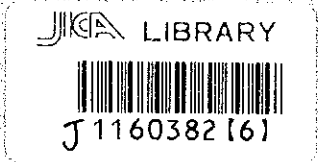


Japan International  
Cooperation Agency

Ministry of Lands and Agriculture  
Republic of Zimbabwe

THE FEASIBILITY STUDY  
ON  
THE LOWER MUNYATI RIVER BASIN  
AGRICULTURAL DEVELOPMENT PROJECT  
IN  
THE REPUBLIC OF ZIMBABWE

Volume - II  
APPENDIXES (2/2)



November 2000

Nippon Koei Co., Ltd.  
Kokusai Kogyo Co., Ltd.

AFA
JR
00-46

RY







Japan International  
Cooperation Agency  
(JICA)

Ministry of Lands and Agriculture  
Republic of Zimbabwe

**THE FEASIBILITY STUDY  
ON THE LOWER MUNYATI RIVER BASIN  
AGRICULTURAL DEVELOPMENT PROJECT  
IN  
THE REPUBLIC OF ZIMBABWE**

**Volume – II  
- APPENDIXES (2/2) -**

NOVEMBER 2000

Nippon Koei Co., Ltd.  
Kokusai Kogyo Co., Ltd.

## **LIST OF VOLUMES**

**Volume I                    MAIN REPORT**

**Volume II                    APPENDIXES (1/2)**

- Appendix -- I        Meteo-Hydrology
- Appendix -- II      Water Resources Development
- Appendix -- III     Agriculture
- Appendix -- IV     Livestock
- Appendix -- V      Agro-economy and Marketing
- Appendix -- VI     Irrigation and Drainage
- Appendix -- VII    Rural Infrastructure
- Appendix -- VIII   Rural Society and Institutions
- Appendix -- IX     Agricultural Support Services

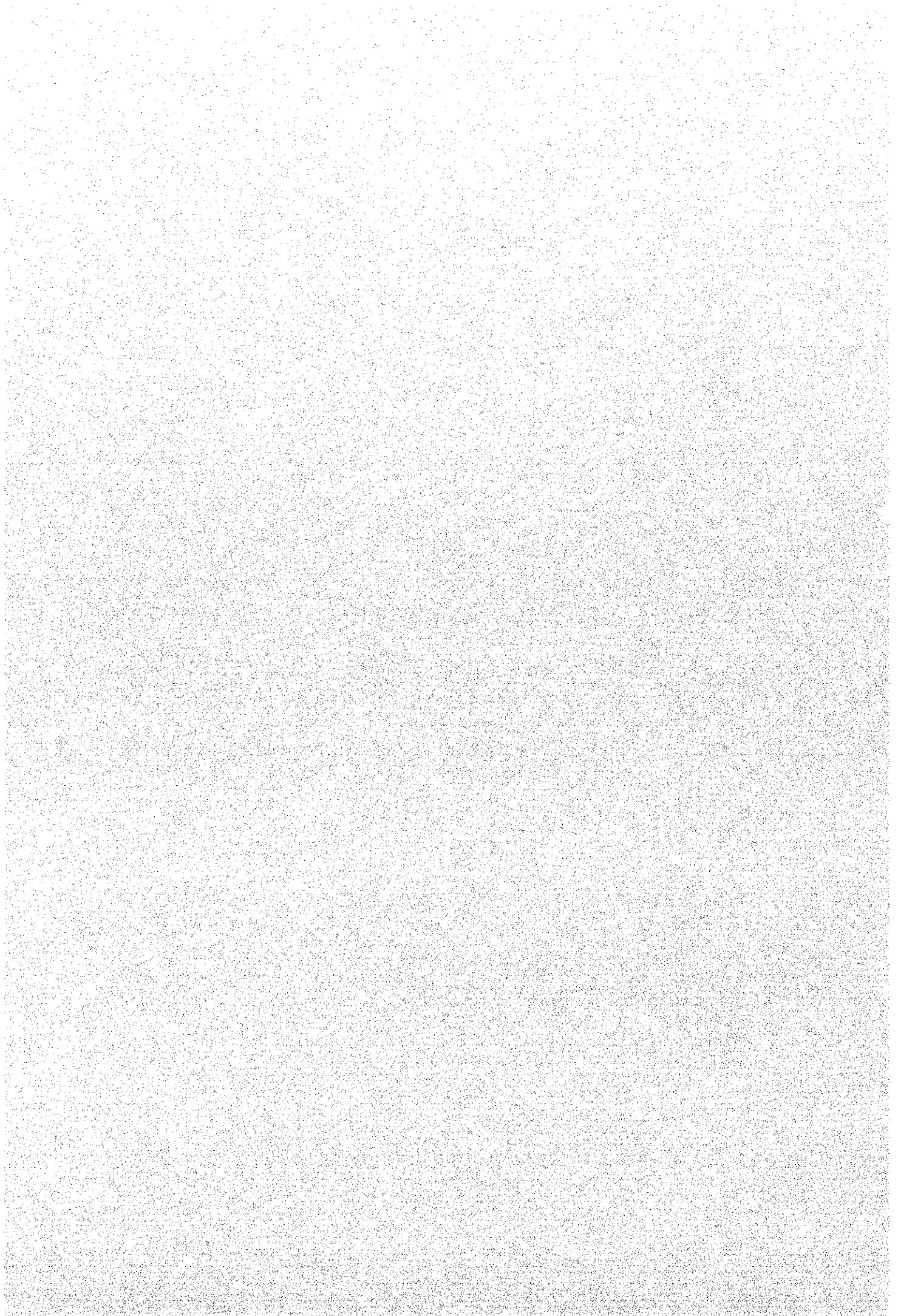
**APPENDIXES (2/2)**

- Appendix -- X      Environment
- Appendix -- XI     Social Dimension Survey
- Appendix -- XII    Cost Estimate
- Appendix -- XIII   Project Evaluation
- Appendix -- XIV    Technical Specification of Sub-contract

**Volume III                DRAWINGS**



**APPENDIX - X**  
**ENVIRONMENT**





**APPENDIX – X**  
**ENVIRONMENT**

**Contents**

	<u>Pages</u>
0. Executive Summary.....	AX-1
0.1 Social Benefits and Risks .....	AX-1
0.2 EIA Status and Recommendation .....	AX-2
1. Study Background.....	AX-3
1.1 Project Design and Purpose .....	AX-3
1.2 Project History and Status of EIA Study .....	AX-4
2. Approach and Methodology .....	AX-5
2.1 Introduction.....	AX-5
2.2 Consultation Methods.....	AX-5
2.3 Data Collection Methodology .....	AX-6
3. Project Description and Components .....	AX-8
3.1 Overview .....	AX-8
3.2 Dam Wall Construction and Reservoir .....	AX-8
3.3 Irrigation Area Establishment .....	AX-9
3.4 Social and Other Rural Physical Infrastructure Development .....	AX-9
3.5 Agricultural Development and Extension.....	AX-9
4. National Policy and Institutional Framework.....	AX-10
4.1 National Policy Context .....	AX-10
4.1.1 Environment and Sustainable Development Policy .....	AX-10
4.1.2 Environmental Policy and Legislation .....	AX-10
4.1.3 Relevant Government Organizations and Agencies .....	AX-11
4.2 Administrative Structures at Local Level.....	AX-12
4.2.1 Government Institutions and Political Representation.....	AX-13
4.2.2 Traditional Institutions in Communal Areas .....	AX-13
4.3 Land Management and Resettlement Policy.....	AX-14
4.4 Institutional Capacity and Land Reform .....	AX-14
5. Baseline Environmental and Social Data .....	AX-16
5.1 Physical and geographical Features of Project Area.....	AX-16

