

**UNITED REPUBLIC OF TANZANIA  
MINISTRY OF WATER AND IRRIGATION  
(MoWI)**



**NATIONAL IRRIGATION COMMISSION (NIC)**

**KILIMANJARO ZONE**

# **AN OVERVIEW OF IRRIGATION DEVELOPMENT IN KILIMANJARO ZONE**

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# CONTENT

1. INTRODUCTION
2. POTENTIAL FOR IRRIGATION DEVELOPMENT IN TANZANIA
3. IRRIGATION DEVELOPMENT IN KILIMANJARO ZONE
  - 3.1. Suitability of Irrigation in Kilimanjaro Zone
  - 3.2. Areas of Intervention
4. SUCCESSES
5. CHALLENGES
6. WAY FORWARD

# 1. INTRODUCTION

## □ Importance of Agriculture in Tanzania

- Agriculture sector plays an important role in the Tanzanian economy and employs the majority of the rural population;
- About 80% of country population live in the rural areas and mainly depend on agriculture for their livelihood;
- Since poverty is predominantly a rural phenomenon, the success in poverty reduction will depend largely on the performance of the agricultural sector.

# Introduction cont.....

## □ The Situation of Irrigation in Tanzania

- The history of irrigation in Tanzania dates back the Iron Age whereby traditional irrigation systems were developed and used by peasants;
- Traditional irrigation is still being practiced by smallholder farmers;
- In most of the traditional irrigation schemes irrigation water is abstracted directly from rivers (*run-of-river gravity systems*).

# Traditional intake



# Unlined irrigation canal



# Introduction cont.....

- On-farm water management is through traditional furrows or small basins. These are normally poorly drained and prone to salinisation;
- Irrigation efficiency is quite low, estimated at an average of 15%;
- Access to water is uneven within the schemes with uncertainty to farmers at the end of the canals;
- Crop production from these irrigation schemes is generally low, with typical average yield of paddy laying between 1.8 – 2.0 t/ha.



# 2. POTENTIAL FOR IRRIGATION DEVELOPMENT IN TANZANIA

## □ Irrigation Potential

- Tanzania covers an area of 94.5 million hectares of which 44 million hectares are classified as suitable for agriculture. The National Irrigation Master Plan (NIMP) of 2002 shows that the total potential area for irrigation development is 29.4 million ha characterized as follows:
  - 2.3 million hectares high potential;
  - 4.8 million ha as medium potential and;
  - 22.3 million hectares low potential.

# Irrigation Potential cont.....

- Despite all this potential, only **461,326 ha** (1.6% of the total potential) have so far been developed under irrigation;
- A three year strategic plan of the National Irrigation Commission (NIC) aims at increasing irrigated area by 111,000 ha thus bringing the area under irrigation to 572,326 ha by year 2018;
- Development of irrigation in the country is the responsibility of the following eight Irrigation Zones:

# Irrigation Potential cont.....

## Irrigation Zones

1. Mwanza Zone (Mwanza, Mara, Kagera and Geita regions);
2. Tabora Zone (Tabora, Shinyanga and Simiyu regions);
3. Central Zone (Dodoma, Singida and Manyara regions);
4. Morogoro Zone (Morogoro, Coast and Dar es Salaam )regions;

# Irrigation Potential cont.....

5. Mbeya Zone (Mbeya, Iringa, Songwe and Njombe regions);
6. Mtwara Zone (Mtwara, Ruvuma and Lindi regions);
7. Kilimanjaro Zone (Kilimanjaro, Tanga and Arusha regions); and
8. Katavi Zone (Katavi, Rukwa and Kigoma regions).

# Irrigation Potential cont.....

- The Zones focus on Government strategy on irrigation development with emphasis on:
  - Attainment of National Food Security;
  - Increased productivity and income;
  - Particular emphasis on production of high value crops.

# 3. IRRIGATION DEVELOPMENT IN KILIMANJARO ZONE

## □ Coverage of the Zone:

- Tanga region - 26,809 sq.km;
- Kilimanjaro region - 13,309 sq.km;
- Arusha region - 36,486 sq.km.

