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THE UNITED REPUBLIC OF TANZANIA

ANNEX B

COUNTRY ENVIRONMENT PROFILE (CEP)

UNITED REPUBLIC OF TANZANIA

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Consortium

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TABLE OF CONTENTS

List of Figures

List of Tables

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Abbreviations

CBD	Convention on Biological Diversity
CEP	Country Environment Profile
CSP	Country Strategy Paper
DDP	District Development Plan
DOE	Division of Environment
DPG	Development Partners Group
EAC	East African Community
EC	European Commission
EDF	European Development Fund
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EWG	Environment Working Group
GBS	General Budget Support
GDP	Gross Domestic Products
GEF	Global Environment Facility
GNP	Gross National Products
GOT	Government of Tanzania
JAS	Joint Assistant Strategy
LGA	Local Government Authority
MDGs	Millennium Development Goals
MKUKUTA	NSGRP in Swahili
MNRT	Ministry of Natural Resources & Tourism
MTEF	Medium Term Expenditure Framework
NEMC	National Environment Management Council
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NFP	National Forest Programme
NIP	National Indicative Programme
NSGRP	National Strategy for Growth and Reduction of Poverty
PO-RALG	President's Office, Regional Administration and Local Government
PRSP	Poverty Reduction Strategy Paper
PSRP	Public Service Reform Programme
RDS	Rural Development Strategy
SEA	Strategic Environment Assessment
SOER	State of the Environment Report
TANROADS	Tanzania National Roads Agency
TAS	Tanzania Assistance Strategy
TOR	Terms of Reference
VPO	Vice Presidents' Office

1. Summary

This Country Environment Profile (CEP) is a basic reference document presenting an overview of the state of the environment and the most important environmental issues facing Tanzania[1]. It also proposes solutions that address the underlying causes of environmental quality and natural resources degradation in the country. The study was initiated by and carried out on behalf of the European Commission Delegation in Tanzania and the Government of Tanzania (GOT) through the Division of the Environment of the Vice-Presidents Office (VPO-DOE). The study was conducted between November 2005 and February 2006.

One of the objectives of this CEP is to identify and assess environmental issues to be considered during the preparation of the 10th EDF - Country Strategy Paper and National Indicative Programme for the period 2008 – 2013. The CEP also provides priorities for EU cooperation from an environmental perspective relating to programming requirements. The CEP also aims to assist EC co-operation strategies to systematically integrate environmental considerations into the focal sectors and co-operation objectives/strategies, and also to establish the necessary safeguards for all cooperation activities undertaken in the country.

Tanzania is one of the world's top twenty biodiverse countries and contains one of the biodiversity hotspots of the world: the Eastern Arc Mountains. Tanzania is also one of the few countries that has a high proportion of its land under protection (over 20% - almost 200,000 sq kms). Tanzania's protected areas network consists of National Parks (12); Game Reserves (31); Conservation Areas (1); Forest Nature Reserves (543); Biosphere Reserves (1); World Heritage Sites (3); and Game Controlled Areas (43). Landscapes includes savannah supporting one of the largest migrations in world, Africa's highest mountain, ancient forests, wetlands, mangroves & coral reefs.

The **environmental policy, legislative and institutional framework** for environmental management in the country is underpinned by Tanzania's Environment Policy (1997) and supported by the Environmental Management Act (EMA - 2005). Steps are now being taken to assist Tanzania implement EMA and set up adequate enforcement and inspection capabilities. Tanzania has made progress in the coordination and implementation of the international environmental agreements and conventions. Particular areas of concern remain in identifying ways in which Tanzania can promote the obligations of the Climate Change and Biodiversity Conventions.
The study raised the following environmental issues:

- ***Land Degradation*** is already a serious problem in Tanzania and aggravated by natural disasters such as droughts, floods and cyclones.
- ***Vulnerability to Natural Hazards*** One of the main challenges at the moment is the continuous drought in the country and certain areas facing reduced river flow rates which have direct implications for electricity and power production in the country as well as significant health and livelihood impacts.
- ***Bio-energy*** is the main source of fuel for 90% of the country's population (both rural and urban) and accounts for 93% of the energy consumption in the country. The long-term prospects for sustained supply of firewood and charcoal as a source of energy are threatened by the visible and worsening problems of deforestation and desertification in many parts of the country.
- ***Water Management*** is a critical issue. In most regions in Tanzania water is relatively scarce. Both in urban and rural areas conflicts of interest between different uses (agriculture, livestock, domestic, industry) are increasingly common. Supplying water to urban and rural areas and thus water management in general, will be one of the key challenges in the near and long term. Where

[1] The report does not cover Zanzibar as there was recently a State of Environment report (SOER) prepared for this part of the country.

water supply is adequate in quantitative terms, the quality of the water is in serious decline - although the level of industrialisation in Tanzania is relatively low, untreated industrial wastes cause significant levels of localised water pollution. Groundwater potential varies from one locality to another as does its development. There is no systematic monitoring of this resource in the whole country.

- ***The Coast and Marine Environments*** is also under threat. Signs of environmental degradation as well as decline in natural biodiversity are becoming obvious in several parts of Tanzania's coast and marine environments. This is attributed to the combination of poverty, rapid population growth, as well as increasing land-based activities and sources of pollution such as industrial and agricultural activities. From its relative control in the 1990s, reports of dynamite fishing are increasing significantly.

'Brown' environmental issues included:

- ***Unplanned Settlements:*** Tanzania's urban centres are developing at an unprecedented rate, with corresponding increasing levels of urban dwellings, industrialization and resulting pollution. In Dar es Salaam, it is estimated that there are 55 major unplanned settlements accommodating about 70% of the city's population (approx 2-3million people).
- ***Sewerage and Sanitation/Health:*** Most urban areas do not have sewerage systems and therefore pollution from sewage is a problem as there is inadequate collection and treatment. 80% of Dar's residents are served by on-site sanitation with severe problems of overflowing particularly during the rainy seasons.
- ***Solid Waste Management:*** Only small percentages of the generated solid waste is collected and disposed of resulting into heaps of uncollected waste in open spaces, streets, road side drains, etc. This represents significant health hazards as well as a source of ground and groundwater pollution.

Other sectors presenting environmental issues included:

- ***Mining:*** is one of the fastest growing sectors in the Tanzanian economy. Its contribution to GDP is currently over US$300m per year. While large scale multi-national mining is relatively well managed, significant environmental (as well as health and safety and human rights) impacts are resulting from small-scale miners entering the sector.
- ***Trade:*** The EU is Tanzania's main trading partner and one of its most important providers of external aid. In 2003, around 21% of all imports came from the EU, while around 50% of all Tanzanian exports were destined for the EU. Trade has by far the largest direct impact on the economic development of most developing countries however in Tanzania, trade-related environmental issues and environment-related trade issues are receiving little attention.
- ***Transport (roads)*** Road Transportation is essential to Tanzania's economic growth however, there was little EIA or SEA work conducted on major road developments. With the introduction of EMA, it is hoped that transport networks will be better planned.

Tentative figures from on-going work in Tanzania has suggested that 'billions of US$' per year is being 'leaked' from the natural resources sector in Tanzania where this amount represents potential lost revenue for the country. Issues relating to **Environment and Poverty** include:

- ***Forestry*** Tanzania has approximately 33.5 million hectares of forests and woodlands. There is no accurate assessment of the magnitude of the problem of deforestation but it is generally perceived as a major environmental problem in the country. Forest resources are regarded as being seriously threatened by uncontrolled exploitation, for different purposes such as agricultural expansion, commercial logging, fuel wood extraction, mining, etc.
- ***Fisheries*** contribute an increasing share of GDP in Tanzania. In 2004 fish and fish products export to the EU25 totalled around €245 million. Fish stocks, fresh water and marine fishing, are exploited by both industrial and artisanal sub-sectors. Approximately 80% of the total revenue and

catch tonnage from fish comes from inland fisheries but there are no quotas set for either freshwater or marine fisheries with very little control and enforcement in the former.

- ***Wildlife*** is important for Tanzania in terms of its present and potential revenue generation, as well as for communities in providing food security and income. However, the sector is suffering from loss of revenues due to poor management practices, lack of capacity and limited participation of communities.

Key recommended actions include the implementation of the provision of the Environmental Management Act; institutional development support to the Division of Environment and in particular the National Environmental Management Council (NEMC); the production of the National Environmental Action Plan (NEAP), the revision of the Environmental Policy; education and awareness building. A summary table indicating the key/critical issues is also provided in the chapter on conclusions and recommendations.

2. Background

2.1 Physical Environment

Introduction

Tanzania is located on the eastern coast of the African Continent south of the equator between latitudes 1° 00' S and 11° 48' S and longitudes 29° 30' E. Eight countries – Kenya and Uganda in the north, Rwanda, Burundi, Democratic Republic of Congo and Zambia in the west, Malawi and the Republic of Mozambique to the south—share boundaries with Tanzania. The eastern side of Tanzania is a coastline of about 800 Km long marking the western side of the Indian Ocean. With an area of 942,784 Km², Tanzania is the largest country of the three East African Community member countries, the others being Kenya and Uganda. The country has a population of about 36 million growing at an annual rate of 2% with about 50% of the population living below the poverty line.

Figure 1: Location of Tanzania (with indication of main cities and towns

Geography

The landscape of mainland Tanzania is generally flat and low along the coast, but a plateau at an average altitude of about 1,200 m constitutes the greater part of the country. Isolated mountain groups rise in the northeast and southwest. The volcanic Kilimanjaro (5,895 m), the highest mountain in Africa, is located near the northeastern border. Three of the great lakes of Africa lie on the borders of the country and partially within it. Lake Tanganyika is located on the western border, Lake Victoria on the northwest, and Lake Nyasa on the southwest. Lakes Nyasa and Tanganyika lie in the Great Rift Valley, a tremendous geological fault system extending from the Middle East to Mozambique.

The Northern coastal plains (north of the Rufiji River) have mangroves, areas of rainforest and pine plantation. Low-intensity smallholder cultivation dominates with permanent holdings of cashew and coconut as cash crops. Food crops include cassava, rice, sorghum and maize. In many areas, citrus, pineapple, fruit and vegetables are grown. Sisal estates around Tanga and Korogwe have replaced the natural vegetation in the area.

The southern coastal areas have valuable indigenous timber and pine plantations. A lack of surface water and tsetse fly infestation has limited the settlement of people to certain areas such as the Makonde plains. The extensive interior plateau enclosed by branches of the Great Rift Valley consists

of savannah woodlands (miombo). These provide a sparse cover and are small, slow-growing trees often not of good quality timber.

In the arid areas of northeast Tanzania (Northern arid lands and Masai steppe), the vegetation is open grassland and acacia scrub. The Masai steppe occupies rolling plains suitable only for grazing or for national parks (Serengeti, Tarangire and Mkomazi).
The arid and semi-arid areas are environmentally fragile and highly vulnerable to land degradation and soil erosion. This characteristic is exacerbated by human and animal interaction as well as soil characteristics, heavy seasonal rainfall, water and wind erosion and inadequate soil conservation measures. Estimates show that 9% of the country has soils of medium to high fertility, 23% are of low to medium fertility and the remaining 68% they are of low fertility. Most areas in the country can only sustain the drought tolerant crops such as millet and sorghum and a limited number of livestock.

Climate
Tanzania has a tropical type of climate. Average temperatures range between 17°C and 27°C, depending on location. In the highlands, temperatures range between 10ºc and 20 ºc during cold and hot seasons respectively. The rest of the country has temperatures never falling lower than 20ºc. The hottest period spreads between November and February (25ºc - 31ºc) while the coldest period occurs between May and August (15 ºc - 20 ºc).

Two rainfall regimes exist over Tanzania. One is unimodal (December - April) and the other is bimodal (October -December and March - May). The former is experienced in southern, south-west, central and western parts of the country, and the later is found to the north and northern coast. In the bimodal regime the March - May rains are referred to as the long rains or Masika, whereas the October - December rains are generally known as short rains or Vuli. Owing to the country's widely varying topography, Tanzania's climate displays great range of regional differences. Tanzania’s climate ranges from tropical to temperate in the highlands. Average annual precipitation over the entire nation is 1,042 mm. Generally speaking, the total amount of rainfall is not very great. Only about half the country receives more than 762 mm annually.

2.2 Current Economic Trends

Following the pursuit of a socialist economic model upon independence, in 1996, the Government committed itself to a programme of economic reform. Since then, Tanzania has made significant progress in restoring macro-economic stability. The growth rate is 6% and inflation is 5.4%. GDP is US11.1bn with GDP per capita of US$300 per annum.

The composition of GDP is such that, agricultural sector accounts for around 50%, followed by trade which accounts for around 16%. Financial and business services rank third at the tune of 10% and the industrial sector 8%. The mining sector is the fastest growing and most important sector in the country and is currently contributing around 2% to GDP.

