



**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

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Volume II of VII

BANKABLE INVESTMENT PROFILE

Phase II of Madibira Rural Development (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: Phase II of Madibira Rural Development

Project Area: Mufindi and Mbarali Districts

Duration: 6 years

Estimated Cost: Foreign Exchange US\$37.5 million
Local Cost..... US\$12.5 million
Total US\$50.0 million

Suggested Financing:

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	7.5 ^(a)	15
<i>Financing institution(s)</i>	37.5 ^(b)	75
<i>Beneficiaries</i>	5 ^(c)	10
<i>Total</i>	<i>50.0</i>	<i>100</i>

- (a) Input from central and local government personnel
 (b) To be determined
 (c) Input in kind through progressive participation

UNITED REPUBLIC OF TANZANIA:
NEPAD–CAADP Bankable Investment Profile
“Phase II of Madibira Rural Development”

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Abbreviations

ADB	African Development Bank
ASDP	Agricultural Sector Development Programme
ASDS	Agricultural Sector Development Strategy
ASLM	Agriculture Sector Lead Ministries
BIP	Bankable Investment Profile
CAADP	Comprehensive Africa Agriculture Development Programme
CP	Cost of Production
DADP	District Agriculture Development Programme
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
JICA	Japan International Development Assistance
MAFS	Ministry of Agriculture and Food Security
MAMCOS	Madibira Agriculture Marketing Cooperative Society
MCM	Ministry of Cooperatives and Marketing
MWLD	Ministry of Water and Livestock Development
NAFCO	National Agriculture and Food Company
NEPAD	New Partnership for Africa’s Development
NGO	Non–Government Organization
NIMP	National Irrigation Master Plan
NMTIP	National–Medium Term Investment Programme
PIMU	Project Implementation and Management Unit
SACCO	Savings and Credit Co–operative Organization
SME	Small and Medium Enterprise
TR	Total Revenue

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 (URT, 2004a).

I.3. Irrigation has been identified as one of the key activities in agricultural production. From a potential irrigable area of 29.4 million hectares, only some 292,895 ha (11 percent of the potential area) is currently under irrigation. The development of small and large-scale irrigation has potential, though this must be undertaken within a carefully controlled and monitored system of cost-benefit analysis, and careful 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. The recently completed *National Irrigation Master Plan* (NIMP,¹ URT 2003) and the *Final Draft Report of the Agricultural Sector Development Programme (ASDP) Task Force 1 Working Group on Irrigation* (URT 2004b) have outlined the lessons learnt and future potential for irrigation development. The report notes that irrigation development represents potential in a number of areas for increase productivity and profitability, and constitutes a significantly under-developed tool for poverty alleviation. Improved water management, including irrigation, also responds to one of the main goals of CAADP Pillar 1.

I.4. Furthermore, it is anticipated that Tanzania, being a SADC member state, is expected to benefit from a regional programme promoted by the *African Development Bank* (ADB) to support irrigation and water resource management. The programme would aim to develop small-scale irrigation schemes and water harvesting, improve water management on rainfed agriculture and support capacity building. There is considerable potential, for example, for expanding the use of low cost treadle-pump and drip irrigation systems that are already commercially available in the country.

I.5. This *Bankable Investment Profile* presents the initial proposals for a follow-on investment to an initial investment funded by the government and the *African Development Fund* (ADF) in Mbarali District, known as the *Madibira Smallholder Irrigation Project*. A second phase is proposed, however, the exact scale of the project would depend on water resource availability and the need to further refine project design. Three possible investment scenarios are presented in the BIP, based on the various levels of infrastructure investment associated with full, limited or no new water rights.

¹ JICA/MAFS (2003). *The Study on the National Irrigation Master Plan in the United Republic of Tanzania: Action Plan Report*; Vol. 1. Main Report, September 2003, Dar es Salaam.

I.6. If implemented at full scale, the proposed second phase investment would cover a wider range of critical development areas, including the expansion of the existing irrigated area, improved storage and water control through the construction of a dam at Lugoda on the Ndembera River, the establishment of a mini-hydro-electricity station at Maluluma Falls. At a lower scale of investment, a “medium scale investment scenario”, there would be no expansion of area under irrigation, but similar investments in a water storage dam and hydro-electricity to improve functioning of the existing scheme in the district. A third scenario would concentrate on rehabilitation and improving the efficiency of the current scheme but with no new irrigation or energy related infrastructure investments. All three scenarios would include components on integrated watershed management, improvement in marketing and market infrastructure and a range of investments in improved socio-economic infrastructure and services. The proposed investments will be provisionally known as “*Madibira II*”.