## □ Administratively the regions are divided into districts (Total = 22 districts):

- Tanga region – 9 districts (Korogwe Rural, Korogwe Urban, Lushoto, Mkinga, Handeni, Kilindi, Muheza, Tanga and Pangani);

# Irrigation Development cont.....

- Kilimanjaro region - 7 districts (Siha, Hai, Moshi Rural, Moshi (Urban), Rombo, Mwanga and Same);
- Arusha region - 6 districts (Arumeru, Arusha City, Monduli, Karatu, Longido and Ngorongoro).

# 3.1. Suitability of Irrigation in Kilimanjaro Zone

## ❑ Irrigation potential

Total high and medium potential area for irrigation development is approximately 700,000 ha; while total irrigated area by 2013 was estimated at over 141,845 ha as follows:

- Tanga region: 18,693 ha
- Kilimanjaro region: 85,105 ha
- Arusha region: 38,047 ha

## ❑ Location of most intensive irrigation activities:

- Slopes of the Meru, Kilimanjaro, Pare and Usambara mountains;



# Suitability of irrigation cont.....

- Low lands / River valleys
- Other areas are found in:
  - ◆ Pangani River and its tributaries;
  - ◆ Valleys of streams and rivers located in the Rift Valley draining into the lakes of Manyara, Eyasi and Natron.

Generally, the districts of Moshi rural, Arumeru, Same, Hai, Siha, Korogwe, Lushoto, Mwanga, Monduli and Ngorongoro are considered as areas with long history on irrigation.

# Suitability of irrigation cont.....

## □ Type of Irrigation schemes

### i. Traditional small-holder irrigation schemes

- Schemes varying in size from less than 20 ha – over 1000 ha for cultivation of crops such as paddy, maize, banana, coffee, beans and vegetables (especially onions);
- Systems developed over years by the local communities (e.g. *Nfongo* system in Moshi, *Ndiva* system in Same and Mwanga);
- Irrigation by traditional irrigation furrows;

# Suitability of irrigation cont.....

- Most of these traditional irrigation schemes are:
  - ◆ unsophisticated in construction;
  - ◆ poor in water use with low crop production;
  - ◆ Low irrigation efficiencies (estimated in the range of 15% - 20%).

# Suitability of irrigation cont.....

Low irrigation efficiency



# Suitability of irrigation cont.....

- ii. Large scale irrigation schemes such as privately owned estates mainly for cultivation of irrigated cash crops as found in:
  - Arumeru district: coffee, sugarcane, flowers and horticultural crops;
  - Hai district: coffee, flowers and horticultural crops;
  - Moshi rural district: coffee and sugarcane;
  - Karatu district: coffee.

## 3.2. Areas of Intervention in Irrigation Development

- i. Improvement of irrigation systems in the smallholder traditional irrigation schemes**
  - a. construction of permanent head works;
  - b. lining of main and secondary canals;
  - c. provision of water control structures;
  - d. provision of farm service roads;

# Intervention areas cont.....

- e. selection of dam sites, surveying and designing dams for irrigation purpose;
- f. conducting feasibility studies in proposed areas for irrigation development;
- g. supervision of irrigation construction works undertake by private contractors.

# Intervention areas cont.....

## ii. Capacity Building to District staff and Irrigators Organizations

- Strengthening of registered irrigators organisations;
- Facilitating formation and registration of new Irrigators Organisations;
- Training of irrigators and Scheme Extension Agents (irrigation water management, crop husbandry, agri-business, operation and maintenance of irrigation infrastructure, etc);
- Carrying out on-farm demonstrations according to specific scheme's demands.



# Intervention areas cont.....

## iii. Identifying alternative water sources in Collaboration with Districts and Basin Water Offices in to curb water shortages

Possible alternatives:

- rain water harvesting / construction of dams;
- drilling wells for exploitation of ground water; and
- promotion of water serving irrigation technologies and practices (drip irrigation, System of Rice Intensification - SRI, etc);

# Intervention areas cont.....

## Construction of intake structures



# Intervention areas cont.....

## Construction of water control structures



# Intervention areas cont.....

## Lining of Irrigation canals

Trapezoidal cross section



Rectangular cross section



# Intervention areas cont.....

## Promotion of water saving technologies (Drip Irrigation)



# 5. SUCCESSES

i. By 2013 over 107,673 ha of irrigated land had improved / rehabilitated irrigation infrastructures

- permanent intake structures for easy abstraction of water from rivers;
- canal lining for reducing water losses in conveyance system;
- water control structures for improvement of irrigation water management and reduction of water use conflicts.

