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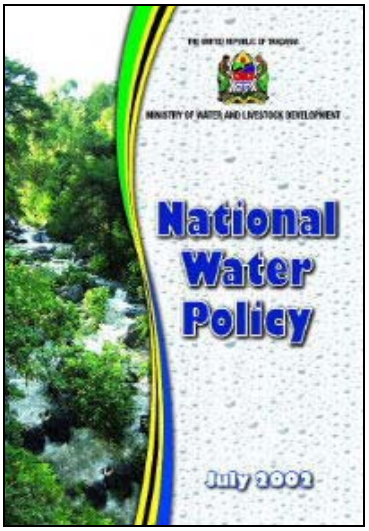

## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| CBOs | Community Based Organizations |
| DRA | Demand Responsive Approach |
| EIA | Environmental Impact Assessment |
| ESAs | External Support Agencies |
| EWURA | Energy and Water Utilities Regulatory Authority |
| GDP | Gross Domestic Product |
| l/s/km 2 | Litres per second per square kilometre |
| m3/h | Cubic Metres per Hour |
| MIS | Management Information System |
| NGO | Non Governmental Organization |
| O&M | Operation and Maintenance |
| PRSP | Poverty Reduction Strategy Paper |
| PSP | Private Sector Participation |
| RWS | Rural Water Supply |
| UN | United Nations |
| UNCED | United Nation Conference on Environment and Development |
| UWSAs | Urban Water Supply Authorities |
| UWSS | Urban Water Supply and Sewerage |
| WRM | Water Resources Management |
| WSS | Water Supply and Sewerage |

# INTRODUCTION

## 1. Overview

Freshwater is a basic natural resource, which sustains life and provides for various social and economic needs. In its natural state, water is an integral part of the environment whose quantity and quality determine how it can be used. Safe drinking water and good sanitation practices are basic considerations for human health. The use of contaminated sources poses health risks to the population as evidenced by the incidences of water borne diseases such as diarrhoea and cholera. Despite its importance to our lives and development, water is unevenly distributed in time, space, quantity and with great variations in quality. Furthermore, water is a finite and a vulnerable resource.

The social and economic circumstances prevailing today have made particular demands upon the country's water resource base and the environment, and its sustainability is threatened by human induced activities. Over the past 15 years these demands have intensified with the increase in population and concurrent growth of economic activities requiring water as an input such as in hydropower generation, irrigated agriculture, industries, tourism, mining, livestock keeping, domestic, fisheries, wildlife and forestry activities. Water scarcity is perceived at many places due to unreliable rainfall, multiplicity of competing uses, degradation of sources and catchments. Water scarcity threatens food security, energy production and environmental integrity and consequently there are water use conflicts between sectors of the economy. There are also increasing challenges of managing the multiple trans-boundary watercourses and strengthening water resources management policy and legal and institutional frameworks. Inadequate regulations to monitor groundwater resources development has led to underutilization of the resources and in some places over exploitation and interference in the existing water sources. Fragmented planning, implemented following sector, regional or district interests, aggravates this situation even further.

Despite significant investment in the Water Supply services since the early 1970s, water supply coverage is not satisfactory. The 1991 National Water Policy set a goal of providing clean and safe water to the population within 400 meters from their households by the year 2002. Today only about 50% of the rural population has access to a reliable water supply service. Due to poor operational and maintenance arrangements, over 30% of the rural water schemes are not functioning properly. The coverage for urban areas is 73%, but most urban water supplies are inadequately treated due to malfunctioning treatment plants.

## 2. Rationale

It is now more than ten years since the 1991 National Water Policy was launched. During this period, many changes have taken place in the sector with major emphasis on active participation of communities, private sector and local governments as the role of central government in services provision diminishes. For instance, in 1992, one year after launching the policy, Tanzania signed Agenda 21, which is an outcome of United Nations Environment Meeting in Rio de Janeiro. The Agenda emphasized all nations to protect natural resources including water resources against pollution and conservation of the ecosystems. The main shortfall in the National Water Policy of 1991 can be identified in the implementation strategies, which emphasised that the central government is a

sole investor, implementer and manager of the projects, both in rural and urban areas. The Policy also emphasised that the Central Government has a responsibility of protecting water sources while environmental protection was not accorded its due importance.

The main objective of this revised policy is to develop a comprehensive framework for sustainable development and management of the Nation's water resources, in which an effective legal and institutional framework for its implementation will be put in place. The policy aims at ensuring that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes. This policy seeks to address cross- sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Also, the policy lays a foundation for sustainable development and management of water resources in the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation.

**Water and the Tanzania 2025 Development Vision**

The Tanzania Vision 2025 aims at achieving a high quality livelihood for its people, attain good governance through the rule of law and develop a strong and competitive economy.

Specific targets include:

(i) a high quality livelihood characterized by sustainable and shared growth (equity), and freedom from abject poverty in a democratic environment. Specifically the Vision aims at:

- food self-sufficiency and security
- universal primary education and extension of tertiary education
- gender equality
- universal access to primary health care
- 75% reduction in infant and maternal mortality rates
- universal access to safe water,
- increased life expectancy
- absence of abject poverty
- a well educated and learning society.

(ii) good governance and the rule of law

- moral and cultural uprightness
- adherence to the rule of law
- elimination of corruption.

(iii) a strong and competitive economy capable of producing sustainable growth and shared benefits

- a diversified and semi-industrialized economy
- macro-economic stability
- a growth rate of 8% per annum

- adequate level of physical infrastructure
- an active and competitive player in regional and global markets.

Water is one of the most important agents to enable Tanzania achieve its Development Vision objectives (both social and economic), such as eradicating poverty, attaining water and food security, sustaining biodiversity and sensitive ecosystems. The revised National Water Policy and subsequent reviews and reforms of existing laws, institutional framework and structures are aimed at meeting the objectives of this Vision.

**Water and Poverty Alleviation**

Tanzania's Poverty Reduction Strategy Paper (PRSP) sets out the medium term strategy for poverty reduction and indicators for measuring progress. It defines the objectives for poverty eradication by 2010, with the following key priority areas for achieving its goal:

(i) reducing poverty through equitable economic growth,
(ii) improving human capabilities, survival and social well being, and
(iii) containing extreme vulnerability among the poor.

The PRSP recognises the heavy dependence of the poor on the environment (soil, water and forests), in particular household's reliance on environmental resources for income generation. Water is considered a key factor in the socio-economic development and the fight against poverty. Deliberate efforts are therefore needed in the management of the resources in order to sustain the desired pattern of growth and consumption, and to ensure that all the socio-economic activities maximize their capacities, as articulated in the Vision 2025. This entails integrated planning, development and river basin management in support of food security and poverty reduction as well as environmental safeguards.

## 3. The Process

The process of preparing this policy was undertaken in a participatory manner involving water resources stakeholders in order to ensure comprehensiveness and acceptability. A number of technical studies were undertaken to provide input to the policy review process. Many key stakeholders were involved at different levels in different forums including field consultations, meetings, technical workshops and national conferences. The draft National Water Policy was subjected to review by water sector related ministries, universities, research institutions and non-governmental organizations.

## 4. The Structure

This policy document contains three sections addressing three sub-sector issues namely:

(i) Water Resources Management,
(ii) Rural Water Supply, and
(iii) Urban Water Supply and Sewerage.

The Water Resources Management section provides a comprehensive framework for promoting optimal, sustainable and equitable development and use of water resources

for the benefit of the present and the future generations. It takes into consideration the concerns of all water users. The Rural Water Supply section aims at improving health and alleviating poverty of the rural population through improved access to adequate and safe water. The Urban Water Supply and Sewerage section sets a framework for achieving an efficient development and management of the Urban Water Supply and Sewerage services. A plan for action detailing the implementation of policy strategies will be prepared and presented separately.

## 5. Instruments for Policy Implementation

Six types of instruments and other measures to be instituted from time to time will be used in the implementation of the policy:

(i) Technical instruments: These are technical measures, which are used to control water uses including gating of abstractions, flow metering, application of cleaner production technology.
(ii) Economic instruments: Economic instruments include water pricing, charges, penalties and incentives to be used to stimulate marketing mechanism, and serve as an incentive to conserve water, and reduce pollution of water sources. This instrument will also facilitate water allocations.
(iii) Administrative instruments: Administrative instruments include information management systems and monitoring, information products, water resources plans including water source protection plans, water resources models and decision support systems, various water resources guidelines.
(iv) Legal instruments: Legal instruments include restrictions and all prohibitions imposed by the regulatory body and the Government. These are individual licenses for abstractions and their revisions, guidelines, discharge permits, codes of conduct, guidelines, standards, Environment Impact Assessments, and agreements, treaties and protocols for trans-boundary water resources.
(v) Regulatory instruments: Regulatory instruments include appropriate management structures and procedures. These procedures and criteria to be adopted include applications for and granting of permits, a clearly defined water right system, appropriate standards and guidelines that control water abstractions from water bodies, controls on specific technologies aimed at reducing water use or waste loads, control of discharge of waste products into water sources (in terms of quantity, quality, timing and location of discharges), and standards for water provided for specific uses or for goods or materials which are potentially polluting.
(vi) Participatory Instruments: These include sensitization, community education, consultations and discussions.

# SECTION I:
# WATER RESOURCES MANAGEMENT

## 1. OVERVIEW

### *1.1 Water Resources Potential*

Although nearly 70% of the Earth is covered with water, only 2.5% of this is freshwater. Seventy percent of the freshwater is frozen in ice caps of Antarctica, Arctic and Greenland. The remaining 30% of this freshwater is available as soil moisture, or lies in deep underground aquifers as groundwater and as surface water. Only one third of this water is the water found in lakes, rivers, reservoirs and those underground water sources that are shallow enough to be tapped at an affordable cost. Only this amount is regularly renewed by rain and snowfall, and therefore available on a sustainable basis. When the world's total river flow (42,700 cubic kilometres) is divided by the world population (of 1995) estimated to be 5.85 billion, the quotient amounts to an average of 7,300 cubic meters of water per person per year (Comprehensive Assessment of The Freshwater Resources of The World Report, UN 1997). Owing to the growing world population, this represents a drop of 37 per cent per person since 1970.

Tanzania's annual renewable water resources are 89 cubic kilometres or 2,700 cubic meters of water per person per year (World Resources 2000- 2001). Based on projected population from estimated 33 million in year 2001 to about 59.8 million by year 2025, annual average available water per capita will be reduced by 45% to about 1,500 cubic meters per person per year which shows that the country will face a water stress situation, considering that below 1,700 cubic meters per person per year signifies water scarcity.

Water resources in the country include rivers, lakes, wetlands, springs, reservoirs and groundwater aquifers; and many water bodies that are shared with neighbouring countries. More than half of the country receives on the average less than 800mm of rain per year. The monsoon type of climate prevailing in the country causes extreme temporal variability in rainfall and even more extreme variability in river flows. The annual mean rainfall shows that the eastern coastal areas receive well over 1000mm per year while most parts of the drier interior receive less than 600mm.

Other areas with relatively high annual rainfall are near the great lakes, notably Lake Victoria and north of Lake Nyasa. The surface runoff pattern and moisture conditions correspond to the general rainfall pattern. On the south-western highlands, Uluguru, Ukaguru and Usambara mountain ranges, the slopes of Mount Kilimanjaro and Meru, as well as the most western parts of the country, where annual rainfall is in the range of 1,200-2,600mm, streams and rivers are perennial. In many other parts of the country, with less than 800 mm of rain per annum and which is highly variable, streams flow intermittently.

Freshwater is also abundant in the form of lakes covering approximately 60,000 square kilometres. Lake Tanganyika shared by Tanzania, the Democratic Republic of the Congo, Burundi and Zambia runs along the western border and this is Africa's deepest and longest freshwater lake, and the world's second deepest lake. Lake Victoria shared

by Tanzania, Kenya and Uganda is the world's second largest freshwater lake and drains into the Nile river. Lake Nyasa in the south of the country is shared by Malawi, Tanzania and Mozambique; and is situated in the Zambezi River system (Basin).