B. Background Information

(i) Strategic Framework

I.7. The overall background to CAADP investment has been presented in the NMTIP report, 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 important contribution.

I.8. Tanzania has a territorial area of 948,000 km², of which on average about 80 percent receives less than 1,000 mm of seasonal, rainfall which sometimes is unreliable. According to the NIMP, out of the territorial area, 2.1 million hectares have high potential, 4.8 million hectares have medium potential, and 22.3 million hectares are of low potential for irrigation development. Currently cultivated area is estimated to be 10 million hectares, of which only about 292,895 ha² are currently under irrigation, or 3 percent of the current cultivated area, which shows that land and water resources are not effectively utilized.

I.9. The income growth of poor people will increase substantially only if it becomes more broadly sectoral-based. That means growth has to come from the agricultural sector including 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.10. 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 loses;

² NMTIP, *cit.*

- 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 Agriculture Development Programme (DADP)* in order to empower the local communities and ensure sustainability.

(ii) **Madibira I**

I.11. The *Food and Agricultural Organization of the United Nations (FAO)* identified Madibira Phase I project in the 1960s during the Rufiji Basin Study. In 1976 the ADB, in conjunction with FAO, mounted an identification mission to the Madibira area which lie within the Usangu plains. The mission’s conclusion was positive about the potential for producing rice on a large–scale basis under irrigation, which has led to the establishment of the *Madibira Smallholder Agricultural Development Project*.

I.12. Following the FAO mission in 1976, a detailed engineering report of the Madibira project was prepared. The Project started with a detailed engineering study in 1985. The study recommended irrigation works and infrastructure development for 3,000 ha, out of which 2,000 ha were to be handed over to the *National Agriculture and Food Company (NAFCO)*, and the rest to the smallholder farmers. Following the *Economic Reform Programme* of 1986, the project was placed entirely under smallholder development.

I.13. Two ADB missions visited Tanzania in November 1992 and in March 1993 to discuss with the Government of Tanzania on the technical parameters and policy framework of the Project. Survey work started again in 1995. After the establishment of the *Project Implementation and Management Unit (PIMU)*, construction work started in 1997. It covered an area of 3,000 ha for about 3,357 families, comprising some 17,660 people. This area has good potential for rice production, although other crops such maize, beans and groundnuts are also grown.

I.14. The land belongs to the village government and is distributed to farmers according to individual requirements. The first crop was harvested at the end of the 1998/99 season and the project construction work was mainly completed in 2000.

I.15. The total investment of the project was TSh31.69bn out of which the irrigation infrastructure amount to TSh12.5bn or 39.4 percent of the total investment. The cost of irrigation infrastructure was about TSh41.7m per ha. The total ADB loan as estimated at appraisal was TSh28.49bn or 89.9 percent of the total investment. The total government contribution was estimated at TSh3.2bn or 10.1 percent of the total investment.

I.16. The project was to be handed over to the farmers living in the project area after its completion in December 2000. However, the project by then had not achieved the necessary levels of capacity building of its beneficiaries for sustainable production. This required project extension for 2 years and initiation of *Madibira Agricultural Marketing Cooperative Society Ltd. (MAMCOS)*. This includes project operations that still required external managerial and technical resources, and the financial know–how to ensure sustainability.

I.17. Madibira Phase I was considered generally to be successful. The yield of paddy has increased from 2.4 t/ha to 5 t/ha and Madibira is currently producing over 15,000 tons of paddy from an area of 3,000 ha. There are, however, some areas of concern. These include the following issues:

- During Phase I implementation farmers were supposed to excavate all the tertiary and field canals and their related drains as their contribution to project implementation. This involved a great deal of earthwork moving and compaction, which was not feasible to farmers. This volume of work should have been given to constructors, because it could not be finished in time and with good quality. On the other hand, farmers could have been assigned more minor works such as maintenance of field canals and field drains.
- The initial design of Madibira Phase I did not adequately consider market outlets, leaving a linkage gap between production and marketing.
- The remoteness of the project area made it difficult to link power input supply from the *National Grid Network*. This obliged the Madibira Phase I scheme to rely on expensive diesel powered generators, raising the cost of milling process to the farmers, and thus hence decreasing their profit margins.
- Erratic rainfall and fluctuating river flows caused uncertainty for the envisaged area to be irrigated at any one time. Lack of available water prevented double cropping and reduced potential yield from the scheme.

I.18. Some farmers were unable to access land for irrigation in the Madibira Phase I and have initiated an informal irrigation scheme of additional 3 600 ha in the area. Unfortunately, these informal schemes have not been very successful due to shortage of water, high seepage rates and flooding in the fields resulting from erratic flow fluctuations in the Ndembera River. Nonetheless, this initiative indicates the interest of farmers in expanding the irrigated area if possible.

