



## CONSOLIDATED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

### REVITALISATION AND CLIMATE PROOFING OF FIVE SMALLHOLDER IRRIGATION SCHEMES UNDER LOT 3 IN MANICALAND PROVINCE, ZIMBABWE

#### Building Climate Resilience of Vulnerable Agricultural Livelihoods in Southern Zimbabwe



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**APPROVAL**

This Environmental and Social Management Plan was prepared for the construction and climate proofing of five irrigation schemes in Manicaland Province, Zimbabwe. The irrigation schemes are being developed under the Project “**Building the climate resilience for vulnerable agricultural livelihoods in Southern Zimbabwe**”. The ESMP has been approved by the Project Proponent, which is the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development.

**APPROVED BY PROJECT PROPONENT**

**MINISTRY OF LANDS, AGRICULTURE, FISHERIES, WATER AND RURAL DEVELOPMENT**

Signature -----  
Name -----  
Designation -----  
Date -----

**Public Consultation/Disclosure Notice**

Date: 15 July 2023

The United Nations Development Programme (UNDP) is requesting feedback on the attached draft Environmental and Social Management Plan for this project.

Comments and questions can be sent to the following address:

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**The last date for receiving of comments is 15 August 2023**

## EXECUTIVE SUMMARY

### ES 1: Project Introduction

The Government of Zimbabwe through the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD) in partnership with the United Nations Development Programme (UNDP) is implementing a seven-year project “**Building the climate resilience for vulnerable agricultural livelihoods in Southern Zimbabwe**”. The Project (Activity No, FP127) aims to strengthen the adaptive capacities of vulnerable smallholder farmers, especially women, to climate change induced impacts on their agro-ecosystems and livelihoods through revitalization and climate proofing of 21 irrigation schemes, upgraded water and soil moisture management and water use efficiency, climate-resilient agriculture, improved access to climate information and markets, and partnerships with public and private sector actors. The project is targeting the revitalization of 15 existing irrigation schemes and the establishment of 6 new schemes in 15 priority districts of Manicaland, Masvingo and Matabeleland South Provinces.

The irrigation schemes have been classified into three lots, namely lot 1, 2 and 3. Each lot is defined by a specific hydrological catchment with similar biophysical and socio-economic characteristics. Lot 1 consist of three irrigation schemes and all are situated in Matabeleland South Province. Lot 2 consist of 7 irrigation schemes and all are situated in Masvingo Province. Lot 3 consist of 5 irrigation schemes and all are situated in Manicaland Province. The other 6 alternative schemes (presumably lot 4) are still yet to receive GCF approval. These are alternative schemes that no longer conformed to the GCF selection criteria between the project design phase in 2016 and the project implementation phase in 2020.

A site-specific Environmental and Social Management Plan (ESMP) was prepared for each of the 5 irrigation schemes under Lot 3. A review of the 5 ESMPs show that the reports largely share the same content particularly on legal and policy framework, baseline biophysical and socio-economic setting, anticipated environmental and social impacts, proposed environmental and social management measures, grievance redress mechanisms, etc. This is because Lot 3 schemes are situated in the same hydrological catchment with similar biophysical and socio-economic characteristics. Based on this, it was therefore logical to prepare a consolidated ESMP for the 5 irrigation schemes to ease the review process.

This ESMP is therefore a consolidation of the site specific ESMPs of the 5 irrigation schemes under Lot 3. Of the 5 schemes, 4 are existing schemes which are targeted for revitalisation and climate proofing, while the other scheme is a new scheme which will be constructed and climate proofed. The existing schemes are Mhakwe, Farai, Vimbanayi and Musirizwi while the new irrigation scheme is Mudzimwa. All the irrigation schemes under Lot 3 are situated in Manicaland Province and have a total net irrigated area of 139 hectares (ha). The area is prone to climate hazards such as frequent and prolonged dry spells, cyclone induced flash floods and extremely high temperatures.

### ES 2: Sub-project description

This section provides brief details particular to each irrigation scheme in terms of location, water source as well as revitalisation and climate proofing interventions proposed.

**Mhakwe Irrigation Scheme:** The scheme is an existing irrigation scheme which is located in Ward 18, Chimanimani District, Manicaland Province. It has a net irrigated area of 21 hectares (ha). The scheme has 53

members of which 37 men and 17 are women. The scheme is located approximately 113km southeast of Mutare off the Wengezi – Chimanimani Road. The existing irrigation infrastructure include Mhakwe dam, abstraction works, main conveyance pipeline and drag hose sprinkler irrigation system. The irrigation scheme faces myriad of challenges on the main conveyance pipeline as well as on the in-field infrastructure. The challenges include inadequate water conveyance from the dam, water leakages, uneven distribution of water in the fields, and inadequate hose pipes and sprinklers. The challenges are compounded by poor agronomical and agribusiness practices. Climate proofing of the scheme will be achieved through maintenance of the abstraction works, gravity delivery pipeline and the infield drag hose sprinkler irrigation system. Specific climate proofing and revitalization activities include:

- ✓ Replacement of air and scour valves along the gravity main line from the dam
- ✓ Upgrading of 140mm PVC section to 160mm PVC on the gravity mainline
- ✓ Replacement of all sprinklers and hosepipes at the scheme with a standard size
- ✓ Installation of pilot valves at the tap points in order to regulate operating pressures at the sprinkler
- ✓ Provision of a flow meter to monitor the flow rate into the irrigation area
- ✓ Review dam abstractions and water allocations to different user groups based on dam levels and inflows at the start and end of the hydrological season
- ✓ Adoption of climate smart crop value chains and improved cropping programme

No power will be required as the water will flow by gravity from both the river and the dam to supply the scheme. Yield analysis and water balance analysis for the dam and the river indicate that the water supply will be adequate for the 21ha irrigation area. Topographical surveys undertaken indicate that the topography is suitable for the selected drag hose irrigation system. Soil tests showed that the soils are suitable for production of most crops and the soils can be irrigated by sprinkler irrigation methods. Water quality tests reviewed that the water is suitable for crop irrigation. The cost of installing the irrigation infrastructure for the 21ha irrigation scheme was estimated at **US\$234,774.00** which translates to **US\$11,179.71** per hectare.

**Farai Irrigation Scheme:** The scheme is an existing irrigation scheme which is in Ward 29, Chipinge District, Manicaland Province. It has a net irrigated area of 27 hectares (ha). The irrigation scheme has 180 members, of which 108 are men and 72 are women. The irrigation system installed at the scheme is flood irrigation but was not completed. Hence the scheme never got to the operational phase. Key irrigation infrastructure at the scheme includes a 200mm buried PVC main-line, a brick storage tank and concrete lined canals. There is existing infrastructure at the scheme to provide electricity from the national grid and this will be utilised to provide power to the pumps. The irrigation scheme faces myriad of challenges which include: (1) existing flood irrigation system not compatible with the topography of the site, (2) damaged canals and (3) poor siting of irrigation equipment such as pumps. Hydrological analysis of the catchment area indicates that surface river flows may diminish during dry seasons in some years. A water resource assessment conducted as part of the feasibility study indicate that subsurface flows persist in the river sand through the year. Analysis of the storage capacity of the sand bed in the riverbed revealed that there will be adequate water to supply the scheme during both the wet and dry seasons for the 27ha irrigation area. Specific climate proofing and revitalization activities include:

- ✓ Installation of new pump station to abstract water from surface flows in the river complete with pumps, motors, and a solar power supply system.
- ✓ Installation of new sand abstraction system complete with pumps, motors, and a solar power supply system.
- ✓ Installation of bulk flow meters on the pumps' outlets.
- ✓ Installation of new 300mm dia PVC Class 12 pumping main.

- ✓ Construction of new infield drag hose system.
- ✓ Adoption of climate smart crop value chains.
- ✓ Implement an improved cropping program that takes into consideration the need for crop rotation, and water availability.

The cost of installing the irrigation infrastructure for the 27ha irrigation scheme was estimated at US\$356,015.00. This translates to US\$ 13,185.74 per hectare.

**Musirizwi Irrigation Scheme:** Musirizwi irrigation scheme is an existing scheme situated in Ward 18, Chipinge District, Manicaland Province. It has a net irrigated area of 2.16 hectares (ha) with a possible extension to 16ha. The irrigation scheme has 72 members of which 50 are female and 22 are male. The irrigation system installed at the scheme is flood irrigation. Existing infrastructure include a 5,500m<sup>3</sup> capacity diversion weir, concrete lined main and infield canals. The irrigation scheme has infrastructure gaps which include (1) small capacity of weir essentially making the scheme a run-of-river scheme, (2) highly elevated outlet in the weir resulting in the outlet pipe not being able to supply water when the water levels in the weir are low, (3) absence of control gates for the canals resulting in significant water losses during irrigation, (4) damaged and leaking canals resulting in significant water losses, and (5) labour intensive irrigation method considering the age group of the scheme members.

Specific climate proofing interventions that will be undertaken include: (1) installation of an improved abstraction system at the existing weir, (2) construction of a Night Storage Dam (NSD), (3) installation of a solar powered pumping system at the NSD, (4) provision of pumping main from the NSD to the field, and (5) installation of a drag hose irrigation system comprising of permanent sub-main pipes, permanent lateral pipes, pressure regulating valves, hose pipes, tripods, and sprinklers. Comparison of the river flows and the irrigation water requirements shows that provision of storage in the NSD will ensure adequate irrigation water during the dry months of September and October. Topographical surveys undertaken indicate that the topography is suitable for the selected drag hose irrigation system. Soil tests showed that the soils are suitable for production of most crops and the soils can be irrigated by sprinkler irrigation methods. Water quality tests reviewed that the water is suitable for crop irrigation. The cost of installing the proposed irrigation infrastructure only the 16ha irrigation scheme is estimated at US\$283,449. This translates to US\$ 17,715.56 per hectare.

**Vimbanayi Irrigation Scheme:** The scheme is an existing irrigation scheme which is situated in Ward 29, Chipinge District, Manicaland Province. The irrigation scheme comprises of 167 members of which 83 are men and 84 are women and the area under irrigation is 23 hectares. This translates to about 0.14ha plot holding per member. There is an additional 12 hectares of land available for expansion and will increase the irrigation area to 35ha. The irrigation system installed at the scheme is flood irrigation. Existing infrastructure includes, an electric powered movable pump, a 200m PVC pipeline, a division box and concrete lined canals. The irrigation scheme faces myriad of challenges which include (1) the pumping system currently operates with a single 200mm dia AC pumping main which is not adequate to deliver the required flow rate to the irrigation area, (2) high susceptibility to climatic hazards such as floods, droughts and cyclones (3) leakages on the main pipeline from the pump station to the distribution chamber, (4) the pump station is entirely dependent on power supply from the national grid which experiences frequent power cuts, (5) high operational costs in the form of electricity tariffs, and (6) poor trafficability of soils particularly under wet conditions. Specific climate proofing and revitalization activities include:

- ✓ Installation of an abstraction system in the river which taps water from both the surface and sub-surface flows.
- ✓ Expansion of the irrigation area in order to increase the sizes of the plot holdings for the farmers.
- ✓ Repairing the existing canals and sluice gates to reduce water losses.
- ✓ Installation of a night storage dam to allow for water abstraction to continue during periods of no irrigation. This can also enable pumping during night hours when electricity tariffs are lower
- ✓ Installation of a storm-water drainage system to collect excess runoff for safe disposal into the river
- ✓ Promotion of crop rotation for soil fertility management and diseases control
- ✓ Adoption of climate-smart crop value chains.
- ✓ Training of the IMC and beneficiaries on improved agronomical practices and irrigation scheduling.

Topographical surveys undertaken indicate that the topography is suitable for flood irrigation system. Soil tests showed that the soils are suitable for production of most crops and the soils can be irrigated by surface irrigation methods. Water quality tests reviewed that the water is suitable for crop irrigation. The cost of climate-proofing the 35ha irrigation scheme was estimated at US\$346,790 (excluding VAT). This translates to US\$ 9,908.29 per hectare.

**Mudzimwa Irrigation Scheme:** The scheme is a proposed smallholder irrigation scheme located in Ward 3, Chipinge District in Manicaland province. The proposed scheme has a targeted net irrigated area of 40 ha and is expected to directly benefit a total of 185 beneficiaries, of which 94 are women and 91 are men. The farmers are currently mainly reliant on rain-fed agriculture and some small-scale gardening with water abstracted from the adjacent Tanganda River. Hydrological analysis of surface water resources in the catchment area of the scheme revealed that there is inadequate surface water resource to support the scheme. However, electromagnetic tests revealed the presence of an alluvial aquifer on the banks of the adjacent Tanganda River. Hence groundwater resources are adequate and will be used to supply the scheme. A solar system will be utilized to provide power to the boreholes. The irrigation scheme is expected to face a myriad of challenges which include reduced annual rainfall, droughts and cyclones, competing upstream water users and increasing temperatures. Specific climate proofing activities include:

- ✓ Drilling of boreholes on the banks of the Tanganda River in order to tap into some water from the baseflows of the Tanganda River.
- ✓ Installation of a drag horse irrigation system
- ✓ Adoption of climate-smart crop value chains.
- ✓ Promotion of crop rotation for soil fertility management and diseases control.
- ✓ Training of the IMC and beneficiaries on improved agronomical practices, irrigation scheduling, financial management, agri-business and contract farming negotiations.

Topographical surveys undertaken indicate that the topography is suitable for the selected drag hose irrigation system. Soil tests showed that the soils are suitable for production of most crops and the soils can be irrigated by sprinkler irrigation methods. Water quality tests indicate that the groundwater is largely suitable for crop irrigation. The cost of installing the drag hose irrigation system for the 40ha irrigation scheme is estimated at US\$1,186,603.00. This translates to US\$ 29,665.08 per hectare.

### **ES 3: Legal and Technical Basis for the ESMP**

As stipulated in the ESMF, the sub-projects were screened for potential environmental and social risks in line with national environmental impact assessment guidelines (1997) as well as UNDP’s Social and Environmental Standards using the environmental and social screening procedure. In addition, the sub-projects activities were also screened against the “negative list” or “exclusion list” provided in the ESMF. This initial environmental and social screening resulted in the development of an environmental and impact assessment prospectus for each sub-project. Upon review of the EIA prospectuses by the Environmental Management Agency, the sub-projects were categorised as a moderate risk, and the preparation of the ESMP was required. Moreover, the sub-projects do not fall within the negative or exclusion list stipulated in the Project ESMF.

To comply with national requirements as well as GCF and United Nations Development Programme’s Social and Environmental standards, the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MoLAFWRD) is required to assess the environmental and social impacts of the proposed sub-projects and prepare an Environment and Social Management Plan (ESMP). The ESMP was produced as per the requirements of Environmental Management (Environmental Impact Assessment and Ecosystem Protection) Regulations, SI 7 of 2007 and in fulfilment of the requirements of the Environmental Management Act (CAP 20:27) – First Schedule (Section 2 and 97) under the “Prescribed Activities”. Internationally, United Nations Development Programme’s Social and Environmental Standards (2015 Policy) were used. The centrality of human rights, gender equality and women’s empowerment and environmental sustainability were considered throughout the course of sub-project development. The Human rights principle and the five project-level safeguards standards were triggered, and these include:

- Principle 1: Human rights
- Standard 1: Biodiversity conservation and sustainable natural resources management
- Standard 2: Climate change mitigation and adaptation
- Standard 3: Community health, safety and working conditions
- Standard 4: Cultural heritage
- Standard 7: Pollution prevention and resource efficiency

### **ES 4: Legal and Policy Framework**

The design, implementation, operation and management of the irrigation schemes shall be done in compliance with national and international legislations, rules, regulations, standards, treaties, conventions, policies, plans and strategies that exist to govern the development of irrigation schemes in Zimbabwe. This helps to ensure that projects are developed in a socially acceptable, environmentally sound, technically possible and economically viable manner. The legal and policy framework governing have been identified. The relevant legislation include the Environmental Management Act (Chapter 20:27), Water Act (Chapter 20:24), Public Health Act (Chapter 15:17), Labour Act (28:01), Forestry Act (Chapter 15:09), Parks and Wildlife Act (Chapter 20:14), Traditional Leaders Act (Chapter 29:17), Farm Feeds, Fertilizer and Remedies Act (Chapter 18:12), Factories and Works Act (14:08), Rural District Councils Act (Chapter 29:13), The Communal Lands Act (Chapter 20:04) and their applicable regulations. Relevant national policies include the Zimbabwe National Gender Policy (2017-2022), National Occupational Health and Safety Policy (2014), climate change policy (2017), Zimbabwe National Climate Change Response Strategy (2014), Zimbabwe National Environmental Policy (2009), etc.



### **ES5: Environmental and Social Assessment Methods**

Environmental and social impacts were identified through several methods which include screening checklist, stakeholder consultation, literature review, safety data sheets and professional judgement. An impact risk analysis was undertaken using the UNDP Risk Assessment Matrix stipulated in the ESMF to assess the probability and the impact of the risk. From this, a significance value was attributed to the potential impact (Low, medium, high). Appropriate measures to manage the identified impacts were selected following the mitigation hierarchy. Moreover, an analysis of alternatives for the proposed sub-project was conducted with respect to site location, technology (irrigation system), water and energy source and do-nothing alternatives. These alternatives were subjected to multiple criteria evaluation ranging from environmental, economic, social and climate risk.

### **ES 6: Anticipated Environmental and Social Impacts**

The development of the schemes is slated to engender significant positive impacts on food production, climate resilience, employment, economic development, livelihoods and quality of life. Good harvests improve their economic status and livelihoods. Marketing and climate smart crop value chain will come with economic expansion and diversification that would lead to stimulation of economic development. The local economy would be improved. There would be creation of employment to a number of people in the targeted area. There would be improved public accessibility to health and education, knowledge and skills enhancement of agriculture related activities, information exchange and strengthened social capital. That kind of development promotes women and youth empowerment. There will also be increased resilience and improved well-being of vulnerable beneficiaries. With proper management, the scheme would notably promote good governance.

Despite these positives, the sub-projects are also likely to bring some negative environmental and social risks. Biophysical negative impacts include water pollution, water depletion; biodiversity loss; waterlogging; degradation of air quality; land pollution, soil erosion, noise and vibration, sedimentation and siltation of rivers, etc. The anticipated social risks include conflicts during plot allocation; poor labour conditions; health and safety incidents; increased crime rates; sexual exploitation, abuse and harassment (SEAH); prevalence of Sexually Transmitted Infections; HIV and AIDS; water borne diseases, child labour, Gender Based Violence (GBV); etc.

***There are no homesteads within the land targeted for the development of the schemes, hence there will be neither displacement of persons nor destruction of property and assets. Moreover, no Indigenous Peoples are present in the Project area of influence.*** Archeological studies conducted in all the schemes. No artefacts or heritage sites were identified in the targeted areas apart from some graves at Farai, Musirizwi and Mudzimwa scheme area. These graves are situated outside the cropping area and will not be affected by the development of the scheme. Through consultations with relatives, traditional leadership, local authorities and the Department of National Museums and Monuments, there was consensus that the graves be fenced off and excluded from farming activities. A cultural site used for rainmaking ceremonies was also identified outside Mudzimwa irrigation scheme command area. The site will not be affected by the development of the scheme.

Environmental and social assessment studies conducted so far show that the environmental and social risks identified are likely to be very minimal or moderate and can be addressed through straight forward application of environmental siting, permitting requirements, pollution prevention, design criteria, construction standards, training and awareness raising.

## **ES 7: Environmental and Social Mitigation Measures**

The following are some of the management measures that will be implemented during the planning, construction, operational and decommissioning phases of the sub-projects.

- Providing for continuous but meaningful, transparent and inclusive engagement of community landowners, traditional authorities, local governmental structures and political leaders at district level to prevent disputes over land use and plot allocation
- Ensuring that the process of land transfer and plot allocation is transparent, fair and accessible to project stakeholders irrespective of their gender and dis(ability). The land donors must be compensated through ensuring that they are the primary beneficiaries to plot allocation, and that they obtain plot sizes proportionate to the size of the land donated.
- Ensuring that the rights and special needs of vulnerable groups such as elders, youth, children, persons with disabilities are respected, including consideration of special measures to improve their participation in decision-making and their general well-being
- Promoting the integrated water resources management approach that seeks the coordinated development and management of water, land and related resources in order to minimize conflicts and to maximize the economic and social welfare in an equitable manner and without compromising the sustainability of ecosystems
- Adopting water efficient irrigation technologies to minimize conflicts related to water use
- Adoption of climate smart crop value chains that are high-yielding, high-value, and have low processing and handling requirements.
- Provide an improved cropping program which takes into consideration the need for crop rotation, and water availability.
- Ensure training of farmers in improved agronomical practices that increase crop yield and crop quality including improving soil quality, diseases/pests' management, water conservation, soil conservation, etc.
- Implementing integrated pest and vector control management practices to minimize excessive application of fertilizers, herbicides and insecticides
- Use of mechanical weed and pest control such as ridging and hand hoes
- Application of green manure and other environmentally friendly organic nutrients to continuously improve the soil structure in the fields to reduce runoff, limit soil erosion and subsequent siltation of water bodies
- Ensuring that equipment and machinery for use at project sites is properly serviced and that maintenance shall be performed only at dedicated areas specifically designed for purpose to minimize health and safety risks as well as environmental pollution;
- Limiting vegetation clearing to working and construction sites only
- Ensuring that locals are given precedence in terms of employment opportunities taking into consideration of gender perspectives
- Graves identified at Musirizwi irrigation scheme must be fenced off and excluded from any cropping activities
- Implementing the "chance find" procedure in the event that tangible forms of cultural or archaeological importance are encountered during excavation and trenching
- Ensuring that the Code of Conduct on Sexual Exploitation, Abuse and Harassment is developed and implemented by contractors during the construction phase of the project

- Strengthening the participation of women in decision-making processes on climate adaptation, mitigation and disaster risk reduction
- Respecting and promoting workers' rights, to ensure the right to decent work, fair treatment, non-discrimination, and equal opportunity for workers, and to avoid the use of forced labour and child labour
- Ensuring that appropriate information about emergency preparedness and response activities, resources, and responsibilities is disclosed to local communities, contractor staff and other stakeholders
- Training of the farmers on irrigation systems maintenance and in improved agronomical practices that increase crop yield and crop quality including improving soil quality, diseases/pests' management, water conservation, soil conservation, etc.
- Ensuring that provision of adequate security personnel and security measures are implemented to limit vandalism and theft of property

The cost of implementing the site specific ESMPs is shown in Table below.

Name of scheme	Cost (USD)
Mhakwe	34,572.00
Farai	37,572.00
Musirizwi	41,572.00
Vimbanayi	39,572.00
Mudzimwa	39,572.00

This include the cost of training and capacity building for ESMP implementation, environmental and social monitoring, Grievance Redress Mechanism implementation and operation. The cost of implementing mitigation measures by the contractor shall be borne by the contractor as may be stipulated in the contract of works.

### **ES 8: Roles and Responsibilities in ESMP implementation**

ESMP implementation during construction and operation phases of the sub-projects will require the participation of several stakeholders each with specific roles and responsibilities. Key stakeholders involved in the implementation of the ESMP include the Project Management Unit (PMU), relevant government ministries and agencies, contractors, local leadership and beneficiaries, etc. The Project steering committee and board has the responsibility for overseeing the implementation of the ESMP and giving strategic direction to any issues that may require changes in project design. The PMU will be responsible for overall coordination in the implementation of the ESMP and ensuring compliance with national, GCF and UNDP SES requirements. The Contractors will be responsible for implementing the Contractor ESMP (C-ESMP) for their specific work sites.

An environmental and social compliance framework has been developed to monitor the implementation of the ESMP in accordance to the provisions and conditions stipulated in the ESMF. EMA shall be responsible for providing the overall environmental and social monitoring of the sub-projects. Contractors shall undertake periodic site audits and inspections to ensure that the ESMP is fully implemented. Officers from the Responsible Parties (RPs) shall be responsible for conducting routine site checks and inspections and report any environmental and social incidents to EMA or the PMU. The targeted beneficiaries and local communities have the responsibility to routinely monitor environmental and social performance during all phases of sub-project development to ensure that their constitutional rights are adequately observed and that the contractors effectively implement the mitigation measures provided in the ESMP. The local authorities and other relevant government agencies will be responsible for dealing with specific issues or conflicts that may arise during sub-project

implementation. All monitoring and evaluation data shall be collated by UNDP and consolidated in the Annual Progress Report (APR) for submission to GCF.

### **ES 8: Stakeholder Consultation and Information Disclosure**

Different categories of stakeholders which include land donors, targeted beneficiaries, traditional leaders, relevant government departments at all levels, industry groups and civil society organisations were consulted. Methods of consultations included key informant interviews, questionnaires, focus group discussions and public meetings. Separate conversations were also held with women due to cultural barriers which mostly provide them with less authority and mobility. Special transport arrangements were made for the elderly so that they could attend the stakeholder meetings. Project Affected Persons (PAPs), in particular, the land donors were given an opportunity to express their views and follow up discussions will be held concerning the process of land transfer and plot allocation.