Groundwater availability, mainly controlled by geology and climate, is variable. Aquifers are discrete. About 75% of the country is underlain by Precambrian Basement complex, which comprises of hard, consolidated and sometimes metamorphosed rocks. These rocks form basement aquifers, where they are weathered, fractured or faulted. Other types are Karroo and younger aquifers, coastal sedimentary formation of limestone and sandstone, and the alluvial sedimentary sequence, which mostly include clay, silt, sand and gravel, and volcanic materials found in alluvial plains. Volcanic areas of northern and southern Tanzania as well as the sedimentary coastal basins are potential groundwater resource areas. Boreholes drilled in the volcanic areas have yields up to 800 cubic meters per hour and those in sedimentary coastal areas yield about 50 cubic meters per hour. However, water quality is a problem in terms of high salinity and fluoride concentration, and thus not suitable for human use. Groundwater is a major supplement for surface water for many parts of the country and is a vital source of water in semi-arid water scarce areas.

### *1.2 Water Resources Depletion*

Water resources depletion and rising demand on limited water supplies result in putting at risk some of the water related investments, thereby creating conflicts. Extensive irrigation during dry season dries up the rivers, thus disturbing ecosystems and wildlife. Inefficient water uses, such as low efficiencies of many irrigation schemes, (estimated at 10% to 15%); and leakages from domestic water supplies estimated to cause water losses up to 52% of water that is produced; both of which contribute to reduction in water availability.

### *1.3 Present Water Resources Management System*

The Water Utilization (Control and Regulation) Act No. 42 of 1974 and its subsequent amendments govern the present water resources management system. Amendment Act No. 10 of 1981 introduced pollution control aspects. However, the Water Utilization Act and other sub-sector water related laws are inadequate to meet the growing water resources management challenges facing the country today.

The country is divided into nine hydrological zones or river basins (Figure: River Basins in Tanzania) for purposes of water resources management. These basins are:

(i) Pangani
(ii) Wami/Ruvu
(iii) Rufiji
(iv) Ruvuma and Southern Coast, all of which drain into the Indian Ocean, and
(v) Lake Nyasa
(vi) Lake Rukwa
(vii) Lake Tanganyika
(viii) Lake Victoria, and
(ix) the Internal drainage basins of Lake Eyasi, Manyara and Bubu depression.

Basin water resources are part of a management continuum starting with the upstream

freshwater sources in the watershed, moving down into the freshwater-seawater interface in the deltas and estuaries.

## 2. WATER AND SOCIAL - ECONOMIC DEVELOPMENT

Water is a basic natural resource for socio – economic development. It is fundamental for various social – economic development activities such as industrial production, irrigated agriculture, livestock keeping, mineral processing, hydropower production, navigation and recreation and tourism.

### *2.1 Domestic Water Supply*

The present population is estimated at about 34 million, of which 80% live in the rural areas. The projected population in the year 2025 is estimated to double, with 60% living in the rural areas. The growth in population will have a negative impact on domestic water supply and in sanitation and sewerage services if appropriate measures are not taken. Presently water services coverage for municipal and industrial water supply is 73% and for rural water supply it is 50%. This coverage in the provision of safe water is undesirably low. In many areas of the dry central part of the country water is so scarce that even water for personal hygiene cannot easily be found. The people, especially women and children, walk long distances to fetch water. The national economy suffers because of inadequate water supplies to the urban and rural population.

### *2.2 Livestock*

In the year 2000 livestock contributed about 13.3 per cent of the Agricultural Gross Domestic Product (GDP). Forty percent (40%) of the agricultural households are involved in crops and livestock production. Livestock are also a potential source of draught power for cultivation and transport. Livestock is concentrated in the water scarce areas, constituting dry open grasslands or wooded grasslands where rainfall is marginal for cultivation. Livestock migration and overstocking result in water and land conflicts between pastoralists and other water users. Scarce grazing lands and distribution of livestock watering points, especially during the dry season, forces heavy traffic patterns in livestock densely populated areas, which impact upon water resources and the environment. The issue in this sector is how to ensure availability of adequate and reliable water for livestock so as to reduce conflicts and increase contribution of the sector to the GDP.

### *2.3 Agriculture*

The main objective of the National Agricultural Policy is to ensure food security at national and household level. In the year 2002 the sector contributed about 48.2% of the GDP. Tanzania has about 43 million hectares of land suitable for agricultural production of which about 6.3 million hectares are under cultivation. This represents about 15% of the arable land. Agriculture, which is mostly rain-fed, remains susceptible to drought as well as the inadequate and erratic nature of rainfall. Irrigated agriculture protects against drought and ensures food security. It is a means for poverty alleviation as more and more people go into cultivation of irrigated high value crops such as vegetables and fruits. Irrigation potential in the country is estimated at one million hectares, of which only about 150,000 hectares are under irrigation. Eighty percent of the irrigated area is under traditional irrigation schemes with low level water use efficiencies. The remaining 20%

are large centrally managed irrigation schemes owned by public and private institutions and individuals. In the Pangani basin, for example, irrigated food crops are bananas, beans and maize, and irrigated cash crops are flowers, rice and coffee. Irrigation is a highly consumptive water user and makes greatest impact on net water resources. In the Pangani and Rufiji basins, for example, irrigation systems are located upstream of major hydropower plants thus the two sectors are competing for the same source of water. Agricultural activities also contribute to pollution from the use of agrochemicals, which are washed by rainwater and find their way to water sources.

### *2.4 Industry*

The industrial sector contributed about 8.3% to Tanzania's GDP in 1999 and 8.4% in the year 2000. In terms of growth, the sector grew by 4.8% in the year 2000 compared with 3.6% in 1999. The increase in the contribution and growth of the sector are attributed to the rehabilitation of privatized industries and establishment of new industries. Industrial performance depends, among other factors, on reliable water supply. Based on economic growth rates estimated for the period 1995-2025, water will be needed for the anticipated growth of the industrial sector. The contribution of this sector to the GDP is expected to more than triple by the year 2025.

The Tanzania development vision 2025 envisages transforming the economy from a low productivity agricultural economy to a semi-industrialized country, and to increase sector's contribution to GDP. This implies that adequate and reliable water supply is required for the growth of this sector. The growth in the industrial sector will have significant impact on the water supply, and also in terms of potential pollution and degradation of water resources due to industrial solid wastes and effluents if not properly disposed of but are allowed into water bodies without adequate treatment.

### *2.5 Mining*

Mining is an important economic sector for Tanzania and is growing rapidly. The vision for the mineral sector for the next 25 years is to have a strong, vibrant, well- organized private sector. The mining parastatals have also been privatized and the sector opened up to private investors due to trade liberalization process. As a result the sector has attracted significant foreign investors. Private mining sectors are in two main groups; artisan and small-scale mining, dominated by Tanzanian citizens, and large-scale mining conducted by mostly foreign investors.

The contribution of the mining sector to the GDP increased from 2.1% in the year 1999 to 2.3% in 2000. The sector had a growth rate of 13.9% in the year 2000 compared to 9.1% attained in 1999. The increase in the growth of the sector is a result of the Government's efforts to improve the mining sector through an attractive environment for both small and large scale investors.

The Government's new role is to continue to provide conducive environment to ensure a rapid expansion of this sector, including motivating and promoting large and small-scale mining operations which are environmentally sound. Large quantity of water is used during processing and discharged thereafter, if contaminated can pollute water sources.

### *2.6 Energy*

More than 60% of energy produced in the country, is from hydropower plants and more potential is available for development, for instance, in River Mara and River Kagera. However, development of hydropower in these rivers requires agreements among riparian countries. Hydropower is not a consumptive water user but a renewable source of energy. However, hydropower development in the country is associated with large storage reservoirs situated in areas with high evaporation losses. For example, losses from Mtera and Nyumba ya Mungu reservoirs are well above 30% of the total inflow into these reservoirs. Water sources for hydropower production will be developed especially in the Kilombero subbasin of the Rufiji Basin, the Rufiji River, and in Lake Nyasa Basin. Main hydropower issues include; management of reservoirs, conflicts with downstream and upstream users, and negative impacts on the environment.

### *2.7 Fisheries*

Tanzania is rich in marine and inland fishery resources. The fisheries sector has a lot of economic and social significance to the country as it contributes greatly towards poverty alleviation and food security. It also provides employment and livelihood to a substantial number of people and promotes recreation and tourism. The sector's contribution to the GDP in year 2000 was 2.7% while in 1999 it contributed 2.6%. The main sector issue and concern is water availability of acceptable quality.

### *2.8 Environment*

In-stream flows or environmental flows and levels are necessary for riparian biodiversity, wetland systems, freshwater-seawater balance in deltas and estuaries. Reduction of water volume affects aquatic life by reducing dissolved oxygen and supply of nutrients. The effluents created by urban water use, if not treated, pollute surface and groundwater resources. Additionally, overexploitation of water resources which does not take into account other uses is also a source of environmental degradation. For example, terrestrial and aquatic animal species in the Great Ruaha National Park (Rufiji Basin) suffer from depleted dry season flows caused mainly by dry season irrigation in the Usangu plains.

There are numerous permanent and seasonal freshwater swamps. These together with flood plain areas cover a total area of 2.7 million hectares; enable the development of special types of plants and animals which are important for environmental conservation, and often among the most productive of natural environments. They usually contain rare and endangered species of plants, fish and other animals. The importance of wetlands is manifested by such activities as tourism, fishing and hunting. They also play an important role in the hydrological cycle, flood control, sediment retention, and nutrient re-cycling and microclimate stabilization. The deltas of coastal rivers are especially important as nursery areas for aquatic life, tourism and recreation.

### *2.9 Wildlife and Tourism*

Tanzania's wildlife protected area covers 28% of the total land area, of which 19% is devoted to wildlife in protected National Parks where no human settlement is allowed. The rest of the area wildlife co-exists with humans. The wildlife sector contributes approximately 2% to the GDP. Tourism is among the sectors with great economic growth potential for the nation. For example, our country has 804 kilometres of unpolluted beach areas. In addition, there exist beautiful waterfalls, valleys, large rivers,

hot springs, National Parks, which offer outstanding experience for tourists and recreation purposes. Depletion of water in some rivers during dry season, disrupted the lives of animals, and thus, results in serious consequences to the tourism industry and the national economy.

### *2.10 Forestry and Bee Keeping*

Tanzania has about 33.5 million hectares of forests and woodlands. Out of this, about two thirds consist of woodlands on public lands that are under enormous pressure from expansion of agricultural activities, livestock grazing, fires and other human activities.

The forests offer habitat for wildlife, bee keeping, unique natural ecosystem and genetic resources, and have an important effect on the conservation of water resources. Forestry and Bee Keeping contributed 3% of GDP in the year 2000.

### *2.11 Navigation*

Tanzania has few potentially navigable rivers due to the sharp relief contrast between the coastal line and inland. Nevertheless, the rivers such as the Rufiji, Kilombero, Kagera and Malagarasi, are used for transportation to some extent. There are also some ferry crossings, which require maintenance of adequate river flows and levels. The three great East Africa lakes of Victoria, Tanganyika and Nyasa, form important national and inter-country navigational water bodies. Oil spills and wastes associated with navigation vessels are detrimental to the quality of the water.

