



THE UNITED REPUBLIC OF TANZANIA

THE NATIONAL IRRIGATION POLICY

Draft

MINISTRY OF WATER AND IRRIGATION

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FOREWORD

Irrigation development in Tanzania is critically important in ensuring that the nation attains a reliable and sustainable crop production and productivity as a move towards food security and poverty reduction.

Agriculture in Tanzania has remained unpredictable and of low productivity, this being due to the utter dependence on rainfall which is erratic, unreliable and non uniformly distributed. This dependence on rainfed agriculture have left the country tremendously vulnerable to the vagaries of weather.

It is widely accepted that, the currently increasing global warming and climate change, is having negative effects on the optimal availability of water resources for crop production world wide including Tanzania. In this regard, Tanzania needs to take advantage of utilising the identified irrigation potential area amounting to 29.4 million hectares for sustainable irrigation development.

The intervention in irrigation development has verified world wide that it boosts crop production 3-4 times than that of rainfed agriculture.

In this context, the policy is coming at a very opportune time when the whole world is being shocked with the increase in food insecurity and prices.

The overall crop production in Tanzania has been greatly affected by low effectiveness of management, operation and maintenance of irrigation schemes. In addition to that there has been unclear ownership of irrigation infrastructure at scheme's different levels, which have lead to low irrigation efficiencies and poorly maintained irrigation infrastructure.

Looking into all these occurrences, it is clearly observed that in Tanzania, ever since there have never been an irrigation policy to direct development in the irrigation sector. In this context, what was being done in this area was to thinly address irrigation in other sector policies, which categorically have impaired the performance of irrigation intervention in the country.

The need to have the National Irrigation Policy has been accorded in various Government policies and strategies like Tanzania Development Vision (TDV-2025) of 2000, National Strategy for Growth and Reduction of Poverty (NSGRP-MKUKUTA) June 2005, Millennium Development Goals (MDGs) 2002, National Irrigation Master Plan (NIMP) 2002, Agricultural Sector Development Strategy (ASDS) 2001, the Agricultural Sector Development Programme (ASDP) 2006 and Rural Development Strategy (RDS) December 2001 address irrigation interventions as having a vital input in crop production and productivity for ensuring food security and increased income.

The Government in the year 2002 prepared the National Irrigation Master Plan, which strongly emphasises the need of having the Irrigation Policy and a Legal and Regulatory Framework to oversee sustainable irrigation development.

In view of these gaps, the Government has decided to formulate the National Irrigation Policy which will ensure the direction for the implementation of irrigation interventions to ensure optimal availability of land and water resources for agricultural production and productivity to contribute effectively towards food security and poverty reduction as stipulated in the MKUKUTA.

The National Irrigation Policy has been formulated in a participatory way by involving stakeholders' representatives, which include Farmers; Local Government Authorities; Government Ministries; Government Institutions; Non Governmental Organizations; and the Private Sector through stakeholders' consultative meetings and workshops.

The National Irrigation Policy covers all relevant areas of irrigation interventions. These include: the Introduction, which covers the background of irrigation development, challenges facing irrigation development, opportunities available for development of irrigated agriculture and rationale for having the National Irrigation Policy. The Policy stipulates on its Vision, Mission and Objectives. It further considers and analyses key issues impairing irrigation development in the country covering: investment, management, promotion, production and productivity, capacity building, financing mechanism, cross-cutting and cross-sectoral issues pertaining to irrigation development and deliberates on policy directives to address the issues. The Institutional Arrangement for Policy Implementation elaborates on the stakeholders and their responsibilities in implementing the policy. The Legal and Regulatory Framework has been included to highlight inadequacies in the existing legal provisions which impact irrigation interventions that need to be addressed for accelerated and sustainable irrigation development in the country. Coordination, Monitoring and Evaluation is included in this policy to avoid duplication of efforts in irrigation interventions and assuring achievements of set milestones.

The existence of the National Irrigation Policy will subsequently be followed by the formulation of the National Irrigation Development Strategy and the Legal and Regulatory Frameworks for Irrigation. These are important tools for guidance and enforcement in the implementation of the policy.

The fact that this policy has been formulated by involving the wide spectrum of the stakeholders through a consultative process ensures its implementability. Thus the implementation of this policy is vested in the hands of all stakeholders with the Local Government Authorities taking the largest stake on implementation on the ground, whereas the Ministry responsible for irrigation interventions has the lead mandate on the technical backstopping and regulatory role. Its implementation success will also depend on the existence of the National Irrigation Development Strategy and the Legal and Regulatory Frameworks for Irrigation, which are important for enforcement.

The implementation of the policy will bring up anticipated positive results, which include:

- (i) accelerated investment and effective management in irrigation schemes;
- (ii) increased private sector involvement in service provision and investment in irrigation interventions;
- (iii) sustainable utilization of land and water resources;
- (iv) effective collaboration with other sectors including water sector through the Integrated Water Resources Management (IWRM) approach and the environmental sector through the Environmental Management Act (EMA) 2004;

- (v) reliable and sustainable crop production which will have more contribution to food security, poverty reduction and the overall economic growth of the Nation; and
- (vi) clear demarcation of the roles and responsibilities of various stakeholder in irrigation interventions in the country.

It is my sincere hope that the National Irrigation Policy with the subsequent Strategy, Legal and Regulatory Frameworks, the irrigation sector will be under a conducive environment accelerate the development of irrigation sector for the benefit of the Nation and its people.

May 2009

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DEFINITIONS

Some of the common irrigation typologies, unless otherwise specified in the text, have been defined hereunder for the purpose of this policy document:

1. ***Agricultural Water Management:*** includes all deliberate human activities designed to optimize the availability and utilisation of water for agricultural purposes.
2. ***Backyard Irrigation:*** refers to a small garden under irrigation around a house using water from domestic supply system or water harvested from roof tops;
3. ***Drainage System:*** means the series of structures and other allied infrastructures including the main, secondary, tertiary and field drainage canals necessary for the removal of excess water and salts from the irrigation scheme in order to allow effective agricultural operations and to prevent water logging.
4. ***Environmental flows:*** is the water flow within a river ecosystem or released into it necessary to ensure the sustenance of the ecological system within a river ecosystem.
5. ***Flood Recession Irrigation Schemes:*** these are the schemes established by farmers whereby crops, usually paddy, are grown on the banks of the rivers and are watered by frequent flooding of the river over the river banks.
6. ***Government:*** means the Central Government, Local Government Authorities and Village Government.
7. ***Gravity-fed Irrigation Schemes:*** these are schemes whereby farmers have diverted water from a surface water source be it a perennial, intermittent or ephemeral stream; a small, medium or large dam or any other source of water and convey it to the command area by gravity via a system of canals or closed conduits.
8. ***Hardware:*** refers to physical infrastructures developed/installed in an irrigation system for the purpose of facilitating availability of irrigation water from a water source for crop production. In a gravity flow irrigation system these include abstraction structures, conveyance structures, distribution structures, drainage structures and on-farm service roads. It also refers to stationary or movable facilities employed for supply of irrigation water in pressurised irrigation systems.

9. **Headworks:** means the engineering works constructed at the point of abstraction of irrigation water. Such works may include structures on a river stream, pumping system or works at a dam or water reservoir.
10. **Institution:** is an entity or organisation that is public or private, engaged in irrigation investment and management (in which case it is a hard institution), or policies, laws, by-laws, rules and regulations, procedures, established customs guiding water use, investments, or water allocation mechanisms (a soft institution).
11. **Institutional Arrangements:** are taken to cover the interrelated set of organisation entities, rules, incentives and cultural practices that affect or influence irrigation development and practice.
12. **Integrated Water Resources Management:** is an approach in water resources management and development which holistically considers all users of the resource upstream and downstream of the system including the ecology.
13. **Irrigation Efficiency:** is a ratio between the amount of water effectively used for crop growth to the amount diverted from the source. Scheme irrigation efficiency is obtained by combining the efficiencies in the entire irrigation scheme which include: conveyance, distribution and on-farm application efficiencies.
14. **Irrigation Potential:** means the total area which is technically feasible, economically and financially profitable, socially viable and environmentally acceptable that has been brought under irrigation, plus that which can be planned for irrigation on the basis of water availability, land availability and suitability.
15. **Irrigation Project:** means an undertaking to rehabilitate, upgrade, improve or develop an irrigation and drainage system.
16. **Irrigation Scheme:** means the area where crops are grown under irrigation through any method including flood recession; gravity or pump fed canal systems supplying either surface or groundwater; water harvesting and pressurised systems such as drip and sprinkler. Irrigation schemes include traditional schemes, rehabilitated or upgraded schemes, new smallholder investment and purely private commercial investment.
17. **Irrigation System:** means the series of structures and other allied infrastructures including the headworks, the water conveyance and distribution system, the farm

infrastructure, machinery and equipment, necessary to provide the supply of water for irrigation to a parcel of land.

18. **Irrigation:** means the application of a specific amount of water at a particular location in order to meet the requirements of a crop growing at that location in amounts that are appropriate to the crop's stage of growth. It can also mean the application of water in amounts necessary to bring soil to the desired moisture level prior to crop planting.
19. **Irrigators' Organisations:** means the organisation to accommodate the joint interests and activities of all the farmers on an irrigation scheme primarily for ensuring increased crop productivity through optimal management of irrigation water and the operation and maintenance of their scheme.
20. **Marginal Areas:** are lands that are characterised by poor agricultural productivity. They are fragile lands that are moderately or slightly degraded or prone to degradation, particularly under unsustainable regimes. These are areas where agricultural and grazing activities are limited by adverse soil and climatic conditions.
21. **Micro Irrigation Schemes:** these are schemes whereby farmers draw water from a source by hand and use it mainly for vegetables and high value crops. They include cases where water is harvested from roof tops and stored in tanks and where farmer's pond the water diverted from a stream and convey it to their fields through a piped network where it is applied to the crops through drip emitters or low pressure sprinklers (sometimes called localised irrigation). These type of schemes include those developed using the bucket drip irrigation kits or the treadle pumps.
22. **Pumped Irrigation Schemes:** these are schemes whereby water is pumped from a source which may include a river stream, a well, a borehole, a water reservoir and convey it to the command area under pressure. The method for irrigation at the scheme could be surface, drip or sprinkler system.
- 23.. **Rain Water Harvesting Irrigation Schemes:** these are schemes whereby farmers construct water retaining bunds, harvest rain water and store the water at the foot of mainly paddy crop. Despite their simple technology, such schemes are significant in production of rice in Tanzania.
24. **Small Scale Irrigation Schemes:** are the schemes with area of up to 500 ha; "**Medium Scale Irrigation Schemes**" are schemes having area between 500 ha and 2000 ha;

“Large Scale Irrigation Schemes” are schemes with areas of over 2000 ha. Although it is difficult to develop strict rules for categorising irrigation into classes based on area, the above three classes of irrigation schemes will be adopted.

