



**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 REPUBLIC OF ZIMBABWE

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

**TCP/ZIM/2905 (I)
(NEPAD Ref. 04/02 E)**

Volume IV of VII

BANKABLE INVESTMENT PROJECT PROFILE

Rehabilitation of Smallholder Irrigation Schemes

November 2004

ZIMBABWE: Support to NEPAD–CAADP Implementation

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

Bankable Investment Project Profiles (BIPPs)

Volume II: Agro–Dealer Network Development

Volume III: Smallholder Irrigation Development

Volume IV: Rehabilitation of Smallholder Irrigation Schemes

Volume V: Increased Crop Production and Diversification

Volume VI: Livestock Disease Control

Volume VII: Livestock Feeds Processing

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Zimbabwe

Sector of Activities: Agriculture

Proposed Project Name: **Rehabilitation of Smallholder Irrigation Schemes**

Project Location: Natural Regions III, IV & V

Duration of Project: 5 Years

Estimated Cost: Foreign ExchangeUS\$54.4 million
Local Cost.....US\$36.3 million
Total US\$90.7 million

Suggested Financing:

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	9.1	10
<i>Financing institution(s)</i>	54.4	60
<i>Beneficiaries</i>	9.1	10
<i>Private sector</i>	18.1	20
<i>Total</i>	90.7	100

ZIMBABWE:
NEPAD–CAADP Bankable Investment Project Profile
“Rehabilitation of Smallholder Irrigation Schemes”

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Abbreviations

ARDA	Agriculture and Rural Development Authority
AREX	Department of Research and Extension
BIPP	Bankable Investment Project Profile
CAADP	Comprehensive Africa Agriculture Development Programme
DDF	District Development Fund
DI	Department of Irrigation
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GoZ	Government of Zimbabwe
MARD	Ministry of Agriculture and Rural Development
MCM	Million Cubic Metres
MFPE	Ministry of Finance Planning and Economic Development
NEPAD	New Partnership for Africa’s Development
NGO	Non-governmental Organization
NMTIP	National Medium–Term Investment Programme
NR	Natural Region
O&M	Operation and Maintenance
ZINWA	Zimbabwe National Water Authority

I. PROJECT BACKGROUND

A. Project Origin

I.1. The project idea originated from the *Ministry of Agriculture and Rural Development* (MARD) as one of the key strategies to overcome the natural constraints of inadequate and unreliable rainfall in the dry areas of Zimbabwe. These restrict the potential for the development of rainfed agriculture on which the livelihoods of most smallholder farmers in communal and resettlement areas depend. The immediate origin of the project was the National Stakeholders’ Workshop held in Harare in March 2004 in support of the NEPAD–CAADP process. The purpose of the workshop was to validate the draft *National Medium–Term Investment Programme* (NMTIP) and agree on the priority areas for investment in agriculture in which *Bankable Investment Project Profiles* (BIPPs) could be prepared. The MARD, in conjunction with the FAO, convened the workshop. Workshop participants were drawn from government ministries, agricultural institutions and associations, donors and the private sector. The workshop identified the rehabilitation of existing irrigation schemes and harnessing water in existing dams for irrigation purposes, particularly for smallholders, as one of the high priority areas in which an investment project could be formulated. This project proposal focuses on rehabilitating existing irrigation schemes.

B. General Information

I.2. *Agriculture and the Economy.* Agriculture is the dominant sector in the economy of Zimbabwe, accounting for, on average, about 18% of the Gross Domestic Product (GDP). However, this relatively moderate share of GDP is deceitful in that it does not fully show the real importance of the agricultural sector. The sector:

- employs or is the main source of income for up to 70% of the people of Zimbabwe;
- is the main source of domestic food supply and therefore plays a critical role in household and national food security;
- accounts for about 40%–50% of export merchandise and hence is an important source of foreign exchange; and
- supplies 60% of industrial raw materials.

I.3. *Agro–ecological Zones.* Zimbabwe is classified into five regions of differing agro–ecological potential called Natural Regions (NR). NR I receives more than 1,050 mm of rainfall per year; NR II receives 700 mm–1,050 mm; NR III receives 550 mm–700 mm; NR IV receives 450 mm–600 mm; and NR V receives less than 500 mm (Vincent and Thomas, 1961). In terms of land fertility, the areas most suitable for agriculture are located in regions I, II and III. In the old resettlement areas, there was a bias towards the drier regions III and V where rainfall is the lowest and rainfed agriculture is risky. However, in the newer resettlement areas, farmers have access to prime land, particularly in Manicaland and Mashonaland provinces. The major characteristics of the five NRs are summarized in the Appendix.

I.4. *The Irrigation Subsector.* Irrigation agriculture in Zimbabwe has long been recognized as crucial to agricultural development. Before 1980, priority was placed on water development, in particular supporting dam construction and providing concessionary loans for irrigation development for the large–scale farms. The resultant water and irrigation development has been a decisive factor in the production of strategic crops such as wheat and sugar cane and, more recently, the production of

high value crops, particularly horticulture and tobacco. However, irrigation development in the small scale farming areas is still largely constrained by the historical imbalances in land and water, lack of investment in infrastructure and poor support services.