II. PROJECT AREA

II.1. The proposed investment area is located in the Usangu plains in Mbarali and Mufindi districts at an altitude of 1,050 m above mean sea level. If built, the proposed Lugoda Dam would be located approximately 50 km upstream of Madibira town.

II.2. The climate is characterized by moderate to high temperatures, low wind speeds and high humidity. There is no cold season. Average mean rainfall is about 660 mm per annum; annual average evapotranspiration is 1,811 mm. The rainfall pattern is mono-modal with the rainy season between November and May.

II.3. The water source for the project area comes from Ndembera River, which could be supplemented by the storage of the proposed Lugoda Dam at Lugoda, Lutali village. Ndembera River is perennial with mean annual flow of 330 million m³ and an absolute minimum flow of 1 m³/s. However, its tributaries, including the Mhumbasi and the Mfyamba, dry up between June and the onset of the rainy season in November. The Mwima Catchment covers 2,460 km² and Ndembera catchment covers 1,831 km².

II.4. The quality of the Ndembera River water is moderately good and moderately suitable for both irrigation and domestic purposes. It is also suitable for leaching of saline soils under improved drainage conditions.

III. PROJECT RATIONALE

III.1. Although Madibira Phase I was successful in many respects, there is significant scope for improvement of irrigation schemes in the Mbarali and Mufindi districts (the Madibira scheme as well as others) and possible expansion of the area under irrigation. The Madibira Phase I scheme obtains water by gravity from Ndembera River, which has high flow fluctuations throughout the year. During high flows it floods the fields causing crop damage, while during low flows there is not enough water for irrigation. Improved water storage through construction of a storage dam at Lugoda would regulate river flows and provide reliable water supply and flood control. Despite the 3,000 ha developed in Phase I, there is still scarcity of improved irrigated land. There is what is considered to be potential irrigable land adjacent to the Madibira Phase I farms: with soils of good water holding capacity. If feasible, the construction of the Lugoda Dam could also bring an additional area of about 3,600 ha under irrigation, which could ease the problem of developed land scarcity. If the dam is not constructed there is still an urgent need to develop water storage structures or improve water retention systems both in the Madibira scheme as well as other irrigation schemes in the district.

III.2. Better environmental management of the water catchment area will be essential to maintaining or improving water resources of the Usangu plains. The programme area has a large number of pastoralists, whose population of cattle is one of the causes of environmental degradation along the Ndembera river as well as catchment areas. Declining forest cover and potentially unsustainable water withdrawal also affect the long term sustainability of water resources.

III.3. Lastly, irrigation investments could be supported by the development of hydropower and socio-economic infrastructure and inputs to provide an integrated rural development programme to boost the local economy and reduce poverty.

IV. PROGRAMME OBJECTIVE

IV.1. The *overall objective* of Madibira Phase II would be to contribute to the enhanced national food security and poverty reduction in the national economy through the development of an integrated rural development programme.

IV.2. The *specific objectives* are:

- To increase agricultural production and improve agricultural marketing in the Mbarali district and thereby increase farmers’ profitability and income;
- To improve rural infrastructure;
- To increase access to health services;
- To increase school enrolment, and
- To improve natural resource management and environmental protection.

V. PROJECT DESCRIPTION

A. Project Components

V.1. Three scenarios are presented for the proposed investment programme: large, medium and small scale interventions where scale refers to the size of infrastructure investments envisioned. Further preparatory work would be required to establish the feasibility and desirability of each of the three scenarios.

Potential Programme Activities	Scenario 1: Large Scale Investment	Scenario 2: Medium Scale Investment	Scenario 3: Small Scale Investment
Expansion of irrigated area through new infrastructure development	X		
The construction of the Lugoda Dam to improve water control and storage	X	X	
The construction of a hydropower facility at the Maluluma Falls to provide electricity	X	X	X
Improving efficiency of existing schemes including rehabilitation of infrastructure and improved management		X	X
The provision of improved agricultural services and institutions	X	X	X
Improved post harvesting and marketing facilities	X	X	X
Improved rural roads	X	X	
Improved health and education facilities	X	X	X
Improved catchment and natural resource management	X	X	X

B. Expansion or Rehabilitation of Areas under Irrigation

V.2. The completion of Madibira phase I has motivated farmers to practice irrigated rice farming. As a result, the 3,000 ha developed in Phase I is insufficient to meet farmers’ demand. Under the large scale investment scenario, large scale infrastructure development, the proposed programme would expand the irrigated area in Madibira Phase II by developing an area of approximately 3,600 ha adjacent to Madibira Phase I. The development of Phase II would target smallholder participation with each household allocated up to a maximum of 5 ha plot. The target would be 5 tonnes/ha yield and some diversification to other crops where appropriate. In addition, other components would support the provision of reliable water, electricity, agricultural services and improved marketing facilities. Under a medium and small scale investment scenario, which would be likely if water availability or technical issues prevent a large new irrigation scheme, no new areas would be targeted for irrigation expansion. Instead, the medium and small scale investment scenarios would aim to improve the efficiency of the Madibira Phase I scheme and other schemes in the Mbarali and Mufindi districts through rehabilitation.