25. **Smallholder farmers:** are defined as farmers owning/allocated a plot of up to 5 ha for irrigation of crops within an irrigation scheme.
26. **Software:** refers to the non-tangible aspects of an irrigation system such as irrigator(s), organisations, institutions, management, by-laws, capacity building (training).
27. **Storage dam::** is a structure built to provide a reservoir to store water from river/rivers, runoff and/or direct rainfall for flow regulation and use during the period of water shortages.
28. **Water Users Associations:** are organisations joining water users using a common source of water. They can be comprised of different water users such as irrigators, miners, livestock keepers, fisheries, hydropower producers, wildlife institutions, domestic and industries.
29. **Weir:** means any physical structure constructed across a natural or man-made channel for the purpose of raising the water level at that point in order to be able to abstract a portion of the water from the stream in a regulated and controlled manner.
30. **Wetland Irrigation Schemes:** these are the schemes developed by farmers in valley-bottoms whereby the soils are inundated by surface or ground water sufficient to support a prevalence of vegetable or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

ABBREVIATIONS AND ACRONYMS

AMCOS	Agricultural Marketing Cooperatives Societies
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
ASLMs	Agriculture Sector Lead Ministries
BWO	Basin Water Office
CBOs	Community Based Organisations
COSTECH	Commission for Science and Technology
DADPs	District Agricultural Development Plans
DITS	Division of Irrigation and Technical Services
DoE	Division of Environment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
FBOs	Faith Based Organisations
GDP	Gross Domestic Product
ha	Hectares
HIV/AIDS	Human Immuno-deficiency Virus/Acquired Immuno-deficiency Syndrome
ICID	International Commission on Irrigation and Drainage
INPIM	International Network on Participatory Irrigation Management
IOs	Irrigator's Organisations
IPTRID	International Programme for Technology and Research in Irrigation and Drainage
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
LGA	Local Government Authority
MAFC	Ministry of Agriculture Food Security and Cooperatives
MATIs	Ministry of Agriculture Training Institutes

MARIs	Ministry of Agriculture Research Institutes
MDG	Millennium Development Goals
MEM	Ministry of Energy and Minerals
MLHHSD	Ministry of Lands Housing and Human Settlement Development
MNRT	Ministry of Natural Resources and Tourism
MoWI	Ministry of Water and Irrigation
NAWAPO	National Water Policy
NEMC	National Environmental Management Council
NGOs	Non-Governmental Organisations
NIMP	National Irrigation Master Plan
NIP	National Irrigation Policy
NSGRP	National Strategy for Growth and Reduction of Poverty
NVIDP	National Village Irrigation Development Project
O&M	Operation and Maintenance
PMO-RALG	Prime Minister’s Office–Regional Administration and Local Government
PPP	Public Private Partnership
RBOs	Religious Based Organisations
RWH	Rain Water Harvesting
SACASs	Savings and Credit Associations
SACCOS	Savings and Credit Cooperatives Societies
SMST	Scheme Management Support Team
TBS	Tanzania Bureau of Standards
t/ha	Tons per hectare
TIC	Tanzania Investment Centre
TOSCA	Tanzania Official Seed Certification Agency
TPRI	Tropical Pesticides Research Institutes
UDSM	University of Dar es Salaam

VEO	Village Executive Officers
VETA	Vocational Education Training Authority
WEO	Ward Executive Officers
WUA	Water Users Association
ZIU	Zonal Irrigation Unit

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1.0 INTRODUCTION

1.1 Background

Tanzania's crop production is still very low due to a number of reasons, which include inadequate and unevenly distributed rainfall resulting into marginal use of the potential for irrigation. Irrigation practice is one of the effective means in increasing and stabilising food and cash crop production and productivity for curbing food shortages and increasing export of cash crop and its products. In this regard, a concise plan and implementation for the development of irrigation infrastructure is pertinent. Water is a central and basic natural resource, which sustains life and provides for various social and economic needs including irrigated agriculture. It is considered as a key factor in the socio-economic development and the fight against poverty. The social and economic circumstances prevailing today have increased the competition in water demands by all users and thus creating a threat in its sustainability. It therefore entails integrated planning, development and management in support of food security and poverty reduction, as well as environmental safeguards amongst others.

The Agriculture sector contributes 45% of Tanzania's GDP and about 30% of its export earnings, while employing over 80% of the nation's work-force, accordingly the sector continues to drive economic growth in the country. Despite of its importance, agriculture is very much affected by inadequacy, seasonality and unreliability of rainfall and periodic droughts. It is for this reason that irrigation is considered necessary for providing protection against drought, a means of stabilising crop production and assurance of household food security.

In response to this, Tanzania launched the National Irrigation Master Plan (NIMP) in 2002 which identified a total irrigation development potential of 29.4 million ha, of which 2.3 million ha are classified as high potential; 4.8 million ha as medium potential; and 22.3 million ha as low potential. However, only 289,245 hectares are under improved irrigated agriculture as of June 2008.

Tanzania's agriculture sector has an unprecedented opportunity to transform itself from subsistence to a modern and highly commercial sector. Irrigation has an important role to play in the realization of the primary objectives of a re-energized agriculture and water sectors. Sound irrigation development has the potential to transform the predominantly

traditional subsistence rain-fed systems into profitable, mixed scales (small, medium and large) and commercial operations.

According to the National Strategy for Growth and Reduction of Poverty - NSGRP (MKUKUTA) which is the national organising framework focusing on economic growth and poverty reduction, the rate of growth is expected to reach 10% by 2010. The NSGRP targets are in line with the aspiration of the Tanzania Development Vision 2025 for high and shared growth; high quality livelihoods; peace, stability and unity; good governance; high quality education and international competitiveness.

Tanzania is also committed to the Millennium Development Goals (MDGs) as internationally agreed targets for reducing poverty, hunger, diseases, illiteracy, environmental degradation and discrimination against women by 2015.

Tanzania has put highest priority on the development of the agricultural sector as a means to meet both NSGRP targets and Millennium Development Goals. However, the variability of rainfall, and limited amount of manmade storage dams and inadequate use of natural storage and/or interbasin water transfer from large lakes is a major constraint on agricultural productivity and rural livelihoods. This is likely to become more exacerbated in future due to climatic changes. The country's overall poverty levels have accordingly fallen only modestly between 1993 and 2003 from 41% to 39% in the rural areas where most households depend on agriculture, as compared with urban areas where poverty levels have fallen from 28% to 18% over the same period respectively. At this rate of change, Tanzania is unlikely to achieve the millennium targets of reducing food insecurity and halving poverty by 2015 without setting and implementing appropriate strategies to curb the situation.

Irrigation development is seen as an important strategy in achieving the set targets and goals. Sustainable irrigation development is a basis for improved food and livelihood security and reduction of poverty. It includes provision of irrigation infrastructure, institutional arrangements and capacity building both technical and financial that is consistent with irrigated area expansion targets and intensification; respond to the new decentralised, demand driven, service oriented paradigm; and engagement of the private sector participation in terms of investment and service delivery. Notwithstanding, the irrigation sector's high strategic potential and the priority given to its expansion, it faces considerable challenges including inadequate funding, inadequate institutional capacity, inappropriate technology and land insecurity.

It is clear that irrigated agriculture can significantly reduce key production risks associated with unreliable rainfall and hence raise farmer incomes. With developed/improved irrigation infrastructure and water management, paddy yields on an average can increase from 1.8 tones per hectare to 4.5 tones per hectare. Higher production rates can be realised. In addition, reliable irrigation service delivery can also persuade risk conscious farmers to invest in better production practices and to diversify into higher value farming systems.

1.2 History of the Irrigation Sector in Tanzania

The use of irrigation in Tanzania dates back from the Iron Age and traditional irrigation systems have long been of considerable importance in various parts of the country.

In 1930 modern irrigation was introduced in Tanganyika through the establishment of the Tanganyika Planting Company Ltd (TPC) at Arusha Chini, Kilimanjaro. After independence the farm was nationalised in the late nineteen sixties and became a subsidiary of Sugar Development Corporation (SUDECO) and subsequently was privatised in 2004 to a private investor. In 1948 a 1,000 hectare Kilangali rice irrigation farm in Morogoro Region was established by the Department of Agriculture, however it was abandoned by the Government in 1951.

In the 1950's more farmer managed traditional irrigation schemes were established by smallholder farmers whereby the Government involvement concentrated on the support in the construction of improvement works and provision of extension services to traditional irrigators by agricultural officers.

In 1953 a Royal Commission was established to examine possible measures to improve the living standards of the people in East Africa. The importance of agriculture to the vast majority of the population was acknowledged by the Commission, but more than half of East Africa was not considered suitable for intensive agriculture because of inadequate rainfall. The Commission stressed the important role that water development would have to play in the development of the farming sector; and proposed that a single Water Department of the Ministry of Agriculture in Tanganyika, become the Water Development and Irrigation Division (WD&ID). During the following decade, more than 20 small scale smallholder irrigation schemes were initiated, most of which proved to be partial or complete failures.

In 1964 WD&ID was transferred to the Ministry of Lands, Settlements and Water Development (MLSWD). During this period most of the development funds were allocated to state farms whereby only eight percent (8%) was allocated for expansion of traditional irrigation through a Smallholder Irrigation improvement programme.

In 1968 the Irrigation section was established in the Ministry of Agriculture with its Staff posted mostly to the Regional Administrations to work under the Regional Agricultural Development Officers (RADOs) to support smallholder traditional irrigators.

In 1973 WD&ID was shifted from the MLSWD to the Ministry of Water Development and Power. Shortly afterwards in 1975, the responsibility for irrigation reverted to the Ministry of Agriculture, which had no capacity for the task and WD&ID was disbanded with most of its staff remaining with the Ministry of Water and Power. In the same year the Irrigation Division was initiated.

The restructuring of the Ministry of Agriculture that took place in 1987, reduced the Division of Irrigation to a section, led by an Assistant Commissioner in a newly formed Division of Agriculture and Livestock Development. This went on until 2002 when the Ministry had to decide whether the Irrigation Section be converted into an Executive Agency (National Irrigation Agency - NIA) or elevate it to a Division. Thus, in 2002 the Irrigation Section was elevated to a Division of Irrigation and Technical Services with three sections. In March 2008, the Division of Irrigation and Technical Services was transferred to the newly formed Ministry of Water and Irrigation.

Since the establishment of the Irrigation Division in the Ministry of Agriculture in 1975, the office of its Headquarters has changed several times (six times) and mostly due to inadequate office space, the Division had to occupy more than one building with distant locations. This has caused irrigation staff at the Headquarters with their working facilities shifting and working under different roofs and thus unable to grow into a single and settled homogenous team of technical staff, which has invariably contributed to low performance.

1.3 Performance of the Irrigation Sector in Tanzania

As indicated in the history of irrigation in the country, improvement of traditional irrigation schemes started during the pre-independence and was extended during the post independence

period, but with a low pace of development. Most of the irrigation schemes that received improvement support, their performance gradually deteriorated due to inappropriate system design, ineffective management, low irrigation efficiencies and poor operations and maintenance, which resulted into their abandonment.

The performance of irrigated agriculture in the country from the 1960s to the 1980s in developmental and operational context is reported with inadequate achievement. In the 1960s targets of developing irrigated area of 10,000 ha by 1970 and a further 10,000 ha, spread over the entire country be developed each year were set. This period was characterised by unrealistic and weakly coordinated planning resulting in slow development of new irrigation schemes with the achievement of only 2,600 ha by 1970. The rate of development after 1970 lagged behind the set targets, because of low impetus by the Government until 1974/75 when the country was faced with a serious drought that resulted in a major food crisis. During the same period, the Government was implementing the decentralisation reforms which created a vacuum in institutional capability for irrigation development. To address the situation, the Government enhanced that capability for irrigation development within the Regional Authorities in the period from 1975 to 1979 which resulted into intensified irrigation activities in most regions of the country. However, the regional programmes were not successful because they were poorly planned, under-staffed, under-equipped and under-financed.

Development goals were revised between 1980 and 1985 emphasizing on the rehabilitation and upgrading of village irrigation schemes (National Village Irrigation Development Project-NVIDP) around the country varying in size from 200 to 2,000 ha and a target of 150,000 ha was set. Under the overall supervision of the headquarters irrigation department, technical support units were established at six zonal irrigation units in 1981, each comprising of three to four regions for the purpose of complementing the capabilities at the Regional Authorities in the implementation of irrigation development. The implementation of the number of programmes that were started with external support was slow because of limited resources and few trained and experienced staff in the entire set up for irrigation development.

The strategy in the 1980s, for full rehabilitation of traditional irrigation schemes and the construction of new high input/output modern schemes in both the parastatal and smallholders proved expensive and unsuccessful with respect to the country's policy objectives during that period.

The rate of development of new irrigation schemes began to pick up from 1985 with the start of several other irrigation schemes development projects through external support. However, despite the increased activities, the performance of these schemes was below expectations. Among the reasons for this low performance are the following:

- i) absence of irrigation policy;
- ii) absence of vital irrigation data for planning purposes;
- iii) inadequate resources on the part of the government, e.g. funds and trained irrigation personnel;
- iv) absence of national irrigation investment criteria;
- v) lack of a national coordination for irrigation developments;
- vi) Reliance on sophisticated irrigation techniques, which demand heavy investment, highly trained manpower and a big component of foreign exchange; and
- vii) Poor planning of irrigation projects, particularly smallholder traditional irrigation schemes.

During the period from 1986 to 1995, the irrigation sector received major institutional capacity building support from external development partners particularly at the headquarters division level and at the established zonal irrigation units.