# Successes cont.....

## ii. Formation and registration of irrigators organizations

- more than 60 IOs are formally registered;
- a number of irrigation schemes have formed IOs and are in registration process.

## iii. Increased farmers sense of ownership of irrigation schemes

- participatory irrigation development;
- willingness to participate in communal works;
- willingness to contribute operation and maintenance fee.

# Successes cont.....

## iv. A training manual on System of Rice Intensification (SRI) in place

- use of few seeds;
- use of low amount of water;
- reduced water use conflicts;
- high productivity of rice (high yields of good quality);
- improved living standards of scheme beneficiaries (modern houses, means of transport, ability to own farm implements, ability to get health services, etc).



# Successes cont.....

High yields from rehabilitated schemes



# Successes cont.....

## Construction of good houses



# Successes cont.....

A power tiller owned by a farmer



# 5. CHALLENGES IN IRRIGATION DEVELOPMENT

## □ General

- i. Decline in surface water resources
  - Environmental destruction
  - Climate change
  - Increased number of water users
- ii. Inadequate and untimely release of funds for rehabilitation / improvement works

# Challenges cont.....

- iii. Inadequate / shortage of technical personnel both at Zonal and District level;
- iv. Lack of refresher training courses to technical field staff to enable them cope with the changing irrigation technologies;
- v. New technologies are not easily affordable by ordinary farmers (e.g. a family drip kit costs about Tshs 1 million);
- vi. Most schemes lack farm service roads;
- vii. Investment in rehabilitation of several schemes but covering small areas only, hence impact is not easily noticeable.

# Challenges cont.....

## □ Planning and Designs Stage

- i Lack of reliable data (irrigated areas, pre-design data, agro-socio economic data);
- ii. Poor priority setting of irrigation projects in the district planning especially in projects formulation for support under ASDP framework;
- iii. Uncoordinated irrigation development strategies;

# Challenges cont.....

## ❑ Implementation and Construction Stage

- i. Old and inadequate construction equipment
  - *most of plants, vehicles and equipment are over 20 years old hence frequent breakdown, repair & maintenance affect project progress;*
- ii. Inconsistent / inadequate financing and untimely release of funds for irrigation development.

# Challenges cont.....

## □ Production, Operation and Maintenance Stage

- i. Inadequate and untrained extension staff in irrigated farming;
- ii. Weak Irrigators Organisations – limited skills in irrigation scheme management and O& M;
- iii. Farmers lack sense of ownership
  - *no smooth O&M schedule*
  - *vandalization of irrigation infrastructure*



# Challenges cont.....

- iv. Most schemes do not have O&M Fund
  - payment for water use permits is difficult
  - sustainability is questionable
- v. Low irrigation water use efficiency especially in traditional irrigation schemes
  - *poor irrigation infrastructure*
  - *low capacity of farmers on irrigation water management*

# Challenges cont.....

- vi. Water stealing (unauthorized abstraction of water in the main canals using pumps)
- vii. Poor accessibility to market outlets.

## 6. WAY FORWARD

- i. Deliberate efforts should be put in:
  - sensitizing formation and registration of new Irrigators Organizations;
  - strengthening of existing IOs to instill sense of ownership and enable them to run the schemes sustainably
- ii. Improvement/rehabilitation of irrigation schemes should be done in partnership with IOs;

# Way Forward cont.....

- iii. IOs should be sensitized to establish O&M fund specifically for regular maintenance of irrigation infrastructures. This is at least 5% of average scheme production per member per season;
- iv. Improvement works should be concentrated in prioritized areas whereby a sound impact can be seen rather than spreading the meager financial resources to several schemes covering only small areas;

# Way Forward cont.....

- v. Collaboration with District and Basin Offices should be strengthened in finding alternative sources for irrigation water
  
- vi. Government should subsidize prices of drip and sprinkler irrigation equipments to promote water saving technologies;

**THANKS FOR YOUR  
ATTENTION**