C. Construction of Water Storage Structures

V.3. Construction of a storage dam at Lugoda village would address the problem of water storage, which remains a key constraint in the current irrigation scheme. The dam would regulate and ensure constant water flows. Under the large scale investment scenario, the proposed Lugoda Dam would have a maximum storage capacity of 210 million m³ with 4,800 ha water surface area. Water for irrigation the entire 6,600 ha area will be obtained by gravity from the dam and the Ndembera River. The discharge would be adequate for irrigation an area of 3,000 ha in phase I and 3,600 ha of the proposed expansion of paddy requiring an irrigation unit water requirement of 16.5 m³/s. Under the medium scale investment scenario, a smaller dam would be built with a storage capacity sufficient for the existing 3,000 ha of the Madibira Phase I scheme. The small scale investment scenario would not

finance construction of a dam, but would invest in improved water storage, possibly through rehabilitation or improvement of existing structures, or construction of new small scale structures. The design of the dam or other water storage structures must include extensive social and environmental impact assessment.

V.4. While Madibira Phase I has a Water Right for 7.5 m³/s at peak period, the proposed Madibira Phase II and the proposed Maluluma Falls power generation currently have no Water Rights. These need to be obtained through Rufiji Basin Water Office.

D. Construction of Mini-Hydropower Station at Maluluma Falls

V.5. Under the large and medium scale investment scenarios, irrigation investments would be accompanied by a power generation station. Reviews of the Madibira I scheme noted the lack of electricity as a source of inefficiency as the scheme is forced to use portable generators for processing activities. In order to minimize running costs and maximize on the use of renewable natural resources, a new hydroelectric power station at Maluluma Falls would be financed. Previous studies have shown that the development of *Maluluma Falls Hydroelectric Power Generation Scheme* is feasible. The development of Maluluma Falls would be implemented at the same time as the Lugoda Dam. Total power requirements for Madibira at full development are estimated at appropriately 2 million kWh per annum, with a peak demand of 600 kW. The Maluluma Falls station would be able to produce the required hydroelectric power using two turbines each generating 300 kW. The design of the station would require extensive social and environmental impact assessment.

E. Catchment Protection and Environmental Management

V.6. The catchment that drains into the Ndembera River is inadequately protected and poorly managed. The Miombo forest cover in the catchment is rapidly deteriorating due to uncontrolled charcoal burning and land clearing for dryland crop production. The deterioration of the catchments will inevitably have negative impact on agricultural production in the long run due to reduced the mean annual flows and enhanced peak flood magnitudes.

V.7. As part of its objective, the programme would encourage the principles of sustainable and wise natural resource use and long-term environmental management. The programme would be participatory in nature whereby the community that lives in the project area is made aware of the possible negative environmental impact that may occur during land clearing and construction activities. The formation of farmers’ association would spearhead compatible environmental management programmes. Activities described in this component would be undertaken in all three investment scenarios.

V.8. Protection of catchment areas raises a significant concern over the sustainability of irrigation in the project area. The proposed activities would involve carrying out conservation measures to the indigenous forest, river corridor and catchments, and conduct environmental conservation awareness among the stakeholders/villagers within the catchment and the river course at Mwima River, which are reported to be in danger of destruction by uncontrolled grazing and bush fires. The programme propose that the land be surveyed and declared a forest reserve and replanted with more indigenous trees. The programme would also promote the use improved charcoal stoves in order to minimize use of fuel wood. This would require a participatory approach that would involve all stakeholders, including the Ministry of Natural Resources and the villagers.

F. Agricultural Support Services

V.9. Increasing production in irrigated areas is at the centre of the programme’s activities and requires better technical support services. Paddy yield has improved from an average of 2.4 t/ha to an average yield of 5.0 t/ha under Madibira Phase I. The agricultural services component of the program would focus on improving production and marketing of crops on new or existing irrigated areas. The component would engage in interventions in training on aspects of crop production, water management, agri-business and farm leadership techniques, as well as on farm agronomic demonstrations. This would accelerate the adoption rate of improved crop husbandry practices. Activities described in this component would be undertaken in all three-investment scenarios.