The Government launched a major irrigation development plan in 1994 with the objective of firstly addressing effectively constraints to the development of the sector which included inter alia: sector policy review and monitoring and sectoral coordination, institutional capacity building, planning and management, information systems and research, beneficiaries involvement, cost recovery and commercialisation and secondly set targets for infrastructural improvement of 147 irrigation schemes in the timeframe to the year 2014. By 1997 the division had recruited 92 professional staff and 197 technical staff of various disciplines, but because of limited practical experience, most of them had not achieved adequate capacity and confidence to operate effectively.

By the year 2002, only 30 % of the activities for removal of constraints had been achieved and only 60 irrigation schemes out of the set target were implemented. In this period the objectives of infrastructural development had not been satisfactory.

In the same year the National Irrigation Master Plan (NIMP) was launched with the intention to align the irrigation sector to contribute more effectively to agricultural productivity and profitability. The master plan identifies the total potential area for irrigation development in Tanzania to be 29.4 million ha with varying potential levels whereby 2.3 million ha, 4.8

million ha and 22.3 million hectares are of high, medium and low potentials respectively.

For the period starting from 2000/2001 to 2004/2005, seventy five (75) irrigation schemes of an area of 27,470 hectares and six (6) dams commanding 860 hectares were implemented. The cumulative area developed under irrigation by 2001/2002 was 191,900 hectares, which apart from other crops produced, paddy production reached 767,600 tons; in 2002/2003 the area reached 200,895 hectares producing 803,580 tons of paddy; in 2003/2004 area developed reached 227,486 hectares with the production of 909,944 tons of paddy. In 2004/2005 it was expected to achieve a cumulative developed area of 254,610 hectares, with 1,018,440 tons of paddy, however the achievement was only 249,992 hectares. In 2005/2006 it was envisaged to develop 18,000 hectares, but the achievement was only 14,396 hectares making a cumulative area of 264,388 hectares. During the year 2006/2007, the target was to develop 10,000 hectares of which the achievement was 9,557 raising the cumulative developed area to 273,945 hectares. The target set to develop irrigation area during the period of 2007/2008 was 27,500, however only 15,300 hectares were developed, thus making a cumulative area developed by June 2008 to be 289,245 hectares. The targets were not achieved due to inadequate resources.

Rice is by far the predominantly irrigated crop in Tanzania, but sugar-cane, tea and coffee have importance as industrial crops. The bulk of rice produced is locally consumed although considerable amounts are exported to neighbouring countries. Typical rice yield have increased from an average of 1.8 – 2.0 tons per hectares to as high as 4.0 – 5.0 tons per hectares on improved traditional and new smallholder irrigation schemes, whereas on the previously parastatal owned farms, yields reached as high as 8 tons per hectares. However, parastatal farms have been privatised due to high insupportable operational costs.

The main reasons for poor performance were inappropriate provisions in irrigation policies; inadequate political and financial commitment of the government in irrigation development in the past years; inadequate appropriate manpower; low commitment of beneficiaries and poor planning of irrigation projects particularly traditional irrigation schemes. In addition to that, the private sector was not adequately involved in irrigation development.

1.3.1 Traditional Irrigation Schemes

Traditional irrigation schemes are characterised by poor infrastructure, poor water management and low yields. Crop yields are typically in the range of 0.8 - 1.0 t/ha and 1.8 - 2.0 t/ha for maize and paddy respectively. The existing infrastructures starting from the headworks up to the fields are all temporal, poorly constructed and pose difficulty in overall

water management resulting to low water use efficiencies. This contributes substantially to water losses and overall poor performance of these schemes. Due to poor water management and absence of drainage infrastructure, salinity and water logging problems are common in some traditional irrigation schemes.

1.3.2 Rain Water Harvesting (RWH) Irrigation Schemes

Most rain water harvesting based irrigation schemes are found in the arid and semi-arid areas of central and western part of Tanzania. Such schemes involve either direct tapping of rain water in bunded fields or diversion of rainwater run-offs from seasonal and ephemeral rivers. Farmers who are irrigating using RWH techniques which are diversion of runoff or ponding rainwater in bunds, suffer from poor infrastructure for diverting harvested water and lack control of water in the bunds. They also suffer from unreliable rainfall. As a result they are characterised by poor water management and low yields or complete crop failure.

1.3.3 Improved Irrigation Schemes

Government support has been directed to improvement of traditional irrigation schemes by mainly improving the irrigation infrastructure and organizing the beneficiaries into formally registered entities. These schemes have permanent structures and facilities for irrigation, drainage and flood protection and have been designed with full water control and measurement to assist in water delivery and management.

The performances of improved irrigation schemes have gradually improved in terms of water management, water use efficiency and crop yields. For example, paddy yields of up to 10 t/ha have been achieved by some smallholder farmers, however average yields of 4.0 to 5.0 t/ha only are common.

1.3.4 Large Scale Commercial Irrigated Farms

In the past, the private sector which was engaged in commercial irrigated farming particularly for coffee, tea and sugarcane performed well until they were nationalised in the 1970s. Their irrigation systems were well built and maintained with relatively higher water use efficiencies. The performance of large-scale irrigated farms that were established as Parastatals for the production of rice, tea and sugarcane declined until they were privatised in the 1990s. Other privately owned estates in the horticultural and floricultural industry which emerged in the late 1990s are performing well with higher water use efficiency.

Private sector involvement covers not only the investment and management of the commercial farms and estates, but also includes the provision of support services and facilities. In recent years the contribution of the private sector which is engaged in service provision for irrigation equipment particularly water pumps, drip and sprinkler equipment, has had significant impact to the sector. Service provision for construction and consultancy remains below expectations. Although the private sector is increasingly becoming stronger and important in turning the development into successful business, it is confronted with inadequate incentive schemes such as assurance of land ownership, water availability and accessibility and leveraging mechanism for investment.

1.4 Constraints of Irrigation Development and Management in Tanzania

Since the dependency on rain-fed agriculture has led to low production and productivity, reliance of the country on irrigated agriculture is inevitable. However, there are crucial constraints facing the irrigation sector, which the Government shall address so as to realize the envisaged targets.

These constraints include:

- i) Inadequate funding for irrigation investments;
- ii) Low capacity and participation of private sector in irrigation development;
- iii) Low level of irrigation skills of the farmers;
- iv) Low production and inefficient marketing systems;
- v) Inadequate institutional capacity at national level with respect to planning, implementation and sustainable management of irrigation development in Tanzania;
- vi) Inadequate capacity of institutions at Local Government Authority level (LGA) to handle irrigation investments, implementation and sustainable management;
- vii) Low Agricultural Water Use Efficiency;
- viii) Ineffective and inefficient control of irrigation water which limits the application of the principles of Water Markets and Socio-Economic Mobility of Water use permit;
- ix) Lack of legal and regulatory framework for irrigation development;
- x) Lack of proper agricultural land use and management plans;

- xi) Inadequate irrigation production support services that is supported by research and technical innovation;
- xii) Inadequate farm power for various farm operations;
- xiii) Inadequate data base for irrigation development;
- xiv) Inadequate attention to drainage;
- xv) Inadequate storage of water for irrigation;
- xvi) Competing demand for water with other users such as Hydropower, domestic use, livestock and wild life); and
- xvii) Changes in river flow patterns as a result of catchment degradation and climatic changes.

1.5 Opportunities for Irrigation Development in Tanzania

The National Irrigation Master Plan has identified potential area for irrigation development as 29.4 million hectares. The country has high potential of surface as well as ground water resources. For the purpose of effective management, planning and development of the water resources, the country is divided into nine water basins namely: Rufiji, Pangani, Ruvuma, Wami/Ruvu, Internal Drainage, Lake Rukwa, Lake Nyasa, Lake Tanganyika and Lake Victoria. These basins hold all the surface and groundwater in the country for all uses of water, including irrigation.

There is a great opportunity for market for crops produced through irrigated agriculture in the country. This is due to the increasing population which is at an average national rate of 2.8% (2002), change of eating habit of most of Tanzanians towards more consumption of rice which requires more water to grow. There is a potential of more supply demand of irrigated crop especially rice from the neighbouring countries and the Eastern, Central and Southern African Region as a whole, which are not endowed with high irrigation potential. Furthermore, Tanzania's location is geographically strategically placed for easy and convenient export outlets to external markets.

Existence of the institutional set up with qualified personnel with different disciplines related to irrigation such as Irrigation Engineers, Sociologists, Soil Scientists, Water Resources Engineers, Hydrologists, Environmentalist, Agronomists, Economists, Land Surveyors, Mechanical Engineers, and Irrigation Technicians. However, the number of personnel is inadequate.

The Government is now giving high priority to irrigation development which is emphasized within the National policy frameworks. The Government is also giving high priority to the management of the nation's water resources. This offers strong synergies with irrigation development.

1.6 Rationale for the National Irrigation Policy

Ever since, there had never been a policy specifically for irrigation interventions in the country. Alternatively, there have been other policies covering inadequately irrigation issues. The Agricultural and Livestock Policy of 1997 provided an overall direction for irrigation development with specific emphasis on improvement of traditional irrigation schemes, support to water harvesting irrigation schemes, private sector involvement and support for water users associations or cooperatives. This policy although accommodates irrigation issues it has a number of shortfalls that could not cope with the ongoing government reforms.

The Government of Tanzania is now giving higher priority to irrigation as a reliable strategy for food and cash crop production. This is reflected in reforms that have taken place including the preparation of the MKUKUTA which emphasizes overall increase in irrigation assets; ASDS which provides strategy for agricultural production and productivity; National Irrigation Master Plan which provides a framework for planning of irrigation development and ASDP which provides the demand-driven investment strategy for the sector.

Other reforms include the formulation of the National Water Policy (NAWAPO-2002) and the emerging Water Resources Management Bill which recognise irrigation as a dominant consumptive user of Tanzania's water resources accounting for about 85% of the total water withdrawals. The National Water Policy was prepared, in part as a response to the growing water use conflicts, especially in the Pangani and Rufiji basins, most of which involve irrigation. The Environmental Management Act (EMA) of 2004 which requires irrigated agriculture under specific obligations to protect the land, surface and groundwater resources and the community; the Land Policy which does not provide adequate legal protection for irrigated land and the Decentralisation policy which calls for institutional capacity building and strengthening at the Local Government Authority level for effective planning and implementation of demand-driven irrigation development. All these have gaps that need to be addressed under the National Irrigation Policy.

It is therefore clearly justifiable having a National Irrigation Policy (NIP) which reflects the implemented national reforms as well as the agricultural policy environment described above. Specifically the NIP aims at addressing policy directions to guide effective growth of the

sector in terms of equipped irrigated area and productivity levels, for effective contribution of the irrigation sector to food security and poverty reduction. The NIP provides effective enhancement of accelerated private sector investment in irrigated agriculture and specifies appropriate management of irrigation assets and institutional capacity building and strengthening at all levels.

Rain-fed agriculture is affected by the vagaries of weather (droughts and floods) and will become exacerbated by climate changes that impact significantly on both the national economy and the vulnerability of smallholder farmers to food insecurity. Furthermore, food security and agricultural development are closely linked to availability and utilisation of land and water resources. Due to increasing pressure of population on food supplies, expansion of cultivated land and/or crop intensification particularly for irrigated agriculture is eminent. Tanzanian farmers are facing serious low crop production as a result of over dependence on rainfall which is inadequate and erratic. Irrigation development is therefore one of the means to solve this problem and will continue to be an important intervention for increased crop production for food security and economic growth.

Self sufficiency in food production enhances the national sovereignty freedom and security. It also allows the nation to have an opportunity to spare more resources for planning and implementing development interventions to its people. National food self sufficiency from within, renders the country's safety against importation of unsafe food staffs.

Tanzania's agricultural sector faces a great and comprehensive opportunity to transform itself from being traditional and predominantly subsistence into a modern, strong commercial sector. The NIP, and subsequently the National Irrigation Strategy and the Legal Framework are required to unequivocally establish the national contributions of irrigation both in terms of macro-economic output and poverty reduction.

The NIP provides a vision and step-wise prioritisation of irrigation development in the country and research with reference to the NIMP. It leads towards the legal establishment of a Financing Mechanism for irrigation interventions that will cater for both Local and National Levels, which are invariably important for sustainable irrigation development in the country. The NIP also defines the roles and responsibilities of different institutions and their relationships with the District level planning process and thereby delineating institutional responsibility for different levels of irrigation interventions, especially the national, zonal irrigation units and district.