I.5. Since independence in 1980, the Government of Zimbabwe (GoZ) has increasingly recognized the potential role of irrigation for smallholder development, particularly as 75% of the drought-prone communal areas lie in Natural Regions IV and V, which receive an average of 600 mm or less of rainfall a year. The droughts of 1986/87, 1991/92, 1993/94 and 2002/03 seasons had the most devastating effects on communal and resettlement areas, where in spite of high population densities, water and irrigation development are at a rudimentary stage of development.

I.6. Zimbabwe is estimated to have untapped irrigation potential of about 250,000 ha. The land-reform and resettlement programme has transferred a considerable amount of irrigation potential from the large-scale commercial sector to the resettlement sector under models A1¹ and A2² as shown in Table 1.

Sector	Land reform (area in ha)		Average landholding (ha)
	Before	After	
Large-scale commercial	126,000	67,178	>100
Commercial settler scheme	1,914	1,914	>10-100
Small-scale settler (outgrowers)	1,271	16,271	2-10
Parastatal estates	12,992	2,992	>600
Communal	10,806	0,806	0.1-2
A1 Resettlement model		3,460	0.1-2
A2 Resettlement model		3,354	(*)
Total	152,983	165,975	
(*) size varies			

I.7. **The Major Irrigation Systems.** There are four main irrigation systems.

- **The Large-scale Commercial Irrigation System.** This is mainly practised by private individuals, groups or companies irrigating on farms generally larger than 100 ha and up to several thousand hectares, as on the sugar estates in the lowveld. This group has generally proceeded by way of developing their own water resources or utilizes water stored in many of the government dams, particularly the large ones. Funding for development of infrastructure has generally been achieved through private efforts. The technologies used in this subsector are mainly pumped irrigation systems irrigating tobacco, wheat, sugar cane and a large variety of horticultural crops. Most of the farms in this system have been acquired for resettlement under the fast-track land reform programme and, in the process, some of the irrigation infrastructure has been damaged.
- **The Parastatal Managed Irrigation System.** This is mainly located in the communal areas and is managed by the *Agriculture and Rural Development Authority (ARDA)*. The government plays a major role in developing these schemes and ensures water supplies from government-developed dams. This system uses both overhead and surface irrigation systems to irrigate cotton, wheat, sugar cane, beans and a variety of horticultural crops. Some of the schemes are operating below capacity because of managerial problems,

¹ “Villagized” or individual, small-scale resettlement model.

² Self-contained, medium to large-scale commercial farm resettlement model.

operational constraints like old equipment and scarcity of spare parts and lack of adequate funds.

- **The Small-Scale Commercial Irrigation System.** This is located adjacent to and operationally linked to the ARDA estates and the sugar cane estates in the Lowveld, with individual farm sizes varying from 2 ha to 10 ha. This subsector uses surface irrigation systems to irrigate sugar cane, coffee and tea. Many of the schemes are operating below capacity because of management problems, operational constraints like lack of spare parts, the high cost of inputs and poor access to affordable credit.
- **The Communal and Resettlement Irrigation System.** This system is being developed by the government, NGOs and missionary societies or by the communities themselves, in some cases with donor support. Plot sizes on these schemes vary from 0.1 ha to 2 ha. The irrigation systems used in this category are mainly surface — irrigating maize, cotton, beans, tomatoes and other horticultural crops for home consumption and markets. The majority of the schemes in the communal areas are relatively old, ranging from 30-50 years of age. The majority of the infrastructure in these schemes has thus outlived its lifespan and needs to be rehabilitated. Some of the infrastructure in various schemes has deteriorated faster than expected because of the following major factors:
 - inadequate maintenance budget from the government;
 - poor operation and management by farmers; and
 - poor workmanship during construction.

I.8. **Government Policy.** The *National Economic Recovery Programme* (NERP) document, which spells out Zimbabwe’s strategy for economic recovery, singles out irrigation as the most important and necessary (though not sufficient) cornerstone for agricultural development, hence the key to agriculture-led economic recovery, given the country’s vulnerability to droughts and the high risk of rainfed agriculture. GOZ’s broad strategy and policy objectives for the irrigation subsector are to:

- contribute to poverty alleviation by targeting resource poor smallholder farmers so as to enhance farm incomes;
- increase agriculture production and enhance food security at the household level by ensuring some crop production during droughts and the dry seasons;
- extend cropping opportunities and provide a wider variety of crops in both wet and dry seasons (all year round cropping) to improve nutritional status, especially of children and women;
- create an enabling environment for irrigated agriculture by facilitating and encouraging the private sector to invest in irrigation development, and encourage rural communities to own and manage irrigation projects thereby fully utilizing the irrigable land in Zimbabwe; and
- enhance human capacity for irrigated agriculture in the public, parastatal and private sector.

I.9. The policy also aims at creating the spirit of business culture in the smallholder sector by promoting and providing competitive financing of irrigation projects and improving the produce marketing system at national and international levels.

C. Institutions

I.10. The various institutions involved irrigation activities in Zimbabwe and their current respective roles are summarized in Table 2.