To ensure fairness in the process of land transfer and allocation, it was agreed that the land donors shall be the primary beneficiaries to plot holding and that they are the size of the plot allocated shall be proportional to the land donated. All the necessary information pertaining to possible impacts will be communicated to the PAPs at the right time in a language, format, and manner that is culturally appropriate, clear, and accessible to ensure transparency in the land transfer process. A Grievance Redress Mechanism has been developed and shall be communicated and popularized in the project implementation areas so that PAPs have access to a transparent, fair, and equitable mechanism that seeks to resolve their concerns.

A stakeholder Engagement Plan was developed as part of this ESMP to ensure that stakeholders including PAPs are kept informed and involved throughout project implementation and in transition arrangements for the closing of the sub-projects. The stakeholder consultation process will be ongoing and iterative throughout the project cycle. For public disclosure, this ESMP shall be made available to the public at local, district, provincial and national levels. At local level, a summary ESMP translated into local language (Shona) shall be made available to the Irrigation Scheme Management Committee (IMC) as well as at a local district office. A full ESMP document will be made available to the public both at EMA provincial and national offices. Furthermore, digital copies of the ESMP will be disclosed through online platforms such as the UNDP country office website and the UNDP transparency portal to enhance public access.

### **ES 9: Project Grievance Redress Mechanism**

The Project will set up a Grievance Redress Mechanism (GRM) on traditional conflict-resolution flows as well as administrative and project-based steps to ensure community members or any stakeholders have the opportunity and means to raise their concerns, complaints and suggestions. A four-tier redressal structure is proposed to address complaints that may emanate from the sub-projects. It represents different stakeholders at the various levels of the conflict resolution process. The four levels of grievance redressal at project level include (1) Local/community level, (2) District/Provincial level, (3) PMU level & (4) Project Steering Committee (PSC). GRM committees will be established at community level to ensure that grievances are received and resolved at the lowest level. The community level Grievance Redress Committee will be trained on the grievance handling procedure including how to receive and log grievances in a grievance register. A reporting line of received (and addressed) grievances will be clearly defined, so that the project Implementation Unit (PIU) will have a full set of grievance data generated at each tier of the GRM structure including at community level. Complaints received at each tier of the GRM structure will be categorized and recorded in an overarching project grievance database

kept the PMU. The database will also be an effective management tool to monitor progress and detect potential obstacles in project implementation. The database will be established in an easy-to-use software system (Microsoft Excel) to allow ease of use.

The necessary procedures for grievance resolution shall be activated until the matter is closed, preferably within 30 days from the date the complaint was received. Stakeholders will be sensitized to take their complaints or grievances to the Project level GRM. In the event of dissatisfaction from affected parties that cannot be resolved within the project’s proposed grievance resolution process, the Project Steering Committee shall refer the dispute or difference to arbitration within 30 days. Where there is no consent, the aggrieved party can seek legal redress.

Sensitive grievances may also be addressed using appropriate approaches by different actors. These include local leadership, respected elders, clinics, Masvingo One Stop Center (Located at the New Start Center) spiritual leaders, church leaders and civic organisations. There are organizations that work with communities to deal with gender-based violence. An example is collaborated work among Musasa project, the Ministry of Home Affairs and the Zimbabwe Women Lawyers Association (ZWLA) in dealing with gender-based violence including sexual exploitation, abuse and harassment (SEAH).

### ES 10: Conclusion

This ESMP concludes that the development of the irrigation schemes will generate significant positive impacts such as enhancing food security, improving nutrition, employment creation and contribute to local economic development. The negative environmental and social impacts of the sub-project are likely to be minimal and moderate and can be easily addressed through implementing of readily available management measures. However, during the construction and operation of the sub-projects there is need for periodic monitoring of water quantity and quality, soil quality, environmental flows, air quality, waterborne diseases, health and safety aspects and Sexual Exploitation, Abuse and Harassment (SEAH) by different stakeholders which include the beneficiaries, irrigation management committees, relevant government agencies, contractors and the PMU. If the environmental and social safeguard measures proposed in this ESMP are implemented, the benefits that the sub-project will bring to the communities will far outweigh the negative impacts which also of course shall be avoided, minimized or mitigated. In this regard, our recommendation is the development of these sub-projects should be given the green light to go ahead.

### ES 11: ESMP Team

The following persons were involved in the study and compilation of the Environmental and Social Management Plan for the irrigation schemes.

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## LIST OF ACRONYMS

AGRITEX	Department of Agricultural, Technical and Extension Services
CBPP	Community Based Prominent Persons
CSO	Civil Society Organization
DDC	District Development Coordinator
DDF	District Development Fund
DOIR	Department of Irrigation,
DR&SS	Department of Research and Specialist Services
EMA	Environmental Management Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GCF	Green Climate Fund
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
IAASTD	International Assessment of Agriculture Knowledge, Science and Technology for Development
ARDA	Agricultural and Rural Development Authority
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IMC	Irrigation Management Committee
ISDC	Irrigation Scheme Disciplinary Committee
LGC	Local Grievances Committee
M&E	Monitoring & Evaluation
MLAFWRD	Ministry of Lands, Agriculture, Fisheries, Water and Rural Development
MSD	Meteorological Services Department
NGO	Non-Governmental Organisation
PMU	Project Management Unit
RDC	Rural Development District Council
RPs	Responsible Parties
SEAH	Sexual Exploitation, Abuse and Harassment

SECU	Social and Environmental Compliance Unit
SEP	Stakeholder Engagement Plan
SES	Social and Environmental Standards
SESA	Strategic Environmental and Social Assessment
SMP	Social Monitoring Plan
SRM	Stakeholder Response Mechanism
ToT	Training of Trainers
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WCCW	Ward Child Care Workers
ZINWA	Zimbabwe National Water Authority,
ZRP	Zimbabwe Republic Police
ZWLA	Zimbabwe Women Lawyers Association

## 1.0 INTRODUCTION

### 1.1 Background

With continued intensification of climate variability and change, Zimbabwe's current coping strategies for the agriculture and water sectors are becoming increasingly ineffective, requiring essential adaptation investments to achieve lasting climate resilience among vulnerable rural farming households. Adaptation to climate change for vulnerable smallholder farmers requires resources and capacities for adaptive management of their agro-ecosystems with the aim of stabilizing, increasing and sustaining agricultural yields and incomes. In areas that are becoming drier and hotter, particularly the Southern part of Zimbabwe, these resources include access to, as a priority, sufficient, dependable water and a diversity of climate-resilient crop varieties and livestock breeds and management practices.

To respond to and manage growing climate risks and hazards, the Government of Zimbabwe through the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD) in partnership with United Nations Development Programme (UNDP) is implementing a seven-year project "Building climate resilience of vulnerable agricultural livelihoods in southern Zimbabwe". The project is financed by the Government of Zimbabwe and the Green Climate Fund (GCF). The project intervention builds the climate resilience of vulnerable agriculture livelihoods in 15 districts across three provinces of Manicaland, Masvingo and Matabeleland South through the following strategic components:

- Increasing access to water for climate-resilient agriculture through climate-resilient irrigation systems and efficient water resource management.
- Increasing access to climate-resilient inputs and practices, as well as stronger market linkages;
- Improving access to weather, climate, and hydrological information for climate-resilient agriculture.

The objective of the project is to strengthen resilience of agricultural livelihoods of vulnerable communities, particularly women, in the face of increasing climate risks and impacts. The proposed project will be implemented in 15 selected districts and 137 wards in southern Zimbabwe in the semi-arid Agro-Ecological Regions (AERs) IV and V of the provinces of Manicaland, Masvingo and Matabeleland South. The 137 wards are distributed as shown in Table 1 and the geographical spread of the project is shown in Figure 1.

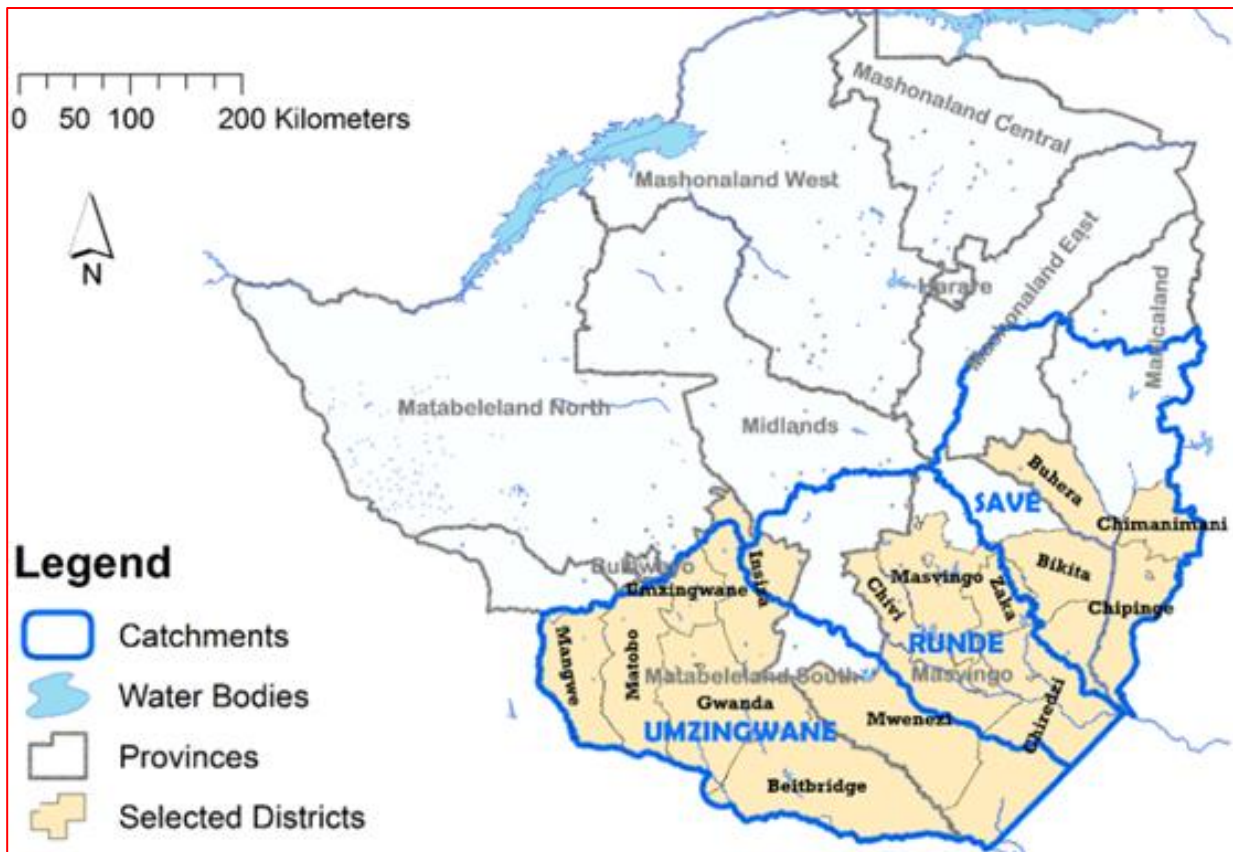


Figure 1: Geographical Spread of the Project

Table 1 Distribution of the Wards in 15 priority districts

Province	District	Number of Wards
Manicaland province	Buhera	13
	Chimanimani	7
	Chipinge	15
Masvingo	Masvingo	9
	Bikita	4
	Zaka	4
	Chivi	9
	Chiredzi	8
	Mwenezi	5
Matabeleland South	Beitbridge	5
	Gwanda	13
	Matobo	16
	Insiza	16
	Umzingwane	7
	Mangwe	6



The project is targeting the revitalization of 15 existing irrigation schemes and the establishment of 6 new schemes in 15 priority districts of Manicaland, Masvingo and Matabeleland South Provinces.

The irrigation schemes have been classified into three lots, namely lot 1, 2 and 3. Each lot is defined by a specific hydrological catchment with similar biophysical and socio-economic characteristics. Lot 1 consist of three irrigation schemes and all are situated in Matabeleland South Province. Lot 2 consist of 7 irrigation schemes and all are situated in Masvingo Province. Lot 3 consist of 5 irrigation schemes and all are situated in Manicaland Province. The other 6 alternative schemes (presumably lot 4) are still yet to receive GCF approval. These are alternative schemes that no longer conformed to the GCF selection criteria between the project design phase in 2016 and the project implementation phase in 2020.

Site-specific Environmental and Social Management Plans (ESMPs) were prepared for each of the 5 irrigation schemes under Lot 3. A review of the ESMPs show that the reports largely share the same content particularly on legal and policy framework, baseline biophysical and socio-economic setting, anticipated environmental and social impacts, proposed environmental and social management measures, grievance redress mechanisms, etc. This is because Lot 3 schemes are situated in the same hydrological catchment with similar biophysical and socio-economic characteristics. Based on this, it was therefore logical to prepare a consolidated ESMP for the 5 irrigation schemes to ease the review process.

This ESMP is therefore a consolidation of the site specific ESMPs of the 5 irrigation schemes under Lot 3. Of the 5 schemes, 4 are existing schemes which are targeted for revitalisation and climate proofing, while the other scheme is new scheme which will be constructed and climate proofed. The existing schemes are Mhakwe, Farai, Vimbanayi and Musirizwi while the new irrigation scheme is Mudzimwa. All the irrigation schemes under Lot 3 are situated in Manicaland Province and have a total net irrigated area of 139 hectares (ha).

The ESMP objectives are as follows;

- i. To inform the Ministry of Environment, Tourism and Hospitality Development and the Green Climate Fund about the project, its location and activities.
- ii. To provide preliminary identification of potential impacts on the biophysical and socio-economic environment.
- iii. To propose mitigation options managing the potential negative impacts, while promoting positive ones in line with the requirements of the Environmental Management Act Cap 20:27 and UNDP SES (2015 Policy).

## 1.2 Proponent contact Details

Table 2 provides details of the Project proponent.

Table 2: Contact details of the project proponent

Organisation	Ministry of Lands, Agriculture, Fisheries, Water and Rural Development
Contact Name	Mr Shepard Kadaira
Physical address	10th Floor, Kaguvi Building Corner 4th Street and Central Avenue
Tel	+263 714 900 693/+263 773 375 353
Email	<a href="mailto:skadaira@gmail.com">skadaira@gmail.com</a>

### 1.3 Methodology

Mixed methods, both quantitative and qualitative were used; using multiple research methods to collect and triangulate qualitative and quantitative baseline data from a range of sources. Data was collected from both primary and secondary sources. Ecological data was collected from the field through field measurements, document review, stakeholder consultations and observations. Consultations were done with the locals who had historical and indigenous knowledge about their natural resources. Some information was derived from satellite remote sensing data using ArcGIS software and the Google Earth Engine. Socio-economic data was collected from stakeholders through document review, questionnaires, in-depth face to face interviews, tele-interviews, meetings and focus group discussions. MAXQDA was used for qualitative analysis, and MS Excel and Power BI for quantitative analysis.

Risk identification and analysis tools such as the Integrated Environmental and Social Impact Assessment Risk Assessment Tool and the United Nations Development Programme’s Environmental and Social Screening procedure were used. Risk assessment was conducted using the risk matrix tool which entail analysis of the level of impact (consequence) and the likelihood (level of probability) of risk. Risk = Level of impact x Likelihood. Table 3 provides the risk assessment tool used for analysing the risks from the sub-project.

Table 3: UNDP impact rating matrix

Impact	5	High	High	High	High	High
	4	Medium	Medium	High	High	High
	3	Low	Medium	Medium	Medium	Medium
	2	Low	Low	Medium	Medium	Medium
	1	Low	Low	Low	Low	Low
			1	2	3	4
	<b>Probability</b>					

## **2.0 SUB-PROJECT DESCRIPTION**

### **2.1 Introduction**

The irrigation schemes experience extreme weather conditions that have been exacerbated by the effects of climate change. Climate hazards such as recurrent droughts, flush floods and very hot temperatures are increasingly frequent. The rainfall patterns have become highly unpredictable making it imperative to have climate proofed irrigation schemes. Appropriate irrigation system were selected at each scheme in consultation with stakeholders including the beneficiaries through consultative meetings. The main consideration was to select an irrigation method that is climate proof, lower installation costs, efficient, easier to operate and maintain, and socially acceptable. This Chapter describes the status at each irrigation scheme and provides a description of the proposed climate proofing activities at each of the five schemes.

### **2.2 Mhakwe Irrigation scheme**

Mhakwe irrigation scheme is an existing scheme. The scheme is located approximately 113km southeast of Mutare off the Wengezi – Chimanimani Road. The scheme was initially developed by AGRITEX in 2001 with assistance from European Union. It has a net irrigated area of 21 hectares (ha). The scheme draws its water from Mhakwe dam which was constructed in 1994 (GoZ) and has a capacity of 540,000m<sup>3</sup>.

#### *2.2.1 Site location*

Mhakwe Irrigation Scheme is located in Ward 18, Chimanimani District, Manicaland Province and the geo reference coordinates for the scheme are 462453.54mE and 7810534.74mS. A locality map of the irrigation scheme is shown in the Figure 2. Figure 3 shows the topographical map of the project area with a clearly marked site location.

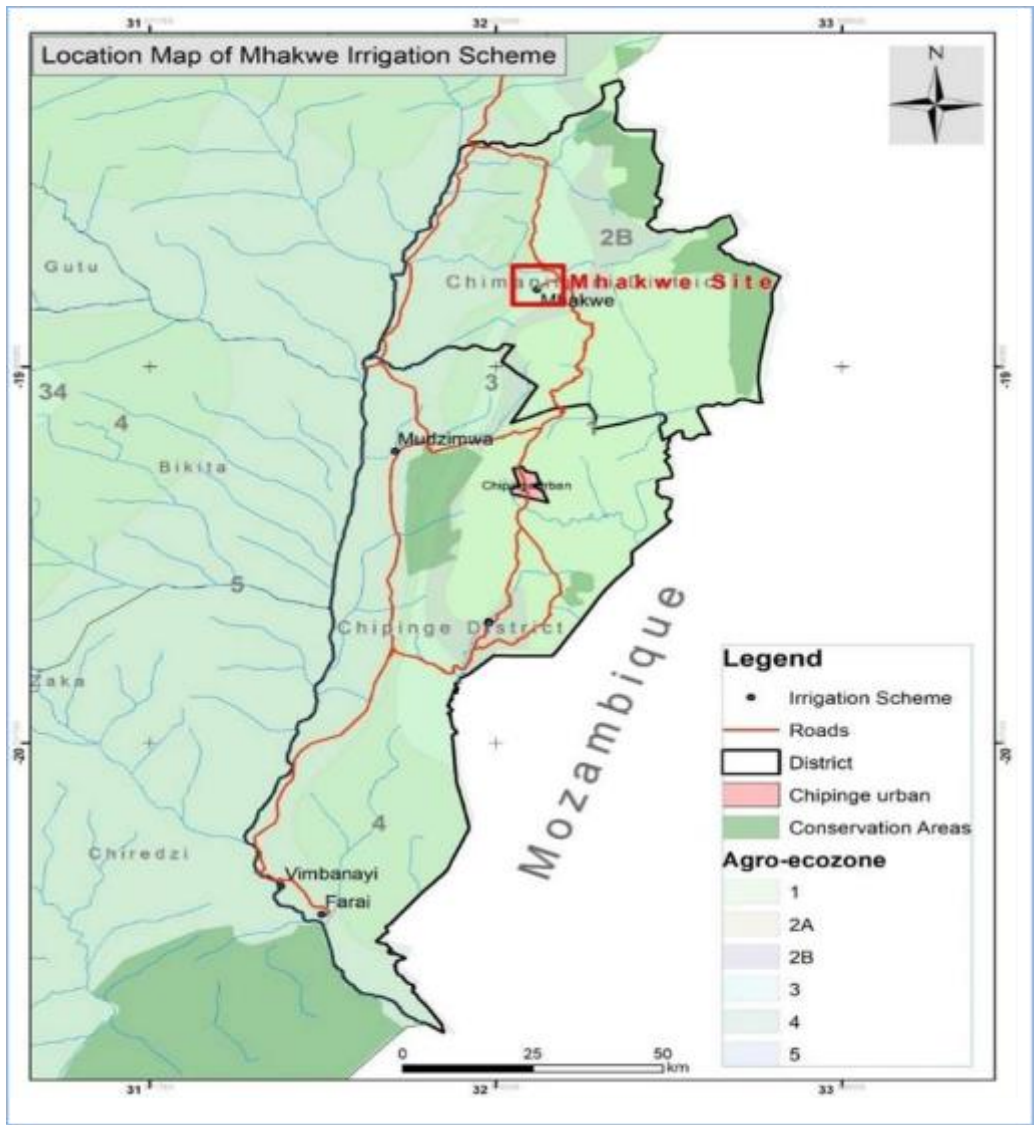


Figure 2: Location map for Mhakwe irrigation scheme



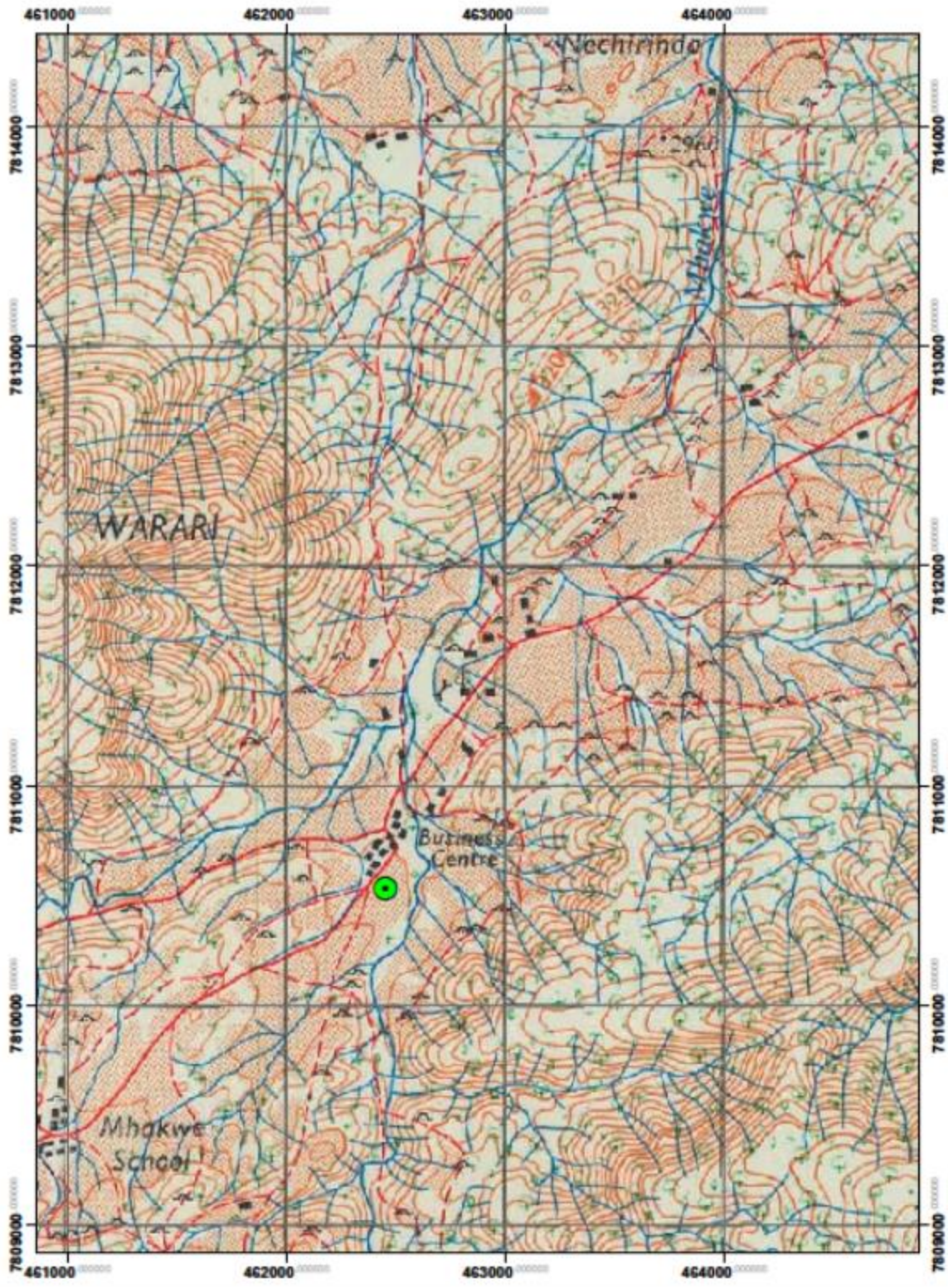


Figure 3: Topographic Map of the proposed site



### 2.2.2 Configuration of the Irrigation Scheme

Mhakwe Irrigation Scheme relies on the Mhakwe Dam and the water flows to the scheme by gravity. The Irrigation Scheme uses a drag hose irrigation system. Figure 4 show the configuration of the drag horse system at Mhakwe irrigation scheme. Taps in the field deliver the water through a hosepipe and a sprinkler on a tripod. The farmers have different types of sprinklers in terms of size and the discharge. The farmers also have hosepipes that have different sizes and lengths. Some of the hosepipes are worn out causing leakages. Plate 1 shows the dam spillway and the outlet pipe (300mm diameter steel). The dam outlet has a 300 mm gate valve which controls water supply to the scheme. As shown in Plate 2, the outlet has a tee-junction, and the other section is a blank.