Tanzania is a country that depends on agriculture for its economic and social development. It is also estimated that of the 19 million labour force in the country, 80% are in the agriculture sector. Crop production is the most prominent sub-sector, contributing 74% of the agricultural GDP mostly comprising maize (23% of agricultural GDP and rice 8%).Major agricultural exports are coffee, sisal, tea, cotton, pyrethrum, cashew, tobacco, cloves, corn, wheat, cassava (tapioca), bananas, fruits, vegetables; cattle, sheep, goats. Downstream agricultural processing industries exist for sugar, beer, cigarettes and sisal twine. The mining sector is dominated by diamonds, gold and iron. Other industries include soda ash, shoes, cement, apparel, wood products and salt. Tanzania's natural resource based industries are centred on hydropower generation, tin, phosphates, iron ore, coal, diamonds, gemstones, gold, natural gas and nickel.

3. State of Environment

Biodiversity Management

Tanzania is one of the richest countries in biodiversity. With at least 310 mammal species, the country has Africa's fourth largest number of mammals. The species richness of birds, plants, amphibians and reptiles are among the highest in Africa. Tanzania contains one of the world's biodiversity hotspot areas: the Eastern Arc Mountains. The Eastern Arc Mountains and Coastal Forests of Tanzania and Kenya hotspot is one of the smallest of the 25 global biodiversity hotspots. It qualifies by virtue of its high endemicity and a severe degree of threat. Around 40 percent (800 of more than 2000) of the plant species and 2 percent of genera (16 of about 800) are estimated to be endemic in the Eastern Arc Mountains. Lastly, Tanzania is one of the twelve-mega diverse countries of the world, and the nation's biological diversity has important economic, technological and social implications.

Tanzania's protected areas network consists of National Parks (12) where all consumptive exploitation (e.g. hunting, grazing and tree felling) are prohibited, Tanzania has gazetted 31 Game Reserves such as the Selous where access and activities are by special permission only; One Conservation Area is managed for both wildlife conservation and legally agreed resident Masai herders. There are 543 Forest Nature Reserves and one Biosphere Reserves (1) as well as three World Heritage sites and 43 Game Controlled Areas (where restrictions apply specifically to hunting animals in the area). It is estimated that the flora of Tanzania consists of about ten thousand plants species of which about 11 percent are endemic. There are also 31 endemic species of amphibians, 18 endemic species of lizards, 9 endemic species of snakes, 10 endemic species of birds and about 80 species of the famous violet flower plant species. The main threats to Tanzania's terrestrial biodiversity (wildlife resources and habitats) are:

- Fragmentation and loss of critical ecosystems linkages
- Over exploitation of some species (e.g. elephants and rhinos),
- Considerable local pressure to extend agriculture at the expense of forests often for very short-term gain,
- Rapid growth of human population,
- Land degradation, pollution, and causal threats (human activities),
- External threats (foreign demand for local resources and products) and increased influx of refugees into the habitats.

The main activities aimed to conserve terrestrial biodiversity have been made through programmes and initiatives like wildlife and forests protected area networking, establishment of different levels of legal statuses, administration and protection as well as the imposition of restrictions with regards to hunting, grazing and tree felling. In the Ngorongoro Conservation Area, its authority manages both wildlife conservation and resident Masai herders. The current most evident threats of terrestrial ecosystems and biological resources are indicative of inadequacy inherent to the current conservation measures or their implementation modality.

Relevant direct anthropogenic threats to aquatic biodiversity emanate from (i) pollution from industrial, domestic and agricultural effluents, (ii) destructive fishing by use of dynamite, beach-seining and poisoning, (iii) trophy collection - coral and shell collection, (iv) unregulated coastal tourism, (v) over-exploitation of aquatic resources, (vi) introduction of exotic species, (vii) erosion and silting due to over-grazing and deforestation and (viii) loss of habitat due to developmental activities, e.g. habitat clearing, construction of dams, mineral and aggregate mining and irrigation.

National Goals and Gaps in Biodiversity Management

Under the current scenarios of increasing population growth which necessitates heavy reliance on natural capital, urbanization and migration, evolution to market economies, and extreme poverty due

to both international and domestic factors, the conservation of biological wealth becomes more necessary.

Tanzania embarked on the implementation of the Convention on Biological Diversity (CBD) in 1995, and was able to produce the first comprehensive National Biodiversity Country Study (NBCS) Report in 1997. The development of a National Biodiversity Strategy and Action Plan (NBSAP) started in March 1998. The NBSAP has been formulated taking further into consideration the country's dependency on biodiversity wealth for socio-economic development recognising the uniqueness of Tanzania's biological wealth worldwide. Integrating the provisions of the CBD with current policy goals and objectives for relevant sectors in Tanzania has developed goals and objectives for biodiversity conservation and sustainable utilization. The goals and objectives for the NBSAP on each sub theme (i.e. Agro Biodiversity, Aquatic Biodiversity and Terrestrial Biodiversity) is a synthesis of the issues which have been identified through the consultations which were undertaken either through zonal consultative workshops or through consultations with various institutions.

Some key issues to be considered in efforts to conserve Tanzania's biodiversity are:

- Inadequate or lack of inventories of biodiversity resources in protected areas hence little knowledge of their bio-diversity potential.
- Inadequate experts in the field of physiology, pathology, anatomy and taxonomy particularly in high learning institutions.
- Not many studies have been done on ecosystems, such as wetlands and coastal forests (especially mangrove) and use of non-traditional mushrooms and medicinal plants.
- There is lack of catalogue and field guides for some plant and animal families
- Improper execution of the established planning process and regulations

Natural Resource Management

Tanzania is endowed with abundant natural resources which include a large area of land, forests, rivers, lakes, minerals, wildlife, fisheries, natural gas and many others.

Agriculture, Livestock, Forestry, and Fisheries together contribute over 65% of the country's GDP, account for over 80% of the total employment and over 60% of the total export earnings. The natural resources sector comprises of forestry and beekeeping, wildlife, and fisheries sub-sectors (mineral resources are discussed later).

Forestry and Beekeeping

Tanzania has about 33.5 million hectares of forests and woodlands. Out of this total area, almost two thirds consists of woodlands on public lands which lack proper management. About 13 million hectares of this total forest area have been gazetted as forest reserves. Over 80,000 hectares of the gazetted area is under plantation forestry and about 1.6 million hectares are under water catchment management. These forests offer habitats for wildlife, beekeeping and for the conservation of unique natural ecosystems and genetic resources. It is estimated that the sector's contribution to the Gross Domestic Product is between 4 % and 10% of the country's registered exports. This contribution is significantly underestimated given current ongoing studies in Tanzania on leakages from the natural resources sector (at the moment this information is confidential).

It has been estimated that if forest resources were managed in a sustainable and efficient manner, the sector's contribution could be between US$1.3 – 3.0 billion per year. This suggests that current loss opportunities in monetary terms may amount to US$1-2 billion per year, irrespective of the indirect services that are provided by forests, including amenity values, tourism opportunities, and watershed conservation.

Despite the importance and roles played by the forest resources to the economy, the new Forest Act and the National Forest Programme (NFP) aims to address some of these however, there are still a

number of problems faced which hamper the development of the sector and thus its contribution to the economy. The various problems include among others illegal logging, deforestation, inadequate forestry extension services, inefficiency wood based industries and poor infrastructural facilities. Some of the causes could be linked to a lack of understanding of the Act and NFP and the potentials it provides, limited capacity in the sector and weak governance leading to fragmented administration at all levels between the centre and the local levels, lack of participation of various stakeholders in the management of the resources, poor resource databases, outdated and non existence of management plans for efficient resource use.

The forest sector has been receiving financial support from the donor community for a long time. However there has been poor coordination within the sector particularly between the national priorities and the donor interests. The actions to address this problem are being worked on. Development Partners were recommended to increase awareness of the sector's actual and potential contribution to the development of Tanzania, link the cases of irregularities in the sector with the work on good governance, and link the work on civil service reform with the current human resources problem in the sector.

Beekeeping activities in Forest reserves

Tanzania is estimated to have 9.2 million stinging and sting less colonies of honeybees, which have an estimated production potential of about 138,000 tonnes of honey and 9,200 tonnes of beeswax per year. The current annual production is estimated at 4,860 tonnes of honey and 324 tonnes of beeswax, which is about 3.5% of the production potential. There have been several reforms in the sector. However there are remaining problems which have hampered the development of the beekeeping sector, namely lack of formal cross–sect oral coordination, ineffective beekeeping extension services, insufficient statistical information, and inappropriate beekeeping technology.

Wildlife

The Government of Tanzania adopted its Wildlife Policy in 1998 intended to better address the problems and obstacles that have plagued wildlife management in Tanzania. The vision for the wildlife sector as envisaged by the policy is to:

Promote conservation of biological resources; Administer, regulate and develop wildlife resources; Involve all stakeholders in wildlife conservation and sustainable utilisation, as well as in fair and equitable sharing of benefits; Promote sustainable utilisation of wildlife resources; Raise the contribution of the wildlife sector in country's GDP from about 2% to 5%; Contribute to poverty alleviation and improve the quality of life of the people of Tanzania; and Promote exchange of relevant information and expertise nationally, regionally, and internationally.

The Wildlife Act (1974) is the major legal instrument for current wildlife policy. This and other related acts need to be revised and subsidiary legislation updated to accommodate the Wildlife Policy 1999. The policy recognises the role of the Government, private sector, local and international donors, NGOs, and the public in the management of wildlife in Tanzania. Also the policy advocates for the transfer of the Wildlife Management Areas (WMA) to local communities and ensure that the local communities obtain substantial tangible benefits from wildlife conservation whilst taking wildlife protection responsibilities. The policy, nonetheless, retains state ownership and control of wildlife resources. Transfer of powers to manage WMAs has been slow due to a lack of commitment by the government's wildlife division.

Fisheries

Tanzania is a coastal state endowed with fishery resources. It has both marine and inland fisheries potential. The marine zone covers 64,000 square kilometres which includes the Indian Ocean and the Exclusive Economic Zone. Tanzania's fresh water includes the riparian shared waters of Lake

Victoria, Tanganyika and Nyasa. The country has also other small natural lakes, man made lakes, river systems and many wetlands with fish potential. It is estimated that freshwater covers 58,000 square kilometres in the country. Fishing is carried out by artisanal fishers and commercial or industrial operators. The artisanal fishery is concentrated on the freshwater, most of the marine tonnage is caught by Tanzanian registered prawn trawlers and foreign flagged tuna vessels. The present annual fish catch is approximately 350,000 metric tons. In 2004 the estimated export of fish and fish products to EU25 totalled around €245 million.
In 2004, the fisheries sub-sector grew by 6.9 percent, compared to 6.4 percent in 2003. The increase in growth rate resulted from increase in number of fishing licenses issued in the coastal zone as well as improvement of patrols and surveillance in fishery resource areas.
The establishment of an appropriate regulatory framework is still needed as well as strengthened capacity for management and securing livelihoods of poor people in the sector.

Vulnerability

Land degradation in Tanzania is also aggravated by some natural disasters such as droughts, floods and cyclones. The disaster management unit that deals with natural disasters is under the Prime Minister's Office. The following are some of the documented natural hazards which occurred in Tanzania in recent years thus contributing to the current status of the environment.

Droughts

Droughts have a major impact on the environment and the lives of both human and other living organisms. Droughts affect the growth of vegetation cover hence making land susceptible to erosion by wind and human activities. Again drought causes destruction of crops and threatens livelihood opportunities as well as threatening loss of biodiversity.

Floods

Floods contribute significantly to the destruction of the natural resources resulting into socio-economic losses and environmental degradation. For instance the floods that occurred in Lushoto and Korogwe in Tanga region in 1993 caused considerable damage. The scale of damage included destruction of infrastructure, environment, water system, school, homes, hospital, and roads. The government provided a sum of Tshs 263.3 million to assist the affected communities. In 1998, 14 regions were affected by ***El-Nino*** whereby 416 people died and roads, railways, airport strips, bridges, water system and crop fields (nearly 240,000 ha) were damaged; school buildings and nearly 37,615 residential houses were destroyed. Birds and animals (both domesticated and wildlife) were affected. Additionally, epidemic diseases particularly cholera occurred in many areas.

Water Quality and Resources & Use (including marine environment)

Among the challenges currently facing Tanzania, perhaps none is more important than the threat to the country's supply of clean, fresh water. In most regions water is relatively scarce. Even where the supply itself is adequate in quantitative terms, the quality of the water is in serious decline. Tanzania shares three major Lakes (Victoria, Tanganyika and Nyasa) with other countries in the eastern and central Africa. Other Lakes in the country include Masoko, Rukwa, Eyasi and Magadi. Tanzania also has many permanent and seasonal rivers. The main rivers include Rufiji, Ruvuma, Pangani and Ruvu. The total renewable water resources are estimated at 80 km^3/year of which 30 km^3/year is groundwater resources.

