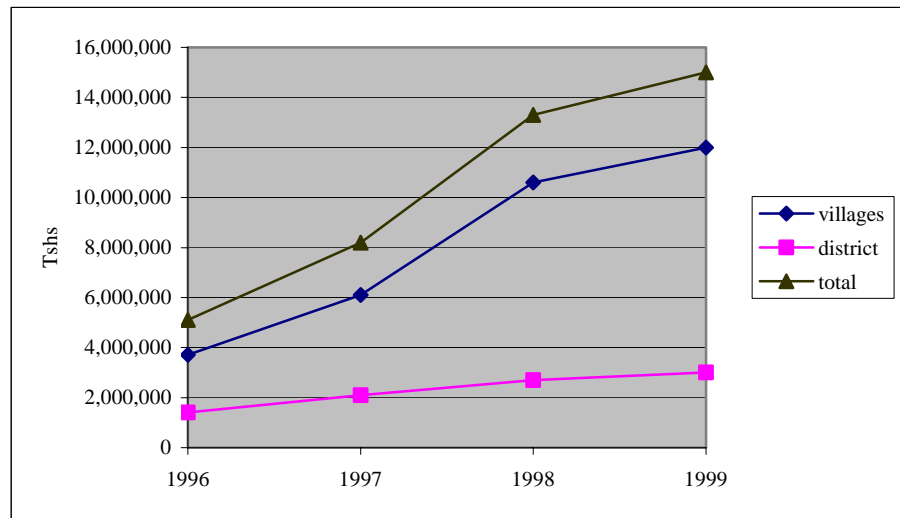
Wildlife Management Areas (WMAs) are described in the 1998 Wildlife Policy as land areas managed by communities to provide substantial tangible benefits from wildlife conservation. The regulations detailing WMA procedures were released with a four-year delay at the end of 2002. These regulations list 16 pilot areas in Tanzania where the concept of WMAs is being tested over a three year period (2003-2005). A number of applications for establishment of WMAs within these pilot areas have been submitted to the Wildlife Division, but no WMA has so far been formally established.

The primary sources of village income from WMAs are the sale of hunting quotas to resident hunters and a percentage of revenue obtained from tourist hunting. Case studies provide aggregate income data at community level. There is no data on household gross benefits, and the distributional effects of income accrued at community level. There are studies showing that elite capture is a constraint to achieving the desired effects of poverty reduction (Mabugu and Mugoya 2001, Gillingham 2001, Ashley et al. 2001, and Homewood et al. 2001)

Walsh (2000) provides income data from the MBOMIPA project working with communities in Ruaha National Park in Iringa, one of the WMA test sites. The data is presented in Chart 22 and Chart 23 below. Chart 22 shows the income from sale of resident hunting quotas, which totalled Tsh. 15 million in 1999, out of which the Villages earned 80 and the District 20 percent.¹⁹ This divided over the nine participating villages would be an annual income of Tsh. 1,7 million per village, assuming equal distribution.

¹⁹ These are 9 villages of Idodi and Pawuga in Iringa District.

Chart 22 Village and District Incomes from sale of Resident Hunting Quota

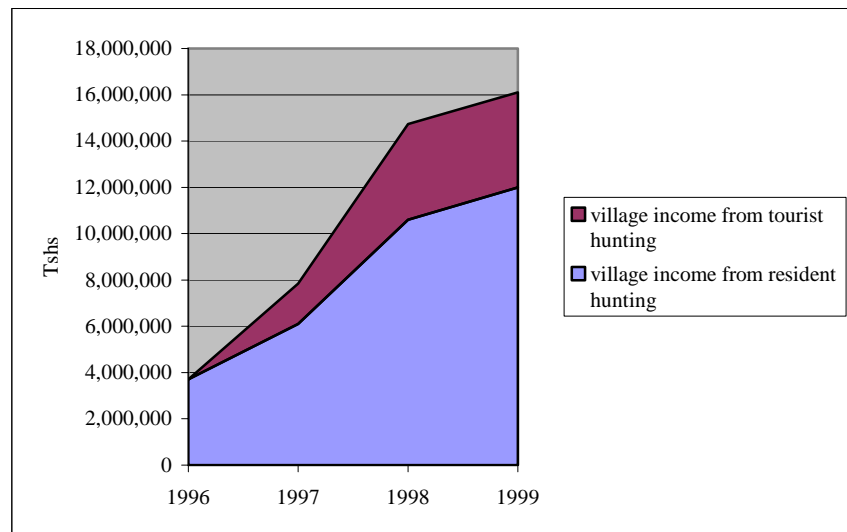


(Source: Walsh 2000)

In addition, seven out of the nine villages earned Tsh. 4,1 million from the 25 percent share of license fees from tourist hunting, which is Tsh. 587,000 per village. For those seven villages who record income from both sources, the annual income from WMAs per village was hence, Tsh. 2,25 million (assuming equal distribution). The overall total gross income for all villages from WMAs was close to Tsh. 20 million. No data on cost encountered by the villages is given, hence the net income cannot be assessed. Local management cost can be substantial.

Walsh 2000 describes how frictions with resident hunters and potential investors, as well as problems of good governance and competition over resources at village level, as well as conflicts with the district level, were constraints in maximising the potential income.

Chart 23 Village Total Incomes comprised of resident hunting quota and 25% share of license fees from tourist hunting



(Source: Walsh 2000)

Ashley et al. (2001) likewise report considerable income figures in MBOMIPA villages. The income from hunting quotas was sufficient to treble village level communal income, enabling villages to pay district-level taxes though would otherwise be levied by households, as well as to carry out specific inter-village investments such as the building of a secondary school and road improvements (Ashley et al. 2001). One of the success factors identified was that the project has placed emphasis on institutional capacity building at village and inter-village levels. Negotiations have been initiated with private tourism developers and the project is trying to help communities retain some control over the negotiation process.

By contrast, WMA data from the Selous Game Reserve shows that village income generated is small and several villages reported misuses of funds by village level institutions (Gillingham 1998). Gillingham quotes figures of total income of Tsh. 1.8 for nine villages for the 1994/95 hunting season. Total income is comprised of quota meat income plus Tsh. 75,000 per year to the village from the tourist hunting company operation in the buffer zone of the WMA. Depending on the total income per village and the cost, net income per village ranged between US\$ 159 and 463. While in one village cost were 9.5% of total income the highest was 37.5%. (Gillingham 1998).

Similarly, Ashley et al 2002 found that in case study villages along the northern boundary of Selous Game Reserve most benefits accrued to local institutions. In terms of cash earnings, the 19-village society set up to manage wildlife, plus the District council and village governments had earned approx. twice as much in total as individuals received in wages or allowances. The main focus has been on *distributing* revenue shares from trophy hunting. Less evident are attempts to create enterprise opportunities or build capacity to manage problems. The role of private sector development and tourism development is often forgotten.

These experiences are from isolated 'project islands' and as long as there is no national effort to make WMAs fully operational, lessons learned from these pilot sites will not be replicated. Despite the alleged commitment to community involvement and participation through the Wildlife Policy, in practice, the WD has not adhered to its own policy and legal framework. For example it is reported by resident hunters and the MIOMBO magazine of the Tanzania Wildlife Conservation Society, the a well known and functioning WMA in 'Utete', Rufiji District, was taken away from the village government and sold to a foreign private entrepreneur. Communities who are the legitimate holders of the land upon which hunting takes place are excluded from the decision making process. As Baldus and Cauldwell 2004 describe "there is a distinct lack of will to implement the policy" (p. 30).

Consequently, the development of WMAs is seriously delayed. There is no progress on development of an effective schedule for sharing of benefits from tourist hunting with the local communities on whose land hunting takes place. There is a general hesitation among outfitters to accept the WMA concept. It is possible that much of the delay in the development of WMAs is the result of a negative high-level influence by some hunting operators, who reportedly have influence with the Government to block the allocation process.

Another criticism suggests that the above regulations fail to place any real control of the WMAs in the hands of the communities as was originally envisaged. It is widely known that hunting will be the major source of income from WMAs, but scrutiny of the regulations reveals that the WD will regain full control over the appointment of outfitters to operate the WMAs and what they are allowed to hunt by controlling the quotas.

Further constraints to community involvement in wildlife related business is that commercial success in mainstream hunting and tourism business requires large up-front investment, commercial experience and substantial risk-taking behaviour. These often present barriers of entry for local entrepreneurs or community level organisations. Rural credit is scarce, familiarity with the international tourism sector limited and hospitality skills low. Community partnerships could be a possible way of tackling some of these constraints.

3.8 Sustainability

There seems for example to be agreement among conservationists and hunters that there is a general decline in wildlife populations in many areas of Tanzania. Typically, they point to increased settlement and illegal off take of bushmeat by local communities as the main reasons for the alleged decrease. It is argued that growing human population are turning game areas into islands of wildlife habitat surrounded by cultivated and semi-urban land, risking that these areas lose their economic value for the hunting industry and associated government alliances. In this context it is reported by the hunting industry that a number of hunting concessions have ceased to be viable (Baldus and Cauldwell 2004)

The views of local communities, by contrast, has not been well represented in the debate and no reliable figures have been provided by the authorities.

Hence, in the absence of reliable ecological data it is not possible to objectively conclude about current levels of wildlife resources and their future sustainability.

However, the absence of community benefits from wildlife management provides poor rural households with little incentive for conservation. High levels of illegal utilization of wildlife resources persist, leading to a loss of opportunities for economic growth and poverty reduction and un-sustainable use of the resource. While poaching and illegal trafficking is often associated with adjacent communities, a data analysis in Katavi National Park on the village of origin of poachers, shows that the majority of poachers did not reside in the park adjacent villages but rather in the district capital or other further removed locations (KRCD 1995 unpublished).

Although fines from poaching present a source of government income, they will be outweighed through the cost of anti-poaching control.

As reported by The Guardian on May 9, 2005, Illegal trade of ivory from Tanzania into the Middle East, is a persisting problem. As reported by the MNRT, over a five year period, 3,704 kg of ivory in transit were intercepted and more than 700 guns impounded at various exit points. Valued at the price that a professional hunter pays for an elephant (US\$ 5,000) the government revenue loss through a single illegal consignment of ivory is 200 million US\$ for 40 elephants killed in sport hunting. As the sources have established there is a well-organized criminal network of illicit trade out of Tanga port that rapes the country of billions of shillings. While the illicit trade pays the porters only Tsh. 50,000 while exposing them to great risks, it brings prosperity to the middlemen. The last consignment weighted 800 kg stuffed in 10 boxes labelled as horticultural produce. Since the consignments are usually under police escort, it is difficult to stop illicit traffickers.

There is a declining elephant population although an increase would have been expected due to the export ban introduced in the 1980s. Elephants are on the CITES Annex 1 list, for which trade is prohibited. There is a dispute as SADC countries wanted to down list elephants into Appendix 2, endangered with limited trade allowed.

Unsustainable use and over-exploitation of wildlife resources is also fostered through hunting quotas out of tune with true market values and with no scientific basis with respect to maintenance of critical stocks.

Concessions are leased at rates far below true market value irrespective of size, quality or income potential. This represents a significant loss of income to the Wildlife Division (estimated at over UD\$ 7 million). Many concessions are leased to outfitters without the capacity to market or manage their own hunting operations. The system thus promotes subleasing to foreigners with a result that much of the income generated by the industry never enters the country and the Tanzania Revenue Authority do not access much of the funds that should be due for taxation.

There is no effective monitoring of wildlife populations in the hunting areas. There is no objective system for quota setting. Many hunting quotas are issued at levels that allow unsustainable take off. Hunting outside of quota and a general lack of respect for the law by the members of the private sector has prompted the Director of Wildlife to issue a Call for Compliance to all hunting outfitters in 2004. However, no serious effort to prosecute violations has been observed.