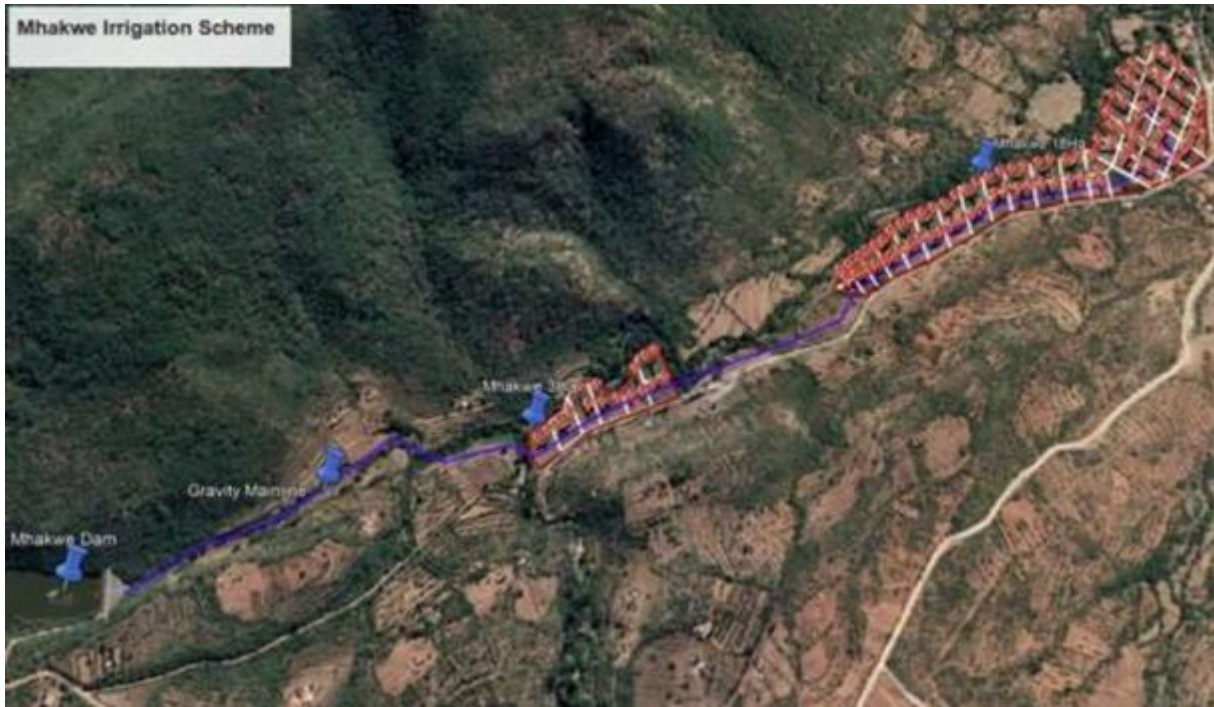


Figure 4: Configuration of the drag horse system at Mhakwe



Plate 1 Dam Spillway and Outlet Pipe



Plate 2: Outlet pipe and control valve

### *2.2.3 Challenges with the existing infrastructure*

#### 2.2.3.1 Delivery Pipeline

A gravity pipeline delivers the water from the dam to the edge of the field for onward distribution into the fields through a drag hose system. The main challenges reported by the scheme members regarding water supply is the low flow rate from the delivery pipeline. It is reported that the flow rate has been decreasing gradually over the years. The delivery pipeline was also damaged at a river crossing during Cyclone Idai in 2019 but has since been repaired. Air valves (Plate 3) were observed to be non-functional resulting in entrapment of air leading to reduced the flow rate.



Plate 3: Air release valve on 300mm Dia Section



Plate 4 shows the section of the delivery pipeline where the gravity main from the dam crosses Shekani River and it was previously damaged by Tropical Cyclone Idai in 2019. It was then repaired and laid in concrete to reduce the possibility of being washed away in the event of heavy flows in the river. Immediately downstream of the river crossing, there is a scour valve (Plate 5). The scour valves on the pipeline are not being operated, hence the collected debris, silt etc in the pipeline are not being removed resulting in constrained flow in the pipeline.



Plate 4: Delivery pipeline buried in Concrete, at Shekani River Crossing



Plate 5: Scour Valve on 100mm Dia Steel Section



### 2.2.3.2 Infield system

The following challenges have been observed with the infield infrastructure

- Leaking lateral pipelines
- Blocked lateral pipelines
- Non-functional isolation valves
- Leaking hose pipes
- Inadequate sprinklers
- Different sizes of sprinklers resulting in uneven distribution of water across the individual plots

### *2.2.4 Proposed climate proofing interventions*

#### *2.2.4.1 Delivery Pipeline*

- Increasing an 800m long section of the existing 140mm dia PVC to 160mm dia PVC will be sufficient to meet the peak current water requirements at an operating period of 8 hours per day.
- Increasing the 2005m long section of 140mm dia PVC to 160mm dia PVC will be sufficient to meet the peak water requirements in the year 2050 at an operating period of 8 hours per day.
- The following additional works are proposed on the conveyance pipeline:
- Provision of a flow meter at the edge to monitor the flow rate into the irrigation area.
- Installation of new air release valves at high points along the conveyance pipeline.
- Installation of new scour valves at low points along the conveyance pipeline.
- Flashing of the conveyance pipeline to remove settled sediments.

#### *2.2.4.2 Infield Infrastructure*

The following remedial works are proposed for the existing drag hose system:

- Flashing of the infield pipes to remove settled sediments.
- Replacement of infield isolation valves.
- Testing of infield pipeline and make replacements as necessary.
- Supply and installation of uniformly sized hose pipes and sprinklers.
- Installation pilot valves to regulate discharge pressure at the hydrants.

## **2.3 Farai Irrigation Scheme**

Farai irrigation scheme is an existing scheme which is situated in Ward 29, Chipinge District, Manicaland Province. The scheme was established in 1995 as a result of a partnership between the Government of Zimbabwe and World Vision. The irrigation system installed at the scheme is flood irrigation but was never completed. Hence the scheme is not operational. Key irrigation infrastructure at the scheme includes a 200mm buried PVC mainline, a brick storage tank and concrete lined canals. The irrigation scheme faces myriad of challenges which include poor irrigation system design, damaged canals and poor siting of irrigation equipment such a pumpsThe scheme never got to the operational phase.

### 2.3.1 Site location

Farai irrigation scheme is situated in Ward 29, Chipinge District, Manicaland Province. The UTM geo reference is 424065.44mE and 7668382.86mS. The irrigation scheme has a net irrigated area of 27 hectares (ha) but was never operational. A locality map of the irrigation scheme is shown in the Figure 5. Figure 6 shows the topographical map of the project area with a clearly marked site location.



Figure 5: Location map for Farai irrigation scheme

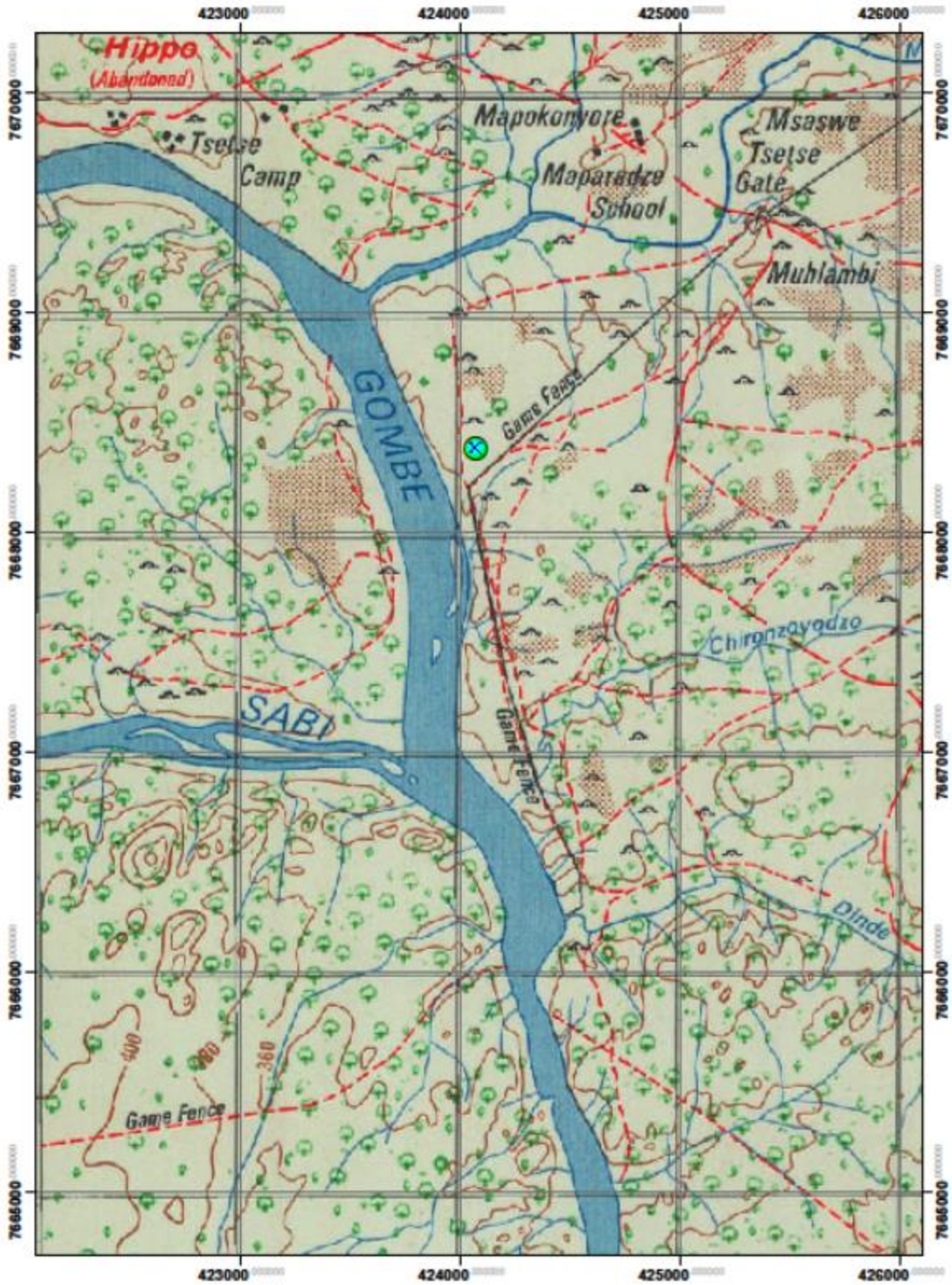


Figure 6: Topographic Map showing the site location



### 2.3.2 Irrigation Scheme Infrastructure

#### 2.3.2.1 Water Source

The original intention was to abstract river flows from the adjacent Gombe River. An abstraction pipe was installed in the river including trenching for a pumping main. But installation of the pump and pipeline was not completed hence the scheme is not yet functional. Water for irrigation will be pumped from River using a new sand abstraction system complete with pumps, motors, and a solar power supply system.

#### 2.3.2.2 Configuration of the Irrigation Scheme

The scheme was originally conceived to operate as a surface irrigation system with canals. Figure 7 shows the satellite image of Farai irrigation scheme. The water would be pumped from the river into a storage tank located at the highest point at the scheme. Water would then gravity from the tank through a network of main canals and laterals to deliver the water into the fields for irrigation. The storage tank was constructed (Plate 6). It is brick structure complete with inlet and outlet ancillaries. The tank appears to be still in good working good condition although water tightness tests would be required to determine any remedial works that may be required. The canals were constructed in the fields. But the condition of the canals has deteriorated over the years and a complete reconstruction would be required for most of the canals to resuscitate the system. Plate 7 shows the damaged infield canals.



Figure 7: Satellite image of Farai irrigation scheme



Plate 6: Centrifugal pump on the banks of Save River



Plate 7 Damaged infield canals

### 2.3.3 Challenges with the existing infrastructure

The following infrastructural gaps were identified at the scheme:

- Construction of a flood irrigation system was commenced but not completed.
- Several of the installed canals have collapsed and will need to be reconstructed in order to revive the scheme. Training of farmers on maintenance of irrigation infrastructure is critical to ensure sustainability.
- The storage tank appears to be in good condition. Water tightness tests will be required. Inlet and outlet pipe connections will also be required.
- However, the flood irrigation system appears not to be the most suitable technology considering the topography of the site. Hence a more sustainable irrigation technology system will be required.

### 2.3.4 Proposed climate proofing interventions

The following infrastructural works are recommended to climate proof the irrigation scheme:

#### *Water source*

Water will be abstracted from the adjacent Gombe River. The river is not perennial throughout the year, with limited flows being recorded in the dry seasons. However, flow persists within the sand bed within the river during the dry season. It is therefore proposed to install a sand abstraction system to abstract water from the sand media to guarantee water supply during both the wet and dry seasons.

#### *Pumping System*

Three submersible pumps are proposed to be installed within the sand bed for direct pumping into the infield irrigation infrastructure. Three submersible pumps are proposed operating in a 2-duty, 1-standby mode. Each pump will have a duty point of 100 m<sup>3</sup>/hr at 59.2m and be fitted with a 30kW (or 40HP) electric motor.

#### *Power Supply*

Power supply will be required for the pumps. Total power requirements for the pumps are 60 kW (30kW for each motor on duty). Both solar power and power from the national grid were considered. Considering that there is already infrastructure at the site for power supply from the national grid, comprising of OHTL lines and a step-down transformer, it was considered cost effective to use power supply from the national grid. Additional poles and cables will be required to deliver the power from the transformers to the motors at the pump station.

#### *Pumping Main*

A 250 mm dia PVC Class 9 pipe will convey the water from the river to the edge of the field. The pumping main will be fitted with air valves at high points and scour valves at low points. The total length of the pumping main is 1066 m. The pipeline will be laid at depths ranging from 0.7 m to 1.5 m below natural ground level for protection from floods, vandalism, and damage from farming activities.

#### *Infield Infrastructure*

Considering the topography of the area, the requirement for efficient water application, and ease of operation and maintenance, the beneficiaries and the technical team selected a drag hose irrigation system for the infield works. Permanent sub-mains will connect to the main pumping main from the river to supply water to defined irrigation blocks within the scheme. Permanent lateral pipes will then distribute the water into the blocks.



Hydrants along the lateral pipes will be positioned within plots defined within the irrigation blocks. The hydrants will be fitted with permanent riser pipes and taps. Portable hose pipes will then deliver the water to sprinklers fitted onto portable tripods to irrigate the individual plots. The configuration of the irrigation system is shown in the Figure 8.



Figure 8: Configuration of Farai irrigation scheme

## 2.4 Musirizwi Irrigation Scheme

Musirizwi irrigation scheme is an existing scheme which is situated in Ward 18, Chipinge District, Manicaland Province. The existing pumped flood irrigation scheme has a net irrigated area of 2 hectares (ha). There is a plan to extend the scheme area with another 14 hectares (ha). The scheme was established in 1995 as a result of a partnership between the Government of Zimbabwe and UNDP. The scheme is currently operational and draws its water from Musirizwi river.

### 2.4.1 Site location

Musirizwi Irrigation Scheme is situated in Ward 18, Chipinge District, Manicaland Province. The coordinates reference is 32,33,27.25E and 20,28,58.37S. The irrigation scheme has a net irrigated area of 2 hectares (ha), and there is a plan to extend by a further 14 hectares (ha). A locality map of the irrigation scheme is shown in the Figure 9. Figure 10 shows the topographical map of the project area with a clearly marked site location.

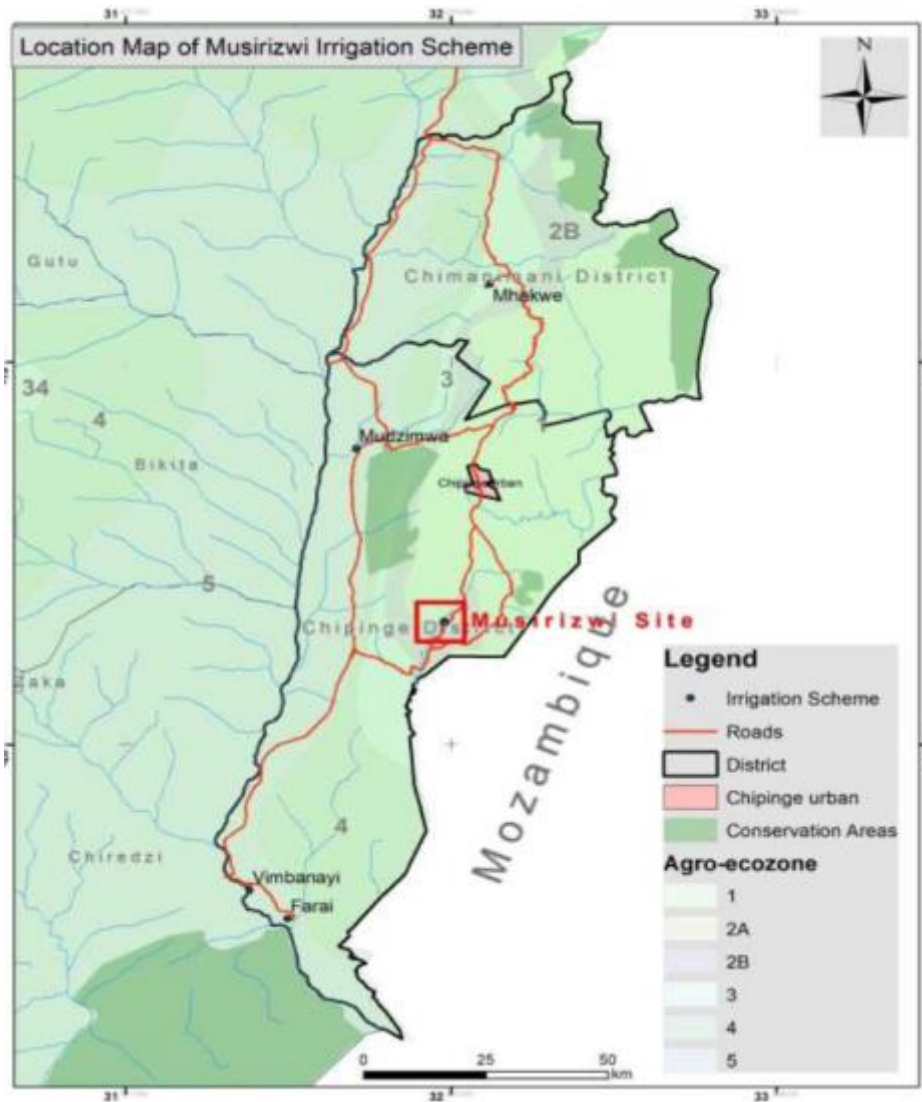


Figure 9: Location map for Musirizwi irrigation scheme



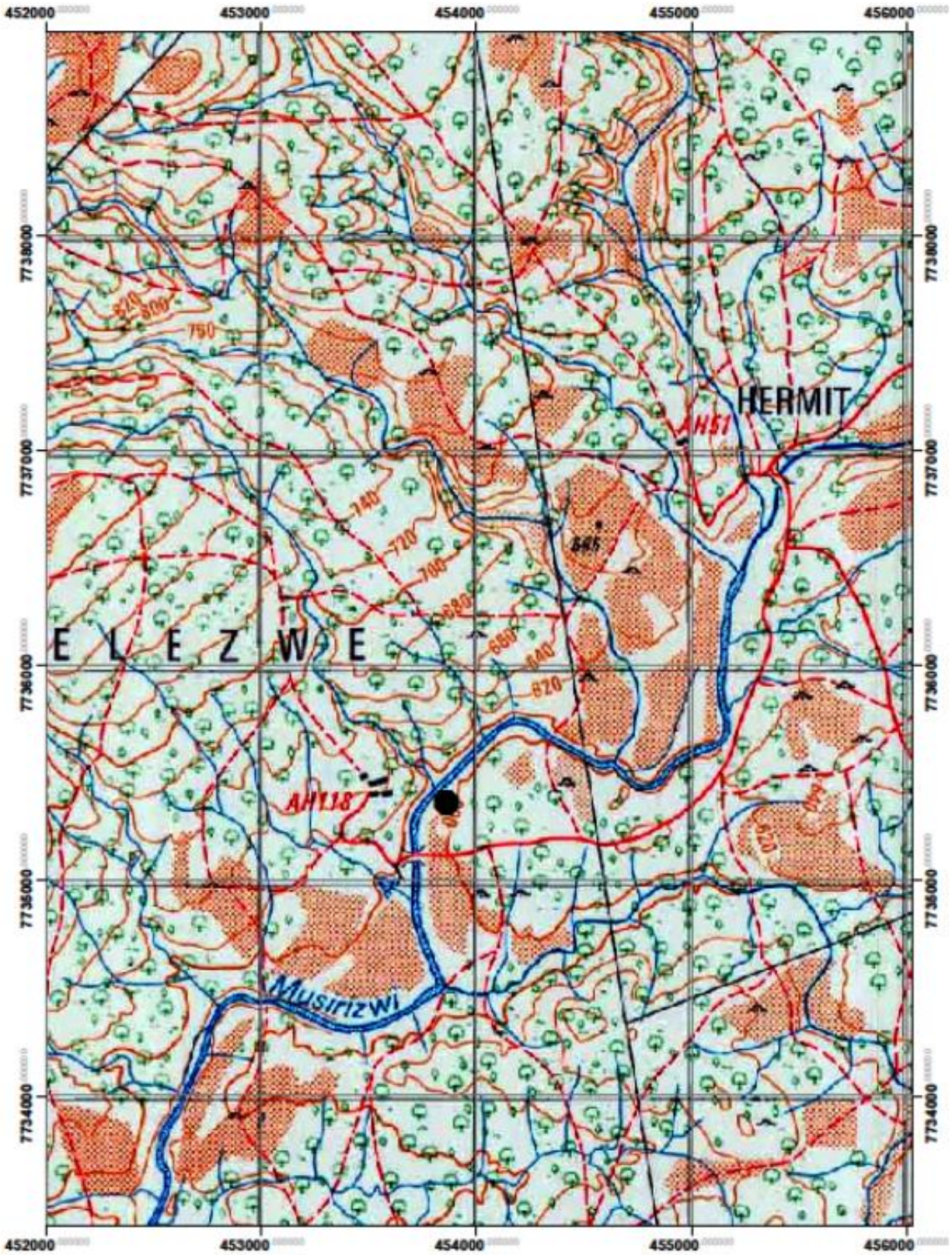


Figure 10: Topographic Map of the proposed site



#### 2.4.2 Irrigation Scheme Infrastructure

Musirizwi irrigation scheme obtains water from Musirizwi river. Figure 11 shows the satellite image of Musirizwi Irrigation Scheme. The scheme is essentially a “runoff the river scheme” with water diverted from a small pickup weir into a canal. The canal runs on a contour on the left bank. The irrigation is by flood irrigation below the canal. The main canal is about 900m long and is supplying water to the 2.16ha of the field. Due to the slope of the field, the canal can only supply water to the lower side of the field that is close to the river. The capacity of the pickup weir was measured using bathymetric survey. It is small and does not provide backup storage. The pickup weir cannot be economically raised. The intake at the weir has a 200mm diameter outlet pipe. Farmers use short pieces of PVC and HDPE pipes as siphons. Plate 8 and Plate 9 show the Weir on Musirizwi River and the outlet from the weir into the main canal respectively. Plate 10 show the lateral from the main canal. However, these laterals are currently deteriorating (Plate 11).

It is very likely that the river will run short of water in most years in September/October. The cropping programmes need to take this into account. The Metrological Services Department will help with the weather forecasts to predict the dry periods. The irrigation scheme needs to maximise cropping when water is available then adjust what and how much they irrigate depending on seasons and river flows every year in September/October.



Figure 11: Satellite image of Musirizwi Irrigation Scheme



Plate 8: Weir on Musirizwi River



Plate 9: Outlet from the weir into the main canal





Plate 10: Lateral from the main canal



Plate 11: Deteriorating canals

#### *2.4.3 Challenges with the existing infrastructure*

The following gaps were identified at the scheme that needs to be addressed:

- The capacity of the weir was bathymetrically surveyed by the Consultant in February 2023. The capacity of the weir was determined as 5,500 m<sup>3</sup>. This is quite small and make the scheme essentially a run-of-river scheme.

- The outlet pipe from the weir delivers the water by gravity to the canals. The outlet is at a high elevation in the weir in order to provide sufficient head to deliver the water to the weir. This results in the outlet pipe not being able to supply water when the water levels in the weir are low.
- The canals are constructed at very steep slopes towards the river. The farmers do not have adequate control gates for the canals resulting in most of the water being lost during irrigation.
- Some of the canals are damaged and leaking resulting in significant water losses.
- The current irrigation method is very labour intensive, which is a major challenge especially considering the age group of the scheme members.

#### *2.4.4 Proposed revitalization and climate proofing interventions*

The following infrastructural works are recommended to climate proof the irrigation scheme:

##### *Water source*

Water will be abstracted from a weir on the Musirizwi River. The abstraction efficiency will be improved from the current system by installing the abstraction pipe close to the bottom of the weir.