(i) Agricultural Extension Services

V.10. With the improved water supply and cultural practices for production of rice or other high value crops as the main crop, other crops such as sugarcane, vegetables, beans and maize, crop yields will increase. If water availability can be increased, double cropping will be possible, significantly increasing crop production at the full development stage of the farm. Even if area under irrigation is not expanded, farmer would still need advice and irrigation extension services, including the following areas:

- Irrigation water management
- Catchment protection and management
- Choice of crops and crop varieties to be grown;
- Improved crop husbandry practices, including fertility management, soil conservation, organic farming;
- Appropriate plant protection;
- Agri-business, choice of high value crops, credit possibilities and management and market opportunities;
- Effect of nutrient mining and role of organic manure on crop growth.
- Post-harvest handling.

(ii) Provision of Post-harvesting Facilities

V.11. Under the large and medium scale investment scenario, it is expected that production will increase to 18,000 tons of paddy per season or 31,500 tons annually from the additional 3,600 ha, which would be developed. This poses a considerable pressure on the present post-harvest facilities, which would be required to mill about 33,000 tons annually for 13,200 hours or 1,320 days or 3.6 years. With 175 percent cropping intensity, some 57,750 tons of paddy annually would be produced. This corresponds to 23,100 hours or 2,310 days or 6.33 years required to mill annual production. Under the small-scale investment scenario, it is also expected that production would increase as greater efficiency gains are realized.

V.12. The programme would facilitate the introduction of a series of small milling machines with a capacity to handle increased production.³ While the 7,500 tons of paddy produced annually in Phase I can be handled conveniently by the present central milling machine, appropriate small milling machines with a capacity of 0.5 ton/hr handle the remaining 50,250 tons of paddy produced annually. The programme would also facilitate farmer organizations and farmers to access other processing technology as needed.

(iii) Enhanced Capacity of the Farmers’ Organization

V.13. It is important that installation of new irrigation infrastructure be combined with a programme for organization and training of farmers in their use. Physical structures for irrigation alone will not be sufficient for scheme management to realize the full potential of the irrigated land. This is particularly the case for other schemes in the Mbarali district, which are not functioning at full efficiency.

V.14. Farmers’ Organization will therefore be encouraged and empowered, and their management strengthened to improve internal farm control and management. This will be done through a number of different approaches, but based on the useful lessons already garnered through the *farmers field school* approach and from national farmers’ networks such as MVIWATA.

(iv) Improved Market Infrastructure

V.15. Improved market outlets are needed to enhance marketing of farm products and the importation of different inputs to the farm. Farm service roads improvements would improve access to fields during preparation operations and the transportation of both inputs and farm harvests. The large and medium scale investments would finance rehabilitation of two important market roads:

- The 65 km Madibira–Mafinga road, the most reliable and shortest market outlet from the Madibira schemes. This road is a vital communication link for the development of the proposed Madibira Phase II activities and would also be an important market link as a result of increased production expected after the full development of the proposed Madibira Phase II activities.
- The Rujewa–Madibira road, which is 82 km.

V.16. Both roads are in very bad conditions, even for four wheel drive vehicles. The Rujewa–Madibira road is impassable during the rainy season. This component would provide for the construction and upgrading of the road.

(v) Health and Education

V.17. As with the first phase programme, Madibira II will provide support for improved health and education services, with the aim of reducing illiteracy and mortality and morbidity in the programme area. All investment scenarios would finance activities in this component. The details of this component will be determined after a detailed, participatory, needs assessment and analysis has been done.

³ The nature of this facilitation would not involve purchase harvesting and processing equipment by the programme but would be rather aimed at attracting investment and increasing the capacity of organisations such as MAMCOs or the Madibira SACCO to access financial resources for these purposes.

(vi) *Gender and HIV/AIDS Issues*

V.18. Women in the farm area have the principal responsibility of cultivating subsistence crops for family consumption. They also tend household cash crops supplementing family earnings through selling beer, growing grounds etc. In addition to their domestic chores they supplement their family nutrition by growing fruits and vegetables around the house. Apart from beer brewing clubs they are not usually represented in other community organizations.

V.19. Youths of the area expected to get self-employment by intensifying crop production plots and some might be encouraged to become traders of the crops produced. In general, the well-established and sustainable agriculture industry in the area is anticipated to provide employment to the youths and notably women and reduce the vagaries of life.

V.20. However, high incidence of HIV/AIDS in the project area needs urgent attention, and poses a significant risk to the development of the scheme. This is because social interaction as a result of agricultural development activities may increase incidences of HIV/AIDS cases. If this happens, there is a danger that the labour force will be reduced and the project’s objectives will not be met. This calls for serious and massive awareness campaign to the farmers and the rest of the community in the area.