5.1.1	Overview.....	AX-16
5.1.2	Vegetation and Wildlife .....	AX-16
5.2	Human Environment .....	AX-16
5.2.1	National Context : Farming System, Land Use and Mining .....	AX-17
5.3	Population and Social Characteristics of Project Area.....	AX-18
5.3.1	Overview of Available Census Data .....	AX-18
5.3.2	Main Findings of Social Surveys in Project Zone .....	AX-19
6.	Potential Environmental and Social Impacts.....	AX-23
6.1	Overview of Issues.....	AX-23
6.2	Construction Period Impacts .....	AX-23
6.3	Upstream Issues : Erosion Risks .....	AX-24
6.4	Lake Reservoir Issues : Ecological and Land Use Change .....	AX-24
6.5	Downstream Issues in the Irrigation Area : Land Use Change.....	AX-24
6.6	Dam Reservoir Creation and Resettlement Impacts .....	AX-25
6.7	Social Issues and Risks in Project Zone.....	AX-26
6.8	Health Risks.....	AX-28
7.	Environmental Management and Mitigation Plans .....	AX-28
7.1	Environmental Management Plan : Responsibilities, Organization and Policy .....	AX-28
7.1.1	Proposed Administration Structure .....	AX-28
7.1.2	Activities of RCPEM Division and Sections.....	AX-29
7.2	Construction Phase .....	AX-32
7.2.1	Employment Generation and Social Issues .....	AX-32
7.2.2	Pollution and Erosion Management .....	AX-32
7.2.3	Borrow Pits.....	AX-33
7.3	Resettlement Plans .....	AX-33
7.3.1	Planning Principles : Participation and Equity .....	AX-33
7.3.2	Issues Affecting Extent of Required Resettlement .....	AX-33
7.3.3	Alternative Inundation Area Resettlement Scenarios .....	AX-34
7.3.4	Proposed Resettlement Modalities:Complementary Approaches....	AX-35
7.4	Land Re-Allocation in Irrigation Areas.....	AX-35
7.4.1	Project Policy and Approach.....	AX-35
7.5	Multi-Purpose Reservoir Area Management .....	AX-37
7.5.1	Access and Community Involvement .....	AX-37
7.5.2	Protection Area Planning and Recreation.....	AX-37
7.5.3	Fisheries Development.....	AX-38
7.6	Catchment Management : Soil Erosion and Water Quality.....	AX-38
7.7	Health Programme .....	AX-39
8.	Environmental Monitoring Proposals .....	AX-40
8.1	Project Environmental Monitoring and Control .....	AX-40
8.2	Post-Implementation Monitoring.....	AX-40

9.	Cost Estimates for Resettlement/Environment Plans.....	AX-41
9.1	Resettlement Plans : Land Acquisition and TA Support.....	AX-41
9.2	Facilitation for Community Participation in Land Re-Allocation .....	AX-42
9.3	Reservoir and Protection Area Management.....	AX-43
9.4	Summary of Project Resettlement and Environmental Cost.....	AX-43
	References .....	AX-44

### **List of Tables**

	<u>Pages</u>	
Table 1	Potential Positive and Negative Social and Environmental Impacts.....	AX-46
Table 2	Resettlement Scenarios .....	AX-49
Table 3	Environmental Management Personnel (and Vehicle) Costs.....	AX-50
Table 4	Staffing Costs for Resettlement, Community Participation and Environmental Management Division RCPEM Division Draft Staffing Plan .....	AX-51

### **List of Figures**

	<u>Pages</u>	
Fig. 1	Map of Submerged VIDCO Areas .....	AX-52

### **Attachments**

	<u>Pages</u>	
Attachment 1	Organisations and Individuals Consulted .....	AX-53
Attachment 2	Dir. of NRD Memo on 1992 EIA Report.....	AX-56
Attachment 3	Public Information Sheet, 23 Nov. 1998 .....	AX-59

## Abbreviations

AIDS	Associated Immune Deficiency Syndrome
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CPPAS	Community Participation and Plot Allocation Section
DA	District Administrator
DAER	District Agricultural Extension Officer
DDF	District Development Fund
DERUDE	Department of Rural Development
DEAP	District Environmental Action Plans
DWD	Department of Water Development
EIA	Environmental Impact Assessment
EMMS	Environmental Management and Monitoring Section
EMP	Environmental Management Plan
GoZ	Government of Zimbabwe
IIED	Institute for Environment and Development
IMCRD	Inter-Ministerial Committee on Resettlement and Rural Development
ITDG	Intermediate Technology Development Group
IUCN-WCU	International Union for the Conservation of Nature World Conservation Union
JICA	Japanese International Co-operation Agency
MLGNH	Ministry of Local Government and National Housing
MMET	Ministry of Mines, Environment and Tourism
MOLA	Ministry of Lands and Agriculture
NCS	National Conservation Strategy
NECF	National Economic Consultative Forum
NGO	Non Governmental Organisation
NPWD	National Parks and Wildlife Management Department
NRB	Natural Resources Board
NRD	Natural Resources Department
PRA	Participatory Rural Appraisal
RCPEMD	Resettlement Community Participation and Environmental Management Division
RDC	Rural Development Council
RRA	Rapid Rural Appraisal
RS	Resettlement Section
SAEO	Senior Agricultural Extension Officer
SOER	State of Environment Report
STI	Sexually Transmitted Infections
USD	United States Dollars
VHW	Village Health Worker
VIDCO	Village Development Committee
WADCO	Ward Development Committee World Conservation Union
ZIDC	Zimbabwe Infectious Diseases Programme
ZTA	Zimbabwe Tourism Authority

## 0. Executive Summary

### 0.1 Social Benefits and Risks

The Lower Munyati Agricultural Development Project is a large and ambitious project designed to irrigate 25,000 ha of which 14,500 is in smallholder communal land, principally in Gokwe and Kadoma Districts. If successfully implemented it could transform the development prospects of some 100,000 people directly and many more indirectly.

The main risks in implementation are for the social rather than the physical or natural environment. It will be necessary to resettle about 500-600 households in the submerged area and there will have to be an extensive re-allocation of land in potential irrigation areas. This will not be easy to accomplish without suspicion and resistance. However it is suggested that for those in the submerged area a well-planned resettlement programme if properly budgeted for and managed can improve the existing living conditions of those affected.

With a transparent approach, including proper consultation and choice, those affected will in large majority accept resettlement if they can be convinced that they will indeed have equivalent or improved livelihoods systems provided. Most families have already come to the area in recent historical times to settle in a former tsetse fly affected area. To ensure that there is no feeling of inequity or hostility towards the project it is proposed to move as few people as necessary and allow those remaining to benefit from the new opportunities and employment provided by the dam, including multi-purpose development for fisheries and recreation.

In the downstream irrigation areas the proposal is that each beneficiary family be provided with about one hectare of irrigation land in the irrigation development areas. These cover about one third of the project area. To share the benefits of irrigation there will necessarily be a large amount of land re-allocation required. This is a sensitive area for farmers because in the past they have been allocated usufruct rights to land by traditional leaders and those in irrigation areas will be reluctant to cede land. It is proposed that a non-government organisation or consultants independent of government might be contracted to assist farm households in agreeing land re-allocation by consensus among themselves.

Women are the vital labour source in farming and there is an issue of labour availability for the greater inputs required in irrigation throughout the year. It is essential that young men are attracted back into agriculture by the new economic opportunity provided by irrigation. Irrigation farming requires investment not just in time but in management of water, cropping systems and farm budgets. Extension will be necessary and again it is proposed to involve NGOs and locally retained extension workers to the extent possible.

There is no special bio-diversity value in the project zone and the creation of a new reservoir should add interest to the natural environment and encourage new species into the area. The reservoir will create a new and significant fisheries resource. Some health aspects concerned with water development are the likely increased presence of malaria and bilharzia. Mitigation is possible but increased incomes, a greater variety of food produce grown and the greater availability of fish protein at lower cost in the region can bring net health benefits.

## 0.2 EIA Status and Recommendations

The present environmental assessment study has been undertaken by the JICA Study Team to assist the DWD and Agritex with preparation of a finalised EIA to be submitted for the project to the Director of the Natural Resources Department in the Ministry of Mines Environment and Tourism. A first EIA Report was produced in 1992 for the Kudu Dam. This new environmental assessment report develops that study and covers the wider development envisaged by the Lower Munyati Project. In advance of a decision definitely to undertake the project this study should be sufficiently comprehensive to assist in environmental decision-making related to the project.

