MAJOR ENVIRONMENTAL ISSUES IN TANZANIA*

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1.0 INTRODUCTION

Tanzania is the largest country in East Africa with an area of 945,200km^2. The area includes 881,300km^2 of land, 61,500km^2 inland water and an indented shoreline stretch of about 1000km. About 75% of the land area is either uninhabited or difficult to manage because of undulating relief, tsetse flies infestation or unreliable rainfall. Over 400,000km^2 (46%) of the total land area are forests and woodland, while 40% is permanent pasture.

The distinctive features of Tanzania are "Y-shaped Rift Valley whose form is marked in many places by long narrow and deep depressions often with lakes and other wetlands. The other prominent feature is Mountain Kilimanjaro with the height of 5895 metres above sea level.

The coastal belt is characterized by mangroves and sandy beaches. From the coast (Om asl) up to the tip of Mt. Kilimanjaro, Tanzania enjoys a broad spectrum of climates from the coastal humid type to the tundra climate. The highlands which look like a (though not in the real sense unbroken) G-shaped chain, form major catchment areas as sources of the river network in the country.

The annual rainfall ranges from 400 to 1500mm. Temperatures which are moderate by altitude and by onshore breezes along the coast, fluctuate although the range is between 0^0 to 35^0C. Humidity in the country falls between 25 to 95 per cent.

According to the three recent censuses (1967, 1978 and 1988), the annual average intercensal growth rate for mainland Tanzania was 3.2% for 1967 to 1978 and 2.8% for 1978-88 (Bureau of Statistics, 1988). The figures were the same for Zanzibar. In terms of numbers the population for the whole country doubled from 12.3 million in 1967 to 23.2 million in 1988.

The 1988 census displays interesting characteristics. Dar-es-Salaam is the most densely populated region with 977 people per square kilometer. It is followed by Mwanza (96 people/km^2) and Kilimanjaro (83 people/km^2). Sparsely peopled regions are Rukwa and Lindi with 10 people per square kilometer, Ruvuma (12/km^2) and Tabora (14/km^2). Dar-es-Salaam has the highest population growth rate (4.8%) followed by Rukwa (4.3%) and Arusha (3.8). The lowest growth rate is experienced by Mtwara (1.4%), Lindi (2.0%) and Coast, Kilimanjaro and Tanga each with 2.1 per cent.

2.0 TANZANIA'S NATURAL RESOURCES

Tanzania is endowed with a substantial number of natural resources which support its population. The resources include agricultural produces, aquatic and wildlife resources, range lands, forests and minerals. The population growth *vis-a-vis* demand for survival and economic growth has continually exerted considerable pressure to these resources. However, there are other challenges as the NCSSD (1995) puts it:

> *" ---- as these resources are the base overall socio-economic development in the country, this dependency, aggravated by poverty and lack of appropriate management and technologies in exploiting these resources has resulted in a tendency towards irrational and inefficient utilization of resources".*

An overview of the natural resources is advanced but the problem of data accuracy and reliancy is still great. The data is still inconsistent, contradictory and unreliable in most cases. However, of particular importance is that about 40% of land area is protected (wildlife and forests).

2.1 Agricultural Products

Agriculture (including livestock) is the mainstay of the country's economy. It is estimated that more than 55% of the total land area is potential agricultural land. On the other hand the actual land under cultivation is currently estimated to be only about 6% (URT, 1991). There are many products accrued from agriculture ranging from crops, by-products and finished goods and commodities.

The potential of livestock industry to GDP is very high though it still contributes only 10 per cent (Ibid). According to the 1984 and 1986 livestock census and estimation, there were more than 22 million livestock units in the country (MA, 1991). The annual growth rates are 0.7% for cattle and 1.0% for goats and sheep (MA,1990).

2.2 Forestry and Rangelands Resources

Berry (1971) classified seven categories of vegetation in Tanzania. The categories are woodlands (miombo), forests, bushland and thicket, wooded grassland, grassland swamps or marshes, desert and semi-desert. In real terms there are not very apparent climatically induced desert and semi-desert conditions except for the characteristic shrubs, *Acacia* and *Commiphora* species. These occupy the central and north-eastern arid and semi-arid areas.

Forests and woodlands occupy 44 million hacters (43%) of the total land area. About 1.5 million ha of the forest area is covered with closed forests and mangroves while the remaining (42.5 million) are comprised mostly of open woodlands. There are 540 forest reserves totaling 13 million ha (this is about 15% of the land area and 30% of the forest area).

Fuelwood accounts for 97% of all the uses of wood and 92% of the country's energy use. Apart from the provision of direct products and by-products, forestry resources are linked with agriculture, livestock, wildlife, beekeeping, energy, water and biological diversity. Economically, forestry generates about 10% of the country's registered exports and provides some 730 person years of employment.

The natural pasture land resource is estimated to occupy over 51% of the country's total land area. Rangelands are important for livestock, agricultural production and support of wildlife. They supply over 90% of the feed requirement of the ruminant livestock population. Unfortunately, nearly 60% of all livestock production is taking place on only 10% of the land (Mpiri, 1990), resulting in widespread localized land degradation in much of the central and northern regions of the country due to overgrazing and overstocking.

2.3 Aquatic Resources

Aquatic resources include coastal and marine, freshwater rivers and lakes, and wetlands with over 9 million hectares. Overall, freshwater fishing accounts for a much greater (80%) proportion of total fish catches than the marine fisheries (20%). For example, catches for 1978 were about 16,400 tonnes for freshwater and 47,000 tonnes for marine water. However, freshwater catches increased progressively to 337,000t in 1989 while it was 50,000t for marine waters during the same year (Bwathondi & Ngoile, 1990).

Tanzania owns about 47% of Lake Victoria, 45% Lake Tanganyika and 20% Lake Nyasa (Bwathondi, 1990). The coastline is about 1000 km long and the land area of the coastal zone is approximately 30,000km^2 including the islands. The current designated Mafia Marine Park is a milestone towards marine resources conservation.

2.4 Biological Diversity

Tanzania is one of the most endowed countries in Africa for her biodiversity. In terms of the number of mammal species, Tanzania ranks 4th out of the 48 countries in the Afrotropical Realm; for birds it ranks third, for swallowtail 4th and for plants 2nd (Stuart, 1990). Consequently, it is one of the twelve megadiversity countries on earth with highest richness of biodiversity, Indonesia being the first (Rodgers, 1992).

Tanzania's biological diversity is a reflection of its broad biogeographic affinities. No less than six different phytochoria (biogeographic units based on plant distribution) are present,

only two other African countries (South Africa and Sudan) having this many.

The country is also very important for her endemic species including flora and fauna. Particularly important areas for the endemic species are the great lakes, wetlands, the "Eastern Arc" mountains, the remnant patches of coastal forests and mangrove forests, marine environment and the Itigi thicket.

According to Bitanyi (1990), plants which have known valuable heritable characters are many. Typical examples include: over 625 coffee varieties and 278 hybrids at Lyamungu; over 36 cotton varieties and several wild species and hybrids; 41 sisal species and varieties; 30 Tanzania sugar cane clones, 36 varieties from Muguga, Kenya, 165 wild species at Kibaha, 271 varieties at Kagera Sugar Company, and over 300 varieties maintained at each of the other sugar cane estates; 36 tobacco germplasm; and 2 varieties and 60 hybrids tea clones.

2.5 Wildlife Resources

Tanzania's wildlife is re-known worldwide. Wildlife protection started in 1922 when the Selous Game Reserve was established. Later came Rungwa and Mkomazi (1951) game reserves, and Serengeti Game Park in 1957 (Mosha, 1993). Today there are 12 National Parks, covering some 4% of the surface area of Tanzania, 23 Game Reserves (10%), 44 Game Controlled Areas (9%) and Ngorongoro Conservation Area (1%) (Mpemba, 1991). All the wildlife protected areas form about 25% of total land use which amounts to almost 236,250sq.Km. Thus, 15% of surface area devoted to wildlife where no permanent human settlement is allowed and 10% where there is co-existence with human beings.

The protected areas harbour a great number of biological diversities, contribute to the national heritage and is one of the potential socio-economic bases.

2.6 Mineral Resources

Mining, mineral and metallurgical processes and gas exploitation involve primarily gold, diamonds, gemstone, coal, tin, salt, gypsum, sand and lime.

The potential of expanding the mining sector is bright. However, environmental and social impacts could be increased if deliberate and concerted measures are not taken.

2.7 Antiquities

The antiquities resources encompass archaeological sites, historical towns and structures, monuments and artifacts or relics. Some of the important antiquities include:

. the Olduvai George (also called the "cradle of mankind") in Ngorongoro district where the remains of middle and later stone age industries as well as fauna and hominid remains, can be found.

. dinosaur fossils at Tendaguru, Lindi District

. Pleistocene lacustrine deposits with early stone age materials at Isimila in Iringa, and faunal and hominid remains at Lake Natron on the Peninj River. A mandible of Australopithecus *(Zinjanthropus boise)* has also been found there.

. historical urban centres like Bagamoyo, Kilwa, Mikindani, Ujiji, Mafia and Pangani.

. important monuments and relics include old buildings, rock arts, prehistoric prints, iron working sites, burial mounds, pottery and others scattered across the country.

. the National Museum, Village Museum and tribal cultural heritages, performances and dances.

3.0 OUTLINE OF ENVIRONMENTAL PROBLEMS

In Tanzania, there are a number of environmental problems caused primarily by misuse and overuse of natural resources in the fragile habitats and ecosystems. This is emphasized by Blaikie and Brookfield (1987) who maintain that degradation is a "result of forces, or a product of an equation in which both human and natural forces find a place".

This carries sense since environmental degradation in the country, is a manifestation of deforestation, soil erosion and loss of soil fertility, overgrazing, bushfires, industrial and technological development, disasters and others. All these are actions applied on the environment or results of human activities.

The main environmental problems according to regions are shown under Table 1. The list below highlights most important ones.

3.1 Land Degradation

Land degradation (including the loss and reduced productivity of vegetation cover, degradation of soil and water resources, and reduction of secondary production including wildlife and livestock) is number one environmental problem. The extent of land degradation is still somewhat localised, and whilst it is quantitatively estimated to be severe in eleven regions, there are indications of degradation throughout the country.

Two types of land degradation are:

(a) Desertification - this includes both incipient and overt desertification, particularly in the semi-arid and arid zones of the central and northern regions.

(b) Loss of forest cover - this manifests itself especially with loss of closed forest resources of the mountainous regions. The reduced cover has led to greatly changed water flows in most of the river systems, loss of forest resources and biodiversity, and interrupted natural systems.

The physical symptoms of land degradation are basically human induced and include:

i) Loss of vegetative cover particularly caused by:-

- agricultural expansion
- overgrazing and overstocking
- bushfires
- increased demand for forest resources and products serving increasing population
- inadequate management of forest resources.
- concentration of many refugees in one area

ii) Loss of soil resources

This leads to loss of soil fertility, soil erosion and reduced agricultural produces

iii) Loss of biodiversity

Depletion of grassland, woodland and forests leads inevitably to a simplification of natural resources. These are loss of species, varieties, habitats and ecosystems.

Also loss of biodiversity is experienced almost everywhere including wildlife, fishes and other living organisms in water

iv) Deterioration of water resources

Many wetlands in the country are facing deterioration due to sedimentation and frequency of flash floods. There is reduced water flows in rivers and reccuring floods and landslides in many regions. Moreover, water contamination associated with bio-accumulation is a problem.

Table 1: Main environmental problems by region

REGION	LAND DEGRADATION				AQUATIC PROBLEMS			POLLUTION					OTHERS		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Arusha	a	b	b	b	c	c	b	b	c	b	b	c	c	b	c
Coast	b	b	b	b	c	b	b	b	c	c	c	c	a	c	b
Dsm	c	b	c	b	c	c	b	a	c	a	c	a	a	a	a
Dodoma	a	a	a	a	c	c	b	c	b	c	b	c	a	c	c
Iringa	b	b	b	b	c	c	c	c	b	c	c	c	b	b	c
Kagera	c	b	b	b	b	b	c	b	c	c	c	c	a	b	c
Kigoma	c	b	c	c	c	b	c	c	c	c	c	c	b	b	c
K/Njaro	b	b	b	b	c	c	b	c	b	c	c	c	a	b	b
Lindi	c	b	c	b	a	b	c	c	c	c	c	c	b	c	c
Mara	b	b	c	b	b	b	c	b	c	c	c	c	b	b	c
Mbeya	c	b	b	b	c	c	c	c	b	b	a	c	b	b	c
Morogoro	b	b	b	b	c	c	b	b	c	c	a	c	b	b	c
Mtwara	c	b	c	b	a	b	c	c	c	c	c	c	b	c	c
Mwanza	b	b	a	a	a	b	b	a	a	b	b	b	a	b	b
Rukwa	c	b	b	b	c	c	c	c	b	c	c	c	b	a	c
Ruvuma	c	b	a	b	c	b	c	c	a	c	c	c	b	b	c
Shinyanga	a	a	a	a	c	c	a	c	b	c	b	c	a	b	c
Singida	b	b	b	b	c	c	b	c	b	c	c	c	b	b	c
Tabora	c	b	c	c	c	c	b	c	c	c	c	c	b	c	c
Tanga	b	b	b	b	b	b	b	b	c	b	c	c	b	c	b

KEY: 1. Desertification
2. Soil erosion
3. Loss of soil fertility
4. Loss of biodiversity
5. Death of organisms due to chemicals/ inappropriate gear
6. Overfishing
7. Loss of wetlands
8. Water pollution
9. Land pollution
10. Waste disposal
11. Mining effects
12. Air pollution
13. Energy crisis
14. Population increase (>2.5%)
15. Transport problems

a. Extremely serious
b. Serious
c. Not serious

3.2 Environmental Problems Affecting Water

Major factors which threaten the future productivity of marine environment include urbanisation, over-fishing, dynamite fishing, and beach erosion. Others are siltation caused by poor land use practices, eutrophication and contamination due to bio-accumulation, pollution due to oil spills and chemicals and inadequate coastal zone management and planning. The coast is confronted with destruction of corals and coral reefs, depletion of mangroves for various uses and production of salt using salt pans.

Inland water bodies are threatened by more or less the same factors as marine environment. The only exception is dynamiting which is common along the coast. However, the big water bodies (rivers and lakes) as well as other wetlands are faced with more problems. These are: infestation of water hyacinth (*Eichornia crassipes)* in Lake Victoria, Pangani and Sigi Rivers; heavy siltation due to constant floods; loss of biodiversity; introductions of exogenous species and use of under-size nets, toxic plants and chemicals in order to get big catches.

The contaminants which pose threat to aquatic environment are: sewage, nutrients, synthetics, sediment, litter, plastics, metals, radio nuclides, oil/hydrocarbons and polyaromatic hydrocarbons. Most of the polluting substances originating from land-based sources are of particular concern since they exhibit at the same time toxicity, persistence and bio-accumulation in food chains.

3.3 Environmental Pollution

There are three main forms of pollution: Water, Land and Air pollution resulting from industries, domestic activities, mining and hospital wastes. Major pollution problems are outlined below.

(a) Industrial pollution

The siting, choice of technology and actual operation of industries have been implemented without consideration of the environmental implications, but rather to achieve socio-economic development goals. Todate there are very few industries which have facilities for minimizing, recycling or treating the wastes they produce.

Untreated waste water, poor sewage systems, unsound disposal of solid waste, scavenging of waste and inadequate or ineffective guidelines and standards, have continued to enhance industrial pollution.

(b) **Pollution due to agro-chemicals**

Indiscriminate use of agro-chemicals coupled with agro-mechanization pose great threat for future production of crops and aquatic pollution. The use of pesticides has been on the increase and will most likely continue to increase in the foreseeable future, bringing with it such adverse environmental impacts as water and soil pollution and human poisoning.

Expired chemicals are improperly stored mainly in open areas and also pose a serious threat to land and water quality and human health in their immediate vicinity.

There is a claim that paddy farms under irrigation produce Methane. This is not yet emperically established in the country but need immediate scientific back up.

(c) **Urban pollution**

Due to rapid growth of urban areas (estimated to be 2½ times the population growth rate for rural areas, or 6.8% per annum), there is mismatch between population and available resources, infrastructural facilities and amenities. This rapid and largely uncontrolled urbanization process has had unexpected, far-reaching and mostly negative results affecting all people living in urban centres.

Our urban areas are characterized by the following:

(i) uncontrolled and mushrooming infrastructures

(ii) invasion of open spaces or even public areas (grounds intended for schools, games and sports, and others)

(iii) emergency of squatters with filthy conditions

(iv) poor accessibility and impassable roads

(v) poor sewage systems, inability to get rid of waste and inappropriate dumping sites

(vi) severe shortage of housing

(vii) general lack of social services and amenities

(viii) increased traffic leading to air pollution and social evils

(d) **Pollution associated with mining activities**

Apart from gross land degradation, mining done with inadequate processing technology contributes to a higher concentration of waste and by-products than desirable.

Water pollution in gold mining areas resulting from the use of mercury is also a serious problem. It is estimated that

" about 1.5 tonnes of Mercury are introduced into the environment for every tonne of gold recovered by Mercury amalgamation in the small-scale mining centres" (NCSSD, 1994).

