



**New Partnership for  
Africa's Development (NEPAD)  
Comprehensive Africa Agriculture  
Development Programme (CAADP)**



**Food and Agriculture Organization  
of the United Nations  
Investment Centre Division**

## **GOVERNMENT OF THE UNITED REPUBLIC OF TANZANIA**

### **SUPPORT TO NEPAD–CAADP IMPLEMENTATION**

**TCP/URT/2908 (I)  
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**Volume III of VII**

### **BANKABLE INVESTMENT PROFILE**

**District Irrigation and Water Harvesting Support (Mainland)**

*April 2005*



**UNITED REPUBLIC OF TANZANIA:**  
**Support to NEPAD–CAADP Implementation**

**Volume I: National Medium–Term Investment Programme (NMTIP)**

*Bankable Investment Profiles (BIPs)*

**Volume II: Phase II of Madibira Rural Development (Mainland)**

**Volume III: District Irrigation and Water Harvesting Support (Mainland)**

**Volume IV: Crop and Livestock Private Sector Development (Mainland)**

**Volume V: Small and Medium Enterprises in support of Participatory Forest Management (Mainland)**

**Volume VI: Land Management and Development of Irrigation Schemes (Zanzibar)**

**Volume VII: Private Sector Development for Agriculture, Forestry and Fisheries (Zanzibar)**



## NEPAD–CAADP BANKABLE INVESTMENT PROFILE

**Country:** Tanzania – Mainland

**Sector of Activities:** Agriculture

**Proposed Name:** District Irrigation and Water Harvesting Support Programme

**Project Area:** Districts Nationwide

**Duration:** 6 years

**Estimated Cost:** Foreign Exchange ..... US\$14.05 million  
Local Cost..... US\$20.00 million  
**Total .....US\$34.05 million**

**Suggested Financing:**

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	5.10	15
<i>Financing institution(s)</i>	27.24	80
<i>Beneficiaries</i>	1.71	5
<i>Total</i>	<b>34.05</b>	<b>100</b>



**UNITED REPUBLIC OF TANZANIA:**  
**NEPAD–CAADP Bankable Investment Profile**  
*“District Irrigation and Water Harvesting Support Programme”*

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### Abbreviations

ADB	African Development Bank
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
ASLM	Agriculture Sector Lead Ministry
ASSP	Agricultural Sector Support Programme
BIP	Bankable Investment Profile
CAADP	Comprehensive Africa Agriculture Development Programme
DADP	District Agricultural Development Programme
DITS	Division of Irrigation Technical Services
EIA	Environmental Impact Assessment
EMU	Environmental Monitoring Unit
FAO	Food and Agriculture Organization
FBD	Forest and Beekeeping Division
FFS	Farmer Field School
GDP	Gross Domestic Product
IA	Irrigators’ Association
ICID	International Commission on Irrigation and Drainage
ITSD	Irrigation and Technical Services Department
JICA	Japanese International Development Assistance
LGA	Local Government Authority
MAFS	Ministry of Agriculture and Food Security
MCM	Ministry of Cooperatives and Marketing
MNRT	Ministry of Natural Resources and Tourism
MWLD	Ministry of Water and Livestock Development
NAFCO	National Agriculture and Food Company
NEPAD	New Partnership for Africa’s Development
NIMP	National Irrigation Master Plan
NMTIP	National Medium–Term Investment Programme
PIDP	Participatory Irrigation Development Programme
PIMU	Project Implementation and Management Unit
RWH	Rain Water Harvesting
SACCO	Savings and Credit Co–operative Organization
SME	Small and Medium Enterprise
TEIAPG	Tanzanian Environmental Impact Assessment Procedures and Guidelines
WUA	Water Users Association
ZIU	Zonal Irrigation Unit



## I. PROGRAMME BACKGROUND

### A. Programme Origin

I.1. African Heads of State and Government have adopted the *New Partnership for Africa's Development* (NEPAD) as an overall framework for achieving Africa's self-reliant development. NEPAD's objectives include the eradication of poverty, accelerating sustainable economic development and ending of economic marginalisation. An annual growth rate in Gross Domestic Product (GDP) of 7 percent is targeted over the next 20 years.

I.2. In recognition of the importance of agriculture in the future development of Africa, the *Comprehensive Africa Agriculture Development Programme* (CAADP) has been established as the NEPAD programme for agriculture. It is based on an acknowledgement that past efforts in agriculture and rural development have not been successful, and it recognises that agriculture in many African countries is currently in crisis. It aims to promote interventions that best respond to the widely recognised problems that face agriculture in Africa. There is clear acceptance that it will not be possible to tackle all problems at once. There is therefore a need to prioritise investments, opportunities and interventions. A *National Medium-Term Investment Programme* (NMTIP) has been prepared which provides the strategic basis for future additional investments under NEPAD's CAADP.