### *2.12 Trans-boundary Water Resources*

Tanzania is riparian to trans- boundary water resources with neighbouring countries. These water bodies include Lakes Victoria, Tanganyika, Nyasa, Chala and Jipe, as well as Kagera, Mara, Umba and Songwe Rivers. Each of these water bodies exhibit unique characteristics and a complex range of water management and development issues and challenges. These challenges include environmental management issues such as water pollution, biodiversity conservation, wetlands and catchments degradation, fisheries management and water hyacinth control. Others are river basin development for irrigation, domestic and livestock water supply, and for hydropower production. There are also issues regarding international border stabilization, river control and regulation, and inter-basin water transfers. In order to make effective utilization of trans-boundary water resources efforts have to be directed at assessing the needs of Tanzania, development of national plans and promotion of regional cooperation and integration with riparian states.

## 3. WATER RESOURCES MANAGEMENT CHALLENGES AND POLICY PRINCIPLES

### *3.1 Water Resources Management Challenge*

Sustainable water development and use implies that the actions of the present generation to develop and use water resources are taken in such a way as to ensure that the present and future generations enjoy the benefits of this vital resource. This entails taking into consideration the following:

(i) A minimum water requirement is guaranteed to all humans to maintain human

health, and sufficient water is guaranteed to restore and maintain the health, services and functions of ecosystems.

(ii) Water for food security, energy production and other economic activities is readily available.

(iii) Water quality is maintained to meet agreed objectives and standards and that human actions do not impair the long term availability of freshwater stocks; ensure that water resources management is financed and raw water priced to promote efficiency, sustainability and equity.

(iv) Integrated water resources management is instituted.

(v) Effective and sustainable strategies are in place to address natural and man-made water resources problems.

(vi) Water resources planning and decision-making are participatory involving all users and stakeholders.

(vii) Water resources data are available and easily accessible to all and an effective infrastructure and information system is in place and operational.

(viii) Institutional mechanisms exist to resolve conflicts over water resources.

(ix) Adequate number of motivated and highly skilled professionals is available.

### *3.2 Rationale for an Integrated Water Resources Management*

In view of the issues and challenges in water resources management it is clear that an integrated water resources management is needed to ensure that water does not become a constraint to national development. This calls for a new vision " A country where there is equitable and sustainable use and management of water resources for socio-economic development, and for maintenance of the environment". The existing approach is sector oriented and does not fully recognize the multi-sectoral linkages in the planning the use of water resources. This is based on a regional development and does not focus on institutional capacity to manage water resources. It is oriented more towards the development of the water resources and not on the protection or management of the water resources, and is based on regulation as a primary instrument for implementing the water policy. The integrated approach addresses participatory, multi-sectoral, multidisciplinary river basin management, which, recognizes that water is a scarce resource and integrates the linkage between land use and water use and recognizes the important role water ecosystems play in the national economy.

Basically, the new approach reflects three major shifts:

(i) Comprehensiveness: A holistic basin approach for integrating multi-sector and multi-objective planning and management that minimizes the effects of externalities, and ensures sustainability and protection of the resource,

(ii) Subsidiarity: decentralizing decision making and devolving to the lowest practicable level, with stakeholders participating in the planning, design, implementation of the management actions and decision making, and

(iii) Economic: decision making in the public sector, private sector and in civil society on the use of water should reflect the scarcity, value of water, water pricing, cost sharing, and other incentives for promoting the rational use of water.

### *3.3 Main Policy Principles in Water Resources Management*

Since the UN Water Conference held in Mar del Plata, Argentina in 1977, various international meetings on water resources and the environment have developed common understanding on how water resources should be managed. The international understandings of broad policy principles arising out of recent international conferences; including the Dublin Statement on water and sustainable development, 1992 and United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 1992 (Agenda 21, Chapter 18) are as follows:

(i) Fresh water is a finite and vulnerable resource, which is essential to sustain life, development and the environment.
(ii) Water management and development should be based on a participatory approach, involving users, planners, and policy makers.
(iii) Women play central role in the use, management and protection of water resources and thus should be involved fully in the decision making process.
(iv) Water has a value in all its competing uses.

In order to attain equitable, efficient and sustainable water resources management and based on experiences gained in the country and international understanding, the Water Resources Management will be based on the following guiding principles:

(i) Socio-Economic and Water Allocation Aspects

- Water is a common use resource whose use shall be determined by and have consistence in the laws,
- The water allocation system shall distinguish and separate water use permit from land title,
- A sufficient supply of water and an adequate means of sanitation are basic human needs.

(ii) Protection and Conservation of Water Resources

- The "polluter pays principle" shall apply,
- Water conservation in all aspects of water use shall be enforced,
- "Demand management" shall be used in conjunction with water supply provision.

(iii) Water and the Environment

- Water related activities should aim to enhance or to cause least detrimental effect on the natural environment,
- The allocation and consumption of water for environmental purposes shall be recognized and given appropriate considerations,
- Water for the environment shall be determined on the best scientific information available considering both the temporal and spatial water requirements to maintain the health and viability of riverine and estuary eco-systems.

(iv) Water Resources Planning and Development

- The river basin or sub-basin shall be the planning unit,
- Planning shall involve all stakeholders and will be intersectoral in character,
- Planning shall consider requirements for bio-diversity and human health.

(v) Information, Education and Communications

- A sound information and knowledge base including both data on surface and groundwater (quantity and quality), socio and economic data are needed for effective actions within all water related activities.
- Education is a vital component of water related schemes if health and life enhancement benefits are to be achieved and sustained.
- Communications, awareness creation and information exchange are essential ingredients in all forms and levels of water resources management.

(vi) Trans-boundary Waters

- Forms of cooperation in the management of shared water resources shall be in accordance with the principles of equitable and reasonable use.
- A cooperative approach to management of shared water will be fostered.
- Technical cooperation especially in research, data collection and information dissemination will be promoted. It will ensure the participation of legitimate representatives of stakeholders so that the system to be established is highly responsive.

(vii) Institutional Framework

- Administrative arrangements and decision-making processes shall be put in place to ensure an integrated approach to natural resource management in basins.
- The roles of water resource management, including standard setting and regulatory enforcement, shall be separated institutionally from service provision at all levels.
- The lower levels shall be given a greater degree of responsibility in the management of water resources, subject to appropriate regulatory frameworks.
- Gender implications shall be examined and taken into account at all stages of management of water resources.
- Roles of government and official bodies at all levels shall be clearly defined and areas of responsibility officially established.
- The structure and systems of management shall be designed in such a way as to facilitate involvement by the responsible authorities at different levels.
- Involvement of user organizations and the private sector is fundamental.
- Institutions for water resources management including participating groups at all levels shall be strengthened and capacitated.
- Management systems shall be transparent, appropriate and accountable to the public.

## 4. POLICY ISSUES IN WATER RESOURCES MANAGEMENT

The objective of the policy for Water Resources Management is to develop a comprehensive framework for promoting the optimal, sustainable and equitable development and use of water resources for the benefit of all Tanzanians, based on a clear set of guiding principles. The specific objectives of the water resources management are:

(i) To develop equal and fair procedures in access and allocation of the water resources.
(ii) To ensure that social and productive sectors, and the environment receive their adequate share of the water resources.
(iii) To ensure effectiveness and efficiency of water resources utilization.
(iv) To promote the management of water quality and conservation.
(v) To improve the management and conservation of ecosystems and wetlands.
(vi) To promote integrated planning and management of water resources.
(vii) To raise public awareness and broaden stakeholder participation in the planning and management of water resources.
(viii) To ensure financial sustainability and autonomy of Basin Water Boards,
(ix) To promote regional and international cooperation in the planning, management and utilization of water.
(x) To provide the basis for future institutional framework and legislation for water resources management.

### 4.1 Water Resources Allocation, Use and Socio-Economic Considerations

#### *4.1.1 Water as a common use resource*

*Objective: To have in place fair and equal procedures in access to and allocation of water resources so that all social and economic activities are able to maximize their capacities.*

Water is a basic natural resource for sustainance of life and for socio-economic development. Many social and economic activities rely heavily on availability of adequate supply of fresh water. As a source of natural capital, water in adequate quantity and quality is a primary input for a whole array of productive activities. Water is fundamental for food security, domestic – urban and rural water use, livestock development, hydropower production, industrial production, fisheries and for wildlife water use, and for the sustenance of ecosystems. As a sink water sources are used as receptors for wastewater discharges from industrial, municipal and agricultural sources. Therefore water is a public good of very high value in all its competing uses, and requires that careful conservation and sustainable utilization is ensured. Deliberate efforts are, therefore, needed towards protection and sustaining the resource and to ensure that it is used efficiently and effectively for the benefit of the present and future generation.

Laws and Regulations will be put in place to ensure that, like many other natural resources, by constitution and law, all the water in the country is vested in the United Republic of Tanzania and every citizen has an equal right to access and use of the nation's natural water resources for his and the nations benefit.

### *4.1.2 Prioritization of water uses*

*Objective: To have criteria for prioritization of water allocations so as to ensure that socio-economic activities and the environment receive their adequate share of the water resources on the basis of its availability, and to enable the sectors increase productivity, and to mitigate conflicts.*

Water is a finite and vulnerable resource which is under pressure and growing scarce as a result of increasing multi-sectoral demands of the rapidly growing population. For example, over the past 15 years these demands have become apparent due to increase in population and concurrent growth in economic activities such as irrigated agriculture, industrial production, hydropower production, mining, livestock keeping, fisheries, environmental sanitation and for wildlife water use. Water is also vulnerable due to increasing environmental degradation, which causes unsustainable availability of the resource and hence failure to meet demands. Severe widespread water shortages also occur due to low and highly variable rainfall resulting in inadequate river flows and reservoir levels. All these have manifest implications in the overall availability of the water resources for domestic uses, food and energy production, and environmental sanitation which result in competition and conflicts among the different social and economic sectors.

In planning water uses, water for basic human needs in adequate quantity and acceptable quality will receive highest priority. Water for the environment to protect the eco- systems that underpin our water resources, now and in the future will attain second priority and will be reserved. Other uses will be subject to social and economic criteria, which will be reviewed from time to time. Utilization of trans-boundary water resources will be based on the principle of equity, right and rationality in accordance with agreements among the riparian state, and by respecting the principle of international obligations on trans- boundary water resource.

All water abstractions and effluent discharges into water bodies shall be subject to a "water use permit" or "discharge permit" to be issued for a specific duration. Water use permits shall be issued only for a determined beneficial water use. Procedures, criteria and guidelines for issuing of the permits will be prepared and operationalized.

## 4.2 Water Conservation, Water Quality Management and Pollution Control

### *4.2.1 Water Conservation*

(a) Sustainable water use and conservation

*Objective: To have in place appropriate principles and procedures for managing the quality and conservation of water resources, as well as improve and protect the ecological systems and wetlands.*

Water resources comprise of rivers, reservoirs, lakes, wetlands, springs and groundwater resources. These resources are used for various social and economic activities. Despite its importance, bad water use practices and degradation threatens sustainability of the resource with potential negative effect to ecosystem integrity, human health, food security, industrial production, and investment in various socio and economic sectors. Conflicts which have already surfaced, for example, in the Pangani

and Rufiji Basins are between hydropower production and irrigated agriculture, environment and irrigated agriculture, hydropower production and environment, and upstream and downstream water users. Additionally, environmental degradation and pollution of water sources from increasing discharge of untreated and partially treated municipal and industrial wastewater contribute to the deterioration of the quality of the water resources. If measures are not taken to control the situation our resources will be severely degraded, which will deprive future generations their basic right. Lack of multi-sectoral and integrated approach, lack of comprehensive water resources information base and inefficient use of the resource aggravates the problem.

In order to ensure that water resources are used in a sustainable manner, conserved and that ecological system and biodiversity are sustained the following will be undertaken:

(i) Water management approaches will focus on how best water is used beneficially and efficiently. Water allocations and use shall be carried out considering the principles of sustainability so that the resources remain viable for the use of the present and future generations.
(ii) Trading of water rights, application of economic incentives and pricing for water use, shall be gradually built into the management system as a means or strategy for demand management and water conservation.
(iii) Urban and rural water supply entities, hydropower producers, irrigators, industries, mining operators, etc are required to improve the efficiencies of their water abstractions and distribution systems to avoid undue wasteful use of the resource.
(iv) Where feasible and necessary, rainwater harvesting, wastewater recycling and desalination of seawater will be employed as a means of increasing the availability of water resources.