Commercial gold extraction by Cynidisation, at present confined at Buckreef gold mine in Geita district, is another source of water pollution. Mining activities can lead into:

(i) emergency of epidemics, chronic diseases and deaths

(ii) concentration of people resulting into social and economic evils (eg. diseases, drug trafficking, thefts)

(iii) problems related to disposal of waste, slurry and ash

(iv) inability to control pollutant emissions and effluents

(v) social stresses due to inadequate water or food; lack of sanitary, health and school facilities; problems related to accessibility

(vi) land excavation and ecological stress due to various reasons.

(e) **Pollution caused by transportation**

In Tanzania there has been a rapid increase in the volume of traffic in major towns such as Dar-es-Salaam, Arusha, Mwanza, Moshi and Morogoro. Motor exhausts and noise are the major types of environmental pollution associated with this increase. Motor exhausts include such air pollutants as Carbonmonoxide, Nitrogen oxides, Aldehydes, Ozone and Sulphurdioxide. Other air pollutants created by traffic include Particulate matter and Lead.

Traffic and traffic-related activities such as overland transport especially with tankers, workshops and garages generate a variety of wastes, including oil from accidents, waste oils, solvents and wrecks. Special attention must be paid to the spilling of hazardous materials such as waste oils and solvents as they can pose a serious threat to water bodies.

Tanzania has a number of ports and harbours along the sea and lake shores. Port infrastructure often creates negative environmental effects both locally and regionally. Discharge of bilge water, oil spills and leakage, damage the marine ecology, affecting fisheries, recreational facilities and fragile organisms such as corals.

Habour sanitation in Dar es Salaam, Mtwara, and Tanga cannot be regarded as satisfactory. There is poor planning and design to accommodate special needs for the handling of liquid and solid wastes from anchored vessels, offices, residences, commercial establishments and industries in and close to the harbour complexes.

(f) **Pollution due to aspects of energy use**

The principal source of energy in Tanzania is woodfuel, followed by imported petroleum products, hydropower, coal, natural gas, solar and wind energy.

The environmental impacts arising from the exploitation of woodfuels include depletion of woodlands and the release of Carbondioxide and Methane gases. The data to estimate the degree to which woodfuel accounts for deforestation in the country is lacking, making it difficult to quantify the amounts of Methane and Carbondioxide emitted.

Petroleum/gas exploration and the construction/operation of gas pipelines, can have far reaching consequences for the environment. For example, the drilling operation uses special chemicals whose disposal may present ecological problems. Leakage from a gas or oil pipeline is a potential fire hazard which could have a devastating effect on the environment. Of concern is the possible gas exploration taking place at Songosongo Island, which could damage the local marine environment.

(g) **Environmental pollution and degradation associated with tourism**

Tourism is an important source of revenue and employment. However, environmental damage will result from the continued growth of the tourism industry, if such growth is uncontrolled, threatening the future economic sustainability of the industry itself.

Environmental problems associated with tourism include the destruction of vegetation and wildlife, loss of land for buildings and roads and improper solid waste and waste water disposal methods at hotels. Uncontrolled tourism can also have significant negative effects on the socio-cultural stability of local populations. Ecotourism is at present much more preferred than mass tourism.

(h) **Global climate change and transboundary air pollution**

The depletion of Ozone layer and the increase in the concentration of Greenhouse gases are the major causes of global warming and climate change. Chlorofluorocarbons are largely responsible for the damage of Ozone layer, while activities such as tree and forest destruction and biomass burning cause the concentration of greenhouse gases.

The major problem is the lack of reliable data on Ozone layer depleting substances and Greenhouse gases. This is a constraint to controlling transboundary air pollution. There is also insufficient information of the environmental health effects of air pollution.

Sources of these problems are industries, transportation, refregerators, airconditioners, aerosols, biomass burning, deforestation and others.

3.4 Destruction of Biological Diversity

Several factors pose threats to biological and genetic diversity including habitats and ecosystems countrywide. According to Bakobi (1992) some of the outstanding ones include:

. bush fires

. poaching and trade in trophies,

. trade in threatened live animals including birds, animals and some plant species,

. pollution and solid waste disposal,

. the tendency to overexploit traditional crops and indigenous tree species,

. introduction of exotic species in certain ecosystems,

. use of dynamite, toxic plants and chemicals for "fishing",

. cutting of specific types of hard wood trees (for charcoal, carvings, poles, trade and other uses),

. destruction of habitats and their replacement with other uses, e.g. settlements, mining, dams, croplands, etc.

. erosion, siltation, eutrophication and salinazation leading to declining agricultural production, shortened life span of Hydroelectric Power (HEP) schemes and creation of higher Biological Oxygen Deficiencies (BODs) with all their consequences.

. indiscriminate use of agro-chemicals, and poor mining practices and constructions.

. concentration of refugees in one area leading to overuse of tree and animal resources

3.5 Other Environmental Issues

3.5.1 Environmental Policies, Legislation and Management

As observed above, Tanzania faces a range of complicated environmental problems. These are closely linked to and influenced by social, cultural and above all economic spheres.

On the other hand, sectoral interests pursue their own courses and have so far left Tanzania with no coherent environmental policy and a strong legislation on environment management. The challenge and consolidated environmental strategies, policy and

environmental law to harmonise sectoral approaches can not be overemphasized.

Such a shortfall can be illustrated by inadequacy in project implementation. For example, the Mining Act No. 17 of 1979 and the National Environment Management Council (NEMC/Council) Act No. 19 of 1983, are the only ones which make reference to proper account of environmental concerns prior to initiating any operation (Kamukala, 1992). A few government sectoral policies, like Tourism and Energy policies, mention the importance of carrying out environmental impact assessment (EIA/EA). However, they do not provide guidelines or procedural direction to be followed when carrying out environmental assessment. Todate it is only the National Parks which have produced clear guidelines on conducting the EIA.

3.5.2 Energy

Whereas there are several alternative sources of energy, the major source is skewed towards bio-energy. The continued dependence on charcoal, fuel wood and related vegetation products, pauses a threat to our environment. Woodfuels are the dominant sources of energy accounting for 92% (Muheto, 1992).

Other sources of energy which could be utilized include petroleum products, hydropower, windmill, solar energy, geothermal energy, bio-gas and others. Deliberate efforts have to be made to promote these sources as well as wood saving stoves.

3.5.3 Population

Although the population density in Tanzania is still low (about 26 people per Sq Km), there is a direct relationship between population and resources use. In areas where there is high population density, there is an obvious pressure on resources.

In rural areas with high population density, there is land scarcity leading to over-use of land resources. This in turn, causes land degradation, unemployment, social and economic problems leading to exoduses to urban centres (Bakobi, 1992). In urban centres the influx of rural immigrants is a potential cause of social, economic and environmental problems. These include proliferation of unplanned settlements, poor sanitation and lack of essential social services as well as disrupted infrastructure. Today it is no longer a secret to find stray youths involved in drug abuse and other social menaces.

3.5.4 Health

Environmental problems contribute significantly to health problems. The current rampant diseases outbreaks, the insidious nature of chemicals like Mercury, Cyanide, Chromium, Lead, Asbestos and others, is a characteristic of a filthy, contaminated and polluted environment. The problems are

probably compounded by poor planning, itching palm for economic gains and ignorance.

Impoundments lead to very good breeding places for mosquitoes. The water hyacinth is harbouring a sizeable number of snails that are a source of Bilharzia. Floods are certainly disturbing and in some cases cause losses of life. Improper sewage treatment can be a source of Dysentery and Cholera.

3.5.5 Land Tenure

The lack of a clear land policy which persisted for years and land use planning has rendered many areas degraded. The absence of elaborate tenure systems has resulted into irresponsibility and mis-use of land. The assumption that land belongs to the public, should be treated as ideas of the past in order to encourage investment of labour by owners-cum-developers on the land. However, with the advent of Land Policy and legislation (1995) it should be assumed as a remedy to land tenure problems.

3.5.6 Poverty

For many of the poor Tanzanians, survival takes priority to environmental conservation. Similarly, at national level we are forced to forego certain natural habitats and ecosystems in an endeavour to get food and economic advancement. In other words, the vicious circle of poverty endangers environmental conservation. Somehow, the poverty situation seems to force most people to postpone environmental care at the expense of survival development.

These problems are also compounded by lack or low technological advancement. It is high time to decide whether short-lived economic gains should supersede sustainable development.

3.5.7 Public Awareness and Involvement

Our people at the grass-root levels have for a long time been managers of their immediate environment. This is exemplified in many places in the country by the well adopted land husbandry practices for sustained environmental productivity (Ruthenberg, 1980). Even pastoralists were capable of assessing the feed value of different range lands and their stock carrying capacity at different seasons of the year as a trigger to move into other range lands rotationally.

Unfortunately extraneous forces have all the time forced the rural population to change their systems and patterns of living. For example, the forces include need for "cash" crops; high population densities in some areas *vis-a-vis* demand for natural resources; adaption of strange activities or species and varieties; natural phenomena; and "imposed development" projects.

With such a situation, there is need for tactical and holistic approaches. We need to comprehend our people's needs and

priorities. This can be done and realized only when people are fully convinced.

The importance of environmental education (EE), public awareness and sensitization carries a significant role. People need to acquire knowledge in order to change attitude so as to revisit their practices.

All parties concerned with dissemination of environmental education and awareness should understand their target audiences, work harmoniously and with the people. Unless people know their role in environmental conservation, our efforts will always be futile and thus remain short-lived.

3.6 Effects of Environmental Problems

Some of the effects of environmental problems have been highlighted above. Complex issues, can arise as a result of the above problems as shown below:

(a) Loss of soil fertility and consequently inadequate food supply and cash crops are currently common issues. These in turn result into malnutrition and ~~lake~~ lack of foreign exchange.

(b) Inability to generate foreign currency which is important for purchase of equipment, machinery and improved technology, has been experienced frequently. Consequently low productivity, low sales and inadequate food.

(c) Importantly, pollution and contamination can interfere with smooth physiological and anatomical functioning of living organisms. This can, in some cases lead to loss of biodiversity.

(d) There is rampant loss of biological diversity in form of genetics, species or varieties/clones, and habitats or ecosystems. Loss of biodiversity denies of a country a myriad of benefits such as food, medicines, aesthetic, and others.

(e) It is now common to encounter unprecidented degradation that can lead or enhance natural phenomena such as floods, droughts, famine, climate change and rise of temperature

(f) It is believed that there are possibilities for catalysing or influencing conflicts, wars, economic doldrums and political instability generated from environmental degradation.

(g) The above complications subsequently lead into a viscous cycle of poverty whereby dissociation is difficult if not impossible.

Environmental degradation is greatly influenced by human actions on the environment. In turn the problems generated influence

welfare of human beings. Unfortunately the consequences are not uniform: women and children seem to be hit more severely. This is undisputable because of socio-cultural and economic background of established societal systems. Although there are ethnic disparities, examples advanced in Table 2 vividly show that women are more victims of environmental degradation than men.

Table 2: Some environmental problems and their magnitude on human beings.

Environmental problem	Consequences	Magnitude of Impact	
		Women	Men
Loss of soil fertility	lack of food	3	2
	lack of cash crops	1	3
Drought/deser-tification	lack of water	3	1
	abscence of food	3	2
Deforestation	inadequate fuelwood	3	1
	loss of water sources	3	1
Water pollution	death of fish	2	3
	polluted water	3	2
Population rise	increased family size	3	2
	squatter problems	2	3
Waste management	haphazard dumping	3	1
	scavenging	1	2
Land degradation	soil erosion	3	1
	inadequate grassland	1	3

* 3 magnitude very serious
  2 magnitude serious
  1 magnitude present

4.0 ABATEMENT OF ENVIRONMENTAL PROBLEMS

In an endeavour to control, reduce or improve environmental problems, several measures have or are being taken. Efforts are being executed by the Government institutions, non-governmental organisation (NGOs) and community based groups (CBGs).

4.1 Traditional Conservation Practices

Soil and Water Conservation measures have been practices for many years in Tanzania. The natural resources base and economic factors have been taken into consideration at local level. At least four different systems are well known from available literature:

(1) The Matengo Pit System in Songea (motivated by inadequate land after the Matengo tribe was displaced from the surrounding plains by Wangoni warriors),

(2) The Ufipa Mound Cultivation System (motivated by thick forests and heavy soils),

(3) Ukerewe Mixed Farming System (motivated by population pressures) and,

(4) Iraqw Intensive Farming System in Mbulu (motivated by inadequate land after the Iraqw tribe was confined to steep sloped mountain terrain without room for expansion due to the warring Maasai who roamed the surrounding plains).

Other systems include those practised in Ukara (where soils are actually transferred according to necessity) and in the Kilimanjaro and Kagera regions and Rungwe district where mulching and agroforestry has been widely used in traditional cultivation systems.

4.2 Pre-Independence Government Conservation Measures

Soil and Water Conservation has been an issue of concern since the 1920's. Action began with the organization of a conference on Soil Erosion in Dodoma in 1929. This conference led to the formation of an Advisory Communittee on Terrain. The Native Authority Ordinance of 1952, gave local authorities the power to combat land degradation.

Several important pieces of legislation which have greatly affected environmental management were passed during this period. These include the National Parks Ordinance, Forestry Ordinance, Natural Resources Ordinance and the Grass Fires Control Ordinance.

After the Second World war under the Colonial Development Welfare Act the policy was to develop large scale schemes. The following, along with several smaller ones, were initiated.

(a) *The Sukumaland Development Scheme.*

This was established in 1946 and dealt primarily with land use planning. In pilot areas land was divided into usage categories and subject to detailed mapping followed by control of what, when and how to plant for each usage category. Attempts were made to distribute population density according to carrying capacity.

(b) *The Usambara Mountains Development Scheme 1946-1958.*

This incorporated the Mlalo Basin Rehabilitation Scheme. The objectives of the projects were:

(1) to develop an agricultural system for the rehabilitation of eroded area, and

(2) to generate information and experience for later use.

(c) *The Uluguru Land Usage Scheme: 1945-55*

This approach to environmental degradation problems in the area was initiated with the establishment of the Committee on "Rehabilitation of Eroded Areas in the Ulugurus." Remedial actions proposed by the Committee were wide-ranging:

. re-demarcation of forest boundaries
. tree plantation to forest boundaries
. control of grass fires
. adoption of contour ridging.

(d) *Others*

A good number of wildlife protected areas and conservation of forests began during the colonial era and continued to be gazetted even after independence.

In this category historical sites such as Isimila Stone Age tools and others were protected since colonial era. Their success was not positive because they became unpopular, planning was inappropriate and were later turned into a political rallying point.

4.3 Post-Independence Measures

In Tanzania environmental problems, including uncontrolled resource use, increased despite the existence of a plethora of planning activities; promulgated policies; enacted legislation; elaborate administrative and institutional mechanisms; and numerous educational and extension packages. It is generally agreed that the key reason for this non-alleviation of environmental problems is the *unisectoral nature* of the above outlined measures.

Subsequently several sectoral or field-specific environmental conservation-related activities have been undertaken which have had a direct or indirect impact on the state of the environment.

4.3.1 Zonal/Regional/District-based Conservation Programmes

Some of the regional/district-based conservation programmes include:

(a) *Land Management Programme for Environmental Conservation (LAMP-Babati)*

LAMP programme in Babati District is focused upon soil and water conservation: but bases its activities on land management.

(b) *Regional Integrated Development Programmes (RIDEPs)*

These programmes address themselves to all aspects of regional-based development.

(c) *Hifadhi Ardhi Dodoma (HADO) and Shinyanga (HASHI)*

Hifadhi Ardhi Shinyanga and Dodoma are two Soil and Water Conservation projects currently run by the Forestry and Beekeeping Division, however they address themselves not only to forestry matters, but also to land use and livestock.

(d) *Serengeti Regional Conservation Strategy.*

This is one of the few projects which is zonal. Issues at hand cover not only several regions, i.e Arusha, Mwanza, Mara and perhaps also part of Shinyanga, but they are also transboundary in that they extend into Kenya. It is basically involvement of communities for conservation of wildlife.

(e) *Hifadhi Mazingira (HIMA)*

This is an Iringa regional-based soil and water conservation programme, which although concentrating its activities in its first few years to a few divisions of Iringa District, there are plans to expand into other areas of the region in due course.

(f) *Health, Sanitation and Water (HESAWA).*

This is a zonal project covering the Lake Victoria regions of Mara, Mwanza and Kagera. As its name indicates, it incorporates programmes on health, sanitation and water supply.

(g) *Soil Erosion Control Programme (SECAP) in Lushoto.*

This is a Lushoto district-based soil and water conservation programme.

4.3.2 **Legislative and institutional measures**

Since independence, sectoral legislation has been enacted and amended and administrative/institutional mechanisms established-all of which has had a great impact on matters related to environment and development.

In addition there are a number of legal provisions applicable (although not adequately) to air quality, water conservation, protected areas, control of hazardous substances, coastal zone and marine conservation and land use planning.

4.3.3 Development planning and resource use

(a) *Development Plans 1961/62 - 1993/94*

The overall aim of development planning is to improve people's lives through socio-economic growth. Two long term perspective plans have been implemented, the first one (1964-1981) with the objective of consolidating independence after many years of colonial rule. This was to be reflected in an improvement of people's lives through access to basic social services such as education, health, water, housing, etc. as well as bringing about structural change in the national economy.