##### *Pumping System*

The outlet pipe will discharge by gravity into a NSD. Two submersible pumps will be installed in the NSD to pump water for supply to the scheme. The pumps will operate in a 1 duty, 1 standby mode. The duty point of each pump will be 120 m<sup>3</sup>/hr at 60 m head to meet the water requirements for the 16ha irrigation area for the proposed cropping program.

##### *Power Supply*

Power supply will be required for the submersible pumps. The power requirements for each pump is 30 kW. Solar power will be used to provide electrical energy to the pumps. A total 120 No panels will be installed, each with a power rating of 415W.

##### *NSD and Pumping Main*

A manifold connecting all the submersible pumps will deliver the water from the NSD into a single pumping main. A 200 mm dia PVC Class 9 pumping main will convey the water into the field. The pumping main will be fitted with air valves at high points and scour valves at low points. The total length of the pumping main is 420 m. The pipeline will be laid at depths ranging from 0.8 m to 1.6 m below natural ground level for protection from floods, vandalism, and damage from farming activities. The capacity of the NSD will be 1,000 m<sup>3</sup>. For a peak water requirement of 120 m<sup>3</sup>/hr, this will be equivalent to 8 hours storage capacity which will be sufficient to capture river flows when no irrigation is taking place.

##### *Infield Infrastructure*

Considering the topography of the area, the requirement for efficient water application, and ease of operation and maintenance, the beneficiaries and the technical team selected a drag hose irrigation system for the infield works. Permanent sub-mains will connect to the main pumping main from the river to supply water to defined irrigation blocks within the scheme. Permanent lateral pipes will then distribute the water into the blocks. Hydrants along the lateral pipes will be positioned within plots defined within the irrigation blocks. The hydrants will be fitted with permanent riser pipes and taps. Portable hose pipes will then deliver the water to sprinklers fitted onto portable tripods to irrigate the individual plots. The configuration of the irrigation system is shown in the Figure 12.



Figure 12: Configuration of Musirizwi Irrigation Scheme

## 2.5 Vimbanayi irrigation scheme

Vimbanayi irrigation scheme is an existing scheme which is situated in Ward 29, Chipinge District, Manicaland Province. The existing pumped flood irrigation scheme has a net irrigated area of 23 hectares (ha). There is a plan to extend the scheme area with another 12 hectares (ha). The scheme was established in 1995 as a result of a partnership between the Government of Zimbabwe and World Vision. The scheme is currently operational and draws its water from Save river.

### 2.5.1 Site location

Vimbanayi Irrigation Scheme is situated in Ward 29, Chipinge District, Manicaland Province. The coordinates reference is 416750mE and 7674774mS. The irrigation scheme has a net irrigated area of 23 hectares (ha), and there is a plan to extend by a further 12 hectares (ha). A locality map of the irrigation scheme is shown in the Figure 13. Figure 14 shows the topographical map of the project area with a clearly marked site location.



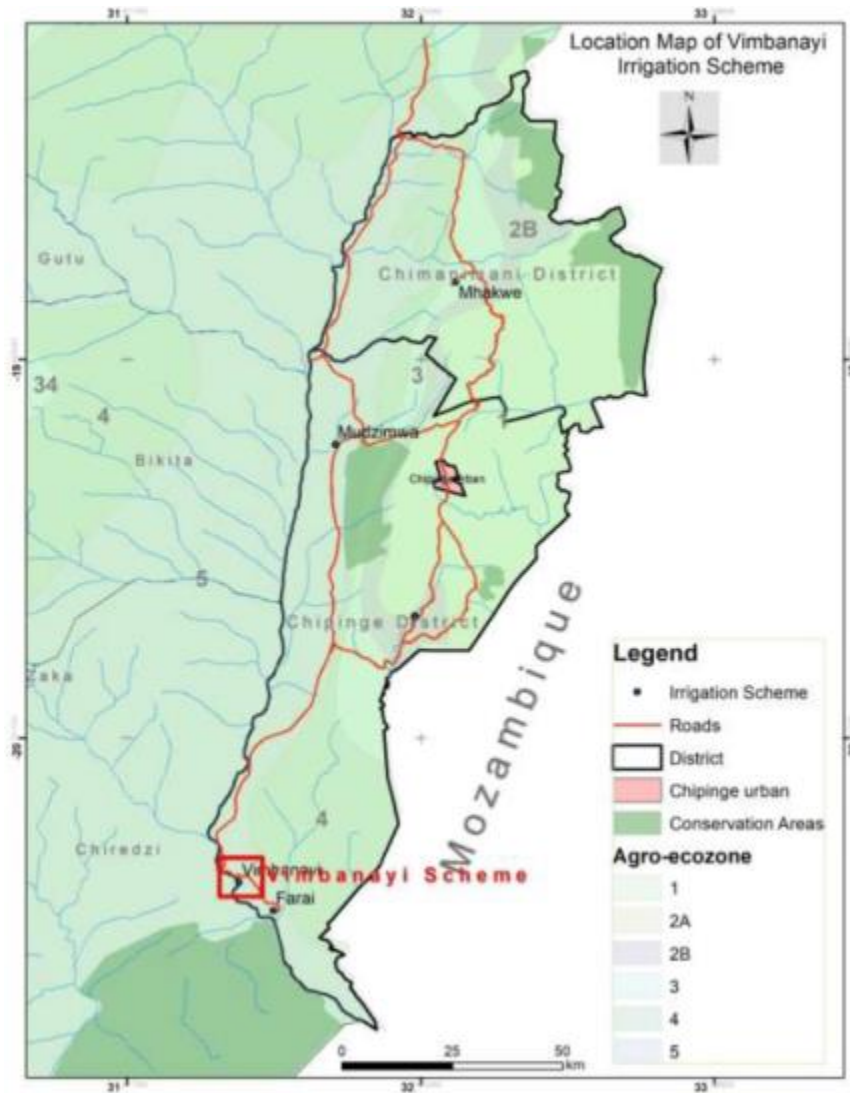


Figure 13: Location map for Vimbanayi irrigation scheme

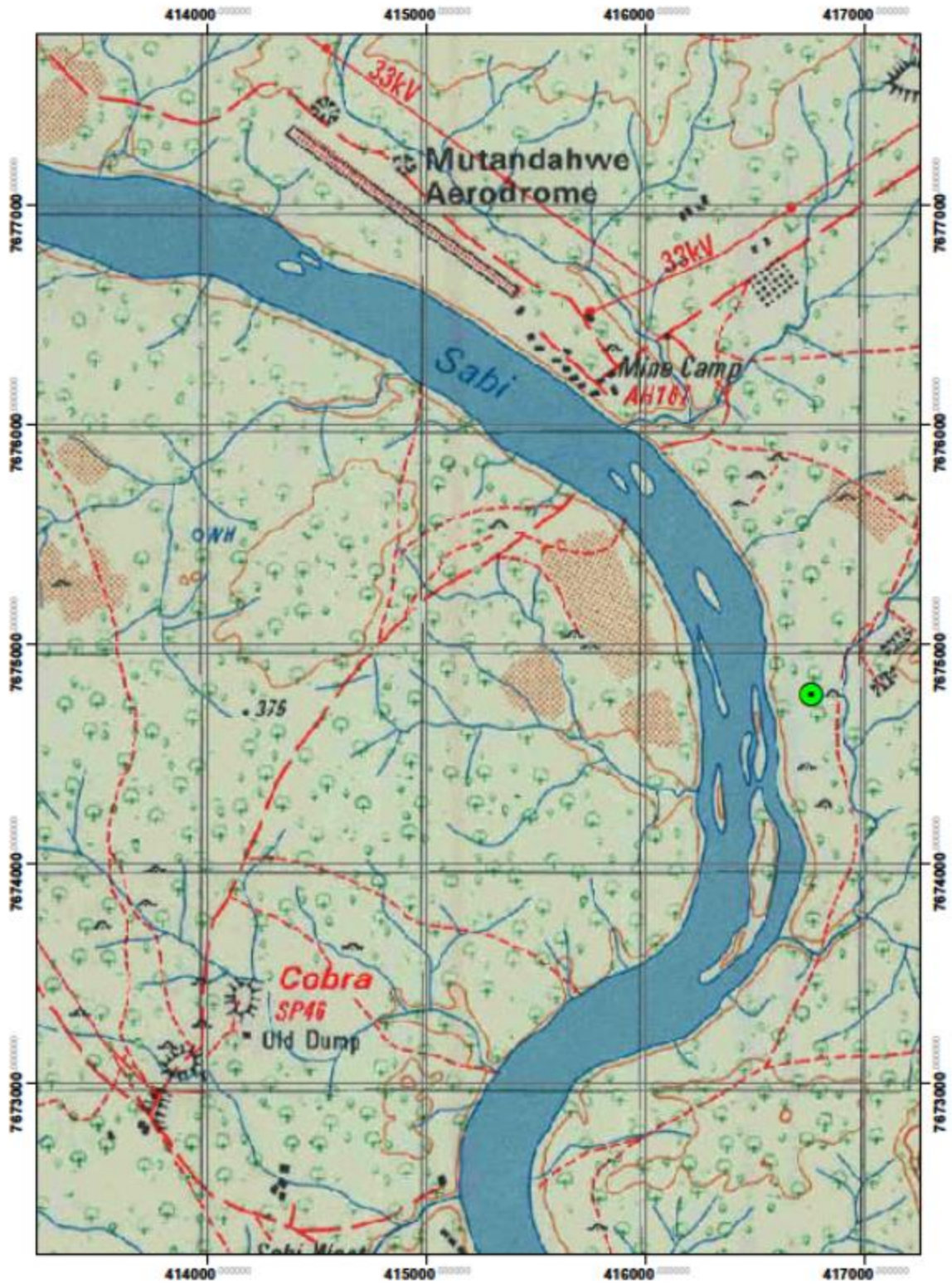


Figure 14: Topographic Map of the proposed site



## 2.5.2 Irrigation Scheme Infrastructure

### 2.5.2.1 Water Source

Currently water is pumped from the Save River using a centrifugal 40HP pump on a ramp on the bank. The pump is currently being powered by electricity from the national grid.

### 2.5.2.2 Configuration of the Irrigation Scheme

Currently water is being pumped from Save river using an electric centrifugal 40HP pump. From the pump, a flexible pipe 200mm in diameter is connected to a steel pipe 200mm in diameter. From the steel pipe that is above ground, a 200mm diameter asbestos pipe delivers water to the distribution chamber (receiving concrete tank) that is at the highest point in the field. The distribution chamber is located at the highest point of the scheme. It has 3 sluice gates that releases water into the canals that deliver water around the scheme. The purpose of the chamber is to hold the water temporarily before it is released to through to the laterals depending on which part of the field requires water. The area irrigated by the canals is 23ha. An additional 12ha is proposed so as to increase the plot sizes per farmer. All the laterals take water from the distribution chamber. Plate 12 shows the 40HP Centrifugal pump, flexible pipe 200mm in diameter connected to a steel 200m pipe that goes into the ground to join an asbestos pipe that is also 200mm in diameter. The wall at the pump only serves as an anchor to the suction pipe and does not provide any protection from the river.



Plate 12: Centrifugal pump on the banks of Save River

Plate 13 shows the distribution chamber and the 200mm asbestos pipe that receives water from the pump and releases it into the canals. Plate 14 shows infield canal and some of the canals require rehabilitation and re-levelling. There is need for training of famers on the maintenance of irrigation infrastructure to ensure sustainability.



Plate 13 Distribution Chamber with 3 sluice gates connected to canals



Plate 14: Infield canals

### *2.5.3 Challenges with the existing infrastructure*

The following infrastructural gaps were identified at the scheme:

- During periods of low river flows, flows persist within the sand bed. But the current abstraction system cannot access water in the riverbed.
- The current abstraction system is prone to flood and cyclone damage.
- There are leaks on the main pipeline from the pump station to the distribution chamber.
- The pump station is entirely dependent on power supply from the national grid which experiences frequent power cuts. This disrupts irrigation activities at the scheme. This also increases operational costs in the form of electricity tariffs which need to be paid to ZETDC.

- There is no water for drinking for the farmers.
- The road network is poor and not suitable for wet conditions.

#### *2.5.4 Proposed climate proofing interventions*

The following climate proofing options are recommended to improve the irrigation scheme:

##### *Water Source*

Water will be abstracted from the adjacent Save River. Hydrological analysis reviewed that flows in the adjacent Save River may diminish during the dry seasons and this further compounded by the large irrigation activities in the upstream catchment. However, flow persists in the sand bed of the river making it a reliable water source. In addition to the existing surface water abstraction system, a sand abstraction system will be installed to supply water from the sand bed in the river.

##### *Pumping System*

The gross crop water requirements were calculated as 801,370m<sup>3</sup> per year with a peak water demand of 443 m<sup>3</sup> per hr over an 8-hour pumping period per day. Water will be pumped from both the surface river flows and the flows in the sand bed through two pumping systems, namely a centrifugal pump on the banks of the river and submersible pumps installed in the sand bed of the river. Three submersible pumps are proposed. The pumps will be installed in a 2-duty and 1-standby mode. Hence the duty point of each pump will be 222 m<sup>3</sup>/hr at 19m operated for 12hrs per day. An 18kW motor will be adequate for each pump.

##### *Power Supply*

There is already infrastructure at the scheme to provide electricity from the national grid and this will be used to provide power to the pumps.

##### *Pumping Main*

The system currently operates with a single 200mm dia AC pumping main from the pump station to the field. A second 200mm dia AC pipeline is installed but not connected to the pump station. The second pipeline will be connected to the pump station to deliver the water to the field. Two parallel 200mm dia pipelines will be adequate will be adequate to deliver the required flow rate to the irrigation area.

##### *Storage*

The pumping main will discharge into a NSD for onward distribution into the canal system by gravity. For a pumping rate of 443 m<sup>3</sup>/hr, a 2,000 m<sup>3</sup> tank will provide about 4-hours storage capacity.

##### *Infield Infrastructure*

The existing infield canal irrigation system infrastructure will be upgraded as follows:

- Replacement of broken main and lateral canals.
- Releveling and repair of some damaged main and lateral canals.
- Replacement of missing and damaged sluice gates at the main and lateral canals.
- Repair of the distribution chamber including the sluice gates.
- Extension of existing southbound main cover to deliver water to the 12ha extension area.
- Construction of new lateral canals, complete with sluice gates for the 12ha extension area.

The configuration of the irrigation system is shown in the Figure 15.



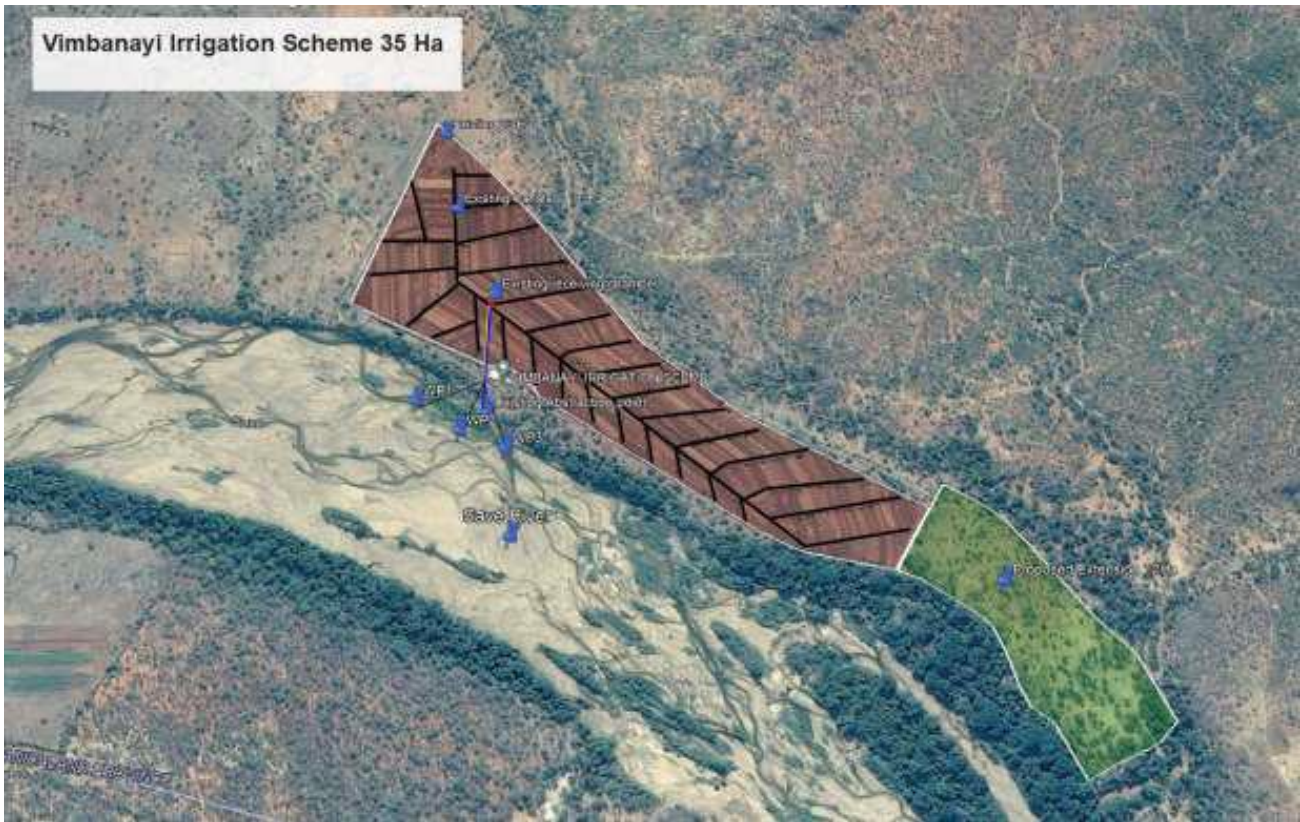


Figure 15: Configuration of Vimbanayi Irrigation Scheme

## 2.6 Mudzimwa Irrigation Scheme

Mudzimwa irrigation scheme is a proposed scheme is situated in Ward 3, Chipinge District, Manicaland Province. The targeted net irrigable area is 40 hectares (ha). The scheme is expected to directly benefit at least 180 beneficiaries

### 2.6.1 Site location

Mudzimwa Irrigation Scheme is situated adjacent to the Tanganda River approximately 6km west of Tanganda Halt. The coordinates reference is 0436845mE and 7773447mS. A locality map of the irrigation scheme is shown in the Figure 16. Figure 17 shows the topographical map of the project area with a clearly marked site location.

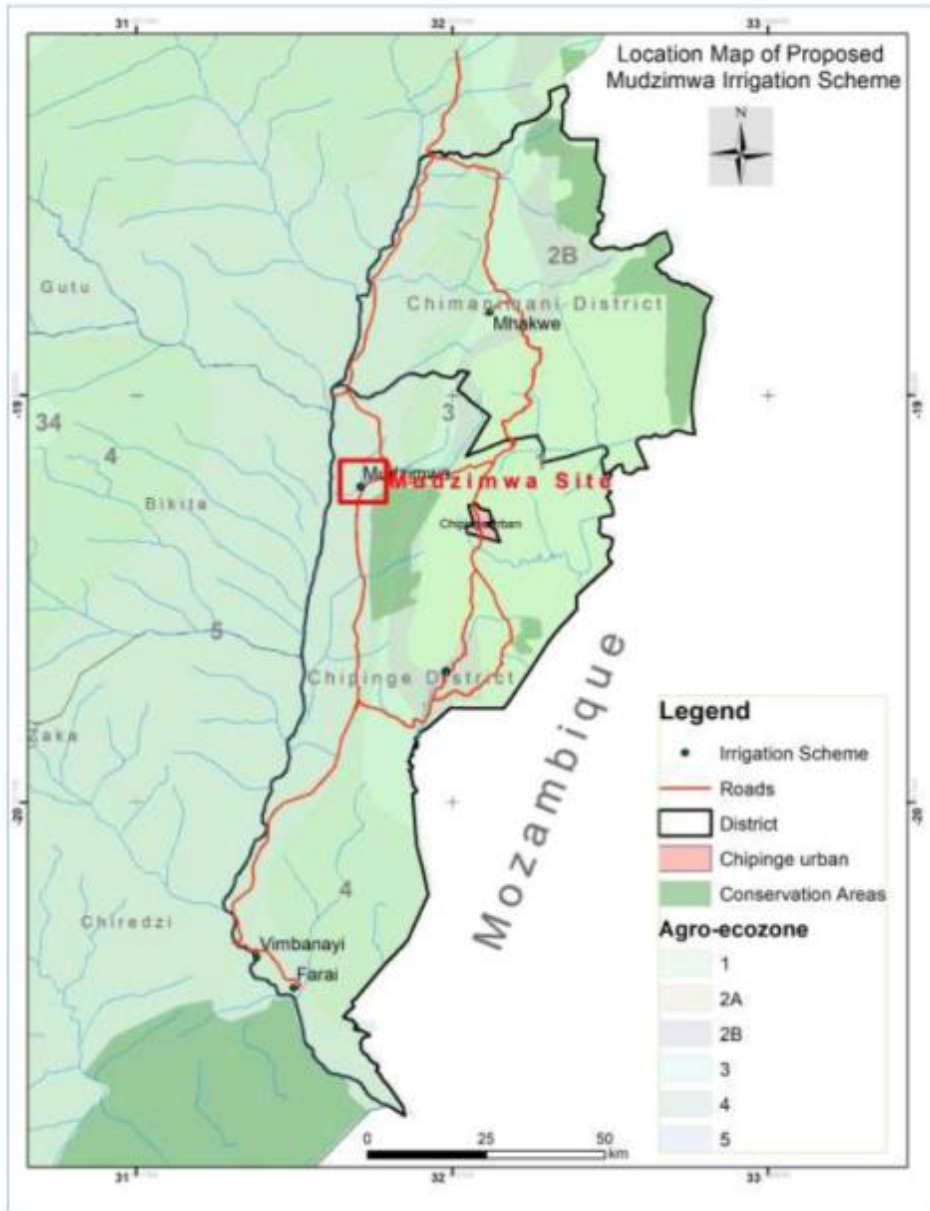


Figure 16: Location map for Mudzimwa irrigation scheme



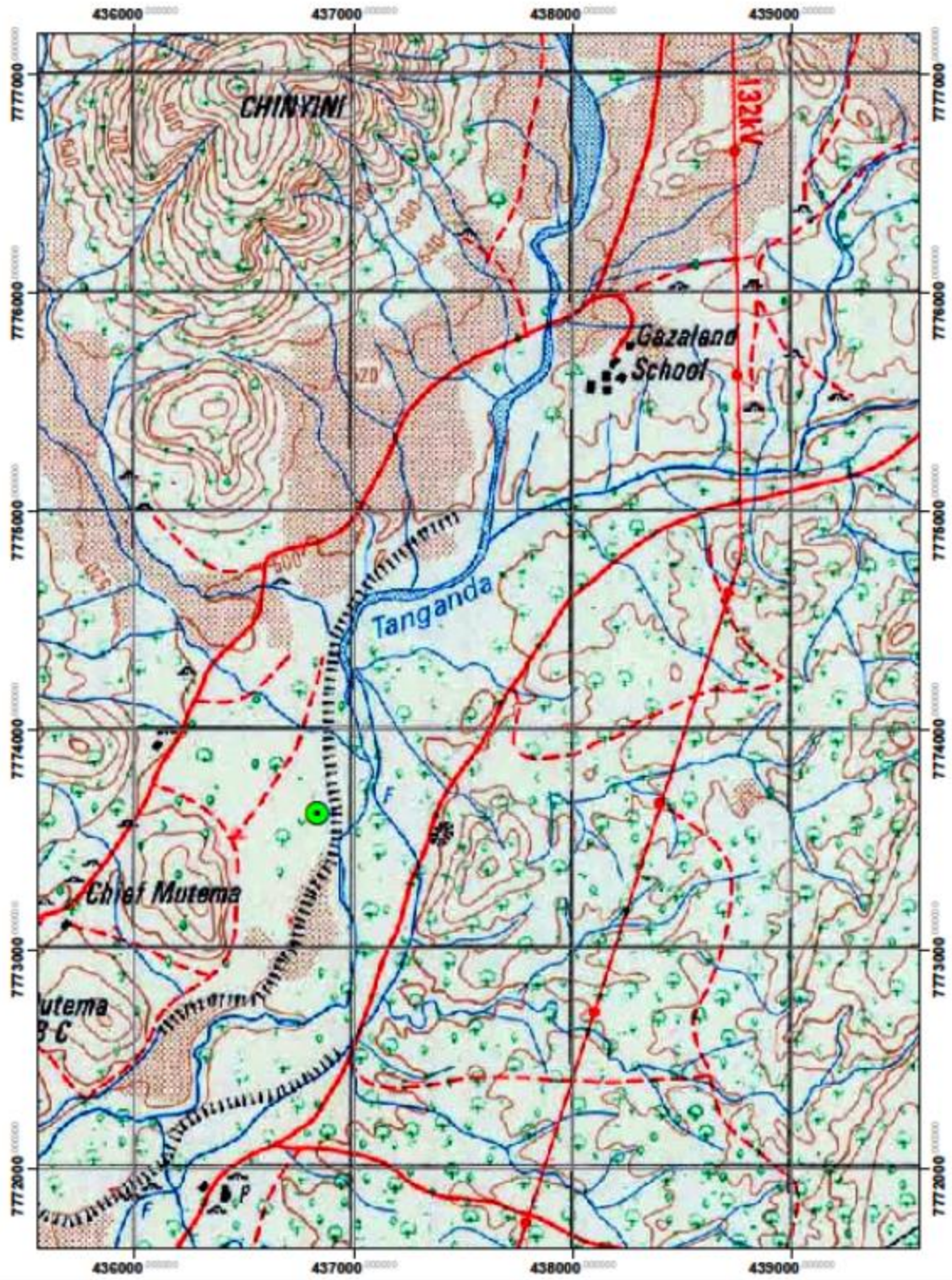


Figure 17: Topographic Map of the proposed site

## *2.6.2 Proposed irrigation scheme infrastructure*

### *2.6.2.1 Water Source*

Water will be abstracted from boreholes to be drilled in an alluvial aquifer located on the banks of the Tanganda River. A total of seven boreholes will be drilled.