2.0 THE NATIONAL IRRIGATION POLICY

2.1 Vision

A sustainable and dynamic irrigation sector that is a driving force in transforming agriculture into a stable, highly productive, modernised, commercial, competitive and diversified sector which generates higher incomes; increases food security and stimulates economic growth.

2.2 Mission

To facilitate a participatory demand driven irrigation development through Integrated Water Resources Management to enhance water use efficiency for increased and sustainable agricultural production, productivity and profitability to ensure food security, poverty reduction, and national economic development.

2.3 Objectives

2.3.1 Main Objective

The main objective is to ensure sustainable availability of irrigation water and its efficient use for enhanced crop production, productivity and profitability that will contribute to food security and poverty reduction.

2.3.2 Specific Objectives

- i) To accelerate investment in the irrigation sector by both public and private sector players;
- ii) To ensure that Irrigation Development Funds are established with a legal status;
- iii) To promote efficient water use in irrigation systems;
- iv) To abide by the Integrated Water Resources Management approach in irrigation development;
- v) To ensure that irrigation development is technically feasible, economically viable, socially desirable and environmentally sustainable;
- vi) To ensure reliable water for irrigation so as to facilitate optimisation, intensification and diversification of irrigated crop production to supplement rainfed crop production effectively;

- vii) To ensure demand driven, productive and profitable irrigation development models that are responsive to market opportunities;
- viii) To strengthen institutional capacity at all levels for the planning, implementation and management of irrigation development;
- ix) To empower beneficiaries for effective participation at all levels in irrigation planning, implementation, operation and management;
- x) To strengthen technical support services, develop and disseminate new practices, innovations and technologies; and
- xi) To mainstream cross cutting and cross sectoral issues such as gender, HIV/AIDS, environment, health, land and water in irrigation development.

2.4 Issues, Objectives and Policy Statements

2.4.1 Investment for Irrigation Development in Tanzania

Irrigation practice in Tanzania is characterised by reliance on the run-of-the river water abstractions for gravity-fed irrigation schemes; inadequate investments in water storage infrastructure; inadequate capacity of farmers to invest in the infrastructure for their traditional irrigation systems; low level of funding by the Government for irrigation investments; low rate of investment in irrigated agriculture by the private sector; inadequate capacity of the private sector to participate in irrigation development and informal and insecure land ownership rights which sometimes is not well defined.

2.4.1.1 Traditional Irrigation Schemes

a) Unimproved Traditional Irrigation Schemes

Issues

Unimproved Traditional Irrigation Schemes in the country rely on the run-of-the river abstraction and gravity flows with the irrigation infrastructures in the state of temporal, poorly constructed and thus poses difficulty in water abstraction and overall water management, with low irrigation efficiencies. The schemes have informal, weak and inefficient irrigators' organisations, inadequate skills on operation and maintenance resulting

in low water use efficiency as well as inadequate environmental consideration during the planning and implementation stages. This contributes substantially to water losses and overall poor performance of these systems. In the absence of drainage infrastructure, and efficient water management, cases of salinity and water logging have occurred in some of the irrigation schemes.

Objective

To improve both the hardware and software aspects of the traditional irrigation systems for achieving a reliable irrigation water supply and raising the water utilisation efficiency.

Policy Statements

The Government will:

- i) continue to support the improvement of traditional irrigation schemes infrastructures and software;
- ii) encourage the private sector, NGOs, CBOs, FBOs and other stakeholders to support the improvement of the irrigation infrastructures and software;
- iii) promote awareness for the beneficiary contribution to the improvement of their irrigation scheme infrastructures; and
- iv) train farmers on irrigation techniques covering water management and support district staff to ensure improved agronomic practices.

b) Improved Traditional Irrigation Schemes

Issues

Improved Irrigation schemes are schemes originally initiated and operated by smallholder farmers that have received interventions by an external agency in the form of construction of a new diversion structure, gated canal intake, water division boxes and other farm related structures. The layout of the irrigation canals and drainage system is well defined. These schemes have high initial investment cost; heavy equipment required for construction and maintenance. Some of these are characterised by weak and inefficient irrigators' organisations, inadequate skills on operation and maintenance resulting in water use inefficiency as well as inadequate environmental consideration when planning and implementing irrigation schemes.

Objective

To promote reliable irrigation water supply and high water use efficiency for increased production, productivity and profitability.

Policy Statements

The Government will:

- i) promote and encourage Public Private Partnership (PPP) in the development of improved and new irrigation schemes;
- ii) promote development of improved and new irrigation schemes on the basis of demand driven, cost sharing and cost recovery;
- iii) provide technical facilitation for farmers to form Irrigators Organisations for management of their irrigation schemes as a step towards commercialisation and participation in the market economy;
- iv) in collaboration with other stakeholders provide assistance at the planning, designing and supervision of construction works of these irrigation schemes;
- v) set standards to ensure that irrigation development will only take place where demand is clearly articulated and that the scheme involved can be shown to be a beneficial, effective, efficient and competitive user of water resources;
- vi) ensure that irrigation development is undertaken in tandem with all social and environmental issues;
- vii) raise awareness on the existing irrigation potential and on the rights and responsibilities of irrigators utilising it;
- viii) support the establishment of a mechanism that will identify potential irrigation investments with special emphasis on those that could attract private sector investors and/or progressive smallholder farmers;
- ix) continue to encourage nucleus estate/out-grower or contract farming modalities and support the momentum gained in the coffee, sugar-cane and cut-flower sectors as well as the flower industries.

2.4.1.2 Rain Water Harvesting Irrigation Schemes

Farmers in the marginal areas of Tanzania which are mainly in the regions of Dodoma, Singida, Manyara, Tabora, Shinyanga and parts of Mwanza, Mara and Arusha have introduced simple techniques of harvesting rainwater to artificially control the availability of water to crop.

a) Unimproved Rain Water Harvesting Irrigation Schemes

Issues

Unimproved Rain Water Harvesting Irrigation Schemes in the country rely on the abstraction of rainwater runoff and conveyance by gravity to farms or direct capturing of rainfall (insitu RWH) into small bunded basins using traditional techniques. The small bunded basins storage facilities are sometimes inadequate for the intended crop growth, as such there is a great need for construction of small, medium or large dams. Other backyard rainwater harvesting techniques are being used, but these are relatively new to the country and are taking place in only a few pilot areas.

The schemes have informal, weak and inefficient irrigators' organisations, inadequate skills on operation and maintenance resulting in water use inefficiency as well as inadequate environmental consideration during the planning and implementation stages. This contributes substantially to water losses and overall poor performance of these systems. In the absence of drainage infrastructure, and efficient water management, cases of salinity and water logging have occurred in some of the irrigation schemes.

Objective

To ensure reliable water supply for water harvesting irrigation schemes.

Policy Statements

The Government will:

- i) support the improvement of traditional water harvesting infrastructures and software;
- ii) promote the development of small, medium and strategic large scale water storage structures and/or interbasin transfers of water in an economically efficient, socially acceptable and environmentally responsive manner; and

- iii) promote beneficiary awareness for the contribution to the improvement of their water harvesting irrigation scheme infrastructures.

b) Improved Rain Water Harvesting Irrigation Schemes

Issues

Improved Rain Water Harvesting Irrigation Schemes are schemes that received support for improvement but are characterised by poor location of intake sites, ineffective abstraction structures and poorly constructed earthworks. Most of them need provision of storage facilities to ensure reliable water supply to the schemes.

Some of these schemes have weak and inefficient irrigators' organisations, inadequate skills on operation and maintenance resulting in water use inefficiency as well as inadequate environmental management capacity which contributes substantially to water losses and overall poor performance of the schemes.

Objective

To ensure effective performance of improved RWH schemes for increased and stable production, productivity and profitability.

Policy Statements

The Government will:

- i) support the rehabilitation, remodeling and upgrading of improved RWH irrigation schemes on the basis of cost sharing and cost recovery;
- ii) support development of water storage facilities to ensure reliable water supply;
- iii) provide technical facilitation for farmers to strengthen Irrigators Organisations for improved management of their irrigation schemes; and
- iv) support in the implementation of environmental management plans.

2.4.1.3 New Irrigation Schemes

The Government has identified that there is available land, water and human resources for development within the 29.4 million hectare of the potential irrigable land. The challenge is the overall planning and development of this potential from the smallholders perspective and effective involvement of the private sector for the utilisation of the potential.

a) Smallholder (small scale, medium and large) Irrigation Schemes

Issues

The identified irrigation potential has not been accurately and exhaustively mapped and demarcated. The demand-driven based process for identification of irrigation potential requires to be aligned with the identified irrigation potential. Although farmers may demand development of their irrigation schemes they lack irrigation skills, and therefore, will require substantial training in the overall development, operation and management techniques on irrigation interventions.

Participatory approach techniques have to be applied in order to inculcate farmers' sense of ownership, commitment and responsibility for their irrigation schemes. There will be a challenge to introduce the cost sharing and recovery mechanisms.

Objective

To ensure optimal expansion of area under irrigated agriculture for smallholder farmers and enhancement of their sense of ownership.

Policy Statements

The Government will:

- i) promote the demand-driven irrigation scheme identification;
- ii) undertake mapping and demarcation of the potential land for new irrigation schemes development;
- iii) provide assistance for the development of the area targeted for irrigation expansion in collaboration with other stakeholders;
- iv) assist in the mobilisation, training and organisation of smallholder farmers for new irrigation schemes;
- v) support in the management of newly developed irrigation schemes; and
- vi) establish effective cost sharing and recovery mechanism.

b) Commercial (small scale, medium and large) Irrigation Schemes

Issues

The identified irrigation potential has not been accurately and exhaustively mapped and demarcated. Most of the new potential areas are characterised by remoteness and difficulty in accessibility and marketing facilities. Lack of primary infrastructures subject the area to require high initial capital investment costs. These being new areas for irrigation development, they lack land title deeds and water use permits and thus there is need for making arrangement for their acquisition by the targeted beneficiaries. The financial institutions available have difficult conditions and terms to facilitate credit to potential investors in irrigated agriculture.

Objective

To ensure optimal expansion of area under irrigated agriculture for commercial irrigation farming by the private sector.

Policy Statements

The Government will:

- i) promote the demand-driven commercial irrigation scheme identification;
- ii) undertake mapping and demarcation of the potential land for new commercial irrigation schemes development;
- iii) create an enabling environment for private sector participation in expanding irrigated agriculture;
- iv) ensure integrated planning for development including infrastructural requirements for ease of marketing systems; and
- v) encourage the financing institutions to provide support for investment in commercial irrigated agriculture.

2.4.1.4 Existing Commercial Irrigation Schemes

Issues

There are some existing commercial irrigation schemes including those established for the purpose of seed production which are operating. However, they are constrained with

inadequate water supply, poor access roads and marketing facilities. Some face problems in accessing credit facilities for rehabilitation, remodelling or expansion. In some of the existing large scale commercial irrigation farms, the inhabitants in the vicinity are not provided with the existing opportunity of the neighbourhood as out-growers to benefit the available facilities for farming practices, agricultural inputs and post harvest facilities.

Objective

To provide a conducive environment to the existing commercial irrigation schemes and the out-growers for a sustainable increased crop production and productivity.

Policy Statements

The Government will:

- i) support the existing commercial irrigation schemes in need of more irrigation water to solicit for other possible sources;
- ii) ensure integrated planning for development including infrastructural requirements for ease of communication, accessing new technologies for irrigation development and marketing systems;
- iii) encourage the financing institutions to provide support for investment in commercial irrigated agriculture;
- iv) encourage water saving technologies in large scale commercial irrigation schemes; and
- v) encourage the existing commercial irrigation schemes management to allow out-growers benefit from the existing facilities of their farming practices and post harvest processes.

2.4.2 Management of Irrigation Schemes

Generally most irrigation schemes in Tanzania have management problems which include poor operation and maintenance of the infrastructure, poor leadership, inadequate skills on the part of farmers on the management of irrigation schemes and poor on-farm water management. There is therefore a great need for applying integrated water resources management at scheme level as well as beyond the scheme level.

2.4.2.1 Traditional, Improved and Water Harvesting Irrigation Schemes

Issues

Management of community based irrigation schemes in Tanzania has evolved from traditional management systems established through farmer representations in committees or group leadership structures. Each member has specific roles and functions in the management of their irrigation scheme. However, their contributions for operation and maintenance are usually below the actual requirement amounts. The membership for these organisations is free and open to all people using that particular irrigation scheme.