The second perspective plan, 1981-2000, besides consolidating gains made during the first perspective plan period, had wider objectives of consolidating the policy of socialism and self-reliance. Sectoral objectives were also clearly spelled out in this perspective plan.

Sustainable development and environmental conservation has not been a priority issue in plans. The emphasis continues to be on achieving sustained increase in national income, with the caveat that there should be simultaneous improvements in social welfare.

(b) Physical Plans

Physical plans prepared in Tanzania served the interests of the client: the Government, and focused on compartmentalizing the resources. Some physical plans are:

i. Village land use plans.

About 200 villages in the country have land use plans. The latter help to allocate land for settlement, forestry, grazing and cultivation of various crops.

ii. Interim Land Use Plans.

These cover a 5 to 10 year period. They contain policies to solve problems prevailing in towns which require immediate action, such as squatter up-grading, and location and control of land uses. All district centres and minor settlements have interim land use plans.

iii. Urban Master Plans.

These lay down guidelines for the future development of urban and city areas. Major urban areas such as Dar-es-Salaam, Arusha, Dodoma, Tanga, Moshi and Mbeya all have master plans.

(iv) District plans such as in Kiteto, Urambo, Masasi, Babati and Kondoa.

(v) Zonal Physical Development Plans.

They seek to combine physical planning with economic plans. These include: Uhuru Corridor (1975-1978) covering Coast, Morogoro, Iringa and Mbeya Regions; the Lake Zone (1978-82) covering Mwanza, Mara, Kagera and Shinyanga Regions; and the Northern Zone (1992) covering Tanga, Kilimanjaro, and Arusha Regions.

Preparation of a plan for Southern zone and Ruaha Catchment (a river basin) Development plan are presently in the pipeline.

(c) Attempts at multi-sectoral planning

Some of important plans for environment and development matters where attempts have been made to go beyond purely sectoral concerns include:

(i) *Water Master Plans.*

Provide regional-based valuable information on all natural characteristics and human activities which have either direct or indirect impact on water resources availability.

(ii) *Tropical Forestry Action Plan.*

This plan aims, inter alia, to increase the contribution of the forestry sector to the Gross Domestic Product of Tanzania; and more important to establish links with other sectoral programmes in environmental conservation.

(iii) *Plan of Action to Combat Desertification.*

The Plan of Action to Combat Desertification prepared in 1990 is an attempt to address to desertification as a socio-economically important matter.

(iv) *Livestock Development Programme 2000 AD.*

This is an attempt to improve the contribution of livestock industry to the GDP.

(v) *National Soil and Water Conservation Programme.*

It is currently being developed by the Ministry of Agriculture.

4.4 Current and Future Efforts

The present efforts on trying to conserve the environment are numerous countrywide. However, important ones can be highlighted below:

4.4.1 National Conservation Strategy for Sustainable Development

The National Conservation Strategy for Sustainable Development (NCSSD) is a unique document and first of its kind in the country because:

(a) It involved most stakeholders of environmental issues throughout its formulation

(b) It encompasses and features important and key areas in environmental conservation, namely:

(i) national endowments

(ii) problems confronting the endowments

(iii) priority areas with regard to environment and development - planning, policy, legislation, administrative and institutional matters, environmental education and awareness, and research and technology

(iv) strategy measures with regard to priority areas

(v) action proposals towards broad programme areas.

4.4.2 National Environmental Action Plan

The National Environmental Action Plan (NEAP) came out in 1994 The document draws most of its contents from the NCSSD with a summary of actions.

The NEAP is now in the process of consultations and some circles have gone to the extent of suggesting to amalgamate it with the NCSSD. In whatever the case the purpose is to lay down actions towards conservation of the environment.

4.4.3 Environmental Protection Legislation

Consultations and formulation of the Environmental Protection Bill accompanied by the amendment proposals for Act No. 9 of 1983 establishing NEMC are in the process. The purpose in both cases is to have comprehensive and effective legislation over environmental conservation issues.

4.4.4 Production of Policies

Formulation of an Environmental Policy is going on This, like the environmental protection legislation, will act as umbrella policy over other sectoral policies. Principally it aims at activating other policies and thus harmonise their functioning with other sectors.

There are several policies which are sector-oriented. Most of these, especially which came out in the 1990s, carry some noticeable elements on environmental conservation. Example include policies on population, energy, health, agriculture, livestock, land, tourism and science and technology. Major concern of these policies is to safeguard sectoral mandate and protection issues under respective jurisdiction. However, the National Land Policy (March 1995) carries substantial amount on environmental conservation.

4.4.5 Marine Contingency Plan

Our marine or generally aquatic environment, including the coastal areas and shores are prone to environmental degradation.

There are precautionary measures which have to be prepared in case of any eventualities. Thus NEMC in collaboration with respective and relevant institutions (Tanzania Harbours Authority, MTNRE, Marine Police and Army, Municipal Authorities, Fisheries Department, others) have just produced a "Marine Contingency Plan" draft to be adhered to during unexpected emergencies.

4.4.6 Coastal Integrated Management Programmes

The Council, organisations and agencies and the donor community are embarking on the coastal management programmes which are inter-sectoral, Tanga region and parts of Dar es Salaam are examples which are initiating such programmes.

4.4.7 District Conservation Strategies

The Council in collaboration with regional and district authorities and other organisations, is embarking on producing local strategies for environmental conservation.

4.4.8 Support From Donor Community and NGOs

There is quite an important role played by the donor community and NGOs in the process of conserving the environment. Some programmes, projects or activities are supported under the multi-lateral, bilateral or direct initiatives.

4.4.9 Environmental Education and Awareness

Environmental Education and awareness programmes are mainly carried out on sectoral approach. However, EE in its broadest and effective sense is carried out by a few institutions and organisations. Examples include:

(i) Introduction of some EE components in school syllabi in the subjects of "Maarifa ya Jamii" for Primary schools and "Social Studies" for Secondary Schools. This has been made possible by the MoEC and Tanzania Institute of Education.

(ii) Efforts to bring EE awareness to teacher trainers, schools inspectors, teachers and educationists by NEMC, WWF, MoEC.

(iii) General awareness programmes by various organisations and agencies. Some programmes include:

- Media awareness by JET, NEMC, WWF, 4-H clubs, others
- Action-oriented awareness programmes assisted by WCST, Malihai Clubs, WWF
- Awareness general programmes coupled with integrated activities in conserving environment like SECAP, SCAPA, HADO, HIMA, LAMP, Concern and others
- Awareness and sensitization programmes through various forums by a variety of organisation and institutions.
- Coordination, facilitation and enhancement of EE programmes by NEMC, Tanzania Institute of Education, WWF

5.0 CONCLUSION

The fact remains pertinent that environmental problems or issues as well as resource use conflicts are on the increase. Land degradation, pollution, degradation of marine and freshwater, loss of biodiversity are examples of environmental problems which adversely affect the socio-economic well-being of our people. The social welfare and economic development of the country is dependent upon the sustainable and rational use of the natural resources.

The principal objective of Tanzania's development philosophy has always been to meet basic human needs and improve the quality of life. This will never be achieved unless there is concerted efforts of abating the above problems together with the following issues.

(a) Integration of environmental and development at planning (physical and economic) and management levels. This is a pre-requisite for all sectors including education, health, industry, agriculture, forestry, tourism, fisheries, mining, water, energy, transport and others.

(b) Harmonization of the fragmented and sectoral laws and enactment of an umbrella environmental legislation. It is essential to develop and implement the integrated, enforceable and effective laws and legulation that are based upon sound social, ecological, economic and scientific principles.

(c) Streamlining the complexity within the institutional structure and the ambiguity in the division of roles and responsibilities concerning environmental conservation and management. The action should focus both at central and local governments.

(d) Revisiting and applying corrective measures to the factors that make the use of natural resources not sustainable. These include:

(i) Poverty which is both a cause and an effect of environmental degradation.

(ii) Inadequate policy framework

(iii) Lack of or inadequate environmental impact assessment (EIA)

(iv) Inadequate basic data and monitoring systems

(v) Lack of public participation of a large segment of the population in planning activities

(vi) inadequate research and extension processes based at the former

(vii) Comperatively low or inappropriate technology

(viii) Inadequate EE, awareness and recognition of local knowledge

(ix) Imbalance between population increase and availability of natural resources in some areas of the country.

(x) Inability to apply environmental conservation instruments effectively

No body can bost being away of the network of environmental issues but;

> *"those looking for success and signs of hope can find many. --- Human has than ability to make development sustainable-to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (The Wold Commission on Environment and Development-WCED, 1987).*

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HISTORICAL PERSPECTIVE OF ENVIRONMENTAL EDUCATION

BY

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1. Introduction

The interaction between man and the environment has existed since humans first appeared on earth. Such interaction is an intrinsic aspect of human development. Man's capacity to adjust his relationship with the natural and man-made (i.e. social and cultural) environment, and to transform the environment itself has passed through various phases. In this connection the fundamental factor that distinguishes modern society from preceding societies is the accelerating pace of the changes caused in the environment by the scientific and technological revolution, the massive scale of those changes and the universality of some of their consequences. Environmental education has played a significant role in this process.

This paper examines these issues in four broad areas:The first part examines the evolution of man kind depleting characteristic activities on the environment.
The second part examines some aspects of traditional conservation efforts in Tanzania.
The third part reviews the evolution of environmental education from Stockholm Conference to the present, featuring the incorporation of EE in school curricula. The Final part poses some concluding remarks fro the future.

2. The Evolution of Mankind - depicting characteristic Activities on the Environment

The concept of environmental education has, in its evolution, remained closely linked with the concept of environment itself and to the way in which this was perceived. The view of the environment equating it with its biological and physical aspects has given way to a wider conception which takes into account its economic and soci-cultural aspects and emphasizes more clearly the correlations between them.

Education has, in a way, always been associated with the environment. In earlier societies, and still is the case today among large sectors of the rural population man's preparation for adult life involved an intimate experience of nature.

The present period of human history is characterized by the rapid development of those productive forces through which the scientific and technological revolution, promoting soci-economic progress in every possible way, provides powerful means of affecting the environment. Natural resources have been intensively exploited for almost two centuries, with regard for the social consequences of economic activities. This has resulted in the reduction of large areas of forested areas, in greater soil erosion, air, water and land pollution, damage to various species and in a number of cases, changes in the biosphere which adversely affect human health.

The interaction of humanity and its environment has grown over the last few decades with the exploitation of nature on an increasingly large scale necessarily having a detrimental effect on the ecological balance. The field of production now involves practically all kinds of natural land resources and a considerable part of oceanic resources. Mankind has already used about 70 per cent of arable land up to 80 to 90 percent of natural pastures and nearly half of the wood increment in forests.

Almost 90 per cent of the total population growth of the main commercial fish species are caught in inland rivers and water bodies. The annual out put of minerals has rechecked 44 tons per capital throughout the world. Open cast mining which causes degradation of natural ecosystems is one prevailing method in the exploitation of mineral resources.

World population growth is rising. For the last thousand years on the human population of the world has increased from 2 per cent per 1000 years up 2 per cent annually.

Population growth, the accelerated development of productive forces, the ever increasing involvement of natural resources in economic activity lead to the depletion and degradation of natural resources.

Traditional Conservation Efforts: Case studies in Tanzania

Pre-history communities lived relatively simple lives. They survived by gathering vegetative food and by hunting. Their homes were natural shelters, such as trees and caves. As communities gradually developed, they made tools and fire. Populations increased, and so did the needs of people. Communities started to grow food and to keep animals.

In Tanzania indigenous communities are known to have used indigenous knowledge and skills to alleviate problems of the environment. Interpersonal exchanges and problem solving activities were predominant in the process of learning. Learning by doing was part of lifelong education and was transmitted from generation to generation. Folk lore was a predominant means of transmiting knowledge to the youth. Traditional dances, art and, craft were also used as a means of communication.

Traditional societies in Africa lived symbiotically within their environment. Land was in plenty there was no land degradation of a scale that threatened the stability of the ecosystems.

Some of the characteristic features of traditional societies was prevalance of diseases, famine, and ignorance. The survival rate was drastically threatened by rapid death rates. There was also rapid birth rate. With the advent of science and technology, a number of health services brought down crude death rate. This created rapid increase in the population.

New problems of the environment began to emerge. Scarcity of arable land, inadequate safe water supplies, and accumulation of waste, and poor environmental sanitation were on the increase. Poverty surfaced in many communities. Rapid population growth created stress on the fragile environment. The land carrying capacity too declined very rapidly.

Poverty can be both a cause and an effect. Limited technology as well as ignorance have often forced people to degrade marginal lands. Inequality, especially in land tenure system has often compounded these problems.

Rapid population growth adversely affects progress, and when this was linked with poverty, the situation becomes worse. But as birth rates eventually began to fall, the period of growth has altered the age structure of population that the bulk of a nations people are young and enter their child beaning years. The result is an inbuilt population momentum which means that the absolute number of people rose over after birth rates had fallen steeply.

The concept of environmental education has, in its evolution, remained closely linked with the concept of environment itself and to the way in which this is perceived. The view of the environment equating it with its biological and physical aspects has given way to a wider conception which takes into account its economic and socii-cultural aspects and emphasizes. Popular historical conservation measures based on lifelong education were; (NEMC 1995).

. The Matengo Pit System in Songea motivated by in adequate land after the Matengo tribe was displaced from the surrounding plains by Wangoni Warriors.

. The Ufipa mound conservation system. In this system the communities were motivated by thick forests and heavy soils.

. Ukerewe, mixed farming system was largely motivated by population pressure. People were forced to plant many different crops on one plot thereby enrooting the soils and sustain food availability for many years.

"Iraqw intensive farming system in Mbulu was motivated by in adequate land after the Iraqw tribe was confronted to steep sloped mountain terpin without room for expansion due to the warring Masai who roamed the surround plains. (NEMC, 1995)

Empirical information collected in the field has revealed that there is abundant indigenous knowledge on culture and developmental in general but little on environmental conservation as such. More specifically the knowledge is focused on vernacular language, culture and tradition, good manners, tribal identity and extended family linkages. (Rajabu et al 1994). On the whole the education received was largely life long.

One noticeable feature of the traditional education was that it was gender sensitive. This was very positive in that it was relevant and problem specific. For example, studies conducted in Kisarawe and Mpwapwa have shown that productive learning such as work on farms, hunting and house obstruction were a priority for boys. Interviews with elders and women groups discussions revealed that girls learnt house keeping, which involves cleanliness, in the house, utensils, child care, involving proper child feeding, cooking food of various types and preserving food for future use. They were also taught the necessity of getting clean water and how to preserve water for drinking and for cooking. There were also traditional birth control measures which incidentally were based on traditional beliefs. The findings indicated that knowledge of unsafe water was not available, however it appeared that they believed that water collected through digging deep into the sand and springs was safe.

Folk media such as story telling, local dances, songs and ceremonies are the principal methods through which knowledge on development can be transmitted.

The nature of environmental education has evolved within the framework of an increasing awareness of the relations existing between man-made (social, cultural, politic, economic, and technological and natural (atmospheric, geological, biological and hydrological) system.

Although environmental education has a rich heritage sometimes dating very far back, its nounal and unprecedented importance in the educational field result mainly from the awakening of public consciousness in the face of such serious problems as one on population, the use and availability of natural resources and the general degradation

of certain natural sites.

A study of the environmental education literature of the 1960s reveals little concern with integrating the environment into classical and neon-classical learning situations. There was no real attempt to give student a global picture of environmental problems and issues. From the 1970s onwards, however, the urgent character of environmental problems became more and more evident, and in recent years there has been a wide diversity of books and documents which refer indiscriminately to such terms as environmental education, education for the environment etc.. Whichever the term, interest has been focused mainly on problems related to conservation of resources preservation of plant and animal life and similar themes.

The Stockholm Conference

In June, 1972 the first UN Conference on Human Environment was held in Stockholm, Sweden. The Stockholm Conference put the environment on the global political agenda. The United Nations Environment Programme (UNEP) was created, together with Earth watch, and International environmental information network. The other recommendations laid the foundation and framework for a cooperative effort in a programme of environmental education at International level. One major action in this context was the launching of the UNESCO-UNEP International Environmental Education Programme (IEEP) which organized the International Workshop on Environmental Education, in Belgrade in 1975.

The Belgrade Charter

During the workshop, which came to be known as the Belgrade Charter, provided the frame work and guiding principles for global environmental education.

This Charter recognized the urgent need in environmental education to develop a

global understanding or perspective of the ecological, economic and moral

considerations.

In this Charter preliminary global objectives on environmental education were set. The Belgrade catalyses similar activities at the regional and national levels in different parts of the world. The Belgrade recommendations were reviewed and evaluated in the context of the situations in different regions and nations at various workshops paving the way for the Intergovernmental Conference on Environmental Education held in Tbilisi, in the former USSR in October, 1977.