There is unsubstantiated evidence from professional hunters that trophy quality and age of key species such as buffalo has declined in the last five years in some key areas. Many hunting outfitters also admit that it is becoming increasingly difficult to hunt good lion trophies. Many outfitters are not voluntarily restricting the numbers of lion hunter in their concessions to encourage an increase in the available lion trophies despite high quota allocations. While some operators are imposing their own tight standards on the age and quality of lion trophies taken, others are over-shooting their quotas and taking young animals.

Baldus and Cauldwell 2004 report that, although a few species such as lion are being affected by trophy hunting, the vast majority of species is unaffected. The general decline in wildlife populations is attributed to population pressure and there is no reported evidence that the regulated tourist hunting industry has contributed to the general decline of wildlife populations. In the contrary, Baldus and Cauldwell report that there is plenty of evidence that the presence of a regulated hunting industry contributes significantly to reducing the illegal activities of poaching and provides an economic incentive to protect vast areas.

Ecological monitoring efforts of wildlife populations tend to be concentrate in and around national parks and Ngorongoro Conservation Area. Most areas managed by the Wildlife Division, which include most of the country's hunting blocks, are not subject to any regular population monitoring, with the exception of the Selous Game Reserve.

Developing an ecological basis for setting quotas is not easy. It is extremely costly to conduct regular aerial surveys countrywide. Furthermore, aerial surveys are unable to provide data for key species and do not provide consistently reliable trends of populations.

In the absence of reliable ecological data, cumulative experience of setting quotas over many years relying on a number of indicators (e.g. trophy quality) provide the basis for an adaptive management approach. Each year about 7,500 animals representing up to 60 species are hunted in over 130 hunting blocks generating large amounts of data. The WD has twice resisted attempts to computerise the system. It is doubtful that in the absence of proper records management an adaptive management approach can be practices.

The approach used to allocate quota is to a large extent relying on the knowledge of project managers and district game officers. Aerial survey data are taken into account together with past hunting records. There is a tendency for outfitters to be allocated their required hunting quotas, and that quotas are increasingly raised regardless of the population status. Hence, quotas are not

based on ecological indicators but rather economic interests of a few powerful players.

In summary, the WD is not adhering to ethical principals that would support sustainable management of the resource. For example, under-sized trophies are legalized with export documentation although they do not meet the minimum standard. Also, it is reported that the WD issues additional quotas to outfitters upon request during the hunting season. In addition the environmental standards for hunting camps are inadequate. In summary, an inflexible management system, rigid game fee schedules and strong emphasis of trophy fees leaves the Wildlife division with no option other than to increase quota off take to generate increased revenue. An inventory of the true value of the hunting concessions to know the value of resources has never been conducted.

3.9 Conclusions and Recommendations

Most of the issues raised in the context of the wildlife sector, refer to the tourist hunting industry and can be summarized as government failure to manage the sector effectively and transparently, preventing the realization of the true market value of resources, achievement of sustainable resource use and poverty reduction benefits.

In more detail, some of the key issues include:

- Lack of monitoring of the wildlife resource and ‘off-take’ by the hunting industry. This is associated with a lack of ethical standards for hunters and certification of hunters’ competence.
- Lack of implementation of the WMA regulations, leaving government in control of resources on village land and preventing communities from controlling their own poverty.
- Lack of implementation of the policy and management plan for tourist hunting, developed in 1995 as a tool for reform in the industry. An outdated and non-transparent system of issuing permits is maintained.

In conclusion, the current management of the tourist hunting industry seems to serve the present hunting concession holders at the cost of potential competition. Increased transparency and competition would bring many new players to the industry and thus boost current revenue levels for the potential benefit of the Government as well as local communities.

Recommendations

In order to exploit the potential for growth and rural development from wildlife resources, it is necessary to ensure greater coherence between different national policies and instruments, particularly community based wildlife management, tourism development, rural growth strategies, investment regulations and incentives and poverty reduction strategies. More specifically, the following recommendations are made:

- Encourage a change of mindset at policy level for Wildlife to be seen as an asset for rural development and poverty reduction.
- Involvement of local communities through implementation of the WMA regime. Local communities should be allowed to negotiate directly with hunting outfitters through decentralised tendering, provision of personnel to supervise hunting on their land, participation in setting quotas, and receiving and managing revenue from hunting;
- Improve monitoring, information and records systems at central Government level with a view to monitor wildlife stocks more precisely. This would also improve accountability and transparency in the sector overall and could also be supported through independent monitoring mechanisms.
- Improved information would also give the Authorities a basis for fixing fees and licenses at levels allowing for maintaining sustainable Wildlife stocks. Fees should also reflect market rates and shall include the conservation and observer fee.
- Liberalise procedures for tendering hunting blocks to allow the best outfitters to bid competitively against each other for concessions. Provide enabling frameworks for partnerships between communities and the private sector. However, recognising the strong resistance to this particular issue, alternative allocation procedures may be necessary. The correct allocation and utilization of resources can lead to significantly higher levels of income generation, which should be used as a yardstick for measure of the effectiveness of reform.
- Implement control of subleasing, which may come naturally through effective market-based competition.

4 Marine Fisheries

Marine and freshwater Fisheries are analysed separately in this study. While this Chapter provides some general data on the Fisheries sector as a whole, the focus is primarily on marine Fisheries, aligned with the overall heading of this paper of ‘un-captured growth potential’.

Freshwater Fisheries, by contrast are dealt with in Part 3 of this report, where the significant growth observed in the Lake based fisheries is analysed and its wider externalities for employment, income and food security is discussed.

Apart from Prawns, which are one of the major foreign exchange earners for the country, marine Fisheries has been slow to develop in Tanzania.. The sluggish growth is partly due to the export ban on fin-fish, which has been lifted partly for certain species in early 2005. Still, as this Paper will argue, the sector may hold significant un-captured growth potentials.

Investors are already starting to shift their operations from the Lake Zone to the Coast. It was reported for example by the Norwegian Embassy in Dar es Salaam that five letters from Tanzanian entrepreneurs were received during the last 24 months requesting assistance (credit and equipment) to shift their operations to the coastline.²⁰

Declining yields per boat in freshwater Fisheries place even more emphasis on the potential contribution of the marine Fisheries to economic growth. If the sector is well managed, the commercial Fisheries can potentially have a positive impact on the country’s economic development and the wealth of its population. It is hence important to learn from the lessons of the freshwater sub-sector to ensure that commercial Fisheries in the coastal zones can be developed on a sustainable basis.

However, even in marine Fisheries (as in the freshwater sub-sector), there are estimates that exploitation is approaching or already exceeding maximum sustainable yield (MSY) levels for certain species. It will hence be important for sustainable management of the Fisheries to include the retention and re-investment of revenue into the sector. This may allow control and surveillance monitoring of stocks to ensure sustained exploitation of the marine Fisheries resources. Also, it will be necessary to put in place certain ‘safeguards’ for ar-

²⁰ Personal interview with Eirik Jansen, Norwegian Embassy, 12. May 2005

artisanal Fisheries to protect their rights and access to the resource, which sustains their livelihood.

Another key area for discussion is the growth in near and off shore Fisheries. There are increasing numbers of foreign trawlers in Tanzania's EEZ. While there are improvements to the monitoring and surveillance of these waters, there is arguably a significant degree of illegal fishing and loss in revenue (and growth) to Tanzania from this activity.

Box 10 Key estimates on Fisheries in Tanzania

- Tanzania's Fisheries sector has grown at a rate of 6 to 7 percent annually since 2000;
- Fisheries exports totalled US\$ 130 million in 2003, corresponding to more than 10 percent of total exports
- The export value of Nile Perch totalled US\$ 100 million in 2003;
- The number of artisanal fishermen has roughly doubled since 1995 and reached close to 120,000 in 2003;
- Tsh.9.5 billion was collected in revenue from the Fisheries sector in 2003/04. This represents roughly a 50 percent increase from revenue collected in 2001/02;
- Only 20 percent of revenue originates from marine fisheries, with 80 percent coming from freshwater fisheries (2003);
- The sector registered a revenue over-collection of roughly Tsh.3 billion in 2003/04; and
- The number of foreign vessels licensed to operate in the EEZ (Mainland and Zanzibar) has increased from less than ten in 1998 to more than 170 in 2004 corresponding to a revenue of US\$ 3.3 million

(Source: IMF, URT, 2004c, MNRT, 2004)

The structure of this Chapter is as follows: Section 4.1 provides key figures on the contribution of Fisheries to the GDP and Section 4.2 on Sector Financing and Spending. Section 4.3 describes Marine Fisheries Resources, followed by Section 4.4 on Revenue from Marine Fisheries. The linkages between Marine resources and poverty reduction will be discussed in Section 4.5 and Section 4.6 deals with Sustainability. The policy framework of marine Fisheries is described in Section 4.7 and finally some recommendations will be developed in Section 4.8.

4.1 Contribution of Fisheries to GDP

The Fisheries sector in Tanzania has recorded high growth rates during the past four years. Whereas annual growth was averaging three to four percent during the 1990s, it jumped in 2001 to a level of six to seven percent annual growth.

Hence, export of fish products is now a major source of foreign currency for Tanzania. In 2003, 11.9 percent of total export earnings came from fish products, making it the second most important source of foreign currency to the minerals sector (IMF, 2004).

This growth has primarily been driven by freshwater Fisheries, especially harvesting of Nile Perch in Lake Victoria for consumption in EU markets. Still, catches per boat in the Lake Zone has been declining in recent years and so growth may not be sustainable in the long-term.

Fisheries are a sub-sector under the Agriculture GDP in the System of National Accounts. There are no statistics that account separately for the contribution of marine or freshwater Fisheries to GDP.

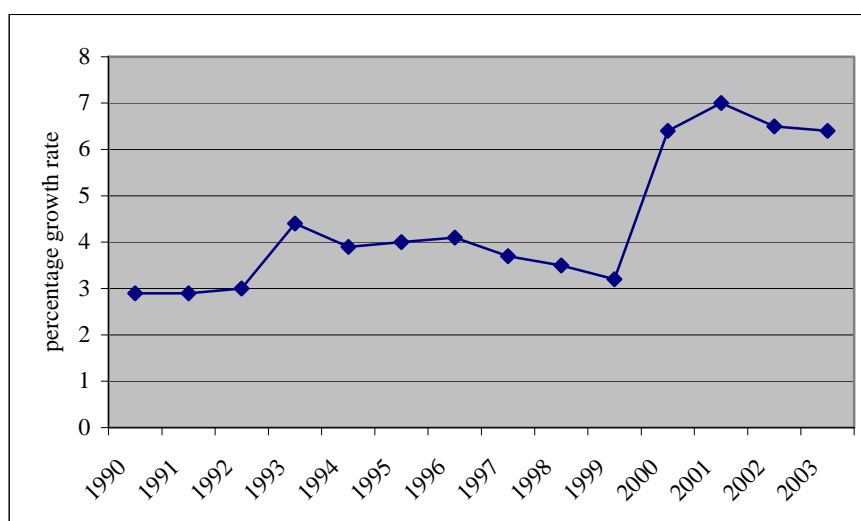
The rate of growth of the Fisheries sector under the agriculture GDP between 1990 and 2003 is shown in Chart 24 below. As mentioned, the increase in growth in 2001 is due to the lifting of an EU import ban on fish from Lake Victoria in November 2000.