I.3. Irrigation has been identified as one of the key activities in agricultural production. Crop production is currently dominated by rainfed systems leaving the irrigation potential marginally tapped. It is estimated that there are 2.3 million, 4.8 million and 22.3 million hectares of high, medium and low irrigation potential in the country. The government, through the ASDS and ASDP aims at boosting crop production through irrigation development and improvement. Specifically, the ASDP aims to support a reduction in over-dependence on rainfed agriculture through the rehabilitation and management of low-cost smallholder irrigation schemes, including rainwater harvesting, to reduce fluctuations in production.

I.4. From a high potential irrigable area of almost 2.3 million hectares, only 227,486 ha — approximately 10 percent — is currently under irrigation. The development of both small and large-scale irrigation has tremendous potential, though this must be undertaken within a carefully controlled and monitored system of cost-benefit analysis, and effective market development programmes. This also needs to be accompanied by detailed attention to land and water rights, the corresponding issues of equity and traditional rights of upstream and downstream users, other social issues and environmental impact.

I.5. The recently completed *National Irrigation Master Plan* (NIMP, URT 2003b) and the *Final Draft Report* of the ASDP Task Force 1 Working Group on Irrigation (URT 2004b) have outlined the lessons learnt and future potential for irrigation development. The information in these documents is extensively used in this BIP. Irrigation and improved use of water-harvesting techniques have significant potential in a number of areas for increase productivity and profitability. They represent a seriously under-developed tool for poverty alleviation. These strategies also respond to one of the main goals of the CAADP Pillar 1.

I.6. The two primary recommendations of the ASDP Task Force on Irrigation were:

- The performance of traditional, improved traditional, modern and rainwater harvesting based schemes can be improved at field level through capacity building of farmers and empowerment to enable them secure full ownership of the schemes, and

- Low cost technologies that are appropriate, affordable and geared towards poor farmers’ needs should be developed through research, development and adaptations. These technologies should be coupled by deliberate inclusion of storage facilities preferably small, medium and strategic large scale dams.

I.7. Tanzania has been selected as one of the eight SADC member states to benefit from a *Regional Programme on Agricultural Water Management for Food Security* promoted by the *African Development Bank* (ADB). The programme would aim to tackle current inadequate and inappropriate water utilisation systems, poor temporal and geographical distribution, inadequate technology to capture and store water and poor infrastructure. The programme will also pay particular attention to the impact of HIV/AIDS on irrigated agriculture. In this respect it is recognised that reduced labour availability makes improvements in water use efficiencies critically important.

I.8. The overall objective of the programme is “*to improve capacity of SADC member countries to appropriately and sustainably manage existing regional water resources in such a way as to increase agricultural output and, ultimately, regional food security, while protecting water availability for human and other uses and assisting the region to adapt to changing social, economic and possibly climatic conditions*”.

I.9. Specific activities for each country will be identified through a consultative process, but might include such things as developing small-scale irrigation schemes and water harvesting techniques in drought prone areas and supporting capacity building. There is considerable potential, for example, for expanding the use of low cost treadle-pumps (such as those being made in Dodoma and Morogoro) and drip irrigation systems that are already commercially available in the country.

I.10. The SADC programme specifically relates to a number of CAADP Pillars; most importantly 1 – *Sustainable land and water management*; 2 – *Improved market functions*, and 3 – *Food security and safety nets*. The programme would include, but not be limited to, three important elements:

- Regional activities;
- Support to low income food-deficit countries — through a specific focus on integrated water resource management approaches and capacity strengthening;
- Support to middle income countries.

I.11. The programme will have four phases:

- Reconnaissance;
- Formulation of a regional framework and programme;
- Formulation of national activities and investment projects;
- Final programme preparation.

I.12. This document presents the initial Tanzanian proposals for a *Bankable Investment Profile* in small-scale, district-based irrigation and water-harvesting development that is directly linked to the proposed SADC programme.

## B. Background Information

I.13. The overall background to CAADP investment has been presented in the NMTIP, and need not be repeated here. It is, however, important to recall that although agricultural growth has increased, this has not yet been to a level to significantly reduce rural poverty, and there is significant potential for the irrigation sub-sector to make an important contribution.

I.14. Tanzania has a territorial area of 948,000 km<sup>2</sup>, of which on average about 80 percent receives less than 1,000 mm of seasonal, unreliable rainfall, and more than half the country receives less than 800 mm in an average year. The country is divided into nine different river basins and annual renewable water resources are currently estimated to be 2,700 m<sup>3</sup> each year. This is dwindling and it is predicted that if nothing is done, the country will soon face a water stress situation. There are a number of dams, mostly built between 1950–1970. Many are now severely silted and some are no longer operational.

I.15. The income growth of poor people will increase substantially only if growth comes from the agricultural sector and the development of a strong agro-processing industry. Public investment in water resource development and rural roads improvement remains a critical factor for broad-based growth; but so far such investment has been inadequate.

I.16. Of the 44 million hectares suitable for agriculture, only 10 million hectares (23 percent) is actually cultivated, and of that only 227,000 hectares are irrigated. There are some 1,428 irrigation schemes of which 1,328 are smallholder, 85 are private and 15 are managed by the government. The regions with the greatest amount of irrigation are Arusha, Kilimanjaro, Mbeya and Morogoro.