### *2.6.2.2 Configuration of the proposed scheme*

#### *Pumping system*

Submersible pumps will be installed in the boreholes to pump water for supply to the scheme. The duty point of each pump will be 15 l/s at 85 m head to meet the water requirements for the 40ha irrigation area for the proposed cropping program.

#### *Power supply*

Power supply will be required for the submersible pumps. Total power requirements for each pump is 18kW. Solar power will be used to provide electrical energy to the pumps. A total 504 No panels will be installed, each with a power rating of 415W.

#### *Pumping main and storage*

A manifold connecting all the boreholes will deliver the water from the boreholes into a single pumping main. A 315 mm dia PVC Class 12 pumping main will convey the water to a storage tank located at a high point on the western side of the scheme. The pumping main will be fitted with air valves at high points and scour valves at low points. The total length of the pumping main is 1020 m. The pipeline will be laid at depths ranging from 0.8 m to 1.6 m below natural ground level for protection from floods, vandalism, and damage from farming activities. The pumping main will deliver the water into a storage tank located at a high point on the western edge of the scheme. The capacity of the tank will be 2000 m<sup>3</sup> and will be able to provide 6-hour storage capacity.

#### *Gravity main*

A 315 mm dia PVC Class 9 gravity main will convey the water from the storage tank to the infield irrigation system. The total length of the pumping main is 1210 m. The pipeline will be laid at depths ranging from 0.8 m to 1.6 m below natural ground level for protection from floods, vandalism, and damage from farming activities.

#### *Infield infrastructure*

Considering the topography of the area, the requirement for efficient water application, and ease of operation and maintenance, the beneficiaries and the technical team selected a drag hose irrigation system for the infield works. Permanent sub-mains will connect to the main pumping main from the river to supply water to defined irrigation blocks within the scheme. Permanent lateral pipes will then distribute the water into the blocks. Hydrants along the lateral pipes will be positioned within plots defined within the irrigation blocks. The hydrants will be fitted with permanent riser pipes and taps. Portable hose pipes will then deliver the water to sprinklers fitted onto portable tripods to irrigate the individual plots. The layout of the proposed irrigation system is shown in the Figure 18.





Figure 18: Layout of the proposed irrigation scheme

## 2.9 Sub-projects Justification

The proposed irrigation sites experiences arid to semi-arid climatic conditions that have promoted a continuous failure of crops under rain-fed agriculture. The detrimental effects of climate change continue to be felt through persistent droughts and floods, leading to hunger and general impoverishment of communities. Irrigated agriculture can ensure reliable cultivation and food security. The existing dams and perennial rivers such as Save provide vast opportunities for communities through irrigated agriculture. Irrigated crop production enhances income from sale of surplus yields and off-season premiums and also provides employment through additional on-farm and off farm labor. All this brought together, contribute to improved food security, enhanced livelihoods and increased resilience and well-being for vulnerable smallholder communities. Hence the proposed irrigation schemes comes in as an opportunity to managing climate risks and hazards.

## 2.10 Stage in project cycle

The sub-projects are currently at the feasibility stage as shown in Figure 19.



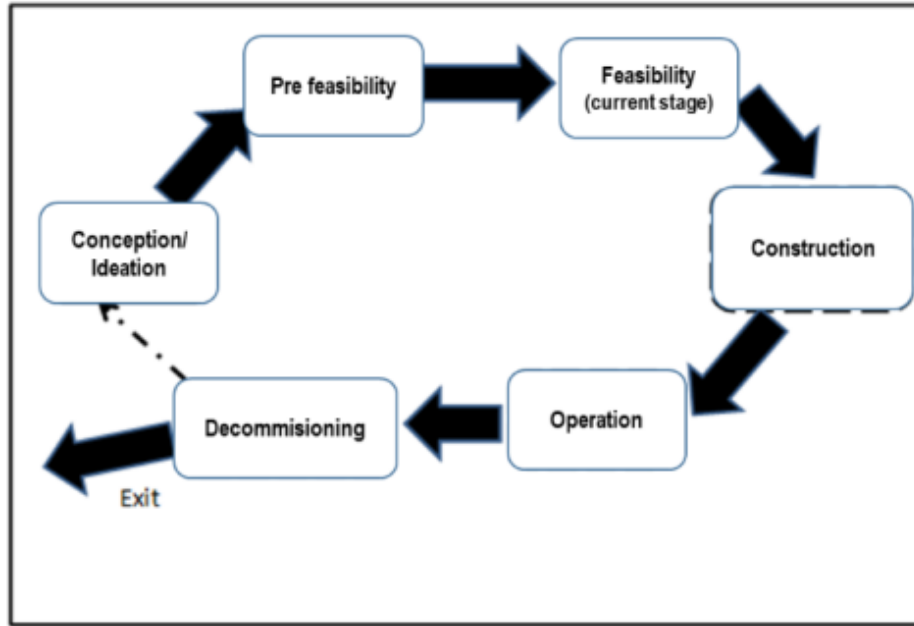


Figure 19: Current status in the project cycle

### 2.11 Estimated cost

The estimated cost for developing each scheme is provided in Table 4.

Table 4: Cost for developing each scheme

Name of Scheme	Cost (USD)	Cost per Ha (USD)
Mhakwe	234,774.00	11,179.71.
Farai	356,015.00	13,185.74
Musirizwi	283,449.	17,715.56
Vimbanayi	346,790.00	9,908.29
Mudzimwa	1,186,603.00.	29,665.08

### 3.0 POLICY LEGAL AND ADMINISTRATIVE FRAMEWORK

The construction and revitalization of the irrigation schemes under Lot 3 will be subject to various pieces of environmental and social policies, legislation, standards, guidelines, conventions. The Ministry of Lands, Agriculture, Water, Fisheries and Rural Development (MoLAWFRD), contractors and the partners shall ensure that the sub-projectivities are aligned to the national development policies, strategies and plans of the country while ensuring that all operations comply with the national laws and regulations.

#### 3.1 National Policies, Plans and Strategies

Zimbabwe has developed various policies, plans and strategies which directly and indirectly affects the agricultural sector. It is to the duty of the MLAWFRD and its partners including contractors to ensure that national policies, plans and strategies are mainstreamed in sub-project implementation processes. The national polices, plans and strategies relevant to the sub-project are provided in Table 5.

Table 5: National policies, plans and strategies relevant to the sub-project

Policy / Plan / Strategy	Principles, strategies, and elements relevant to the project
Zimbabwe National Development Strategy (2021-2025)	The strategy aims to strengthen macroeconomic stability, characterized by low and stable inflation, as well as exchange rate stability, to promote new enterprise development, employment and job creation and ensure sustainable environmental protection and resilience
National Environmental Policy & Strategies (2009)	Promotes principles of resource efficiency, Integrated pollution Control, polluter pays principle, sustainable development, environmental education, and access to environmental Information. Ministry of Lands, Agriculture, Fisheries, Water, and Rural Development and its partners are expected to mainstream these principles in project implementation
National Gender Policy	The policy goal is to eradicate gender discrimination and inequalities in all spheres of life and development. The policy also advocates for gender mainstreaming in all projects and plans. Encourages research that highlight environmental challenges and inequalities among women and men and recommend gender responsive strategies.
National Climate Policy (2017)	The policy calls for the reduction of greenhouse gas emissions. Calls for mainstreaming of climate issues in all sectors of the economy including energy, agriculture, industrial processes, waste, land use land cover and forestry. Promotes principles of sustainable development, prevention of pollution and ecological degradation and inclusive participation

Policy / Plan / Strategy	Principles, strategies, and elements relevant to the project
Occupational Health and Safety Policy (2021)	Encourages Occupational Health and Safety Promotion at workplaces; to ensure the safe handling, storage and transportation of hazardous substances, including chemicals; to ensure the proper use of OSH protection systems, including PPE and to report all reportable accidents to the relevant authorities
National Renewable Energy Policy (2019)	Promotes uptake of Renewable Energy Technologies (RETs) in all sectors resulting in reduced GhG emissions
Vision 20230: Towards an Upper-Middle Income Economy by 2030	Capacitation of local authorities and environmental authorities to management pollution and waste. Promotes cooperation among stakeholders towards environmental management
National Climate Change Response Strategy (2014)	Promotes the principle of sustainable development, resource efficiency, implementation of emission standards; providing incentives for GHG reduction and waste minimization; technology transfer. Promotes integrated waste management including education and awareness; as well as access to environmental information. Encourages partnerships for environmental sustainability
Zimbabwe National Agriculture Policy Framework (2018-2030)	The Policy Framework provides guidance and direction on how to promote and support the sustainable flow of investments to transform the agricultural sector through increased and sustained agricultural production, productivity and competitiveness. Its goals are to ensure national and household food and nutrition security, increase agriculture's contribution to the gross domestic product (GDP) and improve agricultural market access and competitiveness.
National Biodiversity Strategy and Action Plan (2014)	The Plan proposes measures to prevent pollution of ecosystems through monitoring and enforcing national quality standards for water, air and solid waste; reviewing environment fines and mechanisms for enforcement; upgrading waste dumpsites and promoting recycling and reuse of waste. The Plan also describes measures for promoting increased consumer consciousness and demand for environmentally sustainable production and services; as well as conducting assessments on the impacts of chemical use on water bodies

### 3.2 Framework Legislation and Regulations

Several laws and regulations relevant to the sub-project have been developed in the country. The relevant legislation include the Environmental Management Act (Chapter 20:27), Water Act (Chapter 20:24), Public Health Act (Chapter 15:17), Labour Act (28:01), Forestry Act (Chapter 15:09), Parks and Wildlife Act (Chapter 20:14), Traditional Leaders Act (Chapter 29:17), Farm Feeds, Fertilizer and Remedies Act (Chapter 18:12), Factories and Works Act (14:08), Rural District Councils Act (Chapter 29:13), The Communal Lands Act (Chapter 20:04) and their applicable regulations. These laws and the compliance mechanism are discussed in Appendix 1.

### 3.3 International Commitments

Zimbabwe is a signatory to a number of international and regional agreements and conventions, which are related to the project. Notable agreements and conventions relevant to the project include:

- 1995 Protocol on Shared Watercourse Systems to the Treaty of the Southern African Development Community.  
Muzhwi Dam is part of a shared watercourse – the Save river. The protocol considers that the utilisation of shared watercourse systems within the SADC region be open to each riparian or basin State, in respect of the watercourse systems within its territory and without prejudice to its sovereign rights, in accordance with the principles contained in this Protocol. The utilisation of the resources of the watercourse systems include agricultural, domestic, industrial, and navigational uses.
- 1971 Ramsar Convention on Wetlands  
This is an international treaty that provides a framework for the conservation and sustainable use wetlands as a contribution towards achieving sustainable development throughout the world. Shashe River is considered as a wetland under the Ramsar Convention and hence Scheme should not lead to the degradation of the riverine environment.
- 1992 United Nations Framework Convention on Climate Change and Kyoto protocol  
The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty aimed at stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The Convention therefore provides the basis for global action “to protect the climate system for present and future generations”. Zimbabwe ratified the Convention in 1992. The Kyoto Protocol is linked to the UNFCCC to prevent anthropogenic interference with the climate system. The Protocol establishes legally binding commitments for the reduction of greenhouse gases and fluorocarbons. The revitalization project will need to understand its contributions to greenhouse gas emissions relative to that of the country and if relevant include related mitigation measures for on-going monitoring and assessment. Greening from all season cropping means increased carbon sequestration and mitigation contribution
- 1994 United Nations Convention to Combat Desertification  
The objective of the United Nations Convention to Combat Desertification is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification through effective action at all levels and supported by international cooperation. The Convention was established in 1994 and ratified by Zimbabwe in 1997. Irrigation projects are associated with salinization of the soil an environmental problem which leads to desertification. The proposed sub-project activities should be planned, developed and operated in such a manner that promotes organic fertilizers. Should also consider designs that minimize erosion from excess runoff or storm water drainage from the scheme given the gentle falling topography.
- 1992 Convention on Biological Diversity  
The Convention on Biological Diversity is the first global agreement on conservation and sustainable use of Biological Diversity. Its objectives are to conserve biodiversity, promote the sustainable use of bio-diversity components and to promote fair and equitable sharing of benefits arising from the use of resources. Zimbabwe ratified the Convention in 1994. The convention

requires Zimbabwe to prepare a national biodiversity strategy and to ensure that it is mainstreamed into the planning and activities of all sectors that have an impact on biodiversity. In line with this provision, the contractor who is going to carry rehabilitation works should ensure that the project is planned, developed and operated in a manner that is in compliance with the recommendations of the National Biodiversity Strategies and Action Plans (NBSAP).

- 1979 Convention on the Elimination of all forms of Discrimination against Women  
By signing the Convention, Zimbabwe commit itself to undertake a series of measures to end discrimination against women in all forms, including: to ensure elimination of all acts of discrimination against women by persons, organizations or enterprises.
- 1989 Convention on the Rights of the Child  
The convention stipulates how governments, the United Nations – including the Committee on the Rights of the Child and UNICEF - and other organisations work to make sure all children enjoy all their rights. Zimbabwe is committed to ensure children rights. The scheme shall not violet the rights of children.

#### **Other protocols and treaties**

- 1996 Protocol on Energy to The Treaty of the Southern African Development Community
- 1997 International Plant Protection Convention
- 1999 Protocol On Wildlife Conservation and Law Enforcement to the Treaty of the Southern African Development Community
- 2001 International Treaty on Plant Genetic Resources for Food and Agriculture
- 2001 Stockholm Convention on Persistent Organic Pollutants
- 2002 Protocol On Forestry to The Treaty of the Southern African Development Community
- 2003 African Convention On the Conservation of Nature and Natural Resources
- 2015 Paris Agreement under the United Nations Framework Convention on Climate Change

#### **3.4 UNDP's Social and Environmental Standards (2015)**

This ESMP was developed based on considerations of the guidance of UNDP's Social and Environmental Standards to achieve environmental and social benefits and minimize of any potential environmental and social risks. These Standards underpin UNDP's commitment to mainstream social and environmental sustainability in its programs and projects to support sustainable development and are an integral component of UNDP's quality assurance and risk management approach to programming. Through the SES, UNDP meets the requirements of the GCF's Environmental and Social Safeguards Policy.

UNDP applies the United Nations Development Group (UNDG) Country Programming Principles to the development and implementation of Country, Regional, and Global Programmes. These include the following principles: (i) human rights-based approach to development programming; (ii) gender equality; and (iii) environmental sustainability. UNDP screens and reviews its activities to identify opportunities to advance these principles and to identify potential risks that may require measures to avoid, minimize, and/or mitigate potential

impacts. At the Project level, UNDP (2015 Policy) has developed seven (7) operational safeguards Standards which further support implementation of UNDP’s commitments to promote respect for human rights, gender equality, and environmental sustainability. UNDP’s Project-level Standards relate to the following areas:

- Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management
- Standard 2: Climate Change Mitigation and Adaptation
- Standard 3: Community Health, Safety and Working Conditions
- Standard 4: Cultural Heritage
- Standard 5: Displacement and Resettlement
- Standard 6: Indigenous Peoples
- Standard 7: Pollution Prevention and Resource Efficiency

The Standards set out specific requirements relating to different social and environmental issues. Application of the Standards is determined during UNDP’s social and environmental screening and categorization process. Where it is determined that a Project may present certain risks and/or impacts, requirements of the relevant Standard(s) are triggered. The screening carried out during project development indicate human rights principle and (5) of the project-level social and environmental standards have been triggered across the project components. This programming principle and the operational standards are described in Table 6.

Table 6: Operational standards triggered under the sub-project

Principle/ Project-Level Standard	Safeguard Details	Applicable to the Project	
		Yes/No	Basic Details
Principle 1. Human Rights	UNDP recognizes the centrality of human rights to sustainable development	Yes	There is a risk that duty-bearers (e.g., government agencies) may not have the capacity to meet their obligations in the project
OS 1	Biodiversity Conservation and Sustainable Natural Resource Management	Yes	This standard has been triggered because the sub-project may generate potential biodiversity impacts through habitat loss or hydrological changes. Further biodiversity impacts may be experienced during the operational phase of the project due to soil and water pollution
OS2	Climate Change Mitigation and Adaptation	Yes	This standard has been triggered because the sub-project will involve activities that generate greenhouse gas emissions such as vehicular transport. GhG emissions can also be released during handling of crop residues.
OS 3	Community Health, Safety and Working Conditions	Yes	This standard has been triggered because the sub-project will involve construction of civil works which may pose a threat to human and animal life during the construction and operational phase. There is also potential risk of child labour and poor working conditions including occupational health and safety risks during the construction phase of the project.
OS 4	Cultural Heritage	Yes	This standard has been triggered because, tangible cultural heritage may be unexpectedly encountered during the construction phase. As such, risks and impacts to tangible



Principle/ Project-Level Standard	Safeguard Details	Applicable to the Project	
		Yes/No	Basic Details
			cultural heritage, and in particular, archaeological material, that may arise from Project activities need to be managed
OS 5	Displacement and Resettlement	No	This standard has not been triggered because the sub-project will not result in physical or involuntary resettlement of persons during the implementation of sub-project activities.
OS 6	Indigenous Peoples	No	This standard has not been triggered because there are no Indigenous Peoples situated within the sub-project area of influence
OS 7	Pollution Prevention and Resource Efficiency	Yes	This standard has been triggered because the sub-project will result in the use of chemicals e.g. (petroleum-based fuels, fertilizers and pesticides) which may result in pollution of water, soils and air. The project will also result in water abstraction which necessitates its efficient use and management

### 3.5 ESMP implementation Modalities

The sub-projects will be implemented through the Department of Irrigation, the Department of Agricultural Extension (AGRITEX), Zimbabwe National Water Authority (ZINWA) and Meteorological Services Department (MSD). UNDP will oversee the day-to-day implementation of the sub-projects. In addition, collaboration with local government, existing NGOs and local communities is expected.

### 3.6 Licenses/permits required for the sub-projects

The project shall be required to have requisite permits and licenses for it to comply with laws and regulations. The licenses required in Table 7.

Table 7: Licenses or Permits required for the project

ITEM	LICENSE or PERMIT	STAGE	REGULATORY AUTHORITY
1.	ESMP License	Planning	EMA
2.	Water Permit (for abstraction)	Operational	ZINWA

## 4.0 BASELINE ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

Baseline data forms the basis on which environmental and social impacts can be monitored against. Both socio-economic and biophysical data of the project site and its environs was collected. This was done in-order to determine the status quo before the implementation of the project. Socio-economic, climatic data, soils, land tenure, hydrology, hydrogeology, biodiversity, water and air quality, land use, land cover, archeological data, etc. were collected.

### 4.1 Climate

The irrigation schemes fall within agro-ecological zone VI and V according to the natural regions classification of Zimbabwe. The climate is predominantly arid making crop production a challenge. Weather data was obtained from Nyanyadzi, Chisumbanje and Sabi Valley meteorological stations. The sites record an annual average minimum temperature of 14 degrees Celsius and average maximum temperatures of 30 degrees Celsius. High temperatures peak around October-December to around 32 degrees Celsius. The evapotranspiration is high at 4.66mm per day (1700mm/year) compared to the effective rainfall of only 505mm/year.

Drought (Meteorological and Agricultural) is the most common and high-impact natural hazard occurring in Zimbabwe, both in terms of frequency of occurrence and the number of people affected, with droughts accounting for 7 out of the 10 top major natural hazards since recorded 1990. Due to increasing climatic uncertainty, and reduced coping capacity, the risk of drought has spread to all areas of the country including the sub-project implementation areas and is affecting a broader range of people. The impacts of droughts are predicted to increase, with the World Bank Group Climate Change Knowledge Portal, predicting the annual likelihood of Zimbabwe encountering severe drought to increase by 21% in 2040 to 2059 and by 47% in 2080 to 2099 compared to the baseline period of 1986 to 2005 scenario.

### 4.2 Current land use

An assessment of current land use practices in the surrounding communities was undertaken from satellite imagery and transect walks across the irrigation schemes and the catchment area. Currently land is mainly used for agricultural purposes both farming and livestock production. Crops grown at the irrigation scheme include maize, tomatoes, beans, leafy vegetables both for family consumption and for sale. Major dryland crops grown include sorghum, maize, pearl millet, pumpkins, sunflower, cotton, african peas, round nuts and groundnuts. On the livestock side, major ones kept by farmers include goats, cattle, indigenous poultry, pigs and donkeys. Most of these animals are kept for meat, for sell and social status. Donkeys are used mainly to pull scotch cart as transport.

### 4.3 Hydrology and hydrogeology

**Mhakwe irrigation scheme:** The water source for the scheme is Mhakwe Dam. The Dam was constructed across the Matanho River in 1994. The stated dam capacity at the time of construction was 540,000 m<sup>3</sup> but a bathymetric survey undertaken on 10 February 2023 showed the current storage capacity of the dam to be 437,000 m<sup>3</sup>. The catchment area of Mhakwe Dam is 12.4 km<sup>2</sup>. The Matanho River is a tributary to the Shekani River, which in turn is a tributary to the Mhakwe River which subsequently flows into the Nyanyadzi River. According to ZINWA's "Assessment of Surface Water Resources of Zimbabwe & Guidelines for Planning", the dam catchment falls inside the EO1 sub-zone within the Odzi Sub-Catchment, this being part of the Save Catchment. The published runoff statistics for this sub-zone are:

- Mean Annual Runoff (MAR) (mm): 123mm
- Coefficient of Variation (Cv) (%): 90

Flow data was obtained from two ZINWA gauging stations in the area, E122 on the Mhakwe River and E120 on the Piriviri River. A summary of the flow data from these gauging stations is provided in Table 8.

Table 8: Available Flow Data

GaugingStation	River	Years of Data	Data Periods	MAR (mm)	Cv (%)
E120	Piriviri	29	1968-1973, 1974-1978, 1981-1988, 1993-2006	128	110
E122	Mhakwe	8	1969-1977	104	74

Figure 20 is the location of the Mhakwe Dam, the two gauging stations, and their respective catchment areas

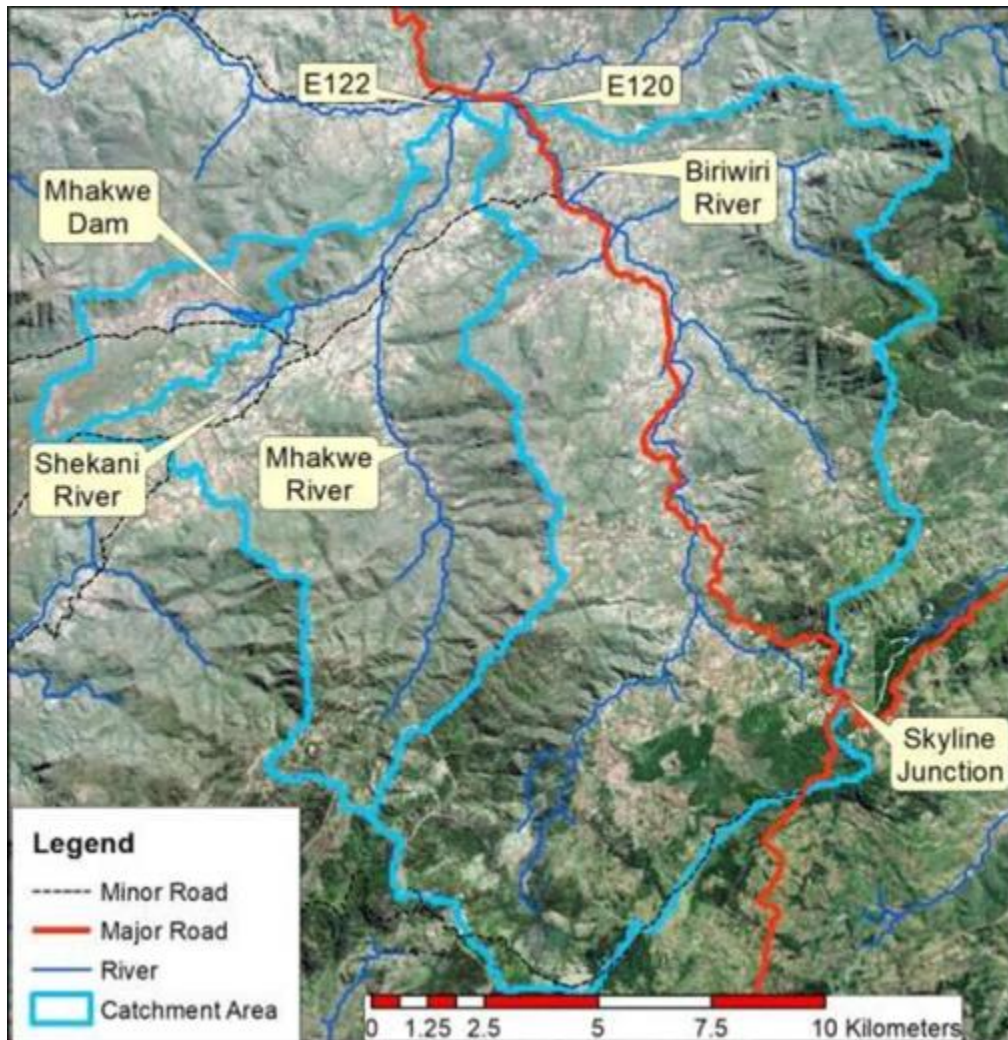


Figure 20: Catchments relating to Mhakwe Dam

The catchment area has a mean annual runoff of 123mm. This equates to an inflow of 1,525,000 m<sup>3</sup> over the 12.4km<sup>2</sup> catchment area of the dam. For the storage capacity of 437,000 m<sup>3</sup> measured in this study, the storage ratio of the dam is 0.29. Effectively this means that the dam should fill most years.