Surface Water

Although Tanzania is blessed with a variety of surface water resources (6% of land area is covered by Lake Surface and numerous rivers draining into four major river basins), surface water is limited throughout the country for most of the year due to uneven distribution of rainfall, a prolonged dry

season and arid or semi-arid conditions. The surface river flow regime and moisture conditions in the country correspond to the general rainfall pattern. The hydrological year starts in September/October in most areas and ends in October/November. About 50% of the surface runoff flows directly into the Indian Ocean from the major river systems. The main internal drainage basins are the Lake Rukwa, the Bubu complex, Lake Eyasi, and Lake Manyara. Lake Nyasa, Lake Victoria and Lake Tanganyika basins drain into international water bodies. Significant water resources exist in the country's Lakes namely Victoria, Nyasa, Rukwa and Eyasi. Tanzania also has several dams namely Nyumba ya Mungu in Kilimanjaro region, Kidatu on the Great Ruaha in Morogoro region, Mtera in Morogoro region, Hale on the Pangani river in Tanga region, Pangani falls on the Pangani river in Tanga region, Tinde in Shinyanga region, Kazima in Tabora region, Kihansi in Iringa region, Mindu in Morogoro region. Currently the country is utilizing the Lake Victoria water by drawing and pumping it, through kilometres of pipeline, to water deficient areas such as Shiyanga and later on to Dodoma region.

Ground Water

Ground water potential varies from one locality to another and so does its development. Over a wide part of the country's ground water development has concentrated mainly on shallow wells for domestic purposes. The inland drainage basin is explored and its water tapped mainly for domestic and industrial use. It is only in few localities in the Dodoma region where ground water is used for irrigation. The ground water potential zones are classified as high, medium and low or negligible for each basin. High ground water potential areas are Makutupora in Dodoma region and Ruvu basin in Coast region, Sanya-Hale plain in the Pangani basin, Arusha, the karoo sandstone (in Tanga region) and fault zones around Same (Kilimanjaro) in the Pangani basin. The ground water recharge is mainly from rainfall. However, ground water monitoring is not systematically done in the whole country.

Wetlands

In Tanzania, natural wetlands occupy over 7% of the country's surface area (Senzia et al., 2002). With rapidly expanding populations and increasing use and manipulation of natural resources, wetlands in Tanzania are facing increasing threat from a variety of sources (Kassenga, 1997). These include: increased land clearance and deforestation of swamp forests and surrounding woodlands, poaching, pollution and eutrophication, and the modification of natural flow regimes. Inadequately planned management as well as a lack of basic information and public awareness of their values, functions and products are also contributing to unsustainable use of wetland resources (Kassenga, 1997).Some Wetlands of International Importance (Ramsar Convention, 2005) are: Kilombero Valley Floodplain, Lake Natron Basin, Malagarasi-Muyovozi Wetlands, Rufiji-Mafia-Kilwa Marine.

Despite efforts by GOT the threats to Tanzania's lakes, rivers, and wetlands come in several forms, among them eutrophication, salinisation, and pollution from industrial effluents and chemical run-off, and extend to broader ecosystem concerns, including exotic weed infestation, declining fish populations, habitat destruction, and loss of biodiversity.

<u>Water Resources Management - Environmental Concerns</u>

Water Use

In Tanzania, water is used mainly for domestic purposes, watering livestock, power generation, irrigation and industries. To this end, groundwater plays a major role in meeting the demand of water especially in rural areas. Agriculture is the largest water consumer. In recent years the GOT continued to implement the National Water Policy of 2002, by creating an enabling environment for sectoral expansion and to empower the community to have decent life and contribute towards poverty reduction. In addition, the policy focused on motivating the participation of international agencies, NGOs and private sector. Despite the efforts water shortages and quality degradation are common problems in Tanzania.

Domestic Water Supply
In line with the Poverty Reduction Strategy aimed at facilitating the provision of adequate, safe and clean water in rural areas reached 53% by 2003 (from 49% in 2000). The next goal is to have 85% by 2010. Urban water supply coverage has increased from 68 % in December 2000 to 73 % in June 2003. The percentage of the population supplied with clean water in urban areas in 2004 remained at 74.0 % as in 2003 due to population increase. In urban areas water is contaminated by effluent disposal and leakages while in rural areas water quality is affected by turbidity during the rainy reason and bacteriological contamination.

The water quality is affected by pollution mainly caused by the following factors:

Industrial development
Although the level of industrialization in Tanzania is relatively low, untreated industrial wastes cause significant levels of localized pollution. Few industries in the country treat their waste hence their effluents are discharged untreated or partially treated into nearby water bodies. About 80% of the industries in Tanzania, including agro-industries, chemical factories, breweries, soap and steel-manufacturing establishments, are located in the coastal city of Dar es Salaam. Most of them contribute directly or indirectly to pollution of the Indian Ocean. Pollution from industries in Dar es Salaam consists primarily of biological oxygen demand (BOD) and suspended solids (SS). The industrial sources of effluents can be classified into three categories: oxygen-consuming wastes (biodegradable organic wastes), eutrophication causing wastes (inorganic nutrients) and toxic wastes (pesticides and heavy metals). The Msimbazi River in Dar es salaam for instance, whose water is extensively used for irrigation of numerous small-scale farms along its valley, is heavily polluted with industrial effluents. Rapid assessment of industries in Tanga city established that about 67% of the large industries contribute to water pollution. Most of the rural sisal estates discharge industrial effluents into these rivers. The direct discharge of untreated industrial effluents through rivers is of both socio-economic and health concern.

For curbing of industrial pollution, one of the strategies being increasingly applied is the Cleaner production concept through the Tanzania National Cleaner Production Centre. Cleaner Production can be summarized as improving the environment, reducing overall costs, increasing productivity, gaining competitive advantage and continuous environmental improvement.

Waste Water and Urban Sanitation
Nationally, the coverage of urban sewage and sewerage services is extremely low. Coverage of sewerage services in urban areas increased from 10 % in 2000 to 17 % in 2003 but pollution control and solid waste management systems are not adequately developed to protect public health, well being, and the environment. Wastewater treatment in Tanzania is mostly through waste stabilization ponds. The waste stabilization ponds are predominantly out of order or are operated inefficiently and do not achieve the design effluent qualities. Liquid waste from un-sewered industrial areas are either discharged untreated directly through one of the nearby major drainage streams or into on-site septic tanks. In most of the urban areas in Tanzania, untreated sewage makes its way to public waterways. Another environmental concern from the few existing systems is that sludge from septic tanks is periodically emptied into ineffective waste stabilization ponds or outfall sewers thus constituting the main sources of pollution and environmental degradation.

Most urban areas in Tanzania do not have sewerage systems except the larger ones whose coverage is very minimal. They mainly depend on on-site sanitation. For instance, of Dar es Salaam's present inhabitants, it is estimated that hardly 5% are served by a central sewerage system, 11% use septic tanks and 76% use pit latrines. Most of the central business district of Dar es Salaam city is sewered

albeit with regular sewer blockages and overflows. However, most of the sewage observed at the outfall screens house shows that the bulk of the sewage is discharged untreated to the Indian Ocean near the Ocean Road Hospital. Domestic sewage in Dar es Salaam produces pollutants with high BOD, suspended solids (SS), faecal coliform, oil and phosphorous compounds (P) as well as spreading diseases such as typhoid and cholera. One of the key challenges is to expand water and sanitation services in rural and urban areas.

Coastal and Marine Environment

Introduction

Tanzania's coast is around 800 Km long. There are 5 coastal urban centres in mainland Tanzania: These are Tanga (city), Bagamoyo (township), Dar es Salaam (city), Lindi (town) and Mtwara (municipality). The coastal regions encompass about 15% of the country's land area and are home to more than 30% of the population of around 36 million. The population of the coastal cities has increased significantly over the past decades. Coastal urban development is driven by internal migration. The coast is one of the country's most valuable natural resources. Coastal resources contribute significantly to the national income and provide social and economic benefits to the population. The coastal regions contribute about one-third of the country's GDP, with Dar es Salaam leading overall with 25% of the GDP. Its coastal environment is characterized by ecosystems of high marine biodiversity and rich and rich and diverse resources. These ecosystems are the backbone of the livelihood of coastal communities and could contribute significantly to the economy of the country.

Coastal Ecosystems

Coastal Forests

The coastal forests and thickets of Tanzania are remnants of the once extensive lowland forests of East Africa covering about 59,000 km^2. These forests, which comprise wooded, secondary and edaphic grassland, are part of the Zanzibar-Inhambane Regional Mosaic. This phytogeographical region covers the coastal belt from Somalia to the mouth of the Limpopo River. Coastal forests in Tanzania cover about 350km^2.

Estuaries and Other Wetlands

Associated with either large river basins or topographical configurations of the coastal plain are a number of freshwater marshes, swamps and lakes. Brackish water swamps and mudflats occur in the large estuaries and delta of the Rufiji, Ruvuma and other river mounts. A typical estuary environment is found on the Pangani river mouth of Pangani bay

Mangroves

The mangrove forests of Tanzania mainland cover about 115,500 ha. There are nine species of mangrove trees in Tanzania. The mangrove habitats in Tanzania are diverse and are best-developed in estuaries such as the Rufiji delta. Mangrove tree species normally occupy specific habitats in the forest. Mangroves have many direct and indirect uses to the communities, particularly for house building, firewood, boat building and poles. The mangrove ecosystem provides feeding, breeding and nursery areas for prawns, shellfish and fish. Consequently, yields are higher from the fisheries in the mangrove-fringed coastal waters than in areas where there are no mangroves.

Coral Reefs

Coral reefs are common along much of the Tanzanian coastline and well-developed barrier reefs occur along most of the ocean-facing eastern coastline of the islands. The reefs are located along about two-thirds of Tanzania's continental shelf. There are about 700 species of reef-associated corals

worldwide and 150 species of *Scleractinian* corals have been reported in Tanzanian reefs. It should be noted however that many reefs in Tanzania are not well studied and some are yet to be described.

Marine Turtles
Five species of marine turtles are found in the waters of Tanzania. The most common type is the green turtle followed by the hawksbill, which is smaller. The loggerhead and leathery turtles are less common, while the olive ridley is very rare.
Marine Mammals
Cetaceans, whales, dolphins and porpoises are among marine mammals which frequent the coastal waters of Tanzania. The dugong (*Dugong dugon*) is found particularly near Kilwa and Mafia. The dugong was once a common species in Tanzania, but is now almost absent because they were hunted for their flesh and oil. Further threats to dugong populations include habitat degradation (e.g. pollution and siltation). Dugongs and turtles are considered endangered in Tanzania

Environmental degradation at the coast

Signs of environmental degradation, as well as decline in natural resources biodiversity, are becoming obvious in some parts of Tanzania coasts. This is attributed to the combination of poverty, rapid population growth, as well as increasing land-based activities and sources of pollution such as industrial[2] and agricultural activities. Of these problems the main ones are:

1. Declining harvests of marine and coastal living resources
2. Loss of coastal and Marine biodiversity
3. Coastal pollution
4. Beach (coastal) erosion

Recently, coastal ecosystems have started to show signs of degradation, attributed to both natural factors and anthropogenic causes (such as pollution from both land-and marine-based sources, municipal and industrial and industrial waste). The coral reefs for example are increasingly threatened by a number of factors, including destructive fishing methods, sewage and industrial waste. Some of the major threats to coral reefs include: destruction by fishing with explosives, anchor damage, destruction for construction material, vessel grounding, trampling, destruction of linked habitats such as mangroves and over-harvesting of fish, octopus, sea cucumbers and shells. Others include sediment mainly brought in by rivers, sewage discharges and chemical pollution, poison fishing and dredging.
Beach erosion is a global environmental problem. Shorelines change and associated coastal erosion is a natural process of evolution of coastal areas. The coastal areas of Tanzania are increasingly attracting a wide range of human activities such as the development of major settlements centres and tourism infrastructures. However, the instability of the coastline threatens the sustainability of this development.

Human Settlements- Urban Development

Based on the 2002 Population and Housing Census, it was estimated that Tanzania had a total population of 36,308,189, split between 51% female and 49% male. Fourty-six percent (46%) of the population is under the age of 15. Population distribution between urban and rural areas indicates that about 77% of the population lives in rural areas while 23% live in urban areas.