The management of these irrigation schemes are characterised by problems relating to leadership capacity, organisational skills, inadequate capacity to maintain the irrigation infrastructure and the legal framework through which the organisations have been established.

Objective

To have an effective and sustainable management system for operation and maintenance of the traditional, improved and Water Harvesting irrigation schemes.

Policy Statements

The Government will:

- i) support capacity building for irrigators organisations for effective management of irrigation schemes;
- ii) ensure that all farmers owning land in irrigation schemes, form irrigators organisations for the management of the schemes whereby all farmers will be members;
- iii) ensure that, when there is a need to transfer land from one farmer to another, formal transactions are made so that the new owner/tenant becomes fully responsible for the management of the land and associated irrigation infrastructures; and
- iv) promote the management of irrigation infrastructure by service providers in the private sector where farmers have demonstrated inadequate capacity.

2.4.2.2 Large Scale Irrigation Schemes

Issues

Large scale irrigation schemes owned and managed by smallholder farmers face ineffective management due to their size and sophistication, which requires higher level of management expertise and discipline to follow the set by-laws for efficient management which are not available in the farmers' organisations.

Large scale irrigation schemes owned by private investors after the privatisation process could suffer inefficiency in management due to non compliance on the agreed objectives.

Objective

To ensure effective and sustainable irrigation management in large scale irrigation schemes for increased crop production, productivity and profitability.

Policy Statements

The Government will:

- i) ensure that smallholder farmers in large scale irrigation schemes form strong and effective farmers' organisations capable to operate the schemes;
- ii) provide its competent staff to form Scheme Management Support Units as a transitional measure while the farmers through their organisations are getting experience to take over the responsibilities;
- iii) ensure a Public Private Partnership (PPP) arrangement instituted for effective Operation and Management of large scale smallholder irrigation schemes.
- iv) ensure that the private investor in a large scale irrigation farm abide by the Governing Laws and Regulations;
- v) ensure that a conducive environment is created for the investors including access to marketing facilities;
- vi) encourage the Private investors owning large scale commercial irrigation schemes to propagate the benefits of their existence to the out-growers; and

- vii) Provide a mechanism for public institutions such as the National Service, prisons and Seed Farms to propagate the benefits of their existence to the out-growers.

2.4.3 Irrigation Research and Development

Issues

Despite the well elaborated importance of irrigated agriculture for crop production, productivity and profitability to the farmers in particular and the nation at large, appropriate interventions including research are not yet adequately pursued in those areas. There is little research undertaking in irrigation for ensuring proper planning, design, development, management and operation and maintenance of irrigation schemes, consequently there are scanty appropriate recommendations that integrate water and other resources relevant to irrigated agriculture. Due to shortage of Irrigation Research Scientists, inadequate funding and lack of appropriate irrigation research facilities and equipment, research activities undertaken by research and academic institutions in the country do not adequately address irrigation issues. Few research activities undertaken have largely been academic in the sense that practical problems facing irrigation schemes and farmers are not addressed to provide required technological support for improvement of productivity and profitability. Tangible benefits from irrigation development will be accrued if improvements in irrigation infrastructure go hand in hand with improvement in water management, production practices and adoption of new technologies for irrigation.

Objective

To introduce and strengthen research on irrigation development and management whose findings will contribute towards attainment of optimal irrigation efficiency, provision of information on new and appropriate technologies for irrigation practices that lead to more crop production and productivity in irrigated agriculture in a sustainable way.

Policy Statements

- i) ensure that research in irrigation is initiated and sustained with a focus on enhanced performance of irrigation interventions;
- ii) support and coordinate irrigation research for irrigation development, with the aim of improving land and water productivity in a sustainable manner;

- iii) ensure that research findings are properly documented for the purpose of utilisation of the already compiled technical information;
- iv) promote and institutionalise a mechanism for coordination and dissemination of research findings; and
- v) initiate and strengthen irrigation research collaboration with relevant stakeholders, which includes local and international research institutions.

2.4.4 Promotion of Appropriate Technologies in Irrigated Agriculture

Issues

The adoption of appropriate technologies with higher efficiency on irrigation water use, which have emanated from research findings on irrigation improvement and new innovations on the irrigation infrastructure have not adequately been adopted by irrigators. Technologies such as drip and sprinkler irrigation methods; use of ground water for irrigation and use of appropriate sources of energy (non conventional) such as wind mills, solar power and draught-animal power are not widely used in Tanzania. This is due to non awareness to farmers. This calls for awareness creation to the users on their availability and utilisation. Moreover, there is no compensation provision in cases where natural disasters occur and affect irrigation infrastructures and crops.

Objective

To create awareness to all stakeholders in irrigation development on appropriate technologies, innovations and protecting irrigated agriculture for increased crop production, productivity and profitability.

Policy Statements

The Government will:

- i) promote the use of appropriate technologies and innovations by practitioners for irrigation development;
- ii) ensure accurate assessment on the quantity, quality and location, and advocate the use of ground water potential in all nine river basins;
- iii) institutionalise a mechanism for irrigation farmers affected by natural disasters leading to damage of their irrigation infrastructures and crops be able to access compensation; and

- iv) in collaboration with other stakeholders, promote indigenous knowledge for the development of irrigation.

2.4.5 Production and Productivity in Irrigated Agriculture

Issues

Production and productivity in most irrigation schemes is generally below the expectation. For smallholder traditional irrigation schemes crop production is very low with typical maize and rice yields being 0.8 - 1.0 tons per hectare and 1.8 - 2.0 tons per hectare respectively. Average rice yields of 4.0 – 5.0 tons per hectare are being realised by some smallholder farmers in improved irrigation schemes. Some farmers in well managed improved irrigation schemes have harvested up to 10 tons per hectare. The inefficient methods of land preparation and cultivation where the use of hand hoe is dominant contributes to low production and productivity. The challenge is how to raise crop production with restricted resources of land and water, finance, agricultural inputs and support services. Irrigated agriculture is also constrained by other production practices, storage facilities, marketing, water management, adequate crop protection and adoption of appropriate technologies for irrigation.

Objective

To increase crop yields and production per unit volume of water and per unit area under irrigation through sustainable, economically viable and ecologically sound crop protection measures in irrigated agriculture.

Policy Statements

The Government will:

- i) in collaboration with the private sector ensure timely availability of agricultural machinery and inputs;
- ii) in collaboration with non-state actors ensure effective extension services;
- iii) promote on-farm application of research findings on new and appropriate technologies developed which enhance crop husbandry and agronomic practices towards more crop production and productivity;
- iv) promote the production of high value crops;

- v) in collaboration with other stakeholders support the development of infrastructures including those for processing, storage, and market linkages; and
- vi) advocate on application of appropriate measures for integrated pest management.

2.4.6 Institutional Capacity

The existing institutions responsible for irrigation development in Tanzania are characterised by inadequate establishments; inadequate and weak data base; low skills and awareness on the roles and responsibilities of the stakeholders; inadequate financing; weak enforcement of by-laws; inadequate equipment, facilities and number of qualified staff and absence of irrigation legal framework. Linkages between relevant institutions are weak and their respective roles and responsibilities are not clearly defined to the detriment of effective irrigation development.

2.4.6.1 National Level

Issues

The mandate to oversee the development of irrigated agriculture is vested within the Ministry responsible for irrigation development. However the present institutional set up of the irrigation division does not meet the demand of the fast growing irrigation sector. There is no legally established irrigation regulation to control the quality of irrigation interventions. There is inadequate number of qualified staff in all levels and relevant professions, inadequate financing and inadequate equipment and facilities. There is also no elaborate plan for provision of short tailor made and long term training arrangements. All these contribute to low capacity at the national level.

Objective

To have a capacitated institution whose performance is effective and efficient in irrigation development and management in the country.

Policy Statements

The Government will:

- i) Establish an effective institutional set up and coordination mechanism for the irrigation sector;
- ii) ensure establishment and enforcement of irrigation legislation;
- iii) ensure adequate number of qualified staff at the national level are available to oversee irrigation development in Tanzania;
- iv) in collaboration with other stakeholders ensure timely availability of adequate financing, provision of required equipment and facilities for irrigation development;
- v) ensure that irrigation staff are provided with appropriate training on short and long term basis;
- vi) strengthen the mechanism for irrigation data collection and management for effective planning, implementation and management of the irrigation interventions;
- vii) strengthen the institutional arrangements such as the Zonal Irrigation Units for effective technical backstopping of the LGAs before they gain adequate capacity in irrigation development;
- viii) capacitate institutes providing training for irrigation technicians and related fields to produce qualified graduands capable to support irrigators in water management; and
- ix) capacitate institutions of higher learning to continuously provide appropriate training to ensure adequate number of qualified graduands in relation to irrigation.

2.4.6.2 Local Government Authorities

Issues

The main roles of the district in the irrigation development are the implementation of irrigation interventions. These include identification of irrigation schemes; planning and designing; construction; and operation and maintenance of irrigation schemes. However, the districts are characterised by inadequate qualified irrigation professional staff, inadequate data base, skills gaps, lack of awareness on the roles and responsibilities of the stakeholders, inadequate financing, weak enforcement of by-laws, inadequate equipment and facilities to undertake irrigation development. Further more the position of the District Subject Matter

Specialist for irrigation is too far below in the district organisation structure as he/she reports to the District Extension Officer who in turn reports to the District Agricultural and Livestock Development Officer who is under the District Executive Director.

The Government has established some technical capacity at the ZIUs which is an opportunity for the LGAs to utilise, however it is not effectively utilised. In the absence of private sector capacity at the LGAs level, the ZIUs will bridge the gap.

Objective

To provide sound technical backstopping to the LGAs and strengthen their capacity for effective implementation of irrigation development.

Policy Statements

The Government will:

- i) improve and upgrade the status of the District Subject Matter Specialist for irrigation to the level of District Irrigation Office;
- ii) ensure recruitment of qualified professional staff for the District Irrigation Office to be managed by an Irrigation Engineer;
- iii) ensure that irrigation staff are provided with appropriate training on short and long term basis;
- iv) provide adequate funding, equipment and facilities for effective implementation of irrigation interventions;
- v) ensure that districts establish Irrigation Scheme Management Support Teams (SMST) at the scheme level for effective scheme management;
- vi) ensure availability of sound technical backstopping to LGAs;
- vii) support the LGAs to ensure formulation and enforcement of irrigation by-laws;
- viii) support the districts to establish and maintain irrigation data base and link to the national data base; and
- ix) ensure that village leadership strongly supports Irrigators Organisations in irrigation interventions.

2.4.6.3 Irrigators Organisations

Issues

Irrigators' organisations participate in scheme development/improvement, collection and management of irrigation service charges and operation and maintenance of irrigation schemes. However, they have limited funds, limited capacity in financial management, weak leadership, and limited capacity for enforcement of the by-laws. Irrigators' organisations also have limited capacity for ensuring effective and sustainable crop production in irrigation schemes.

Objective

To have strong irrigators' organisations for effective development and management of irrigation schemes.

Policy Statements

The Government will:

- i) strengthen the Irrigators Organisations to ensure effective management of their irrigation schemes;
- ii) ensure Irrigators Organisations establish clear irrigation service fee collection mechanism;
- iii) ensure Irrigators Organisations are equipped with the required skills for effective and sustainable crop production;
- iv) ensure that all irrigators' Organisations are legally established and registered;
- v) support irrigator's organisations in the formulation and enforcement of by-laws;
- vi) promote formation and operation of SACAs, SACCOS and AMCOS to improve irrigators financial capacity;
- vii) ensure that all farmers owning land in irrigation schemes are members of irrigators' organisations; and
- viii) ensure that farmers' transfer of land in irrigation schemes to another farmer, whether on temporary or permanent basis is done formally to ensure proper responsibility on farm management for sustainability.

2.4.6.4 Farmers/Irrigators

Issues

In irrigation schemes irrigators identify problems and opportunities associated with their schemes. They participate in the implementation of scheme interventions and are responsible for operation and maintenance of their schemes. However, most of them have limited knowledge of operation and maintenance of irrigation schemes; low awareness on the need to pay water user fees and the willingness to pay these fees is low. Most irrigation schemes have no clear ownership demarcation of the land parcel under irrigation which deprives farmers the opportunity to use it as collateral in financial institution for obtaining required finances for their operations. The ownership of irrigation schemes which are operated communally have to be under the custodian of the irrigators organisation which will take the responsibility of guaranteeing irrigators to financial institutions for obtaining required credits for their operations and development.