Table 2: Zimbabwe – Institutions Involved in Irrigation Development	
Institution	Responsibility
Zimbabwe National Water Authority (ZNSWA)	Allocation of water for agriculture and construction of dams
Department of Irrigation, MARD	Procurement of equipment; supervision of construction and coordinating programmes; providing extension support to farmers
Department of Research and Extension (AREX)	Identification of potential beneficiaries, supervision of construction
Department of Agricultural Engineering	Supervision of construction
District Development Fund (DDF)	Transportation of equipment
Reserve Bank of Zimbabwe	Funding
Agricultural and Rural Development Authority (ARDA)	Transportation and storage of equipment, supervision of construction
Private sector	Manufacturing, sale and installation of equipment; financing of irrigation estate development
NGOs	Input and equipment supply and training

D. Constraints and Opportunities

I.11. The main *constraints* include:

- The difficult macro-economic environment is a disincentive to long-term investments like irrigation infrastructure.
- Establishing and managing irrigation works is too expensive for resource-poor communal farmers. As a result, there has been over-dependency on the government to develop and manage smallholder irrigation schemes, which is not sustainable in the long run.
- Lack of secure land tenure arrangements prohibits long-term investment in irrigation by well-resourced farmers and other entrepreneurs interested in joining farming. This situation also undermines easy access to credit as banks prefer to lend against title deeds as collateral.
- The relatively high prevalence of HIV/AIDS among the rural population and service providers is adversely affecting the agricultural labour force and government extension delivery.
- Lack of cooperation between farmers in the newly resettled areas regarding sharing water, irrigation infrastructure, as well as operational costs like water and electricity bills. Some irrigators are denied servitudes to convey water across other people’s fields, a problem which has been compounded by lack of experience in utilizing and managing water at both the field and catchment level.
- There is a lack of appropriate technology for the smallholder farmers.
- There are poor agronomic practices in small-scale irrigation (e.g. the use of low yielding crop varieties and limited use of chemical fertilizers).
- There is insufficient research into appropriate irrigation systems, equipment and farm management for smallholder farmers.

- Inadequate human resources development both at technician and farmer level.
- Rural infrastructure to facilitate input procurement and produce marketing is not well developed (e.g. roads, telecommunication and electricity).
- Transport is either unavailable or, where available, very expensive
- Poor catchment management causes siltation of some water bodies.
- There is a lack of decentralized irrigation services in rural areas.
- There is an absence of rural credit facilities for both capital and recurrent expenditures.
- Infrastructure is utilized under unclear arrangements. This also applies in the newly resettled areas, worsened by the fact that plot allocation in the newly resettled areas did not take account of the irrigation schemes, resulting in severe management problems.
- Policy incentives to invest in water saving technologies are lacking. For example, there are no incentives to facilitate the local manufacture of some irrigation equipment or components and related ancillary services.
- The irrigation industry is facing operational problems, lack of spare parts and lack of enforcement of quality standards.

I.12. Major *opportunities* include:

- GoZ continues to show a keen interest in irrigation development.
- There is high potential to increase smallholder crop yields and hence production and productivity.
- Considerable potential for farmers to venture into high-value diversified crops such as vegetables, which is not possible under rainfed cultivation.
- There are local and export markets for irrigated agricultural produce.
- There is unexploited irrigation potential in the form of water and land.

E. Ongoing and Planned Irrigation Programmes

I.13. GoZ is spearheading irrigation development by targeting 100,000 ha for the production of winter wheat to meet the country’s wheat requirements. Some 33,000 ha of the targeted area requires rehabilitation and Z\$85 billion has been allocated by the Reserve Bank of Zimbabwe for this purpose.

I.14. In addition to rehabilitation, the Department of Irrigation is increasing the area of smallholder irrigation through the development and rehabilitation of 46 smallholder schemes with a total irrigated area of 5,200 ha. For these projects the government has allocated Z\$70 billion this year.

I.15. There are no significant ongoing or planned donor-funded programmes in the subsector. A number of donor supported development projects were halted following suspension of disbursements by some donors/lenders for non-payment of arrears and, for some, because of political differences with GOZ.

II. PROJECT AREA

II.1. **Location.** The irrigation schemes/facilities being proposed for rehabilitation lie in Natural Regions III, IV, and V where rainfed agriculture is a very risky exercise (particularly in the latter 2 Regions) and the need for irrigation is highest. The Regions lie in low lying plains and valleys with altitudes ranging between 600 m–1,600 m above sea level. They experience very low and erratic rainfall and experience very high temperatures and evapo–transpiration. They are subject to periodic droughts and dry spells; annual rainfall is less than 600 mm/year in Natural Regions IV and V and ranges between 650–800 mm/year in Natural Region III. The three Natural Regions together constitute 83% of Zimbabwe’s land area and have 91% of the country’s communal lands area.

II.2. **Justification for Choice of Schemes for Rehabilitation.** The schemes have been selected for the following reasons.

- The schemes were constructed 20–40 years ago. The infrastructure has therefore outlived its useful life span and has deteriorated extensively.
- Most of the schemes are in drought prone areas where the need for irrigation is greatest.
- With the level of deterioration of irrigation infrastructure the schemes are no longer meeting the objectives for which they were developed namely, reducing levels of poverty among the farmers and enhancing food security at the household level.
- The irrigation facilities in the former large scale commercial farms contributed significantly towards the national needs for wheat, soybean and horticultural crops. The majority of the facilities have now been taken over by the new farmers under the A1 and A2 resettlement models. However, the irrigation infrastructure in these schemes has either been neglected or vandalized beyond use in its current state. There is therefore a need to resuscitate irrigated farming in the newly resettled areas thereby enhancing national food security and export earnings from high value crops, such as horticulture, grown on those farms.