Human settlement in urban areas in Tanzania falls into two categories; planned and unplanned settlements. The main characteristics of unplanned settlements are lack of basic community infrastructure services including water supply, proper sanitation facilities, access roads, drainage and proper waste management system. Presently a greater proportion of the urban inhabitants live in

[2] Sand mining is another major problem in coastal areas as a result of construction booms in the urban areas.

unplanned settlements. For instance in Dar es Salaam, which is the primate city with about 10% of the total population of Tanzania, there are 55 major unplanned settlements accommodating about 70% of the city's population. Rural migration to the urban centers usually originates in areas with low agricultural production where the use of land often exceeds its carrying capacity. Moreover rural-urban migration is accelerated by the lack of local opportunities for both formal and informal employment. Excessive migration combined with inadequate infrastructure facilities in the urban centers causes significant environmental concerns. Tanzania's urban centres are developing at an unprecedented rate, with corresponding increasing levels of urban populations and industrialization, hence subjecting them to high concentrations of man made pollution. In general, due to absence of adequate physical planning in cities and towns of Tanzania, the current environmental problems issues are evident in cities and towns in Tanzania:

- Poor solid waste management;
- Unserviced urban land;
- Poor management of recreational resources, open spaces, green belts and tourism attractions;
- Poor urban economic management and petty trading;
- Management of air quality and urban transportation;
- Management of surface water and liquid waste;
- Management of coastal areas resources;
- Management of environmental hazards; and
- Management of urban agricultural potential.

In order to curb some of this the GOT and donors designed and implemented the Sustainable Cities National Programme that operates under the programme promoting Environmentally Sustainable Urban Development in Tanzania..

Solid Waste Management

Solid waste management services in urban centres in Tanzania have received low priority over the years. Due to the degree of mixed industrial/domestic/commercial development in the country's urban centres, solid waste streams are highly mixed causing difficult challenges for the collection and subsequent disposal thereof. Even hazardous and medical/clinical wastes find their way into the general waste streams since there are no specific services for dealing with such toxic wastes.

Waste collection - The solid waste management service is generally not well developed in most urban centres for a variety of reasons. Firstly most unplanned settlements lack road infrastructure thus rendering them inaccessible to the local authority's collection vehicles. Recent efforts to outsource refuse collection to Community Based Organizations (CBOs) in the unplanned settlements have significantly improved this scenario albeit in rather uncoordinated ways.

Waste Transportation - Waste is commonly transported from the collection points to the disposal sites by using ordinary waste collection trucks (many of them are very old), tipping trucks, skip buckets/containers using skip masters and tractors pulling trailers (filled with solid waste).

Waste Disposal - Most of the urban centres operate open rudimentary dump sites with minimal environment protection measures without leachate control which eventually ends up in polluting the water resources. Lots of littering, burning, water pollution etc occurs at the disposal sites which cause further environmental decline. However, some of the centres are planning to develop new sanitary landfills. The lack of skills for solid waste management within the urban centres has also stunted the service provision. All these shortcomings culminate in the marginal existence of a service rendered by the urban authorities or their representatives. The result of all these has been the flooding of roads, groundwater pollution and escalating outbreaks of cholera and other waterborne diseases.

Energy Production & use

Energy production, supply and utilization have serious implications for Tanzania's economy and environment. Bio-energy is the main source of fuel for 90% of the country's population (both rural and urban) and accounts for 93% of the energy consumption in the country.
Petroleum, hydropower and coal are the major source of commercial energy in the country. The electricity sub sector contributes about 0.6 per cent of total energy consumption. Two thirds or 381 MW of Tanzania's installed capacity is hydro powered. It is reported that Tanzania has an estimated 3800 MW of economic hydro potential capacity. Droughts over the East Africa region have had severe effects on the electrical power supply. Blackouts and power rationing as a result of low water levels in the hydro dams have forced Tanesco to rely on gas-powered generators and to look increasingly at thermal projects for future capacity increases.

With the current high prices of electricity and fossil fuels (kerosene) and the underdevelopment of alternative/renewable sources of energy (solar, wind, geo-power, etc), fuel wood and charcoal will continue to provide the bulk of the country's energy needs for the foreseeable future. However, the long-term prospects for sustained supply of firewood and charcoal are threatened by the visible and worsening problems of deforestation and desertification in many parts of the country.

In 1992 GOT developed the Energy Policy to respond to sustainable energy development needs. The main elements of the Energy Policy and Strategy are:

- Development of domestic energy resources which are shown to be least cost options;
- Promotion of economic energy pricing;
- Improvement of energy reliability and security and enhance energy efficiency;
- Encouragement of commercialisation and private sector participation;
- Reduction of forest depletion; and
- Development of human resources.

Although there is no direct reference in the policy to use of renewable energy resources, there is a provision to consider environmental impacts of forest depletion as well as inefficient utilisation of existing energy sources. Despite the policy, the following sustainable energy issues still need the necessary attention in Tanzania:

Air Quality
Air pollution is currently not a very serious problem in Tanzania, but if left unchecked, it will become a serious one especially in urban centres. Urban areas are faced with high concentrations of man-made air pollution sources such as motor vehicles, industries (due to "dirty" technology), electric thermal power generations, combustion of fossil and wood fuels. These have inevitably led to a series of environment-related problems resulting into worsening air quality.

Urban activities generate close to 80% of all carbon dioxide (CO_2) as well as a significant amount of other greenhouse gases (GHG). Direct sources of greenhouse gas emissions include energy generation, vehicles, industry and burning of fossil fuels and biomass in households. Emissions from vehicles and transport equipment not only contribute to CO_2 emissions but also to local pollution problems through the emission of carbon monoxide, lead, sulphur oxides and nitrogen oxides. In addition, the reduction of green cover in urban areas reduces a city's ability to reabsorb CO_2 and poor waste management releases CFCs and such gases like methane into the atmosphere.

Apart from Dar es Salaam city, no significant studies on air pollution have been carried out in other urban centres in Tanzania. Major sources of air pollution in Dar es Salaam city are vehicular exhaust emissions, industrial activities, sand and quarry industries, road and building industries, all which produce enormous amounts of pollutants in their vicinity.

Plans are underway to establish ambient air monitoring programme for Dar es Salaam City under the financial sponsorship of USAID (USAID, 2005).
Currently NAPA (National Adaptation Programme of Action) is being drafted by the GOT which seeks to further address climatic change related vulnerability of key sectors which form the basis of livelihood of rural communities and the backbone of the national economic development and prosperity. The primary objective of NAPA is to identify the immediate and urgent climatic change adaptation measures of the impact of climatic change and more importantly to ensure that immediate and urgent actions are given attention by the government and International communities. This document is still in its early stages of its development. Once completed it will serve as a guide with respect to issues of climatic change

Noise Pollution
Major sources of noise pollution include traffic noise and road construction. With increased road traffic, noise will affect all those living along the roads. Noise will also be generated during construction of roads in major urban centres like Dar es Salaam. Of late, due to power cuts in many urban centres, electric generators have now become significant sources of noise pollution. In many instances industrial generators are used in residential areas hence causing a lot of noise pollution. The other recent trend in many urban centres in Tanzania is the introduction mainly in residential areas of nightclubs and discotheques which play loud music since they are not designed in accordance with acoustic standards. People are undertaking these activities as income generating ventures.

Health impacts
Some common issues in urban centres which impact upon health are:
Sewage: Overflow of soak-away pits and septic tanks particularly during the rainy season in many of the urban areas impacts directly on public health. Water-borne diseases such as cholera, schistomiasis are some of those associated with untreated sewage discharges.
Solid waste: Only small percentages of the generated solid waste is collected and disposed of resulting into heaps of uncollected garbage in open spaces, streets, road side drains, etc. The result of all these is flooding of roads, pollution of groundwater and escalating outbreaks of cholera and other waterborne diseases.
Air pollution: Exposure to excessive concentrations of industrial emissions increases the frequency of human respiratory ailments such as colds and influenza and also worsens existing respiratory diseases such as asthma, tuberculosis and pneumoconiosis

In order to curb the situation, there are on-going continuing efforts and in combating diseases including provision of health education, environmental sanitation and the use of safe and clean water. In this context one of the main challenges is to expand water and sanitation services in rural and urban areas.

4. Environmental Policy, Legislative and Institutional Framework

4.1 Environmental Policy and Legislation

National Environmental Policy (1997)

The National Environmental Policy (NEP) is an overarching framework policy for environmental planning and management in Tanzania. Specific subsidiary and sectoral policies to carry forward the detailed tasks of everyday environmental governance will fall within this framework. They must subscribe to the vision, principles, goals and regulatory approach set out in the framework policy. The policy applies to all government institutions and to all activities that impact on the environment. NEP 1997 identifies the following six (6) major problems, which require urgent attention:

- Loss of wildlife habitats and biodiversity;
- Deforestation;
- Land degradation;
- Deterioration of aquatic systems;
- Lack of accessible, good quality water; and
- Environmental pollution.

In the policy the role of the private sector in the economy has also been immensely augmented on one hand and, whereas on the other hand the government retains the regulatory role. Undoubtedly, this will endeavour to balance use of regulations and appropriate economic instruments for environmental conservation which have been effective elsewhere. Currently there is on-going work on the use of economic instruments in Tanzania.

Other related policies include:

- National Forestry Policy (1998)
- National Land Policy (1995)
- National Water Policy – NAWAPO (2002)
- Agriculture Policy (1997)
- Health Policy (1998)
- Rural Development Policy (2003)

Environmental Legislation

The key piece of environmental legislation is the Environmental Management Act (2004) Other key laws include:

- The Constitution;
- Land use laws;
- Natural resources and conservation areas laws;
- Pollution-related legislation; and
- Overall environmental management legislation, guidelines/standards

The Constitution of the United Republic of Tanzania 1977 is the principal law. The right to protect the environment is silently enshrined in the Constitution. The constitutional right is given in its broadest sense to include rights to protect natural resources Article 27 is the most relevant constitutional provision. Some of the legislation and regulations that are relevant in the management of the environment include the following:

The Environmental Management Act (EMA) No 20 of, 2004 seeks to provide for legal and institutional framework for sustainable management of environment in implementation of the National Environment Policy. The Act outlines principles for environment management such as precautionary principle; polluter pays principle; and the principle of public participation in development policies,

plans and processes for the management of the environment. The Act also provides for impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards (public participation) as well as compliance and enforcement. The Act is presented in XX parts with each part dealing with specific provisions of environmental management. Part VI provides for the Environmental Impact Assessment (EIA) and other assessments. The section allows the Minister to make regulations and guidelines on how EIA shall be conducted and requires the assessment to be conducted by experts registered by the Council. Part VII of the Act also puts in place a new legislative device for strategic environmental assessment. This device requires that when any Bill, policy, plan or programme is proposed, there must be lodged a detailed statement regarding the likely impacts the proposed law is likely to have on management, conservation, enhancement of the environment or sustainable management of natural resources.

The Act also establishes the Environmental Appeals Tribunal and the National Environmental Trust Fund and repeals the National Environment Management Act, No 19 of 1983. The **Environmental Management Act** is the major legislation governing the management of environment in Tanzania. It should be noted that the development of EMA was based on a comprehensive review of other laws. It is envisaged that implementation of EMA will not conflict with enforcement of other laws. Also NEMC is currently preparing regulations, guidelines, norms and standards relating to different sector and environments for the easy implementation of EMA. Also, following EMA, the NEAP[3] should be prepared. The NEAP is very important in helping to solve environmental problems at all levels of government but more so at the national level. The preparation is in progress; the current draft NEAP should be finalized and implementation should start as soon as possible

Other laws which also contain environmental management safeguards include:

- Mining Act (No. 5), 1998 and Mining (Environmental Management and Protection) Regulations, 1999;
- Water Utilization Act (No. 42), 1974;
- Water Laws (miscellaneous Amendments) Act, (No. 17), 1989;
- Water Utilization (miscellaneous amendment) Act, (No 8), 1997;
- The Forest Act, (No. 14), 2002;
- The Beekeeping Act, (No. 15), 2002;
- Land Act, (No.4), 1999;
- Village Land Act (No. 5), 1999;
- Local Government (Districts and Urban Authorities) Acts, Nos. 7 and 8, 1982;
- Town and Country Planning Ordinance, Cap. 378;
- National Land Use Planning Commissions Act (No. 3), 1984;
- Tanzania Investment Act (No. 26), 1997;
- The Wildlife Conservation Act, (No. 12), 1974;
- The Protection from radiation and Explosives Act, (No. 56), 1963;
- The Occupational Health and Safety Act, (No. 5), 2003;
- Energy and Water utilities Regulatory Authority, 2001.
- Industrial and Consumer Chemicals (Management and control) Act (No 3 of 2003) (Regulation 2004)
- The Atomic Energy Act (No. 7), 2002
- Pharmaceuticals and Poisons Act

[3] The last NEAP prepared for Tanzania dates back to 1994. A SWOT analysis of the implementation of the NEAP1994 was carried and based on these findings the new NEAP is being prepared. Key issues in the 1994 NEAP related to strengthen environmental management capacity of different stakeholders, creating and enabling legislative and regulatory framework. The main problems encountered during implementation was lack of coordination, and insufficient human and financial resources to carry out the plans.