The Intergovernmental Conference on Environmental Education held in Tbilisi

The Intergovernmental Conference on Environmental Education was organized by UNESCO in cooperation with UNEP in the city of Tbilisi in the then USSR in October, 1977. This conference arrived at recommendations which might be undertaken at national, regional and international levels. Of the 41 recommendations formulated by the conference, 16 were on strategies for the development of environmental education at national level. The Declaration and Recommendations of the Conference, considered to be the most important single document on environmental education, outlined a substantive structure, policies and strategies for environmental education and stated the following goals, objectives and guiding principles (UNESCO 1980).

1. The goals of environmental education are:

   (a) to foster clear awareness of and concern about, economic social, political and ecological interdependence in urban and rural areas.

   (b) to provide every person with opportunities to acquire the knowledge, values, attitudes commitment and skills needed to protect and improve the environment.

   (c) to create new patterns of behaviour of individuals, groups and society

as whole towards the environment.

2. **The categories of environmental education objectives**

Awareness to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems.

Knowledge: to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of the environment and its associated problems.

Attitudes: to help social groups and individuals acquire a set of values and fallings of concern for the environment and motivation for actively participating in environmental improvement and protection.

Skills: to help social groups and individuals acquire the skills for identifying and solving environmental problems.

Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working towards resolution of environmental problems.

3. **Some guiding principles** for environmental education: Environmental Education should:

- consider the environment in its totality - natural and build, technological and social (economic, political, technological, cultural-historical, moral, aesthetic).

- be a continuous lifelong process, beginning at the pre-school level and

continuing through all formal and neon-formal stages.

- be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective.

- examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas.

- focus on current and potential environmental situations, while taking into account the historical perspectives.

- promote the value and necessity of local national and international cooperation in the prevention and solution of environmental problems.

- explicitly consider environmental aspects in plans for development and growth

- enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences.

- relate environmental sensitivity, knowledge problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in early years:

- help learners discover the symptoms and real cause of environmental problems.

- emphasize the complexity of environmental problems and thus the need

to develop critical thinking and problem-solving skills.

- utilize diverse learning environments a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first hand experience.

Characterstics of Environmental Education. The proceedings of the Tbilisi Conference have made it possible to define more clearly the characteristics of an education in accord with the ultimate aims described above. These characteristics relate both to the design and structure of the educational content and to educational strategies and the organization of learning procedures.

Environmental education must be directed to the solution of the practical problems of the human environment. It implies an interdisciplinary approach, without which it will be impossible to study interrelations or to bring education into contact with the community by stimulating its members to action. Finally, it should adopt a regional and world outlook and should be forward looking. So as to ensure the permanent and global character of the actions undertaken. Two fundamental ideas should moreover be borne in mind. The first is that environmental education is not be regarded as a new discipline, representing simply an addition to already existing subjects. It should be the product of contributions from various disciplines and educational experiences to knowledge and understanding of the environment and to the solution of its problems and its management. The second idea is that the point of environmental education is not to bring about minor changes in school patterns of learning but to promote new basic knowledge and new approaches within the framework of an overall educational policy that stresses the social role of educational institutions and the need to create new relationships among all the participants in the educational process.

Problems-solving approach

The most important characteristic of environmental education is probably its approach to specific problem-solving. The approach aims at making individuals - irrespective of their population group and level aware of its problems constituting obstacles to individual and collective well being at elucidating the causes of these problems and at determining appropriate means of resolving them. Thus, individuals will be able to participate in collective definition of strategies and operations aimed at solving problems affecting the quality of their environment.

The existence of so many environmental problems today is partly due to the limited number of people trained to identify accurately and effectively solve concrete, complex problems.

In this respect, scientific education itself has its limitations, since all the segmentation of knowledge is valid only within strictly determined fields. Ill-equipped to recognize these and confronted by a real world that never calls for the application of partial knowledge, individuals are not always able to find solutions to problems and tend to take refuge in the irrational. The problems of the environment are indeed complex ones. They involve numerous parameters and inter-relations. Lacking the necessary knowledge and approaches, individuals admit defeat and hand the problems over to the specialists.

To give new relevance and effectiveness to educational process, environmental education should avoid two pitfalls. On the one hand, it must escape the passive role assigned to students by the traditional educational approach in which pre-established notions are transmitted by the teacher, either directly by lecture or indirectly through dialogue. It must also ensure that this knowledge, often fragmentary and compartmentalized within specialized disciplines, is not presented in a way reflecting the intellectual habits of the teacher but rather that it takes account of the child's, the adolescents and even the initialled adults modes of thought. On the other hand, it must avoid pitfall of an

exclusively informative approach. Education must naturally inform, but information alone can never provide an adequate training. This cannot be reduced to the sum of a series of information items. While information plays an important role in creating a climate of public awareness, it cannot of itself offer instruction on the solutions of problems. Environmental education should not confine itself to disseminating new knowledge but should help the public to question its mis conceptions concerning the various problems of the environment and the value systems of which these ideas are a part.

An interdisciplinary educational approach

To solve problems of the environment, it is imperative to identify, rank and coordinate certain vital political, economic, social and ecological needs in the process of planning national development. There must be an awareness of the correlations between phenomena and of the situations that a undisciplinary approach would tend to split up. Interdisciplinary approach seeks to give a more comprehensive and less cursory picture of the problems. It does not consist in juxtaposing different disciplines on an a prior basis but in grasping

the process in its entirety and then proceeding to analyse and solve the specific problems.

The interdisciplinary approach to environmental problems implies, infact that considerations be given first to the system of which the phenomenon causing the problem forms part.

Integration of education into the community

An education that seeks the solution of concrete environmental problems implies not only the development of knowledge and techniques but also, and more important still, practical action by the community in specific environments.

A lifelong, forward-looking education

Since the environment is by its very nature subject to constant and profound transformation and mutation, environmental education must be able to assimilate change. It must have a lifelong and forward looking character. Until recently in the history of mankind, changes in the socii-cultural and natural environment occurred slowly under these circumstances, the younger generation could be instructed in their parents' values and knowledge, and hand these down to their children, in the certainty that this cultural heritage would be sufficient to ensure their Integration in society.

Since the industrial revolution and above all, during the second half of this century, this pattern has been profoundly disrupted. The extraordinary advance of scientific knowledge coupled with its technological applications have increased man's influence on the environment and accelerated the changes occurring in it. The various aspects of the natural and human environment are now changing extremely rapidly, resulting in the constant emergence of new economic and socii-cultural systems and hence fresh problems. For the first time in the history of mankind, knowledge, technical skills and certain values are changing profoundly, sometimes radically in less than the space of one lifetime.

In these circumstances, an education concerned with the solution of environmental problems must be a continuing process. To prevent the knowledge acquired by people from becoming obsolete and to guarantee the long-term effectiveness of operations to be undertaken, environmental education must constantly readjust its sights and revise its content and

methods, it must, at the same time, ensure that the information acquired by the various groups is updated, and adjusted in the light of new situations. The initial phase must be followed by lifelong educational action. Each stage in this continuing process wether involving, education in school or later during working life-must continue to have its own educational value and to fulfil a complementary function.

4. Evolution of Concern for Environment and Sustainability: Our Common Future

The decade of the 1980s has brought truly profound global developments which give us new hope for the future as well as new fears. Among the new opportunities are environmental action and people's power. A fundamental shift has occurred in world public opinion on environmental issues. The real breakthrough occurred in 1987 when "our Common Future, a report of the World Commission on Environment and Development, was published and publicized. It woke up global human consciousness by pointing out environmental failures all around the world and calling for international cooperation and action for the survival of the planet.

The Conference made an important contribution to the preparation of the UNCED Conference in Rio in 1992. Following the World Commission on Environment and Development, FAO endorsed the following definition for sustainable development:

> "Sustainable development is the management and conservation of natural resource base, and the reorientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations such sustainable development (in agriculture, forestry and fisheries sectors) concerns land, water, plant and animal genetic resources, is environmentally neon-degrading, technologically

appropriate, economically viable and socially acceptable" (Rajabu,1992).

This definition describes an ambitions goal which can serve as a guide for the design of policies for sustainable agricultural development. A very important aspect of this definition is the close interrelationship between environmental projection and sound development, i.e. the human resource dimension. The conviction is that the environment can only be maintained if humans enjoy a satisfactory quality of life and inversely, that sustainable soci-economic development is only conceivable in the long run if the environment and natural resource base are not degrading.

In the meantime the same year 1987, the Moscow Congress took place. This was a Commemoration of 10 years of the Tbilisi Conference. Participants had an opportunity to review progress made during the ten years.

The report on our common future signals and initial departure from the purely protectionist-conservationist syndrome to sustainable-development thinking which the Rio Conference provided the answers.

There is a consensus among Specialists that Environmental Education is closely associated with the promotion of sustainable development. It can be argued that the latter cannot be reached without the former.

United Nations Conference on Environment and Development(UNCED) Rio de Janeiro Brazil, June 1992

The United Nations Conference on Environmental Development held in Rio de Janeiro in June 1992 offered a unique opportunity to establish the basis for the major shift required to put this planet on the path towards a more secure and sustainable future.

At the core of this shift there is a need for fundamental change. Change to our economic life, a more careful and more caring use of the Earths resources and greater cooperation and equity in sharing the benefits as well as the risks of technological civilization. Of particular importance is the need to integrate the ecological dimension into education and culture as well as in economics.

Rio Declaration on Environment and Development Recognizing the ingegral and interdependent nature of the Earth, our home, the nations meeting at the Earth Summit in Rio de Janeiro adopted a set of principles to guide future development. These principles define the rights of people to development and their responsibilities to safeguard the common environment. They build on ideas form Stockholm Declaration on the 1972 United Nations Conference on the Human Environment.

The Rio Declaration states that the only way to have long-term economic progress is to link it with environmental protection. This will only happen if nations establish a new and equatable global partnership involving governments their people and key sectors of societies. They must build international agreements that protect the integritity of the global environment and the development system.

The Rio principles include the following ideas:

- People are entitled to a healthy and productive life in harmony with nature.

- Development to day must not undermine the development and environment needs of present and future generations.

- Nations have the sovereign right to exploit their own resources, but without causing environmental damage beyond their borders.

. Nations shall develop international laws to provide compensation for damage that activities under their control cause to areas beyond their boarders.

. Nations shall use the precautionary approach to protect the environment. Where there are threats to serious or irreversible damage. Scientific uncertainty shall not be used to post-pone cost effective measures to prevent environmental degradation.

. In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process, and cannot be considered in isolation from it.

. Eradicating poverty and reducing disparities in tiring standards in different parts of the world are essential to achieve sustainable development and meet the needs of the majority of people.

. Nations shall cooperate to conserve, protect and restore the health and integrity of the Earths' ecosystem. The developed countries acknowledge the responsibility that they bear in interesting and meaningful to students and when students are adequately reinforced. Environmental education is best accomplished through active student participation. Teaching methods must be designed to ensure participation by students. Problem-solving, field study and experimentation are a few of the teaching methods that maximise student participation.

In Tanzania, like other countries of the world, EE began in the early 1970s. In 1974, a workshop an Environmental Education Methodologies in Eastern Africa was held in Kenya at Mombasa Polytechnic. In this workshop, which

I also attended various concepts of conservation methods and ways of imparting such concepts were discussed

As regards EE in the formal and non-formal education sector, most of the courses had not been offered as subjects, but as integrat part of subjects such as science, agriculture, geography, biology, home economics and chemistry.

EE in primary Education

In primary schools environmental dimensions appear in Sciences, Geography, Home Economics and Agriculture. Organization of content, learning materials and methodologies are still weak (Rajabu, 1992; Rajabu, Muheto and Bakobi, 1991). In the geography syllabus main topics include: vegetation, weather and climate, soil, agriculture, livestock keeping, minerals, fishing, settlements, industry and population. However, there is no obvious linkage among these subjects and thus lack cohesion which show ultimate consequence to human kind and other organisms.

Recent studies on knowledge, attitudes and practices (KAP) in primary education, indicated the majority of primary school pupils have heard about environmental messages, but only a few of them (14%) understand components of the environment (Rajabu, 1992; O'saki, 1989). In view of the fact that many of them do not consider conservation of environment as essential, only a few individuals are engaged in such activities as tree planting (14%), making terraces (16%) and growing grass (3%).

EE in Secondary Schools

In the secondary sector, environmental considerations are included in discrete

disciplines: Biology, Geography, Physics and Chemistry. Key issues in which a strong dose of environment is found include: Agriculture, Animal Husbandry, Forestry, Fisheries, Nutrition and Ecology. It is important to note here that these topics are directed at understanding the principles and concepts of use of knowledge and skills required in the lines of communities but like in primary schools no emphases are put on the environmental issues as such.

However the number of Secondary Schools carrying out environmental projects is small compared to that of Primary Schools. It is estimated that about 40% of all public and private Secondary Schools have projects like tree planting and other environmentally-related projects.

EE for Tertiary Level

There are specialized institution for agriculture and livestock, wildlife management, forestry, fisheries, tsetse and rangland management, town planning, survey, water management, industrial management and many others. The training approach is sectoral negating the intergral nature of environmental components. It is because of this that our extension services normally conflict duplicate efforts in and an effort to bombard farmers with different packages.

Within the tertiary sector, however, there are suggestions that there is need for a high environmental literacy among students and that they should not only be aware of environmental problems but also be concerned citizens in environmental decision making.

EE for Teacher Trainers

Teachers' colleges train primary and secondary level teachers. The syllabuses

used for training of teachers reflect respective courses offered either for primary or secondary level. As indicated above, special training sessions were conducted to trainers, mainly to serve as a multiplier factor in schools and communities. At least two tutors teaching Biology, Geography, Science, and other related subjects, from each of the 40 teachers training colleges, have already received some training on environmental issues. This can not be claimed to satisfy the demands for further orientation, much more is still needed.

Environmentally-related activities at the Colleges vary from one place to another. However, there are competitions for all Colleges on tree planting, cleanliness and environmental sanitation as well as maintenance of infrastructures.

EE at University levels and other high institutions of learning

At the University level students can be identified into two special groups:

1. Student scientists, technologists and other future experts and professionals who in one way or another, will be dealing with environmental concerns (foresters, biologists, hydrologists, ecologists, agriculturalists, animal scientists, zoologists, engineers, etc).

2. Students of specific professions and social activities whose future work will have influence and impact on environmental management (social scientists, planners, political scientists, educationist, etc).

Many environmentally-related courses are conducted or are in the pipe -line in our Universities. For example, in the Geography Department of the University of Dar es Salaam (UDSM) there is a course to land use planning

and environmental studies. Relevant topics in environmental issues include, physical resources, agricultural systems, location and planning, remote sensing and quantitative methods, water resources development, land use and potentiality as well as population and rural settlement.

In the Masters programme in Geography the following relevant courses are offered: the physical environment and its relationship to man and management and conservation of physical resources. At Sokoine University of Agriculture (SUA) there are similar courses centering on soil, forestry, agriculture, livestock development and development studies.

In all these disciplines there are specialised courses which are more academic rather than focusing on the nature of environment. They display that the environment is compartmentalised thus composed of loose components.

Efforts Towards Public Awareness and Involvement

There is somehow a general concern about the state of environment in Tanzania. Realising this, many persons, institutions and NGOs have expressed need to raise awareness about the state of environment. More so, proposals have been made to include EE in the general education programmes in the country.

Many efforts have and are underway to raise environmental awareness. As observed above, workshops, seminars, meetings, consultations, and research and studies in the field of environment, are already underway. There is also quite an extensive and varied literature on environmental generalised publication on various issues.

Many sectoral messages and packages are always released to the public by several institutions and organisations. There is a good number of programmes over the media produced towards relevant target audiences. Some examples

include: "panda mti kata miti" (cut a tree plant trees), "mtu ni afya" (man is health), "mazingira hatarini" (environment in jeorapady), "kilio cha Mlima Kilimanjaro" "(the cry of Mt. Kilimanjaro), and many others.

In order to reach a great segment of our people media re greatly used. Tanzania is yet to establish television facilities, but radio programmes are very popular. The philosophy of using electronic media effectively entails knowing the taste of target audiences. In this respect, programmes in form of plays, citations, songs, discussions and news bulletins are used.

The press consists of the popular tabloids, factual papers and quality newspapers. Moreover there are rural newspapers and news-sheets in most of the regions of Tanzania. Unfortunately because of several bottlenecks they have not been able to disseminate environmental awareness appropriately. These bottlenecks include: low circulation, lack of motivation encountered by journalists, inability to cope up with environmental dynamism and intricate issues, and political or economic influences.

However, some information particularly focusing on environmental awareness has been progressively featuring. The media are gradually realising the dangers of environmental degradation. The Council in collaboration with PANOS organised the first workshop for journalists on environment and development way back in 1988. Consequently a number of fora have been organised by various institutions for media professionals.

There are over 50 NGOs in Tanzania whose activities have some bearing on the environment. These originate as religious organisations, international or foreign-funded organisations, journalistic in nature, conservatory and non-profit making. Basically NGOs are expected to work with people at grass-root level and act as bridges between the government or sponsors and the people. Out

of such number, more than 40 NGOs are greatly involved in tree planting

activities mainly at local levels.

As far as public awareness and environmental information is concerned there are a good number of NGOs who are in the forefront. One of these is the Journalists Environmental Association of Tanzania(JET) which for the past few months has emerged as an active organisation in bridging the gap between the grassroots and central government machinery. The efforts initiated will ultimately make the public informed and thus arouse awareness.