I.17. The *Agricultural Sector Development Strategy* (ASDS) is an integral component of the on going macro-economic adjustment and structural reforms in the country. This strategy has been designed with the objectives of increasing productivity and profitability in the agricultural sector as a means of reducing rural poverty, ensuring food security and contributing to overall economic growth. The ASDS revised the sectoral growth and planned the sector to grow at a real annual agricultural GDP growth rate of 5 percent by the year 2003 and 6 percent by the year 2005. In order to achieve these objectives, the government has developed the ASDS by focusing on four major interventions:

- Agricultural profitability by creating conducive policy environment that will attract investments in the agricultural sector, producing for targeted markets and diversification of products, adding value through domestic processing and reducing post-harvest losses;
- Building private/public sector partnership to enable greater private sector involvement in the provision of support services, input and output marketing, and investment in the agricultural sector infrastructure;
- Focusing on agro-industries/contract growers partnership to provide strategic vertical linkages which will ensure access of inputs credit and output markets for small holders, as well as to ensure steady supply of raw materials to agro-industries; and
- Focusing responsibility for implementing the ASDS at sub-national (decentralized) level through *District Agricultural Development Programme* (DADP) in order to empower the local communities and ensure sustainability.

I.18. In Tanzania there is neither a specific Irrigation Development Policy nor Legislation to guide irrigation development. Consequently, irrigation development is poorly supported by the existing sectoral and sub-sectoral policies. Furthermore, some pieces of existing legislation under these

sectoral policies do not sufficiently address the issue related to irrigation development and some contradict irrigation development.<sup>1</sup>

I.19. An ASDP Task Force Working Group prepared a report on ‘Irrigation Development in Tanzania’ which points out that most ongoing assistance is to support smallholder irrigation. It has identified three types of small-scale operations:

- **Traditional irrigation schemes:** Including those developed and managed by farmers themselves using local skills and materials. These schemes are characterised by temporary diversion weirs, which often get washed away by floods and have to be reconstructed at the end of each rainy season. Canal intakes usually have no gates to control the flow. The conveyance system consists of unlined earth channels and losses are high. The distribution systems have no water control structures and drainage system is usually lacking or inadequate.
- **Improved traditional irrigation schemes:** Which usually have concrete diversion weirs, gated canal intakes and water diversion boxes. The layout of irrigation canals and drainage system is usually well defined.
- **Water harvesting schemes:** These schemes involve a process whereby rainfall is concentrated or captured as runoff from a large area and is collected for use in a smaller targeted area. Water application to the scheme is essentially uncontrolled and is dependent on rainfall. The objective is simply to capture as much water as possible and store it within reach of plant in the soil profile of cultivated area or into a storage reservoir.<sup>2</sup>

I.20. For the purpose of this BIP, two categories will be recognised: (i) Traditional and Improved Traditional Irrigation and (ii) Water Harvesting, not overlooking the issues of agro-forestry and watershed management in water catchments’ areas.

## II. PROGRAMME AREA<sup>3</sup>

II.1. The choice of Regions, Districts and Schemes to be supported under this BIP will need to be made after further review and discussion. In particular, investments in individual schemes will depend on district development processes and DADPs. There are, however, a number of district irrigation and water-harvesting schemes that have already been identified as potential sites for improvement and expansion which could be used as a tentative programme area for purposes of budgeting and planning. These include the schemes listed in the table of the following page.

II.2. The total area under these schemes amounts to about 10,000 ha. This represents 10 percent of the total areas for the “A” Schemes Area identified by the *National Irrigation Management Plan* (NIMP), and 1 percent of the total irrigated areas targeted for 2017. Given the current constraints to capacity it is considered that a total of 10,000 ha is a reasonable target for initial investment under this BIP that will be implemented over six years.

<sup>1</sup> See the *Irrigation Development in Tanzania Summary Report* prepared by ASDP for a discussion of the current policy environment related to irrigation and water usage (URT, 2004d).

<sup>2</sup> See, for example: FAO, 1987; Critchley and Siegert 1991; World Bank 1992, and TJAS 1999.

<sup>3</sup> See Map in Appendix 1.

II.3. The NIMP has identified the need for investment in priority programmes to support improved management of small-scale irrigation at the national and district level. The BIP would therefore invest in site-specific, district and national operations. Nonetheless, final selection of irrigation schemes will be made during the course of programme implementation as part of the DADPs.