- Food Control Quality Act, 10/78
- National Industries Licensing and Registration Act
- Tropical Pesticides Research Institute Act, 18/79
- Tanzania Bureau of Standards Act, 3/75
- Factories Ordinance, Cap.297

4.2 Environmental Institutional Framework

The institutional arrangement traces its source from the Constitution of the United Republic of Tanzania which empowers the President to constitute any office in the Government of the United Republic. According to the Constitution the President is one of the national institutions which can affect the arrangement of environmental institutions in Tanzania. The three main government bodies mandated for environmental management are:

1. The Vice President's Office which supervises environmental affairs
2. National Environment Management Council (NEMC) which is the environment enforcement and inspection agency; and
3. Prime Minister's Office, Regional Administration and Local Governments (PORALG) which is responsible for coordinating all matters relating to local governments.

EMA delineates roles and responsibilities of different actors involved in environmental planning and management in Tanzania. Environmental roles are divided amongst the national and local government, NGOs, private sector and other stakeholders. As a coordination framework EMA defines mechanisms for linkages between different roles as well as legal limitation of each. According to EMA legislation the following are the new key institutions/ for environment management in Tanzania:

The National Environmental Advisory Committee
This institution is created to advise the Minister (VPO) or any sector ministry on any environmental matter which may be referred to it.

The Minister Responsible for Environment
This Minister can articulate policy guidelines, make regulations, guidelines, can designate any institution to perform any function or do any activity within a specified time, he can make rules for preparation of periodic environmental plans at sector level and make regulations prescribing the procedure and manner in which Environmental Action Plan may be prepared, adopted and implemented.

The Director of Environment
Shall coordinate environmental activities, advise the government on the law and international environmental agreements on the environment.

The National Environment Management Council (NEMC)
The Council can direct any agency to perform any duty under the EMA or any other law. It can carry out environmental audits, surveys, researches and can review and recommend for approval of Environmental Impact Assessment, and enforce compliance of the National Environmental Quality Standards. The Council, in addition to other functions, may perform the functions assigned to it by the Minister.

The Sector Ministries
Involvement of the Ministry (VPO) in environmental management is through a sector environment section (SES) which is to be established in each ministry to ensure that a ministry complies with the EMA 2004. To ensure implementation of other environmental matters contained in other written laws and report to the Director of Environment.

The Regional Secretariat
The Regional Secretariat is composed of a Regional Environmental Management Expert (REME) charged with the responsibility to advise the Local Authorities on matters relating to implementation

and enforcement of the Environmental Management Act 2004. The REME links the region with the Director of Environment.

The Local Government Authorities

Linked to the above institutional arrangements, the EMA 2004 has vested to the local government authorities the function of environmental management. It has created officers and has also designated to some committees certain environmental functions. These officers and committees are mentioned here below – EMA has created three categories of officers:

- City Environmental Management officer (CEMO)
- Municipal Environmental Management Officer (MEMO)
- Town Environmental Management Officer (TEMO)

These officers shall ensure the enforcement of the EMA 2004,

Environmental Committees

EMA also designates to the following committees the status of Environmental Management Committees. These committees are; Standing Committees on Urban Planning and Standing Committees on Economic Affairs, Works and Environment. The powers of these committees under the EMA are provided for in the law to include:

- Resolving conflicts
- Require provision of information
- Examine and inspect premises
- Initiate proceedings of civil nature against any person, company department or institution that refuses or fails to comply with any directive issued by any such committee

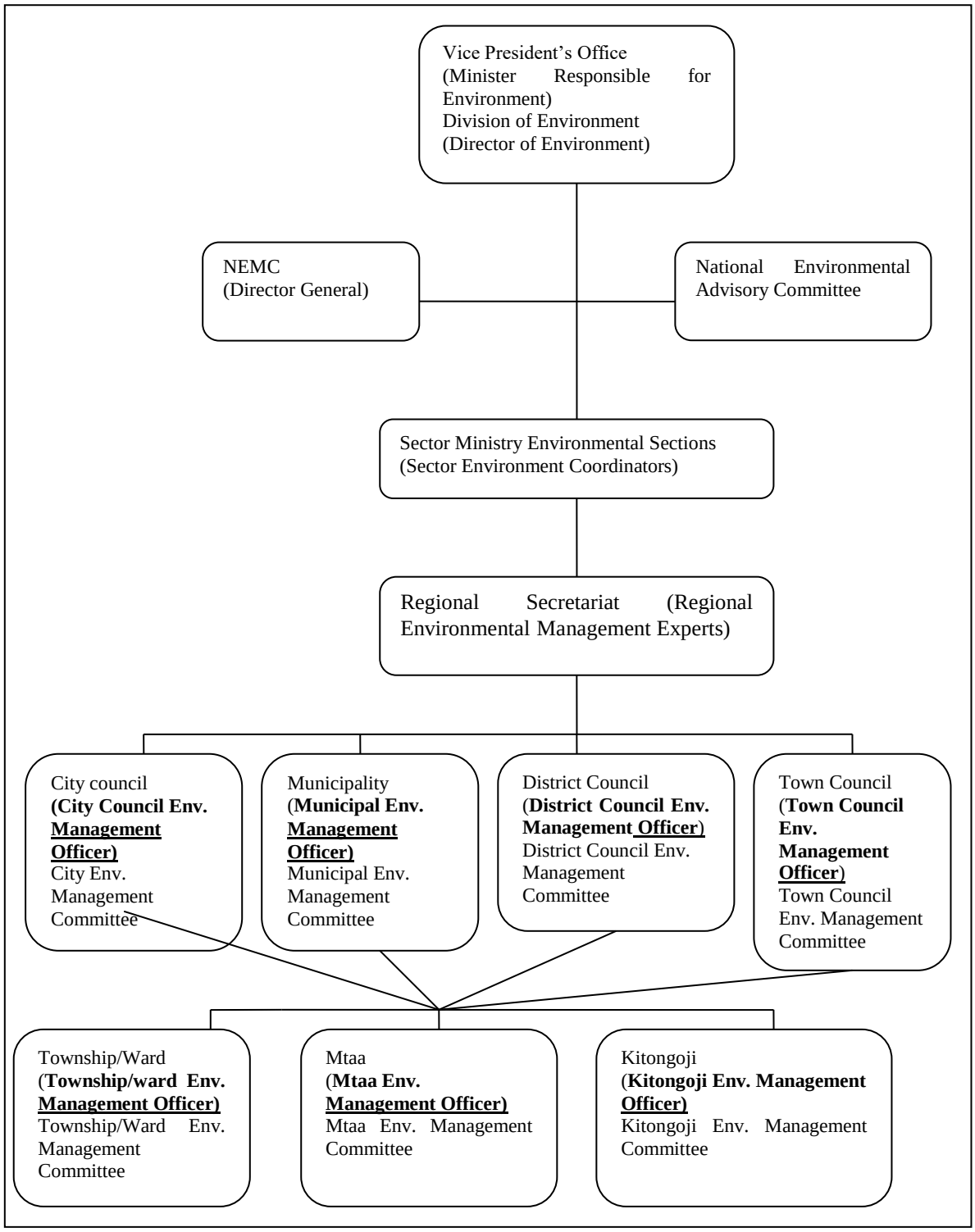
EMA designates these Committees with the status of:

- City Environmental Management Committee
- Municipal Environmental Management Committee

It is worth to note here that at the status of Town Council, the Town Environmental Management Committee is not provided for under this section. This is a legislative gap.

It should also be noted that there are currently two on-going consultancies on 1) capacity-building and 2) mainstreaming environment in the District Development plans (DDP's) which are also looking into matters as regards the implementation modalities and needed resources in order to have a well-oiled, functional and fully operational institutional framework.

Figure 2: Institutional Setting According to EMA 2004



The involvement of civil society, the private sector in environmental management

Exchange of information between the government and public/private sector is critical in sharing broad knowledge base for all interested parties' interests and needs in environmental management. For example, in preparing the NSGRP, as part of the consultation process, civil society organisations and an environment working group submitted proposals on the environment and natural resources. The public[4] and private sectors are involved at different stages of environmental planning and management in Tanzania. Also guidelines for involving the public exist for different sectors (examples are the guides/policy papers of the public consultation within mining sector.) Nonetheless there is a need to further empower the public and private sectors in the ownership of environmental information flowing from the consultation processes. Environmental education should be consistently used in this process. Through education, the public can better understand its rights to participate in government decision-making, monitor government performance and demand compliance, and ensure environmental accountability. It should be noted that education is one of the focal sectors of the EU development assistance to Tanzania. Apart from access, there are several environmental information issues in Tanzania:

- Non-systematic and irregular data collection, lack of quality control in data collection;
- Lack of coordination in data collection, especially between line ministries and specialized institutions;
- Lack of skilled personnel, financial and technical resources (limited computerization) to collect, interpret and report environmental data;
- No involvement of NGOs and communities in the process of data collection especially at the local level; and
- Low level of standardization and compatibility of datasets, and systems interoperability.

Currently, there is some on-going work in this area to further involve civil society and private sector in environmental management in the country.

[4] During the study, there was no info available on the number of national and international environmental NGO's active in the country.

4.3 A review of the international obligations undertaken by the country in the area of environmental protection

Tanzania has demonstrated a strong commitment to protect the environment beyond Tanzania. The table below outlines some of the key conventions and related activities.

Table 1 - Summary international/regional treaties and their Implementation

Convention/ Treaty	Adoption date	Ratification Date	Objectives	Implementation Programmes/projects
1. Convention on Biological Diversity (CBD)	May, 1992	March, 1996	1. Promote Conservation of Biological Diversity 2. Sustainable use of its components 3. Fair and equitable sharing arising out of the utilisation of genetic resources	1. Lake Victoria Environment Management Programme 2. Lake Tanganyika Biodiversity Project 3. Formulation of a National Biodiversity Strategy and Action Plan 4. Conservation and sustainable use of Biodiversity on Eastern Africa Rift Valley Lakes and wet lands 5. East African Cross Border Biodiversity Project 6. National Bio safety framework Project
2. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity	Jan, 2000	2003	1. To contribute to ensuring an adequate of protection in the field of living modified Organisms resulting from modern biotechnology	1. National Biosafety Framework Project launched in 2002 2. Establishment of Biosafety Clearing house
3. Convention for the protection, management and development of marine and coastal environment of the eastern African region and related protocols	June 1985	March 1996	1. To ensure sound environmental management of maritime and coastal areas. (Developed from Region seas Programme initiated by UNEP in 1974)	1. Tanga Coastal Zone Conservation and Development programme 2. Tanzania Costal Management Partnership Programme
4.United Nations Convention to Combat Desertification	June 1994	April 1997	To combat desertification and mitigates the effect of drought in countries experiencing serious droughts and or desertification	1. National Action Plan (NAP) to combat desertification 2. The greening of Chipate area in Masasi district in Mtwara region 3. Strengthening Capacity on NGOs focal point to implement the CCD Programme 4. Tree nursery establishment and installation of small biogas project in Zuzu village Dodoma 5. Catalytic support to Muungano Women group of Iyumbu village in Dodoma
5. The United Nations Framework Convention on Climate Change	May 1992	April 1996	To achieve stabilisation of green house gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climatic system	
6. Kyoto Protocol	Dec. 1997	(Advanced stage)	To strengthen the commitment of developed country Parties with a	1. Sources and sinks of greenhouse gasses 2. Technological and other options for mitigation of greenhouse gasses in

Convention/ Treaty	Adoption date	Ratification Date	Objectives	Implementation Programmes/projects
			view to reduce their overall emissions	Tanzania 3. Assessment of vulnerability and adaptation of climate change in Tanzania 4. Development of a National Action Plan on climatic change in Tanzania 5. Tanzania, enabling activities for the preparation of initial national communication related to the framework convention on climate change
7. The Vienna Convention on Protection of Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer	Sep. 1987	Apr. 1993	Protect human Health and the environment against adverse effects resulting from modifications of the ozone layer form anthropogenic emissions of substances proved scientifically to have high ozone depleting potential	1. Intuitional strengthening for the phase out of ODS and the establishment of a National Ozone Office 2. Phasing out of CFCs at Tanzania domestic appliance manufacturing ltd. 3. Phase out of CFC-11 by conversion to methylene chloride blown technology in the manufacture of flexible Polyurethane at plyfoam ltd 4. Phasing out of CFCs at Tanzania domestic appliance manufacturing ltd. 5. Phase out of CFC-11 by conversion to methylene chloride blown technology in the manufacture of flexible Polyurethane at Pan African Enterprises ltd 6. Phasing out of CFCs at Tanzania domestic appliance manufacturing ltd. 7. Phase out of CFC-11 by conversion to methylene chloride blown technology in the manufacture of flexible Polyurethane at H.K. Foam ltd 8. Phase out of CFCs at Mansoor Daya chemicals ltd 9. National refrigerant management plan for the phase out of ODS in the refrigeration and air conditioning sector
8. The Basel Convention on the control of transboundary movements of hazardous wastes and their disposal	Mar.1989	Apr. 1993	1. To reduce trans-boundary movements of hazardous and other wastes to a minimum consistent to their environmentally sound management 1. To treat hazardous wastes and other wastes 2. To minimise the generation of hazardous wastes.	
9. Protocol on liability and compensation on damages resulting from trans-boundary movements of hazardous waste and their disposal	Dec 1999	Not yet	To provide for a comprehensive regime for liability and for adequate and prompt compensation for damages resulting from the trans-boundary movements of hazardous wastes and their disposal including illegal traffic of those wastes	