All the above methodologies are used to make people realise the duties and obligations in conserving the environment. Furthermore adult education and literacy campaigns are used as channels for EE. Adult education in Tanzania is a programme which started just after independence (1961). At present the level of literacy is over 80% throughout the country. Apart from isolated cases, the major part of teaching adults is carried out by the MEC together with the Institute of Adult Education (IAE).

Under the IAE components regarding EE and awareness are grossly missing. It is only recently that the curriculum for adult trainers/teachers are being reviewed to incorporate EE. (Bakobi et al 1992).

5. ACHIEVEMENTS AND IMPACT

Since the June 1972 Conference on human and environment in Stockholm, Sweden, a number of fora have taken place. In fact there has been a steady evolution of positive changes towards environmental awareness, education, legislation, policies, institutional changes and capacity building. Globally the wake for UNCED is a milestone regarding endeavours to combat environmental issues.

In Tanzania the progressive awareness coupled by mushrooming NGOs has contributed to involvement into EE and actions towards containing

environmental problems. Apart from ongoing programmes there are many on the drawing ;board. These will include EE projects as well as public awareness and involvement (see attached).

The MEC has already endorsed two proposals submitted by the Institute for Curriculum Development (IDC). The proposals are: reduction in the numbers of subjects in schools and incorporation of EE in school syllabi. This is a breakthrough towards changing of a great majority of our young generation. Since it is a programme that will involve overhaul of existing curricula, the need for teaching/learning materials will still be great.

The NEMC to execute some of its duties, has embarked on a nationwide EE environmental awareness and public involvement. It is co-ordinating the EE activities carried out by government departments, NGOs and other organisations. This is a form of mobilising and pulling resources together in an endeavour to combat environmental problems. Such steps will be augmented by launching three major controls of environment: the Environmental Policy; the NCS with Action Plans; and the Environmental Protection Law.

Although there is appreciable awareness and deliberate efforts to promote EE and sensitize the public, meaningful EE will depend on good policies and strategies for its implementation both in formal and non formal education programmes. Although the current education and training policy mentions a statement on environmental management, there is no mention on strategies in various levels of the education system. It is important therefore this issue be considered.

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ENVIRONMENTAL EDUCATION: ITS PLACE IN SCHOOL CURRICULUM IN TANZANA-

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ENVIRONMENTAL EDUCATION: ITS PLACE IN SCHOOL CURRICULUM IN TANZANIA

Abstract

This paper presents some views related to efforts made or being made to incorporate for the incorporation of environmental education (EE) in the school curriculum. To make this function clearer, the paper revisits the place of the Ministry of Education and Culture (MOE & C), efforts made by the Tanzania Institute of Education (TIE) in the implementation of the curriculum objectives with consideration of EE and the constraints faced. Finally the paper emphasizes the essence of this workshop coming up with concrete EE policy suggestions for the quicker realization of sustainable development in Tanzania.

Highlights of the State of Education in Tanzania

Background

Education, **as a process by which the individual acquires the knowledge and skills necessary for one to appreciate and adapt to the ever changing physical and social conditions** has its roots in the society and expands or dies with it. One form of this education is the formal type. Hence talking of this education, we essentially refer to the type which starts in the school and transcends into the community. However the other form is the non-formal education which begins in the community and continues to suit the individual's and community needs. In the former, education is delivered usually in classrooms whereas for non-formal education is not the case. In non formal education, it is not uncommon to have meeting places, community places or even places for medical services as training sites.

Formal education is often conceived as hierachically structured, full time activity and chronologially graded in patterns running from primary to the university level. It involves general, academic, technical and professional training. It is often under a stable organisation such as the government. From the lowest level, as has been refered above, education fosters literacy and numeracy. It also enhances the transfer and application of many other life skills in real life situation.

The formal education in Tanzania is traced back to colonial days when literacy, numeracy and technical life skills were introduced. Since independence, one ministry has been responsible for education. It is till recent years, that the second ministry was created. While the Ministry of Education and Culture (MOE & C) is responsible for promotion of education at pre-primary, primary, secondary and teacher education. The Ministry of Science, Technology and Higher Education (MSTHE) has been entrusted with the development of education in the higher learning institutions.

The Education System

The present education system or organisation is 2 - 7 - 4 - 2 - 3^{+}, where pre-primary education takes two years, primary school education lasts for seven years, while it lasts for four years in lower secondary level. The advanced level takes two years after which beneficiaries may attend tertiary eduation courses which last for three or plus years at different colleges such as the University of Dar es Salaam; Sokoine University of Agriculture and similar institutions.

Besides the celebrated philosophy of the Education for Self Reliance (ESR), there have been a series of developments which also have refined this philosophy. **The Musoma Resolutions, (1974), the Tanzania Education System for the 21st century (Task Force Report), (1993), the presidential Commission Report (1982) and the Education and Training policy (1995)** have been the major fora where further interpretation of education goals and strategies have been made as dictated by Social and Economic demands of the time at hand.

The general goals of education reiterated in these documents are intended to:

1. Provide proper education that is to equip learners with proper attitudes and skills relevant to the needs of our society.
2. Develop Self Confidence and enquiring mind among the youths for confronting different situations to be faced in life.
3. Prepare young people capable to do productive work.
4. Enable pupils to undetrstand, accept, respect and value their customs, traditions and ethics.

5. Enable pupils understand the world and its different social economic systems.
6. Enable pupils understand and properly exploit their environment, use and conserve it for the posterity.
7. Properly use the national resources.

The Enrolment in Primary and Secondary Schools and Teacher Training Colleges.

Today primary school enrolment stands at about 4.0 million pupils. Analysts have showed that this has declined from 90% in 1980 to less than 70% now. This is opposed to the 1974 Universal Primary Education (UPE) strategy which had banked on the concept that education was a right of every child in Tanzania. We assume that certain intervening variables are responsible for this situation (Table I). The result of this scenario has been the increase in numbers of illiterates in the community. The Ministry of Education and parents occassionally work together to solve isolated problems assumed to be responsible for the condition in question. For example some ochestrated campaigns are focused on supply of desks. But if a deeper interest were made into the issue, it could be noted that no concern is being made on the state of school buildings; toilets; water supply, food and the actual teaching. These things scare of parents from commiting themselves to enrol children in such schools. One primary school in Dar es Salaam for example has a Standard III with a population of 630 pupils. One can imagine the scene.

Tanzania with one of the smallest number of secondary schools in Africa South of the Sahara (about 491 in 1994), has witnessed a mushrooming number of private secondary schools (298 out of the 491 in 1994). The population of secondary school pupils now stands at around 200,000 (1995). Two issues are of interest here. One, that this intake should not be confused with an indication of an improved performance at primary level. The big number of private secondary schools explains this situation. The actual situation, though, is that only 15% of pupils can score half of the pass mark for selection to form I. The second aspect is the student teacher ratio (STR). The ratio of 17:1 in Tanzania schools is

lower than the normal 23:1 in Africa South of the Sahara. This implies underutilization of manpower.

It has also been confirmed that there is a big number of Teacher Training Colleges in Tanzania but maintains very low intake of student teachers. This has made tutor student ratio to be at 10:1 thus underutilizing tutors and other resources in colleges (i.e. over 20 colleges have been enroling less than 300 students) against the ideal ratio of 20:1

The educational planning sector too has been reported to be responsible for malfunctions in the Ministry. It is understood that the planning there, concerns itself with project implementation rather than with educational research; processing storing and dissemination of data for consumption. However most of the named problems are a function of critical budgetary deficits. In 1994, for example, the allocation from the central government budget dropped to 3.3% from 13% in 1983. This has seriously crippled the ministry's plans.

The School Curriculum Process and Environmental Education

One of the institutions within the MOE & C assigned with the role of implementing the country's educational policy is the Institute of Education (TIE) formerly known as the Institute of Curriculum Development (ICD). As early as 1982 todate, the TIE has been engaged in curriculum review to acommodate new issues which come up according to national and global developments. Some of such issues are Family Life Education (FLE), democracy, modern technology and environmental issues.

Curriculum

The curriculum is the deliberate, systematic and planned learning experiences provided under the guidance of the education institutions. It is a process of developing, implementing, monitoring, evaluating the educational goals, aims and objectives. Any curriculum focuses on the learner, the teacher, the content and the intended learning outcome to satisfy the needs and expectations of the society.

Many research works, reviews, studies and feedback have showed that the curriculum is not in place as the foregoing definition is trying to potray (Chonjo et al 1992, Rajabu et al 1993, Osaki et al 1994 NEMKI - variable, Task Force 1993, Education and Training Policy 1995). These sources also showed that there were serious bottleneks associated with the state of EE in the School Curriculum.

Such works also revealed that EE in particular had not been moulded as a single subject at any level of learning in Tanzania. What was also confirmed is that almost all school syllabi have some EE content incorporated. The following is the summary of factual aspects found in the school syllabi.

- Overloaded Syllabi at all levels i.e. primary: 13 subjects; secondary schools 11 subjects.
- EE isolated, disjointed, repetitive and lacks discountinuity accross levels.
- Curriculum of the subject/class is centred
- Subjects have a lot of environmental topics but with very little touch on actual EE strategy.
- EE has been theoretically treated and lacked practical orientation by pupils and teachers.
- EE literature is scarce/absent.
- No subject is seriously focusing on better understanding of EE and the local environment.
- Education for Self Reliance had no focus on EE.
- EE is neither examined by the examination council nor monitored by the inspectorate respectively.
- EE is not used to educate learners on the concepts and practice of sustainable use of environment.
- Most of the learners come from places which are environmental unfriendly e.g. poor and destructive sweeping; bush fires; tree felling, poaching; dirty toilets irresponsible littering etc..
- Teaching methods have been more academic hence not aiming at changing learners behaviour and their attitude.
- The present EE component in the subjects fail to show dangerous consequences of human activities on environment.

- Provide little guidance on how to go about with sustainable use of the environment.

Any way out?

After the establishment of these shortfalls, with particular reference to EE, the following strategies were suggested.

- Revise primary and secondary school and TTC curriculum, to emphasize practical EE issues, regarding their present and future implications to Tanzania.
- Create and consolidate pre-primary school curriculum and teach EE issues right from that level.
- Make secondary education available to everybody and continue promoting the teaching of EE at this level.
- Establish EE learning and training mannuals, materials and aids.
- Train EE trainers.
- Develop and introduce EE at University level and at other tertiary institutions for capacity building.
- Adopt teaching methodologies which will enhance appropriate skills for EE.
- Infuse EE in all School college and other tertiary curricula
- Formulate a National EE Policy and establish EE strategy.
- Researches should be undertaken before embarking on any specific activity with EE curricula orientation.

The Attempted Boost of EE through Recent Curriculum Review

As had been observed earlier on, the Tanzania Institute of Education (TIE) responded to lthese recommendations. Thus TIE developed a new curriculum package (NCP) and reviewed the whole curriculum for pre-school to Teacher Training Colleges. Some of the outcomes are:

- TIE reduced the number of subjects thus creating new ones. e.g. Maarifa ya Jamii for primary school and Social Studies for Secondary Schools. For example the subjects were reduced from 13 to 7 at primary level.
- Other independent subjects were created e.g. Civics; Life Skills and Computer Studies.

- Incorporated some EE themes in the newly created and also consolidated them in the traditional subjects (refer Appendix A and B for Maarifa ya Jamii and Civics).
- Some of the newly created subjects i.e. Social Studies; Maarifa ya Jamii and Unified Science are now under piloting in some schools and will be evaluated at the end for consideration to be adopted to all schools in the country. These subject carry fair amount of EE.
- TIE has rewriten all syllabi, and some teacher's guides and pupil's books for school use.
- Curriculum for the Teacher Training colleges have been reviewed with emphasis on methodology.
- Subject themes have been synchronized in order to avoid repetition across the syllabi.
- "Maarifa ya Jamii" has been formally and nationally examined at Std IV level for the first time this year (1995).
- TIE implements a Project on Environmental Education for Primary Schools in East Africa (PEEPSEA - 1995 - 1997).

Tasks Ahead

1. There is an urgent need for establishing EE policy to back up these efforts.
2. Train teachers on EE methodogy
3. Embark on production of EE teaching and learning materials & train local writers taking advantage of the present condusive book policy.
4. **Create strategy so that the different organisations working towards the realization of EE objectives in schools or colleges use the same curriculum designed by the MoE & C.**
5. Establish an Environmental Education Resource Centre(s), (EERC) nationally and regionally.

Conclusion

The Critical message one should get after having gone through this short paper is that there **lacks a mandate to warrant a healthy ground for EE in Tanzania. This is the lack of EE policy mandate.**

In countries such as Greece, Italy, United States; Brazil, and even within the Commission of European Communities, there are already strong political commitments to environmental education. This commitment is either in form of parliamentary acts, agreements, arrangements or national environmental eduation strategies. Those strategies have helped much in strengthening EE there. It is our belief that it is not late in Tanzania to do the same.

It is the hope of the authors of this paper that a full implementation of EE in our country through curiculum may not be holistic and successful unless backed by an EE policy yet in place. In addition it is crucial to expect that the intermarriage between sectoral policies i.e. education policy and EE policy will necessarily enhance the national goals of sustaining the environment.

At the end of this EE policy workshop, therefore, we expect that participants will have come up with **sufficient proposals ideal for formulating EE policy for Tanzania.**

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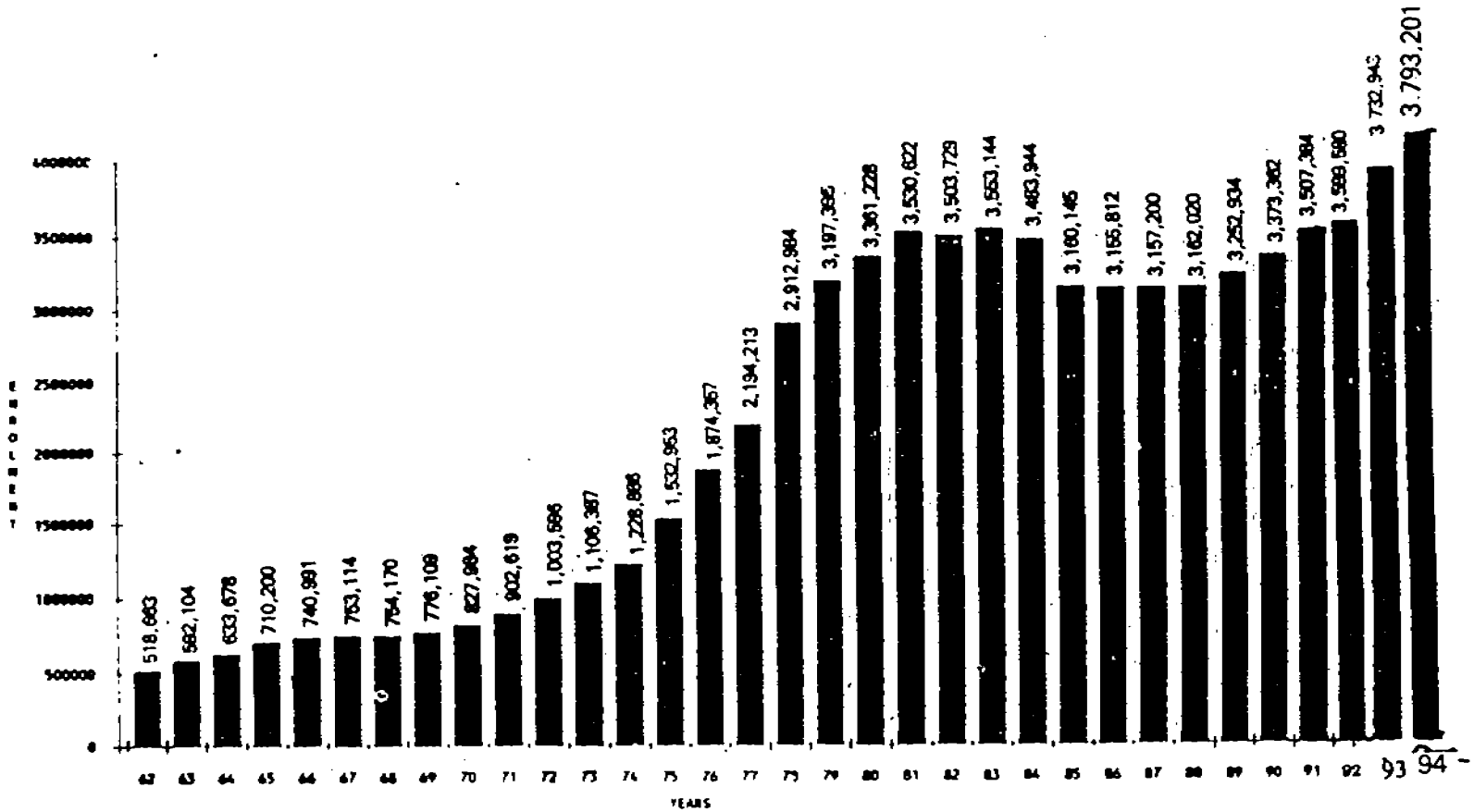
Chart 5

PRIMARY EDUCATION
COMPARATIVE ENROLMENT IN PUBLIC PRIMARY SCHOOLS 1962 - 1994



Appendix A

1. Maarifa ya Jamii (Primary Social Studies Std III - VII)

2. Mwanafunzi atakayesoma somo hili ataweza:-

(i) Kukuza na kuendeleza maarifa, uwezo na tabia ya matumizi bora na hifadhi ya mazingira.
(ii) Kutambua uhusiano uliopo na unaopasa kuwepo kati ya binadamu na mazingira.
(iii) Kukuza na kutumia maadili na stadi za kuhifadhi, kutunza na kutumia vizuri mali, vifaa, majengo, mazingira na kuendeleza urithi wa asili.
(iv) Kubainisha uhusiano kati ya binadamu na mazingira yake
(v) Kueleza jinsi ya kutumia vizuri, na huku akihifadhi mazingira katika kuleta maendeleo.