Type of scheme	Name of scheme	Area (ha)
Traditional and Improved Traditional Irrigation Schemes (as per National Priority Plan)	Magoma – Korogwe District, Tanga Region	350
	Lekitatu – Arumeru District, Arusha Region	464
	Igomelo – Mbarali District, Mbeya Region	300
	Mkindo – Mvomero District, Morogoro Region	100
	Kinyope – Lindi Rural District, Lindi Region	480
	Musa Mwinjanga – Hai District, Kilimanjaro Region	676
	Pawaga – Iringa Rural District, Iringa region	2,000
	<b>Sub-Total</b>	<b>4,370</b>
Lake Victoria Green Belt (National Priority)	Nkenge – Bukoba District, Kagera Region (linked with Ngono River Basin)	3,200
	Bugorora, Nyakakoni	150
	Rwamgango, Kagenyi, Nkwenda	200
	<b>Sub-Total</b>	<b>3,550</b>
Water Harvesting Schemes (as per SADC/ADB Programme)	Chikuyu – Manyoni District, Singida Region	170
	Dodoma Rural District, (including Bahi)	150
	Kirona – Datali, Iramba	100
	Nkiniziwa – Nzega,, Tabora Region	200
	Kakola – igunga, Tabora Region	100
	Usoke – Urambo, Tabora Region	50
	Pamila – Kigoma Rural District, Kigoma Region	50
	Tieme – Masagi, Mara Region	200
	Kissese – Kondoa District, Dodoma Region	120
	Mkomazi– Korogwe, Tanga Region	200
	Nyaisozi – Karagwe, Kagera Region	500
	Maneke – Musoma, Mara Region	200
	Kiserian – Monduli, Arusha Region	50
	<b>Sub-Total</b>	<b>2,090</b>

### III. PROGRAMME RATIONALE

III.1. The underlying rationale behind the programme is to respond to the opportunity to improve agricultural production through support to the expansion of irrigated area, the improvement of irrigation technology, land management and improvement of public sector capacity to manage small scale irrigation development.

III.2. Under traditional irrigation systems, crop production is low. Maize and paddy yields are averaged at 0.8–1.0 t/ha and 1.8–2.0 t/ha respectively. However, under improved schemes and good crop management, yields can rise to 5 t/ha to 8 t/ha. For example, *Working Group 2 of ASDP Task Force 1* found that farmers in Bahi and Chikuyu reported yield increases of paddy of up to 4.5 t/ha, the Ruvu Farm at 6.2 t/ha and Lower Moshi at 8 t/ha (this also depend on the variety used). In addition to yield improvement, the farmers considered that Rain Water Harvesting (RWH) has enabled them to have stable crop production from year to year, and has enabled the economic use of agricultural inputs such as high yielding varieties, fertilizers and herbicides (URT 2003c).



III.3. Low cost irrigation technologies that are pro-poor are either inadequate or not available in many parts of the country. Irrigation efficiencies are often below 10 percent but could be improved to 30 percent with technology transfer and minimal investment. Improved irrigation equipment, such as the sprinkler systems and windmills, is often imported, costly, and often beyond the reach of small farmers. However, with the introduction of simple treadle pumps and drip kits, many farmers are able to adopt these technologies.

#### IV. PROGRAMME OBJECTIVE

IV.1. The *overall objective* of the programme to increase agricultural production and productivity through irrigated agriculture. This would reduce the level of dependence on rainfed agriculture at a local, district and national level and result in improved rural incomes, better local and sustainable national food security and poverty reduction.

IV.2. *Specific programme objectives* include:

- To expand the area under irrigation and increase the efficiency of irrigation or water harvesting infrastructure;
- To build capacity among irrigation users to fully realize the economic and social benefits of irrigation systems;
- To build public and private sector capacity to establish and manage irrigation schemes;
- To improve the environmental sustainability of irrigation systems developed by the programme and address social issues arising out of their establishment;
- To assist irrigation users to identify and access marketing outlets and mobilize resources to improve related market infrastructure.

#### V. PROGRAMME DESCRIPTION

V.1. The programme would have a number of complementary components. These are based on the priorities identified in the NIMP and the work of the *ASDP Working Group 2 of Task Force 1*.

##### A. Development and Rehabilitation of Irrigation and Water Harvesting Infrastructure

V.2. As discussed above, there is tremendous potential to increase the area under irrigation and water harvesting systems.<sup>4</sup> Recent experience would guide design of the component. For example, several projects where farmers were involved from the initial planning stage to implementation using *District Catchment Facilitation Teams* have produced good improvements to traditional irrigation schemes with higher crop production, improved water use efficiency (30 percent), improved infrastructure (permanent weirs and distribution network) and formal registered farmers organisations with legal status. Improved water efficiency and water management practices would be the primary objective behind irrigation development. The programme would finance the expansion of cropped area

<sup>4</sup> The 68,000 ha of potential water harvesting identified by the NIMP is certainly an underestimation of the real potential.



under low-cost irrigation and simple water harvesting, much of which would be undertaken under contract to Districts. The choice of sites would be made after further review and analysis at the district and national level.

## **B. Provision of Agricultural Services**

V.3. Inadequate and inappropriate and costly irrigation technologies geared towards poor farmers on small plots is a major constraint to the spread of irrigation in Tanzania. The ASDP Working Group 2 ‘Report on Irrigation’ noted that *“the agronomic practices used by most farmers in irrigated agriculture are still backward. Most field operations are done manually and minimal low cost irrigation technologies are used. Fertilisers, herbicides and pesticides are seldom used due to unavailability when required or due to high costs”*. Here, again, with some focused attention and support, very significant improvement is possible.

V.4. To address these problems, technologies need to be identified and adapted to suit smallholder farmers. These technologies need to be (a) appropriate, simple and, if possible, equipment should be made using local materials and skills, and (b) affordable and have the potential to earn high returns on investment.