Convention/ Treaty	Adoption date	Ratification Date	Objectives	Implementation Programmes/projects
10. Bamako Convention on the ban of the import into Africa and the control of trans-boundary movements of hazardous wastes within Africa (Bamako convention)	Jan 1991	April. 1993	1. To protect by strict control the human health of African population against adverse effects which may result from hazardous waste by reducing their generation to a minimum in terms of quantity and or hazard potential 2. To adopt precautionary measures ensure proper disposal of hazardous waste and to prevent dumping of hazardous wastes in Africa.	1. Cleaner production investments in Africa 2. Chemical waste management in Tanzania

4.4 Other Environmental Sectors relevant to Tanzania

Regional Co-operation

Tanzania is working dealing with environmental issues in East Africa through the East African Community (EAC). The EAC is the regional intergovernmental organisation of the Republics of Kenya, Uganda and Tanzania, with its Headquarters located in Arusha, Tanzania. The East African Heads of State signed the Treaty for the Establishment of the East African Community in Arusha on 30th November 1999. The main organs of the EAC are the Summit of Heads of State and or Government, Council of Ministers, Co-ordination Committee, Sectoral Committees, East African Court of Justice, East African Legislative Assembly, and the Secretariat. http://www.eac.int/ - Top

The Lake Victoria Basin Commission: Efforts to develop the Lake Victoria Basin into an economic growth zone are being lead by the Lake Victoria Basin Commission. The Commission undertakes a broad range of mandates extending from providing regional coordination and guidance on objective measures of economics development to institutional building. These mandates enable the EAC meet the long-term objectives of sustainable use of the basin and the lake's resources to ensure benefits to the present and future generations. Specific mandates include:

- Development of a Shared Vision and Strategy Framework for management and Development of Lake Victoria Basin;
- Development process for the Protocol on Sustainable Development of Lake Victoria Basin;
- Implementing the Partnership Agreement signed by the EAC with Development Partners on sustainable management of the Lake Victoria Basin;
- Establishing partnerships with the main local actors in the Lake Basin - the civil society organizations, local authorities organization and some sections of the private sector; and
- Enhancing technology packing and dissemination to all stakeholders.

Trade

The EU is Tanzania's main trading partner and one of its most important providers of external aid. In 2003, around 21% of all imports came from the EU, while around 50% of all Tanzanian exports were destined for the EU. Trade has by far the largest direct impact on the economic development of most developing countries and in Tanzania this is no exception. Trade and environment are irreconcilable under certain conditions:

- Environmental protection raises new requirements to trade development; environmental laws and regulations even forbid many products to be traded internationally,
- Trade growth not based on the sustainable development principle will bring significant adverse impacts on the environment.

Unfortunately, in many developing countries, trade-related environmental issues and environment-related trade issues are receiving little attention during the planning process. This is to a great extent due to lack of capacity to deal with the trade and environment nexus, with sustainable development being seen as the basis for enhancing the debate on these issues. The most important trade and environment problems in developing and in particular the least developed countries (LDCs) are: deforestation, desertification, degradation of coastal areas, overfishing, loss of wildlife and other biodiversity resources, land degradation, and the dumping (by other countries) of wastes, environmentally harmful products and obsolete technologies.

The National Trade Policy (2003) of Tanzania, recognizes environment as one of the two cross-cutting issues together with gender and it subsequently acknowledges the need to link growth and development to the optimal use of resources. It also notes that, 'the push for economic transformation and growth tends to lead to environmentally degrading practices and hence mitigation strategies should be adopted to promote environmentally sustainable production practices.'

Transport Sector (Roads)

Tanzania has a road network totalling about 85,000 km of which 10,500 km are trunk roads, 24,500 km are regional roads, and the remaining 50,000 km are classified as rural and feeder roads. Road Transportation is very significant and essential to Tanzania's Economic growth and to improve the social conditions of the population. No sector of the economy could function without an effective road transport system. The EC has also recognized the road sector importance and made it a priority in its 9th EDF. Transport activities however, could impact on the quality of our air, water, and land, and on the quality of human life, if not properly managed. The main road sector environmental issues are: loss of biodiversity; loss of natural resources; land degradation; deforestation; pollution; resettlement, induced development, and social, economic and cultural issues.

In December 2004, the MOW launched the *Sustainable development Strategy for Environmental Management in the Road sector 2004 – 2007* which is based on a broad analysis of relevant road sector data and environmental information. Road sector stakeholders and the Tanzanian Environmental Authorities participated actively in the review of this strategy. The strategy provides a good foundation for integrating environmental considerations into the MOWs road sector activities, decisions, policies and programmes.

In parallel with the strategy MOW also launched a report on the *Environmental Assessment (EA) and Management Guidelines for the Road Sector*. The purpose of these guidelines is to establish a systematic and logical way of incorporating environmental issues into all activities undertaken in the Road Sector. The main strategy is to integrate environmental and social-economic concerns from the project planning phase to the maintenance.
These are positive initiatives in light of the implementation of EMA. As these efforts were initiated approximately a year ago it remains to be seen whether they will be effective and lead to a systematic inclusion of the environment component in the road sector development projects and programmes.

4.5 EC & other international development assistance

EC actions in Tanzania on the environment are well documented, as there was recently an environment performance audit carried out by the European Court of Auditors as part of the general audit of the environmental aspects of EC development cooperation which sampled 8 countries, including Tanzania. The audit report gives feedback on the current strengths and weaknesses of the EC assistance to Tanzania from an environmental perspective. The audit concluded that environment had not been adequately mainstreamed in the current Country Strategy Paper and that environment expertise at the Delegation was not utilised effectively. The audit did however note that Tanzania was one of the few countries that has mainstreamed environment in its general budget support by including an environment indicator in the Performance Assessment Framework (expanded below).

The focal sectors of the current CSP for Tanzania are roads and education, however the majority of assistance goes to general budget support. EC development assistance in Tanzania should also be viewed through the objectives of MKUKUTA and within the backdrop of the joint assistance strategy (JAS) (currently in draft).

The National Strategy for Growth and Reduction of Poverty - MKUKUTA
NSGRP was developed in 2004 and is known by its Swahili acronym 'Mkukuta'. It contains three broad cluster areas of:

- Cluster 1: growth and reduction of income poverty
- Cluster 2: improvement of quality of life and social well being
- Cluster 3: governance and accountability

It is strongly outcome focused and it has set out to mainstream key cross-cutting issues, such as environment. This was in response to recognition by the GoT and development partners that environment, and other important cross-cutting issues were not well addressed in the first PRS and that these were essential to the achievement of sustainable poverty reduction and growth.

Mkukuta makes explicit mention of sustainable development as an underlying principle and has a specific goal on environmental sustainability where 14% of the targets are directly related to the environment and natural resources.

The EC Development Policy Declaration identifies six areas of concentration for Development Cooperation. Environment is considered a cross-cutting issue which needs to be integrated into all of these six themes to make development sustainable. The six core areas are:
1. Trade and Development
2. Regional Integration and Co-operation
3. Support to macro-economic policies linked to social sector programmes
4. Transport
5. Sustainable rural development and food security
6. Institutional capacity building, good governance and the rule of law.

In November 2005, a new European Union Development Policy ("The European consensus on Development") was adopted. In contrast to the previous policy, the new policy includes environment and natural resources as a priority area. The new policy recognises the importance of environmental programmes/projects as well as mainstreaming the environment into other development programmes/projects, if the environmental aspects of development cooperation are to be comprehensively addressed. However, to a considerable degree, the extent to which the new priority given to environmental expenditure is actually implemented depends on whether beneficiary countries select environment and natural resources as a focal area. In Tanzania this focus and priority is reflected in the National Strategy for growth and Reduction of poverty (NSGRP). Also, Tanzania is one of the few countries which have attached conditionalities, designed to support the environment, to general budget support under the Poverty Reduction Budget Support Programme 2003-6 (EC contribution €114 million) where, in the broader context, donors and the GOT have made the passing of environmental legislation one of the six poverty reduction strategy objectives. This is being viewed as a positive example of mainstreaming; that is the inclusion of environmental sustainability as one of six objectives for measuring Government performance in the current Poverty Reduction Budgetary Support programme. The inclusion of this objective gave the Government a further incentive to adopt the Environmental Management Act which had been under preparation since 1998. The fact the environment has now been prioritized and better mainstreamed in the NGSRP (Mkukuta) offers new opportunities for the EC to strengthen their assistance in the environment sector. This, both in terms of environment projects and the mainstreaming of environment in the sectoral activities.

Development Partners Group (DPG) Cooperation with Tanzania in the Environment sector.
In the environment and natural resources sector, it was observed that certain issues and thematic areas in Tanzania appear over-represented by donors. In particular the Green Agenda has been given considerable more attention than ?. It is also important to recognise that policy dialogue, planning of interventions and monitoring of results need not be achieved only through sector-specific SWAPs. Where good dialogue is established through SWAPS or sector baskets, this can and should continue, even as aid modalities shift towards GBS (General Budget support). The optimum number of DPs may in fact vary from sector to sector, with some MDAs able to manage multi-donor programmes more effectively than others. Nonetheless, some rationalisation under new types of partnership is needed to streamline DPs' interface with GoT, to enhance coherence with national policy, and to simplify procedures.

5. Conclusions and Recommendations

This joint initiative to prepare the CEP in close cooperation with the GOT's preparation of the SOER and in consultation with DPG is a sign of the positive move of the EC. It is also a sign of the forward thinking approach and form part of its continues efforts, together with development partners and the GOT, to make efforts to mainstreaming cross-cutting issues, including the environment. In general there is a strong commitment among DPG to coordination of development assistance in the country.

A key area for joint action by DPG in the near future could include movement towards a basket or sector arrangement to build capacity for the implementation of EMA.

On the basis of the state of the environment and situation presented in previous chapters the areas in which the EC and other partners can support the GOT in its objective of reaching sustainable growth are (analyzed) summarized here. The recommendations are designed to be an important analytical tool for both the government and DPG. The recommendations (recommended actions) include environmental policy measures, legal measures, institutional measures, funding/investments, education, and awareness building and some general criteria which could be taken into consideration in preparing actions, programmes and plans (e.g. NEAP). It should be observed that the more specific recommendations which meet the specific needs for EC programming as requested in the TOR are in included in the EC action plan for mainstreaming which is provided on separate sheets (annexed to the main report of the Tanzania Environment study).