At the same time, the Chart shows (mildly) declining growth rates for 2002 and 2003: This is explained as follows by the Fisheries Department (FD):

- In 2002, due to a fall in prices of exported fish products in the world market and decrease in volume of fish, particularly prawns.
- In 2003, due to a shortage of financial capital to small scale fishermen, poor handling and processing of fish products, illegal methods and destruction of marine habitat (URT, 2004c).

Despite the slightly lower growth rates in recent years, growth is still above 6 percent and remains an important source of income for the Tanzanian economy. Hence, it is still too early to say whether declining rates in recent years is indicative of a negative trend.

Chart 24 Growth rate of Fisheries Sector 1990-2003



(Source: URT, 2004c)

Similar to forestry, the total contribution of the Fisheries sector to economic development and as a source of livelihoods is only partly reflected in the GDP.

The GDP figures represent only commercial Fisheries, which are directly associated with a cash flow through either license revenue or foreign exchange earning from export. Artisanal Fisheries, which to a large extent take place on a subsistence basis and fall within the informal sector, are not considered in the National Accounts.

In addition, the potential of coastal zones for increasing the share of foreign exchange earnings from sustainable development of the coastal tourism industry in both mainland Tanzania and Zanzibar is significant but not accounted for under the Fisheries GDP. Part of this contribution of marine resources might be captured under earnings of the tourism industry within the “Trade, Hotels and Restaurants” GDP, which is the closest proxy for tourism in the National Accounts.

There is a trade-off between the use of marine resources as a source of revenue for Fisheries and as a source of foreign exchange earnings through tourism. Mainland Tanzania and Zanzibar combined include 1,380 Km² of Marine Protected Areas and Marine Management Areas (MMAs) within their terrestrial seas. Only if these areas are protected from commercial (illegal) over-exploitation for Fisheries can their tourism values be maintained. A delicate balance needs to be drawn, which requires sound environmental governance.

Research will need to explore additional un-captured growth potentials from marine resources, such as for example bio-prospecting, values of sponges, soft corals, tunicates, and different sea-weeds. These are small but growing industries just beginning exploratory activities along the eastern African coast.

4.2 Sector Financing and Spending

While revenue collection is dealt with more specifically for the marine Fisheries in Section 4.3, some general information and data on sector financing is presented here combined for fresh and marine water Fisheries.

Sources of revenue

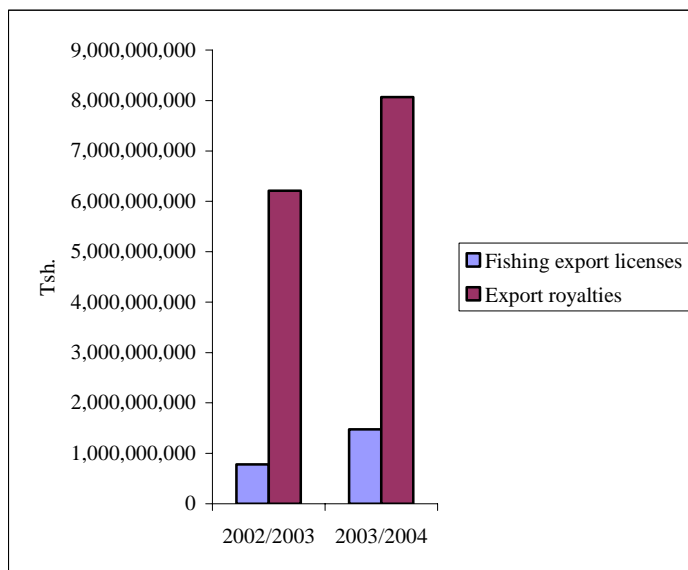
The primary revenue raising instruments in Fisheries are vessel registration and licensing, export royalty and fish levy (charged on the sale of fish). Fish levy accrues to local governments, whilst export royalty and license fees for vessels greater than 11m/20GRT accrue to central government via the Fisheries Division.

Charges for vessel registration, licensing and fishing vary with vessel size, flag and whether the owner has an approved onshore processing facility. Export royalty on principle Fisheries exports is charged on per kilo basis, approximating six percent of free on board (FOB) value. Fish levy is charged at a maximum of five percent of landed value. The legal basis for all charges in the sector is the Fisheries Act of 1970.

Chart 25 below shows the two main sources of revenue for 2003 and 2004: Export royalties and export licenses (from vessels). Export royalties clearly domi-

nate (mainly derived export of Nile Perch from Lake Victoria) while export licenses, although small in comparison, has been increasing due to an increasing number of foreign vessels registering to operate in the Exclusive Economic Zones (EEZ).

Chart 25 Sources of Fisheries revenue in 2004



(Source: MNRT 2004)

Revenue collected at decentralised level amounted to US\$ 1,5 million in 2002. 99 percent of the decentralized revenue collection comes from fish levy, with 34 percent originating from marine Fisheries and 66 percent from freshwater Fisheries.

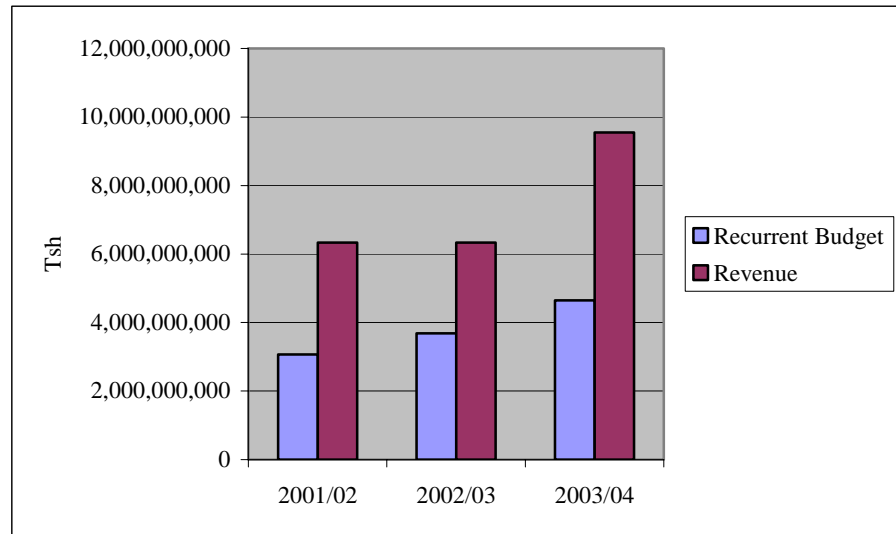
The total revenue collected by the Fisheries sector was close to Tsh.7 billion. in 2002/03²¹ and close to Tsh.9.7 billion in 2003/04.²²

As Table 4 in Section 2.3 above has shown, the Fisheries Department has received 18 percent of the budget of the MNRT in 2002/03 and 2003/04. In nominal terms, this was Tsh.3,688,280 and Tsh.4,648,202 respectively.

Government spending on Fisheries depends on the revenue generated from export levies and the issuing of fishing licenses. Chart 26 below compares the recurrent budget of the FD to collected revenue.

²¹ exact amount: Tsh. 6,994,511,808.15

²² exact amount: Tsh. 9,698,498,793 including revenue retained at source.

Chart 26 Comparison recurrent budget to revenue collected

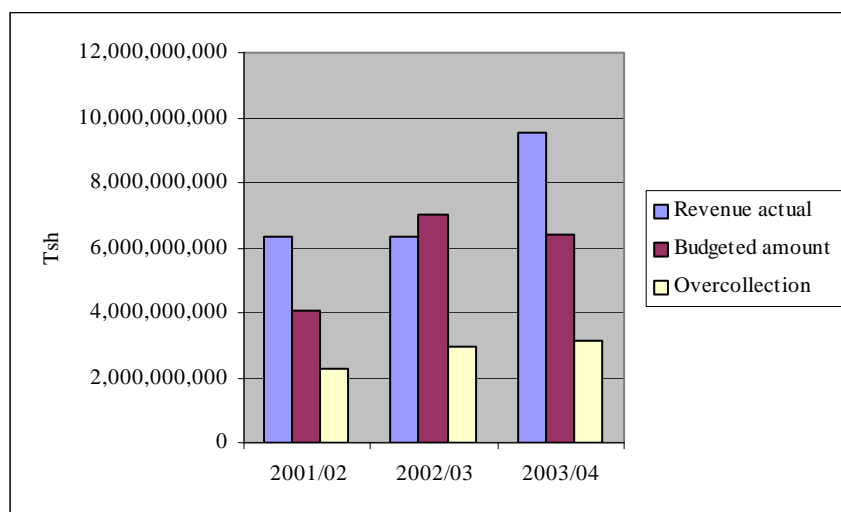
(Source: MNRT 2004)

In contrast to Forestry and Wildlife, Fisheries has no recorded allocations or expenditures under the development appropriation account in the MTEF. There was hence no data readily available on the amount of foreign financing to the sector. In summary, Fisheries operate with a smaller recurrent budget than Forestry and Wildlife while they record higher revenue.

Being a revenue-earning sector, the key fiscal objective for Fisheries is to be self-financing. In other words, the cost of regulating and developing the sector is to be covered by the earned revenue. Moreover, revenue generated from Fisheries on the mainland plays an important role in financing the sector and in raising revenue for the treasury and local administration.

In comparison to the Forestry and Wildlife sectors, the Fisheries sector is the only one where revenue collection exceeds the GoT recurrent budget allocation. As Chart 27 below demonstrates, the Fisheries Division has recorded over-collection of revenue in the past three years.

In 2003/04 the actual collections represented an over-collection of more than Tsh. 3 billion vis-à-vis budgeted amount. The Division explains this over-collection as a result of increased foreign vessel compliance, due to aerial surveillance done under the on-going SADC-MCS programme, and intensified patrols by revenue collectors.

Chart 27 Over-collection in the Fisheries Division, 2001/02 – 2003/04

(Source: MNRT 2004)

The FD's budget ceiling is defined as 50 percent of estimated revenues. If actual revenues are greater than estimated, the difference accrues to the treasury. This can lead to a substantial 'loss' to the potential FD budget. The sector contributes about one percent to total government revenue collection. The retention scheme in Fisheries allows the FD to retain about 48 percent of the earned revenue. 6 percent is taken as overhead by the MNRT and the remaining 46 percent retained by Treasury.

The annual amount spent by the mainland FD is about US\$ 5.2 million. The mainland more than covers its costs. The MNRT reports that FD achieved 96.1 percent of its targets. In terms of sector spending, only 2.2 percent of available resources was spent on protection of resources.

4.3 Marine Fisheries Resources

Marine Fisheries in Tanzania are dealt with separately by the Fisheries Departments of Mainland Tanzania and Zanzibar. Therefore, marine Fisheries can in principle be divided into two Territorial Seas and two Exclusive Zones: Mainland and Zanzibar. To simplify the analysis, there are five distinct marine Fisheries resources in Tanzania:

- Mainland prawns;
- Mainland artisanal;
- Mainland Exclusive Economic Zone (EEZ);
- Zanzibar artisanal;
- Zanzibar Exclusive Economic Zone (EEZ).

Given that Zanzibar falls under a separate CEM process, this report will focus primarily on marine Fisheries administered by the Mainland.

In the context of the economic growth potential of the marine Fisheries, there is a crucial distinction to be made between prawns and artisanal Fisheries on the one hand and Fisheries in the EEZ on the other. While the former are, based on estimates from the Government (UTR, 2004c) and the MCS-SADC project, currently operating at maximum sustainable yields levels, and are already showing declining yields; the latter present an important, emerging revenue source for Tanzania and the sector itself. However, as this Section will show, even for certain species in the EEZ, current catch rates are at MSY levels. An additional difference is the governance regime; in contrast to prawns and artisanal Fisheries, EEZ Fisheries has to comply with international legislation beyond the one of the coastal state, in this case Tanzania (see Section 4.7 below).