II.3. **Target Group and Schemes Selected.** The rehabilitation effort will be carried out on six irrigation schemes covering 1,279 ha in area and will target 2,900 farmers, including men, women and youth. The selected schemes and some key information about them are shown in Table 3 below. The project will also target 33,000 men, women and the youth who have been resettled on 66,000 ha on former commercial farms whose irrigation infrastructure is either too old or has been neglected, damaged or vandalized.

Table 3: Irrigation Schemes Selected for Rehabilitation

Scheme	Natural region	Province	Area (ha)	Water source	Water abstraction method	No. of farmers	Management
Silalabuhlwa	V	Mat South	440	Dam	Gravity	880	Farmer managed
Makonese	V	Masvingo	61	Dam	Pump/gravity	383	Farmer managed
Magudu	V	Masvingo	54	Dam	Gravity	172	Farmer managed
Chibuwe	V	Manicaland	304	River	Pump/gravity	375	Farmer managed
Rupangwana	V	Masvingo	300	River	Pump/gravity	600	Farmer managed
Kwalu	V	Mat South	120	River	Pump/gravity	240	Farmer managed
A1 and A2 Resettlement Irrigation Projects	III, IV & V	All Provinces	66,000	River, dam, and boreholes	Overhead and gravity	33,000	Farmer managed
Total			67,279			35,650	

II.4. A summary description of the schemes is given below.

- ***Silalabuhwa Irrigation Scheme***, with an area of 440 ha, is located in Insiza District of Matebeleland South Province under Chief Sibasa covering wards 3 and 11. The area is accessed via the Insiza District centre town of Filabusi and is situated approximately 32 km along the Filabusi–Gwanda gravel road. The scheme lies in agro–ecological Region IV and has average annual rainfall of around 450 mm.
- ***Makonese Irrigation Scheme*** was developed in 1971 and started operating in 1973. The scheme is situated in Ward 9 of Chivi district in Masvingo province. It is 7 km south of the Masvingo– Zvishavane highway. The scheme, which is in Natural Region V, is 61.4 ha in size and has 383 plottolders, 188 of whom are women. The plot sizes range from 0.1–0.6 ha. Irrigators hold one or more plots on each of the four blocks A, B, C1 and C2. The scheme is farmer managed and follows a cropping programme decided by the irrigators with the assistance of the Agricultural Extension Officers. The crops grown include grain and green maize, sugar beans and cotton in summer, and green maize, vegetables and sugar–beans in winter. The scheme has also moved on to production of winter wheat with the assistance of GMB, which provides inputs on a loan basis.
- ***Magudu Irrigation Scheme*** is in Masvingo district of Masvingo province. It lies in Natural Region IV which experiences fairly low rainfall (450 mm–650 mm annually), and is subject to periodic seasonal droughts and severe mid–season dry spells during the rainy season. The scheme was constructed in 1992 and became operational in 1993. The total developed area is 54 ha. There are a total of 172 plottolders, each apportioned 0.3 ha on average. The scheme is farmer managed. Water is conveyed from Magudu dam to the night storage dam and from the night storage dam to the plots by gravity.
- ***Chibuwe Irrigation Scheme*** is in Natural Region V in Manicaland Province. It was constructed in 1937 and is currently holding 375 plottolders on 304 ha of irrigated land. The scheme pumps water from the Save River. All broken secondary and infield canals as well as distribution boxes need to be replaced. The biggest problem is the frequency of breakdowns of the four pumping units.
- ***Rupangwana Irrigation Scheme*** was constructed in 1979 in the drought–prone area of Natural Region V. The scheme pumps water from the Save River. The pumping unit needs to be replaced and all broken secondary and infield canals have to be replaced. The biggest problem is the pumping unit that fails to deliver adequate water to the irrigators.
- ***Kwalu Irrigation Scheme*** pumps water from the Umzingwane River. The scheme has never had full irrigation of the available 120 ha, even when it was first constructed. The major problem is the pumping facility that cannot deliver adequate water to meet the requirements. As a result there is no irrigation at the scheme and, as a result, it has been abandoned by the irrigators.

II.5. ***Summary Description of Resettled Farm Irrigation Infrastructure.*** The infrastructure in the resettled farms is mainly for overhead irrigation systems. Under the land reform programme, farmers have been resettled in the former large–scale commercial farms the majority of which have irrigation infrastructure that has been neglected and/or vandalized or damaged. Moveable pipes, risers and sprinklers, pumps and electric motors need to be replaced. Water sources such as dams need to be maintained. In a number of instances, the irrigation infrastructure was designed to support one farming unit and not many sub–divided farms as is now the case. In some cases, there is a need to redesign the infrastructure to suit many different users instead of one.

III. PROJECT RATIONALE

III.1. Zimbabwe is predominantly an agrarian country that relies heavily on agriculture for food security, economic growth and development. Growth in agriculture is necessary for macro-economic stability, broad based economic development, poverty reduction and food security. Inadequate and unreliable rainfall in the dry areas of Zimbabwe restrict the potential for development of rainfed agriculture on which the livelihoods of most smallholder farmers in communal and resettlement areas depend.