Due to a lack of long-term rainfall data within or close to the Mhakwe Dam catchment, use has been made in this study of the CRU rainfall dataset (CRU is the Climate Research Unit at the University of East Anglia). The CRU rainfall dataset amalgamates all available observed data and grids it to fill in the gaps in the available rainfall records. It enables longer-term hydrological studies, from 1901 to 2020, to be undertaken and can also be used for future climate change projections.

Due to the coarse resolution of this dataset, the data for Mhakwe Dam is taken from Chimanimani and Chipinge through to Nyanyadzi; and a mean annual rainfall of 700mm was calculated.

Figure 21 shows the rainfall data from 1949 through to 2020. Of interest is the 10-year Moving Average, showing the very clearly defined cyclical nature of the longer-term rainfall patterns. Analysis of rainfall data show a slight gradual decrease in rainfall over the past 70 years in this area.

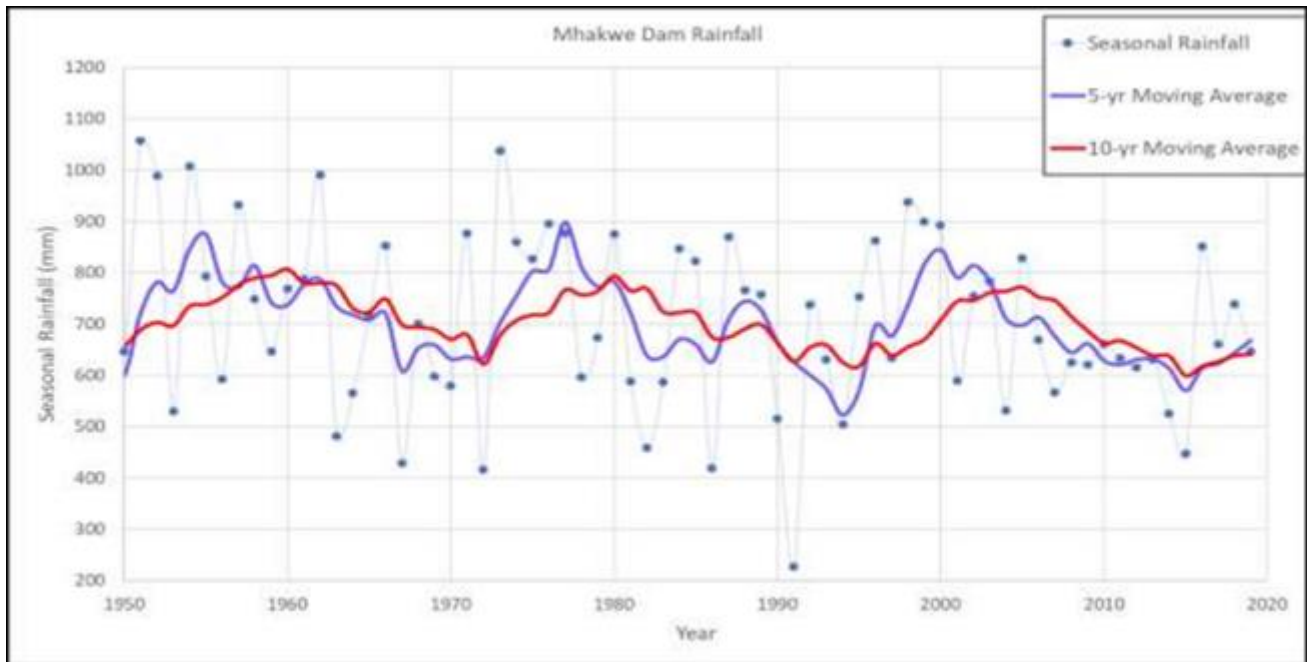


Figure 21 Seasonal rainfall for Mhakwe dam catchment

The geology of the area comprises of Dolerites which are intrusive to the Umkondo group of rocks comprising of Limestones, Shales and Quartzites. A total of three Electrical Resistivity Tests (EMT) were carried out in order to establish points with deep weathering and fracturing. The EMT Profiles were used to estimate the depth to bedrock and aquifer thickness. The electrode spacing used was 5m. Three potential borehole sites were pegged as indicated on the EMT profiles attached below. The sites lie adjacent the Matanhu River where catchment/recharge potential is good. The following observations were made regarding drilling for groundwater at the project site:

- The weathered/fractured profiles recorded are moderate, in the range of 50-70m with moderate resistivities indicating moderate groundwater potential.
- It is recommended that boreholes be drilled to depths in the range of 50-70m.
- Inferred yields in the range of 5-10 litres per second may be expected per borehole.

**Farai irrigation scheme:** Farai Irrigation Scheme comprises an area of approximately 27ha at the confluence of the Musvazwi and Gombe Rivers in the south-east lowveld. Hydrologically, the site is very complex due to the following factors:

- It exists in a low rainfall and high temperature area.
- The Save River splits (bifurcates) into the Save and Gombe Rivers upstream of the scheme; the Farai Scheme is on the banks of the Gombe River.
- The Chisumbanje Sugar Estates (Green fuels) lies inside the Musvazwi River catchment meaning potential return flows in this river.
- The Maparadze Irrigation Scheme (Zuva Rabuda) shares the same water resource and pumping spot.



- There is no flow data available for the Gombe or Musvazwi Rivers.

Figure 22 shows the scheme and immediate surrounds, while Figure 23 shows Musvazwi River catchment and pertinent hydrological features. the scheme in respect to the entire Save River catchment.

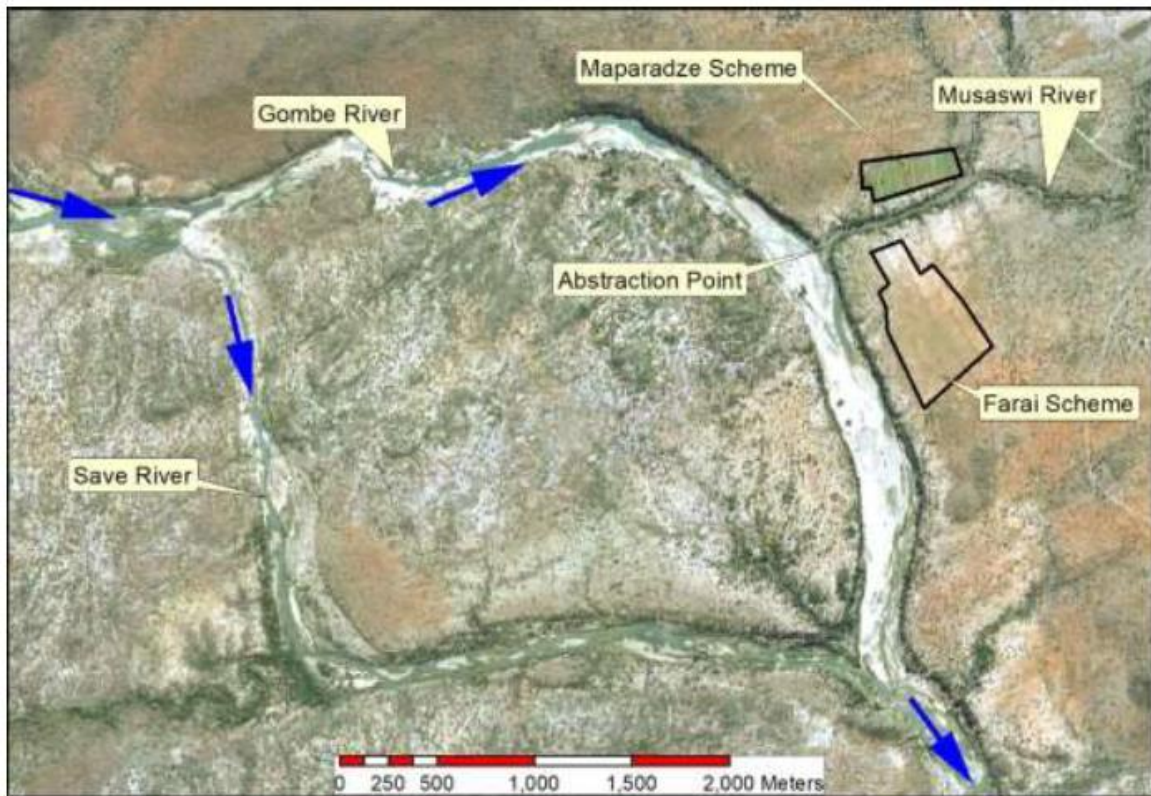


Figure 22: The scheme and immediate surrounds



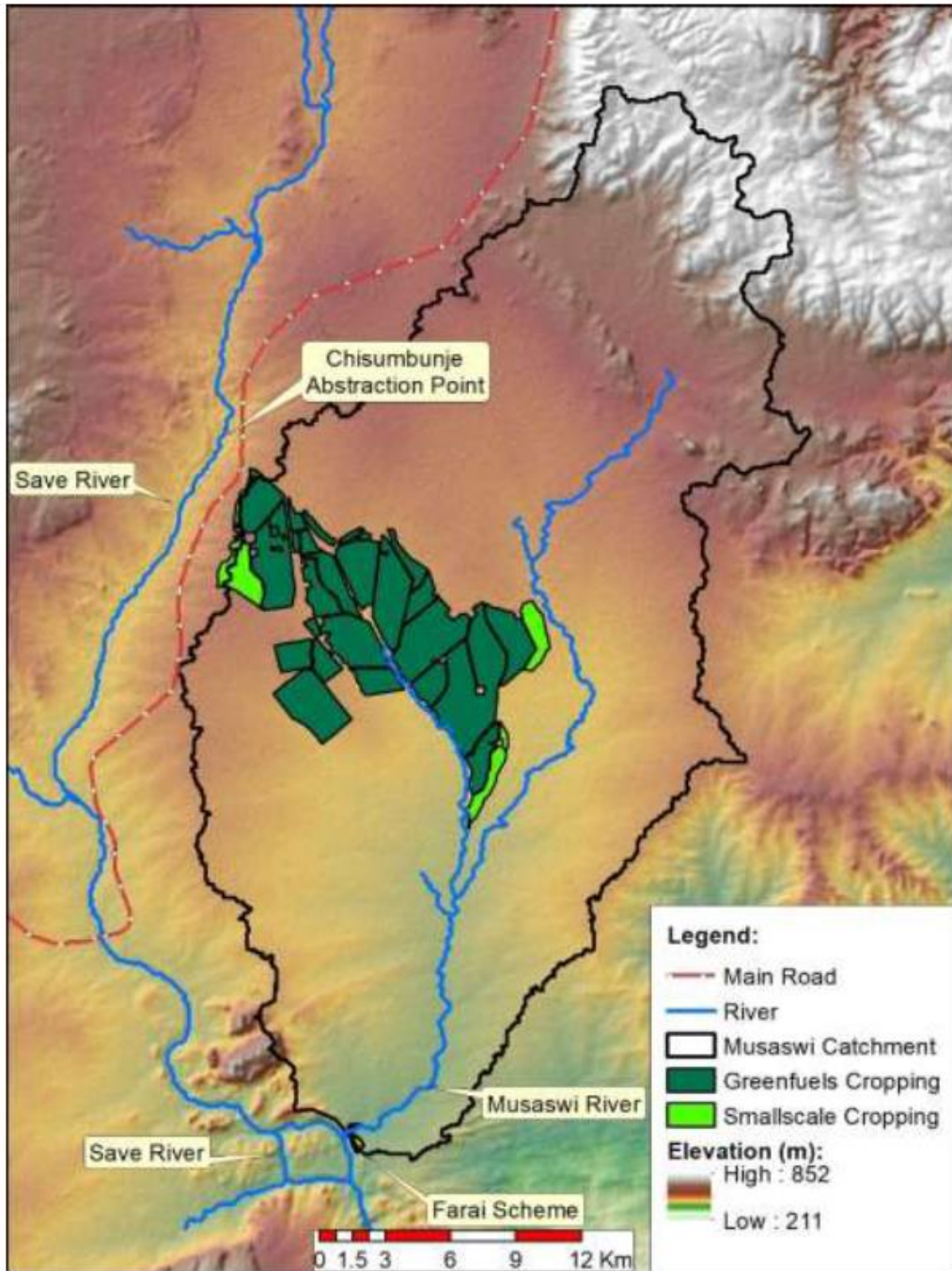


Figure 23: Musvazwi River Catchment Area

The Save River is one of the largest internal rivers within Zimbabwe. Its headwaters are along the central watershed running from Marondera through Headlands to Juliasdale and its catchment area, by the Farai scheme, is 42,226 sq.km. The upper reaches of the catchment contain three large dams, the Lesapi, the Osborne and the Ruti, which are used for storage of wet-season flows and dry-season releases down the Save River to Middle Save and Chisumbanje. Outflows from these dams are strictly, and efficiently, controlled by ZINWA. In addition to the above, plans for the large Kondo Dam are still on the table although have already been for many years without construction commencing. Figure 24 shows the catchment of Save river.

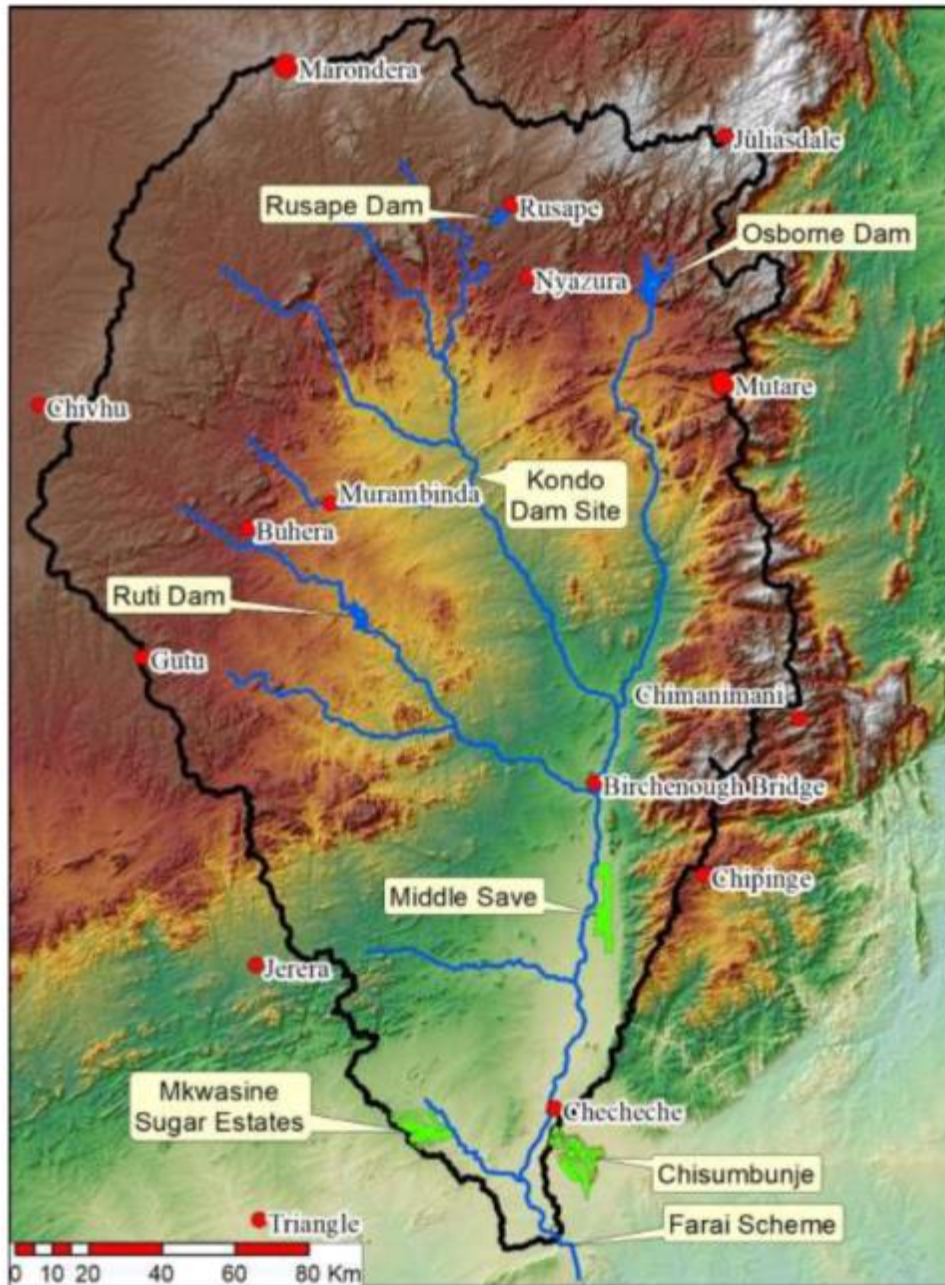


Figure 24: Save River Catchment

Approximately 3.3km west of the Farai scheme, the Save River bifurcates, or splits, into two rivers, one maintaining the name Save River and the other being named the Gombe River (Figure 25). The two rivers re-join approximately 4km south-east of where they split, but downstream of the Farai scheme.





Figure 25: Save River Bifurcation

Discussions with local villagers and examination of satellite imagery both indicate that as river flows decrease, the bulk of the water tends to flow down the Save River, with minimal flows flowing down the Gombe River. Further analysis of satellite imagery suggests a drastic exposure of sand beds in the Gombe River around July of every year, suggesting that it is around this time that the river flows become very low. Figure 26 and Figure 27 show the river bifurcation in August 2013 and July 2016. In the 2013 image, the flows down the Save distributary can be seen, with the white water over the rapids. By contrast, no white water can be seen in the Gombe. In the July 2016 image, no white water can be seen in either river, and the very dry expanse of the Gombe indicates there is minimal water in this section.



Figure 26: Save River Bifurcation, August 2013



Figure 27: Save River Bifurcation, July 2016



Both images are acquired in the middle of the dry season, well before the critical months of September and October, in two different years. This visualization of low flows, particularly in the Gombe, suggest the unreliability of this river as a surface water source.

While visually it would appear that the surface water resources at the Farai Scheme are significant, a more in-depth investigation appears to show that this is not necessarily the case. The bifurcation of the Save into two separate rivers, the Save and the Gombe, appears to divert the majority of the dry season flows away from the scheme.

The Musvazvi River, with 80,000ha of sugarcane production in its catchment, also promises to deliver significant dry season flows through wastewater flows at Chisumbanje. However, due to a focus on water efficiency and water saving, it appears that Chisumbanje are attempting to minimise these flows, both through recycling and through establishing small-holder irrigation schemes on their doorstep to try and utilise them. They would therefore appear to be unreliable.

*A third resource, that has only been alluded to here, is the abstraction of sub-surface water from the Gombe riverbed. There is a rocky shelf immediately downstream of the proposed pumphouse that would act as a natural barrier to sub-surface water, thereby creating a sand reservoir immediately upstream. An assessment of the volume of sand upstream of the aforementioned rocky ridge results in an estimate (assuming a uniform depth of 3m, 150m width and 1.6km long) of approximately 675,000m<sup>3</sup> of sand. Assuming a 35% extraction rate, this would equate to 250,000m<sup>3</sup> of water that is stored in the sand bed during the dry season.*

An additional option is to relocate the planned abstraction point to downstream of the confluence of the Save and Gombe Rivers where it would appear there is significantly more dry season flow and therefore a more viable option for reliable surface water. This site has the disadvantages of increased pumping head, longer distance of water reticulation and not being close to the established ZESA powerline that is at the initially planned abstraction site.

The geology of the area comprises of Granophyres, Syenites and Gabbros of Late Jurassic Age overlain by Alluvial sand deposits along the Gombe river. A total of 2 Electrical Resistivity Profiles were carried out in order to establish the thickness of the water bearing sedimentary aquifer and its degree of saturation as well as areas with depth to solid bedrock. The electrode spacing used was 5m. Two potential borehole sites were pegged, one at Line 1, station 2 and the second at Line 2, station 8 as indicated on the attached profiles. The established saturated thickness of the alluvial sand deposits is in the range of 15-20m. The underlying crystalline hard rocks indicated the existence of well-developed fractures to a depth in excess of 90m, conditions which are very favourable for borehole drilling.

***Musirizwi irrigation scheme:*** The Scheme is situated adjacent to the Musirizwi River in Ward 18 of Chipinge. The Musirizwi River has a catchment area of 364 sq.km. An abstraction weir has been built across the river immediately upstream of the scheme. The weir was bathymetrically surveyed on 9 February 2023 and found to have a storage volume of 5,500m<sup>3</sup>. However, as the outlet pipe is situated close to the crest of the weir, the full storage is not utilised, and the weir only serves the purpose of raising the water level to a level sufficient to enable gravity flow of water to the scheme. Plate 15 shows the weir constructed across the Musirizwi river.





Plate 15: Weir across Musirizwi river

Flow data

According to ZINWA's "Assessment of surface water resources of Zimbabwe & guidelines for planning", the scheme catchment falls inside the FUZ sub-zone within the Buzi (Budzi) River Catchment which itself lies inside the Save Catchment. The published runoff statistics for this sub-zone are:

- Mean Annual Runoff (MAR) (mm): 151
- Coefficient of Variation (Cv) (%): 70

It should be noted that there are no flow gauges on the catchment and hence no available flow data. The elevation of the Musirizwi River catchment ranges from 1257m to 600m above sea level. For the purposes of model calibrating for the catchment, reference was made to gauging station F18 on the adjacent Buzi River catchment. The following map shows the location of the Musirizwi Irrigation Scheme and the gauging station on the Buzi River. Figure 28 shows the catchments relating to Musirizwi Irrigation Scheme.

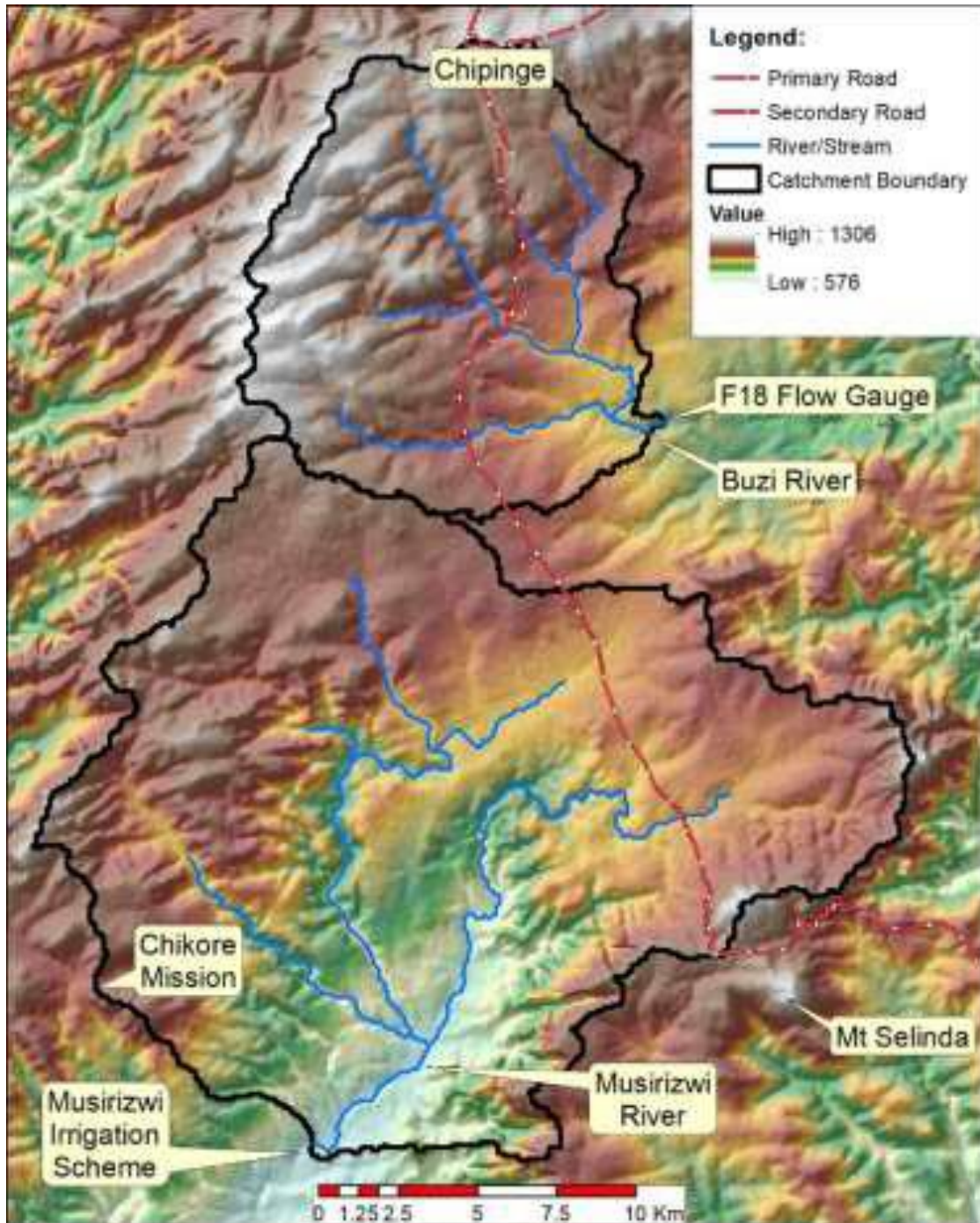


Figure 28: Catchments Relating to Musirizwi Irrigation Scheme

#### Musirizwi river flows

Using the calibration parameters derived for the Buzi River but applying expected rainfall and evaporation data for the Musirizwi River catchment, a 100-year flow series was derived for the Musirizwi River at their site of the irrigation scheme. The flow statistics for this time series are as follows:

- Mean Annual Runoff (MAR) (mm): 123
- Coefficient of Variation (Cv) (%): 103

Figure 29 and Figure 30 show the modelled Musirizwi flows and the mean annual hydrograph respectively.