A summary of the main issues (Implementation/Harmonization of Strategies/Policies to go hand in hand with EMA):

Sector/themes	Problem/Issues or Source	Policy Recommendations / Illustrative Interventions
BROWN AGENDA (Management of the Built Environment)		
Rural and Urban (Settlements)	• Water contamination • Water availability/scarcity • Living Conditions • Illegal settlements	• Sustainable cities programme • Develop and implement Strategic Urban Development Plans • Develop and implement Village, Town and City Physical Plans • Ensure community ownership of water resources and sanitation
Water Resources/ management	• Water pollution • Water scarcity • Water use conflicts • Access to safe drinking water • Poor sanitation	• Integrated water resources management • Enhance water basin management principles • Public-private partnerships • Water supply and sewerage master plans/projects
Solid waste management	Uncontrolled disposal of solid waste Public Health hazards	• Implementation Sustainable Cities programme • Promotion of waste reduction practices and recycling activities • Review Environmental health issues
Air and Noise	Green House Gases Environmental health hazards	• Awareness raising • Forest conservation programmes • Innovative climate change projects
Energy (Climate change)	• Power shortages • Excessive Use of firewood, Charcoal • Insecure and unreliable energy supplies	Enhance energy accessibility, equity, conservation of non renewable energy, alternative sources of energy, management of adverse impacts of energy development project
Industry	Effluent pollution Waste disposal	• Cleaner production concept • Promoting more efficient/environmental friendly technologies
GREEN AGENDA (Natural Resources Management)		

Biodiversity, Natural and Cultural heritage	• Loss of biodiversity	• Review wildlife law to reflect policy statements • Review wildlife institutions • Resolve wildlife-people conflicts • Enhance operationalisation of Wildlife Management Areas
Coastal and Marine Resources	• Declining harvests of marine and coastal living resources • Loss of coastal and Marine biodiversity • Coastal pollution • Beach (coastal) erosion	• Protection of marine resources • Implementation of the integrated coastal zone management project • Investigate alternatives to use of sand in construction
Fisheries & Marine resources	• Decline of fisheries stock	• Review fisheries act • Revisit deep sea fishing issues • Review artisanal fishing issues
Forestry	▪ Deforestation ▪ Forest degradation ▪ Biodiversity loss ▪ Mangrove loss ▪ Illegal logging ▪ Weak forest governance	▪ Enhance Participatory Forestry Management, including formation of Village Forest Reserves ▪ Regulate use of commercial charcoal burners and promote the use of efficient wood burning stoves ▪ Strengthen forest fires control measures ▪ Study and promote use of non-wood forest products ▪ Promote better forest law enforcement ▪ Innovative climate change projects
Mining	The impact of mining on environment (efficient use of energy and water, impact on human health, landscaping issues, etc)	Application of regulations Environmental monitoring and enforcement Cleaner production practices
Agriculture	• Land degradation • Loss of agro-biodiversity • Biosafety (potential risks to human health, etc)	• • Reduce the use of water and agro-chemicals in agriculture. Increasing agriculture production per unit area; • Reducing agricultural risks to the health of air and the atmosphere; • Reducing agricultural risks to the health of water resources; • Reducing agricultural risks to the health of soils; and • Ensuring compatibility between biodiversity and agriculture
Land Resources	• Desertification • Land degradation	• Undertake a detailed assessment of the land resources base • Study the land tenure system • Prepare land use plan • Conserve and improve soil fertility • Assess rangeland activities

Appendix 1: Technical Appendixes

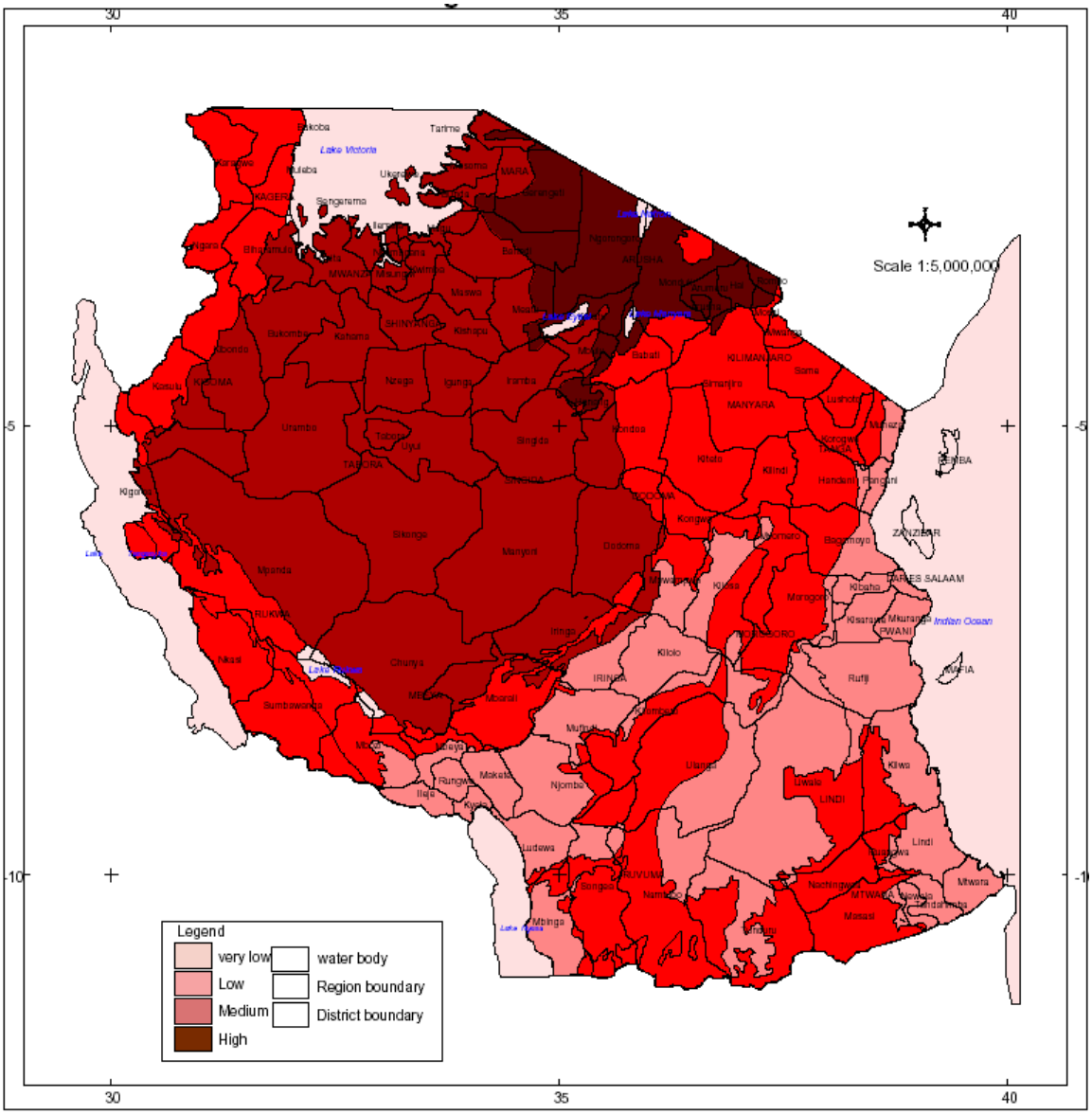


Figure 3: Drought vulnerability in Tanzania

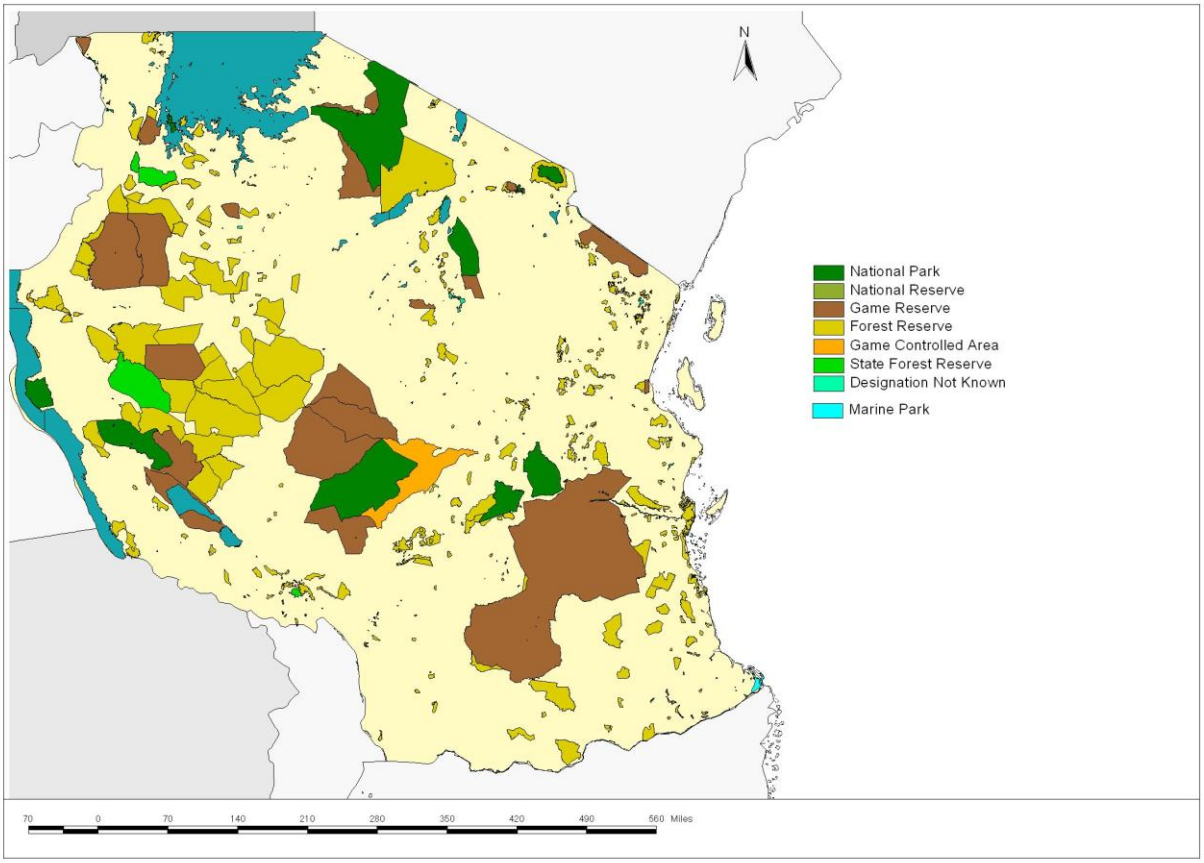


Figure 4: Protected areas of Tanzania

Appendix 2: Administrative Appendixes

Study Methodology

The study methodology included: Literature collection and review, consultations/interviews & input from key-persons and stakeholders, field visits/development of case study material and the organization of a debriefing/consensus building workshop. An inception report dated 28 November 2005 and a Progress report dated 16 December 2005 were prepared as part of the deliverables of the study. The consensus-building workshop was held on the 10 January 2006 in order to agree on the major themes and issues and review the current state of the study. In this context the initial recommendations as drafted by the group were reviewed and discussed in 4 working groups covering the several chapters as agreed upon. The 4 groups were as follows: (1) Capacity building/Institutional Strengthening, Legal and Policy Reviews; (2) Management of Pollution – Brown Issues (3) Management of Natural Resources and Agriculture – Green Issues and (4) Mainstreaming environment in sectoral programmes integration – environment/economics and some emerging issues.

It could be said that all the components as regard the study methodology moved according to plans with the exception to the consultation of the different stakeholders.
This was partly due to the fact that these consultations/interviews were mainly in December 2005 which was a period leading up to presidential elections and included several holidays in Tanzania. Hence, some further consultations took place before and following the workshop in January 2006. A list of persons consulted and those who participated in the workshop is attached as ANNEX 2.

In general, the study progressed satisfactorily and this report was prepared in good cooperation and team spirit which included working through the Christmas and New Year holidays in order to finalize it on time.

Appendix 3 : Terms of Reference

Terms of Reference
Tanzania Country Environment Study

Appendix 4: Internet Sites Consulted

www.parliament.go.tz
www.povertymonitoring.go.tz
www.tanzania.go.tz
www.leat.or.tz
www.leat.or.tz/publications/env.handbook
www.tanzania.go.tz/environment
http://www.natural-resources.org/minerals/CD/docs/unctad/blinker.doc
http://www.newafrica.com/mining/tanzania_miningdev.htm).
http://www.newafrica.com/mining/laws/tanzania.pdf (Mining)
http://www.mwekawildlife.org
http://www.tanzania-web.com/map/home.htn
http://www.areed.org/country/tanzania/energy.pdf (Energy Sector review)
http://www.crc.uri.edu/download/TCM_004A.PDF (CoastalZone Management)
http://www.tic.co.tz
http://www.tanzania.go.tz/profilef.html

Appendix 5: References List

1. National Environment Policy (1997)
2. Environmental Management Act (2004)
3. National Strategy for Growth and Reduction of Poverty - MKUKUTA (2005)
4. Tanzania Joint Assistance Strategy, 1st Draft May 2005
5. Policy Briefs to Tanzania Development Partner Group on Forestry, Fisheries and Wildlife. (May 2005)
6. Public Expenditure Review on Environment (2004)
7. Report on development of poverty-environment indicators for Tanzania (August 2005)
8. Study on Poverty-Environment Issues in Tanzania, World Bank
9. European Court of Auditors - draft preliminary findings arising from the audit on the environmental aspects of development cooperation in Tanzania (July 2005)
10. Study on Growth and Environment Links for Preparation of Country Economic Memorandum (CEM). Produced by COWI consultants for the World Bank (May 2005)
11. European Community's Poverty Reduction Effectiveness Programme (EC-PREP) research project: Streamlining poverty-environment linkages in the European Community's development assistance. National-level assessment of EC Country Strategy Papers: Tanzania follow-up CSP (2002-2007) review and institutional evaluation. Conducted by WWF (Mathilde Snel, July 2005).
12. SIDA report 'Tanzania – an Environment Policy Brief'. By Jessica Andersson and Daniel Slunge at the Environmental Economics Unit, Göteborg University and Maria Berlekom at SwedBio (June 2005).
13. Boulding, K., 1966, The Economics of the Coming Spaceship Earth. In: H. Jarret, (ed)
14. Environmental Quality in a Growing Economy Johns Hopkins University Press, Baltimore
15. FAO 1993, A year book of Forest products 1983-1993 Rome
16. Fisher, G.; E. de Pauw, H.T. van Veldhuizen, F.O. Nachtergaele and J. Antoine 1995. A Provisional World Climate Resource Inventory Based on the Length of Growing Period Concept. Proceedings of NASREC Conference
17. Harris, M. and I. Fraser, 2002. Natural resource accounting in theory and practice: A critical assessment. The Australian Journal of Agricultural and Resource Economics. 46:2, pp.139-192.