All the main issues are elaborated in this current report. Resettlement is not a new phenomenon in Zimbabwe, indeed it is an ongoing process in the country as government attempts to achieve a more equitable land distribution. The report contains recommendations for project environmental management including the creation of a project Resettlement, Community Participation and Environmental Management Division, with sections to manage necessary resettlement, land re-allocation and environmental monitoring. Approximate costs for this and the resettlement programme are estimated at 11 million USD.

It is recommended that the environmental management of the project is contracted out to international/regional competitive tender. If it is decided to proceed with the project it will be necessary to undertake a detailed Resettlement Action Plan which will adopt one of the proposed resettlement options. It will inventory fully all the households to be resettled and identify and plan the receiving area which could be expected to be a number of existing commercial farms. About 500 households might be settled on 10,000-20,000 ha, equivalent in size to about 5-10 commercial farms depending on land quality and grazing area. This assumes there is no opportunity to offer irrigation land.

There will clearly be considerably evaporation water losses from the 80 hectare surface area dam reservoir, the main irrigation canals and the irrigation areas. This will mean a reduction in net return flows to Lake Kariba. It is important that if the project is to be adopted by the government of Zimbabwe then it should notify

neighbouring countries in the Zambezi River Authority of its intentions. This is to fulfil its regional treaty obligations under the SADC region Zambezi River Action Plan(ZACPLAN).

## **1. Study Background**

### **1.1 Project Design and Purpose**

The basic plan of the project is to build an earth filled dam (860 metres across and 73 metres in height) about across the Munyati River at a point 2 km upstream of its confluence with the tributary Ngondoma River. Here the river flows northwards through an area of low stony hills towards Lake Kariba.

The dam wall will be 73 metres high and the reservoir created upstream will fill to the 950 m contour. The dam reservoir will extend approximately 25 km upstream and flood about 80 sq km to provide sufficient water for the irrigation of about 25, 000 hectares downstream. Two large main canals will extend for about 105 km (left bank) and 77 km (right bank) on either side of the downstream Munyati catchment. The majority of the identified irrigation areas will be in Communal Areas of Zhombe and Sanyati (14,500 ha) in the Districts of Gokwe North and South in Midlands Province and Kadoma in the province of Mashonaland West.

The reservoir will flood areas of woodland to the east of the dam in Kadoma District (Mashonaland West) on the north of the Munyati River, but very much more significant will be the required displacement of communities on the southern side of the river. Here the village of Samambwa will be inundated and a total of some 600 families will require resettlement from the VIDCO areas of Batanai, Karonika and Kubatana in Mabura Ward, Kwekwe District (Midlands).

Beneficiaries of the project in the irrigation area could be as many as 15,000 households in Communal Areas with approximately 1 ha plots each, as well as a large number of small commercial farmers. However if reallocation of irrigation land is not undertaken very much fewer farmer households would benefit. Along with the proposed agricultural development activities the project will entail complementary social and physical infrastructure components, including roads and boreholes for drinking water in the downstream irrigation area. It will also provide municipal water supplies to regional urban centres.

An alternative design involving the construction of a series of smaller dams on Munyati tributaries was rejected after a Masterplan study in 1995-997. Variations in dam size, retention capacity and length of associated main canals and potential irrigation area were considered during the current feasibility. These alternatives

were not retained. The major alternative is therefore the “no project” scenario. Clearly the environmental impacts of the smaller dam alternatives considered in the Masterplan would have been proportionately very much smaller.

More detailed investigations have been undertaken for a pilot project at Nyarupakwe where a small dam is to be created to irrigated 60 hectares in Gokwe District to test and evaluate modalities for successful project implementation. The environmental impacts of this small development on its own are minimal.

## 1.2 Project History and Status of EIA study

The current project was identified at the end of 1950s. It was adopted again as a serious proposal about 10 years ago. In 1992 an EIA was commissioned from ARA-TECHTOP with a team composed of staff from the University of Zimbabwe. The EIA Report identified all the main issues and is particularly strong on implications for the natural environment. The report is focused mainly on dam impacts rather than social and environmental issues relating to development downstream of the irrigation system and irrigated agriculture. The report made useful suggestions for further studies.

Following the submission of the 1992 EIA study to the Natural Resources Department the Director of NRD made a number of comments addressed to the Permanent Secretary of the Ministry of Environment and Tourism in a letter of 20 November, 1992 (NRD Memorandum “Re: EIA of the Proposed Kudu Dam”). These included a recommendation that a detailed environmental management plan be prepared to encompass; 1) impact monitoring; 2) a resettlement and compensation plan; and, 3) a reservoir management plan.

The inter-ministerial memorandum proposes a resettlement and compensation plan integrated into project feasibility studies. “Families in any buffer zone... as well as families who live outside these areas yet depend on the resources of the flooded area, must also be included. The report’s recommendation that entire communities be resettled should be followed.”

In June 1998 a team from Agritex/DWD and Japanese Consultants undertook a “Joint Scoping” exercise. Checklists were used to highlight all possible issues and a commentary was made on key areas for further investigation which to be covered in subsequent studies. The present study has been undertaken in support of the role of Agritex and DWD in presenting the Project EIA. It attempts to gather together information and judgement based on consultation with informed persons and local populations.

This report draws in part on information presented in the Kudu Dam EIA Report of 1992 and is presented as an appendix of the JICA Team Final Report documentation.



It should be taken into account in decision-making together with other economic, social and technical criteria regarding the viability of the overall project. If the decision is positive, the report should be developed by Agritex/DWD in its present standardised EIA format along with a Resettlement Action Plan for submission to the Director of the Natural Resources Department.

Sufficient information is presented to allow a global appraisal of the Lower Munyati Project and its environmental and social impact. In advance of a definite decision to attempt this ambitious and risky project it is not appropriate to raise expectations and fears by undertaking detailed surveys to determine exactly who will be resettled and where. Modalities for resettlement and land re-allocation are nevertheless addressed.

## **2. Approach and Methodology**

### **2.1 Introduction**

It is a requirement of 1994 EIA legislation of the Republic of Zimbabwe that an EIA should be conducted for the project. National EIA Guidelines make reference to the need to undertake public consultation on large projects. The JICA team is assisting in fulfilling these legislative requirements and a variety of other international environmental guidelines have been reviewed. Secondary data sources have been examined and new baseline investigations conducted, including a major social survey of the project area. Additional social appraisal was undertaken for the designated "pilot project area". Soil surveys have been undertaken and in the absence of reliable water quality monitoring data tests have been made of samples selected sampling points in the catchment area of the dam.

The results and suggestions of the original 1992 "EIA Report" and a subsequent scoping exercise (Agritex/DWD, June 1998) prior to this study have been taken into account in elaboration of this report. The scoping exercise was particularly concerned with social and cultural issues including land allocation, health and gender issues; there was also a concern for soils and land degradation. The current study is focused on key issues critical decision-making. It attempts to outline practical environmental management plans, taking into account the political and institutional realities surrounding land management together with experience of resettlement and land allocation. Reference is made to emerging new policies of government agencies and institutions and to complementary approaches to resettlement.

### **2.2 Consultation Methods**

A public information and consultation exercise was initiated at the start of the feasibility studies. Among local officials there was found to be considerable misunderstandings regarding the status of the present project studies. Some

believed the team, which follows the Masterplan or pre-feasibility study of 1995, to have arrived to commence the construction of the project. It was necessary to explain that further detailed studies were required to determine whether the project was indeed viable and the Masterplan, as conceived, had cast some doubt on this.

Before social and opinion surveys were undertaken, efforts were made to inform persons living in the project area of the status of the project and nature of the further studies, and the possible implications of the project were it to be found to be an economic proposition and the funding identified. This was designed to be an appropriate response in line with: i) Zimbabwe Government public consultation requirements for large projects (Volume 1: General EIA Guidelines, Section 5—Consulting the Public), and, ii) the written statement of the Director of the NRD that “it is imperative that an information and consultation programme be launched ... to ensure that local people have accurate information about the project...”. (see Attachment 2: NRD Memo.).

A meeting with Councillors and District officials was held on 24 November 1998 and a subsequent meeting in Kwekwe on 2 December. A “*Public Information Sheet*” (see Attachment 3) prepared by the JICA Team was discussed and approved for distribution, following translation into Shona, to Councillors and VIDCO officials. It was felt to be particularly important to explain the purposes of the social surveys and ensure that there would not be any misunderstandings resulting from the taking of samples across the project area in the soil survey. Information could therefore pass to the kraals, whose occupants might be subject to interview by the social survey team.