V.21. All three investment scenarios would support activities designed to address key issues of HIV/AIDS in the programme area and include vulnerable groups in improved production activities.

VI. IMPLEMENTATION ARRANGEMENTS

VI.1. The implementation of the proposed project would be led by the Ministry of Agriculture and Food Security with the Mbarali and Mufindi district governments playing a supervisory role over implementation of day to day activities. Under the large and medium scale investment scenarios, the construction of the Lugoda Dam would be supervised by the Ministry of Water and Livestock Development while construction and set-up of a mini-hydro electricity structure will be the responsibility of the Ministry of Energy and Minerals. Construction contracts would be awarded through a process of competitive bidding. Daily programme co-ordination duties will be contracted out to an external consulting firm which would be required to provide staff with hands-on experience as well as specialists with an in-depth understanding of how to support small and medium enterprises (SMEs) in rural areas. The programme would establish close links to private sector players such as agro-processors, transporters, input suppliers, credit providers, saw-millers and forest management experts. It would develop collaborative relationships to specialist organisations and NGOs with experience in developing small irrigation schemes.

VI.2. The programme would assist with the development of sustainable sources of financing for programme. At the District level, local government would co-ordinate and supervise much of the work, but as with the national level, implementation would be sub contracted to local NGOs or private sector service providers with relevant expertise and experience.

VI.3. At the community level, the programme would work with existing farmer groups, or local self-help groups, savings associations or *Savings and Credit Co-operatives* (SACCOs).

VII. INDICATIVE COSTS

VII.1. Although three investment scenarios are presented in this BIP, only the large-scale investment scenario has been costed. Further work would be required to determine the overall cost of the medium and small-scale investment scenarios.

Cost Summary – Large Scale Investment Scenario							
Component	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total (US\$)
1. Training and Capacity Building	350,000	500,000	50,000	50,000	50,000	50,000	1,770,000
2. Lugoda Dam	1,800,000	1,700,000	6,000,000	-	-	-	9,500,000
3. Maluluma Hydro Station	700,000	700,000	2,100,000	-	-	-	4,200,000
4. Consultancies, Market Surveys, Sub-sector Analyses, Monitoring and Evaluation	450,000	400,000	300,000	300,000	300,000	300,000	2,050,000
5. Contracts to Services: irrigation area extension, roads, farm machinery, marketing, health and education etc.	5,800,000	3,700,000	3,500,000	3,500,000	2,500,000	2,500,000	21,500,000
6. Programme Coordination (*)	1,750,000	1,700,000	1,700,000	1,000,000	1,500,000	1,500,000	9,150,000
Total Baseline Costs	10,850,000	8,500,000	8,070,000	7,250,000	6,750,000	6,750,000	48,170,000
Physical Contingencies (2%)							963,400
Price Contingencies (2%)							963,400
Total Programme Costs (US\$)							50,096,800

(*) To include transport costs and other investment equipment.

VIII. PROPOSED SOURCE OF FINANCING

VIII.1. Financing of agriculture, livestock and water development recurrent expenditures come largely from the government while financing of the development expenditure comes almost entirely from the donor support. The financing of the *Madibira Phase II Programme* would be achieved through a blend of government contribution, beneficiaries’ contribution and the external support from incremental financial support solicited through NEPAD/CAADP initiatives. The government would contribute about 15 percent of the total funds, the beneficiaries about 10 percent. The remaining 75 percent will be the contribution of external financiers through grants or loans. The opportunity for private sector investment, especially in machinery services, agro-processing, input supply and technical support services will be encouraged.

IX. BENEFITS

IX.1. The proposed programme will benefit the surrounding population of about 24,200 people who live in, or near to, the project area. They are the beneficiaries in terms of seasonal employment, labour, land, fishing, power supply and catchment protection. The direct beneficiaries will be about 4,600 households.⁴ They will benefit from extending the irrigated area by 3,600 ha (large scale investment scenario only), construction of Lugoda Dam and Maluluma Falls power supply station (large or medium scale investment scenario) and catchment conservation (all scenarios).

⁴ Based on an average of 5.2 people per household.

IX.2. The without project crop yield in the proposed Madibira Phase II area is approximately 2.4 t of paddy/ha depending on the extent of the drought or flood damages. It is anticipated that the target yield for paddy in the proposed Madibira Phase II area would be 5 t of paddy/ha. In the case of the large scale irrigation investment scenario, the anticipated crop production in 3,600 ha with 150 percent crop intensity would yield an anticipated annual production of 27,000 t of paddy.⁵

IX.3. Experiences from the Madibira Phase I show that diesel generated power supply for the post harvest facilities and domestic purposes are very expensive due to high running costs. If shown to be feasible, the construction of a hydropower station at Maluluma Falls, utilizing the regulated flows from the proposed Lugoda Dam, would provide energy benefits to irrigation users as well as the surrounding community.