Objective

To have irrigators who are conversant with their roles and responsibilities for effective management of irrigation schemes.

Policy Statements

The Government will:

- i) ensure that awareness is created among irrigators on their roles and responsibilities in initiation, implementation and management of their irrigation schemes;
- ii) ensure that farmers are trained on the general O&M requirements of their irrigation schemes;
- iii) support the Districts to ensure that farmers understand on the importance to pay water user fees and O&M fees; and
- iv) support the Districts to ensure clear scheme ownership rights by the irrigators' organisations and the individual irrigators.

2.4.6.5 Private Sector

Issues

The participation of Private Sector in construction, consultancy services, support services and management in irrigation development in Tanzania is very low. Despite the desirability of involving them the capacity to provide such services to the irrigation sector is limited. On the other hand, the private sector has been sceptical in investing in large scale commercial farming due to high initial capital investment requirement for irrigation infrastructure, doubt on the security to the right on land ownership and reliable water use permit.

The challenges with respect to this sector include attraction and engagement of the private sector as investors (in both service delivery and large scale commercial irrigated farming), and the nature of partnership arrangements for PPPs in irrigation development.

Objective

To have an effective participation of the private sector in irrigation interventions.

Policy statements

The Government will:

- i) continue to have dialogue with the private sector on matters related to irrigation development in Tanzania;
- ii) create an enabling environment for effective private sector participation in irrigation development; and
- iii) ensure establishment and updating of irrigation databank in collaboration with Tanzania Investment Centre for potential investors.

2.4.6.6 Non-Governmental Organisations (NGOs)

Issues

A number of NGOs are already active in Tanzania's irrigation sector. The operations of the majority of these NGOs are financed by a range of sources including the Government and its Development Partners. However, despite of this and the wide range of services that NGOs could potentially provide to the sector, particularly to smallholder farmers, there are still not

many NGOs that have the necessary capacity or technical competence in irrigation interventions. More over, the existence of most of the NGOs and the range of their areas of operation are not well known by the beneficiaries.

Objective

To have effective participation of NGOs in the irrigation sector without compromising the quality of end results of the irrigation interventions.

Policy Statements

The Government will:

- i) continue to facilitate registration and establishment of an effective coordination mechanism of NGOs that are interested in irrigation interventions;
- ii) ensure that NGOs work in close collaboration with LGAs in the implementation and backstopping matters related to irrigation development;
- iii) ensure that districts support services demonstrated by NGOs in irrigation interventions; and
- iv) ensure that NGOs are performing to the required standards when dealing with irrigation interventions.

2.4.7 Financing Mechanism

Issues

Despite the known importance of irrigation for boosting agricultural production and productivity in the country, which is endowed with a vast irrigation potential, relatively very little area has been developed under irrigation. The requirement for initial investment in developing irrigation infrastructure is relatively larger amount of financial resources compared to other interventions in agricultural development. The best period for construction of irrigation infrastructure is the dry season which in Tanzania is mainly from June to October. This best period does not coincide with the financial cycle of the Government which begins in July ending up in June, whereby between mid-June and end of August the Government budget is under discussion by the Parliament and thus no funds are made

available until sometimes in end of September. On the other hand, most of irrigation schemes are constructed by private contractors with the construction period, normally requiring more than one year, on average between two to three years. Thus signed contracts between the Government and the private contractors for such works which legally bind the two parties, are equally effective for more than a year. This means once construction works have commenced, payments to the contractor have to be made available quantitatively and timely throughout the contract period as the payment certificates are raised by the contractor. Short of that the client becomes liable for payment of interest and beyond that, legal actions for payment delays results to the disadvantage of the Government. With the existing situation, the requirement of funds for irrigation development have not been coinciding with the financing sources in terms of quantity and timeliness as inadequate and untimely disbursement has been a rule of thumb.

Objective

To have a financing mechanism for irrigation interventions at both levels of national and local, whereby adequate funds will be made available from all relevant financing sources on a timely basis to ensure that targeted implementations are achieved and value for money is observed.

Policy Statements

The Government will:

- i) ensure that, funds for irrigation interventions are made available adequately and timely throughout the execution period;
- ii) create an enabling environment that attracts different financiers, internally and externally to finance irrigation interventions;
- iii) ensure that appropriate irrigation development Funds are established with a legal status at both the local and the national levels; and
- iv) ensure that value for money is seriously considered during the planning, financing and implementation process for irrigation interventions.

2.4.8 Cross-sectoral Issues

2.4.8.1 Water Resources

Issues

Water is becoming increasingly scarce locally with respect to the demands placed upon it. The opportunity cost of Tanzania's raw water is increasing, especially in many of the areas considered to have irrigation development potential. The use of water for productive purposes which include irrigation is an essential requirement for poverty alleviation and food security. However, irrigation practices in Tanzania are characterised by low water use efficiency, low water productivity and absence of a mechanism for exercising socio-economic mobility of water and over dependency on surface water as a major source for irrigation development. In addition, irrigation also happens to be one user that has been in the centre of most water use conflicts amongst themselves and/or with other users. All water users which include farmers need to understand their obligations with regard to the use of water as stipulated under the National Water Policy and the Water laws. Different water users viz a vis irrigators, miners, livestock keepers, fisheries, hydropower producers, wildlife institutions, domestic and industries using a common source of water if not well organised under a Water Users Organisation can easily be subjected to water use conflicts as a result of inequitable water allocations.

Objective

To have optimal utilisation of water allocated for irrigation development and a mechanism for exercising the socio-economic mobility principles of water.

Policy Statements

The Government will:

- i) promote improved management practices and the use of technologies with a high water use efficiencies;
- ii) promote development of water storage facilities for irrigation purposes.
- iii) promote irrigation of high value crops with high employment generation and added value potential;
- iv) encourage the practice of socio-economic mobility principles of water in irrigation development.

- v) Create awareness on water management implication and responsibilities regarding regulation of water use; and
- vi) Facilitate organisation and formulation of entities such as Water Users Associations (WUA) for water users within a common catchment or sub-catchment to oversee equity distribution of the resource and its sustainable management at that level.

2.4.8.2 Land

Issues

The land tenure system plays an important role in the establishment of self-reliant and sustainable irrigation development. Most of the cultivated area is held by small-scale smallholder farmers who hold it through customary right of occupancy and most of them are unaware of the importance of land registration for title deeds. Most of the arable land is categorised as village land and some as general land. However, land administration procedures are not streamlined to the extent that the granting of title deeds is painstakingly slow. This situation discourages potential investors from investing into medium and large scale irrigated agriculture. On the other hand, land can become waterlogged or chemically compromised as a result of poor irrigation and drainage. Moreover in most cases land earmarked or developed under irrigation has no protection against conversion into other uses.

Objective

To have all irrigation potential area and irrigated land clearly demarcated and registered.

Policy Statements

The Government will:

- i) facilitate the demarcation and registration of all irrigation potential area and irrigated land;
- ii) ensure the establishment of agricultural land use plans;
- iii) promote appropriate farming systems which conserve soil and water;
- iv) accelerate the process of issuing the certificate of customary land ownership rights;
- v) ensure that title deeds are provided to all developed irrigation schemes; and

- vi) provide security for land developed for irrigated agriculture against encroachment and/or conversion to other uses.

2.4.8.3 Public Health and Safety

Issues

There are issues of environmental health and public safety which will be addressed when planning or authorizing irrigation investments. These include water borne diseases and vector borne diseases, the risks of which increase significantly when irrigation is introduced to a hitherto drier area, especially where awareness to water users is low. There is also a danger of increased flood risk especially where drainage provisions are inadequate. Besides, there is HIV/AIDS which not only has the potential to weaken a schemes' workforce, but also could increase in the locality of irrigation schemes as a result of the influx of seasonal workers and crop traders.

Objective

To have irrigation schemes with none or minimal health risks and safe environment.

Policy Statements

The Government will:

- i) create awareness on public health risks such as malaria, bilharziasis, typhoid, worms, HIV/AIDS etc. associated with irrigated agriculture and provide preventive measures that are available to mitigate or avoid such risks; and
- ii) ensure that designs of irrigation schemes take into consideration safety measures for flood control and other natural disasters.

2.4.9 Cross-cutting Issues

2.4.9.1 Environment

Issues

Irrigation can lead to negative environmental impacts. These may result right from the initial stage of construction, rehabilitation activities or from crop cultivation and irrigation practices.

They can affect water quality, sanitation and erosion and create water use conflicts through reduction in downstream water flows which sometimes neglect consideration of environmental flows.

Inappropriate water use practices and the resulting degradation threaten the sustainability of ecosystem, human health, food security and productivity; and constraint investment in various social and economic sectors.

Another fundamental problem is that inappropriate land use practices can result into accelerated run-off, reduced groundwater recharge, soil erosion and increased sediment transported by rivers and silt accumulation in reservoirs and irrigation systems.

Objective

To have irrigation systems which are environmentally sound.

Policy Statements

The Government will:

- i) ensure that Environmental issues are addressed in all irrigation interventions in accordance with Environmental Management Act (EMA) 2004;
- ii) in collaboration with non-state actors promote irrigation development in a way that protects and conserves water and land sources;
- iii) establish mechanism for pollution control in irrigated agriculture; and
- iv) in collaboration with the Ministry responsible for agriculture, promote and ensure proper land use practices.

2.4.9.2 Gender

Issues

Women play major roles in rural economic development especially in developing and practising irrigated agriculture but are hampered by low level of social status in the community, illiteracy, low entrepreneur skills, inadequate access to productive resources and services. The concept of equity access to water or irrigated lands and decision making is a challenge which has to be addressed. Participation of both women and men in irrigation development will be encouraged to include the most vulnerable groups.

Objective

To have active and effective participation of both women and men in irrigation development.

Policy Statements

The Government will:

- i) encourage a fair representation of both women and men in irrigators organisations;
- ii) promote effective participation of both women and men in initiation, planning, implementation and operation and maintenance of irrigation schemes;
- iii) facilitate awareness raising, training and empowerment of women to actively participate at all stages in irrigation development; and
- iv) ensure that women and vulnerable groups have equal access to water, land, productive resources and support services for irrigation development.

2.4.9.3 HIV/AIDS

Issues

Public health risks associated with the practice of irrigation include HIV/AIDS. This is more pronounced in areas with large scale commercial farms which attract interaction of many people, thus making them more vulnerable to HIV/AIDS pandemic. The level of the effect is not under rated in rural areas where small scale irrigation farming is dominant. As a consequence in both cases, the reduction of manpower that is required on the intensified activities in an irrigation scheme results.

Objective

To mitigate risks associated with HIV/AIDS in irrigation development.

Policy Statements

The Government will:

- i) collaborate with other stakeholders to make Irrigators fully aware of the public health risks accruing to HIV/AIDS and measures that are available to mitigate or avoid such risks; and

- ii) support establishment of physical measures necessary to minimise health and safety risks at irrigation schemes.

3.0 INSTITUTIONAL ARRANGEMENT FOR POLICY IMPLEMENTATION

3.1 Roles and Responsibilities at Different Levels

3.1.1 National Level

The implementation of the National Irrigation Policy is vested in hands of various stakeholders including the Government, the private sector, the academic institutions and the civil society organisations. The Ministry responsible for irrigation development has the lead mandate for the implementation of the National Irrigation Policy.

The Ministry will determine policy orientation, development and from time to time, review the policy and legislation, prepare conducive environment for sectoral coordination and integration. It will take into account the availability of different legal and regulatory frameworks and standards which depend on legislation, regulations and procedures for irrigation development. This policy recognises different sectoral policies, as they are important in achieving its objectives. The implementation of this policy will be harmonised with other sectoral policies and coordinated with the work of different stakeholders interested in the development of the irrigation sector.

The Ministry will provide technical services to the Local level through the Zonal Irrigation Units (ZIUs). The Zonal Irrigation Units will undertake awareness raising, advisory services to Regional and Local Government Authorities (LGAs), Irrigators Organisations (IOs) and the private sector on all aspects of irrigation development, capacity building of IOs and LGAs. They will also provide technical backstopping on studies and detailed designs of irrigation infrastructure, preparation and processing of tender documents for irrigation schemes, construction and supervision of irrigation infrastructure, service provision to the users of irrigation investments and advisory services to private sector in irrigated agriculture.