MADA KUU	MADA NDOGO	MAELEZO
	1.4. Shule yetu	(i) Dhana na maana ya ramani (ii) Pande kuu nne za dunia na umuhimu wake (iii) Ramani ya shule pamoja na ujirani wake (iv) Mazingira ya shule na umuhimu wa utunzani wake (v) Sheria, alama na kanuni za Usalama katika mazingira ya kazi na ya kuishi - usalama barabarani - tahadhari kwa maafa km. ajali, mafuriko, tetemeko, njaa nk. - maonyo kwenye chupa, makopo, pakiti na makasha ya vifaa, vyakula, madawa, sigara, vipodozi nk.
	1.5 Kijiji Chetu au Mtaa Wetu	(i) Shughuli za jamii na athari zake katika mazingira ya kijiji au mtaa (ii) Ugavi na matumizi bora ya nishati km. maji.

	1.6 Kata Yetu	(i) Sura ya nchi (ii) Athari za shughuli za wakazi katika mazingira ya kata na jinsi ya kudhibiti athari hizo.
	1.7 Tarafa Yetu	(i) Sura ya nchi (ii) Idadi ya watu na mazingira (iii) Athari za shughuli za wakazi wa eneo kwa mazingira na jinsi ya kudhibiti athari hizo.

DARASA NNE

MADA KUU	MADA NDOGO	MAELEZO
	2.1 Stadi za Ramani	(i) Ramani
	2.2 Sura na maumbile ya Nchi katika wilaya yetu	(i) Maumbile ya wilaya yetu k.v.
	2.4 Tabia ya Nchi na Uoto wa wilaya yetu	(i) Tabia ya nchi (ii) Aina za uoto
	2.5 Wakazi	(i) Sanaa za ufundi na za utendaji katika kudumisha mila na desturi: (ii) Idadi na mtawanyiko wa watu katika mazingira ya wilaya yetu.
	2.6 Uchumi na Maendelezo	(i) Kazi za uzalishaji mali, utunzaji wa mazingira (ii) Athali za ongezeko la watu na shughuli zao kwa mazingira ya wilaya yetu na jinsi ya kudhibiti athari hizo
	2.8 Haki na wajibu wa Raia	(i) Kushiriki/kushirikishwa katika mipango ya mazingira
	2.9 Huduma za jamii na wajibu wa Raia	(i) Athari katika mazingira
	3.2 Sura ya Nchi katika Mkoa Wetu	(i) Sura ya nchi
	3.3 Tabia ya Nchi na Uoto wa Mkoa Wetu	(i) Tabia ya nchi (ii) Upimaji wa hali ya hewa (iii) Uoto
	3.4 Wakazi	(i) Athali za idadi iliyoko na kazi za watu katika mazingira na jinsi ya kudhibiti athali hizo.

	3.6 Huduma za Umma katika Mkoa wetu na Utunzaji wa Mazingira.	(i) Huduma za jamii, maji, nishati (umeme) (ii) Wajibu wa kila raia katika kuhifadhi na kuendeleza misitu, wanyama pori, vyanzo vya maji na mazingira ya mkoa wetu.
	3.7. Maliasili ya Mkoa Wetu	(i) Maana ya maliasili, mahali zilipo, hifadhi na udhibiti wa matumizi ya mali hizo. (ii) Jinsi wananchi wa mkoa wetu wanavyonufaika na maliasili iliyopo mkoani.
	4.1 Stadi za Ramani	(i) Pande nane za dunia (ii) Kontua (iii) Utambuzi wa sura ya nchi.
	4.3 Sura ya Nchi ya Tanzania	(i) Sura ya nchi ya Tanzania
	6.1 Wakazi	(i) Athari za ongezeko la haraka la watu kwa mazingira (ii) Utunzani wa mazingira
	6.2 Utamaduni Wetu	(i) Mila na desturi zinazohitaji kudumishwa nchini
	6.3 Uchumi wetu na maendeleo ya Taifa (a) Maliasili	(i) Aina za maliasili (ii) Matumizi (iii) Matumizi mabaya (iv) Taratibu za kuhifadhi.
	(b) Utalii	(i) Maana na umuhimu wa Utalii (ii) Aina za utalii (iii) Vivutio
	(c) Kilimo	(i) Athari za kilimo duni katika mazingira
	(d) Ufugaji wa Jadi	(i) Ufugaji wa jadi (ii) Athari za mifugo mingi kwa mazingira

	(e) Uvuvi	(i) Uvuvi
	(f) Viwanda	(i) Athari ya viwanda katika mazingira
	(g) Madini	(i) Athari za uchimbaji wa madini kwa mazingira na jinsi ya kurekebisha athari hizo
	(h) Nishati	(i) Taratibu za kujikinga na madhara ya aina mbalimbali za nishati km. jua, umeme, upepo, sauti, mwanga.

DARASA LA SITA

MADA KUU	MADA NDOGO	MAELEZO
7.0 **STADI ZA RAMANI**	7.1 Kipimo	(i) Kipimo
8.0 **MFUMO WA JUA**	8.1 Umuhimu wa Jua	(i) Jua, sayari, nyota (ii) Chanzo cha nishati kwa uhai wote duniani (iii) Nguvu ya uvutano
	8.2 Jua na Sayari	(i) Majina ya sayari (ii) Umbali kati ya jua na kila sayari (iii) Aina na muda wa mizunguko ya sayari na athari zake (iv) Mizunguko ya mwezi na athari zake.
	8.3 Dunia	(i) Nafasi ya Dunia (ii) Umbo na mkao wa dunia (iii) Mizunguko ya dunia na athari zake (iv) Dhana ya latitudo na longitudo (v) Maana na matumizi ya latitudo na longitudo kwenye ramani.
9.0 **AFRIKA YA MASHARIKI**	9.1 Nafasi ya Sura ya Nchi za Afrika ya Mashariki katika Bara la Afrika	(i) Nchi zinazoifanya Afrika ya Mashariki (ii) Sura ya nchi (iii) Mwinuko
	9.2 Tabia ya Nchi	(i) Tabia ya Nchi (ii) Hali ya hewa

	9.3 Uoto	(i) Kanda za uoto (ii) Maturnizi ya uoto (iii) Kuharibu uoto na madhara (iv) Kuhifadhi na kudhibiti uoto wa nchi.
	9.4 Wakazi na makazi yao	(i) Idadi, Mtawanyiko na msongamano wa watu (ii) Mahitaji ya makazi (iii) Athari za Ongezeko kubwa la watu kwa Mazingira katika Afrika ya Mashariki (iv) Sheria ya Mazingira
	9.8 Taratibu za Uchumi, Maendeleo na Ushirikiano katika Afrika ya Mashariki.	(i) Mazao makuu ya biashara katika Afrika Mashariki - hali ya hewa - matatizo yanayokabili kilimo katika Afrika ya Mashariki
	(b) Ufugaji wa Kisasa	(i) Ranchi
	(c) Viwanda	(i) Mambo muhimu ya kuzingatia katika ujenzi wa viwanda (ii) Madhara yaletwayo na viwanda kwenye mazingira na namna ya kuyadhibiti

	(d) Madini	(i) Athari za machimbo katika mazingira na tahadhari au urekebishaji wake
	10.1 Mahali zilipo na sura ya nchi	(i) Mahali nchi hizo zilipo
	10.2 Tabia ya Nchi	(i) Tabia ya nchi (ii) Mabadiliko ya halli ya hewa yanavyoathiri mazingira
	10.3 Uoto	(i) Uoto (ii) Manufaa ya uoto (iii) Mambo au vitendo vinavyoweza kuharibu uoto wa nchi na madhara ya uharibifu huo (iv) Mbinu za kudumisha na kuhifadhi uoto wa nchi.
	10.4 Wakazi na makazi katika Nchi za Kusini mwa Afrika	(i) Athari za ongezeko kubwa la watu kwa mazingira katika maeneo mbalimbali ya kusini mwa Afrika (ii) Matatizo yanayounda maana na ukuaji wa miji, uharibifu wa mazingira.

12.0 BARA LETU AFRIKA	12.1 Mahali lilipo na Sura ya Nchi	(i) Mahli Afrika ilipo katika dunia (ii) Sura ya nchi (iii) Tabia ya nchi (iv) Mambo yanayoathiri tabia ya nchi (v) Mabadiliko ya tabia ya nchi (vi) Jinsi ya kukabili athari zinazotokana na mabadiliko ya tabia ya nchi
	12.3 Uoto	(i) Uoto (ii) Shughuli za maendeleo zinavyoathiri uoto na mazingira (iii) Kuhifadhi na kudhibiti uoto
	13.3 Nafasi ya Sayansi na Teknolojia katika Maendeleo ya Afrika	(i) Athari za matumizi mabaya ya teknolojia kwa mazingira
	14.2 Mazingira	(i) Uharibifu wa mazingira na udhibiti wake (ii) Maliasili (iii) Jitihada za kuboresha mazingira (iv) Kudhibiti hewa chafu km. kutoka kwenye magari na mitambo.
	14.3 Wakimbizi	

DARASA LA SABA

MADA KUU	MADA NDOGO	MAELEZO
16.0 DUNIA YETU	16.1 Sura ya Nchi	(i) Mabara, bahari kuu (ii) Sura ya nchi
	16.2 Tabia ya Nchi	(i) Tabia ya nchi katika dunia (ii) Chimbuko na madhara ya ukame, matetemeko, vimbunga, mafuriko, tufani, nk. katika sehemu mbalimbali za dunia.
	16.3 Uoto wa Dunia	(i) Kanda za uoto (ii) Mambo yanayoathiri uoto na matokeo ya athari hizo (iii) Maeneo ya dunia yenye uoto ulioathiriwa na njia za kukabiliana na athari hizo
	16.5 Uvuvi	(i) Njia za kuzuia uharibifu na kuhifadhi mazingira ya samaki
	16.6 Viwanda	(i) Athari za viwanda kwa mazingira na jinsi ya kudhibiti athari hizo.
	16.7. Nishati na Madini (a) Mafuta	(i) Mafuta na uchafuzi wa mazingira na jinsi ya kuzuia.

	(b) Umeme	(i) Matumizi ya umeme na tahadhari zake
	(c) Gesi	(i) Athari za gesi kwa mazingira na tahadhari za kuzuia athari hizo
	(d) Makaa ya Mawe	(i) Athari za uchimbaji makaa ya mawe kwa mazingira na jinsi ya kudhibiti athari hizo
	(e) Nishati na Nyuklia	(i) Athari za nguvu za nyuklia kwa mazingira na jitihada za kudhibiti na kuzuia matumizi mabaya ya nguvu hizo duniani.
	(f) Uchimbaji wa madini	(i) Athari za uchimbaji wa madini na njia za kudhibiti
	16.8 Mawasiliano na Uchukuzi	(i) Athari za njia za mawasiliano kwa mazngira na jinsi ya kudhibiti athari hizo

APPENDIX B

Environmental Education Incorporated in the Civics syllabus for Secondary Schools Forms I - IV.

FORM ONE

THEME	TOPIC	NOTES
9. **OUR ENVIRONMENT**	Background	• Meaning, components and importance of Man's Physical Environment
	Balance of Nature	• Meaning and Importance of biodiversity and biotechnology in the Balance of Nature • Meaning of an Ecosystem • Importance, Promotion and Conservation methods for Tanzania's forests. Wild animals and plants • Importance of Biotic and Abiotic Elements in the Balance of Nature • Effects of Mineral Exploitation on the environment • Energy Saving and conservation methods

FORM TWO

THEME	TOPIC	NOTES
2. ECONOMIC AND SOCIAL DEVELOPMENT	Social Services	• Meaning, Importance and Characteristics of - Social Groups - Social Services
	Social Services - Health	• Meaning, characteristics and Importance of a Health Service • Individual and Community Participation in the Promotion of Environmental Health and Hygiene • Conditions which Promote and maintain Personal and community Health • Characteristics of a good quality and healthy environment • Social Measures for the Prevention and Control of communicable and Infectious Diseases e.g. Cholera, STD, AIDS, Ebola infection, Meningitis, diarrhoea, Dysentery - Waste Disposal - Control of air and water pollution - Health Education - Consideration for the Needs of others - Personal Hygiene and Responsible behaviours

3. **OUR CULTURE**		• Types, Location, Importance, Preservation and protection of Important Objects of Culture in Tanzania - Natural and man made historic sites, objects, monuments, museums etc. - Natural and National sites and wildlife - plants and animals
9. **OUR ENVIRONMENT**	Natural Resources	• Meaning, Types and Importance of Natural Resources in Tanzania • Basic Human Needs and sustainable use of the Environment - food production and agroecology - human settlements transport and communication systems - sustainable water sources - social services • Planned Urbanisation and the Care of the Environment • Environmental Impact and Control of Human Settlement
	Population Growth and the Environment	• Population Structure, Growth Rate, Density and Associated problems on the environment • Key issues in Family Life Education for sustainable use of the Environment • Human migration and the Refugee Problem in Africa

	Environmental protection	• Prevention and Control of Environmental Degredation - prevention of files - prevention of soil erosion - control of overgrazing - use of modern methods of agriculture - planned land use • Control and Prevntion of ill Effects of agro and other Chemicals in the environment • Afforesation and Sustainable Exploitation of Forests • Protection of Rare and Endangered Species of Plants and Animals • Protection of water Sources

FORM THREE

THEME	TOPIC	NOTES
9. OUR ENVIRONMENT		• Components of the Atmosphere • Meaning and Importance of Ozone Layer on climate condition • Types, source and control of chemical substances e.g. aerosols and CFCs which disrupt the ozone layer • Meaning, Types, Effects and Control of pollution (air, water and environmental pollution etc.

FORM FOUR

THEME	TOPIC	NOTES
2. ECONOMIC AND SOCIAL DEVELOP MENT	Education as a Social Service	
	Health as a social service	• Publlic Cooperativeness and Support in Times of Difficulties and Hazards e.g. Accidents, Earthquakes, Floods, Fires, Famine, Epidemics etc. - Safety Precautions in Construction and other similar sites and undertakings - Road safety regulations for all users - Fire Control and Fire fighting Mechanisms and Equipment - Importance of quarantines in times of epidemics - National Food Security stratery and the responsibilty of farmers and consumers. • Choice between services of clinics, Health Centres and Hospital Services against Traditional medicines and currative methods. • Importance of Proper use of Drugs and Other Forms of Medical Prescriptions. • Warning's pm Bottle and packed Food Stuffs, Medicines and other Chemicals. • Importance of Observing. Health Warnings Against Smoking, Alcohol, Drugs, Agrochemicals, Herbicides, Fumigants and other Chemicals. • Care for the health Service support systems - e.g. Public telephones, ambulance services, road system etc

	Water as a Social Services	• Importance of Water in maintaining Life •, Sources and Uses of water • Ways of caring for sustaining and Protecting water sources and Supply Ststens e.g. Through tree Planting and Prevention of Uncontrolled Tree Felling etc. • Meaning and Importance of Clean and Safe Water Supply

9. OUR ENVIRONMENT	Management and Conservation of the Environment	• Meaning and Importance of Environment Management • Existing Methods of Environmental Conservation and Protection • Environmental Hazards - Their Detection, Effects and Man's Preparedness in cases of: - Fires - domestic, urban, forest and mountain fires - Volcanic erruptions - Earthquakes - Floods - Droughts - Soil erosion - Deforestation and desertification - Pollution of the air, water and general environment - Radioactivity - Solar emissions

THE EXTENT OF ENVIRONMENTAL EDUCATION IN SCHOOL

By

PROSCOVIA K. MUJUMBA

Paper presented during the Environmental Education Policy Workshop. 13-15 Dec. 1995 Morogoro

INTRODUCTION

The question of environment and environmental protection in Africa and elsewhere in the world has been a matter of concern that it can no longer be ignored by any serious educators involved in the development of relevant educational curriculum materials. The situation has been alarmed by an increasing speed of transformation of natural environment by man-made destruction and exploitation. Many of the resources that sustain life and wealth are being over used and abused. The basic needs of the people are not being met. People are forced to live in an environment that is dictated by deprivation, poverty and increasing ignorance. Such a situation requires forceful measures to provide the means to overcome such problems, so as to be able to conserve the environment for future generation.

Education as part of culture reflects a society's approach in solving common problems. Thus education is intended to create awareness of conserving and exploiting the natural environment meaningfully, in a creative and useful way in order to live in harmony with the environment.