V.5. The programme would support the provision of demand-driven technology through the *farmer field school* (FFS) systems to be implemented under the *Agricultural Sector Support Programme* (ASSP) using private sector service providers working under the direction of the District team.

## **C. Capacity Building in Irrigation Management**

V.6. A number of capacity constraints have been identified in the irrigation sector, particularly at lower levels of government. *Zonal Irrigation Units* (ZIU) have been established to support irrigation development throughout the country and provide technical backstopping and logistical support to Local Government Authorities. Six zones have been established, and currently the formation of the seventh one, the Manyara, is underway. However, the zonal irrigation offices are facing serious manpower constraints, especially following the move to a district focus and the limitation on government recruitment.

V.7. Districts have generally less capacity than ZIUs; the report prepared by the ASDP Working Group 2 noted that *“most LGAs are poorly staffed in relation to qualified staff in irrigation development. From the field survey, for example WG2 found out that not a single Irrigation Engineer is attached to any LGA. Similarly, irrigation technicians are very few and poorly distributed. You may find an Irrigation technician posted in a district where there is no irrigation development”*.

V.8. The NIMP has identified a series of priority activities to increase national capacity in the sector. They include:

- Institutional Improvement to the *Division of Irrigation Technical Services* (DITS);
- Strengthening Local Government Authority Capacity;
- Improving the Policy and Legal Framework;
- Improving Irrigators Association Organisation and Capacity;
- Management Training for Irrigators Associations;

- Improved Irrigation Administration;
- Strengthened Contract Management Systems.

V.9. Currently there is no policy and legislation to guide irrigation development in the country. Irrigation development is therefore inadequately supported by the existing water-related sectoral and sub-sectoral policies such as the water, environment, land, forest and Local Government. Some initiatives are already underway aimed at training and capacity building, institutional strengthening, improving the policy and legal framework, and better management, administration and contracting capacity. The proposed component in this BIP would focus on capacity building aimed at increasing the capacity of Local Government Authorities and Irrigation Associations in irrigation management and contracting.

#### **D. Improved Linkages between Irrigation Schemes and Market Infrastructure**

V.10. The location, accessibility and linkages with markets of irrigation schemes have a bearing on prices of the produce. In those schemes where the market linkage is poor – usually due to inadequate infrastructure, poor communication, poorly developed and inadequate market infrastructure including transport and insufficient storage and processing facilities – the prices offered to farmers are extremely low. While the BIP cannot justify major investment in market infrastructure, it would support studies and facilitation processes to attract investment from other sources to improve market access. This component could also support the development of local small- and micro-enterprises (SMEs) to enable them to become established and invest in the provision of marketing and processing services.

#### **E. Environmental Assessment and Catchment Management**

V.11. *Environmental Impact Assessment* (EIA) as a formal study to predict environmental consequences of proposed undertakings will have to be conducted before their implementation to determine possible ill effects of development interventions. The example of the Kihansi Gorge has provided Tanzania with an important lesson in this regard.

V.12. The *Environmental Monitoring Unit* (EMU) of the *Ministry of Agriculture and Food Security* (MAFS) will carry out EIAs for all irrigation development projects using the *Tanzania Environmental Impact Assessment Procedures and Guidelines* (TEIAPG). It will be important that these studies are carried out in order to design mitigation measures in case of any negative impacts.

V.13. The MAFS will work closely with all stakeholders including but not limited to; the District Council Land Management Officers (usually the District Natural Resources Officer) and the *Forestry and Beekeeping Division* (FBD) of the *Ministry of Natural Resources and Tourism* (MNRT). The programme interventions will support selected activities in the planning and implementation and improved land use planning and catchment management operations. Where possible, these would be linked to participatory agro-forestry management activities, conservation of water sources (including soil erosion and flood control, protection of river/stream banks, springs, dams and improved forestry management and conservation).

#### **F. Social Services**

V.14. The development of improved irrigation capacity needs to be accompanied by the provision of improved social services, particularly for health as it is very much linked to water-borne diseases and malaria. Links will have to be established between MAFS and the *Ministry of Health* and other

service providers at all levels to ensure that such problems are addressed. The Programme would also support the construction of some social or water related infrastructure in the areas surrounding irrigation schemes.

## VI. INDICATIVE COSTS

VI.1. The total estimated costs of the proposed investment using the indicative list of schemes found in section II would be US\$34.05 million. More detailed costing would depend on a final selection of irrigation schemes to be financed by the programme.