The ZIUs will in collaboration with the Basin Water Offices (BWOs) promote Integrated Water Resources Management in the basins. The former will also strengthen linkage and coordination with Agricultural Training Centres, Research Institutions, extension/advisory services and linkages with the private sector.

3.1.2 Local Government Authorities (LGAs) Level

In accordance with the local government reforms, LGAs will play an increasingly important role in the implementation of the National Irrigation Policy. The LGAs have been given responsibilities of developing and implementing irrigation development interventions by outsourcing expertise from ZIUs, the private sector and NGOs. LGAs have a major role of assisting farmers in the overall process of irrigation schemes identification, implementation and management. The LGAs will be responsible for the preparation and enforcement of irrigation by-laws, establishment and maintenance of database for irrigation development. Furthermore, the LGAs will be responsible for the training of staff and irrigators on issues related to irrigation development.

3.1.3 Ward Level

The Ward level has an important role in the implementation of the National Irrigation Policy, as it stands as a linking body between farmers and the district level. The requests from the farmers for irrigation intervention by the district have to be verified by the Ward Development Committee (WDC) before submission to the district.

3.1.4 Village Government Level

The Village Government plays an important role in the implementation of the National irrigation Policy. The Village Government is an overall overseer of all development plans and implementation at that level. As such farmers requests for irrigation interventions requiring support from the higher level are invariably approved by the Village Council for further steps.

3.1.5 Irrigators Organisations

Irrigators Organisations (IOs) are the lowest appropriate level of management of irrigation schemes. The main functions of these organisations include management, distribution and conservation of water for irrigating their schemes; acquisition of the Water Use Permit from the respective Basin Water Offices; resolution of conflicts among members of the organisations related to the joint use of a water resource and collection of water charges for operation and maintenance and payment of water user fees to the Basin Water Offices.

The Irrigators Organisations have other responsibilities which include planning of interventions on their schemes; the implementation of agreed and supported interventions, management and control of resource allocations for implementation of their planned investments and procurement of essential services for irrigation development. They are also

responsible for establishment of SACAs, SACCOs and AMCOS for capacitating and empowering farmers.

3.1.6 Irrigation Farmers

The irrigation farmers are the direct beneficiaries of the policy as they are the implementers of the irrigation farming practices in the field. They are, therefore, strategically involved through the participatory approach in all activities including schemes selection, designing, construction and at the end commissioning before entering into the operation and maintenance stage. The private sector has an important role to contribute in the development of the irrigation sector, in this regard they are more relevant in investing in medium and large scale commercial irrigated agriculture.

3.2 Roles and Responsibilities of Different Actors/Stakeholders

Irrigation development interventions draw together a number of stakeholders from all levels with different roles, responsibilities and interests. In order to achieve a sustainable development, it is important to understand the obligations and concerns of each actor and their linkages to the irrigation interventions. There are Key and Non-Key Stakeholders.

3.2.1 Key Stakeholders

Key stakeholders include the Agriculture Sector Lead Ministries (ASLMs), Development Partners and irrigation farmers. The ASLMs consist of (i) Ministry responsible for Water and Irrigation; (ii) Ministry responsible for Agriculture Food Security and Cooperatives; (iii) Ministry responsible for Livestock Development and Fisheries; (iv) Ministry responsible for Trade Industry and Marketing; and (v) Prime Minister's Office, Regional Administration and Local Government.

The ASLMs have the mandate of creating a conducive environment for implementation, coordination and supervision of the implementation of irrigation development as stipulated in this policy and the associated legal framework and legislation.

3.2.1.1 Ministry Responsible for Water and Irrigation

The Ministry responsible for Water and Irrigation (MoWI) has a leading role in the implementation of the National Irrigation Policy in all aspects including collaboration with

MAFC in monitoring the development of irrigation. The Ministry, from time to time, will review the policy and legislation, prepare a conducive environment for sectoral coordination and integration, and will take into account the availability of different legal and regulatory frameworks and standards which depend on legislation, regulations and procedures for irrigation development.

Furthermore, the Ministry has a role in the development and management of water resources, coordination in the preparation of integrated water resources management plans and coordinating planning and designing of dams and in promoting rational allocation of water with prescribed conditions attached to formal water use permits.

3.2.1.2 Ministry Responsible for Agriculture Food Security and Cooperatives

The Ministry responsible for Agriculture Food Security and Cooperatives has a big role in the implementation of the National Irrigation Policy due to the fact that development of irrigation interventions leads to high crop production and productivity. The Ministry will collaborate with the Ministry responsible for Water and Irrigation to determine policy orientation and to prepare a conducive environment for sectoral coordination and integration.

3.2.1.3 Ministry Responsible for Trade Industries and Marketing

Development of irrigation interventions leads to high crop production and productivity. For the farmers to realize more profit from their produce, more demand for agro-processing and marketing system will result. The Ministry is therefore responsible for formalising agricultural marketing systems, promoting agro-processing industries, promoting standard packaging of farm produce and products and identifying opportunities of markets locally, regionally and internationally.

3.2.1.4 Prime Minister's Office - Regional Administration and Local Government

The principal function of PMO-RALG is to coordinate the execution of irrigation interventions as part of agricultural development. The Regional Secretariat has a role to coordinate irrigation development in the region by ensuring eligibility and compatibility of investment proposals by the districts with regional development plans and adherence of district plans to the National Policies and strategies. The Local Government Authorities are responsible for the implementation of irrigation development in their jurisdictions. This involves identification, selection and planning of irrigation schemes for development through the District Agricultural Development Plans (DADPs). Furthermore, the districts are responsible for procurement of services for the implementation of irrigation development at

the local level. They are also responsible for mobilisation of funds, provision of equipment, facilities, recruitment and training of staff; assisting farmers in the formation and strengthening of Irrigators Organisations and management of irrigation schemes. At the lower level the Village Executive Officers (VEO) and the Ward Executive Officers (WEO) have a role of mobilizing and sensitizing the community on sustainable use of water for irrigation.

3.2.1.5 Ministry Responsible for Livestock Development and Fisheries

The Ministry responsible for Livestock Development and Fisheries has got a role in the implementation of the National Irrigation Policy through the promotion on the use of draught animals in irrigated agriculture, planning and demarcation of grazing areas in relation to irrigation schemes. The Ministry has got a role to collaborate in the development of pasture irrigation and multipurpose dams including aquaculture. This is also strategic in avoiding conflicts between the farmers and livestock keepers.

3.2.1.6 Development Partners

Development Partners in Tanzania have been intensively involved in all key areas of interventions that are covered in this policy. They have been providing assistance in terms of funding and technical aspects in different interventions to achieve the set objectives and propel the economy of the country into sustainable growth. It is therefore, expected that development partners will continue to support development of the irrigation sector.

3.2.2 Other Stakeholders

The second category of stakeholders includes ministries, academic and research institutions, Government Institutions, Non-Governmental Organisations (NGOs) and International Organisations whose responsibilities involve specific and cross cutting issues related to irrigation development. These include the following: Ministry responsible for Finance and Economic Affairs; Public Service Management; Ministry responsible for Lands Housing and Human Settlements Development; Ministry responsible for Infrastructure Development; Ministry responsible for Community Development Gender and Children; Ministry responsible for Justice and Constitutional Affairs; Vice President's Office - Division of Environment; Ministry responsible for Natural Resources and Tourism; Ministry responsible for Energy and Minerals; Ministry responsible for Health and Social welfare; Ministry responsible for Labour, Employment and Youth Development; Ministry responsible for Education and Vocational Training; Ministry responsible for Home Affairs;

Academic and Research Institutions; Tanzania Investment Centre; Non-Governmental and International Organisations. Their roles and responsibilities are as indicated hereunder.

3.2.2.1 Ministry Responsible for Finance and Economic Affairs

The role of the Ministry is to provide development planning at macro level and coordinate sectoral development plans including those of irrigation development. It is also responsible for timely mobilisation of adequate financial resources for implementation of irrigation interventions to cope with contractual obligations of the Government and suitable season for construction of irrigation infrastructure. Further more it is responsible for auditing financial expenditures.

3.2.2.2 Public Service Management

The success in the implementation of this policy is very much dependent on the availability of staff in terms of quantity and competence at national and Local Government Authority levels. This will be achieved through recruitment of appropriate staff by the Public Service Department.

3.2.2.3 Ministry Responsible for Lands Housing and Human Settlements Development

The Ministry has to collaborate with the Ministry responsible for irrigation development in ensuring that the irrigation land is well identified and demarcated for security. The Ministry is required to issue title deeds to the owners of all developed and improved irrigation schemes. Smallholder irrigation schemes require title deeds to bring them to the status of being considered as collaterals for soliciting loans from financing agencies. For medium and large scale commercial irrigation schemes, title deeds are important for attracting the private sector to invest in irrigated agriculture.

In case irrigation development requires resettlement of people particularly in dam construction, the MLHHSD will facilitate the resettlement process.

3.2.2.4 Ministry Responsible for Infrastructure Development

Apart from on-farm service roads within the irrigation schemes, good road network from the level of trunk roads, rural roads and feeder roads is a necessity for improving irrigation development, supply of inputs and marketing of farm produce. The road-network in the country has to be enhanced by the Ministry responsible for Infrastructure Development to improve accessibility to markets by the farmers and service providers, attract private investors to invest in agricultural sector and attract more people especially youths to remain

in rural areas and hence reduce the number of rural-urban migration. With improved road-network throughout the country, the accessibility to and from the irrigation schemes will also be enhanced.

3.2.2.5 Ministry Responsible for Community Development Gender and Children

The Ministry responsible for Community Development Gender and Children has a stake in the implementation of the National Irrigation Policy through its responsibility of ensuring community empowerment, gender mainstreaming in development interventions. The Ministry shall ensure equitable access to benefits accruing from irrigation interventions to all gender and vulnerable groups.

3.2.2.6 Ministry Responsible for Constitutional Affairs and Justice

The Ministry responsible for Constitutional Affairs and Justice has a vital input in the implementation of this policy through reviewing and providing legal opinion related to tender documents and contract agreements necessary for executing irrigation development.

3.2.2.7 Vice President's Office

The National Irrigation Policy has to be implemented closely with the Vice President's Office, particularly the Division of Environment (DoE) for issues requiring integration of environmental and social concerns. In collaboration with the National Environmental Management Council (NEMC), irrigation development at all levels will be implemented in conformity with the set laws and regulations on environmental and social issues to ensure sustainability of the development. The Division of Environment is a coordinator of policy issues of social and environmental concern, whereas NEMC is an enforcer.

3.2.2.8 Ministry Responsible for Natural Resources and Tourism

The Ministry has an important role in the implementation of this policy as most of the water sources for irrigation development originate from forestry/conserved areas which are managed by the Ministry responsible for Natural Resources and Tourism (MNRT). Further more irrigated land close to the protected areas usually shares water with wildlife from a common source. There is a need of having a coordination mechanism for the implementation of this policy to ensure sustainability and harmony amongst the users.

3.2.2.9 Ministry Responsible for Energy and Minerals

The Ministry responsible for Energy and Minerals (MEM) has a responsibility of ensuring the availability of electrical power in the country which is mostly harnessed from water

resource. Hydropower generation is considered as a non-consumptive user of water, however where hydropower generation points are situated in the downstream of irrigated areas, it poses hindrance of water use by other users upstream including irrigated agriculture and consequently resulting into water use conflicts. To avoid this situation, during the planning process for hydropower development, the Ministry has to coordinate with the Ministry responsible for the development of irrigated agriculture to ensure optimal allocation of the water resource for both hydropower and irrigation development and management including other water users. Similarly, the MEM has to collaborate with the Ministry responsible for irrigated agriculture and other stakeholders in the holistic planning of future hydropower generating points to ensure construction of multipurpose dams through the integrated water resources management approach and consideration of produced power being used in pumping irrigation water and post harvest processes.

3.2.2.10 Ministry Responsible for Health and Social Welfare

The Ministry responsible for Health and Social Welfare has a stake in the implementation of the National Irrigation Policy through its responsibility of ensuring community awareness and prevention of water borne diseases and HIV/AIDS at all levels and provision of social and health facilities to communities in irrigation schemes.