III.2. The NERP strategy document highlights the fact that Zimbabwe has in the past suffered from the vagaries of droughts, against a background of vast bodies of water (dams and river systems) that remain un-utilized by the local community and the nation at large. It highlights irrigation as the one single most important cornerstone for agricultural development, hence the key to agriculture-led economic recovery, given the country’s vulnerability to droughts and the high risk of rainfed agriculture.

III.3. The rehabilitation of irrigation infrastructure in the smallholder schemes and resettled farms will resuscitate agricultural production on those lands and enable them to be productively and gainfully exploited.

III.4. The project thus constitutes a major stride in the country’s efforts to achieve optimum utilization of the available resources (land, water and infrastructure) to address the problems of food insecurity, poverty, hunger and malnutrition. The project will address the problem of low agricultural land and labour productivity. In addition to raising yields and improving the quality of produce, irrigation will lengthen the production season thus enabling intensification and diversification of agricultural production. These objectives cannot be attained in schemes with old infrastructure and poor farmer organization; hence the need for rehabilitation, inputs support and agricultural services delivery improvement.

III.5. The information compiled by AGRITEX (the precursor of AREX) shows that smallholder irrigated agriculture could be profitable if appropriate water management techniques are followed, proper and farmer participatory management methods are pursued and appropriate agronomic practices are implemented. Low yields being realized in some schemes at the moment are due to unreliable water supplies caused mainly by infrastructure deterioration, lack of participatory scheme management and other social factors which, if they were to be addressed, irrigation potential would be fully and gainfully exploited.

IV. PROJECT OBJECTIVES

IV.1. The *overall objective* of the project is to increase agricultural production and productivity and incomes, particularly of smallholder farmers, through the rehabilitation of irrigation schemes.

IV.2. The *specific objectives* are to:

- rehabilitate some farmer-managed irrigation schemes constructed by the government in the past but which are no longer functional or are operating below capacity for various reasons;
- enhance household food security and self-sufficiency through increased productivity of agriculture, particularly by smallholder agriculture, in drought prone areas;

- create employment opportunities for rural people by promoting agricultural production and agro–industrial growth and development in the rural areas of the country;
- build up farmer capacity through training in the efficient planning, operation and maintenance of the irrigation systems including on–farm water management.

IV.3. The above objectives would be achieved through:

- the rehabilitation of 1,279 ha of existing smallholder irrigation schemes;
- the rehabilitation of 66,000 ha of irrigation under the A1 and A2 resettlement farm models.
- the improvement of farmer access to agricultural inputs and support services; and
- capacity enhancement of smallholder farmers to operate and manage productive irrigation schemes on a sustainable basis.

V. PROJECT DESCRIPTION

V.1. The project will run for five years and will be composed of the following five components.

Component 1: Rehabilitation of Irrigation Infrastructure

V.2. This component will target the rehabilitation of six irrigation schemes.

- ***Silalabuhwa Irrigation Scheme (440 ha)***. The project will rehabilitate the entire obsolete irrigation scheme so as to improve yields by ensuring that the desired crop does not suffer from moisture stress conditions. The rehabilitation works will involve the levelling of the entire 440 ha, lining of 5 night storage dams with a diameter of 20 m and a depth of 3 m, lining of the 10 km main supply canal from the water source and that of 13 km infield canals on the edge of the fields. Another 12 km earth furrows that convey water from the field edges to the actual planted area will be constructed. The irrigation water will be drawn from Silalabuhwa dam by gravity abstraction and this will completely eliminate costs of pumping water. The project will provide 20 ventilated blair toilets to be evenly spread on the 440 ha as a measure to reduce incidences of water borne diseases. The whole scheme will be surrounded by a boundary to prevent unauthorized entry by stray domestic animals and wildlife.
- ***Makonese Irrigation Scheme (61 ha)***. The project will:
 - Rehabilitate the 30–year old Makonese dam which is currently silted, reducing dam capacity by about 60%. Therefore the major rehabilitation activity is to raise the dam wall.
 - Acquire a spare water pump because if one of the existing pumps breaks down, water delivery to the scheme is reduced accordingly by half. The collar joints on the pipe section that crosses the spillway are heavily corroded and will be replaced by the project.
 - Remove water weeds that have reduced the night storage dam’s capacity by about 30%.

- Replace about 50% of the canal length in sections that have cracks.
 - Carry out building repairs, particularly the hall for the farmer’s meetings.
 - Replace 1,100 m of heavily damaged (from old age) distribution and infield canals.
 - Repair and maintain 1,200 m of the distribution and infield canals.
- ***Magudu Irrigation Scheme (54 ha)***. The project will:
 - Replace the fencing (to stop animals from trespassing) on both sides of 8 km lined canal.
 - Repair the northern side of the night storage dam which has been corroded by wave action; replace the fence around the dam and replace the dam’s gate valve.
 - Repair and maintain 1,100 m of the distribution and infield canals.
 - Upgrade a total of 500 m of storm drain to divert storm water from flooding irrigated lands and canals; install a length of 7 km of diamond mesh wire, 1.2 m high to prevent small livestock from destroying irrigated crops.
 - ***Chibuwe Irrigation Scheme (304 ha)***. The project will:
 - Replace the 4 pumping units which currently breakdown frequently and disrupt irrigation operations.
 - Replace the broken secondary and infield canals and distribution boxes.
 - ***Rupangwana Irrigation Scheme (300 ha)***. The project will:
 - Replace the old pumping unit which is disrupting irrigation operations
 - Replace the broken secondary and infield canals and distribution boxes.
 - ***Kwalu Irrigation Scheme (120 ha)***. The project will:
 - Install a new pumping unit.
 - Reconstruct all broken secondary and infield canals and distribution boxes.
 - Construct blair toilets.