Table 16 below shows various marine Fisheries resources and their estimated value for Tanzania Mainland.

Table 16 Marine Fisheries resources and their value (base year 2000)

Fish-eries	Type	Total Value in US\$	Export Value in US\$	Remarks
Prawn	Industrial and Ar-tisanal	Estimated at 7 mil-lion per year	5-6 million an-nually	13-21 trawlers all Tan-zanian flag. Closed Sea-son March – Nov.
Ar-tisanal	Artisanal reef and inshore pelagic species, crusta-ceans	Estimated at 11 million per year	3.5 million	Up to 13,000 traditional fishing vessels
EEZ/ Off shore	Industrial – large pelagics	Not known	1.9 million	Boats from far East and the EU. Most do not land in Tanzania and records are incomplete.

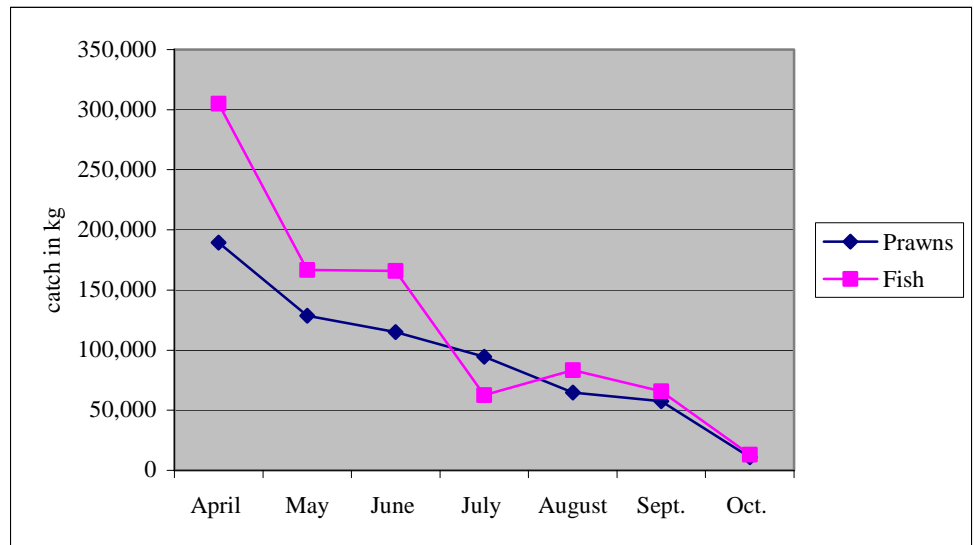
(Source: Fisheries Department)

Prawn and artisanal Fisheries

With regard to prawn fishery, there is evidence at TAFIRI, the Tanzania Fisheries Research Institute that the stocks in the Rufiji Delta are decreasing. However, no quotas have been imposed. Albeit lack of government control, the Trawler Owners Association has voluntarily reduced the length of the season by one month (March to October) and reduced the number of nets used on its beam trawlers. The fact that this has happened is an indication that the prawn fishery has been operating at a level that cannot sustain increased exploitation. However, government has not yet imposed effective controls beyond these voluntary measures.

Prawn catch is also associated with fish by-catch, which provides an important source of fish supply to the domestic market. Chart 28 below shows the catch of prawn and fish by-catch between April and October 2004, an in-season period. There is a sharp decline from a total of 189,319 kg prawn catch in April down to 10,998 kg in October 2004. The decline is even more significant for the fish by-catch, which declined from 305,052 kg to 12,952 kg within the same period. The abovementioned voluntary restrictions may explain part of this decrease.

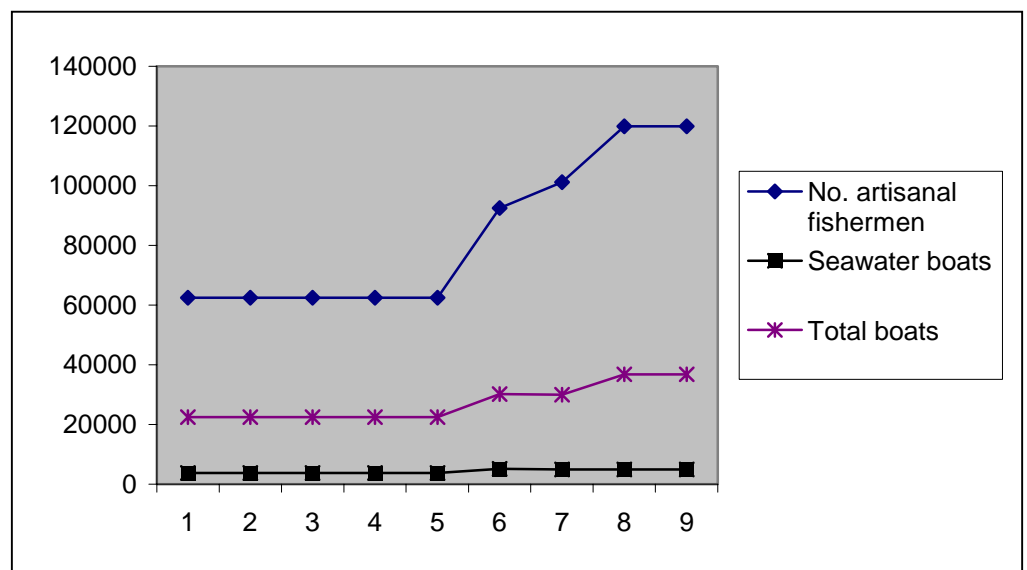
Chart 28 2004 Prawn Catch and Fish by-catch in 2004



(Source: Fisheries Department)

While the artisanal Fisheries present an important economic activity in coastal regions, there are no official statistics on the volume of business activity, employment or catch. Still, Some indication can be derived from Chart 29 below, which shows number of seawater boats compared to the total number of boats in artisanal Fisheries and the total number of artisanal fishermen. While the number of registered seawater boats has remained around 4000 between 1995 and 1999, it jumped to roughly 5000 in 2000 where it now remains stable. The number of freshwater boats on the other hand has increased much more rapidly, and now counts more than 30,000 boats. This growth seems to be positively correlated with the number of fishermen, which has increased to 120,000.

Chart 29 Artisanal fishermen, total no. of boats and sea water boats



(Source: Economic Survey 2003)

EEZ Fisheries

There is a dearth of information on the Exclusive Economic Zone (EEZ) Fisheries in the Tanzanian territorial seas. Foreign corporate bodies and/or individuals are allowed operate within the EEZ water bodies provided that they enter into an agreement with the Government.

Of the approximately 25 industrial boats fishing the EEZ in any given season, only four land in Tanzania (Dar es Salaam) and the fishing states supply only limited information on the fish removal from EEZ and their value. Although the FD closely monitors these registered vessels, they only represent about one sixth of the entire fishing effort. It could be surmised from the figures that are available from the FD that the potential value of the fishery is about US\$ 12 million per annum but this is not substantiated by scientific research.

The other major factor concerning EEZ Fisheries is that the stocks are generally migratory and their appearance in Tanzanian waters is seasonal. There is a distinct season from September to February only. Regarding EEZ pelagic fishery, there is no baseline study of stocks and no figures for Maximum Sustainable Yield or Total Allowable Catch. However, some estimates exist for Tuna and Tuna like species in the Western Indian Ocean from the Indian Ocean Tuna Commission (IOTC).

Yellowfin catches in the Indian Ocean were extraordinarily high during 2003 and 2004, while skipjack and bigeye remained at their average levels. 2003 was a record year for the catches from all fleets that reported to the IOTC Secretariat. These anomalous catches occurred all over the western Indian Ocean, in particular a small area in eastern Africa. The fish caught were of large sizes (100-150 cm). The management advice of the IOTC was that total catches of Yellowfin were close to or possibly above MSY. In these circumstances, any further increase in both effective fishing effort and catch above levels in 2000 should be avoided. While the MSY set by IOTC is 280,000-350,000 tons per year, the 2003 catch was 400,000-450,000 tons per year and the average catch over the last 5 years was 326,000 tons (Chopin 2005).

For all main tuna species,²³ yearly catches have been increasing steadily since the early 1950s when the industrial tuna Fisheries in the Indian Ocean began. While the increase has been slow but steady until the late 1980s, there has been a sharp increase in fishing effort since the 1990s with exceptional high catches in 2004 recorded through voluntary reports by longline vessels and tuna seiners. The catch includes younger, lower weight tuna for canneries, caught by seine vessels, and larger fish for the sashimi market caught by longliners.

Evidence suggests that 2004 was an anomalous year for tuna Fisheries with a significant shift in effort benefiting Tanzania as the fish moved into the EEZ. Accordingly, there is the possibility that this temporal shift may not occur in future years and interest for licenses may decline.

²³ These are: yellowfin, skipjack, forskip jack, bigeye

Based on a review of the current status of stocks from IOTC data and on the Fisheries data submitted by vessels operating in the Tanzanian EEZ, there may be cause for concern with respect to sustainable development of three of the prime species harvested in the EEZ (see Table 17 below). In light of these estimates, future controls may be organised by the IOTC.

The fact that Tanzania is not an IOTC member and hence does not have a history of catch reporting vis-à-vis the IOTC, the quota eventually allocated to Tanzania by the IOTC may underestimated since IOTC has no information on the level of current catchments.

Table 17 Management advice from the IOTC

Species	Recommendations and Observations
Bigeye Tuna	Current catches above MSY
Yellowfin Tuna	Current catches close to or above MSY Increasing pressure on juvenile fish by tuna seiners is likely to be detrimental to the stock if it continues
Skipjack	No need for immediate concern
Swordfish	Current level of catch unlikely to be sustainable Controls recommended for the SW Indian Ocean.

(Source: Robin 2005)

The data coming from the Far East longliner fleets and the EU Tuna seiner fleet is scant and of dubious quality. This lack of data makes it extremely difficult to assess the total removals of fish from the EEZ and their value. The catch of species listed as 'others' is very high (69 percent) and there is no indication what these species are, or what their value is. There is also a disparity between catch composition of longliners in the EEZ and data held by IOTC on all fleets. The data available on both catches and effort at the vessel level are extremely limited. There have been no scientific observers onboard the vessels to verify catch and effort information. Based on the data available, the following estimates are provided for the year 2004:

Table 18 EEZ Catch and Value of Tuna and Tuna-like big pelagis, 2004

	Estimated Catch	Estimated Value of Catch*)
Longliner (mainly Asian countries)		
Total Fleet	900 – 18,000 t out of which 4,500-8,800 t tuna and billfish	US\$ 47.6 – 254.0 million
Per vessel per year	70t of tuna and billfish and 150 t of other species	US\$ 0.39 – 2.06 million
Tuna seiner (mainly EU)		
Total Fleet	26,000 – 32,800 t of tuna	US\$ 27.5 – 85.6 million
Per vessel per year	900 – 1,000 t	US\$ 0.67-2.09 million

(Source: Chopin 2005) *) based on average annual prices for tuna for the sashimi market and canning.

However, the data may underestimate actual catch, as some vessels reportedly are in breach of the license conditions by fishing in restricted areas, such as marine protection areas.