A follow-up EIA participation meeting on 2 March 1999 was scheduled to share summary results from the survey with interested Councillors and District Officials from affected Wards. Inevitably the effective dissemination of information to villagers proved to be difficult to achieve.

### 2.3 Data Collection Methodology

Both formal and informal data collection methods were employed throughout the study. Research was made on existing data and documented reports of experience from other irrigation schemes in Zimbabwe. Stakeholders were identified and consulted together with other informants who might contribute their experience to the understanding of key issues for planning and environmental management. Ministry and district officials from different services, university personnel (including those involved in the Dutch supported ZIMWESI smallholder irrigation research link), farmers, doctors and nurses in local clinics were contacted and consulted wherever possible.

A field visit to irrigation schemes in Manicaland (Nyamanaropa and Musikavanhu) and locally at Ngondoma was made and informal data collection and farmer interviews

took place continuously during the study period. Direct observations in the project area helped to corroborate received opinion. Non-governmental organisations (NGOs) have been contacted and their views sought on critical environmental management issues and the capacity of the various government agencies to manage and control possible potentially negative impacts of the project. A number of surveys were undertaken as planned to collect baseline social and environmental data in the Lower Munyati project area.

#### (1) Village and Household Surveys

As programmed in the "Inception Report" a social survey of households and affected villages was commissioned from the local office of an international consultancy company —SWK, together with a soil survey. The consultants were selected at the beginning of November 1998 and a team of mainly university-based academics and students were involved in the social surveys. By mutual agreement certain detailed adjustments were made to the survey questionnaire and programming was time-tabled to allow a period of public information dissemination in the project area in advance of entry into the area by the social and soil survey teams.

The social survey work included surveys in the downstream irrigation command area and the dam reservoir area. Key results are presented in Section 5. In the downstream irrigation command area a "*Household Survey*" and a "*Household Members Survey*" were conducted while in the dam reservoir area a "*Villagers' Intention Survey*" and a "*Village Inventory Survey*" were completed.

#### (2) Soil Survey

The consultant for the social survey work (SWK) also undertook the soil survey, employing a well-respected local Zimbabwean consultant. The results of the survey have been evaluated for purposes of prioritisation of lands which are suitable for irrigation.

#### (3) Water Quality Survey

In accordance with the Project Work Plan ("Inception Report") a programme of water monitoring on the Munyati River of upstream (and certain downstream) tributaries was commissioned from a Zimbabwe government laboratory. Boreholes in the command area were also monitored to make a total of thirty samples taken at 20 sites. Two recordings at river sites were taken in December 1998 at the beginning of the wet season, and, in February 1999, towards the middle of the wet season -- the Munyati River is usually dry between June/July and November. Unfortunately the results of the analysis by government scientists were incoherent and clearly very seriously flawed.

It was therefore necessary to take new samples in January 2000 to be analysed in Japan. These results are presented in the Main Report of the feasibility studies and

show low concentration of mercury and lead. Only two samples from boreholes showed a slightly higher value for lead than the WHO standard.

#### (4) Nyarupakwe Pilot Project Social Surveys

From February 2000 further social surveys were undertaken by ITDG, a Zimbabwean NGO and the JICA Study Team sociologist. These were done to highlight critical implementation issues for the pilot project, to develop awareness of irrigation technology and assess local acceptability of irrigation proposals and alternative methods of managing land re-allocation.

### 3. Project Description and Components

#### 3.1 Overview

The Lower Mnyati Basin Agricultural Development Project is designed to benefit some 15,000-20,000 farm families by provision of irrigation water supply for agriculture as well as to provide social and physical infrastructure (for instance, boreholes and urban water supplies) to benefit the whole of the project region, outside irrigable areas themselves, and beyond. A single large dam would be built and two major main canals. A small pilot project area is to be developed first and this has its own small dam as source of irrigation water supplies.

##### Dam Details

Catchment area:	17,520 km		
Full supply capacity:	1,551 x 10 <sup>6</sup> m		
High flood level:	EL. 963 m		
Full supply level:	EL. 947 m		
Main dam height:	72.7 metres	Saddle dam height:	30 metres
Main dam length:	860 metres	Saddle dam length:	875 metres

#### 3.2 Dam Wall Construction and Reservoir

An earth-filled dam wall of about 73 metres in height is to be constructed across the Mnyati River at a point 2 km upstream of its confluence with the tributary Ngondoma River. Here the river flows northwards through an area of low stony hills towards Lake Kariba. The aggregate soil and rock will be mined from quarries located in the reservoir fill area. This reservoir will fill to the 950 m contour line and extend approximately 25 km upstream, flooding about 80 sq km.

The reservoir will flood areas of woodland to the east of the dam in Kadoma District (Mashonaland West) on the north of the Mnyati River, but very much more significant will be the required displacement of communities on the southern side of

the river. Here the village of Samambwa will be inundated and a total of some 500–600 families will require resettlement from the VIDCOs (village administrative areas) of Batanai, Karonika and Kubatana in Mabura Ward, Kwekwe District (Midlands).

### 3.3 Irrigation Area Establishment

The Kudu Dam will provide sufficient water for the irrigation of about 25,000 hectares downstream, this is approximately one third of the command area defined by the two large main canals. These will extend for about 105 km (left/west bank) and 77 km (right/east bank) providing irrigation water by gravity flow to identified areas of suitable soils. There are approximately 21 one river crossing sections identified. In addition pumping is proposed in order to take in suitable soils above main canal command.

The majority of the identified irrigation areas will be in Communal Areas of Zhombe and Sanyati (14,500 ha) in the Districts of Gokwe North and Gokwe South, in Midlands Province, and Kadoma in the province of Mashonaland West. During the construction period there will be considerable localised disturbance along the line of the main canals and during construction of the secondary and tertiary canals in the irrigable areas.

### 3.4 Social and other Rural Physical Infrastructure Development

Along with the physical infrastructure development for the irrigation network will be the rehabilitation of 300 kms of surfaced roads, the rehabilitation or construction of about 160 borehole. Resettlement of those in the dam reservoir area will also require the re-building of basic physical infrastructure in selected locations. The social and environmental impacts of these works will be temporary and limited and in the long term will have lasting benefit to those served.

The dam will also provide regional municipal water supplies to the surrounding towns, including Gokwe, Nambudziya, Sanyati, Kadoma, Kwekwe and Gweru.

### 3.5 Agricultural Development and Extension

The project naturally includes considerable training and extension components in water use, agriculture, marketing and organisational management skills. These institutional and human (soft) components would be classified as having no directly attributable implication in terms of environmental impacts (World Bank Category C project component).

#### 4. National Policy and Institutional Framework

##### 4.1 National Policy Context

##### 4.1.1 Environment and Sustainable Development Policy

Zimbabwe has taken a significant role in international forums for environmental co-operation. It was also one of the first countries to undertake and adopt a National Conservation Strategy (NCS) in 1987. It hosts the regional headquarters for IUCN—World Conservation Union. The level of environmental awareness and education has been among the highest in Africa. Unfortunately political and economic difficulties have affected the commitment and ability of government to provide public funding and leadership in support of its own national environmental management policies. Yet Zimbabwe retains a well-managed wildlife and tourism sector with a significant private investment.

Zimbabwe has pioneered community based resource management solutions, notable through the CAMPFIRE programme (Communal Areas Management Programme for Indigenous Resources). These have been developed through direct co-operation between government agencies and local people. They are designed to share revenues accruing to local wildlife protection, for example hunting fees tourist admission charges, where villagers are otherwise negatively affected by the presence and damage inflicted by wildlife in communal lands, especially those buffering protected areas.

##### 4.1.2 Environmental Policy and Legislation (incl. water policy)

The Environmental Management Act (Draft, March 1998) provides a new legislative framework for sustainable development. It seeks to complement and succeed the Natural Resources Act (1941, amended 1981) and the Forestry Act (1949, amended 1986). Some twenty environmental laws have been administered by at least eight ministries. The new law reduces the fragmentary way in which environmental legislation is administered.