(b) Sustainable groundwater resources development and use

*Objective: To have sustainable groundwater resources for the present and future generation.*

Groundwater is a viable source of domestic, livestock and irrigation, and industrial water, etc. for many areas in the country. In other places which have persistent water shortages such as Shinyanga, Coast, Mwanza, Arusha, Mara, Tabora, Dodoma, Singida, Mtwara and Lindi Regions, it is a better and secure alternative to surface water. The on-going groundwater resources development in the country is being carried out without sufficient knowledge of the resource potential, in terms of quantity and quality, due to lack of data and adequate regulations to monitor the activity. This has led to under utilization of the resource, and in some places overexploitation and interference in the existing groundwater sources, notably in coastal areas, may result in saltwater intrusion. The role of the private sector in groundwater development, especially in providing consultancy services and private drilling companies are involved directly in the development of this resource. However, there are no comprehensive procedures and guidelines governing the development of this resource, thus threatening its sustainability.

In order to have systematic and sustainable development of groundwater resource, the following will be undertaken:

(i) Groundwater will be managed on the basis of aquifer boundaries and in conjunction with the river basin.
(ii) An effective system for controlling pollution will be developed and implemented.
(iii) Vulnerable recharge areas and potential groundwater sources, and areas with poor water quality will be identified, delineated and declared as protected areas.
(iv) Assessment, research, and monitoring and controlling groundwater exploration and drilling activities will be strengthened.
(v) Procedures and guidelines governing groundwater development and management, including exploration and drilling activities as well as operation of projects, which use groundwater resources will be reviewed and disseminated.

### *4.2.2 Water quality management and pollution control*

*Objective: To have water resources with an acceptable quality.*

Pollution from point and non-point sources of water resources is responsible for the deterioration of the quality of water, makes water unusable and its treatment very costly. Increased human activities including poor land use practices, as well as uncontrolled abstractions and pollution of water bodies impact on the quantity and quality of the available water resources. Generally, the options for using water depend on its water quality. Then proliferation of water hyacinth in Lake Victoria, and in some rivers and reservoirs, is a result of high nutrient levels. In order to remedy this water shall be protected from pollution and harmful depletion through the following measure:

(i) Water quality monitoring and assessment will be undertaken systematically so as to identify extent and status of the quality of the water resources so that problems are detected early and remedial actions employed timely.
(ii) The quality and quantity of water resources will be dealt with conjunctively, and will be assessed comprehensively.
(iii) The "polluter pays" principle shall apply in conjunction with other legal and administrative actions. Standards for in-stream flows, industrial effluents and other waste discharges for meeting environmental objectives will be developed and enforced.
(iv) Practical and cost effective water quality and pollution control monitoring programs (including networks) will be developed and implemented. Factories, municipal authorities, large irrigation schemes and mining operations will be required to collect and keep accurate records of the quality of effluents into receiving water bodies.
(v) Creation of public awareness in the importance of protecting water resources from pollution including that resulting from inappropriate use of agrochemicals will be undertaken.

## 4.3 Water and the Environment

*Objective: To have in place water management system which protects the environment, ecological system and biodiversity.*

Water is critical to ecological systems and to the maintenance of the environment. The ecological systems include wetlands, floodplains, estuaries and coastal zones. Such systems serve important hydrological and ecological functions such as biophysical filters, safeguard biological diversity, maintain sea and freshwater balance. Management

of this system is an integral part of water resources management, however there are no procedures and guidelines to ensure sustainability of these important ecological systems. Basin water resources are part of a management continuum starting with the upstream freshwater resources (in the watershed) moving down into the freshwater-seawater interface in the coastal areas (in the deltas and estuaries) and into the seawater realms. Various land use activities such as hill slope cultivation and deforestation are responsible for soil erosion which contributes to generating sediments that are eventually deposited in reservoirs, thereby reducing their storage capacities and hence useful life. High turbidity levels pollute water and causes costly treatment of water for domestic water supply. Water related activities will have to be planned to enhance or to cause least detrimental effects on the natural environment and its health and life giving properties.

In order to protect ecological systems and biodiversity which, together, are important part of sustainable water resources system the following will be undertaken.

(i) Water for the environment, in terms of quantity and quality, and levels, and for both surface and groundwater resource shall be determined on the best scientific information available considering both the temporal and spatial water requirements to maintain the health and viability of riverine and estuary ecosystems, and associated flora and fauna.
(ii) In order to contain the erosion problem, public awareness campaigns will be carried out on good land use practices.

## 4.4 Water Resources Assessment, Planning and Development

### *4.4.1 Water resources assessment*

*Objective: To have appropriate and sustainable procedures for management and preparation of water use plans*

Water resource assessment, of both surface water and groundwater, quantitatively and qualitatively, is a very fundamental element of the water resources planning process. Generally, effective planning cannot proceed without a thorough assessment of the water resources available. The assessment refers to all sector-wide basin and national level comprehensive collection and assembly of information on the quantity, quality, character, location and patterns of use, and response of the resource to use and user demands, pollution and water quality degradation processes. This assessment also includes water use projects and those for mitigating water related disasters such as floods and droughts. Currently the data collection networks are in a state of near total collapse due to lack of adequate resources and tools. This has led to operational weaknesses in implementing comprehensive water resources assessment, which has resulted in under-designing of projects which could cause their failure and thus loss to nation, or over-design which are not cost effective.

In order to have an appropriate basis for sustainable planning and development of water resources the following will be done:

(i) Water resources assessment will be done on the basis of sound scientific and technical information and understanding.
(ii) The status of surface and groundwater resources in terms of quantity and quality

and its use will be defined regularly on the basis of river basin and in conjunction with aquifer boundaries; and the information made easily accessible to users, stakeholders and decision makers.

### *4.4.2 Water resources planning and development*

*Objective: To have sustainable plans and development of water resources.*

Water resources development projects have been sectorally oriented without due consideration of the demands of other users. This has led to failure to realize the objectives by some of the projects, or face frequent water shortages to the extent of considering inter-basin water transfers. Implementation of interbasin water transfers could have serious negative impacts if no procedures, guidelines and standards are in place to govern it. In addition, operation of hydropower reservoirs and large irrigation schemes do not take adequate consideration of the environment thus threatening sustainability of the ecosystems and biodiversity. Planning is one of crucial aspects in water resources management. The various technical and policy issues are incorporated in the development and management plans. For a long time water resources planning has been sectoral oriented, regionally based or project specific, resulting in conflicts among users. In order to have appropriate water utilization plans the following will be done:

(i) Water resources planning will be on the basis of river basins; and will be done in an integrated multi-sectoral approach. The main levels of planning are National, Basin, District and Community or User level. In addition the plans will take into consideration land use-water-environmental linkages.
(ii) Development of both surface and groundwater resources will conform to basin or catchment water resources development and management plans.
(iii) Development of large water schemes including construction of dams, large rainfall harvesting schemes, water intakes, river diversion works, pumping stations, water well drilling, groundwater abstraction and use, and inter-basin water transfers must meet objectives of water resources management, and will be subject to a permit and an Environmental Impact Assessment (EIA).

## 4.5 Data and Information

*Objective: To have correct and timely data and information for design, construction and operation of different projects.*

A sound information and knowledge base is needed for different kinds of assessment, preparation of plans, construction and operation of projects. In addition, data are required for decision making and for taking appropriate interventional measures regarding management, allocation and development of water resources. An effective integrated water resource management system must be able to provide timely and correct information on the quantity, quality and resource use. Presently data gathering networks have deteriorated due to lack of resources and tools, thus affecting the system of collecting data and information. This lack of important water resources data leads to unsustainable projects, non cost effective and inefficient. In addition, lack of important data has led to inability to prepare and effectively implement disaster mitigation plans. These weaknesses not withstanding, currently there is no unified, adequately coordinated information management for water resource management. In order to obtain

correct and timely data and information the following will be implemented:

(i) The existing system of data collection, processing, storage and dissemination of various water resources information will be strengthened at National and Basin levels. The operational capacity for data collection, management of information and assessment of water resources will be strengthened on the basis of simplified, practical needs and cost effective solutions.
(ii) An effective system of local and international exchange of information will be strengthened, with a view to increase knowledge and experience, efficiency, and collaboration.
(iii) Regulatory authorities will be empowered by law to obtain information from water users.

### 4.6 Research and Technological Development

*Objective: Increase knowledge, information and communication between community and resource users.*

Integrated Water Resources Management is a complex process, which takes into account environmental, ecological and socio-economic concerns in the planning and management of the resource, aimed at solving the problems of supply, demand and control. It involves research, technical works and administrative and legal controls for the purpose of preserving and allocating the available water resources to the needs of society and increase efficiency and cost effectiveness. Very little research or identification of low cost technologies is done and is not sustainable. Additionally, there is lack of sectoral coordination, and research findings are not disseminated to users. Due to these weaknesses, technologies which may not be appropriate to our country may have been used. In order to improve water resources research the following will be implemented:

(i) Determination of research and technological development needs will be undertaken.
(ii) Water resources research and technological development centers will be established, and local researchers initiatives will be recognized and encouraged.
(iii) Collaboration with local and international research institutions will be strengthened.

### 4.7 Training and Human Resources Development

*Objective: To have adequate number of staff who would implement different water resources activities.*

Water resources management functions include data collect, processing and analysis, assessment, water allocation, monitoring and control, basin planning and development, research and various administrative controls and legal enforcement. These activities require specialized expertise to implement. Presently implementation of the activities is affected to a large extent by lack of enough number of qualified staff and absence of in-service training for the available staff. The number of experts in the various fields has continued to dwindle due to some of them leaving their jobs, retirement or death. Expertise on water issues among water resources experts, water users and decision-makers at all levels is essential for effective water resources management. There is

need to have qualified experts in the fields of hydrology, hydrogeology, water quality, water law, water conflict resolution and who can identify and implement the best water technologies, as well as socio-economic aspects of water resources planning and management. Presently, the capability to deal with various water resource management issues continue to go down due to lack of adequate number of graduates from technical and higher learning institutions.

In order to have adequate number of qualified staff the following measures will be taken:

(i) Inventory of different expertise and needs assessment will be prepared, and training programs prepared and implemented.
(ii) A succession plan for the sector staff will be developed and implemented.

### 4.8 Disasters Management

#### *4.8.1 Floods*

*Objective: To have flood mitigation plans.*

Two types of floods have been recorded in the country i.e. floods of the normal rainfall runoff process and floods caused by landslides resulting into mudflows. These floods, for example in Rufiji, have resulted in losses of property and life, and damage to infrastructure. Water disaster management in the country has been based on limited inter-sectoral co-ordination and inadequate real time information thus focusing on remedial actions rather than on preventive approaches. There are no early warning systems. Due to these weaknesses large floods have occurred quite suddenly with loss to life and property.

(i) Management of disasters will include establishment of flood monitoring stations and early warning systems so that occurrences of flood events can be detected early and information disseminated to public in advance, strengthening existing hydrological stations and development of mechanisms for emergency preparedness, in collaboration with other sector departments and agencies.
(ii) Flood prone areas and areas susceptible to landslides and mudflows will be identified and mapped,
(iii) Public will be encouraged to avoid development in areas susceptible to floods and landslide. Hazardous flood prone areas delineated and development controlled by water legislation.

#### *4.8.2 Droughts*

*Objective: To minimize the negative impacts of droughts.*

Droughts have been experienced quite often with losses to crops and livestock, and hence reducing food security. Diminished flows in rivers and reservoirs has had negative impact on various water use activities such as power production.