Cost Summary							
Component	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total (US\$)
1. Expansion of Areas <sup>(a)</sup>	500,000	2,500,000	3,000,000	5,000,000	5,000,000	5,000,000	21,000,000
2. Agricultural Services <sup>(b)</sup>	150,000	150,000	200,000	200,000	200,000	100,000	1,000,000
3. Capacity Building <sup>(c)</sup>	500,000	1,000,000	1,000,000	1,000,000	1,000,000	500,000	5,000,000
4. Improved Market Infrastructure	50,000	250,000	250,000	250,000	250,000	100,000	1,150,000
5. Environmental and Catchment Management	100,000	300,000	300,000	300,000	300,000	100,000	1,400,000
6. Social Services	100,000	300,000	300,000	300,000	300,000	100,000	1,400,000
<b>Total Baseline Costs</b>	<b>1,400,000</b>	<b>4,500,000</b>	<b>5,050,000</b>	<b>7,050,000</b>	<b>7,050,000</b>	<b>5,900,000</b>	<b>30,950,000</b>
Contingencies (10%)	140,000	450,000	505,000	705,000	705,000	590,000	3,095,000
<b>Total Programme Costs (US\$)</b>	<b>1,540,000</b>	<b>4,950,000</b>	<b>5,555,000</b>	<b>7,750,000</b>	<b>7,750,000</b>	<b>6,490,000</b>	<b>34,050,000</b>
<sup>(a)</sup> The average cost of seven proposed models of Traditional Irrigation and Water Harvesting Schemes in the NIMP was approximately US\$1,600/ha. For the purposes of these proposals a slightly higher cost of US\$2,100 has been used to allow for inflation and the fall in the value of the Tanzania shilling since the NIMP was finalized. <sup>(b)</sup> Cost Recovery Systems will be established. <sup>(c)</sup> Based on NIMP estimates.							

## VII. PROPOSED SOURCE OF FINANCING

VII.1. Currently funding to support the implementation of the irrigation projects/programmes comes from a number of different donors including the World Bank, IFAD, ADB, FAO, Japan and Denmark. Government is also contributing internal funding through the MAFS *Medium Term Expenditure Framework* (MTEF) as well as providing overall coordination, policy leadership, technical staff, office space, and other resources.

VII.2. Incremental investment funding for this intervention is sought through government, NEPAD international initiatives and development partners. Financing would pass through the framework of the ASDP, which utilizes basket funding. At District level, there will be one communal basket fund to meet the needs of agriculture including the service provision requirements of all irrigation and water harvesting developments. For large projects, a basket fund at the central level, a fund for irrigation development, would be used for identified larger scale investments (possibly those greater than US\$30,000) using the established planning processes. DITS would manage this fund and applications would be made by Districts to draw down on this fund.

VII.3. Of the total indicative cost of US\$34.05m, it is estimated that 80 percent (US\$27.240m) would come from international investors and donor organisations, 15 percent (US\$5.10m) would comprise the government contribution, and 5 percent (US\$1.71m) would be provided by the beneficiary population. The latter's contribution would be mainly through labour, land and management inputs.

## **VIII. BENEFITS**

VIII.1. Implementation of this programme would result in a series of local and national benefits. These would include:

- Enhanced national food security and increased rural incomes. This will be achieved through increased crop yields and production. The net result of this will be poverty reduction at macro level;
- Expansion of the area under improved traditional irrigation and simple water harvesting systems;
- Improved water control and distribution, and increased water use efficiency;
- Improved farmer organizations through enhanced water user association, technical skills and management capacity;
- Improved marketing and processing, and local value-added to agricultural produce;
- Enhanced central and local government capacity to facilitate irrigation development;
- Increased private sector service delivery to the sub-sector;
- Improved environmental and catchment management.

## **IX. IMPLEMENTATION ARRANGEMENTS**

IX.1. Implementation arrangements for the programme would be refined over the course of preparation as the design of the programme is further developed and issues related to the roles of the various institutions (DITS, ZIUs, Districts) under the ASSP are resolved. It is expected implementation of the programme would take place within the ASDP framework, with districts holding primary responsibility for implementation of programme activities with assistance and coordination provided by ZIUs/DITS. Overall programme coordination would be led by the MAFS in collaboration with the Ministries of *Water and Livestock Development, Natural Resources and Tourism, Regional Administration and Local Government, Industry and Trade, Health and Cooperatives and Marketing*. A Programme Committee would ensure co-ordination between line ministries and stakeholders at the local level. Members of the committee would include representatives of the ASLM, farmer’s associations/organisations including *Water Users Associations* and representatives of private sector service providers as well as financial and technical service providers,

IX.2. Day to day implementation of the programme would be delegated to private sector providers in many cases with supervision provided by districts and other stakeholders involved in irrigation and natural resource management. In general, DADPs would identify irrigation schemes to receive funds under the Programme. In order to address issues of technical feasibility, ZIUs/DITS may provide a list of priority projects to districts, giving details of both the existing schemes and identified potential. Districts would then check and confirm information, discuss identified priorities with the beneficiaries in the field to confirm their interest and need for support. For relatively small scale schemes, lead responsibility for overall coordination will rest with the District Team. For rehabilitation and upgrading of schemes that require relatively large investments and experienced technical support, both of which may be beyond District budget ceilings and technical resources, ZIUs/DITS may take on a larger role as needed.

IX.3. While the programme implementation team will report directly to the inter-ministerial committee, close links will be established to both public and private sector operators with a view to identifying suitable collaborative activities as proposed in this document. Furthermore, the programme will develop collaborative relationships to specialist organisations with experience in a range of appropriate areas such as developing small scale irrigation schemes, construction of water harvesting techniques including designing and construction of dams, agricultural marketing and natural resource management.