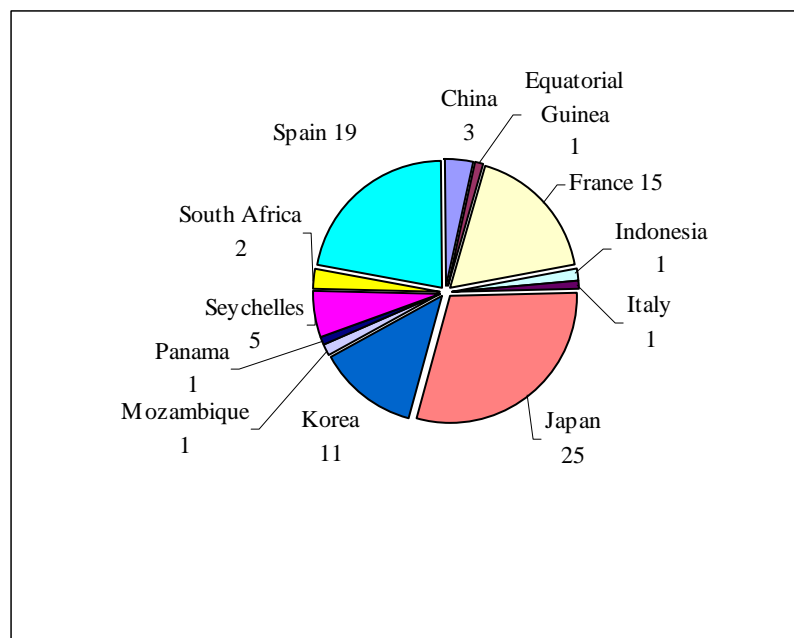
4.4 Revenue from Marine Fisheries

The greatest potential for increasing government revenue from fishery is in the licensing of vessels to fish in the EEZ. The FD started issuing licenses to foreign vessels in 1998, mainly to European tuna seiners and Asian longliners. The license period ranges from a month to one year. The cost of a license depend on its duration, but the following general rules apply:

- The annual license fee is set at US\$ 16,000;
- The registration fee is set at US\$ 2,000;
- A license can be issued for a period of 1 month, 3 months, 6 months or one year; and
- Where the license period is less than one year, the license fee is pro-rated but the registration fee remains fixed at US\$ 2,000.

Since licenses were introduced in 1998 the numbers of foreign vessels fishing Tuna and Tunalike big pelagis has risen rapidly. In 2004 the total number of registered vessels was 171 of which 41 were tuna seiners and 123 longliners. The mainland issued 85 licenses and Zanzibar 86 (mainly to longliners from the Far East).

Chart 30 EEZ licenses issued by mainland Tanzania in 2004

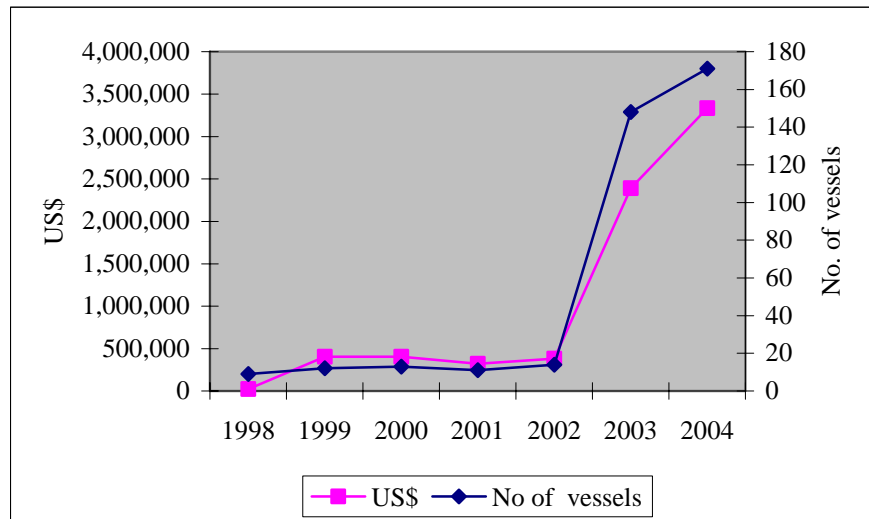


(Source: Fisheries Department)

Chart 30 above shows to which countries the licenses are issued. The revenue accrued from these licenses (combined for Mainland and Zanzibar) is shown in Chart 31 below. The significant increase from 2002 to 2003 can be explained

by two factors: a) increased demand as a result of an increase in the presence of Tunas in the Tanzania controlled EEZ and b) improved enforcement mechanisms, which have been strengthened in the framework of the MCS-SADC project.

Chart 31 Annual License Revenue and foreign vessels in Tanzanian EEZ



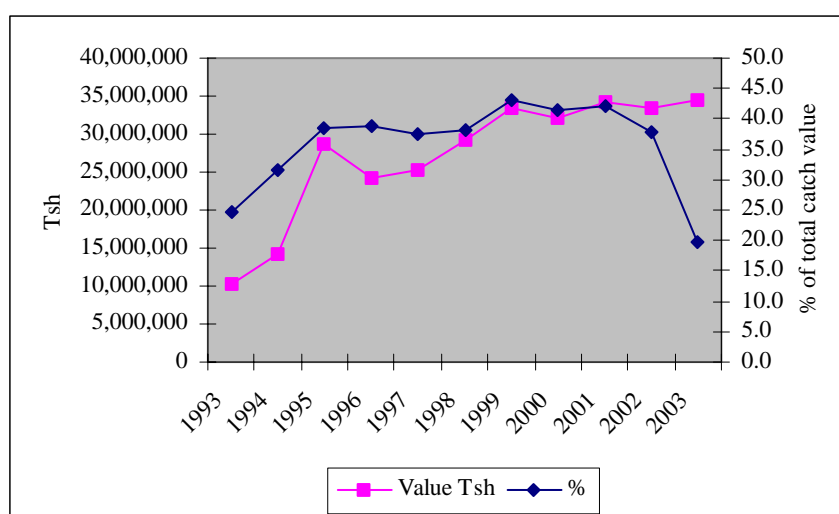
(Source: Fisheries Department)

Increased control and compliance in 2004 have increased the number of licenses and reduced illegal fleets. In 2004 the total revenue from license fees that accrued to the Tanzanian FD was US\$ 3.3 million (171 licenses @ US\$18,000). This is not even reflecting the total amount that the government could earn. Experts estimate that the real catch is most likely much higher than what has been assumed as a basis to set the license fees (between 200 and over 400 tons a day per boat). Notably, there is no catch based license or fee, and the vessels are allowed unlimited catch once they are in possession of a valid license.

In addition, the Government earned US\$ 300,000 in license fees from Tanzanian Flag Prawn Trawlers (there are 25 with a license fee of 16,000 US\$), which are not shown in Chart 31 above.

Although the above revenue figure is a considerable amount, it is low compared to the estimated value of the catch by foreign vessels in Tanzanian waters sold on foreign markets (see Table 16 in Section 4.3 above). Also, in the search of efficiency, substantial cost may be incurred, especially in monitoring and surveillance. In addition, in order to maintain a healthy resource base, substantial scientific research will be required and membership of IOTC should be considered. Taking these costs into consideration, the net revenue from EEZ Fisheries will be modest and certainly not sufficient to capture a resource rent to re-invest into the sector to ensure sustainable growth. Estimates on resource rent are provided in Section 4.6 below.

Chart 32 Revenue earned from Marine Water Catch in Tsh. and percent of total catch (incl. Freshwater)



(Source: URT, 2004c)

Chart 32 shows that the revenue from marine water catch increased significantly between 1993 and 1995, and has also, except minor drops in 1996 and 2000, increased in absolute terms until present day, albeit at lower rates.

Measured as a proportion to total revenue, revenue from freshwater also increased during the early 1990s and peaked to a level of roughly 40 percent in the 1990s, but has since dropped sharply to roughly 20 percent, following the previously mentioned boost in the freshwater Fisheries sector which led to a corresponding increase in revenue from freshwater catch by more than 150 percent²⁴ in 2003.

Revenue from Export royalties

In 2003 there were 25 vessels for prawn fishing, which generated the catch volume and export revenue listed in Table F, Annex 1. Prawns, fish maws and octopus are by far the largest income earners. The percentage of marine products on total exports of fish products is small but has been increasing in the time period considered.

4.5 Marine Resources and Poverty Reduction

Marine Fisheries have a significant importance for employment and income levels along the coastal regions in Tanzania.

Presently, one third of the national GDP is produced in the coastal areas (Ruitenbeek et al. 2005). This however is mainly due to the fact that some 75 percent of the country's industries are located on the coast, mainly in the Dar es Salaam area.

²⁴ From Tsh. 54,771,300 to 141,073,500

Poverty along coastal regions in Tanzania is widespread, on average 85 per cent of the sample population of a survey conducted for the “Blueprint 2050” study survives on less than a dollar a day. The average monthly per capita consumption expenditures in 2003 for the sample population of the same study was about US\$ 21. This is roughly two-thirds of the established poverty line of US\$ 30 (Ruitenbeek et al. 2005).

Table 19 below shows the GDP per capita for the five coast regions, the Human Development Index (HDI) and the Human Poverty Index (HPI). While Dar es Salaam is an exception and shown here for comparison, the other four coastal regions are among the middle and low ranked regions for both indicators, suggesting relatively high poverty levels.

Table 19 HDI and HPI for coastal regions²⁵

Indicator	Tanga	Pwani	Lindi	Mtwara	Dar es Salaam
GDP per capita 2002 in Tsh (current prices)	230,454	193,877	223,191	292,795	584,086
GDP contribution in percent	4.4	2.0	2.1	3.8	16.9
Human Development Index by Region	0.447	0.449	0.407	0.488	0.734
Human Poverty Index	40.7	44.9	47.2	36.8	21.4

(Source: NBS website and URT 2002, p. 57 ff)

Outside the urban centres, marine Fisheries are a vital source of employment and income as well as an important source of nutrition and alternative to expensive meat. Direct benefits of marine Fisheries resources to the local population are presently derived from artisanal Fisheries and fish by-catch from Prawn fishing, which is sold on the domestic market.

The household survey in fishing communities conducted through the ‘Blueprint 2050 study’ shows high levels of dependency in fishing communities on marine resources, in particular fish. As Table 20 below shows, among the resource based activities, fish is with 47.4 percent of all households the second largest source of household subsistence and employment after cassava farming which is undertaken by every second household (50.1 percent of the sample households).

²⁵ While a low value for HPI shows lower level of poverty, a high value of HDI show lower level of poverty. For computation of the two indices see URT 2002.

Table 20 Contribution of fish to household subsistence in coastal areas

Activity		Percentage of households engaged in activity (total sample size 749)
Marine fauna	fish	47.4
	crustaceans	15.6
	sea cucumbers	4.3
	mollusks	2.4
Seaweed farming		25.9
Farming - various Crops	Cassava	50.1
	bananas	32.7
	rice	27.5
Farming - Agroforestry	coconuts	14.7
Livestock keeping	poultry	12

(Source: Ruitenbeek et al (2005), p. 53, adjusted)

While commercial Fisheries, in particular in the EEZ, represent potential for economic growth, the impact on poverty reduction will depend on how the license revenue earned by the Government is translated into benefits for local people. The effect of Fisheries Agreements on poverty reduction will depend on the creation of economic ‘spin-offs’ and associated development activities. These are expected to be negligible as no fish is expected to be landed ashore and few supplies will be sourced from the country. It is for example unlikely that foreign vessels will employ Tanzanian nationals as crew in addition to what is stipulated in the Fisheries Agreements. If none such ‘spin-off’ effects are created, the net impact of commercial Fisheries on poverty reduction may be negative, provided that it competes with artisanal Fisheries over the same resource.

Although EEZ Fisheries and artisanal Fisheries cover different zones, foreign vessels sometimes transect from the EEZ into coastal zone. It will consequently be important to impose strict policy measures to protect the resource rights of the local population. Otherwise, poverty might be aggravated as a livelihood base is withdrawn while catch by foreign vessels, who can access the EEZ waters and have more efficient technology, increases.