Component 2: Rehabilitation of Resettled Farm Irrigation Facilities

V.3. Resettled farmers cannot use the irrigation facilities in their current state. The project will rehabilitate the facilities by reopening dams and the irrigation water distribution infrastructure as well as replacing missing irrigation equipment such as hydrants, pipes, risers and sprinklers, pumps and electric motors.

Component 3: Inputs Supply

V.4. In order to fully exploit the irrigation potential, farmers in the developed schemes will be required to apply the appropriate agricultural inputs such as seed, fertilizer and chemicals. The project will avail to them, through the appropriate financial institutions like AGRI Bank, a line of credit from which they can borrow to finance their input requirements. The line of credit will also help them finance the land preparation requirements like hiring of tractors or acquisition of draught oxen.

Component 4: Agricultural Support Services

V.5. The farmers would require some backstopping from the national extension service institution (AREX) on various aspects of irrigated crop production including among others, agronomy, on-farm water management and marketing. The project will facilitate the delivery of such services through the provision of logistics and staff allowances.

Component 5: Capacity Building in Irrigation Development and Management

V.6. This project will be farmer managed with support from the relevant technical arms of the government, viz., DI and AREX. There will therefore be a need to strengthen the capabilities of field technicians of these departments and farmers involved by offering them technical training in implementing irrigation agriculture operations and marketing. They will receive on-the-job training from people experienced in planning and implementing smallholder irrigation systems and technologies. To improve farmer own scheme management, the farmers will be assisted in the formation and management of Water Users Associations.

VI. INDICATIVE COSTS

VI.1. The project will cost about US\$90.7 million over a 5-year implementation period. Table 4 below gives the indicative estimated costs per component. About 60% or US\$54.4m will be in local costs and 40% or US\$36.3m will be in foreign exchange. The costs have been derived from reports and experiences of the DI of MARD who have designed and implemented such projects in the past. Where information is limited and/or lacking, professional estimations have been used basing on prevailing market prices.

VI.2. Average rehabilitation costs are working out at an average of about US\$4,133 per ha for the schemes and US\$500 per ha for the resettled farms. These are in line with experiences elsewhere in Zimbabwe.

Component	Cost (US\$ million)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Irrigation infrastructure development						
– Silabuhlwa	44.0	44.0	44.0	44.0	44.0	220.0
– Makonese	213.0	54.0	53.0	53.0	54.0	427.0
– Magudu	14.0	13.0	–	–	–	27.0
– Chibuwe	875.0	875.0	584.0	584.0	584.0	3,502.0
– Rupangwana	30.0	30.0	30.0	30.0	30.0	150.0
– Kwalu	192.0	192.0	192.0	192.0	192.0	960.0
Sub-total	1,368.0	1,208.0	903.0	903.0	904.0	5,286.0
2. Rehabilitation of resettled farms irrigation facilities	6,600.0	6,600.0	6,600.0	6,600.0	6,600.0	33,000.0
3. Farmer training	150.0	150.0	150.0	150.0	150.0	750.0
4. Input supply	5,900.0	5,900.0	5,900.0	5,900.0	5,900.0	29,500.0
5. Support services	800.0	800.0	800.0	800.0	800.0	4,000.0
Total base cost	14,818.0	14,658.0	14,353.0	14,353.0	14,354.0	72,536.0
Physical contingencies	1,481.8	1,465.8	1,435.3	1,435.3	1,435.4	7,253.6
Price contingencies	2,222.7	2,198.7	2,153.0	2,153.0	2,153.1	10,880.4
Total	18,522.5	18,322.5	17,941.3	17,941.3	17,942.5	90,670.0

VII. PROPOSED SOURCES OF FUNDING

VII.1. GoZ, international and domestic financial institutions, NGOs, the private sector and beneficiaries will finance the project. The government will provide US\$9.1m (10%) of total project financing; the donors/IFIs will provide US\$54.4m (60%); the beneficiaries will provide US\$9.1m (10%); and the private sector will contribute US\$18.1m (20%) of total costs.

VII.2. IFIs/Donors such as IFAD, the World Bank, JICA and the EU have supported irrigation activities in the past and will likely be interested in contributing towards the funding for this project.

VII.3. Aspects of the rehabilitation work which require unskilled labour such as digging pipe trenches, canal construction and erecting fences will be carried out by the beneficiary farmers as their contribution towards project cost. Also the neighbouring communities could be mobilized to provide labour and be paid in food rations. Farmers should be empowered to maintain the infrastructure such as canals by themselves without external assistance after rehabilitation. For operation and maintenance of the schemes, farmers should meet the running costs in full or in part provided a proper system is set up for that purpose. This will necessitate establishing maintenance procedures by farmers after rehabilitation.