## X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. The limited technical capacity in the irrigation sector has been identified as a significant constraint to growth and sustainability of irrigation investments. In order for the programme to achieve its intended goal, a significant level of training and capacity building would be needed, including substantial levels of private sector services and technical assistance. To as great an extent as possible, this should be obtained from within Tanzania and East Africa. However, certain specialised services may need to be obtained from national and international specialists and consulting companies. In this regard, technical assistance would be required as short-term technical assistance (national and international) and /or medium term assistance (3–5 years) to provide specialist input for a range of activities. These would be required in the following fields:

- Water harvesting: especially dam design construction and other techniques;
- Irrigation research and technology development;
- Flood and water control;
- Environment Impact Assessment.

## XI. ISSUES AND PROPOSED ACTIONS

XI.1. A number of issues should be addressed prior to finalization of the Programme. The main issues related to the development of district level irrigation and water harvesting schemes are:

- ***Review of implementation arrangements in light of finalization of the ASDP:*** Discussions within the sector about the role of ZIUs, DITS and districts with regard to priority setting and irrigation management are ongoing. The proposed Programme should be reviewed in the context of eventual outputs from the ASDP Working Group, which are to address many of these issues.
- ***Review irrigation costs:*** The main issue is the high cost in the construction of irrigation schemes. It would be wise to review costs to ensure development and operational costs are as low as possible.
- ***Review of technical capacity in the field of irrigation:*** There is limited technical capacity for the design and implementation of schemes. The actions proposed to overcome them are (i) training of staff and update skills and (ii) careful supervision of the approval of proposals and the execution of plans.
- ***Inadequate funding for capital and recurrent expenditures:*** Agriculture is generally under funded and irrigation is costly. In order to address this concern, extensive work needs to be done to attract investments in irrigated agriculture. This may require dialogue

between MAFS and other stakeholders particularly the development partners and private sector (both domestic and international).

- **Review of agriculture and food security policy** is needed to accommodate and develop details of a comprehensive Irrigation policy and regulatory framework.
- **Review of suitable service providers in both private sector and NGO sectors:** Like other interventions, this BIP will need to develop an extensive network of government, non-government and private sector partners if it is to be effective in reaching its goals. Specialist service providers with experience in developing irrigation schemes and management would need to be identified and engaged accordingly.
- **Other infrastructure needs:** Rural infrastructure (particularly rural access roads) has been identified as one of the biggest constraints facing rural producers in Tanzania. A review would be conducted with a view to identifying ways in which these constraints can be overcome, by collaborating with programmes targeting rural access roads and through cost sharing mechanisms with local stakeholders to upgrade local roads and storage facilities.