4.6 Sustainability of Marine Fisheries

There are concerns about the sustainability of marine Fisheries. These originate from two kinds of illegal fishing:

Firstly, infractions by industrial fishing fleets which often transgress into territorial waters disrupting the livelihood of the artisanal fishery. These vessels are at times in the zoned areas of the marine protected areas as well, causing the destruction of globally significant marine biodiversity.

The second type of illegal fishing is related to dynamite fishery, which continues unabated, causing economic and ecological loss with negative impacts for tourism potential and waste of the fishery resource.

Recent reports from Muheza District in Tanga Region, suggests that dynamite fisheries remains a serious problem: After a significant fall in explosions to a level of three per month, allegedly as a result of Navy patrolling, the frequency has increased to 70 explosions in just three months following the cessation of patrolling by the Navy (*Daily News* 16 May 2005).

In 2004, Private Fisheries Agreements (PFAs) were the basis for all longliner and tuna seiner fishing operations in the Tanzanian EEZ. The PFAs specify the financial compensation and license conditions associated with access to the resource. There are significant deficiencies in PFAs regarding responsible management of the Fisheries. Specifically the PFAs for these fleets have not

- Set limits on the catches that can be made by individual vessels or fleets;
- Generated the quantity and quality of Fisheries information required to reliably assess the catch and effort of foreign fleets;
- Provided reliable estimates of the value of fish removals from the EEZ;
- Achieved a measurable level of compliance of the fishing fleets or deterred IUU fishing activity;
- Enhanced the coastal state's understanding of the EEZ pelagic Fisheries nor fostered the development of a Tanzanian capacity to contribute to management of these Fisheries in a rational manner;
- Contributed to establishing an accurate EEZ catch history that could be used to justify future resource sharing formulas in the RFOs; and
- Provided the basis for a cooperative partnership between coastal and fishing states wherein the financial benefits are disbursed equitably between the relevant parties and the resource is exploited in a sustainable manner.

With regard to the artisanal Fisheries, which are operating at the limits of the traditional technologies, there is evidence that catches are decreasing across the range of reef and inshore species. The destruction of habitats by dynamite fishing and poisoning causes concern for the future of these Fisheries. Artisanal Fisheries are socially and economically important activities for the coastal communities, but the systems put in place by the Authorities for monitoring the conservation of these areas appear inadequate.

From the fragmentary data available, it seems that coastal and prawn Fisheries are surpassing MSY levels. Increasing effort would appear to be impracticable without causing possible terminal damage to the stocks. The EEZ fishery is presently an unknown from a scientific standpoint, and highly seasonable in nature.

In such a scenario, sustainable management of the Fisheries resources is a *sine qua non* for sustaining or developing future economic growth in the sector. This would include research to establish stocks, regulation, control, monitoring and

surveillance. The resource rent generated by the sector would need to be high enough to allow re-investment into its protection against over-exploitation.

Resource rents

Estimates of resource rents from marine Fisheries computed from license fees as percentage of value of revenue are provided by Chopin (2005). Table D and Table E in Annex 1 show the detailed calculation of resource rent for longliner and tuna seiner operations.

For longliners, estimates are that the gross resource rent is approximately 2.2 percent. This is slightly less than half of what might be expected in a western industrial fishery. Calculations for tuna seiners vary somewhat more depending on different catch scenarios. See Table D and Table E in Annex 1 for detailed estimates of resource rents.

In summary, while the current license fee arrangements of PFAs in the EEZ generate a not insignificant amount of revenue, the level is too low to result in a reasonable return to capture resource rent (>5 to 7 percent of gross revenue) to the coastal state. The PFAs as currently offered to foreign fishing enterprises are hence considered untenable.

4.7 Policy framework for Marine Fisheries

Marine Fisheries are governed by national legislation as well as international conventions. The international conventions include the UN Convention on the Law of the Sea (UNCLOS) and the related Fish Stock Agreements. These impose roles and responsibilities on the coastal state (Tanzania) as well as on the Distant Water Fishing Nations (DWFN). Therefore, illegal activities in the marine context include illegal activities of vessels of DWFN which contravene national legislation and international obligations.

The 1970 Fisheries Act provides the basis for the national policy framework. It was reviewed in 2002 with the aim to “ensure promotion of sustainable Fisheries, ensuring adhering to regulations and conservation of resources” (URT, 2004c: 152). The Act is currently re-written and expected to be back in force by 2005.

On the mainland, 80 percent of the fishing effort is freshwater based and lake Fisheries (and export) dominate the policy agenda with marine Fisheries somewhat neglected. For example the Fisheries master plan (funded by JICA), is heavily weighted towards the lakes and rivers but there is a marine component (10 percent in real terms), which is designed to fit traditional craft with donated outboard motors and better net technology. The effect of these measures on an already fragile stock situation along the coast has not been assessed.

It should be acknowledged, however, that there are projects in the pipeline, which aim to deal more comprehensively with marine fisheries: An example is the World Bank/ Global Environmental Facility (GEF) supported ‘ Marine and Coastal Environmental Management Project’ (MACEMP) designed to

strengthen governance of the EEZ and the near-shore marine environment as well as supporting livelihoods in the coastal communities.

The fact that Fisheries is administered by two separate Fisheries Departments (Mainland and Zanzibar) increases transaction cost and the need for co-ordination and exchange of information. There is duplication of effort and neither entity can afford to carry out surveillance unilaterally.

The 1998 Deep Sea Fishing Authority Act by contrast has status as a United Republic Law and so applies equally to both Mainland and Zanzibar. The implementation of the Act is however stalled, due to reservations from the Zanzibar Government. An important vehicle for the management of the EEZ is therefore missing. Dialogue is however ongoing between the two sides of the Union with a view to establish a common governance regime for EEZ.

Efforts to regulate resource access in EEZ Fisheries are undertaken by each FD unilaterally by issuing licenses. However, enforcement is too lax and the fiscal regime inadequate to enable resource rent capture. There are no onboard observers on these vessels although it is a condition of license. Moreover, there are no enforcement of catch reporting or vessel arrival or departure. The license agreements do not result in reasonable amount of catch and effort data flowing from the fishing state to the coastal state to allow it to perform its responsibilities for managing the Fisheries taking place in its EEZ. The existing licenses have failed to result in either fleet submitting comprehensive reports on their fishing activities within the EEZ.

There are no catch limits attached to the licenses, allowing vessels to take as much fish as is available with scant information being returned to the coastal state. There is anecdotal information about irregularities in the Zanzibar licensing system. Supposedly some vessels are being registered through Muscat, Oman with the fees escaping the Zanzibar authorities.

A new Fisheries agreement (FA) is currently being negotiated between Tanzania and the EU. The FA is a vehicle to regulate the sector and provides a revenue source to GoT. However, currently the average catch taken as a basis for the negotiations has been undervalued and negotiations are difficult in a scenario where for EEZ pelagic fishery, there is no baseline study of stocks, no figures for Maximum Sustainable Yield or Total Allowable Catch.

Monitoring, Control and Surveillance

Presently, Tanzania's Monitoring Control and Surveillance (MCS) capacity is dependent on the MCS SADC project. This is a regional programme that aims to build national and regional capacity in marine fishery monitoring, control and surveillance in SADC countries.

Prior to 2002, fewer than 13 vessels were licensed to fishing in the Tanzanian EEZ and it was not considered necessary or cost effective. However, with the increasing effort over the last two years, the need for MCS has become apparent. Under the SADC programme, approximately 6 hours flying time per week

is required to search most of the EEZ. With the support of this project it was possible to apprehend nine suspects and three ships in 2003 through air surveillance.

In 2003 a total of 26 government patrols were conducted along the coastal strip and in the EEZ zone (URT, 2004c). This is a reduction compared to 2002, when 135 patrols were conducted and 53 suspects were apprehended for fishing without license and undertaking dynamite fishing. In 2001, the FD reported that 90 rounds of patrol were undertaken and about 50 illegal fishermen were caught with 4,130 mesh fishnets, 250 purse seines and 600 kg of fish. Likewise, efforts to strengthen monitoring of commercial fishing activities were undertaken, whereby 27 observers were assigned to monitor fishing activities carried out by large fishing companies.

Although some MSC activities are taking place, efforts are patchy. Effective MCS is difficult for the coastal state as long as the fishing state is not providing adequate quantity and quality of data. Vessels need to provide more comprehensive and timely information on all fishing activities.

4.8 Recommendations

Based on the analysis provided in the previous Sections, some of the key recommendations include:

- Putting in place a regulatory framework and sound governance regime for marine Fisheries, comprising the EEZ and near-shore Fisheries;
- Strengthen capacity for MCS to address the illegal Fisheries;
- Punitive measures that are real deterrents to control unsustainable fishing practices, whether in EEZ or nearshore Fisheries;
- Safeguard rights and livelihoods for coastal communities, through for example demarcation of a Community Territorial Sea;
- Fisheries Sector review to assess the economic and social, ecological and fiscal perspectives, policy options etc. To inform policy makers and influence the strengthening of the regulatory framework.
- Capacity building for research, MCS and assessing economic and fiscal aspects.
- The Fisheries Agreement should support the scientific effort of establishing precisely what the EEZ Fishery will support. 'Spin-off' effects through related on-shore development could also be promoted.
- Sponsoring some form of EEZ inspectorate in patrol terms could help to build up a much more accurate picture of what is available in the sector.

- Operational feedback from sea inspections is a vital element of any monitoring effort.
- Investigate the potential for exports of (various) marine products and value adding of these products in order to promote growth in the coastal zone.

Although some of the above recommendations are being addressed by the ongoing SADC Regional MCS Programme, or will be addressed by the proposed MACEMP project, project activities are of limited duration and it will be important that these recommendations are institutionalised.

Annexes

Annex 1. Background data

Table A. Forest distribution by regions

Name of Region	Forest estate in 1000 ha
<u>Group 1: ha > 400.000</u> 1. Tabora 2. Rukwa 3. Lindi	around 540 around 500 around 450
<u>Group 2: 200 000 < ha > 300.000</u> 4. Arusha 5. Coast 6. Dodoma	around 250 around 250 around 230
<u>Group 3: 150.000 < ha > 200.000</u> 7. Tanga 8. Morogoro 9. Kigoma	around 200 around 190
<u>Group 4: 100.000 < ha > 150.000</u> 10. Mbeya 11. Singida 12. Shinyanga	around 120 around 120 around 110
<u>Group 5: 50.000 < ha > 100.000</u> 13. Ruvuma 14. Mtwara 15. Iringa	around 90 around 90 around 80
<u>Group 6: ha < 50.000</u> 16. Kagera 17. Kilimanjaro 18. Mwanza 19. DSM	around 30 around 20 around 20 0

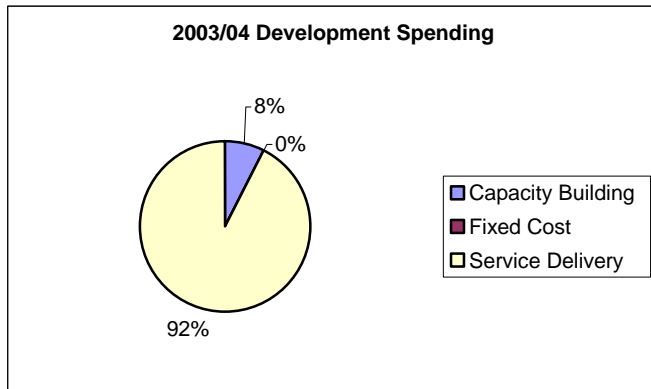
(Source: Author, based on Forestry on Figures 2002).