In 1994 Environmental Impact Assessment was adopted as a procedure for assessing projects. Requirements for public consultation are included and sectoral guidelines laid out. The Department of Natural Resources (DNR) is responsible for its implementation and approval of all subject projects.

Zimbabwe has intended to develop District Environmental Action Plans (DEAPs) using participatory methods. These would feed into the National Environmental Action Plan. Financial constraints have restricted such initiatives, though one pilot District in each province has received support from UNDP. A state of the environment report was produced for 1998 by the Ministry of Mines, Environment and Tourism and published as *The State of Zimbabwe's Environment (1998)*.

#### 4.1.3 Relevant Government Organisations and Agencies

##### (1) Ministry of Lands and Agriculture (MOLA)

MOLA exercises an environmental mandate through Agritex (Agricultural, Technical and Extension Services) regarding soil conservation and land use planning. Through several thousand extension workers its potential influence on environmental matters greatly outweighs that of the Department of Natural Resources or the Forestry Commission. Agritex has responsibilities for supporting re-settlement project including the mobilisation of land surveying teams, it “oversees” plot allocation, water management and extension on all smallholder irrigation schemes. Agritex extension officers can clearly influence the appropriate use and safe handling of agro-chemicals.

##### (2) Ministry of Rural Resources and Water Development (MRRWD)

The MRRWD is responsible for providing support to village infrastructure through its administration of the District Development Fund (DDF) especially in re-settlement schemes. This fund is intended for development of essential public infrastructure, including village water supplies and rural roads. Priorities are determined for each district by the District Development Committee. The Department of Water Development (DWD) has had a mandate in managing and developing water supplies. A current initiative in creation of Catchment Councils and re-allocation of water rights (WRMS—Water Resources Management Strategy) includes a pilot project in the nearby Mupfure River, a downstream tributary of the Sanyati River. This catchment planning management system is being extended to the entire Sanyati River Basin.

##### (3) Ministry of Local Government and National Housing (MLGNH)

This ministry is responsible for co-ordinating all local government activities. It nominates Provincial and District Administrators (DAs). The DA has responsibility for programming development projects in his district and through the District Development Committee and his District Executive Officer (DEO), administering the activities of the District Council. Through its Department of Physical Planning it has the mandate to produce masterplans which take into account environmental considerations in land use planning. These should be influenced by DEAPs. There is a separate section for Resettlement responsible for generating and administering policy in this area through resettlement officers.

##### (4) Ministry of Mines, Environment and Tourism (MMET)

Administration of disparate elements of the country’s environmental policy is through the Department of Natural Resources (DNR) and the Department of National Parks and Wildlife Management (DNPWM) answering to the Natural Resources Board and the Parks and Wildlife Board. The DNR has responsibility for the implementation of EIA procedures. It does not have an effective presence in the Districts. The

DNPWM manages all protected areas designated as national parks and manage the associated accommodation and tourist facilities within them.

Certain dam schemes have had their reservoirs gazetted by the Department of Water Development (DWD) for management by DNPWM with an associated terrestrial buffer, or recreational development area. This occurs where lakeside protection is deemed appropriate or a tourist or nature conservation opportunity presents itself. The Zimbabwe Tourist Development Corporation (ZTDC) co-ordinates and promotes tourism products, predominantly a wildlife and nature-based product, to overseas markets.

#### (5) Ministry of Health and Child Welfare

The Ministry of Health and Child Welfare provides outreach services, including trained midwives, through Village Health Workers (VHW) and is active in AIDS awareness campaigns. Within this ministry is the Blair Research Laboratory which has been involved in environmental programmes through its research on vector-borne diseases. A recent Japanese-supported project in this area is the Zimbabwe Infectious Diseases Control Project (ZIDC) with a West Mashonaland pilot district (Hurungwe) close to the project area.

There are environmental health officers in each District with responsibilities for both occupational and environmental health and an inspectorate. Government Hospitals exist in each District and clinics, nurses and health workers can be found at the ward levels. All clinics are required to report on a weekly basis to district hospitals indicating cases of each of the main maladies diagnosed: diarrhoea, dysentery, clinical malaria and sexually transmitted infections (STIs), also measles/influenza and polio. Data is compiled for all clinics by the District Medical Information Officer and submitted to the Provincial Medical Officer. Recorded in the Weekly Disease Health Surveillance System are both 'Cases' and 'Deaths,' indicating also age as 'under 5', '5-14' or 'over 15' years.

## 4.2 Administrative Structures at Local Level

### 4.2.1 Government Institutions and Political Representation

Many of the key government ministries with sectoral and technical responsibilities are represented at Provincial and District levels. The Ministry of Local Government and National Housing (MLGNH) administers resettlement through the Department of Rural Development (DERUDE) and is represented by the District Administrator at District level. In relation to agriculture/land management matters, Agritex offices can be found at both these levels. In the Wards there is a single Agricultural Extension worker (AEW) and a basic clinic with a nurse.



The lowest unit of the government administration system has been a Village Development Committee (VIDCO). VIDCO areas ("administrative villages") cover a number of kraals and compose some 150-250 households or 1,000 people. From its constituency of kraals—or in, a resettlement area, a new settlement village—six members should be elected to embrace local socio-political realities and sentiment. However, re-elections have not regularly taken place since 1984 and committees have not always been fully functional or representative. An elected chairman of each VIDCO sits at a higher level on a Ward Development Committee.

District Councillors are elected from all adult inhabitants of a Ward, some 10,000 people, alternative candidates to nominated persons are seldom encountered. The agendas of District Development Committees and WADCOs/VIDCOs and, indeed, traditional representative bodies may be at variance. In terms of land administration, their ordinances have tended to conflict with traditional structures and customary laws for the management of natural resources (see below). The bureaucratic and top-down government administrative system is recognised to be weak in terms of effectiveness and impact, accountability and transparency (Land Commission, 1994).

#### 4.2.2 Traditional Institutions in Communal Areas

In parallel to these structures are traditional political institutions which may be more "democratic" or participative. Here the interests of a kraal or group of households (approx. 10–30) are represented by a kraalhead whose ancestor will have first founded the particular kraal. He represents the interests of all the related households in his kraal and is responsible for local land allocation decisions. At a higher level will be a sub-chief representing a number of lineage groups in the area covered by a WADCO. A higher subdivision of a lineage group might be described as a clan, whose people could inhabit an area the size of a ward or several wards. By tradition headmen and kraalheads are responsible for all land allocation divisions as recognised by the Land Commission Report.

The chief of a clan will derive status from his descent line and indeed he may historically have brought his people into a new area of settlement by hiving off his group from a wider tribal group. This could have happened at a time of population expansion or in relation to natural resource availability and once, perhaps, by territorial incursion. The project area is one of recent in-migration following tsetse eradication. The chief of a clan represents the spiritual and cultural interests, and general wellbeing, of his people and their land. A paramount chief will represent an entire tribal subdivision and would normally live within the Province.

After Independence the role of chiefs was diminished but there has now been a reversion of policy to accept the traditional authority of chiefs and headmen as representatives of their people. In the arbitration of land and family disputes headmen

have retained their traditional role, especially in the Communal Lands. Government has come to accept that widely respected traditional leaders may be valid representatives of rural communities. However it is also the case that the interests of women in development projects and land disputes may be more progressively arbitrated by civil authorities and more liberally minded government officials (Vijfhuizen, 1998).

Another non-governmental form of representation of rural people is through the various churches represented in the project areas. These often have an important hold and influence on their congregations and need to be co-opted into development decisions. Their agendas may conflict with traditional cultural practices. In addition, teachers also are important influences on local communities. All such interests and means of local mobilisation will need to be tapped in order to facilitate project success and achieve acceptable solutions to re-settlement, land re-allocation and general project implementation.