The author believes though that the situation is still irreversible at least in Africa, unless nothing will be taken seriously. It is a hard task but manageable. Although Tanzania is first and foremost one of the least developed countries in Africa, but it is one which has clearly defined the aims of education in the well quoted documents of Education for Self Reliance. Thus, Tanzanian education is expected to produce people who are aware of the ecological potential of their country and with the knowledge, ideas and skills of preserving, tapping and developing its natural resources intelligently.

ENVIRONMENTAL EDUCATION

This paper is an attempt to provide senior decision-makers in policy making and planning, donors, all partner institutions and interested parties, teachers, curricula developers planners, youths, community workers, journalists and other with a dosier in environmental education (EE) in schools. The necessity has arisen from the fact that little is known on Tanzanian educational institutions' awareness, attitudes and actual practice in caring for their environment. The empirical evidences provided are based on several works which have been revealed by EE experts and researchers in Tanzania Mainland. These include the findings by Dr. Osaki (1989), which presents data from a research conducted in a sample of about 100 from six students and few teachers in three secondary schools. Two were urban schools in Dar-es-Salaam and one in Iringa. Among the three, two had an agricultural bias. The study aimed at finding out how much school science students have involved themselves in environmental issues at the classroom or field levels,&2 the skills they have acquired to solve common local environment problems and their feelings about some practices which are 'known to accelerate environmental deterioration process. In 1992 Dr.

Osaki conducted another study to investigate primary school teachers and pupils' perception of afforestation and how the schools could be used to protect the environment. The study was conducted in the most degraded areas in the regions of Shinyanga, Mwanza, Singida, Dodoma, Tanga, and Coast regions.

Yet in the same year 1992 another study was conducted by a team of EE experts. These included Mr. S. Ndunguru Mr. A.R.M. S. Rajabu both from the Ministry of Education and Culture, and Mr. B. Katigula from Curriculum development. The main theme of the study was to look for possibilities of incorporating environmental dimension in school curricula. Among the terms of reference were to study the situation in primary schools with regard to the knowledge, attitudes and Practices on EE. They further investigated the information on environmental issues, problems and programmes related to environmental conservation. The study involved the regions of Arusha, Dodoma, Iringa, Mtwara, Mwanza, Singida, Shinyanga, Dar-es-Salaam and Tabora.

Another study has of recent been conducted by another team of four EE experts. They include Mr. Abayo from Ministry of Education and Culture; Mr. Mwinuka from Tanzania Institute of Education, Ms Mujumba and Mr. Gasule both from Dar-es-Salaam Teachers College.

Meaning of EE

EE has been defined by Meadows (1989) as "the preparation of people for their lives as members of the biosphere. It is learning to understand, appreciate, work with and sustain environmental systems in their totally" That is to say the survival and well being of man depends on how much the environment is well managed. Environment supplies air water, food energy, clothing and shelter the essentials for man's survival.

The Cause for Alarm

Despite of all the blessings the environment offers for man's survival, man has been on the forefront to manipulate and exploit it to the extent that its manipulation has now become a threat to man himself. The results of this threat was realised by delegations from 113 nations who met in Stockholm in 1972 at the United Nations Conference on the Human Environment. The purpose was to inspire and adopt measures for the preservation and enhancement of the human environment, UNEP (1989). The debate on mismanagement of the world environment, giving way to its deterioration, pollution, and extinction of useful life forms, have since then been going on. However, problems of environmental misuse and mismanagement are still serious Sabaya (1991).

It appears that most of the recent disasters are man-induced. Example include the desert encroachment into the Western African

states of Mali and Chad, (Grainger 1982); the disappearance of various species of wildlife in Eastern Africa as a result of poaching; pollution of water bodies through the waste dumping; the destruction of coral reefs in the Ocean; and serious soil erosion.

Bude (1991) and 1993 suggests that some of these malpractices have been accelerated by the loss of culture of many nations in Africa which is said to be threatened by the rapid development of technological culture.

It has been suggested by Osaki (1989), Katunzi (1991), Sabaya (1991) and Bakobi (1992) that some amount of environmental education must be responsible in eradicating such destructive and slum mentality. It is obvious that most people are not aware of that some malpractices would result into environmental destruction.

However, environmental studies conducted by various researchers Osaki 1989, Rajabu (1992) and Abayo, et al suggest strongly that sufficient exposure to broad ideas on local environmental maintanence to young people, would instill the sense of responsibility in environmental maintenance.

EMPIRICAL EVIDENCES

Students Perception, visits and attitudes towards the environment by O-Saki 1989.

The first instance assessed the form six students perception in performing certain activities which were thought to be centrol in mastering their environment. The findings revealed that over 60 percent of the respondents would be able to maintain gardens; fighting insect pests in school farm; choosing the correct farming site to grow maize, advising pregnant mother on what to eat, controling soil erosion, and advising in planning of a village or town. Over 40 percent were not sure whether they could locate fish hiding places in the lake or sea, etc. From the findings it appears that students have just a general idea about mastering the environment like any other person who have not even gone to form six level.

The second question required respondents to find solution to a practical problem involving some knowledge of environmental management of a new home. The responses on the practical problem of converting a former pesticide store into a living home were really funny. About 19% of the student sample esp. from Physics Chemistry and Maths did not respond to this section, the researcher thought that may be it was a language problem. Students of Economics, Geography and Maths combinations for a living room they suggested inclusion of such items like radio casettes, cooling system like air condition, etc. Kitchen amenities such as fridges, cookers, furniture scored the highest frequency 64%, while 39% of the sample mentioned the importance of water and 34% mentioned cleaning/pollution control for such

type of a house etc. Such a stuation is really worrying as the form six level student could not decide matters outside the school situation.

It leaves much to be questioned about the type of science education the students have been exposed to with regard to its application in life.

The researcher was also interested to know the students' visits made to various places of environmental interest in the country either as school trips or with parents and friends for leisure.

Table 3 below indicates visits made by students to local environments

Code	Place	None	At least one school visit	At least one other visit
01	National Park	3.3	34.0	33.0
02	Game Researve or 200	35.8	24.5	39.6
03	Sea or Ocean	15.9	21.7	59.4
04	Forest	19.8	30.2	50.0
05	Factory	17.9	46.2	35.8
06	Lake or	31.1	23.6	45.3
07	Mountain	33.0	23.6	43.4
08	Island	40.6	26.4	33.0
09	Animal Farm	25.5	34.9	39.0
10	Crop farm	21.7	45.3	33.0
11	Water works	24.5	44.3	31.1
12	Electricity works	28.3	41.5	30.2
13	Museum	34.9	22.6	42.5
14	Historic place	22.6	28.3	49.1
15	Village or towns other than home	9.4	30.2	60.4

Source: Osaki 1989

The table above reveals that over 30% of the sample have never visited, while any of the 15 common abundant sites for school children to visit 30-60% of the sample have visited some places

through their families or friends. The situation reveals clearly the loss of that culture of the school trips common during the 1960s and 1970s.

Responses show that most frequently visited places were crop farms, villagers or homes, factories, water works, among other while the least visited included islands, game reseves or game sanctuaries, museums, national parks and mountains. This indicates that few students have been to the national parks or even the national museum as part of school trips. The above findings leave much to be questioned as to how could the school children feel bad about the loss of the golden mole (mule), the rhino, and the Afircan leopard which they have never seen.

The findings on attitudes of students towards environmental issues revealed further that there was a significant association between students' subject combination and the way they responded. For example while 95.5% of EGM students thought it was useful or very useful to out down trees and burn them into charcoal, 70% of PCB, PCM, and CBG groups thought it was harmful to do so. The findings suggest therefore that EE should be taught to all school children regardless of their combinations.

Furthermore, the findings revealed that the question of pollution has received very little attention in schools. Although almost 80% agreed that it is useful to keep fish eat which a mosquito larvae which is a biological control and less polluting strategy of fighting the mosquito, about 70% agreed also that it is useful to spray mosquito with DDt and other insecticides a method known to increase insect resistance to insecticide and polluting the environment.

Such a situation confirms fact that learning in our present school system is examination oriented. Students do not get time to analyse issues which could be practical in life. Again topics such as pollution, ecology genetics, and conservation biology might as often been covered hurriedly or left out so as to get time to do revision ready for their examinations. It has been suggested by Sabaya (1991) that EE should take place outside the classroom doors. Such places like farms, rivers, back yards, markets, factories national parks museums are worth visiting so that children develop interest and appreciate their environment.

THE PERCEPTION OF AFFORESTATION BY PRIMARY SCHOOL TEACHERS AND PUPILS.

In 1992 another study was conducted to survey the perception of afforestation by primary school teachers and pupils and how the schools can be used to protect the environment. It was assumed that people normally act in accordance with their perception of an event, problem or situation.

The area of the study included the most degraded areas of

Shinyanga, Mwanza, Singida, Dodoma, Tanga and Coast regions. The findings were as follows:

Tree nurseries and the establishment of demonstration plots were the main activities which primary schools were engaged in, which are directly and indidirectly related to afforestation. It was observed though that the knowledge possessed about afforestation was not always matched by the practice and attitudes in the schools. This was because such activities are treated as extra-curricular outside the main education curricula. Again they were not seen as schools' own afforestation activities but somebody's (government etc) effort.

It was thus recommended that: so as to promote the programme, schools should develop & tree nurseries especially fruit trees which pupils should take home to plant while other seedlings are planted at school.

The findings also revealed that teachers and pupils have limited view of EE in general and afforestation education in particular. For example when asked to define the word environment, 65% of students in the sample replied that environment meant the area that sorrounds ones' dwelling. When asked to give the details they mentioned trees, grounds, flowers and grass. Such responses were not quite different from the teachers' responses with who 60% mentioned specifically trees and land.

It was found out that teachers are unconfortable with inter-disciplinary curriculum materials because they were trained and brought up, in the single disciplinary tradition. It is recommended though that inter-disciplinary materials on EE be developed and pilot-tested. (Osaki 1992).

Yet another study was conducted by a team of three senior education officers. The study sought to find out possibilities of incorporating environmental dimension in school curricula.

It also sought to find out the awareness of pupils and community as a whole as regards EE issues and the level of pupils' knowledge in EE issues. Other areas were the attitudes and practices of the pupils towards the environment and practices of the pupils and the community in whole execise of environmental improvement and protection.

With regard to awareness the findings showed that EE is not new to pupils, teachers and the community. The fact has been revealed by 66% of the pupils in the study sample who have heard of EE in the respective lessons, while 61.7 have specifically heard about it on the radio. Furthermore, the distribution of teachers as regards to subjects in which EE is intergrated, the findings shows that most of the EE is integrated in Primary school subjects curriculum. 74.3% of the teachers show that EE is integrated in science subjects, while 73.3% say it is

integrated in agricultural science, home economics 66.1% geography 56.9%, fine art 4.6%; health education 3.7% and history 3.7%. This confirms the fact that EE awareness exists.

However it appears as if there is misconception in the way people perceive environment. The most known component of the environment is plants which was indicated by 9.0% followed by water 7.7% animals 3.4% and the least known is air 1% and soil 1.5.

Such a misconception might affect the behaviour towards environmental management. The author has a feeling that such a misconception proves why tree planting was the most observed activity in almost all schools visited.

The finding reveals further that EE is intergrated in primary schools subject, but the amount of infusion is not adequate. This fact was revealed by 78% of the teachers in the study sample who indicated that the amount is on the average. The findings to these studies indicated that the teachers have poor knowledge about the EE. Poor knowledge would obviously lead to incompetent teachers. Nobody would expect wonders from students who, always become victims of the circumstance.

Poor knowledge of students, teachers and the community about EE led to the conducting of seminars of the training of trainers who had to act as a multiplier factor on the sensitization process of Tanzanian students. However, the seminars did not bring about significant changes in the attitudes and behaviour of people towards EE.

A monitoring excercise has been conducted to ascertain the level of EE in primary schools, secondary schools, and the community. The populatien sample comprised of teachers, school children, parents, and administrators. The objectives of the study were to:- to assess teaching and learning resources in schools; to determine their suitability in delivering EE concepts; to examine teachers' competence in supporting EE; to investigate community perception and awareness and to assess environmental conservation activities in schools.

HEALTH WELFARE AND LEARNING RESOURCES

The data with regard to health and learning resources reveal that though careful and systematic disposal of human waste is a pre-condition for proper management of environment, the up keep of latrines indicated that, some schools had no latrines at all. For example, in one school the only pit, latrine available in the community belonged to a village chairman. The rest have the culture of hiding themselves in the bush. In some schools still the so called pit-latrine were in a

quite filthy condition. The condition was very unhealthy as fresh and old human excreta spread all over, the situation which endangers the life of school community. Thus, though very few schools had toilets which meet the minimum standards of a public toilet. In all, the standards are very low. Morestill, though health education is taught in schools, it is yet to instil the culture of cleanliness.

However, other buildings like classrooms and offices at least are well maintained given the standards of schools. Town schools were better off with regard to building maintainance than rural schools.

The question of furniture was also frustrating in most schools visited. In comparison secondary schools had better furnitures

than primary schools. In most primary schools there is a problem of over crouding which hampers conducive learning environment.

School compounds are usually marked by boundaries. In few schools there were well unmarked school boundaries made by tree fence but the rest are neither fenced nor have 'any alternative ways to control tress-possing. Tress-passing creates footpaths which ultimately cause soil erosion. Furthermore, tress-passing causes noise pollution, theft of school property and attract petty business, an activity which accelarates dirty and endangers life of students because of eating unhealthy food. All the above suggest that proper learning is to a great extent hampered by poorly managed environment.

Teachers Competence

The study sought to find out the capability of teachers in contributing to the development of EE teaching and learning materials. A proper preparation of teachers is a prerequisite for the successiful introduction of EE in schools. The findings reveals that teachers had not attended EE orientation programmes during their preservice training courses. Almost all teachers interviewed had heard about EE through the media such as newspapers, radio, and TV. Some more heard of EE through topics in the respective subjects like Biology, Geography, Agriculture, Nutrition etc. It was found out therefore that there was no formal teacher training on environmental issues.

While planning for incorporating EE in initial teacher training programmes, in-service teacher training programmes, would help those who are already in the field. Inservice training helps to fill gaps and raise the teachers' awareness on the rapid changing of knowledge on EE.

The study findings revealed further that very few teachers have attended seminars on EE. Some have attended "Sayansi-Mazingira" seminars, but the reseacher doubted whether such courses were really environmentally oriented. Through interview with participants Sayansi - Mazingira seminars were meant to raise the ability of for science subject teachers. However, there was a degree of appreciation for those who have attended Mali Hai workshops/seminars conducted in Arusha, Dar-es-Salaam and Zanzibar. The actual number of teachers who have so far managed to attend courses and seminars on EE is very small, compared to the vast population of teachers in Tanzania. All in all most teachers are not competent enough to diseminate EE in schools.

However, inservice courses could be conducted at the Teachers Centres (TCS) or Teachers Resources Centres (TRC). The TCs and TRCs are educational institutions situated within reasonable distance from the schools. Such places would enable all the teachers to attend seminars or workshop as it is not easy to converne all the teachers in Tanzania within a shortest time possible.

Teachers motivation towards EE

The status of teachers especially in rural areas is really pathetic. Teachers an paid low salary, most of them have no proper accommodation and most of them have transport problems. Through the study it was found out that the teachers are not motivated the fact marking a significant barrier to successful implementation of EE.

Teaching methods and styles

Transfering of knowledge skills and attitudes requires proper teaching method. Through observation it was found out that many teachers do not use teaching materials, instead most of them use chalk - board method. In some schools still even the teaching materials was a big problem (see Katunzi and Sabaya 1991). An introduction of EE in schools could be easily implemented through the improvement of the teaching methods.

Extra Curricula Activities

Informal methods and activities for EE outside the school compound reinforce the normal classroom teaching. It was found out from the study that club activities like debates, nature studies, walking tours, film shows, exhibits, essay competition and field trips were not practised. Where club activities were conducted they were not well organised. It was observed from the study that children, students do not get an opportunity of exploring environmental issues outside the curriculum and the classroom activities. In short children are not exposed enough to nature so as to get the opportunity to learn from the environment.

Teachers competence towards EE is thus hampered by low motivation

and lack of incentives, poor teaching methodology and styles.

ENVIRONMENTAL EDUCATION PERCEPTION

Community Perception

The study also sought to find out the degree of state of community perception towards EE. Among the people consulted were the teachers, parents, pupils, community leaders. It was found out from the study that the degree of parents' awareness of EE goals and objectives vary in relation to the development level of the communities they live in. In relatively developed communities like Kilimanjaro region and districts in Kagera region the parents are active participants of innovations and changes in schools. In less developed communities, there was less concern wards to education. For example in some regions of cattle keepers the families had big herds of cattle but the living standards were below standard line. These are the people who restricted there children from attending school and thus feel that their children's education was not worth investing in.

There was very little economic growth, because farming methods employed here were relatively primitive and unscientific leading to very low yields per units area. Furthermore there were acute soil erosion due to overgrazing.

However, in some cases some people have been aware and are trying environmental conservation activities.

An impressive example is Chamkroma village situated deep into the rural of Mpwapwa district is changing towards the right direction.

The Headteacher of the primary school after being sensitized in an environmental seminar, has executed some soil erosion control measures. From there after, one of the school boy learnt this at school, planted a banana sucker in a gully which had formed near their house. Furthermore an NGO known as SSIPDO (Small Scale Irrigation Project Dodoma) has embarked on soil conservation schemes in Chankroma, sensitizing and educating farmers on soil conservation measures as well as soil erosion.