In order to mitigate the negative impacts of droughts the following measures will be taken:

(i) Drought monitoring and mitigation plans will be prepared in collaboration with

other sector departments and agencies such as Tanzania Meteorological Agency.

(ii) Procedures, guidelines and parameters for reviewing water allocations during droughts will be strengthened and streamlined so as to mitigate the potential negative impacts.

### *4.8.3 Dam Safety Monitoring, and Ownership of Dams*

*Objective: To have procedure for safety and ownership of dams.*

Dams are important structures for storing water, regulating flows and containing floods. However, establishment of dams and reservoirs in a watercourse automatically introduces the element of risk in possible loss of life and property to the people living downstream due to possibility of dam failure. Sedimentation of reservoirs is also a problem as it reduces storage capacities and hence their useful life, but no guidelines are in place to control land use activities around reservoirs. In addition, operation of reservoirs which does not follow established rules threatens the safety of dams and is a source of undue wastage of water. Currently there are no guidelines and regulating mechanism on dam safety issues, registration and ownership.

In order to have dams appropriately registered, owned and operated the following measures will be
implemented:

(i) Dams will be constructed, operated and maintained by the respective owners in accordance with established procedures and guidelines.
(ii) Dams will be owned by those who invested in their construction in accordance with established procedure and regulations.
(iii) The impounded water resources will remain public property and its use will be governed by established rules and regulations.
(iv) Dam owners and potential developers will be required to prepare dam safety monitoring plans and implement them in accordance with the established procedures. Water Legislation shall provide for dam safety.

### *4.8.4 Disasters associated with accidental pollution of water sources*

*Objective: to protect against hazards associated with pollution of water sources.*

There are disasters associated with accidental spills of poisonous and hazardous materials into surface and groundwater resources. Such accidents could occur from burst or leaked oil pipes, damaged chemical industries or spillage from transportation vehicles and vessels. This could lead to serious pollution of water sources and thus ecosystems and biodiversity, and may seriously affect health of people and animals.

In order to protect against and mitigate the effect of hazards associated with accidental pollution of water resources a quick and emergency assessment of extent, and possible impact will be implemented and information made available to concerned authorities. Transportation of poisonous and hazardous materials will follow established rules and guidelines.

## 4.9 Trans-Boundary Water Resources

Tanzania is riparian to trans-boundary water bodies with neighbouring countries. Large abstractions and use of Trans- boundary water resources requires understanding and agreement among the riparian states. In principle, a needs assessment and strategy for utilization of these resources are not yet prepared for all basins. Each of the trans-boundary water bodies exhibits unique characteristics, and a complex range of water management challenges. These challenges are broadly grouped as follows: (a) environmental management challenges on issues like water pollution, biodiversity conservation, wetlands and catchment degradation, fisheries management, and water hyacinth control; (b) river basin development for hydropower production, domestic rural and urban water supply, and irrigation, (c) river control and regulation, and international boarder stabilization, and (d) inter-basin water transfer. All these require specific strategies and actions aimed at development and management of the water resources.

In order to have effective framework for the management, development and utilization of trans- boundary water resources the following measures will be taken:

(i) An assessment for the identification of national priorities related to the management of trans-boundary water will be carried out in collaboration different national institutions.
(ii) Trans- boundary water resources such as lakes and rivers which we are riparian to will be used effectively to meet different social and economic demands based on the principle of equity, right and rationality. Local capacities to utilize the resources will be strengthened in collaboration with different national departments and agencies.
(iii) A framework for the management and utilization of trans-boundary water resources will be developed, based on the need for fostering regional cooperation. Technical collaboration on areas of research, data collection and information exchange will be promoted.

### 4.10 Institutional Framework

*Objective: to have an effective institutional framework for effective management of water resources.*

Water resources management requires an effective institutional setup to perform core functions of (a) water resources exploration, (b) water resources assessment both in quantity and quality, monitoring and evaluation, (c) water allocation, (d) pollution control, and other cross-sectoral activities such as catchment management, basin planning and development. Strong institutional set-up will be responsible for enforcement of the water legislation.

(i) The institutional setup will be reviewed and streamlined to meet challenges in water resources management and planning. Roles and responsibilities of different stakeholders will be clearly defined in the new framework, and will ensure the participation of legitimate representatives of stakeholders.
(ii) The structure and system of management will be designed to facilitate the involvement of responsible authorities at different levels and promote autonomy at the Basin level. Appropriate, transparent and accountable management information systems will be established.

***Co-ordination and collaboration***

Water resources management is a multi-sectoral activity that requires an effective collaboration and coordination mechanism among sectors at all levels. Co-ordination and collaboration mechanisms that enhance information sharing thus, keeping stakeholders aware of sector problems, successes and needs to encourage exchange of ideas and experiences and to provide mechanisms for collaborative action will be established and strengthened.

***Institutional set-up and resolution of conflict***

Tanzania is divided into nine river Basins, that do not follow administrative boundaries such as Regions and Districts. Considering this fact, the management of water resources will have five main levels; National level, Basin level, catchment level, District level, and Community or Water User Association level which will be the lowest level and will bring integrate users of the same source.

***National Level***

The Ministry with the mandate for water is responsible for managing the nation's water resources. It will determine policy orientation, development and time-to- time review of policy and legislation, preparation of conducive environment, sectoral coordination and integration, and sectoral planning, National water assessments and planning; data collection and dissemination, monitoring and evaluation, establishment and maintenance of water resources databases and information management systems, preparation and implementation of training programs, and preparation of Regulations. This is the level where the perimeters of the Basins and sub-basins, the groundwater recharge areas, aquifers are defined. The Minister is the appellate authority. The structure and functions of present Central Water Board will be reviewed and assigned new roles of integrated, multi-sectoral water resources planning and management, in addition to resolution of national level conflicts among sectors. In addition, the Ministry responsible for Water will be the custodian and implementer of the water law and will coordinate water use planning and preparation of Basin plans.

***Basin Level***

Since water resource management and development will be undertaken on the basis of river basins, this is the level for data collection, processing and analysis, water allocation, pollution control, preparation of water utilization plans, collection of the various fees and charges, and resolution of various water related conflicts. The present system of managing through Basin Water Boards will be strengthened.

***Catchment Level***

The large size of our River Basins makes water management difficult since Basin staff is distant from water users. In order to remedy this, catchment Water Committees and sub-catchment Water Committees will be established, and will be composed of representatives from the public and private sector, and from the Water User Associations within the respective Basin. The role of catchment Water Board includes preparation of preparation and implementation of catchment plans, and resolution of conflicts within the catchments.

***District Level***

District Councils shall participate fully in Basin Boards and Catchment Committees. The Districts will be responsible for planning and development of water resources in accordance with Basin plans, protection and conservation of natural resources in the villages and wards, establishment of bye-laws on the management of water resources, conflict resolution in accordance with established laws and regulations. In addition the District Councils will make assessment of water demands of their respective districts, and participate fully in the preparation of Basin plans.

***Community Level and Water User Associations***

Water User Associations (WUAs) or Water User Groups (WUGs) will be the lowest appropriate level of management. These associations will be responsible for local level management of allocated water resources, mediation of disputes among users and between groups within their areas of jurisdiction, collection of various data and information, participate in the preparation of water utilization plans, conservation and protecting water sources, and catchment areas, efficient and effective water use and ensuring return flows, enforcement of the law and implementation of conditions of water rights, and control of pollution. They provide legitimate representatives in Basin Boards and Catchment Committees.

***Participation***

Community in general play a major role in the water sector because they are the primary users, guardians and managers of water sources. Participation of both men and women in decision-making, planning, management and implementation of water resources management and development will be enhanced. Youth and children as the future managers of water resources have to be involved from the early stages for better management and future sustainability. Youth and children will be educated on the management, protection, conservation and development of water resources as they are the facilitators for change.

**4.11 Legal and Regulatory Framework for Water Resources Management**

*Objective: to have strong and effective legal and regulatory framework for management of water resources*

The Water Utilization Act of 1974 and its amendments is the principle legislation governing the utilization and pollution control of the water resources. This legislation and associated regulations do not adequately meet present and emerging water resources management challenges. Thus the legislation needs to be reviewed in order to address the growing water management challenges. In order to have an effective legal and regulatory framework the following will be done:

(i) The existing Water Act and regulations will be reviewed and conflicting water related laws and regulations will be identified and harmonized. In the review the mandates of Basin Water Offices will be strengthened to enable these offices to (a) enforce and follow-up on existing legislation, regulations and operating rules governing water use and control of pollution; (b) become the legal authority to

collect the various water use charges, (c) facilitate the establishment of lower level water management organizations which will bring together users and stakeholders of the same source, (d) become centres for conflict resolution in water allocation, water use and pollution.

(ii) Relevant customary law and practice related to water management will be institutionalised into statutes.

### 4.12 Financing of Water Resources Management

*Objective: To have sustainable source of financial resources to meet the costs for water resources management.*

Water resources management entails a variety of technical, administrative and legal activities that cost money to implement and that must be funded. These activities include water resources exploration, assessment, water allocation, pollution control, monitoring and evaluation, regulation and enforcement, environmental protection, basin planning and development, and other cross-sector activities such as catchments management, basin planning and development. The constraint of inadequate resources has resulted into poor infrastructure for continuous water resources data collection which is important for water resources management.

In order to realize the objectives of water resources management all water uses, especially water use for economic purposes will be charged for. The level of the charges and criteria to be used will be reviewed from time to time and will be based on studies to be conducted.

# SECTION II: RURAL WATER SUPPLY

## 1. OVERVIEW

About 80% of Tanzania's population estimated at 34 million live in rural areas. Despite significant investment in the Rural Water Supply (RWS) since the early 1970s, presently only about 50% of the rural population has access to a reliable water supply service. However, due to poor operation and maintenance, over 30% of the rural water supply schemes are not functioning properly.

A review of the water sector carried out in 1995 identified a number of shortfalls in the 1991 National Water Policy amongst which are: the under estimation of the role that could be played by the private sector, necessity of a stronger involvement of the various stakeholders especially the communities and inadequacy of the legal and institutional framework. These findings led to the review of the rural water supply section of the National Water Policy with the aim of articulating more clearly the rural water supply sub-sector policy objectives as well as the strategies, which will be taken in pursuance of the stated objectives. This sub-sector policy is a result of various inputs from several stakeholders who participated fully in the different stages of its development.

## 2. OBJECTIVES

The broad rural water supply sub-sector policy objectives are to improve health and alleviate poverty of the rural population through improved access to adequate and safe water.

The specific policy objectives are:

(i) to provide adequate, affordable and sustainable water supply services to the rural population,
(ii) to define roles and responsibilities of various stakeholders,
(iii) to emphasize on communities paying for part of the capital costs, and full cost recovery for operation and maintenance of services as opposed to the previous concept of cost sharing,
(iv) to depart from the traditional supply-driven to demand-responsive approach in service provision,
(v) to manage water supplies at the lowest appropriate level as opposed to the centralized command control approach,
(vi) to promote participation of the private sector in the delivery of goods and services,
(vii) to improve health through integration of water supply, sanitation and hygiene education.

## 3. PRINCIPLES

Formulation of the rural water policy objectives has been guided by four main principles, which have been derived from experience gained in implementing the 1991 National Water Policy as well as the experience of other developing countries. These principles

are in the Social, Economic, Environmental and Sustainability aspects.

### *3.1 Social Principles*

**Water is a basic need and right**
Recognizing that access to clean and safe water is a basic need and right for all human beings, efficient management and equitable use of water in the rural areas will be promoted.

**Use of water for human consumption shall receive first priority**
In the provision of water supply and sanitation services water required to meet basic human needs shall enjoy priority number one of use by right.

**Investment priority shall be given to water scarce areas**
Most parts of the country are water-scarce and experience acute water shortage. Due priority shall be accorded to water scarce areas with respect to
water supply for both human and livestock use.