#### 4.3 Land Management and Resettlement Policy

Rural District Councils can influence access to land and its utilisation in Communal and Resettlement Land. Under the Communal Lands Act the Minister for Local Government and National Housing can set aside land for any purpose deemed to be in the interests of the inhabitants of the area concerned or in the public interest. The Land Acquisition Act allows the state through Land Identification Committees (LICs) to prioritise and acquire land for the purpose of resettlement. Plans for resettlement are drawn up at provincial level by offices of Agritex, while DERUDE allocate plots to farmers in designated resettlement areas according to the various selected models for resettlement. In 1980 three models were distinguished:

Model A: Village settlement with small cultivation areas of 5–8 ha of dryland and common pasture areas for 6 livestock units for each holding; Model B: Agricultural co-operatives; and, Model C: Large scale state commercial operations. Other models were introduced in 1990 (applicable to grazing and ranching areas), while in 1996 a third approach is one of commercial settlement. Under this scheme households are given plots whose sizes are dependant on agro-ecological zones. Plot sizes can range between 30-70 ha. There exists a resettlement officer for each resettlement area nominated by the Ministry of Local Government.

#### 4.4 Institutional Capacity and Land Reform

A great number of reforms to government institutional structures are currently underway. Not least is the recent approval of a new constitution. Of most direct impact on the project are reforms in Agritex, water management and revisions in resettlement policy and land purchase arrangements.

(1) Agritex

A scaling down of non-core functions of Agritex is in prospect. This means that services to farmers in Communal Areas will be increasingly provided through NGO or private sector support. This should mean that such services will be more effectively and efficiently provided where bottom up approaches are applied and farmer (women) -- oriented advice is paid for and controlled by beneficiary groups. On worthwhile irrigation projects farmers will easily have the capacity to fund these services themselves after the initial development period.

(2) Water Catchment Authorities

In the area of water management the new Catchment Authorities will take over responsibility for allocation of water between different sectors and have a role in also in water quality management. Catchment protection has a responsibility of Agritex soils and water conservation divisions at provincial level, likewise an area in which the provincial Natural Resources Division of MMET, with its District Natural Resources Officers, has a statutory enforcement responsibility. However these agencies have limited budgets and resources and little effective control. For instance, their capacity to bring any control to the small informal mining industry, for effective conservation area and habitat protection or to enforce water pollution legislation is minimal.

(3) Land Reform

Land acquisition could become cheaper but will remain equally contentious under new legal arrangements passed through Parliament before recent elections. The prospect of learning lessons from past mistakes and for improved practice and new approaches is encouraging. Policy frameworks for future resettlement are set out in Land Reform and Resettlement Programme Phase II (September 1998) and Inception Phase Framework Plan 1999-2000: An Implementation Plan of the Land Reform and Resettlement Programme—Phase II. These documents have been prepared by the Technical Committee of the Inter-Ministerial Committee on Resettlement and Rural Development (IMCRD) and National Economic Consultative Forum (NECF) Land Reform Task Force.

New resettlement modalities such as the Complementary Approaches recently advocated favour voluntary approaches and NGO involvement. The fact that women may be able to have land registered in their name or jointly with their married partners is significant and allows a more optimistic view of the success of resettlement projects. Agritex capability in land identification, surveying and organisation of resettlement will improve but there is little doubt that responsible NGO involvement can provide a source of independent support and appeal in the negotiation and implementation of successful and sustainable resettlement.

The record of successful resettlement on the ground to date has not been good

because of budget cuts in provision of ancillary services (for schools, boreholes, service centres and extension) and inherent problems in providing effective extension of Agritex (gender biases, lack of transport, poor motivation of staff, inappropriate extension advice, etc). Sometimes inappropriate land has been taken for resettlement. The current sensitivities in land redistribution and the stalled programme of Phase II Land Resettlement means that there is already a large potential burden of surveying and organisation that will be required by Agritex and District Administrations.

## 5. Baseline Environmental and Social Data

### 5.1 Physical and Geographical Features of Project Area

#### 5.1.1 Overview

The vegetation in the project zone predominantly consists of mixed savannah woodland, dominated by *brachystegia*, *combretum*, *terminalia*, *grewia* and *accacia* species. Climax vegetation is a *miombo* or *mopane* mosaic.

The downstream command area falls into the agro-ecological category described as *Middleveld* which covers 40% of the country's land surface. It is normally characterised as EL.915–1,200m, with low rainfall and seasonal drought, temperatures at 20°C and above. Average rainfall in the project area drops from 800 mm in the south to 600 mm per year to the north and east of the project zone. The upper catchment of the Sebakwe and Munyati and Umsweswe Rivers is distinguished as *Highveld* covering 25% of the country is of EL.1,000–1,525m, 600–1,000mm rainfall in a single rainy season Nov–March, with mean temperatures are 15–17°C. The flatlands of the *Lowveld* has generally less than 500mm rainfall.

Tsetse fly (*Glossina spp*) once infested large areas of the *Lowveld* including much of the project zone, thus restricting the presence of livestock and human settlement. Control of tsetse has allowed the in-migration into this zone over the last 30 years. In the project area command published vegetation Survey Maps (1993, Timberlake et al.) corroborate observation that there is limited woodland (defined as <30% cleared). Remnant stands tend to be restricted to the marginal cultivable land dominated by *mopane* species.

#### 5.1.2 Vegetation and Wildlife

Two ecological categories were distinguished in the 1992 Kudu Dam EIA Report: a) the terrestrial Mopane and Acacia Woodland, and, b) the river and riparian fringe.

##### (1) Mopane and Acacia Woodland

The predominant tree species is the tall and short scrub mopane (*Colophospermum*

*mopane*). The acacia woodland comprises mainly short scrub muunga (*Acacia nilotica*) in the river valley and dense impenetrable thickets of mupangara (*Dichrostachys cineria*). On the right bank taller more mature trees dominate because this was until recently unoccupied state and commercial farmlands. The tall thorny munanga (*Acacia polycantra*), mopane (*C. mopane*) and musasa (*B. spiciformis*) are dominant. Bird fauna typical of mopane and acacia woodland are evident.

#### (1) River and Riparian Habitat

The dominant tree species are those requiring the higher moisture level and fertile silt of the river. The weeping willow (*Salix subserrata*) predominates. Other tree species associated with this aquatic ecosystem are the musuma (*Diospyros mespiliformis*), muchechete (*Ziziphus mucronata*) and mupfuti (*Brachystegia boehmii*). Bird fauna associated with the river fringes are hammerkop (*Scopus umberta*), reed cormorants (*Phalacrocorax africanus*), Aters fishing (*Anhinga rufa*) and white-faced duck (*Viduata dendrocynga*). Dry season pools retain fish species including *Tilapia spp.*, *Clarius spp.* and kapenta (*Limnothorisa spp.*).

#### (2) Fauna and Biodiveristy Values

Very few wild animals (kudu, baboons, monkeys and squirrels) have been observed in the project area. As for the flora in the inundation area, the terrestrial and aquatic species are readily found elsewhere in both the Munyati Basin and in other parts of the country. There are therefore no biodiversity issues of concern from the construction of the dam. Indeed the new habitats created by the dam will add to the local biodiversity and at the same time increase the economic value of the environment. A sustainable harvest of fish species will likely be of much greater economic value than sustainable harvest of tree species, new habitats and biotopes will be created for birds and animals along the lake edge. These can be enhanced by protection measures to create new wildlife areas.

## 5.2 Human Environment

### 5.2.1 National Context: Farming Systems, Land Use and Mining

About seventy per cent of the population of Zimbabwe is employed in agriculture. Commercial privately owned areas are distinct from communal areas of traditional tenure where "rights of avail" or usufruct persist (42% of land area and 75% of farms). The degradation of fragile communal lands, as in the project beneficiary area, is apparent though not as severe as in other communal land areas in the south of the country. The reasons for the degradation are an inherent tendency to overstocking, sometimes poor soils and limited technology and aggravated drought in previous years.

Subsistence farming is dominated by maize, sorghum and millet; cotton is the most important cash crop. This provides a stark contrast to the large commercial farms created by settler families in the generally more well endowed areas where maize, cotton, tobacco, tea, oranges, cut-flowers are grown. Livestock husbandry is an important element in the livelihood system. Sixty five percent of the cattle of the national herd are in the communal land areas (IIED, 1992), where there is persistent low offtake. Most smallholders also keep goats and hens. Cattle herds tend to be owned by just one or two individuals in a kraal (or even absentees), but through a system of clientage a greater number of households have the use of animals, for milk and draught power and manure for example. The latter must look after the animals and graze them but they do not own the progeny.