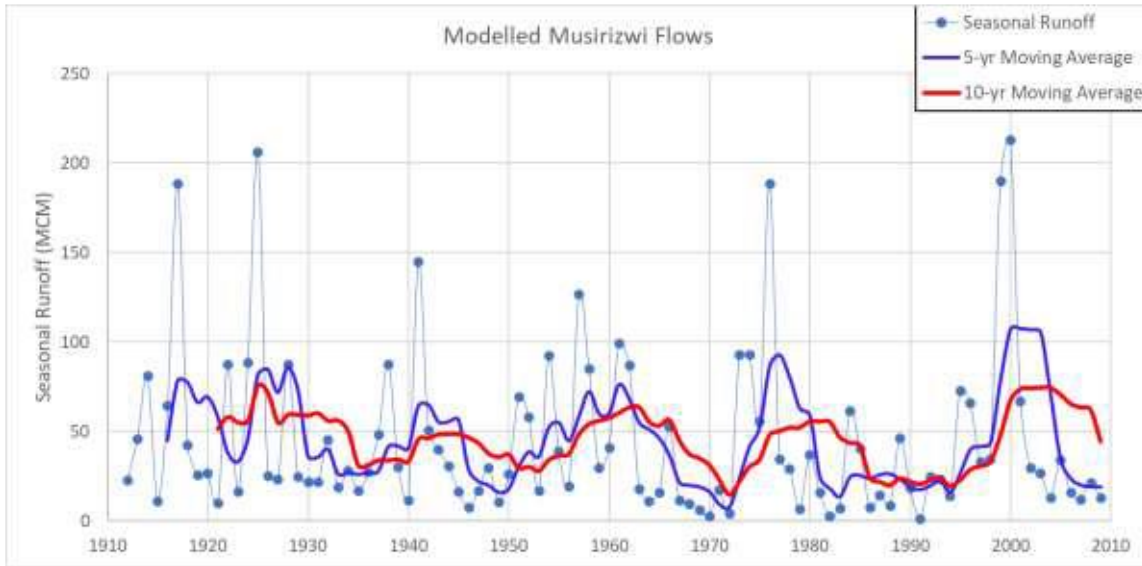


Figure 29: Modelled Musirizwi Flows

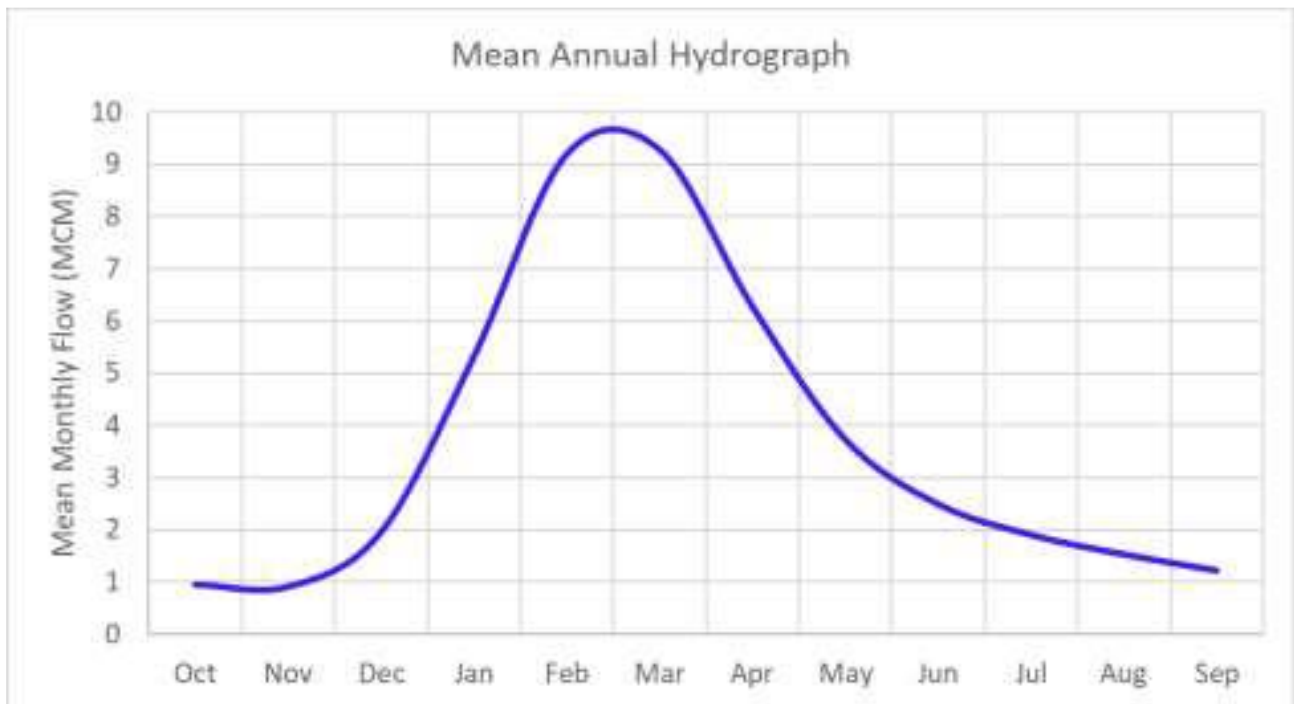


Figure 30: Mean Annual Hydrograph

#### Geological setting and groundwater potential

The geology of the area comprises of Limestones, shales and quartzites of the Umkondo group of rocks belonging to the Mid Precambrian Age. The following observations were made regarding drilling for groundwater at the project site:

- The weathered/fractured profiles recorded are very thick, in excess of 75m, with low resistivities indicating moderate to high groundwater potential.
- Drill boreholes at the pegged sites to depths between 60-90m.
- Inferred yields in the range of 6-10 lit/sec may be expected per borehole.
- Collapsible conditions may be encountered in the first 15m especially at Peg 1 which is adjacent to Musirizwi River. The use of steel construction casings of 300mm diameter and 4.5mm thickness is recommended.

***Vimbanayi Irrigation Scheme:*** The scheme is a well-established flood irrigation scheme. The scheme has been operating well, drawing water from the Save River, and, with the exceptions of 2008, 2012 and 2018, has not, according to the scheme members, run short of water. In most years, surface water is used for irrigation. But in the dry seasons, a pool is dug in the riverbed to channel subsurface water for abstraction using the existing centrifugal pump.

There is a flow gauge immediately upstream of the Vimbanayi scheme, at the Jack Quinton Bridge, from which flow data was obtained. However, with the siltation of the river the main flow moved, in time, away from the gauging post, resulting in flow measurements being abandoned. This gauging station has recently been rehabilitated and automated (December 2022) meaning that flow data can now be recorded again. A second gauging station, E43, exists on the lower Save River, approximately 20km downstream of the scheme. This station, while having records of short duration, is located within a rocky gorge, meaning siltation is not an issue and therefore most flow is surface flow and can be measured. Figure 31 shows the scheme and immediate surrounds, while Figure 32 shows the scheme in respect to the entire Save River catchment.





Figure 31: The scheme and immediate surrounds



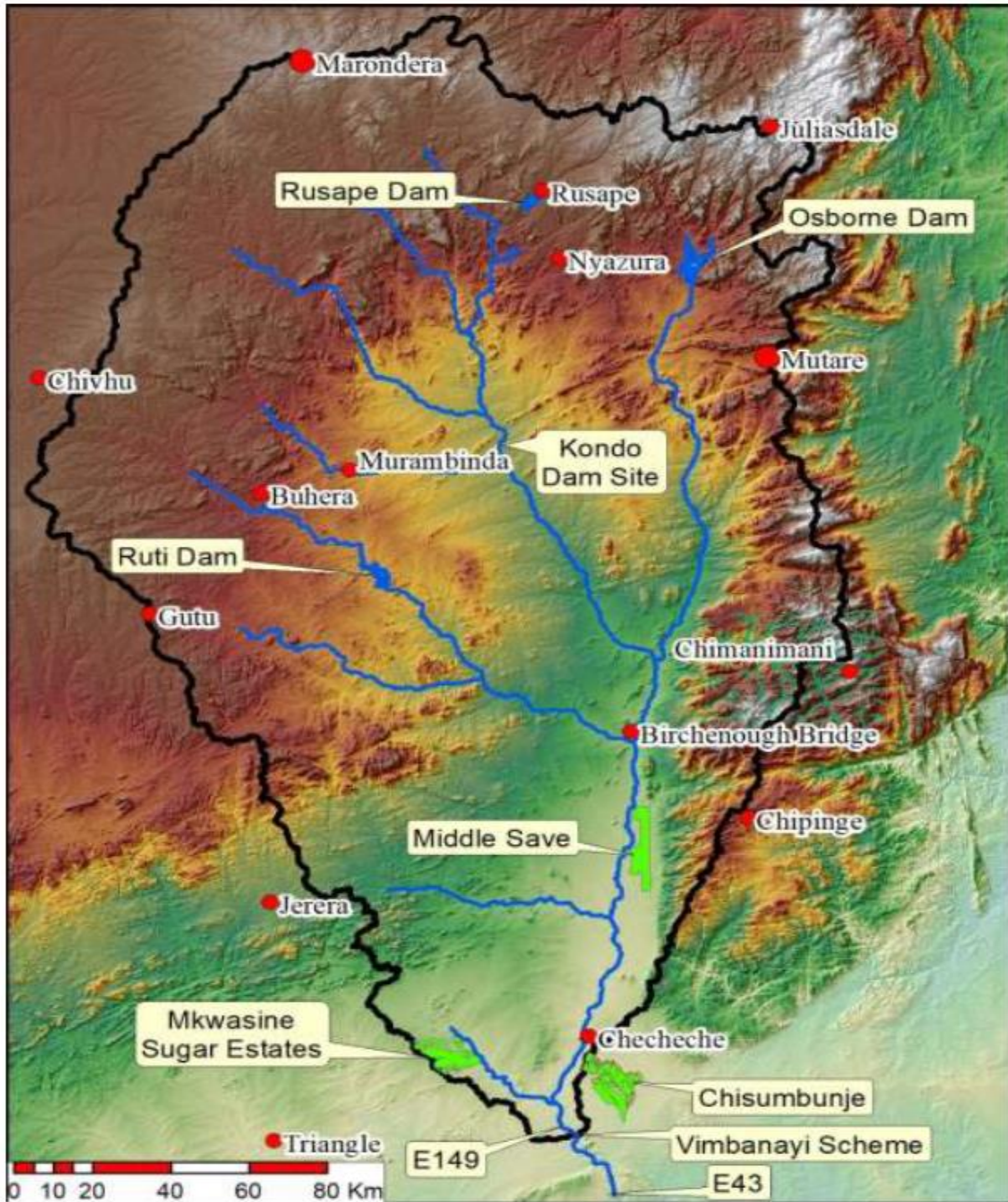


Figure 32: Location of scheme in relation to the entire Save River catchment

The Save River is one of the largest internal rivers within Zimbabwe. Its headwaters are along the central watershed running from Marondera through Headlands to Juliasdale and its catchment area, by the Vimbanayi scheme, is 42,105 sq.km. The upper reaches of the catchment contain three large dams, then Lesapi, the Osborne and the Ruti, which are used for storage of wet-season flows and dry-season releases down the Save River to Middle Save and Chisumbanje. Outflows from these rivers are strictly, and efficiently, controlled by ZINWA.

The geology of the area comprises of Granophyres, Syenites and Gabbros of Late Jurassic Age overlain by Alluvial sand deposits along the Save river. A total of three Electrical Resistivity Profiles were carried out in order to establish the thickness of the water-bearing sedimentary aquifer and its degree of saturation as well as areas with depth to solid bedrock. The electrode spacing used was 5m. Two potential borehole sites were pegged at Line 1, station 9 and Line 2, station 6. The established saturated thickness of the alluvial sand deposits is in the range of 15-25m. The underlying crystalline hard rocks indicated the existence of well-developed fractures to a depth more than 75m, conditions which are very favourable for borehole drilling. Groundwater potential is moderate to high. However, water quality is likely to be hard with elevated TDS.

**Mudzimwa irrigation scheme:** Mudzimwa Irrigation Scheme is situated adjacent to the Tanganda River approximately 6km west of Tanganda Halt. At this point, Tanganda River has a catchment area of 485.7 sq.km. The river itself originates in the eastern highlands and is joined immediately upstream of the irrigation scheme by the Musanhi River. According to ZINWA’s “Assessment of Surface Water Resources of Zimbabwe & Guidelines for Planning”, the river catchment falls inside the ES2 sub-zone within the Lower Save River Catchment. The published runoff statistics for this sub-zone are:

- Mean Annual Runoff (MAR) (mm): 47
- Coefficient of Variation (Cv) (%): 130

It is noted that the ES2 sub-zone covers a large area of approximately 4000 sq.km, predominantly made up of low-lying, low rainfall areas west of the eastern highlands. By contrast, Tanganda River has much of its catchment in the high-altitude and high-rainfall eastern highlands. Flow data was obtained from the ZINWA gauging station on the upper Tanganda River, E37. A summary of the flow data from this gauging station is shown in Table 9.

Table 9: Available flow data for E37

Gauging Station	River	Years of Data	Data Periods	MAR (mm)	Cv (%)
E37	Tanganda	47	1958-1986, 1987-2006	120	78

Figure 33 shows Tanganda River catchment upstream of Mudzimwa and the location of E37 with respect to the catchment area. The lower Tanganda River, in the vicinity of the Mudzimwa scheme, has been heavily developed over the years for irrigation purposes.



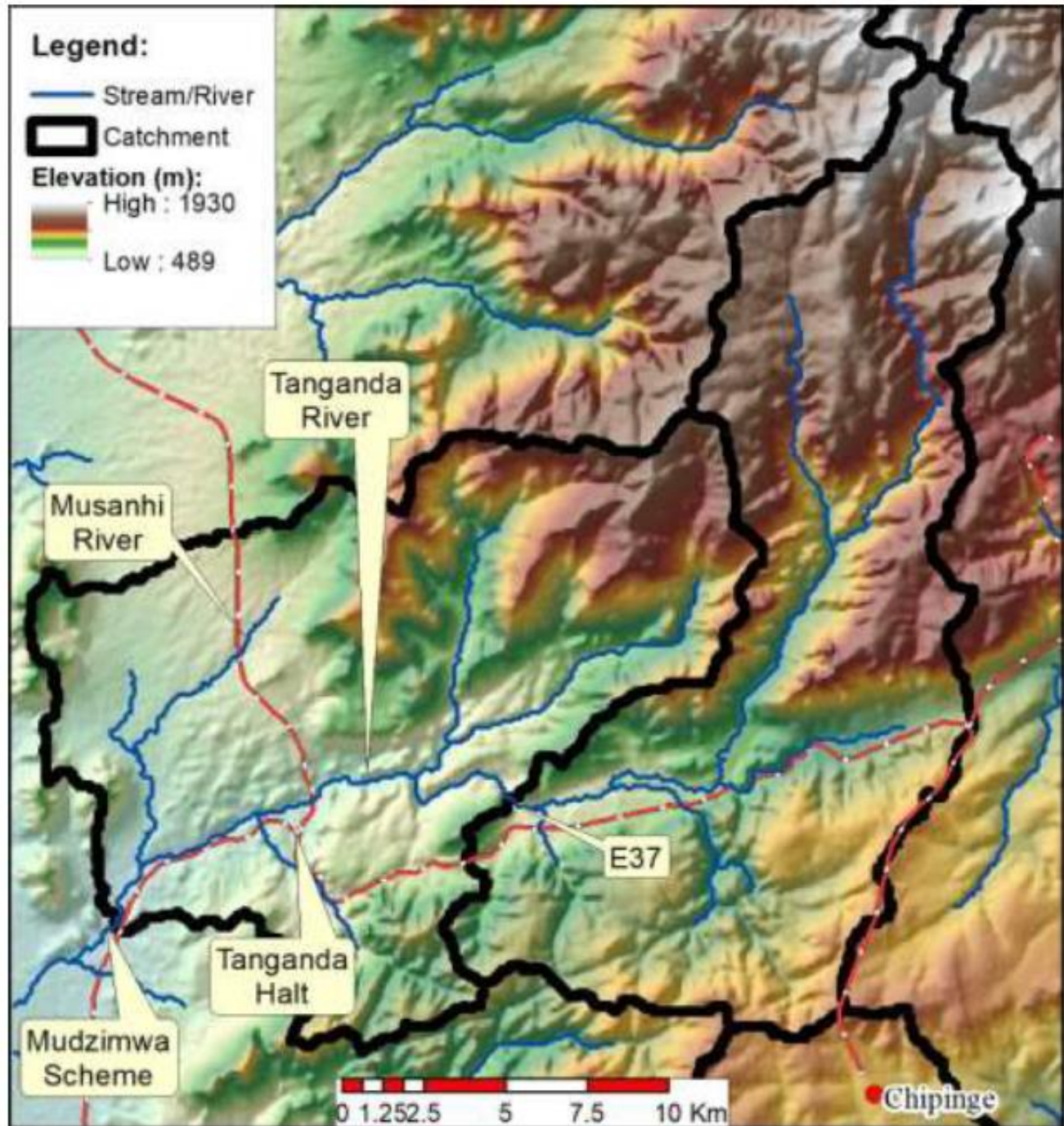


Figure 33: Tanganda river catchment

*Hydrometeorological Data*

Hydrometeorological data comprises of **rainfall** and **flow data** for the catchment area.

*Rainfall*

Due to a lack of long-term rainfall data within or close to the project and within the catchment, use has been made in this study of the CRU rainfall dataset (CRU is the Climate Research Unit at the University of East

Anglia). The CRU rainfall dataset amalgamates all available observed data and grids it to fill in the gaps in the available rainfall records. It enables longer-term hydrological studies, from 1901 to 2020, to be undertaken and can also be used for future climate change projections. The CRU dataset has been refined by comparing it with shorter timeseries of rainfall collected at Chipinge, Nyanyadzi, Middle Save, Vleiplaats Farm and Tandeval, in order to adjust it to be more site specific. Figure 34 and Figure 35 show the seasonal rainfall for upper and lower Tanganda River catchment used for this study respectively, from 1949 through to 2020. Of interest is the 10-year Moving Average, showing the very clearly defined cyclical nature of the longer-term rainfall patterns. There has been a slight gradual decrease in rainfall over the past 70 years in this area.

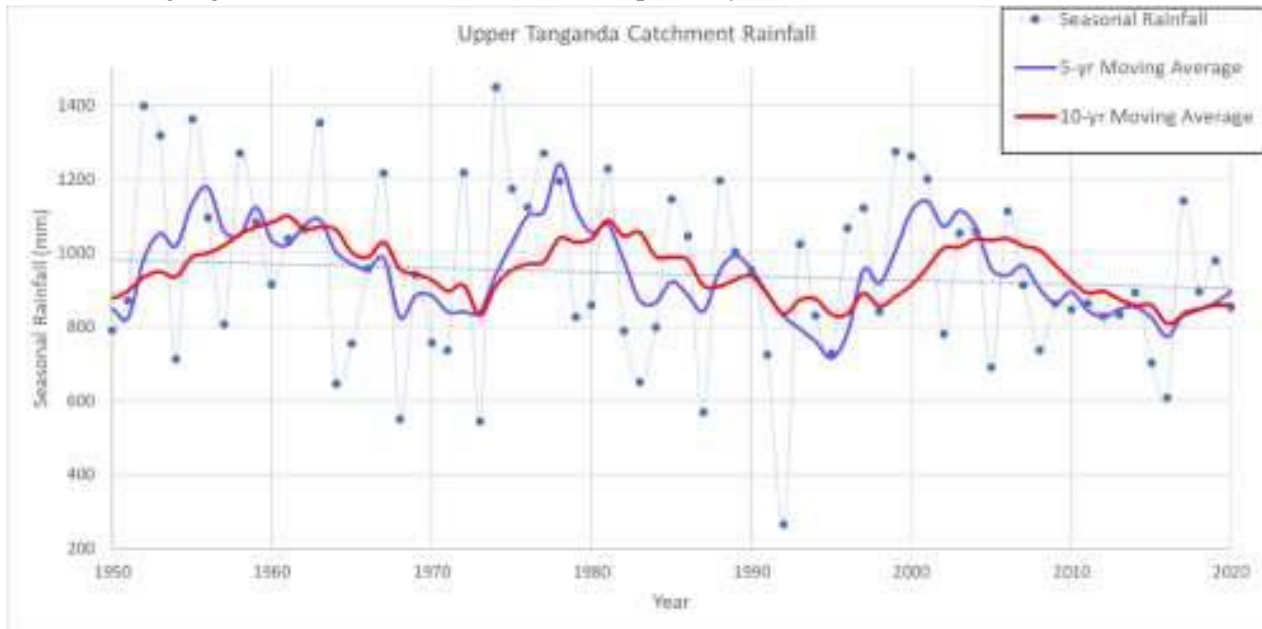


Figure 34: Seasonal Rainfall for Upper Tanganda River Catchment

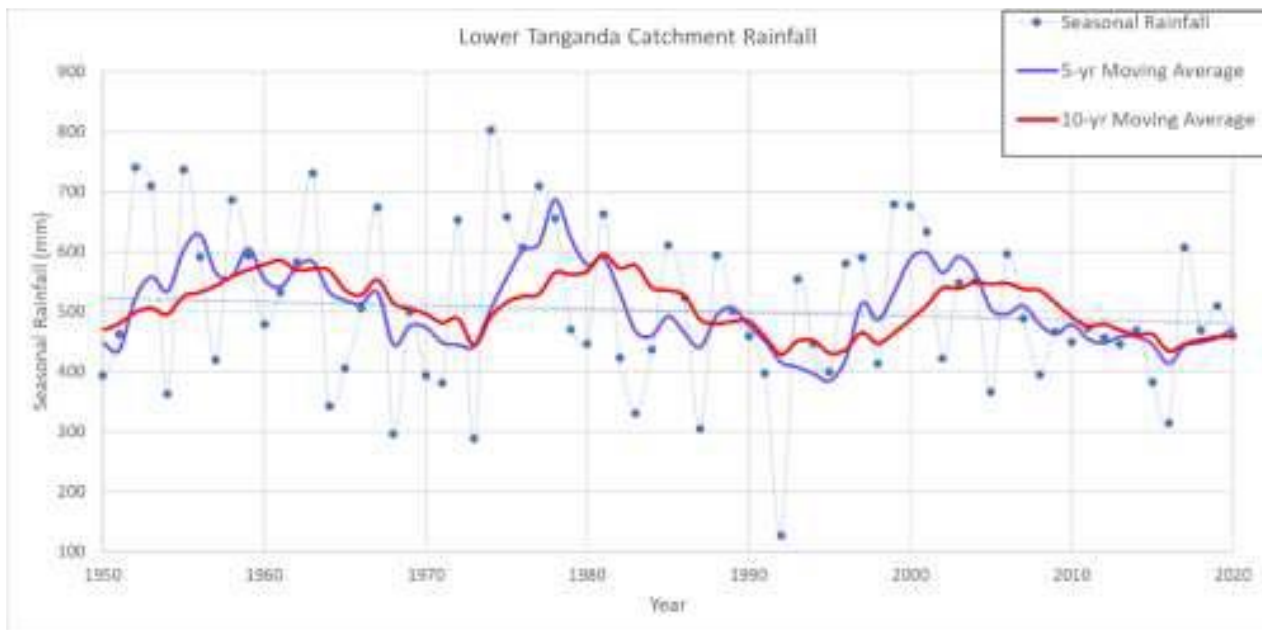


Figure 35: Seasonal Rainfall for Lower Tanganda River Catchment



*Flow data*

The river flows at Mudzimwa were analysed taking into consideration other irrigation water users in the catchment. Figure 36 shows the significant irrigation activities in the catchment. Not shown on the map is also the New Years' Gift Farm in the upper reaches of the catchment.