### *3.2 Economic Principles*

**Water is an economic good**
Recognizing the extent to which the water resource contributes to economic productivity on the one hand, and the financial investments required for water development on the other, development of water for productive purposes will, therefore, be treated as an economic undertaking requiring efficient management of the resource and financed by water users themselves.

### *3.3 Environmental Principles*

**Water Sources Protection and Conservation**
In order to ensure sustainability of water supply and sanitation services for the rural population, water sources areas will be delineated and water user entities encouraged to acquire land title deeds so as to protect them from human-induced land degradation.

**Enhanced conservation of the environment**
Water supply projects will be subjected to environmental impact assessment at the design and planning stages so as to ensure that potential impacts and proposed remedial measures are taken into consideration during the implementation and operation stages.

**Improvement of health through sanitation and hygiene education**
Safeguarding health through safe disposal of excreta and solid waste and adequate safe water shall be encouraged. This shall be achieved by integrating water, sanitation and hygiene education programs.

### *3.4 Sustainability Principles*

Sustainable development and delivery of rural water supply services relies on clear definition of the roles and responsibilities of the various actors as well as those of the stakeholder groups. Pre-requisites for a sustainable rural water supply are:

(i) Adopting the principle of managing water schemes at the lowest appropriate level,
(ii) The beneficiaries themselves establishing, owning and managing their water schemes,
(iii) Ensuring full cost-recovery for operation and maintenance, and replacement,
(iv) Facilitating availability of spare parts and know how for timely repair and maintenance of the schemes through standardization of equipment and promotion of private sector involvement,
(v) Protection of water sources areas,
(vi) Reconciling the choice of technology and the level of service with the economic capacity of the user groups, and
(vii) Recognizing women as being among the principal actors in the provision of rural water supply services.

## 4. POLICY ISSUES IN RURAL WATER SUPPLY

Realization of the policy objectives will require application of various strategies, which will also change over time, to cope with changing needs and circumstances. Guided by the principles stated above, it is expected to achieve the policy objectives by addressing the following issues:

### *4.1 Community Participation*

**Ownership**
*Goal: Sustainable water supply and sanitation services legally owned by communities themselves*

Water supply and sanitation facilities provided without the active participation of the beneficiaries in planning and management are often not properly operated and maintained and hence are unsustainable. Ownership of the facilities including water wells is neither perceived to be, nor legally vested in user communities. These factors lead to lack of commitment to maintenance of the facilities by the users. Communities will be empowered to initiate, own and manage their water schemes including water wells. In order to ensure that communities become legal owners of water supply schemes the following will be undertaken:

(i) Legal registration of water user entities will be instituted to ensure that communities are the legal owners of their water supply schemes including water wells,
(ii) Roles, responsibilities, rights and limits of authority of water user entities will be clearly defined,
(iii) Communities will be facilitated in acquiring technical and management skills.

**Choice of technology**

*Goal: A mechanism enabling communities to make appropriate choices of technology*

Failure of some of the rural water supply schemes has been attributed to inappropriate technology and location of facilities, and lack of social acceptability and affordability. In order to put in place a mechanism which will allow communities to make informed choices of technology the following will be undertaken:

(i) Communities will be empowered and facilitated to make appropriate technology choices that suite them, particularly which require low investment costs and are least costly in operation and maintenance,
(ii) Use of environmentally friendly technologies including gravity, solar and wind power for pumping will be promoted.

**Involvement of Communities in Planning, Design and Construction**

*Goal: Communities with a feeling of ownership of sustainable water supply schemes*

In order to motivate communities into full and effective participation in planning and managing their water schemes and thereby creating a sense of ownership and gradually building up capacity, it is essential that communities let and supervise design and construction contracts. Communities may call on their district authorities for assistance in letting contracts including their preparation and supervision. Ultimately, however, communities shall be responsible for letting and supervising design and construction contracts awarded to private consultants and contractors. To ensure that communities participate fully in the planning, design and construction the following will be undertaken:

(i) Design manuals will be reviewed and disseminated,
(ii) Communities will be trained to acquire skills in letting and supervision of design and construction contracts.

**Involvement of Communities in Operation and Maintenance**

*Goal: A sustainable arrangement for making communities fully responsible for operation and maintenance of their water supply schemes.*

For sustainability of water schemes, communities will be required to pay full operation and maintenance (O&M) costs and costs of higher service levels as well as to manage their schemes. At the stage of project conception, the indicative magnitude of the O&M costs will be discussed with the communities to match the level of service and technology selected with the willingness and ability of the community to operate, maintain and manage the chosen option. Communities may contract private operators to operate and manage their schemes. In order to make rural communities responsible for the operation and maintenance of their water supply and sanitation services the following will be carried out:

(i) Communities will be educated and facilitated to enable them manage operations and meet operation costs including that of scheme improvements.
(ii) Communities will be trained to acquire skills in letting and supervision of operation contracts.

### *4.2 Private Sector Participation*

*Goal: Improved service delivery levels through enhanced private sector participation in rural water supply and sanitation services*

Water supply development and delivery has been dominated by the public sector. The private sector is at infancy and its involvement has been limited and hence its slow

growth. Involvement of the private sector in the delivery of water supply services will improve efficiency and effectiveness and enhance development and sustainability of service delivery. In order to promote Private Sector Participation in rural water supply and sanitation services the following will be undertaken:

(i) Participation of the private sector in service delivery will be promoted,
(ii) An enabling environment for increased private sector involvement, including incentives and legal recognition, will be created,
(iii) Assistance will be given to private sector and Districts Councils to strengthen their capacities.
(iv) Communities will be educated on the importance of the private sector participation in the provision of rural water supply and sanitation services

### *4.3 Public Sector Regulation, Facilitation and Co-ordination*

*Goal: Increased productivity*

Until recently, the Ministry responsible for water played a key role in implementing water programs. The new strategy, in conformity with the ongoing reforms in the public sector, is for the Government to change its role from being an implementer to a regulator, facilitator and co-coordinator. In order to ensure that productivity is increased as the Government assumes the new roles ,the following will be undertaken:

(i) Adequate legal framework related to rural water supply will be provided,
(ii) Technical and financial support for the construction of new schemes, expansion and rehabilitation of existing water supply schemes will be provided,
(iii) The Ministry responsible for water including the District Councils will be streamlined and strengthened to effectively take on the new roles.

### *4.4 Domestic Water Supply Minimum Service Level*

*Goal: Domestic Water Supply Minimum Service Level established*

In rural areas actual water use ranges from 5 litres per capita per day in acutely water scarce areas to 30 litres per capita per day in other areas. In most cases, domestic water, which is often not potable, is fetched from a source far away from the homestead. In providing rural water supply and sanitation services to rural areas the minimum service levels are established as follows:

(i) The basic level of service for domestic water supply in rural areas shall be a protected, year-round supply of 25 litres of potable water per capita per day through water points located within 400 meters from the furthest homestead and serving 250 persons per outlet.
(ii) Higher service levels including house connections will be encouraged where it is technically feasible and there is an effective demand.

### *4.5 Water for Livestock*

*Goal: Adequate water for livestock*

Over 90% of the livestock is found in rural areas and most of the population in the semi–

arid regions are engaged in livestock keeping. Most of the important livestock keeping areas experience acute water shortage. Often water for livestock is not included in the designs of community water supplies. Lack of water for livestock results in constant migrations by livestock keepers in search for water. This can lead to contamination and destruction of water sources, which in turn can initiate or enhance water use conflicts among water users. In order to ensure that livestock is provided with adequate water, the following will be carried out:

(i) Emphasis will be placed on construction of dams, charcos and water wells for livestock,
(ii) Water requirement for livestock will be included in rural water supply designs where feasible,
(iii) Livestock areas where water is scarce shall be identified and given priority in the provision of water supply and sanitation services.

### *4.6 Rainwater Harvesting*

*Goal: More water available to rural communities through rainwater harvesting technologies*

Rainwater harvesting is a good source of water supply, especially in arid and semi-arid areas where it may prove to be the only reliable source of water in the dry season. Rainwater harvesting will be promoted in rural areas. In order to make water more available to the rural areas through rainwater harvesting the following will be undertaken:

(i) Communities will be made aware and encouraged to use rainwater harvesting technologies.
(ii) Research on rainwater harvesting technology will be enhanced.
(iii) Rainwater harvesting will be promoted through creation of awareness and training of various stakeholders.

### *4.7 Integration of Water Supply & Sanitation and Hygiene Education*

*Goal: Improved health and conditions of people in rural areas.*

Diseases associated with lack of safe water and poor hygiene and sanitation are major causes of sickness and death in the country. Lack of access to safe water, sanitation and hygiene education is one of the root causes of poverty as it is the poor, especially women and children, who suffer most due to poor living conditions, diseases and foregone opportunities. Hygiene education greatly improves the health impact of water and sanitation interventions, whereas providing water alone has minimal impact.

In order to improve the health and conditions of people in the rural areas emphasis will be placed on integrating water supply and sanitation services and hygiene education.

### *4.8 Gender Sensitivity*

*Goal: Active and effective participation of women and men in rural water supply programs.*

In the rural areas women bear the burden of searching for water and guardians of the

living environment. However, this pivotal role has seldom been reflected in institutional arrangements for the development and management of rural water supply and sanitation services. In order to improve gender participation in rural water supply programs the following will be undertaken:

(i) A fair representation of women in village water-user entities will be encouraged.
(ii) Rural water supply programs shall be based on what both men and women in rural communities know, want, and are able to manage, maintain and pay for.
(iii) Raise awareness, train and empower women to actively participate at all levels in water programs, including decision making, planning, supervision and management.

### *4.9 Service Regulation*

*Goal: A service delivery system to ensure efficient and equitable use of water*

Considering that access to clean and safe water is a basic need and right for all human beings, it is important that all members of the community including the disadvantaged groups efficiently and equitably use the water. District and village governments shall regulate water user entities. Communities will ensure the protection and conservation of water sources as well as equitable service provision to economically disadvantaged groups within the communities. In order to establish a system for service regulation for the rural water supply and sanitation services the following will be implemented:

(i) Roles, responsibilities, rights and limits of authority of water user entities will clearly be defined.
(ii) Communities will be made aware of the importance of water sources protection and conservation.
(iii) Mechanisms to ensure entities and private operators are accountable to water users and that water users meet their obligations will be established.

### *4.10 Financing Rural Water Supply Programs*

*Goal: Communities to participate in financing their water supply programs*

Development and sustainability of rural water supply schemes requires adequate financing. Dependence on government and donors as sole providers for water services has led to inefficient delivery of rural water supply and sanitation services. It is imperative to mobilize and empower communities to take the lead in their development activities.

Water is a basic need and right, yet most communities do not have the financial means to meet capital costs. The Government, both Central and District Councils, will continue to support communities in the development of their water supply schemes. Financial support for water supply will be initiated and requested by the respective communities themselves who shall also demonstrate their ability to sustain the schemes before they can access to financial support. Communities will be required to pay a portion of the capital costs, both in cash and in kind, for new schemes, for rehabilitation, and systems expansion. Where there is demand, and available water permits, house connections will be allowed but beneficiaries will pay for the full costs connected to the higher service level. The Government shall continue to mobilize and provide financial support to

complement community efforts. In order to ensure that the communities finance their water supply programs the following will be undertaken:

(i) Demand Responsive Approach (DRA) shall be promoted,
(ii) Communities will establish a mechanism to contribute a portion of the capital costs, in cash and in kind, for new schemes, for rehabilitation, replacement and systems expansion,
(iii) Communities will establish a mechanism to pay the full costs of O&M and for higher service levels,
(iv) Water scarce areas shall be identified and given priority for investment.