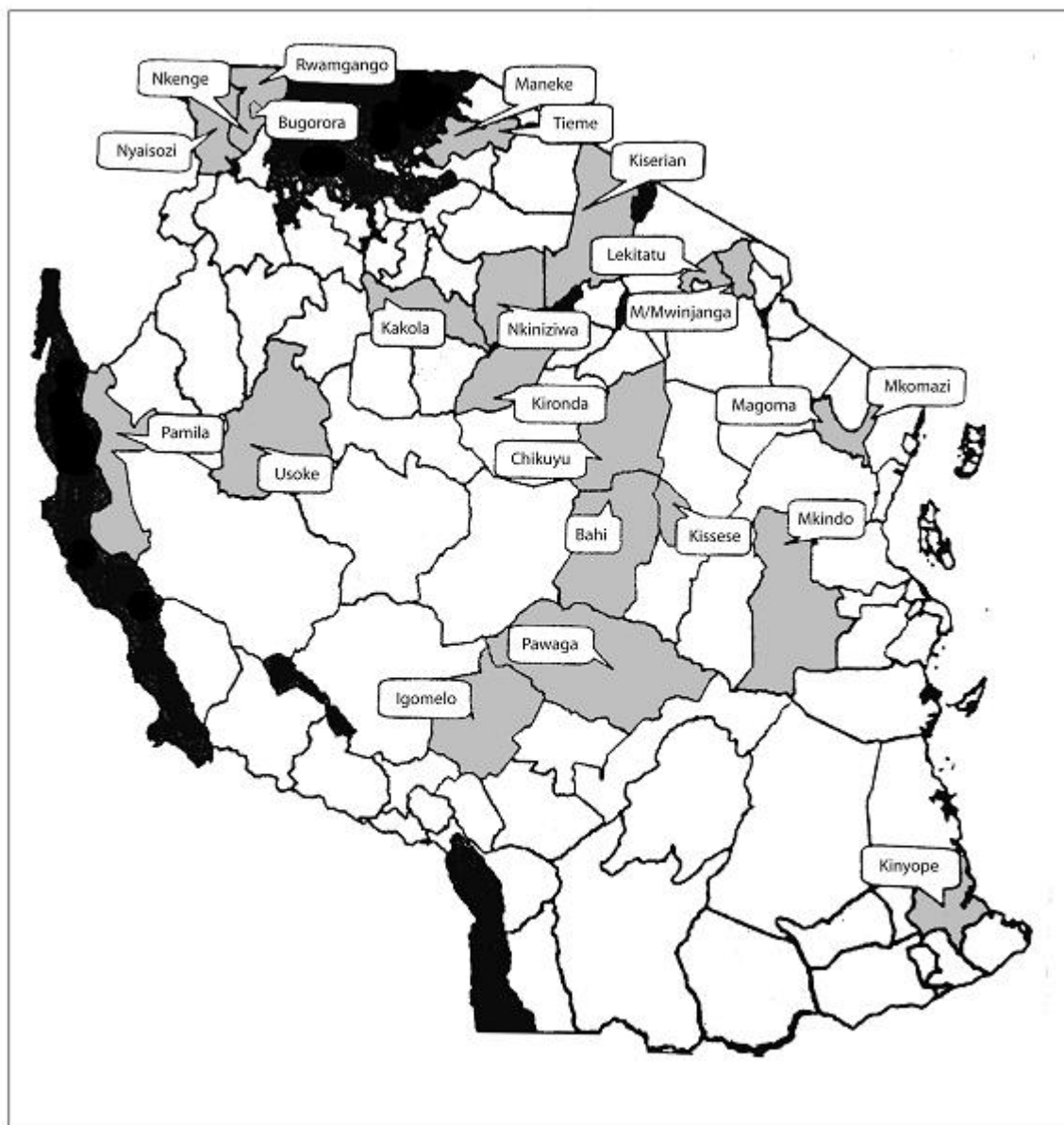
## **XII. POSSIBLE RISKS**

XII.1. The possible risks associated with this programme may include

- Continued low funding of irrigation sub-sector and inherent high costs of irrigation development in Tanzania making investments uneconomic;
- Unwillingness of farmers to form effective associations or cooperatives, and networks such as MVIWATA, to ensure the institutional sustainability of the programme;
- The HIV/AIDS pandemic, which may result in huge loss of both trained staff and farmers;
- Unwillingness of the private sector to participate due to low profit margins in the provision of services.



**Appendix 1: Map of Tanzania Showing Location of Schemes Pre-Identified  
as Potential Programme Sites**



TCS-TCP/URT/2908-2/15-05





## Appendix 2: List of References

1. **Critchley, W.R.S and Siegert K.** 1991: *Water Harvesting: A Manual for the Design and Construction of Water Harvesting Schemes for Plant Production*. AGL/MISC/17/91, FAO, Rome, 133 pages.
2. **FAO.** 1987. Soil and Water Conservation in semi-arid areas. FAO Soils Bulletin 57, by Norman Hudson, Rome, 172 pages.
3. **FAO.** 1995. Special Programme on Food Production in Support of Food Security. The Pilot Phase Plan of Operation, Rome.
4. **Tanzania Journal of Agricultural Sciences (TJAS).** 1999: Special Issue: Rain water harvesting for crop production in semi-arid Tanzania. Vol.2 No.2: Faculty of Agriculture, SUA and DRD, MAC: ISSN 0856-664X, Dar es Salaam, 242 pages.
5. **URT.** 2002. *National Water Policy*. Ministry of Water and Livestock Development, Dar es Salaam, 42 pages.
6. **URT.** 2003a. *The Agricultural Sector Development Programme*. Ministries of Agriculture and Food Security, Water and Livestock Development, Cooperatives and Marketing, and The President's Office-Regional Administration and Local Government, 54 pages and Annexes. Dar es Salaam.
7. **URT.** 2003b. *Study on the National Irrigation Master Plan in the United Republic of Tanzania: Action Plan: Master Plan and Executive Summary*; Volume 1: Main Report; Volume II: Action Plan Report, Appendixes 1/2; Volume III: Action Plan Report, Appendixes 2/2.
8. **URT.** 2003c. *Irrigation Development in Tanzania. Current Performance, Institutional Support, Agronomy, Community Participation, Environmental, Infrastructure, Water and Land Related Policies*. Draft Report by Working Group 2, Task Force 1 – Agricultural Sector Development Programme. 67 pages, Dar es Salaam.
9. **URT.** 2004a. *National Medium-Term Investment Programme for NEPAD's Comprehensive Africa Agriculture Programme*. Ministry of Agriculture and Food Security, Dar es Salaam.
10. **URT.** 2004b. *Irrigation Development in Tanzania*, Final Draft Report. ASDP, Dar es Salaam.
11. **URT.** 2004c. *Baseline Socioeconomic Study in SPFS Areas in Korogwe, Iringa and Kilosa District*. Report by Korongo Ltd. to FAO and the Special Programme in Food Security. 70 pages, Dar es Salaam.
12. **URT.** 2004d. *Irrigation Development in Tanzania*, Summary Report. ASDP, Dar es Salaam.
13. **World Bank.** 1992. *Water Harvesting for Crop Production*. Technical Paper No 157: Critchley, Reij and Seznec, Washington DC, 134 pages.