18. Morsely, W.G., 2001African Evidence on the relation of poverty, time preference and the environment Ecological Economics 38(3): 317-326
19. NBS 2002. National Accounts: Methodology for Agriculture Production Estimates. National Bureau of Statistics Tanzania, Dar Es Salaam. 114pp.
20. Repetto, R. 1993: How to Account for Environmental Degradation. In Adamowicz et al. (Eds): Forestry and the Environment: Economic Perspectives, CAB International, Wallingford, UK.
21. Repetto, R., Magrath, W., Wells, M., Beer, C., and Rossini, F. 1989. Wasting Assets: Natural Resources in the National Income Accounts. Washington, D. C.: World Resources Institute.
22. Rugalema, G.H; S.C. Lugeye; R.Y.M Kangalawe and Liwenga E.T. 1998. The poverty-Environmental Degradation Nexus: Is there Enough Evidence? Journal of Agricultural Economics and Development 2:25-32
23. Karpagam M. 1999 Environmental Economics. A text Book. Sterling Publishers Ltd.
24. ***Mugurus Eric and David Howlett,*** Strategic Environment Assessment, Poverty Reduction and Growth in Tanzania: Challenges and opportunities Joint Evaluation of General Budget Support to Tanzania.
25. Kassenga, G. R. and Mbuligwe, S.E. (1998). "Potential and Ramifications of Noise and Vibration Pollution in Tanzania. Case Study: Dar es Salaam City". *The Tanzania Engineer*. Vol. 6 No. 5; pp 86 – 97.
26. Kassenga, G.R. and Mbuligwe, S.E. (1996) "Automobile Air Pollution in Dar es Salaam City, Tanzania", *Science of Total Environment.* Vol. 199; pp. 227 – 235.
27. Kassenga, G. R (1997). "A Descriptive Assessment of the Wetlands of Lake Victoria in Tanzania". *Resource, Conservation and Recycling*. Vol. 20; pp. 127 - 141.
28. Mato, R.R.A.M; Mufuruki, T. S (1999), "Noise Pollution Associated with the Operation of the Dar es Salaam International Airport". *International Journal of Transport and Environment, Transport Research Part D*. Vol. 4(2), pp 81-89.
29. UNEP-CEDR, (Centre for Economic Development Research). 2001. The Study on the Impact of Privatization of Trade in Forest Products. UNEP.
30. Central Census Office (2000) Population and Housing Census General Reports, Dar es Salaam.
31. Moyo, S., O'Keefe, P. and M. Sill. (1993). The Southern African Environment; Profiles of the SADC Countries. Earthscan Publications, London. pp. 345.
32. Kiunsi. R, Meshack, M. and M. Jackso. (2003*), Disaster Vulnerability Assessment Phase II*, Prime Ministers Office, Dar Es Salaam, Tanzania.
33. Havnevik, K.J. et al. (1988). *Tanzania: Country Study and Norwegian Aid Review*. Bergen, Centre for Development Studies, University of Bergen, 366 pp
34. CI (Conservation International) & ICIPE (International Centre of Insect Physiology and Ecology). (2005). Eastern arc mountains and Coastal forests of Tanzania and Kenya: Ecosystem Profile, Nairobi, Kenya.
35. GEF. 2002. Project Brief: Conservation and Management of the Eastern Arc Mountain Forests, Tanzania. GEF Arusha, Tanzania.
36. Ramsar Convention on Wetlands. (2005). The List of Wetlands of International Importance. Retrieved (2005) from: http://ramsar.org/key_sitelist.htm.
37. Senzia, M.A., Mashauri, D.A. and Mayo, A.W. (2002). Suitability of Constructed Wetlands and Waste Stabilization Ponds in Wastewater Treatment: Nitrogen transformation and Removal, 3rd Waternet/WARFSA Symposium on Integrated water supply & water demand for sustainable use of water resources, University of Dar es Salaam, White Sands Hotel, Tanzania. Pg. 519.
38. Mwalyosi, R., Fisher, W., Kessy, E. Gereta, E. Engle, R.L., Varoya, I.J., Madayi, Z.A. and Kijazi, A. (2001). Programmatic Environmental Assessment for Road Improvement in Tanzania's National Parks. Prepared for Tanzania National Parks (TANAPA) and USAID-Tanzania, Dar es Salaam, Tanzania.
39. Kiely, G. (1997), Environmental Engineering. McGraw-Hill. Maidenhead, United Kingdom.

40. Ndesamburo, J (1986), The impact of Kigamboni petroleum oil refinery effluent to the environment. Diploma project. Ardhi Institute, Dar es Salaam. Unpublished.
41. Nshunju, J.J. (1993), Management of oily wastewater: Case study, BP, ESSO and Caltex depots, Dar es Salaam. Diploma project. Department of environmental engineering, UCLAS, Dar es Salaam.
42. Vindi, N. (2000), Waste lubrication oil management in Dar es Salaam. B.Sc. Dissertation. Department of Environmental Engineering, University College of Lands & Architectural Studies (UCLAS), Dar es Salaam. Unpublished.
43. Ndesamburo, J (1986), The impact of Kigamboni petroleum oil refinery effluent to the environment. Diploma project. Ardhi Institute, Dar es Salaam. Unpublished.
44. Mato, R.A.M. (2002), Groundwater Pollution in Urban Dar es Salaam, Tanzania Assessing Vulnerability and Protection Priorities. Ph.D. Dissertation. Eindhoven University of Technology, The Netherlands.
45. Yhdego, M and Mato, R.R.A.M (1996), Environmental management system for the Tanzania Liquid Storage Company. Consultancy report. (Unpublished), Dar es Salaam.
46. Jackson, M.M. (2005). Roadside concentration of gaseous and particulate Matter pollutants and risk assessment in Dar es salaam, Tanzania. *Environmental Monitoring and Assessment.* 104:385-407.
47. USAID (U.S. Environmental Protection Agency) (2004). Ambient air monitoring plan for Dar es Salaam, Tanzania. North Carolina, USA.
48. UNEP (United Nations Environment Programme) (2001). Eastern Africa Atlas of Coastal Resources: Tanzania. United Nations Environment Programme, Nairobi. pp. 111.
49. Mariki, S.W., Shechambo, F. and J. Salehe. (2003). The Contribution of Environmental Goods and Services to Tanzania's Economy: With Reference to Poverty Reduction. Policy Brief No. 5. IUCN, Eastern Africa Regional Office, Nairobi, Kenya.
50. CEEST (Centre for Energy, Environment, Science and Technology) (1994) Sources and Sinks of Greenhouse Gases in Tanzania. Report No. 5/1995.
51. Cleaner Production Centre of Tanzania (2005): Cleaner Production Concept and its Practice, a paper presented at the Sustainable Cities Programme Consultative Workshop held from 1-2 December 2005 in Dodoma, Tanzania.
52. Dutch Ministry of Economic Affairs (1991): Manual for Prevention of Waste and Emissions Part I. Ieiderdorp. Grafisch Productie Bureau BV
53. Kirango, Jasper Mwanga (1996): Industrial Effluent Management in the City of Dar es Salaam – a M.Sc. Programme in Urban Environmental Management, Institute for Housing and Urban Development Studies, Rotterdam, the Netherlands
54. Kirkwood, R.C and A.T. Longley, (Eds.) (1995): Clean Technology and the Environment, London – Blackie Academic and Professional/Chapman and Hall
55. Kitilla, Martin D (1999): The Status of Air Pollution in Dar es Salaam city
56. Kitilla, Martin D (2004): Urban Air Pollution in Tanzania: The Case of Dar es Salaam City, a paper presented at the Better Air Quality in the Cities of Africa 2004 Regional Workshop held from 21-23 April 2004 at the Indaba Hotel, Johannesburg – South Africa
57. Kondoro, J.A.W. (1994): Pollutants and their levels in soils surface, water and air of the city of Dar es Salaam: A Case Study of the Msimbazi River Basin and Dar es Salaam City Centre, Department of Physics – University of Dar es Salaam
58. Ministry of Water and Livestock Development: Annual Report – The Urban Water Supply and Sewerage Authorities: Financial Year 2003/2004 (May 2005). Prepared by Ernst & Young and Norplan
59. Ministry of Water and Livestock Development – Budget Speech 2005/2006
60. Ministry of Water and Livestock Development: Statistical Year Book, January 2005

61. OECD (2000): Shaping the Urban Environment in the 21st Century: From Understanding to Action, a Development Assistance Committee Reference Manual on Urban Environmental Policy
62. Ojwang, J.B. (1993): Eco-policy 3. Environmental Law and Constitutional Order. Nairobi. African Centre for Technology Studies
63. Per Elvingson and Christer Agren (2004): Air and the Environment – Swedish NGO Secretariat on Acid Rain
64. Shen – yan and B. Peter (Eds.), (1994): Industrial Pollution Prevention, Manila. Asian Development Bank
65. UNEP/UNIDO (1991): Audit and Reduction Manual for Industrial Emissions and Wastes – Technical Report Series No.7.
66. Investment Opportunities in the Fisheries Sector in Tanzania, (January 2005, Fisheries Division
67. Sustainable Development Strategy for Environmental Management in the Road Sector 2004 – 2007, (December 2004) Ministry of Works, United Republic of Tanzania.
68. Environmental Assessment (EA) Guidelines for Road Sector, (December 2004) Ministry of Works, United Republic of Tanzania.
69. Report on the Workshop to Develop a Table of Contents for the National State of the Environment Report for Tanzania (1998)
70. Guidelines for the Preparation of Medium Term Plan and Budget Framework for 2005/06 – 2007/08, Ministry of Finance, The President's Office Planning and Privatisation, January 2005
71. International / Regional Treaties on the Environment and Implementation Programmes/Projects (2001), VPO-DOE
72. Tanzania Environmental Profile (March 1997), Mato, R. (Document prepared for Japan International Co-operation – JICA)
73. Johannesburg Summit 2002 Country Profile United Republic of Tanzania, United Nations (http:www.un.org/esa/agenda21/natlinfo)
74. Technical Recommendations of the Workshop on Integrated Coastal Zone Management in Eastern Africa including the Island States 21 – 23 April 1993, Arusha, Tanzania. Environment Department, The World Bank/SAREC
75. Draft Report on the Mid-Term Review (MTR) of the EC Country Strategy Support (January 2005)
76. Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources – A Case Study on Uganda's Fisheries Sector (1999), UNEP, Economics and Trade Unit.
77. Mbarali District Council – Medium Term Plan and Budget Framework (MTP & BF) for the Year 2005/2006 – 2007/2008
78. East Africa Atlas of Coastal Resources, 2001, UNEP, Nairobi, Kenya
79. National Framework for Urban Environmental Management in Local Government Authorities in Tanzania, (November 2005), PO-RALG – UASU
80. Management of Forests in Tanzania, a country Report, (November 2005) Kihwele D, Hoza I., Kiboga, M.
81. Climate Change Mitigation in Southern Africa, Tanzania Country Study (January 1999) UNEP, Ministry of Energy and Minerals, RISO
82. URT/VPO (2005) National Adaptation Programme of Action. Draft Report October 2005
83. URT (2005) The National Biosafety Framework for Tanzania. Vice President's Office, Division of Environment.
84. URT (2005) The National Biosafety Guidelines for Tanzania. . Vice President's Office, Division of Environment.
85. REFERENCE. URT 2004 Ministry of Finance. Cross Sector MTEF strategy

86. Howlett, DJB, Hughes R and Mwalyosi, R. 1999. Home or away: achieving the greatest impact of training on national EIA capacity in developing countries. Paper presented at IAIA conference, Glasgow.
87. TANAPA (1994a). National Policies for National Parks in Tanzania. Tanzania National Parks.
88. TANAPA (1994b). Guidelines for the preparation of environmental impact assessments for Tanzanian National Parks. Tanzania National Parks.
89. Mwalyosi, R. and Hughes, R. (1998). The performance of environmental assessment in Tanzania: an assessment. IRA Research Paper no. 41/IIED Environmental Planning Issues no. 14.
90. URT, 2004a. Strategic Environmental Assessment and its Potential for Application in Tanzania with Linkages To The Poverty Reduction Strategy Process. Study commissioned by Vice President's Office with support from UNDP.
91. URT, 2004b. Strategic Environmental Assessment of the Poverty Strategy Reduction Credit. Study commissioned by Vice President's Office with support from the World Bank.