### *4.11 Legal and Regulatory Framework*

*Goal: Communities to become legal owners of rural water supply schemes*

The Ministry responsible for water, External Support Agencies (ESAs) and Non Governmental Organizations (NGOs) have been planning and constructing rural water supply schemes, with little participation of the beneficiary communities. The government has been the owner and operator of most of these schemes leading to lack of commitment by the beneficiaries to safeguard the facilities. Issues of ownership and management of water schemes are central in the sustainability of rural Water Supply Schemes. To ensure that that existing and new water schemes are legally owned by appropriate water user entities and performance standards are adhered to by all actors the following will be undertaken:

(i) Relevant Acts and regulations under which rural water user entities can be legally registered will be reviewed,
(ii) Regulations pertaining to private sector participation in water supply and sanitation services in rural areas will be strengthened.
(iii) Information on the regulations pertaining to rural water supply and sanitation services will be disseminated to all stakeholders

### *4.12 Institutional Framework*

*Goal: An institutional framework for the development and management of RWSS facilities*

Sustainability of rural water supply and sanitation (RWSS) services requires that communities take the lead in developing their WSS facilities and be fully responsible for the O&M of their schemes. The private sector will provide support to communities in planning, design, construction and supply of materials, equipment and spares. The government will continue to provide the necessary technical and financial support as well as co-ordination and regulation of the RWSS development activities. The ESAs and NGOs will also provide financial and technical support. Integration of water supply, sanitation and hygiene education will require close collaboration with other actors in the sanitation sub-sector. This new approach requires effective institutionalized linkages between key sector actors including Central Government, Local Government, ESAs, Private Sector, NGOs, CBOs and the Communities themselves.

An effective organizational structure that is simple, transparent, efficient and accountable to the communities needs to be established in order to make rural water supply and

sanitation schemes sustainable. The roles and responsibilities to be played by each actor will be carefully and clearly defined; linkages and partnership framework established and properly coordinated and nurtured, and activities continuously monitored and evaluated to capture lessons learnt.

In order to establish an institutional framework for the development and management of RWSS facilities the following will be undertaken:

(i) The existing institutional structure will be reviewed in line with the new roles and responsibilities,
(ii) Roles and responsibilities of each RWS sub-sector actor will be clearly defined and disseminated,
(iii) A partnership framework for all stakeholders will be established,
(iv) Awareness to the communities on their roles and responsibilities will be created.

### *4.13 Co-ordination and Collaboration*

*Goal: Forums for co-ordination and collaboration among various actors in the rural water supply sub-sector and stakeholders*

The existing co-ordination and collaboration mechanisms practiced by various actors in the rural water supply sub- sector are generally project oriented. Rarely is information shared on various experiences. It is essential to keep stakeholders aware of problems, successes and needs to encourage exchange of solutions and experiences and to provide mechanisms for joint action. Lack of co-ordination and collaboration may result in duplication of efforts and misallocation of available resources. Ultimately actors sometimes end up confusing communities by using conflicting approaches. In order to coordinate activities of various actors in the rural water supply sub-sector and different stakeholders the following will be undertaken:

Forums for co-ordination and collaboration mechanisms will be developed, defined and made accessible to all stakeholders.

### *4.14 Monitoring and Evaluation*

*Goal: An appropriate mechanism for monitoring and evaluation of rural water supply and sanitation services.*

Improvement of rural water supply service delivery requires that activities are continuously monitored and evaluated to capture lessons learnt. Participatory monitoring and evaluation will be carried out at the district and community levels with support from the central government, District Councils, ESAs, NGOs, and the Private Sector. Involvement of all key actors and interested groups in monitoring will be encouraged. In order to establish a mechanism for participatory monitoring and evaluation at different levels the following will be undertaken:

(i) Communities monitoring capacity will be developed,
(ii) A computerized data base will be developed at districts and national level,
(iii) A comprehensive reporting and feedback mechanism from each level will be established.

# SECTION III:
# URBAN WATER SUPPLY AND SEWERAGE

## 1. OVERVIEW

Urban areas in Tanzania are experiencing rapid expansion. The population is growing at a rate of more than 6% per annum, which is exerting enormous strain on the delivery of various services including water and sanitation services. According to a recent review, between one third and one half of the urban population lives in unplanned or squatter areas. Apart from being of generally poor housing, the areas are characterized by high population density and general deficiencies in infrastructure services including water and sanitation.

The existing water supply infrastructures and water sources are old and inadequate to meet the ever increasing demand for water. Presently, only about 73% of the urban population has access to reliable water supply services. Major issues and challenges facing the urban water supply and sanitation services sector include inadequate water supply both in quantity and quality, poor billing and revenue collection, lack of an enabling environment for private sector participation and the belief that water is a God given resource for which no price can be attached.

## 2. POLICY OBJECTIVES

This policy aims at achieving sustainable, effective and efficient development and management of urban water supply and sewerage (UWSS) services. This will be attained by providing a framework in which the desired targets are set outlining the necessary measures to guide the entire range of actions and to harmonise all related UWSS activities and actors with a view of improving the quality of service delivery. The specific objectives of the policy in the context of developing and managing urban water supply and sewerage services are:

(i) to guide the development and management of efficient, effective and sustainable water supply and waste water disposal systems in urban centres.
(ii) to create an enabling environment and appropriate incentives for the delivery of reliable, sustainable and affordable urban water supply and sewerage services.
(iii) to develop an effective institutional framework and ensuring that the water supply and sewerage entities are financially autonomous.
(iv) to enhance an efficient and effective system of income generation from sale of water and wastewater removal.
(v) to enhance water demand management and waste water disposal.

## 3. URBAN WATER SUPPLY AND SEWERAGE PRINCIPLES

The challenge and weaknesses of urban water supply and sewerage require emphasis on improving the management of water supply based on sound policy and strengthened institutional arrangements. This approach has several guiding principles which have been derived from issues agreed upon in various forums and the experience gained in implementing different strategies and action plans developed in the last ten years of implementing the 1991 National Water Policy. The guiding principles are as follows:

(i) Water and sanitation are critical components of development, thus access to UWSS services is a right of every Tanzanian.
(ii) Quality assurance is vital in UWSS services.
(iii) Cost recovery is the foundation of sustainable service delivery.
(iv) The public supplied with water has an obligation to pay for wastewater treatment proportionately to the water used, irrespective of the collection method.
(v) Water demand management shall be emphasised.
(vi) UWSS entities to take into consideration existence and the needs of the low income groups.
(vii) Service delivery will be decentralised and institutional reforms implemented.
(viii) Wastewater and water supply development shall be integrated under one management.
(ix) Private sector participation in the management and development of urban water supply and sewerage services will be encouraged.
(x) Public/private sector partnerships will be promoted where appropriate.
(xi) The regulatory framework shall be independent and transparent and fair to all players.
(xii) Environmental Impact Assessments shall be mandatory in all water supply and sewerage interventions.

## 4. POLICY ISSUES IN URBAN WATER SUPPLY AND SEWERAGE

### *4.1 Water Sources and Infrastructures*

**Deteriorated Infrastructure**

*Goal: To have an improved infrastructure for sustainable and efficient water supply and sanitation services.*

Water sources and infrastructures for most urban water supplies and sewerage systems are old, inadequate and poorly functioning; and cannot cope with the increasing demand and emergencies such as fire fighting. As a result water delivered is inadequate and sometimes of poor quality. Necessary measures shall be taken to ensure that all urban areas have adequate water supply and sewerage systems. Urban-specific strategies for dealing with emergency situations of drought, floods and fire shall be pursued in order to guarantee water supply during such emergencies. In order to have sustainable and efficient urban water supply services the following will be pursued:

(i) Facilitation of acquisition of necessary financing for rehabilitation and expansion will be undertaken by the Government.
(ii) Development and expansion of the water supply systems shall consider development of sewerage systems and general environmental sanitation at the same time.
(iii) UWSS utilities will develop contingency plans and establish financing mechanism to deal with emergencies.
(iv) Mechanisms to deal with emergencies of floods, drought and fire will be put in place.
(v) In cases of acute water shortage or conflicts first priority will be accorded to domestic water supply and emergencies.

**Encroachment of Water Source Areas**

*Goal: To put in place a mechanism for the protection of water sources from encroachment of land around water source areas.*

The impact of human activities on the environment has increased in recent years. Water sources are constantly being polluted due to the disposal of untreated and/or inadequately treated domestic and industrial wastewater, agro-chemicals and high turbidity caused by sediments due to soil erosion. As land becomes scarce, water sources become vulnerable to invasion and settlements around them. Water source areas and infrastructure will be protected, thus:

(i) Water sources and infrastructure will be identified, protected, demarcated and land title deeds acquired;
(ii) Title deeds and lee-way will be obtained for all major water supply and sanitation infrastructure;
(iii) Protection of infrastructure such as dams, pipelines, treatment plants, pumping stations and reservoirs way-leaves and property sites, which are provided in the Town Planning Ordinance shall be ensured, and shall be availed in water laws to facilitate self executing without recourse to different jurisdictions.
(iv) Assessment of land around a source with regard to acquisition of land title will be made prior to applying for a water right.

**Standards and Guidelines**

*Goal: To have strong institutional organs to ensure standards and guidelines are adhered to in construction and service.*

With the advent of private sector in the urban water industry the number of operators and players will increase and hence the need for comprehensive sector guidelines. UWSS systems shall be efficiently operated and assets adequately maintained with a view of attracting capital and motivating customers to pay for the services provided. In designing water supply and sewerage systems, demand driven approach shall be emphasized. Compliance with the design criteria produced by the Ministry responsible for water and other relevant design criteria applied internationally shall be observed.

To ensure compliance with standards and guidelines:

(i) Development of specifications and quality assurance procedures for machines, chemicals and treatment processes for safety and health reasons shall be undertaken,
(ii) The Design Manual will be reviewed and disseminated,
(iii) Staff training will be undertaken as part of capacity building in order to improve performance of the entities.
(iv) UWSSAs will conduct regular water quality monitoring
(v) UWSSAs entities will ensure that the supplied water meets the standards set.

### *4.2 Financing of Urban Water Supply and Sewerage Services*

**Low revenue collection**

*Goal: To have a tariff setting mechanism which will ensure that water users pay for full cost recovery.*

Tariffs for urban water and sewerage services are very low resulting in very low revenue inadequate to meet even the basic operation and maintenance requirements. Provision of water and sewerage services has been seen as a social service, resulting in low willingness to pay, making revenue collection very difficult. Many water users refuse even to be connected legally. UWSAs are weak in billing, metering, revenue collection, metering water use, preventing leakages and wasteful use. To ensure full cost recovery in UWSS services the following will be done:

(i) Mechanisms for regulating tariff levels concurrently with the rise of costs of delivery of services taking into consideration the cost recovery principle will be established
(ii) A mechanism for controlling and regulating prices for water supply and sewerage services taking into consideration of all costs involved will be put in place.,
(iii) Awareness to public on tariff setting mechanism will be created,
(iv) A program for universal metering and connection to water supply and sewerage systems will be prepared,
(v) Where a sewer line exists, mechanisms will be put in place to enable properties within 30 metres to be connected, at a price affordable to customers,
(vi) Where there is a distribution system with adequate and reliable water supply, customers will be obliged to connect. Cost of providing new connections will be made affordable to encourage more connections.
(vii) Private water supply sources in urban areas will not be allowed, except with permission from a legally recognised regulator.

**Weak financial resources base for UWSSAs**

*Objective: To attract private sector investment in UWSS Sub Sector.*

The resources allocated to water supply and sewerage services delivery have been inadequate to meet investment and even basic operation and maintenance requirements. UWSSAs are unable to operate commercially and therefore cannot attract private investment.

Whereas water is life, sanitation is a way of life that affects all people. To safeguard the environment and the health of people, wastewater must be properly collected, treated and discharged. There shall be equitable financial resources allocation between water supply and wastewater handling in terms of investment, operation and maintenance.