VIII. PROJECT BENEFITS

VIII.1. The main project benefits are expected to be:

- Increased agricultural production and productivity because of a substantial reduction in the risks associated with rainfed agriculture.
- The farmers will be able to grow a diversified range of crops all year round.
- Improved food security and nutrition.
- Boosting of rural incomes and reducing poverty among the participating farmers.
- Increased rural agricultural trade and commerce.
- The provision of irrigation facilities will bring the communal farmers into the mainstream of irrigated agriculture.
- Increased irrigated agricultural knowledge among farmers and government technicians.
- Increased agro-processing activities because of higher volumes of raw materials from farmers.

IX. IMPLEMENTATION ARRANGEMENTS

IX.1. The project will be housed in the *Ministry of Agriculture and Rural Development (MARD)* which will have overall responsibility, in collaboration with the private sector and farmer organizations, for planning, coordinating, monitoring and evaluation of the project. An inter-ministerial committee chaired by a senior official from MARD would have oversight responsibility for the project.

IX.2. The *Zimbabwe National Water Authority (ZINWA)*, which is mandated with the construction of major dams and allocation of water for agricultural purposes, will offer technical guidance and supervision to the project as regards the water rights and the design and construction of dams and pumping stations.

IX.3. Responsibilities of other Ministries and government agencies involved in the water sector will be as follows:

- *Ministry of Finance, Planning and Economic Development (MFPED)* will be responsible for the mobilization of resources for the project including coordination of donor inputs.
- The *Department of Irrigation (DI)* of MARD will be responsible for providing the irrigation officers who will be engaged in the physical implementation of the project as well as trainers in planning, design and construction.
- The *Department of Agricultural Research and Extension (AREX)* of MARD will be responsible for providing extension services to the farmers on various aspects of irrigated farming including pest control, input procurement and use and marketing of produce.
- The private sector will be service providers in terms of contracts, manufacture and distribution of irrigation equipment and farm inputs.
- Non-governmental organizations (NGOs) will be brought on board as and when/where their mandates relate and contribute to the effective design and implementation of the project. In many areas they will be empowered to play complementary roles such as organizing farmers to work in groups and training.

X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. Based on the envisaged scope of the project activities, technical assistance will be needed to carry out in-depth studies and to guide the design and implementation of the project. Technical input requirements will be of a short to medium term duration in the following aspects:

- socioeconomic evaluation of the schemes;
- Environmental Impact Assessment of the schemes;
- detailed topographical surveys of the existing irrigated land; and
- detailed technical designs of pumping units, reservoirs and canals including preparing bills of quantities.

XI. ISSUES AND PROPOSED ACTIONS

XI.1. ***Difficulties with Donor Funding.*** Because of current disagreements between GOZ and some donors, donor funding might not be forthcoming in the required amounts in the short term. This might delay project implementation. However, the GoZ has recently resumed some negotiations with the IMF and World Bank. This is an indication that donors have not closed the doors completely and is a hopeful sign for this and other projects.

XI.2. **Poor quality control of the planning, design and construction of irrigation facilities.** Any proprietor/farmer can implement irrigation schemes without being subjected to any minimum standards for such schemes. There have been situations where projects are implemented with poor designs and quality of materials. These have crumbled after operating for very short periods of time, thereby shattering the hopes of the farmers. There is a need to put in place mechanisms, through some legal instrument such as an Irrigation Act, which ensure that irrigation schemes meet some minimum standards regarding design, quality of construction and management. Likewise the supply of irrigation equipment to the market is not regulated. There is a need to test equipment for compliance to standards before selling to consumers.

XI.3. **Land Tenure.** The farmers in the communal and resettled areas do not have title to the land they farm. Even the recently re-settled farmers under the fast track land reform programme do not have clear information about the ownership of the land they were allocated. Without certainty of ownership, farmers will not have incentive to invest in long-term irrigation infrastructure or crops, like trees/agro-forestry whose gestation period is long. They will also tend to mine the soil resources. Lack of clear ownership of the land is also quoted as the major reason why smallholder farmers have been locked out of the formal lending sector – they have no title deeds to secure their borrowings with the financial institutions.

XI.4. **Irrigable plot sizes in smallholder irrigation schemes.** In smallholder irrigation schemes, plot holdings vary in size from about 0.1–2 ha. Considering the government’s drive to commercialize irrigation development, and the fact that some plot holdings may be too small to provide any meaningful financial returns to the farmers, a position has to be taken and guidelines issued regarding the minimum economically viable individual plot sizes in the irrigation schemes.

XI.5. **Gender issues and Youth.** Women and youths tend to be mostly providers of labour but do not derive benefits. This is because the ownership and user-ship rights of the plots are usually vested in male-headed households. The rights to irrigated land for women and children are secured through marriage and parentage. Part of the problem lies in the official line that land is allocated to families. It is also further noted that there are inheritance issues where in some cases sons inherit land and dispossess their own mothers. Polygamy has also been observed not just to disadvantage the wife who has fallen out of favour but also her children. It is only a few women who manage to hold on to the plots. Cultural aspects also come into play. The few women that may hold positions often do not exercise their full mandate as their male colleagues. For example in several schemes women who are part of the marketing committee are discouraged from travelling away from the schemes to source for markets on the grounds that married women could not sleep away from home. The youth in smallholder irrigation do not hold any land rights.

XI.6. **Environmental Impacts.** Irrigation schemes are notorious for their high incidence of soil salinity, water-logging and infections of malaria and other waterborne diseases. In the 1980s there was an effort made to design and construct free drainage structures that would facilitate easy flow of water and reduce the incidence of water-related diseases. However, the incorporation of such structures has not been widespread. There has also been an attempt to raise the awareness of local people in relation to the management of the catchment of the water source thereby minimizing siltation in dams.