Mining has always been an important sector. Gold, nickel, coal, asbestos, copper, chrome ore, iron ore, silver and tin are exploited around the project area. Poor prices in the international markets are creating difficulties for commercial state and privately owned enterprises. There is much commercial and artisanal mining activity upstream of the project area. Drought and loss of formal employment opportunities has intensified artisanal mining, including illegal river bed activities which have been rendered politically difficult to control.

### 5.3 Population and Social Characteristics of Project Area

#### 5.3.1 Overview of Available Census Data

The population of Zimbabwe is increasing at 2.9% (1992 census), creating environmental pressures both in the rural communally owned areas (through over-grazing) as well as in the major towns (in terms of sanitation and housing). Access to safe drinking water records, as calculated from 1992 census figures for Districts (and Provinces), shows: Gokwe 40.8%, Kwekwe Rural 73.9% (Midlands Province Rural Areas 56.2%); Kadoma Rural 82.5% (Mashonaland West Rural Areas 59.8%). The national rural average is 64.3%. In the project area Gokwe appears particularly low and Kadoma Rural District very high in provision.

There is a considerable gender imbalance in Zimbabwe in the rural areas with 85.9 males to 100 females and 80% of those living in rural areas are in fact women and children (IIED, 1992). Men have sought wage labour elsewhere and are increasingly less able—and sometimes less willing—to remit funds to family members in rural areas. Farmers are predominantly female as elsewhere in Sub-Saharan Africa and almost all cultivation activities are undertaken by women. This is equally the case for irrigation projects visited. It is essential that extension efforts in agriculture and water management recognise this.

In terms of health status, diseases in the project area are dominated by malaria,

particularly during the wet season and especially in the months of February to April. Figures from clinics at Sanyati in the centre of the project area are particularly high. Bilharzia is a consistent problem throughout rivers and irrigation schemes visited. AIDS is a scourge for the country with incidence of HIV positive individuals at 30%. The potential economic impact on the agricultural sector is already serious with women too often infected by their marriage partners. Family subsistence production, cash revenues and savings are necessarily diverted to supporting and caring for incurably sick and dependent family members, seriously affecting labour availability and resources for farm re-investment.

### 5.3.2 Main Findings of Social Surveys in Project Zone

#### (1) "Household and Household Member Survey"

The average size of household derived from the survey in the downstream area was 7.1 persons. Among households 67% were reported to be male headed and 33% female headed. The number of female headed households is not as high as reported elsewhere in census data for rural areas on a national basis, possibly using different criteria. The highest percentage was in Gokwe South. Men may leave the rural areas for differing lengths of time and for different reasons but if there are indeed fewer female headed households than elsewhere this may be because of the success of cotton as a cash crop.

Ethnic composition recorded is summarised in the table below. There is a Zezuru majority with Karanga the second largest group, dominating the influx from Masvingo into the area. According to the surveys the families of 37% of the population have been settled in their village more than 30 years ago, 21% in the last 10 years. In the resettlement areas no families have been resident for more than 20 years.

**Ethnic Groups Identified in Project Zone**

Project Area (District)	Karanga (Shona)	Zezuru (Shona)	Korekore (Shona)	Nyanja (Shona)	Ndebele	Other
Kadoma	39%	44%	2%	1%	4%	9%
Gokwe South	30%	30%	14%	-	18%	8%
Gokwe North	35%	40%	22%	2%	-	1%

Eighty percent of those interviewed participate in farming activities. The most important sources of income are maize and cotton, followed, by salaries and then livestock. Animals sold are mainly goats. Cotton is the most profitable cash crop and is cultivated on an average of 2 ha per household; sunflowers, groundnuts millet and sorghum are also grown. Seventy-eight per cent of households have cattle—look after at least one cow.

Most families rely on their own harvesting of fuelwood which is predominantly in areas which are readily accessible. Only 10% reported that fuelwood was difficult to access and only 2% of households said they buy fuelwood. Eleven percent of landholders are reported to be "wives"/women. No large animals were reported in the area, but while baboons and monkeys are pests in certain areas.

Very few households (4%) report that children suffer from diarrhoea and respiratory diseases but a high incidence of malaria is reported. Fifty-two per cent of adults say they have been affected by malaria. Diarrhoea reports are reckoned to be low because of good access to protected borehole water. Fifty-four per cent indicated that they had their own toilets. Seventy-two per cent of households had been visited by family planning health workers. In terms of education, approximately 20% of the population in the three districts had not had any formal education.

The social survey researchable on "*intention to irrigation development*" shows 75-80% want irrigation land and 20-25% do not want irrigation with a higher percentage of women against it. In the younger group, age 14-40, only 15-20% did not want irrigable land. Twenty per cent of respondents did not want irrigation if this meant that they would have to resettle on re-allocated land. About 20% considered labour was not sufficient for irrigated farming, but it is not clear that respondents would have understood that this would be on a smaller plot of land if re-allocation is to be the policy of the project.

Ten per cent of men in Gokwe South (who did not want irrigation) said they were "(simply) not interested in irrigation" and about 25% in Gokwe South and North said that "present farming brings sufficient income", while another 10% said that the reason for not wanting irrigation was that they were too old. The survey research team observed that "in the proposed submerged area men flocked to the bottle-stores of Samambwa for quite a significant proportion of the day despite the fact that we were there in December when labour demand in the field is high".

A kraalhead ventured to say that men may not wish to get involved in irrigation because "labour demand lasts through the year spoiling the social life". It is therefore critical for the project to attempt to reverse men's negative attitudes or "mindset" with regard to agriculture such that underemployed young men see the serious financial potential to change their lives by commitment to irrigation. Clearly the women on their own will not be able to supply the labour necessary to undertake the proposed irrigated agriculture.

It is well known and reported in other project survey work that women undertake the bulk of agricultural, domestic and even commercial activities and men spend much more leisure time, especially when not gainfully employed in the formal sector. Even artisanal mining is reported to be carried on as much by groups of women as of men.



## (2) "Villager Intention (Attitude) Survey" in Potentially Submerged Area

Most of the people living in the two affected wards of Mabura and Sidakeni to the south of the Munyati River came from Chirimanzu, Shurugwi, Mberengwa and Masvingo during the 1960s. Between 36-40% of households are female headed associated with AIDS, the migrant labour phenomenon in Zimbabwe, also polygamy/divorce. Nearly half the population is under 17 (45%) and about 40%, age 17-40. In Muzvezve 1 Resettlement Area 80% have been resettled only in the last 10 years.

Approximately 80% of population get water from boreholes and report that the quality is good throughout the year, in both summer and winter. About 40% of households achieve a surplus to subsistence of their cereal requirements which they can sell with cotton for cash. Protein is provided by occasional consumption of chickens and other small livestock, but also from groundnuts, beans and round peas. Cattle are kept as a source of draught power, security and cash in emergency, apart from ingrained cultural reasons. One third of households have had no extension advice from Agritex in the last five years.

Most households would like to be moved as a group and females particularly from different households value sharing tasks together. Social relations are important in exchange of unpaid labour and access to draught power. Many said they would like to be relocated on an irrigation scheme close to where they are currently living.

## (3) "Village Inventory Survey"

Rapid appraisal and participatory methods were used in this survey of affected VIDCOs for the two Wards which would be partially inundated by the project. The objectives were: a) to make a qualitative and quantitative inventory of private and community property potentially lost to submergence, b) to make an inventory of cultural, historical and natural assets and values potentially lost, and c) to investigate key informants viewpoints on intentions (attitudes and preferences) regarding resettlement. Fig. 1 shows the affected area.

The survey was carried out in the busy planting season during a period of exceptionally heavy rainfall in November 1998 and January 1999. There was a general under representation of women who were working in the fields and "some (women) farmers were said to have been forced to attend against their own wills". This gender bias could be seen in the prioritisation of community assets where men tend to value grazing land higher than women who themselves prioritise agricultural fields and drinking water sources in their rankings.

## (4) Property Values

The economic values of existing properties, shops, boreholes and churches is very

limited and in many respects irrelevant to decision making for the project. As a cost against potential benefits it can be ignored. Loss of grazing land has more indirect economic implications to households who may not be automatically resettled. Those households to be moved will automatically be resettled with sufficient land, new schools, churches and boreholes to make them viable units whether in project irrigation command or settled as dryland farmers on former commercial farms.