In order to attract private sector investment in UWSS the following will be done:

(i) Enabling environment for investors will be created.
(ii) Necessary efforts shall be taken to mobilize local and external financial resources for capital works to enable UWSAs become commercially viable entities that attract investment from various sources.

(iii) Cesspit emptiers will be allowed to discharge at treatment facilities free of charge.

### *4.3 Water Demand Management*

*Objective: To prevent wasteful water use and control water leakages.*

Water demand in urban areas is increasing at a rate, which is not proportional to the rate of expansion of water supply and sewerage services. This is due to high rate of urbanisation, increase of industrial activities and significant unaccounted-for-water that includes leakage, wastage and illegal connections. Water demand management measures will be undertaken to conserve and use the available water efficiently and equitably, by instituting:

(i) Measures on proper tariff setting (at an economic cost), metering, rationing, leakage control and mass education on frugal use of water and conservation.
(ii) Regulations on efficient use of water by using low capacity cisterns.

### *4.4 Water for Low Income Groups and Community User Groups*

*Goal: To improve water and sanitation services in low income and peri-urban areas*

People living in underprivileged urban and peri-urban areas rarely benefit from adequate water supply and sanitation services. They collect water from kiosks or buy it from vendors at a cost higher than that of the house connections. The poor cannot afford to collect their wastewater and hygienically dispose it, thus leading to increase in water borne diseases, which may spread to all corners of an urban area.

Recognizing the existence of low-income groups in the urban and peri-urban areas, UWSS entities shall be required to provide them with appropriate WSS services. Given the importance of water for life and survival, appropriate social equity considerations shall be put in place so that a basic level of water supply and sanitation service is provided to the poor at affordable costs. Entities shall promote workable mechanisms whereby the water supply and sanitation needs of the urban and peri-urban poor are promoted in all initiatives that encourage public-private partnerships. In order to have water supply and sanitation services in underprivileged urban and peri-urban areas the following will be done:

(i) Low-income groups will be identified and plans and programmes to provide water supply and sewerage services to peri urban shall be drawn by utilities;
(ii) Awareness on safe water use to the peri urban groups will be created;
(iii) Uses of small bore and shallow sewerage systems in the peri urban areas will be promoted;
(iv) Urban poor dimension in public-private partnership negotiations will be promoted;
(v) NGOs and CBOs will be encouraged in financing, developing and managing the water supply and sewerage service in low income urban areas.

### *4.5 Waste Water and Environmental Management*

*Goal: To have a wastewater treatment system which is environmentally friendly.*

Water supply services in urban areas result in the production of wastewater estimated at about 80% of water supplied. Wastewater treatment and disposal in urban areas has not been accorded due priority. Common methods of disposal of public wastewater are through septic tanks and pit latrines. The wastewater so disposed is haphazardly discharged leading to contamination of groundwater sources and the environment. Entities shall be required to ensure proper collection and disposal of sewage.

Most existing industries were established without wastewater treatment facilities. In some instances, industrial wastewater contains toxic substances or biological process inhibitors. Industries shall establish pre-treatment facilities to treat their wastewater before discharging into public sewerage system. UWSS entities shall conduct own regular chemical and bacteriological tests of the raw sewage to control toxic and offensive substances from being discharged into the treatment plants.

To ensure domestic and industrial wastewater is not haphazardly discharged to contaminate water sources and the environment the following will be done:

(i) Sewerage systems and sludge disposal facilities will be constructed and old ones will be rehabilitated.;
(ii) Cesspit emptying services will be established and /or contracted to the private operators, cesspit emptiers will be required to discharge only at sewage treatment facilities.
(iii) Discharge of untreated wastewater to the sea shall be through long and a deep sea out-falls.
(iv) Legislation requiring industries to pre-treat their wastewater before discharging into municipal sewerage system will be reviewed.
(v) Legislation enforcement mechanism will be strengthened.
(vi) UWSS entities shall co-operate with industries and other institutions in the research and development of least cost technologies for wastewater treatment and recycling.
(vii) Industries shall be required to use environmentally friendly raw materials with less toxic elements and adopt cleaner production technology.

### *4.6 Institutional Framework*

*Goal: To put in place an efficient and comprehensive institutional framework for UWSS management*

The Government of Tanzania has embarked on a far reaching process of restructuring of the centralized economy and reform of the Civil Service. The role of the Government is now changing from that of a provider to that of a facilitator. Other stakeholders will now play the role of implementation and management of UWSS activities. An appropriate institutional framework that will ensure establishment of decentralized autonomous entities for management of water supply and sewerage services in all urban centers shall be put in place. The institutional set up shall be accompanied by reforms that promote integrated approaches, taking into account changes in procedures, attitudes, behaviour and the full participation of women at all levels. To ensure an efficient and comprehensive institutional framework for UWSS management system:

(i) Functions of the Ministry responsible for water will be streamlined and the existing urban water supply and sewerage entities capacity will be strengthened,

(ii) New entities of user groups and private cooperatives will be promoted and established,
(iii) Staff up to the lowest level will be trained and deployed,
(iv) Effective monitoring mechanisms of the entities will be instituted.

### *4.7 Legal and Regulatory Framework for UWSS*

*Goal: To have a comprehensive legal and regulatory framework for UWSS*

Legislation and supporting regulations have been enacted at different times to regulate urban water supply and sewerage programs. The existing legislation however does not address all issues relating to the UWSS service delivery. Other sectors have laws related to water supply and sewerage that require harmonization with water legislation.

Autonomous entities and private sector participation in urban water supply and sewerage services delivery without effective regulation may result in high tariffs and conflicts. A regulatory framework is vital in order to serve both customer and operator interests. Existing laws related to water and sewerage in urban areas shall be broadened, amended and harmonized to accommodate changes that are taking place, including the recent introduction of Energy and Water Utilities Regulatory Authority (EWURA) legislation which has set the broad framework for regulating water and energy services delivery. With regard to independent regulation of UWSS the role of the Government will be to prepare tools, such as setting standards, for use by the regulator. The Ministry will continue to regulate the water sector when and where the Private Sector is not involved. In order to have efficient structure for UWSS the following will be done:

(i) Water legislation shall provide for compensation and restoration rather than for penal sanction only;
(ii) Existing laws shall be reviewed, conflicting laws related to UWSS shall be identified and harmonised and different pieces of water and sewerage legislation shall be consolidated into one;
(iii) Laws related to UWSS services shall be publicised and translated in Kiswahili for wider dissemination.

### *4.8 Private Sector Participation (PSP)*

*Goal: To have efficient UWWS services through PSP*

The Government will create a conducive environment for the Private Sector to participate in the delivery of UWSS Services. The local Private Sector will be promoted. Existing UWSS infrastructure will be rehabilitated and capacity building undertaken to enable Urban Water Supply Authorities (UWSAs) operate commercially in order to attract Private Sector investment. To avoid monopoly and facilitate comparative competition, there shall be limitation to the number of urban centers that one private company can manage. For the purposes of PSP and to allow for economy of scale, an asset holding company may be formed for a group of urban centers.

In order to create a conducive environment for the Private Sector to participate in the delivery of UWSS Services:

(i) UWSSAs will be strengthened to attract private sector participation.
(ii) Capacity of the Ministry responsible for water to procure operators, goods and services from private sector will be strengthened.
(iii) Public campaigns to enlighten the public on objectives of PSP will be conducted;
(iv) Local private sector institutions will be strengthened.
(v) Regular assessment of private sector performance in the provision of urban water and sewerage services will be instituted.
(vi) Small scale water supply and sanitation service providers will be assessed and recognized officially.

### *4.9 Privatisation of Water Supply and Sewerage Entities in Small Urban Centres*

*Goal: To have improved water supply and sewerage services in small urban centres.*

The emphasis in UWSS delivery has been mainly in the large urban centers. Attention will also be given to the small towns where service levels are relatively low. Water Supply and Sewerage (WSS) entities in small urban centers shall be encouraged to form private liability companies or any other autonomous legal commercial arrangement. In order to improve water supply and sewerage services in small urban centers:

(i) Emphasis will be on privatising water supply and sanitation service in small towns.
(ii) Local private sector institutions shall be promoted and strengthened. Their access to credit facilities will be enhanced.

### *4.10 Monitoring and Evaluation*

*Goal : To strengthen entities in UWSS services in monitoring and evaluation.*

Monitoring helps to conduct effective management audit with the objective of analyzing, evaluating, reviewing and appraising the performance of the entity concerned. As of now there is inadequate monitoring as well as a weak Management Information Systems (MIS) within the urban sub sector. Storage and dissemination of information received through reporting and feedback are also inadequate. Information and reports are still kept in paper files despite the advent of computer technology. An up to date MIS that addresses and defines performance targets to measure operational, financial and managerial performances will be put in place. In order to have strengthened entities for monitoring and evaluation of UWSS:

(i) Performance guidelines will be reviewed,
(ii) UWSS entities' management capacity will be improved,
(iii) A computerised database at all management levels will be established,
(iv) A comprehensive reporting and feedback mechanism from each level of management will be established.

### *4.11 Accountability to the Public*

*Goal: To have accountable UWWS entities*

In the delivery of services in the urban and peri-urban areas, the entities are accountable to the customers in the sense that the customers receive reliable and adequate service

all the time and are fairly treated in tariff setting and treatment in general.

Willingness to pay, timely water and sewerage bills payment, rational and economic water use, use of economical appliances are part and parcel of accountability of the customers to their UWSS entities. Mechanisms shall be put in place to ensure that entities are accountable to their customers and that customers meet their obligations. Mechanisms shall be put in place to ensure that entities are accountable to their customers and that customers meet their obligations through:

(i) Effective consultations and information sharing with stakeholders and the general public will be enhanced,
(ii) Mechanisms for protection and safeguarding water supply and sewerage infrastructure by involving the general public will be established,
(iii) Awareness and mass education on water conservation and security will be promoted.

### *4.12 Capacity Building*

*Goal: To have efficient and sustainable UWSS services.*

Sustainable water supply and sewerage services delivery in urban areas requires building of strong institutions in terms of physical and human resources. Infrastructural capacity has to be enhanced.

Human resources development is at the heart of institutional strengthening. The Government shall ensure that entities are appropriately and properly staffed and that the staffs are adequately motivated. Women should be well represented in professional and managerial positions. Sustainable water supply and sewerage services delivery in urban areas requires building of strong institutions in terms of physical and human resources. Thus:

(i) Retooling and infrastructure capacity has to be enhanced;
(ii) Inventory of different expertise and needs-assessment will be done;
(iii) Training program will be prepared for implementation;
(iv) Succession plan for the sector staff will be developed and implemented.

### *4.13 Research and Technological Development*

*Objective: To strengthen research and technological development capacity.*

A variety of technologies are in use in the sector. Some of these technologies are not sustainable because they are costly and inappropriate for the local situation. Very little research is done in the sector. Applied research and technological development shall be promoted in this regard:

(i) Collaboration with sector stakeholders, local and international research institutions will be strengthened.
(ii) Mechanisms for coordinating and dissemination of sector research will be developed and institutionalized.
(iii) Local researchers initiatives will be encouraged.

### *4.14 Co-ordination and Collaboration*

*Goal: To have strong co-ordination and collaboration mechanisms in UWSS*

It is essential to keep stakeholders aware of sector problems, successes and needs; to encourage exchange of solutions and experiences and to provide mechanisms for joint action. Lack of co-ordination and collaboration results in duplication of efforts and misallocation of resources available. Forums for co-ordination and collaboration among entities and stakeholders will be established and strengthened.

The existing co ordination and collaboration mechanisms practised by various actors in the sector are generally project oriented. Rarely is information shared on various experiences. In order to have strong co-ordination and collaboration in UWSS:

(i) Main sector collaborators and stakeholders will be identified.
(ii) Coordination and collaboration mechanism will be developed and executed.

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## Map: River Basins in Tanzania