Table B. Actual annual expenditure of FBD, 2001/02 – 2003/04

Year	Amount in 1000 Tsh and % by expenditure Type					
	Recurrent	%	Development	%	Total	%
2003/04	7,633,912	83.448	1,514,220	16.552	9,148,132	100
2002/03	4,897,656	70.880	2,012,171	29.120	6,909,827	100
2001/02	4,300,955	96.743	144,800	3.257	4,445,755	100

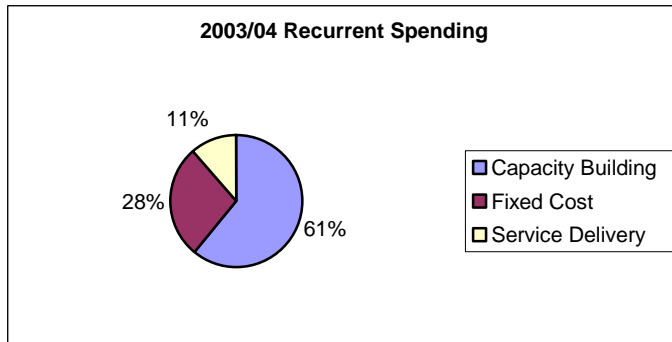
(Source: Author based on MNRT 2004)

Chart A Forestry: Development Spending, 2003/04



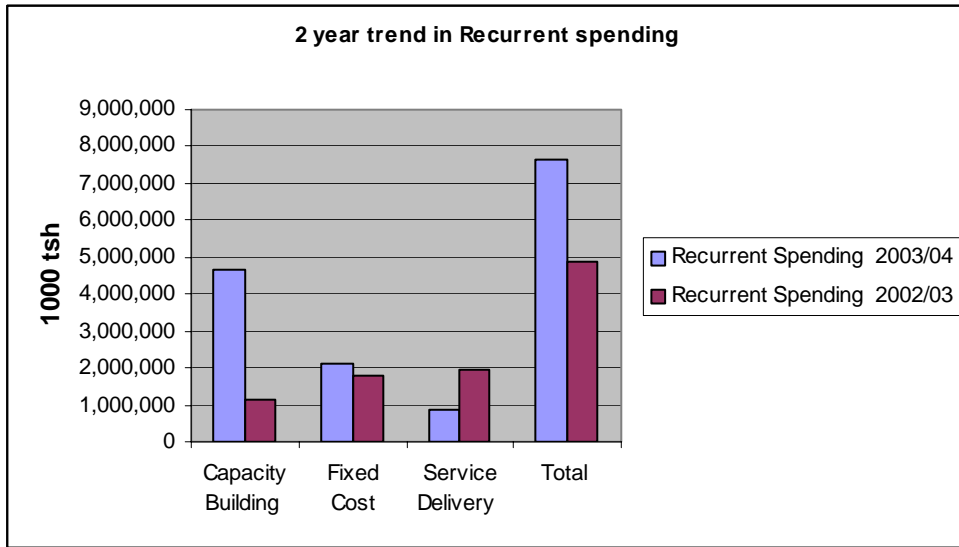
(Source: MNRT, 2004)

Chart B Forestry: Recurrent spending, 2003/04



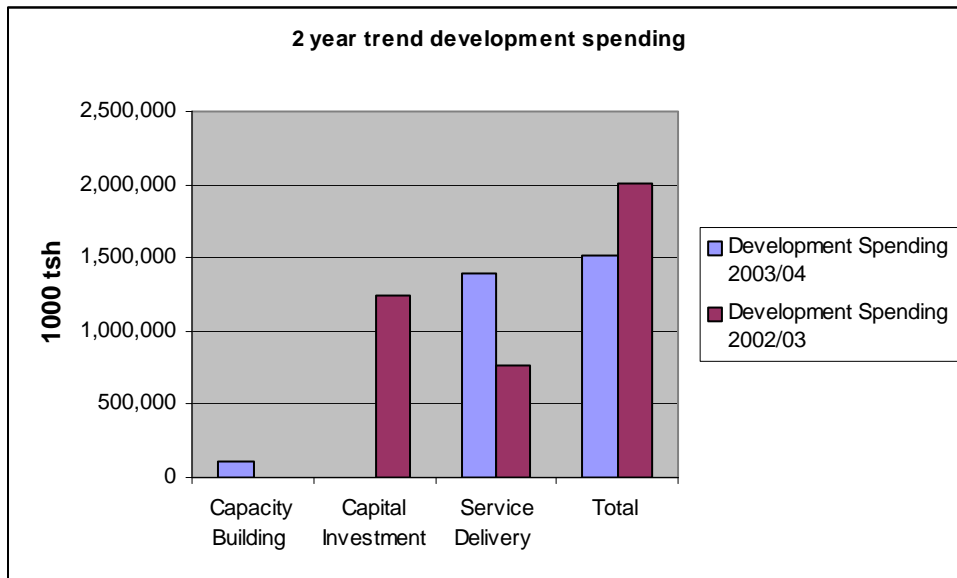
(Source: MNRT, 2004)

Chart C Allocation of recurrent budget, Forestry, 2002/03 -2003/04



(Source: MNRT, 2004)

Chart D Allocation of development budget, 2002/03 – 2003/04



(Source: MNRT, 2004)

Table C. Volume and Value of Exports from the Forestry Sector, 1998 to 2003

Product	1998/99		1999/2000		2000/2001		2001/02		2002/2003	
	Vol./Weight	Value US \$(000)	Vol./Weight	Value US \$(000)	Vol./Weight	Value US \$(000)	Vol./Weight	Value US \$(000)	Vol./Weight	Value US \$(000)
Logs - Teak Paurosa(M ³)	3897.0	718.0	1956.7	585.6	1724.4	453.4	934.6	299.0	-	-
Timber (M ³)	8066.0	684.5	103.7	710.0	511.0	15.5	1230.0	271.0	4122.9	415.0
Ebony (M ³)	122.0	1193.2	848.2	1355.5	62.8	294.3	38.5	368.4	57.8	528.7
Floor boards (M ³)	68.0	128.4	6546.2	87.1	157.2	114.1	66.0	46.2	486.4	190.9
Wood carvings(Pcs.)	-	-	258494.0	1210.7	83746.0	163.5	56254.0	114.5	165696.0	1201.0
Other products	-	-	21.2	9.2	43.0	4.8	-	-	-	-
Tree seeds (Kg)	-	-	-	-	69.0	18.6	80.5	24.2	-	-
Beeswax (Tons)	-	-	-	2405.6	431.0	1044.6	109.0	306.7	600.0	1800.0
Honey (Tons)	-	-	-	167.7	12.0	5.5	1.8	2.4	12.0	12.0
Total		2724.1		6531.4		2114.3		1432.5		4147.6

(Source NBS, Economic Survey 2003)

Table D. Estimation of Gross Resource Rent for Tuna Seiners

Gear type	tuna seiner				
	8,000	16,000	24,000	36,000	48,000
Fleet catch (t)	8,000	16,000	24,000	36,000	48,000
No. vessels buying licenses	39	39	39	39	39
No vessels fishing in the EEZ	39	39	39	39	39
Days spent in the EEZ	25	25	25	50	50
Nominal fishing effort	975	975	975	1950	1950
Vessel Catch per day (t)	8.2	16.4	24.6	18.5	24.6
License fee (US\$ / t / yr)	0	0	0	0	0
License fee (US\$ / t / yr)	17,550	17,550	17,550	17,550	17,550
Registration fees USD	1,950	1,950	1,950	1,950	1,950
Compensation	0	0	0	0	0
License fee paid (US\$)	760,500	760,500	760,500	760,500	760,500
Gross Fee per tonne (US\$/ t)	95.063	47.531	31.688	21.125	15.844
Revenue from seining @ 910 (US\$/t)	7,280,000	14,560,000	2,184,000	3,315,000	43,680,000
Revenue from seining @ 1040 (US\$/t)	8,320,000	16,640,000	24,960,000	37,440,000	49,920,000
Revenue from seining @ 1,170 (US\$/t)	9,360,000	18,720,000	28,080,000	42,120,000	56,160,000
License as % of Value @ 1,040 (US\$/t)	9.1%	4.6%	3.0%	2.0%	1.5%

(Source: Chopin, 2005)

Interpretation: The gross resource rent ranges from 9.1 percent for 8,000t catch to 1.5 percent for 48,000 tons catch. The 5 percent gross resource rent is reached when the catch is limited to 14,300 tons. It can also be reached by increasing the license fee to US\$ 42,000 and allowing a total catch of 28,000 tons.

Table E. Estimate of Gross Resources Rent for Longliners

Fleet catch	9225	18450
No. vessels buying licenses	123	123
Days spent in the EEZ	50	100
Nominal fishing effort	6150	12300
Vessel Catch per day t (tunas)	0.5	0.5
Vessel Catch per day t (others)	1.0	1.0
License fee (US\$/tonne)	0	0
License fee (US\$)	1775	1775
Registration fees (US\$)	195	195
Compensation	0	0
License fee paid	2,878,200	2,878,200
Gross Fee per tonne (US\$/tonne)	312	156
Revenue from fishing (@ 9,750 US\$ /t)	89,943,750	179,887,500
Revenue from seining (@ 11,050 US\$ /t)	101,936,250	203,872,500
Revenue from seining (@ 12,090 US\$/t)	111,530,250	223,060,500
License as % of value (@ 9,750 US\$/t)	2.8%	1.4%

(Source: Chopin, 2005)

Interpretation: To reach a 5 percent gross resource rent, the catch would either have to be limited to 4000 tons or the license fee increased to US\$ 42,000 allowing a total catch of 9000 tons.

Table F.Exports of Fish Products, Marine Resources, 1998-200

Marine Product	1998		1999		2000		2001		2002		2003	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Kg	US \$	Kg	US \$	Kg	US \$	Kg	US \$	Kg	US \$	Kg	US \$
Prawns	223,639	390,976	1,154,181	5,127,642	1,218,181	5,644,876	1,175,095	5,850,876	1,248,008	6,618,047	1,672,018	5,979,557
Lobsters	25,999	255,146	161,962	818,512	63,093	365,455	98,793	804,425	119,261	1,189,357	146,286	1,443,442
Live Lobsters	..	..	..	..	14,799	186,581	..	....	63,589	852,366	165,580	2,050,997
Crabs	17,882	99,295	4,819	24,697	29,880	144,373	51,719	294,864	487,950	182,227	40,139	118,736
Live Crabs	..	..	..	..	67,261	134,623	..	..	128,242	806,503	168,002	925,586
Octopus	595,783	1,055,637	574,522	1,357,381	492,763	1,177,630	275,286	667,788	355,310	1,023,762	1,603,456	5,044,536
Squids	12,567	30,494	35,005	107,572	26,750	66,194	55,164	282,993	59,359	182,523.61	298,398	1,239,705
Sea shells	154,893	29,859	250,006	85,539	345,164	105,501	433,643	120,345	253,189	113,763	895,748	380,010
Beche de mer	872,926	21,722	93,439	255,514	124,478	463,883	49,947	185,483	6,800	5,409	12,301	40,330
Fish maws	..	..	..	..	..	..	..	..	1,081,123	2,919,410	1,353,604	5,774,464
Fish offals	199,974	389,169	90,050	181,575	1,171,660	717,666	120,804	286,497	..	..	123,900	172,666
Shark jaws	254	4,274	..	..	..	..	..	..	..	..	..	..
Marine Fish Fillet	10,321	24,248	..	..	..	..	..	..	..	..	..	..
Sea shells	..	..	..	..	5228 pcs	5,680	..	..	253,189	113,736	..	..
Sub-Total	2,114,238	2,300,820	2,363,984	7,958,430	3,554,028	9,012,463	2,260,451	8,493,272	4,056,020	13,824,580	6,479,432	23,170,030
% of total fisheries export	4.8	3.2	8.2	12.9	8.9	14.9	5.4	8.9	13.1	15.2	16.1	18.3