In most of the areas people are well sensitized and they have started growing of trees, however there are some communities which needs a lot of sensitization.

Teachers' Perception on EE

The way the teachers perceive and thus their awareness on EE goals influence not only their teaching styles but also their commitment to supporting education principles and practices that are both environmentally sensitive and friendly. It was found out from the study that about 74 percent of those interviewed

limited the concept to tree planting and gardening and upkeep of school compound. Furthermore, some teachers showed no love for the children under their care and most of them payed little attention to the welfare and health of their pupils. For example in one school in the area where the school is situated 2000 metres above sea level with temperatures around 10° to 15°C while pupils went around barefooted, without sweaters with clenched fist, shiveing in the cold, their teacher was confortably dressed up in warm-clothing. Such a situation is recally inhumane. There is no way such a student could easily follow the lessons when is physically toutured.

The Government Leaders' Perception of EE

This study sought also to find out the government leaders' perception on EE. The findings revealed that many leaders got the message through national campaigns, in the media and the concerned organisations like NEMC. However the information proved to remain theoretical without practical impact. Where organisations are involved, the government leaders made little monitoring. Hunting for example, proved to suffer from a lot of negligence and to benefit few who are rich. In two incidences the researchers witnessed extremely hostile treatment to wildlife. The annual fires have demolished the once thick forest. The warden who accompained the hunter explained that the burning of forest was unevitable since it created fresh grass liked by the wildlife. It appears that the warden considered himself a warden of deers, antelopes rhinos, elephants but not for birds, squirrels and other creaping scpecies. Again the sounds from the rifle created fear and terror to animals.

The act indicate low perception by government leaders in the need to protect the wildlife.

ENVIRONMENTAL CONSERVATION ACTIVITIES

The study also sought find out environmental conservation activities performed at school and school sorroundings. From the study planting was an activity reported to be observed in almost all schools. Trees marked the location of school from far and were used for shade. It appears that tree planting was taken as a tradition in many schools without giving much concern to environmental conservation act. A slightly exceptional case was reported by Malihai Club Members of Ilboru Secondary School who occassionaly join villegers in planting trees.

Grass planting is another activity which was considered as one of the significant methods to conserve soil. Efficient and conscious grass carpet growing was evident in some schools in Kagera, KIlimanjaro and Arusha. In some schools where grass planting was not exercised confirmed of discomforting clouds of dusts brown by wind from unprotected ground.

Gardening was another activity excercised by all schools visited. Nevertheless there were common problems like watershortages, poor

seeds, poor methods of gardening, lack of proper equipments which hindered favourable outcomes. Moreover, inability to control soil erosion, pests, unavailability of local manure in some areas contributed to poor yields.

Waste Management

The most commonly observed means of waste control in the study area was sweeping both the waste and the soil itself. There was no tendency of distinguishing and separating the garbage before disposal. Though some kind of garbage could have been collected, heaped some where to wait for recycling and turn into the manure, all were mixed up, and dumped somewhere thus after sometime plastics, papers and grass would be seen scattered allower the compound. Thus waster management is not properly done.

Soil Conservation

Soil conservation is an action aimed at maintaining soil fertility, intergrity and structure. Practices of stone pilling along the gullies, terrace farming, constructing water control ditches and grass planting were some effective measures applied to cheeck soil erosion. Maringeni Primary School in Moshi rural, Chamkoroma Primary school in Mpwapwa district, and Bwiru Girls Secondary School in Mwanza region were sited as best examples.

Other activities included control of bush fires by making paths around school compound. It was intresting though to find out that while some communities find bush fires destructive others believe that wildfire would be checked by another fire. It is also a belief that bush fires clear ground for young grass. In some extremes in the southern Tanzania it was believed that the one who set such fires was either lucky or strong person. Such misconception could be eliminated through EE.

Other activities included environmental clubs, and associations. Malihai Clubs of Tanzania (MCT) whose coordinating office is in Arusha was reported to be active. Members performed activities like video shows with environmental education orientation, bearing, study tours, tree planting and tree seedlings raising-for afforestation. However such clubs where they were active they had very few members due to funds raising problems.

Community Sensitization towards EE

Was yet another activity performed by school members. Such activities included cultural drama and songs, film and video shows with an EE bearing. The availability of various publications on environmental conservation issues in the community seem to sensitize people. Such publications include "Kunguru" Misitu ni Mali" "Mazingira Yetu" "Tunza Mazingira Yakutunze" "Jihadhari na Moto" "Panda Mti Kata Mti" etc.

Bee and Rat Keeping

An unique case about bee keeping was observed at Lake Secondary School in Mwanza. The beeive made of glass was stationed in one of the classrooms. When asked what led to the initiation of this project, the teacher who was responsible said that, he had witnessed people smoking and killing these insects, wherever they sought for a refuge. Such cruelity was being subjected to poor insects without consideration of sweet honey they offer. Rats were kept in some schools in Arusha and Dar-es-Salaam to be used as a specimens during Biology lesson.

Aqualculture:-

Some schools in Morogoro practiced aqua-culture. These are keeping fish in fish ponds, and they are used as sources of fish (food).

Support for the Conservation Activities

The success of conservation activities in some schools and communities were brought about by several organisations some of them include TRCC, Red Cross, IPP, ICRAFT, KNCU, SCAPA, DANIDA, HIMA, TWCA, NORAD, HASHI, SHISCAP, HADO, DOVAP, Town Councils and WWF, and the forest department.

Most communities appreciate the donations though some communities were complaining that some donors have contradicting ideas and maintained their interests. For example in one school instead of getting a borehole which the community had asked for, a donor opted to construct a water pipeline from the main water urban supply network, which failed to work. That is to say donations need to be checked, they should march with the needs of the recipients.

CONCLUSION

This study has discussed at length the extent of EE in schools and the communities surrounding them. An attempt has been made to show the degree of awareness of the community and schools on environmental man-made destruction and exploitation activities. All the studies confirm the fact that the level of awareness on environmental issues to the teachers, students and the community is very low. The studies further have tried to show the measures which have been employed to try to rectify the situation. However, efforts have been achieved at varied levels of success, but more efforts are being frustrated by unchanged peoples' attitude and behaviour.

Factors which appear to contribute to peoples' unchanged attitude and behaviour have been pointed out by Osaki 1992. Such factors include: Ignorance, poverty and perception. It appears that people are ignorant about what is good for them and what might be dangerous for their lives in future.

Poverty also plays a big role in overlooking at serious issues. Because of poverty people tend to act against law and against nature. Although they know for example, that tremendous cutting of trees is dangerous especially for future generation but they have no alternative. They are forced to produce charcoal in order to survive.

Another factor is perception of an event or issue which is influenced by information and knowledge possessed by a person in his or her cognitive structure about an event. As it has been revealed through the studies, people's perception on environmental education inappropriate. This fact affects to a great extent the degree of awareness on environmental exploitation, destruction and ultimately the activities performed to protect it. Awareness leads to both sensitivity which must come through both classroom lessons and frequent interaction with nature.

It is believed that, teachers have been strong change agents of various events. The fact that they have a positive perception towards the role of primary and secondary education in introducing to the students the basic principle, rapid ways should be sought to educate a generation of teachers to the new realities. It is obvious that teachers will educate students who will be the next generations' decision makers. Such an education move have to be accompanied with a political will and action in which measures are undertaken to remedy economic and social injustice.

STRATEGIES OF IMPLEMENTATION

Environmental Education Policy statement has to be formulated for future direction regarding conservation strategy.

- Management capacity in schools and education authorities need to be taken care of. There is a great need to have educational leaders who are aware and are committed to bring about effectiveness in the provision of EE in schools.

- EE component should be infused in curricula, and teachers who are the main actors should be involved in the exercise.

- Change of teaching methodology is also very crucial. A syllabus however good its content is, it is not expected to bring change if the students cannot practice what they have been taught.

- Teachers should be motivated, through incentives such as allowance, houses, accommodation, transport so that they could spend their precious time preparing themselves for their classes.

- Suitable assessment methods for evaluating pupils' achievement experiences in EE should be planned. The present tendency which emphasises the school leaving examination to remain academic does not measure the realization of gools stated in Education for Self Reliance.

- Communication was observed to be poor due to less developed communication infrustruction. EE awareness programmes by mass media is hindered by poor communication services. Thus communication services should be improved.

- Water shortages hampers a lot of environmental conservation activities. Plans should be made to minimise water shortages in the communities. However, water harvesting during the rainy season which is still in its embryonic stage in Mtwara region could be tapped. Other organisations like HESAWA could be consulted to assist that situation.

- Acqu culture as man made environmental feature would help to minimise the problem of protein shortages in schools where natural waters are very far.

- Absence of literature focusing on environmental issues, relevant to the needs of the pupils and the community is a greater barrier in disseminating EE. Thus they should be prepared.

- Legal laws and coercive powers should enhance conservation of environment and immediate measures should be taken wherever there is violation.

- Schools should act as demonstration places where the community could learn environmental conservation activities.

- Education system should introduce competition on environmental conservation activities. The winners should be rewarded so as to encourage such practices.

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ENVIRONMENTAL EDUCATION AS AN INTERDISCIPLINARY/MULTIDISCIPLINARY SUBJECT

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Synopsis

In this paper we review the various conceptual areas of Environmental education (EE) and show how they lead to specific emphasis in the development of curriculum materials for EE programmes. We review and discuss the advantages and disadvantages of interdisciplinary and multidisciplinary approaches in the development and implementation of EE curricula, and some historical issues associated with the approaches. We also discuss major approaches of teaching EE including the focus on transmission, transaction and transformation of the knowledge and the learner respectively, and eventually we show that the main goal of EE should be transformation of the minds and behaviours of learners and communities. Finally we describe various teaching methods which can be used effectively in EE teaching and we provide examples of lessons and concepts which could be taught using some of the proposed methods.

Introduction

The subject called "environmental education" has often created more ambiguities than agreement among educators despite its importance in the school curriculum and in adult education programmes. These ambiguities arise, first from the broadness of the subject of environmental education, to include education *about from*, or *for* the environment (Lucas, 1980).

This philosophical distinction is easily noticeable in the literature. Some researchers and curriculum developers concentrate on inculcating general knowledge (cognitive understanding) about the environment, mainly ecological, biological geographical or even chemical information to be studied by the learners. Others concentrate on use of the environment as a learning resource by emphasizing nature study/observation, field work and visits to important sites and even collection of samples and analysing them in labs and so forth. This focus on using the world around as a learning resource.

The third group focuses on education for the environment which implies development of attitudes and feelings or emotions towards the environment. This group focuses on taking action, showing good examples visiting and discussing success stories. etc. Aho (1984) has proposed that a new theoretical framework for EE must emphasise the development of a social, emotional and attitudinal framework to be developed while providing knowledge and skills about and in the environment around us. Without producing an attitude change, EE achieves very little in the struggle to change the world.

Integrated versus single discipline EE

Curriculum projects focusing on environmental education can either be integrated (or interdisciplinary) or single subject discipline (multi-disciplinary). An integrated subject is one that unites forms of knowledge around issues or themes rather than particular disciplines, takes a holistic rather than an atomistic conception of nature and is more action oriented than theory ridden. A single subject discipline or

multidisciplinary approach is one in which the focus is on specific forms of knowledge, such as physics, chemistry, biology, mathematics, geography or english, and emphasises knowledge of facts such as definitions explanations and the like without requiring a commitment to mix disciplines, be practical and down to earth or work intergrate with communities in local environments.

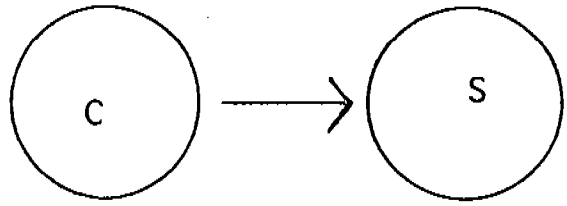
The strengths of integrated curricula (including environmental education ones) outweigh their weaknesses. They include the following:

i) integrated curricula are more related to knowledge as experienced by children in their daily lives.
ii) integrated subjects require a more practical approach than specific disciplines.
iii) it is easier to transfer integrated knowledge to new situations than subject specific knowledge.

The disadvantages of integrated approach are mainly due to resistance from parents, employers and general public who may not know the pedagogical advantages of integration as well as the elitist mentality characteristic of post colonial society. This mentality tends to view integrated subjects as low calibre subjects due to their treatment since colonial days. Since colonial times subjects such as gardening, general science, environmental studies, agriculture were meant for less academically motivated children, hence they tend to occupy a similar status todate.

Approaches in EE: Conventional versus current

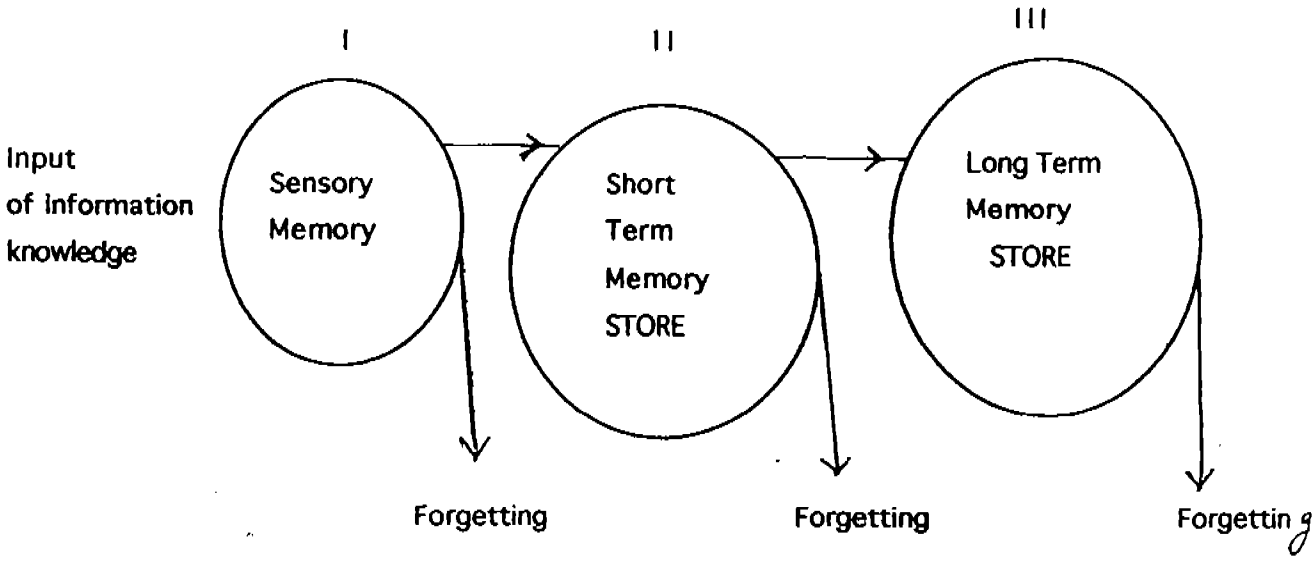
Conventional teaching and research of environmental issues tends to emphasize the old values of didactic teaching, Didactic teaching assumes that learning is the acquisition of the wisdom passed from past generations to future generations, and hence from the expert or teacher to the novice or pupil. Therefore the best teaching approach is believed to be that of transmission, which Miller (1990) symbolizes as



namely content is transmitted to the student, who is the receiver. While this approach is absolutely essential at times, it doesnot always lead to permanent learning outcomes. The approach involves direct methods such as lecturing, preaching, direct teaching and even indirect methods such as private reading and watching/listening to educational media such as tapes, videos or charts.

Environmental educators use these strategies with older learners when there is a lot of new facts to be learned. However, as we all know knowledge acquired through transmission especially by mere lecturing is soon forgotten. Worse, younger learners have a much less attention span and cannot cope with excessive transmission.

Atkinson and Shiffrin have clearly demonstrated this in their model of human information processing theory.



The five senses, namely seeing, hearing, touching, smelling and tasting are the main agents of taping the information from the surroundings. After picking information the senses transfer it to the short term memory or working memory, which stores information for some time, especially during the input and a short while later. Some of the information is transferred to the long term memory store but a lot is lost through forgetting. When the stored information is needed it is retrieved from LTM to STM and can then be recalled.

Psychological studies have established that in order to increase the efficiency of input by the senses into STM, more senses should be involved in the input process. That is why educators encourage the use of audio visual media such as pictures, films or direct field visits and activities performed in the field.

Example

If you are teaching facts such as composition of ar, pyramid of numbers , the objectives of EE stressed in the Belgrade Charter or the main issues raised in Agenda 21 of the Rio Summit etc, you can give a lecture or talk, but to involve senses other than the ear, you could use:

. an overhead projector with all the points summarised in a few words, then you go through them one by one

or

. Combine the OHP transparencies with slides illustrating some examples of behaviours which indicate awareness or lack of awareness, knowledge and lack of it, good and bad attitudes, etc.

Evidence suggests that motion pictures are the most effective teaching media. In a good video or film sound is essential, and must be coupled with good selection of relevant music. All these stimulate more senses and hence increase the rate of remembering.