XI.7. **Inadequate farmer organization and participation.** Smallholder farmers are not organized as groups to participate in the initial identification of irrigation schemes, liaise with technical officers in the planning and design of schemes and participate in the implementation of schemes. This has resulted in the top-down development of irrigation schemes which is quoted as one of the main reasons why those schemes have not been sustainable. Under this project, potential beneficiary farmers will be encouraged to take over greater responsibility for all stages of project development

from the design stage to operation and maintenance of the rehabilitated irrigation schemes. In particular, they will be sensitized about the desirability for the community to meet the costs of the O&M of their schemes and also to re-organize their village operations to enable them to take over greater responsibilities for scheme management. To that end, the extension service will initiate modalities for community organizations, such as Water Users’ Associations, through which greater community participation and autonomy will be achieved.

XII. POSSIBLE RISKS

XII.1. The major risks identified at this stage are as follows.

- ***Persistence of Macro-economic Difficulties.*** The present difficult macro-economic environment may not improve as fast as wished resulting in lack of interest by donors and the private sector to invest in irrigation development.
- ***Government Counterpart Funding.*** Although government support to and interest in irrigation development cannot be doubted, it is currently experiencing severe budgetary constraints to meet its commitments. There may therefore not be available, in the short run, the required levels of public financing for this project.
- ***Inadequate Advisory Services provided to farmers.*** Irrigated farming is quite involving, requiring prompt decision making and timely action in order to reap the full potential benefits. However, the Department of Irrigation in the Ministry of Agriculture and Rural Development, the agency responsible for developing irrigation infrastructure and extending advisory services to farmers is not yet fully staffed at provincial and district levels and this is a potential risk to project success.
- ***Limited Farmer Capacity in Irrigation.*** Limited farmer managerial capacity may result in poor management of the resources and infrastructure. However the intensive training being proposed under this project will go some way to mitigate this risk.
- ***Farmer Participation and Interest.*** The long-term success of projects is dependent on the level of farmer involvement in all stages of developing and implementing the project. Farmers should be made aware of the benefits associated with optimum performance of their irrigation systems and should participate fully in project implementation. As a result of the prevailing culture in Zimbabwe of government and donors giving free handouts to farmers for various reasons, there is a potential danger that farmers might not fully participate in project implementation; project sustainability could be jeopardized as a result.
- ***Project Implementation Delays.*** For various reasons, particularly slowness in fulfilling legal covenants, delays in the release of project finance by the government or donors or both and the bureaucratic delays within the government, the project may encounter lags and delays in starting operations. Experience has shown that farmers lose interest in projects because of the time taken to start physical implementation after raising farmers’ enthusiasm. Project design will ensure that there are built-in checks and balances to avoid unnecessary start-up delays.

Appendix: Major Characteristics of the Natural Regions of Zimbabwe

Natural region	Altitude & topography	Climate	Details on the agricultural season	Recommended farming system	Need for irrigation
I	Mostly high veld, alt. 2,000 m	Over 1,000 mm rainfall per year; precipitation every month; low temperatures	Rainfall is highly effective; frost-free valleys	Specialized, diversified farming; high-value crops: coffee, tea, deciduous fruit, forest products for paper and timber	Low need: irrigation supplements minor variations in rainfall
II(a)	Mostly high veld and plateau, alt. to 1,800 m	750–1,000 mm rainfall; 18 rainy pentads* per season; very reliable rainfall	Rainfall limited to summer; rarely dry spells in summer.	Intensive farming system; major crops: maize, soybeans, tobacco, groundnuts, wheat and cotton	Low need: irrigation reduces effects of mid-season dry spells; also lengthens growing season for many crops; wheat is fully irrigated.
II(b)		16–18 rainy pentads* per season	Susceptible to severe dry spells during the rainy season		
III	Middle veld, alt. 1,000–1,600 m; open and undulating terrain.	Moderate rainfall: 650–800 mm per year in infrequent, heavy falls; 14–16 rainy pentads*; unreliable start of rainy season	Subject to severe mid-season spells and periodic droughts; marginal for major crops, i.e. maize, soybeans and tobacco	Semi-intensive farming under good management; maize, cotton, groundnuts under irrigation only; suited to livestock production	Irrigation sustains crop production
IV	Low-lying plains, alt. 600–1,000 m	Fairly low rainfall: 450–600 mm/year; high temperatures; high evapotranspiration	Subject to periodic seasonal droughts and dry spells during the rainy season; uncertain rainfall for cash crops	Semi-extensive farming; suited to livestock production and drought-resistant crops	Great need: Irrigation greatly enhances reliability of food crop production
V	Low-lying valleys: below 600 m	Low and erratic rainfall; very high temperatures and evapotranspiration	Rainfall too low and erratic for reliable production of even drought-resistant fodder and grain crops	Extensive farming system; suitable for utilization of the veld alone, i.e. cattle and/or game ranching	Need for irrigation is greatest; No production of crops is possible without irrigation

* Rainfall pentad: five-day period with more than 40 mm rainfall, two days of which should receive at least 8 mm of rainfall.
 Adapted from various sources