(Source: Economic Surveys 2001-2003)

Annex 2. References

- Ashley, C., Mdoe, N., and Reynolds, L. (2002): Rethinking Wildlife for Livelihoods and Diversification in Rural Tanzania: A Case Study from Northern Selous. LADDER Working paper No. 15, Norwich, University of East Anglia.
- Aku O'king'ati, Monela G.C. & Nyella H. (2000). *Contribution of Kilimanjaro Regional Forest Sector to the Economy of Tanzania (1990-1998)*.
- Barnett, R. (ed.) 2000: Food for Thought: The Utilization of Wild Meat in Eastern and Southern Africa. Nairobi, TRAFFIC East/Southern Africa.
- Buys, Hans; Moshi, Izzet and Mariki. (1996) *Long-term Financing of Forestry*, Report prepared for FCMP.
- Chatterjee & Mushi (1994) *Study on improvement and monitoring royalty collection systems*, Report no.1., Evaluation, reformulation and design of recommendations of the Silviconsult study.
- Chopin, F. (2005): Review and assessment of the DRAFT United Republic of Tanzania – European Community Fisheries Agreement. Draft. Restricted Circulation.
- DFID (2003): odi Natural Resource Perspectives, Just Wildlife? Or a Source of local Development? Number 85, April 2003.
- DPG (2005): Development Partners Group Tanzania, Brief on Issues Pertaining to Tourist Hunting, April 2005.
- Emmanuel, Juma (2001). *Tourism in Mikumi National Park (MNRP) Morogoro, Tanzania*. Special Project.
- Eustack, Mtui Boniface (2004). *Assessment of the contribution of agroforestry to poverty alleviation in Lushoto District*. M.Sc. thesis.
- Gillingham, S. (1998): Giving Wildlife Value: A Case Study of Community Wildlife Management Around Selous Game Reserve, Tanzania. Dissertation submitted to the University College of Cambridge.
- Homewood, K., Lambin, E.F., Coast, E., Kariuki et al (2001): Long Term Changes in Serengeti-Mara Wildbeest and Land Cover: Pastoralism, Population or Policies? PNAS 98 (22).
- Idda, Makawia Amani (2003). *Contribution of Agroforestry to human nutrition. A case of Arusha Region*. M.Sc. thesis.
- Issango, Juma (2001). *Honey production and sales along Dar es Salaam – Morogoro High way*. Special project.
- IUCN (2000): The effectiveness of Trade Measures Contained in the convention on international trade in endangered species of wild fauna and flora, UNEP Economics, Trade and Environment Unit.
- Kaduvage, B. L. (2000) *Study on the present status and future prospects for mechanical and chemical industries in Tanzania*, Project report.
- Kallonga, Emmanuel; Rodgers, Alan; Nelson, Fred; Ndoinyo, Yannick and Rugemeleza, Nshala (2003) *Reforming Environmental Governance in Tanzania: Natural Resource Management and the Rural Economy*, non-commissioned paper presented at the Inaugural Tanzania Biennial Development Forum, 24-25th April 2003, Dar es Salaam.

- Kagya, M. A. (2004): *Gums and Resins production and marketing in Tanzania. FAO project report, Strengthening the Production and Quality Control of Gums and Resins in Africa*, September 2004.
- Kagya, Monica Andrea Nkunja (2002). *Contribution of non-wood forest products to household economy and welfare of women in Meatu District, Shinyanga Region, Tanzania*. M.Sc. thesis.
- Khamis Fatma Ali (2003). *Financial Analysis of Ecotourism industry. A case study of Jozan Chwaka Bay conservation area, Zanzibar*. Special Project.
- Kobb, Daniel (1999) *Forestry royalties in Tanga Region: Paper vs. Reality*, Paper prepared for East Usambara Catchment Forestry Project, Natural Resources Management and Buffer Zone Development Program, Tanga Coastal Zone.
- Koppers, B. (1998) *End of Assignment Report*, Danagro.
- Kowero (1990) *Some Aspects of Tanzanian Forest Royalties*, TFAP, Working Paper no.26, FBD.
- Kowero (1991) “Management and utilisation of forest estate in Tanzania: some policy issues”, *Journal of World Forest Resource Management*, vol.8. (10), pp.15-27.
- KRCD (2005): Establishment of a socio-economic monitoring system for WMAs. Mission report. Unpublished.
- Luoga, E.J.; Witkowski, E.T.F. and Balkwill, K. (2000). “Economics of charcoal production in Miombo woodland of eastern Tanzania: some hidden costs associated with commercialization of the resources”. *Ecol.Econ.*35 (2000) 243-257.
- Lusambo, L.P. (2002). *Socio-Economic Analysis of Land use Factors causing Degradation and Deforestation of Miombo woodlands. Case study of Kilosa District, Tanzania*. M.Sc. Thesis.
- Lyimo Jacobo Ophoro (2002). *Production economics of Transmission poles in Tanzania*. Special project.
- Mabugu, R. and Mugoya, P. (2001): Financing, Revenue sharing and Taxation issues in Wildlife Management Areas. Report prepared for USAID, October 2001.
- Makundi, W.R. and Aku O’king’ati (1991). *Carbon flows and economic evaluation of mitigation options in Tanzania’s forest sector*.
- Malimbwi, R.E.; S.Misana, G.C. Monela, G. Jambiya & E. Zahabu (2000). *Socio-economics of charcoal extraction to the forest resources of Tanzania: The case study of Kitulangalo Area, Tanzania*.
- Mkanta & Chimtembo (2002) *Towards Natural Resource Accounting in Tanzania, A study on the Contribution of Natural Forests to National Income*, CEEPA Discussion Paper Series.
- MNRT (2001a). *National Forest Programme in Tanzania (2001-2010)*, Ministry of Natural Resources and Tourism . Forestry and Beekeeping Division.
- MNRT (2001b). *National Beekeeping Programme (2001-2010)*, Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division.
- MNRT (2002) *Forestry in Figures*, Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division.
- MNRT (2004) *MTEF Budget of the Ministry of Natural Resources and Tourism, Vote 69*
- Monela, G.C., S.A.O. Chamshama, R. Mwaipopo and D.M. Gamassa (2004). *A study on the social, economic, and environmental impacts of forest landscape restoration in Shinyanga Region*. Report. MNRT & IUCN.

- Mushi, J.A. (1999) *Evaluation of Revenue Collection and Monitoring Systems in Singida, Tabora, Shinyanga, and Mwanza Regions*, Report prepared for Forest Resources Management Project (FRMP), IDA Credit no. 2335-TA.
- Mwanahija, Salehe Shalli (2003). *Contribution of agroforestry Vs Rural households food insecurity in Kibaha District, Coast Region, Tanzania*. M.Sc. thesis.
- Ngaga Y.M, Chamshama S.A.O. & Monela G.C. (2003). *Resource Economic Analysis of Catchment Forest Reserves in Tanzania*. Report.
- Ngaga, Y. M. (1990). Present consumption and future requirement of sawn wood in two urban centers of Tanzania. M.Sc. thesis.
- Ngaga, Y. M. (1998). *Analysis of Production and trade in Forest products of Tanzania*. Doctoral Scientiarium Thesis. Department of Forest Sciences, Agricultural University of Norway.
- Noah Edward (2002). *Impact of production and consumption of wood fuel in Miombo woodlands of Makanya Division, in Kilimanjaro Region*. Special project.
- Noel, Maeda (2001). *Statistics of game hunting and revenues; and its implication to the economy of Tanzania 1997-2000*. Special project.
- Norconsult (2002) *The True Cost of Charcoal*, Norconsult Ltd., May 2002.
- Paullo, Teddy (2002). *Market survey and economic values of useful edible mushrooms consumed in Iringa Municipal*. Special Project.
- Pearce (1991)
- Philbert, Michael (2002). *Impact of tourism on employment. A case study of Kilimanjaro National Park (KINAPA)*. Special project.
- Robert, Modest (2003). *Economic potential of trophy export in Tanzania*. Special project.
- Roe, D., Mulliken, T.; Milledge, S., Mremi, J., Mosha, S. and Grieg-Gran, M. (2002): Making a killing or making a living? Wildlife trade, trade controls and rural livelihoods, Biodiversity and Livelihoods Issues No. 6, Traffic, IIED.
- Rutenge, Catherine (2004). *Assessment of the influences of live small animals trade in Arusha Region*. Special Project.
- Ruitenbeck, J.; Hewawasam I.; Ngoile, M. eds. (2005): *Blueprint 2050, Sustaining the Marine Environment in Mainland Tanzania and Zanzibar*, The World Bank.
- Salmi and Monela (2000) *Study on Financing in Forestry, Formulation of National Forest Programme in Tanzania*, Final Report by Salmi and Monela, Dar es Salaam, November 2000 for Ministry of Natural Resources and Tourism (MNRT), Forestry and Beekeeping Division.
- Sathaye, J. & W.R.Makundi (1995). *Biomass and Bio-energy; special issue forestry and climate change*. Special issue.
- Sekandende, A.N. (2001). *Economic benefits of wildlife-based tourism. A case study of Tarangile National Park*. Special project.
- Severin, Ansbert (2001). *The economic implication of tourism towards the economy of Tanzania*. Special project.
- Silviconsult (1991) *Forest revenue collection in Tanzania*. FBD, World Bank and ODA.
- Skage and Naess (1994) *Pitsawing and sustainable forest management, a case study of ecological and social considerations from Morogoro District*. MSc Thesis in Forestry, Dept. of Forestry, AUN.

- TANAPA (1999): Review of Efficiency and Effectiveness, Draft Report of 6 December 1999, For internal review.
- TANAPA (no date): Maximizing Revenues in Tanzania National Parks: Towards a better understanding of park choice and nature tourism in Tanzania.
- TaTEDO (2003). *Scaling-up Dissemination, Partnership and Networking for Increased uptake and use of Sustainable Energy Technologies*. Annual Report 2002/2003.
- Theostina, Anthony Lema (2003). The role of NTFPs in household food security and women income in Morogoro rural. Special Project.
- TIC (2001)
- Turpie, J.K. (2000): *The use and value of natural resources of the Rufiji floodplain and delta, Rufiji district, Tanzania*. Rufiji Environmental Management Project, Dar es Salaam, Technical Report No. 17
- URT (1997) *Ruvuma Region Socio-economic Profile*. Dar es Salaam, Tanzania. pp 1-57, United Republic of Tanzania.
- URT (2002) *Poverty and Human Development Report 2002*, United Republic of Tanzania.
- URT (2004a) *Budgetary Speech (2004/2005) by the Minister for Natural Resources and Tourism*, United Republic of Tanzania.
- URT (2004b) *Public Expenditure Review of Environment, Financial Year 2004*. United Republic of Tanzania.
- URT (2004c), *Economic Survey for 2003*, Planning and Privatisation Commission, Dar es Salaam, Tanzania.
- Utz, R. (2005). *Tanzania, Recent Growth Performance and Prospects*.
- Walsh, M.T (2000): The development of community wildlife management in Tanzania, Lessons Learned from the Ruaha Ecosystem. Paper presented to the conference on African Wildlife Management in the New Millenium College of African Wildlife Management, Mweka, Tanzania, 13-15 December 2000.