3.2.2.11 Ministry Responsible for Labour Employment and Youths Development

Since irrigation interventions are targeting to have commercial agriculture with high productivity and profitability the Ministry responsible for labour employment and youth development has a responsibility to ensure that youths are made aware on the opportunities for employment through the irrigation interventions. More over the Ministry has to empower youths to effectively utilise the opportunity. This will contribute significantly to the efforts of reversing the rural-urban migration of the youths in search of employment.

3.2.2.12 Ministry Responsible for Education and Vocational Training

The Ministry responsible for education and vocational training has a stake in the implementation of the National Irrigation Policy. The Ministry has a responsibility of incorporating irrigation development and practice in their curriculum so that irrigation knowledge is inculcated to the pupils and students right from their early ages.

3.2.2.13 Ministry Responsible for Home Affairs

Irrigation farmers have been opting to register their Irrigators Organisations either under the Ministry responsible for Cooperatives as Cooperative Societies or the Ministry responsible

for Home Affairs as Irrigators Associations. Therefore the Ministry responsible for Home Affairs has a stake in the implementation of this policy regarding the registration of Irrigators Associations.

3.2.2.14 Academic and Research Institutions

There are several academic and research institutions in the country which are relevant for the implementation of the National Irrigation Policy. These include: Sokoine University of Agriculture (SUA), University of Dar es Salaam (UDSM), Ardhi University, Dar es salaam Institute of Technology, Ministry of Agriculture Training Institutes (MATIs), Ministry of Agriculture Research Institutes (MARIs), Water Development and Management Institute (WDMI), Tanzania Official Seed Certification Agency (TOSCA), the Tropical Pesticides Research Institutes (TPRI), Tanzania Bureau of Standards (TBS), Commission for Science and Technology (COSTECH), Vocational Education Training Authority (VETA) and the like. Their roles in relation to irrigation interventions are in the areas of training, research, crop marketing and certification of inputs and equipment.

3.2.2.15 Tanzania Investment Centre

Tanzania Investment Centre has an important role to play in the implementation of this policy as an entry door for investors intending to invest in irrigated agriculture. The Centre maintains data and information on the opportunities available and modalities for such investment. It will also play a role in the process of promoting and advertising the areas available for investment.

3.2.2.16 Non-Governmental Organisations and International Organisations

The policy implementation also requires the complementary input from Non-Governmental Organisations (NGOs) including Faith Based Organisations (FBOs) and Community Based Organisations (CBOs). They play an important role in irrigation development particularly in the provision of knowledge, information, capacity building and mobilisation of resources at the grass-root level. They will provide independent forums for establishing dialogue between irrigators and the LGAs.

The policy also recognises the benefits accruing from membership and participation in regional and international irrigation based organisations. The government will establish close working relationships with international institutions such as the International Programme for Technology and Research in Irrigation and Drainage (IPTRID), International Commission on

Irrigation and Drainage (ICID); the International Network on Participatory Irrigation Management (INPIM), International Water Management Institute (IWMI) and International Rice Research Institute (IRRI).

3.2.2.17 Private Sector

The private sector has an important role to contribute in the development of the irrigation sector. The private sector is responsible for providing services in construction, consultancy, production, operation and maintenance of irrigation facilities and equipment, processing and marketing in order to develop the irrigation sector. Furthermore, the private sector has the responsibility for investing in commercial irrigated agriculture. The private sector will also take up responsibility in the provision of most of the public services such as extension, research and training and providing opportunities for employment.

4.0 LEGAL AND REGULATORY FRAMEWORK FOR ACCELERATED DEVELOPMENT OF THE IRRIGATION SECTOR

4.1 Objective

The objective of the legal and regulatory framework is to have a clear and effective legal and regulatory framework for accelerated development of the Irrigation Sector in Tanzania.

4.2 Existing Legal and Regulatory Framework Guiding Irrigation Development

The existing legal and regulatory framework guiding irrigation development is vested in widespread legal provisions enacted in a number of legislations. Basically, legislation for water and land rights, form an important reference for legal framework for irrigation development.

Water is a scarce and finite resource that is shared among different sectors and there are various statutory instruments regulating water resources development and management. The existing legal framework for land administration and management complies with various laws which in many respects impacts on the irrigation sector development. There is one thing in common that, both land and water legal regimes consider the two resources to be public goods with regulatory roles vested to the executive bodies of the State.

Irrigated agriculture is a consumptive user of water. The relationship between the Government and water users including irrigators requires an elaborate legal framework and legislation. In addition to that, the necessary technical support, needs to be clearly defined in legal terms for irrigation development to achieve sustainable development in terms of participatory irrigation development and management.

Existing legislation impacting on irrigation does not ensure sustainability in irrigation activities by the fact that irrigation being a non domestic user appears to be less important with environmental impact on the high side. On the other hand, the development of irrigation is also affected by inadequate coordination of irrigation activities within the relevant sectors. Water related legislations impose responsibilities on water regulatory authorities (government agencies) to construct and maintain water works. By definition, under Water Works Ordinance, water works include irrigation infrastructure which is constructed by the irrigation sector. However, the irrigation sector is not defined under the relevant water laws to qualify for water authority with mandates to undertake regulatory functions over water resources including construction and supervision of irrigation projects as it is currently done. Given the fact that in the actual practice, a separate institution/department not qualifying as the water authority within the ambits of water legislation is involved and responsible for construction and management of irrigation projects, it implies that the existing water laws may be of more relevance for regulation and management of water resource other than that meant for the development of irrigation sector. This fact is authenticated when considering the fact that

water users for irrigation which involves a lot of investment in construction, are only required to pay for water use fees but not for the costs of operation and maintenance.

With a guaranteed investment through Government and Development Partners' support, still the sustainability of irrigation projects seems to depend on the Government management interventions as opposed to the beneficiaries' initiatives and involvement. In the existing legislations in other sectors which have influence on irrigation, there are no provisions that bind the farmers as beneficiaries of irrigation schemes supported for development or improvement to get effectively involved in the entire process of irrigation interventions.

The institutional structure for water and land management as provided in the relevant laws provide for inadequate representation of irrigation beneficiaries in decision making. There is a weak coordination of activities of various bodies charged with water and land resources management to the effect that it may be difficult to have a clear demarcation of responsibilities of each and every institution at either central or local level. For example, there is no specific representation of the irrigation sector at the national advisory/regulatory bodies established for water resource management in the proposed Water Resource Bill i.e. Water Resources Committees and Council. The power of the water sector authorities to allocate water and grant water use permits do not vest right to the holder of water permit to complain for compensation in case there is none supply of water on the time or prescribed quantity.

The fact that there is more than one authority vested with the mandates to prescribe or impose water rates/tariffs charges is a duplication of powers in the legislation. These authorities include the Minister responsible for Water, Water Regulatory Authorities established under Water Works; Basin Boards pursuant to the Water Utilization (Regulation) Act; EWURA and Local Authorities. There is also duplication of functions in regulatory instruments regarding water and agricultural land management. Under the laws, agriculture activities and water resources management seems to be statutory issues whose management and regulations are vested to both the Central Government through its Ministries or agencies and the local authorities through Districts Authorities without clear demarcation of responsibilities. Clear mandates and responsibilities need to be aligned for irrigation development.

The National Water Policy (NAWAPO), 2002 addresses the need to involve private sector in water resource management. However, the existing legal framework does not sufficiently cover the mechanisms of promoting and strengthening capacities of Irrigators Organisations. While the Water Resource Management Bill empowers the Water Users Associations to collect user fees on behalf of the Basin Water Board, the law does not allow the associations to impose the penalty to the users who fails to pay the service charges or utilizes the collected fees for their sustainability. The WUAs mentioned in the NAWAPO are important as they should be encompassing all Water Users Groups or organizations within a water catchment or basin. These organisations include but not limited to Irrigators Organisations, Livestock keepers and Mining practitioners with a common interest in a catchment or basin. The Irrigators Organizations being members of the WUA could ensure integrated water resources management approach while planning, constructing and managing irrigation systems. Though WUAs play a pivotal role in performance of the irrigation sector, the existing legal system

does not provide for how the existing or future constructed schemes would be operated and managed by the beneficiaries and the role of the local authorities within the area to enable sustainability of the schemes and ensure effective Operation and Maintenance.

The existing water legislation does not specifically include procedures to be followed by the Irrigators Organisations in carrying out operation and maintenance activities of the irrigation system. Instead, there are general mandates of construction and repair of water works vested to the Water Authorities established under Water Works or specific legislations such as Dar es Salaam Water Supply Authority Act. The legislation is silent as far as accountability of water users and government agencies involved in water resource management. The legal framework for the water resource also does not expressly provide for a fully decentralisation of water management which would encompass participatory irrigation management to allow for a better and more efficient water management.

From these aspects of water legislation, the existing or proposed institutional structure for water resource management do not allow for wider involvement of water users particularly irrigators organisations, in decision-making related to designing, implementation, operation and maintenance of irrigation infrastructure. For example, in the Water Resources Management Bill, the private sector is less involved in the national advisory bodies for water resource management (Water Resource Management Advisory Committee and Water Resource Management Council).

Under the reserve legislation such as Natural Resources, Wildlife and Forestry Acts, once an area of land is declared for natural resources, wildlife or forest reserve, any activities contrary to the purpose of which it was so declared (including irrigated agriculture) becomes illegal unless with given permission under specific reserve law. On the other hand, irrigated land has no legal provisions to protect it from encroachment and being changed into other uses.

4.3 Conclusion and Way Forward

4.3.1 Conclusion

The aforementioned inconsistencies in the legislation which provide for irrigation development, point at the crucial need to have a legal framework for the irrigation sector. This will ensure accelerated development and management of water and land resources for diversified, economically sound and sustainable irrigation and drainage systems under organised smallholder and estate management institutions and to maintain an effective advisory service. A legal framework for all types of irrigation development in Tanzania should as a minimum requirement cover the aspects of and provisions for: land tenure and water rights; forms of irrigators' organisations, their registrations as well as ownership of and responsibility for infrastructure on farmer initiated and managed irrigation schemes and privately owned commercial irrigated farms.

4.3.2 Way Forward

In order to have an effective legal and regulatory framework for the irrigation sector the following will be done:

- i) The Legal and Regulatory Framework for irrigation Development will be prepared to ensure effective interventions with a view to remove the inadequacies note in the existing legal frameworks. The intention is to address not only the changing needs arising from the National Irrigation Policy and Strategy for the irrigation sector but also other sectoral and National policies and strategies; and
- ii) The preparation of the legal framework for the irrigation sector will be followed by the preparation of an Irrigation Bill and suggestions for appropriate amendments to legislations impacting on the development of the irrigation sector.

5.0 COORDINATION, MONITORING AND EVALUATION

5.1 Coordination Mechanism

It is important that all actors of this policy are coordinated whilst implementing the policy. The Ministry responsible for the development of irrigated agriculture is responsible for coordinating all stakeholders of this policy. The Agricultural Sector Lead Ministries have an important role to play in ensuring a holistic approach in the implementation of the policy. Proper coordination on the implementation will lead to awareness creation to all stakeholders to accrue a number of benefits which include integral and optimal utilisation of the efforts and resources from all players. This will avoid duplication of efforts amongst the stakeholders, conflicts on the use of resources and interventions and ensuring a holistic approach on land and water resources development and on integrated water resources management.

5.2 Monitoring and Evaluation

Monitoring on the implementation of the National Irrigation Policy is an ongoing process. This will ensure focused irrigation development for the realization of the objectives. Monitoring will be participatory involving all the stakeholders and beneficiaries.

The Ministry responsible for irrigation development will collect, compile and analyse information on the implementation of various irrigation interventions from other implementers of the policy. The information will be processed so as to compare the various benchmarks with actual implementation of the interventions.

The responsibility for monitoring the implementation of irrigation interventions will be vested within the Department of Irrigation in collaboration with the Regional Secretariats and the Local Government Authorities. For this reason adequate capacities for monitoring and evaluation will be established within the Irrigation Department, Regional Secretariats and LGAs..

In the multi-sectoral nature of the activities and the envisaged accelerated participation of the private sector, clear and elaborate reporting system will be established within the Department of Irrigation and linked closely with the Department of Policy and Planning of the Ministry responsible for irrigation development. Regular evaluation on the implementation of the policy will be done by the Ministry and the findings shared with other relevant stakeholders for improvement of the policy implementation.

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