As an indicator of the insignificance of the economic loss which would be set against the economic benefits of the dam. A calculation based on the survey inventory of the housing stock value in Batanai shows a value of only 2,702,000 \$Zim (Zimbabwe dollars) or about 71,105 USD (38\$Zim=1\$US). The housing stock of Kubatana, the second most affected village is valued at 2,187,000 Zim dollars (57,552 USD). The value of Koronika housing stock is reckoned at 2,854,000 \$Zim (or 75,105 USD). The cost of proper resettlement is of course very much greater, and in material terms the populations affected should be much better off with equivalent land quality and improved social and physical infrastructure. However spiritual and psychic losses are real, especially for old people. They are impossible to value but should not be ignored.

The survey identified certain graves of elders and former chiefs as well as special sites of spiritual value. The graves it was said can be moved after performing a small ceremony, but there is still a psychological loss. Five sacred sites were identified. Three of these were pools on the Munyati River (Chiridzangoma, Dibora and Jorodani); the first two were used for traditional ceremonies and the third for Christian baptism and exorcisms. Two other such sites were Chikomba sacred pools and the Kasawe spring.

Churches can be rebuilt but fully functioning communities are not quickly rebuilt. Whether existing communities are necessarily more benign social institutions than those evolving in newly created and planned resettlement villages is an open question. They need not necessarily be worse; they will be different. Use of participative planning methods and sensitivity to preferences is an essential principle.

The inventory identified other built and physical infrastructure such as shops and boreholes (10 in Batanai and Kubatana), schools (2 in Sumambwa, primary and secondary), clinics (1 in Sumambwa), small churches (8 in Sumambwa), grinding mills (3 in Sumambwa), but these are very few in number and invariably dilapidated. Indeed there has been a small planning blight in the area because people have been aware of the dam proposal and have avoided any property investment for fear of not being properly compensated.

Non-physical social infrastructures include church communities, loyalty of certain shop clientele and market systems/knowledge. The value of these is difficult to estimate

but is considered to be close to zero and at most negligible.

## **6. Potential Environmental and Social Impacts**

### **6.1 Overview of Issues**

The development of a gravity irrigation scheme with capacity to irrigate approximately 25,000 ha and the construction of a dam and canal system to supply the necessary water must inevitably bring a major environmental transformation to its region. Both environmental risks and benefits are identifiable as potential direct and indirect impacts. These are shown diagrammatically in Table 1. How well these are managed will be crucial to the economic and environmental sustainability of the proposed development in the Lower Munyati Basin.

The most important issues are identified below:

- Construction impacts: social and environmental
- Resettlement implications for submerged area
- Land use change, local ecology, siltation risks and upper catchment management
- Dam reservoir management and opportunities for multiple use
- Water quality and quantity: upstream (received) waters; in-reservoir water quality; on-scheme drinking water supplies; quantity and quality of groundwater recharge and river return flows
- Ecological Impacts
- Health impacts (positive and negative) through changes in nutrition and wellbeing and risks from waterborne disease in the irrigation area downstream
- Social issues related to change in traditional livelihood and farming systems, including land re-allocation

### **6.2 Construction Period Impacts**

The methods employed in the construction of the proposed earth/rock filled dam can have a significant influence on the quality of waters in the Munyati River downstream. Aggravated siltation must be minimised and pollution, for instance from construction plant and vehicle lubricants/oils, chemicals, domestic and sewage waste, must be controlled. Details of quarry location and road access with environmental implications have yet to be established. It is expected that quarry materials can be sourced nearby in the area to be submerged.

During the period of construction both of the dam and the downstream irrigation scheme and infrastructure there will be major opportunities for local employment generation. Opportunities as between men and women must be seen to be fair. In the

construction of the irrigation systems women can be employed as labourers. Experience suggests they are often more reliable workers on for instance road building projects than men.

Payments to women workers are in addition more likely to be spent on activities conducive to sustainable development, in other words providing subsistence needs for the family, spent on medical expenses, on buying agricultural inputs and on schooling. Revenue in the hands of men has a tendency to be dissipated on less essential items, usually to the benefit of local bottle-stores.

### 6.3 Upstream Issues: Erosion Risks

Commercial farmland usage in the upper catchment of the Munyati, Umsweswe and Sebakwe Rivers suggests, at first sight, the erosion and siltation risk will be restricted in the foreseeable future, unless there are radical changes in land tenure and use. In the Munyati catchment downstream of the dam, especially on the west bank, erosion from the Zhombe Communal Lands is more significant, but does not present a risk to the project. Re-investment of revenues into cattle stocked on already pressured communal grazing areas presents an induced risk of aggravated erosion which could result from the project if not anticipated and counteracted.

### 6.4 Lake Reservoir Issues: Ecological and Land Use Change

There will be a whole-scale change in the ecology around the dam and reservoir as a result of clearing and inundation, a new landscape will be created around the dam which is equally a new ecological resource, with a potential for fisheries development and recreation. Habitat and species losses will not be significant as no special interest has been accorded to the vegetation of the submerged area nor to dependant wildlife species. Nor are any flora or fauna (animal) species of special conservation value reported in the agricultural development zone.

Experience suggests that the ecology of the impounded waters of the lake reservoir will be subject to considerable fluctuation and change during the first five to ten years before an equilibrium in terms of, for example, organic content, acidity and fish composition is achieved. Man-made lakes in certain catchments of Zimbabwe have suffered from enrichment from fertilisers leading to eutrophication. Dangers of excessive and uncontrollable accumulation of water hyacinth are also apparent, as is possible pollution from agricultural pesticide use and upstream mining and other domestic and industrial activities.

### 6.5 Downstream Issues in the Irrigation Area: Land Use Change

Clearly there will be a major land use change in and around the dam area and especially across the very extensive command area. Beneficial changes can be

predicted to the extent that the project is successfully implemented. With irrigation there will be an extension of crop cover throughout the seasons in the project area. Livestock may possibly have a restricted access to former grazing areas, but can have alternative dry season watering points provided nearer to winter (dry) season grazing. In-command erosion from traditional dryland agriculture and Communal Land (over-) grazing should be reduced, but there is a risk of a build up in cattle numbers outside irrigation areas and above the command of the main canals.

Siltation should however be limited in the downstream area and naturally the dam will prevent normal silt transport down the river course of the Munyati. The ecology of the Munyati River will inevitably be changed through these processes. Groundwater recharge from the irrigated areas should beneficially affect well water availability (though water loss to groundwater is a function of inefficient in-field irrigation). The quality of surface and sub-surface river return flows (and well water) may be affected negatively by poor practices in biocide and fertiliser use.

#### 6.6 Dam Reservoir Creation and Resettlement Impacts

Depending on the dam reservoir height—and agreed resource management strategies around the reservoir—a greater or lesser number of people would have to be resettled and/or be compensated appropriately for direct and indirect impacts on their livelihood systems. These could be in loss of arable fields, grazing or access to dry season river water sources—also of relevance downstream—as well as in whole-scale resettlement.

The creation of the dam reservoir will affect those living in three Wards (two in Kwekwe District and one in Kadoma District). In total some seven or more VIDCOs will be directly impacted upon with a total of 8,500–10,000 inhabitants. Of these, the population of at least two or possibly three entire VIDCO areas on the south bank and some households from one “resettlement village” (Kadoma) might need to be moved out of the area. The social repercussions of this are significant both for those resettled and for those people living adjacent to them in the selected receiving area. However, there is a history of migration and resettlement in Zimbabwe—and especially in the project area—suggesting a limited potential for serious social dislocation.

Clearly the resettlement and the relocation of those in and around the submerged area of the dam must be very sensitively handled. At the least those moved must be made no worse off in terms of land and access to water and other services than previously. There must be sensitivity also in relation to those who may have to accommodate them nearby. Those able to remain near to the dam reservoir must not be unnecessarily denied access to dry season watering for their cattle, and indeed the benefits arising from creation of the new resource. There will otherwise develop a resentment against the project making sustainable resource management more difficult to achieve.