IX.4. Efficient farm operations in Madibira would need efficient and appropriate farm machinery. The proposed programme would facilitate acquisition of appropriate farm machinery to respond to the need for increased production. Due to the envisaged programme intervention, production would increase and place increased pressure on the present, limited, post harvest facility. In order to ease the pressure, the programme would facilitate private sector capacity to handle the expected increase in production.

IX.5. Open-up of new markets due to improved infrastructure services esp. roads, storage, post-harvest management and power supply.

IX.6. Finally, through participatory forest management and other environmental initiatives, the ecological resources of the area will be managed in a wise, sustained and rational manner. This will secure long-term economic and environmental benefits that would not be realized without the programme’s intervention.

X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. The irrigation development and installation of electricity generating equipment and facilities and the road construction may require Technical Assistance from abroad on short and medium term periods but could be undertaken under local competitive bidding. Some consultancy studies may also require some technical assistance both locally and internationally. The ranges of activities that may need technical support include:

- Designs and construction of the expanded Madibira irrigated area;
- Design and construction of the Lugoda Dam;
- Design and construction of the Maluluma hydropower station;
- Training in specialized areas such as irrigation, market analysis including prices, processing, packaging, storage and farmers’ associations/cooperatives;
- Identification and developing partnership agreements with specialist service providers with proven track record and experience in Tanzania;
- Production and distribution of electricity in the catchment areas;
- Environmental impact analysis of the catchment area.

⁵ Using a price of TSh150,000 per ton, the total revenue would be TSh4.05bn; estimated total cost of production would be TSh1.08bn indicating potential profits of TSh2.97bn.

XI. ISSUES AND PROPOSED ACTIONS

XI.1. This *Bankable Investment Profile* (BIP) requires further refinement and preparation work before it can be finalised as a detailed proposal. Of primary concern is the feasibility or desirability of expanding irrigation within the programme area. These and other issues require further detailed investigation:

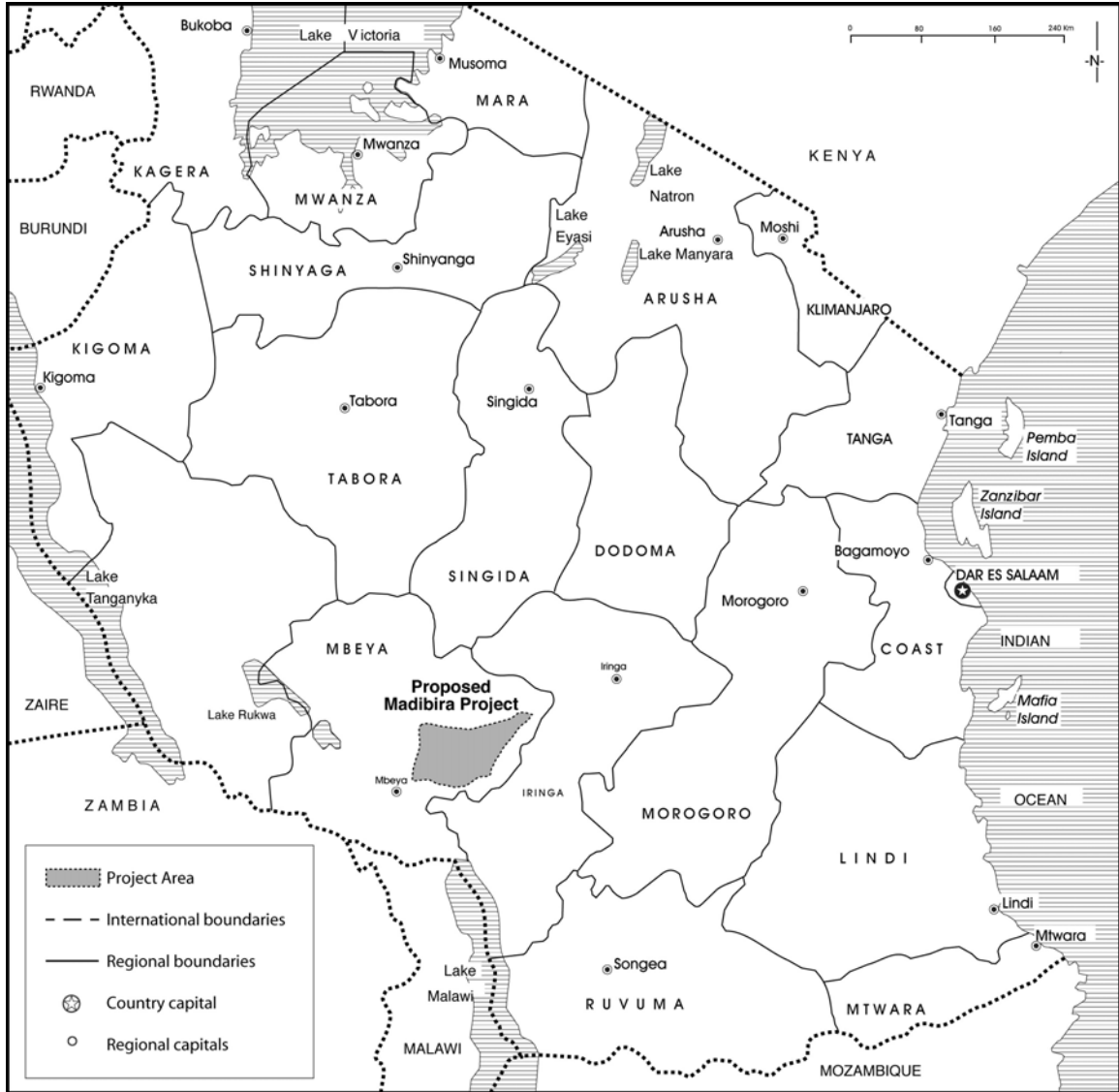
- ***Irrigation feasibility study.*** There is uncertainty about the amount of water available for irrigation in the area, particularly given the needs of other major water users in the area. A feasibility study should be undertaken to assess the availability of water and likelihood of gaining water rights for the scheme proposed under the large scale investment scenario.
- ***Potential service providers.*** This programme would need to develop an extensive network of government and non-government operators, and beneficiaries if it is to achieve its goals. Specialist service providers with experience in small scale irrigation and developing market strategies would be identified and engaged to extend the reach and impact of this programme.
- ***Current market trends for agricultural products.*** A wide variety of agricultural products, such as rice and maize, are currently traded locally, nationally, regionally and internationally. However, knowledge of these existing and potential market opportunities remains patchy, limited and in the hands of a few. There is a need to assess markets for a wide range of agricultural products harvested from the catchment areas.
- ***Implementation structure and options.*** There is a need to further understand how the programme can best be managed and institutionalized within the changing structure of the smallholder farmers in the sector.
- ***Detailed costing.*** Detailed costs of each sub-programme would have to be established. All the cost components would have to be prepared, including design costs, consultancy services, material costs and the labour costs.
- ***Capacity and training needs assessment.*** As skills and knowledge are critical components of programme sustainability, a needs assessment for training and capacity building will be prepared. This would be undertaken before the start of the construction process. The community should feel that they own the scheme.
- ***Environmental Impact Assessment.*** Construction activities of the expanded irrigation area, the Lugoda Dam and the Maluluma Hydropower Station will inevitably be associated with possible negative environmental impact. There also might be some positive impact possible. Detailed *Environmental Impact Assessments* (EIAs) should be therefore carried out for each type of investment in order to ascertain that the potential risks, and to determine appropriate mitigation measures.

XII. POSSIBLE RISKS

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

- The HIV/AIDS pandemic which may result in huge loss of trained staff and reduced livelihood opportunities among the beneficiaries;
- Unwillingness of farmers to form groups such as associations or cooperatives to ensure the institutional sustainability of the programme;
- The possible conflict of interest among the beneficiaries on how to utilize the water in the dam; usage for electricity, irrigation, fishing and local household consumption in the absence of clear water rights;
- Delay or reluctance of the government to contribute its share in time and in full amount;
- Unwillingness of the private sector to participate in low profit making activities;
- Inability of the beneficiaries to contribute their share. Out of the total cost of TSh50bn over the six years, beneficiaries will have to contribute 15 percent i.e. TSh5bn or TSh833.3m per year, although part of it will not necessarily be financial, e.g. labour;
- Negative environmental impact;
- Inherently high costs of irrigation development in Tanzania making the investment uneconomic.

Appendix 1: Map of Tanzania Showing the Project Area



TCI-TCP/URT/2908-1/05-05

Appendix 2: List of References

1. **URT.** (Undated) *Phase II Activities for the Sustainability of the Madibira Smallholder Irrigation Scheme*, Concept Paper.
2. **URT.** 2003. *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.
3. **URT.** 2004a. *National Medium–Term Investment Programme for NEPAD’s Comprehensive Africa Agriculture Programme*. Ministry of Agriculture and Food Security, Dar es Salaam.
4. **URT.** 2004b. *Irrigation Development in Tanzania*, Final Draft Report. ASDP, Dar es Salaam.