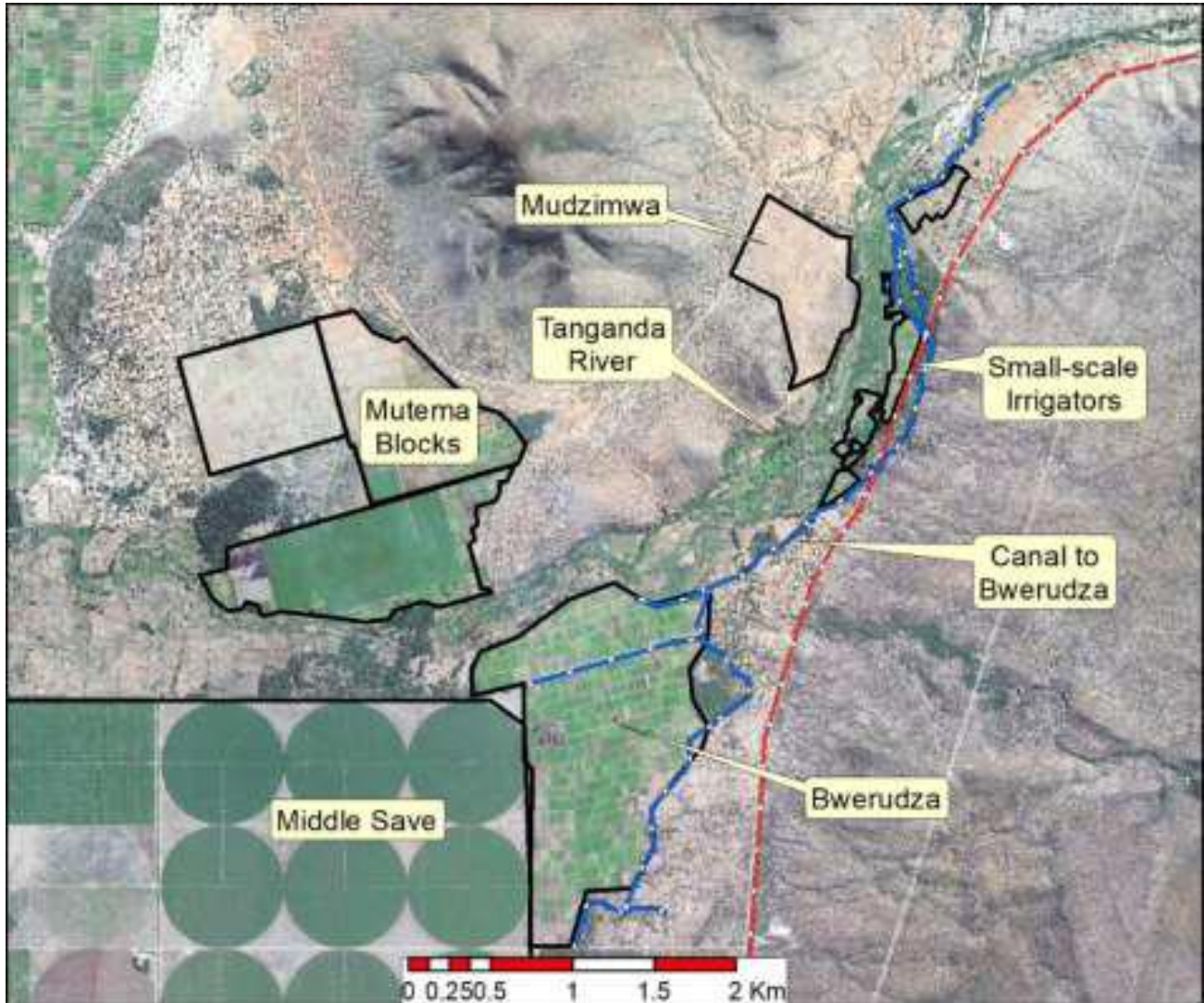


Figure 36: Irrigation Schemes adjacent to Mudzimwa (29 June 2018)

*Runoff*

Rainfall-runoff modelling was then undertaken using the Pitman Model taking into considerations from the other irrigation schemes. Irrigation abstractions were assumed for the other schemes based on the FAO Cropwat irrigation scheduling model. The modelled Tanganda River flows at Mudzimwa are shown in Figure 37, and the mean annual hydrograph is shown in Figure 38.

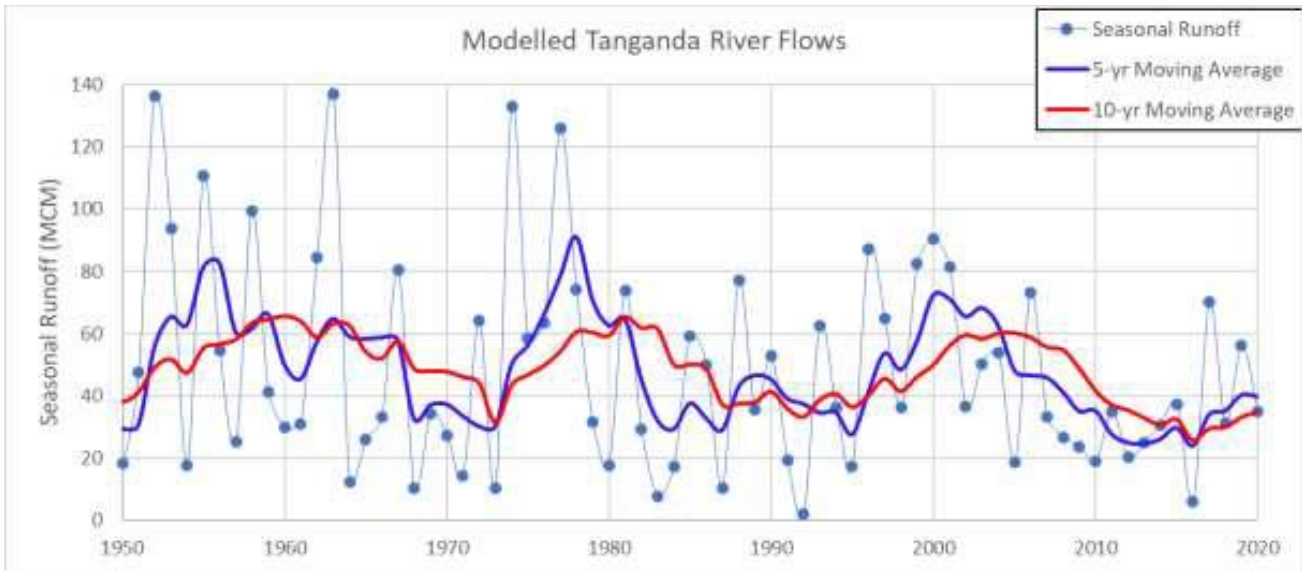


Figure 37: Modelled Tanganda Flows

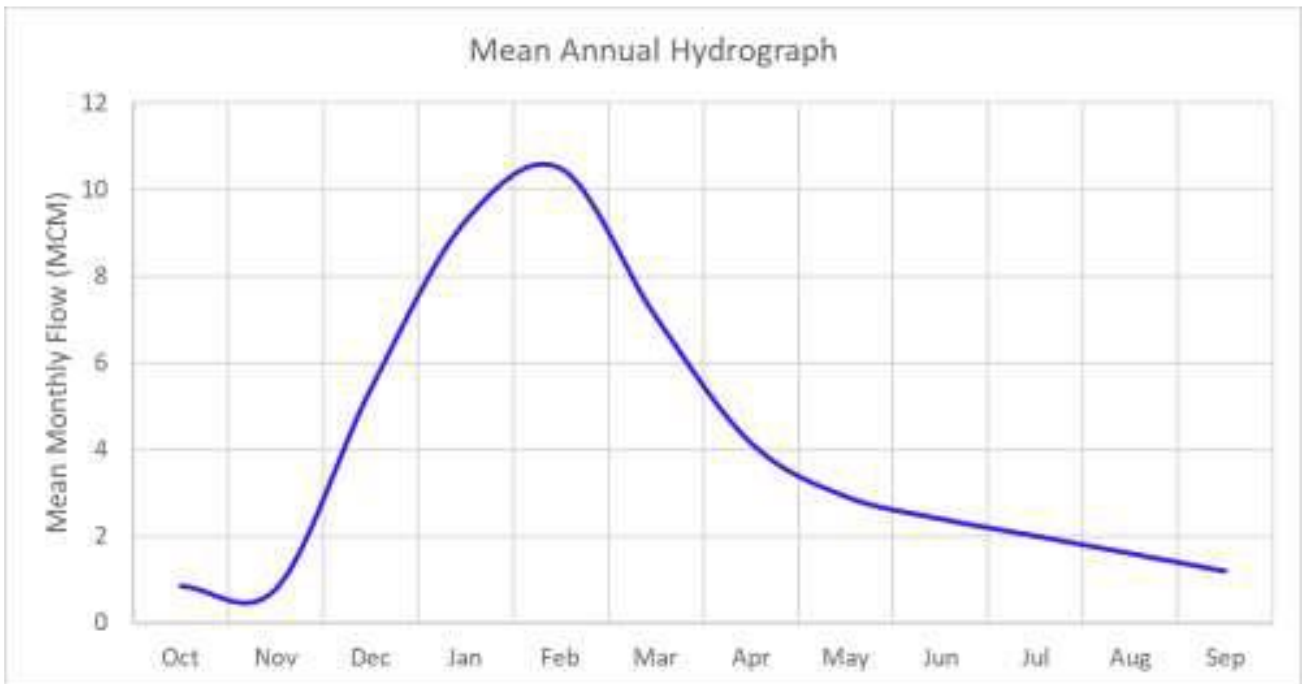


Figure 38: Mean Annual Hydrograph

### *Hydrogeology*

The geology of the area comprises of Alluvial and Superficial deposits along the Tanganda river which are underlain by sandstones and siltstones of the Upper Karoo. The topography is gently sloping to the south. There is one existing community borehole in the area which is fitted with a bush pump. The depth and yield information for the existing borehole could not be ascertained.

### Electrical Resistivity Profiles

A total of 3 Electrical Resistivity Profiles were carried out in-order to establish the thickness of the water bearing sedimentary aquifer and degree of saturation. The following observations were made regarding drilling for groundwater at the project site:

- The established saturated thickness of the alluvial sand deposits and karoo sandstones is quite thick, ranging from 45 – 65m with low resistivities indicating moderate to high groundwater potential.
- It is recommended that boreholes be drilled to depths in the range of 30-45m. Deep drilling is recommended in-order to fully penetrate the saturated alluvium and sandstone aquifer.
- Difficulties are highly likely to be encountered in drilling through the loosely consolidated alluvial and sandstone formation using the air drilling technique as this formation is highly collapsible, especially between 0-25m. It is therefore recommended that the boreholes be drilled using the Mud Rotary Drilling Method.
- Inferred yields in the range of 15-30 litres/sec may be expected in this area. The main water strikes should be expected between 15-40m below ground level

### Pilot Boreholes

Two pilot boreholes were drilled at the site for further assessment of the hydrogeology of the site. The boreholes were drilled close to the banks of the Tanganda River to tap into the groundwater and baseflows from the river. The river baseflows would help to reduce the salinity of the deep groundwater that is typical in the area. The first borehole was drilled to a depth of 13m. A second borehole was drilled to 16m depth. Table 10 provides the summary of the borehole tests results.

Table 10: Borehole tests results

Borehole	Borehole Depth	Pump Inlet Depth	Pump Size	Pumping Test Duration	Safe Pumping Rate	Static water level	Dynamic Water Level - end of test	Total Drawdown	Remarks
	(m)	(m)	(HP)	(hrs)	(ℓ/s)	(m)	(m)	(m)	
BH1	13	12.5	10 HP	24	11	7.32	7.76	0.44	A very good yielding borehole with good recovery. The borehole can be pumped sustainably, with sand-free water at a rate of 11 lit/sec. The rate can be increased to 15 lit/sec.
BH2	16	15.5	10 HP	24	2	5.85	13.31	7.46	A low yielding borehole that can be pumped at a rate of 2.0 lit/sec. Recovery is very good.

#### 4.4 Water Quality

Water samples were collected from the potential water sources and tested to determine the suitability of the water for crop irrigation. The results of analysis are provided in Table 11.

Table 11: Suitability of water for crop irrigation

Scheme	Water Source	Suitability for use
Mhakwe	Mhakwe dam	The water quality test results show that the water is suitable for crop irrigation except for the high value of total hardness which was measured which can result in clogging of drip irrigation emitters.
Farai	Gombe/Save River	The water quality test results show that the water is largely suitable for crop irrigation. However, the high values for T.D.S. and iron would make the raw water unsuitable for drip irrigation as this can result in clogging of the drippers.
Musirizwi	Musirizwi river	The water quality test results show that the water is largely suitable for crop irrigation. However, the high values of minerals may clog drip emitters making drip irrigation unsuitable
Vimbanayi	Save River	The water quality test results show that the water is suitable for crop irrigation except for the high value of total hardness which was measured which can result in clogging of drip irrigation emitters if drip irrigation technology is used.
Mudzimwa	Tanganda	The water quality test results show that the water is suitable for crop irrigation except for the high value of total hardness which was measured which can result in clogging of drip irrigation emitters if drip irrigation technology is used.

#### 4.5 Topography

The topographical maps for each site are provided in the site specific ESMPs as well as in the detailed feasibility study reports. However, Table 12 provides a summary of topography at each site.

Table 12: Topography of each site

Scheme	Description of topography
Mhakwe	The site is located on the right bank of the Matanhu River on a gently sloping terrain and stretches along the river until the Matanhu River discharges into the Mhakwe River.
Farai	The site is bound by the Gombe River to the west, the Musvazvi River to the north, and communal lands in the south and east. There is a high point at the scheme where a brick tank was previously constructed. The site generally slopes downwards in all directions from this high point, with a markedly steep slope towards the Gombe River on the western edge



Scheme	Description of topography
Musirizwi	The site is located on the left bank of the Musirizwi River. The terrain slopes steeply towards the river making it unsuitable for surface irrigation methods due to resultant high flow rates and erosion risks.
Vimbanayi	The site is located on the left bank of the Save River. Significant land scaping has been undertaken at the site in order to fit a surface irrigation system which relies on gravity flow.
Mudzimwa	The site is located on the left bank of the Save River. Significant land scaping has been undertaken at the site in order to fit a surface irrigation system which relies on gravity flow.

#### 4.6 Soil resources

A soil survey of the command area was conducted for each irrigation scheme. Table 13 shows the description of the soils and the associated irrigability class at each of the seven irrigation schemes.

Table 13: Soil type and irrigability class

Irrigation Scheme	Soil description and irrigability class	General conclusion
Mhakwe	The soils are generally from fersiallitic group of the kaolinic order which are moderately deep to deep, reddish brown granular clays and sandy clays. However, since the site is on a hill pediment and along the river, there has been a strong influence by colluvial and alluvial activities giving rise to different soils depending on the proximity of the soils on either the hill or the river	Soils are suitable for irrigated agriculture.
Farai	Two distinct soil types were identified at the scheme, i.e., U1 and U2. The U1 soil type has moderately deep sandy loam over sandy clay loam. They are well drained with good permeability. The soils are suitable for most crops using any irrigation systems. The U2 soil type has moderately deep to deep soils(100cm) light textured (fine sands and loamy sands)with good permeability and very well drained top and subsoils. The soils have high infiltration rates	Soils are suitable for irrigated agriculture
Musirizwi	The soils are generally from siallitic group of the calcimorphic order. These soils are generally moderately shallow brown to	Soils are suitable for irrigated agriculture but highly susceptible to erosion

Irrigation Scheme	Soil description and irrigability class	General conclusion
	<p>reddish brown. Fine to medium grained loamy sands over sandy loams, or sandy loams over sandy clay loam. River action also played an influence of soil category P2 which is found in close proximity with Musirizwi River. Two soil categories were identified based on fieldwork, satellite imagery and digital elevation model (DEM). These soils are derived from mainly mafic and alluvial parent material.</p> <ul style="list-style-type: none"> <li>• <b>Category P1:</b> This category has moderately deep medium sandy clay loam over sandy clay and clay subsoils. They are well drained with good permeability. The soils are suitable for most crops using any irrigation systems.</li> <li>• <b>Category P2:</b> These are deep soils(&lt;150cm) brown(10YR4/3m) sandy clay loam over strong brown(7.5YR4/6m) sandy loam soils with good permeability and well drained top and subsoils. The soils generally decrease the clay content with depth due to previous flooding from Musirizwi River in the Precambrian period.</li> </ul>	
Vimbanayi	<p>Three distinct soil types were identified at the scheme, i.e., U1, E1, and E2 as shown in the Figure 9. The soil investigations and analysis conducted showed that the soils at the scheme are generally suitable for cultivation of various crops. The majority of the soils are in category U1 which has an irrigability class of 1. The other two categories have an irrigability class of 2 primarily because of the medium depths which may not be suitable for some crops.</p>	<p>Soils are suitable for irrigated agriculture.</p>

Irrigation Scheme	Soil description and irrigability class	General conclusion
Mudzimwa	Soil investigations were undertaken for the irrigation scheme to determine the suitability of the soils for crop farming. Two distinct soil types were identified (U1 and C1). Both soil categories are generally suitable for crop farming and can be irrigated with most irrigation technologies. However, the light textures in Soil Category C1 will make the section susceptible to erosion when surface irrigation methods are used.	Soils are suitable for irrigated agriculture.

#### 4.7 Biodiversity

Dominant tree species identified around the scheme include Mutsikiri, Muhute, Muparauta, Mupfura, Mupanda, Muunga. The other tree species in the targeted areas include *Adansonia digitata*, *Acacia spp.*, *Dichrostachys cinerea* (Sickle bush), African biobab, *Grewia flavascens* (Donkey berry), *Kirkia accuminata*, *Diospyros Mespiliformis*, *Dalbergia Melanoxylon*, *Ficus spp.* *Hyperenia spp* and *Eragrostis Tenuifolia* are the dominant grass species which are mostly found in disturbed areas. *Amaranthus hybridus Aloe*, and *Tagetes minuta* are the herbs mostly found across the project area. Faunal species include elephants, hippos, Hynas, monkeys, Baboons, mhene (antelope, *Raphicerus campestris*), mhembwe Duiker (*cephalophinae*), rabbits, mapere (hyenas), makava (jackals), maherani, springhare (*pedetes capensis*), Magwizhu, shindi (squirrels) and hovo (*galerella sanguinea*).

The Save river and Gombwe river is home to various animal species both vertebrates and invertebrates which include Pelomedusa sp, Crocodylus niloticus, amphibian (bull frogs, chorus frogs) and a variety of fish species such as cat fish (muramba), bream (magwaya). Tanganda river is also home to amphibian (bull frogs, chorus frogs) and a variety of fish species such as catfish (muramba), bream (magwaya).

***No rare, protected, endangered nor threated species were identified in the targeted areas.***

#### 4.8 Air quality

There are currently no major human activities that generate air pollutants in or around all the proposed seven irrigation schemes. There are fugitive dust emissions that are as a result of traffic movements in dust/ gravel roads and from agricultural operations.

#### 4.9 Noise and Vibration

There are no activities or machinery that generate noise and vibration in the area except for very few vehicles that pass by. However, there is need to monitor employee exposure levels to noise and vibration during the construction phase of the Project.

#### 4.10 Archaeology and cultural heritage

A qualified and experienced independent expert was engaged to assess the project's potential impacts on cultural heritage using, among other methodologies, field-based surveys and involving meaningful, effective, and informed stakeholder consultations as part of the social and environmental assessment process. Some cultural sites have been noted at some of the schemes which are highlighted below:

- **Mhakwe irrigation scheme:** Three graves have been identified but they are located outside the cropping area, hence they won't be affected by the sub-project.
- **Farai irrigation scheme:** Two graveyard sites (Plate 16) were identified, but these are outside the targeted command area, hence they will not be affected by the sub-project.



Plate 16: Graves identified outside the cropping area

- **Musirizwi irrigation scheme:** Three graves were identified in the area targeted for the extension of the scheme. Stakeholders agreed that these graves must be fenced off and excluded from any farming activities.
- **Mudzimwa irrigation scheme:** Two graveyard sites were identified (Plate 17) but these are situated outside the targeted cropping area of the scheme, hence the proposed irrigation infrastructure will not impact on the grave sites. There is also site marked by a huge tree near the scheme where local communities normally gather for traditional rain making ceremonies (Plate 18). This site is situated outside the proposed scheme area. The site will not be affected by the scheme. To ensure that these sites are protected, the Irrigation Management Committee (IMC) in cooperation together with the traditional leaders will monitor sub-project development activities to ensure that these sites are protected.



Plate 17: Graveyard sites covered by a thicket





Plate 18: Site used for traditional rain making ceremonies

The construction and or revisitation of the 5 irrigation schemes will not affect any materials of cultural or archaeological importance. However, the project proponent is strongly advised that if any suspected archaeological and cultural material is discovered during the site development and or construction process, a Chance Find Procedure attached in Appendix 2 should be activated.

#### 4.11 Socio-economic profiles

Socio-economic data was collected in all sub-project areas through primary and secondary sources. Primary data sources comprised in-depth interviews, questionnaires, focus group discussions and meetings. Demographic data at all the irrigation schemes were assessed in terms of sex, relationship to the household head (HHH), age, marital status, highest level of education achieved, literacy level, sources of livelihoods, etc. The number of households interviewed per scheme is given in Table 14.

Table 14: Number of people interviewed at the scheme

Type of Farmer	Mhakwe	Farai	Musirizwi	Vimbanayi	Mudzimwa
Dryland farmers	0	122	0	0	41
Irrigators	30	0	22	33	0
<b>TOTAL</b>	<b>30</b>	<b>122</b>	<b>22</b>	<b>33</b>	<b>41</b>

Field visits were also conducted to observe and gather data on the land uses, socio-economic activities within the area, infrastructure, agronomic practices in and around the irrigation sites, sources of livelihoods, etc. Key Informant Interviews (KII) were done with the IMC chairman and members, Rural District councils CEO, District Development Coordinators, Provincial and district irrigation officers, AGRITEX officers, political leaders and traditional heads. A group discussion was also carried out with all intended beneficiaries at each of the proposed irrigation sites. Plate 19 show consultations with targeted beneficiaries at Mudzimwa irrigation scheme. An invitation to attend the community meetings was extended through the AGRITEX officers.

Secondary data from the EIA prospectuses, project feasibility study report, UNDP reports, FAO reports, World Bank reports and other reports from different actors were consulted.



Plate 19: Meeting with the targeted beneficiaries at the proposed Mudzimwa site (March 2023)

#### 4.11.1 Demographic profiles

Table 15 shows the household composition by gender, size and age.

Table 15: household composition by gender, size and age.

Name of Scheme	sex of HH head		HH age distribution			Average # people in the HH
	males	females	< 35	35-64	65+	
Mhakwe	70%	30%	42%	42%	16%	6
Farai	59%	41%	40%	47%	13%	5
Musirizwi	69%	31%	29%	23%	48%	6
Vimbanayi	49%	51%	37%	49%	14%	6
Mudzimwa	58%	42%	37%	51%	12%	5

The survey indicated that the majority of households for all the schemes are male headed. An analysis of the data indicates that majority of HH members fall within the 35-64 age group except for Musirizwi which has most of its members falling within the 65+ age group. The <35 age group is perceived to be economically active to provide labour in the irrigation schemes. The household heads who are over 65 years are expected to be less active in the irrigation projects and their children are expected to take over irrigation. The average number of people per HH range from 5 to 6 in all schemes which is good for labour provision. In all the schemes, the majority of farmers are married and living together which is positive for labour and schemes sustainability. However, most marriages are not registered and this may pose a challenge on inheritance especially for women.

#### 4.11.2 Scheme Governance

The irrigation schemes will or are management by an Irrigation Management Committee (IMC) which comprises of the Chairperson, Secretary, Vice Chairperson, Vice Secretary, Treasurer and other committee members.

#### 4.11.3 Vulnerable groups

Vulnerable groups at all the sub-project sites include the chronically ill, people living with disabilities, child headed households and the elderly. The selection of plot holders will take into consideration of the vulnerable members so that they must not left behind in the development process. The selection of irrigation technology was also informed by the plight of those vulnerable in the communities. Table 16 shows the vulnerable groups in all the schemes.

Table 16: Vulnerable groups at the schemes

Scheme	Chronically ill	Child Headed	Disabled	Old aged	Total
Mhakwe	3	1	1	7	12
Farai	4	2	0	8	14
Musirizwi	5	0	2	13	20
Vimbanayi	2	0	0	4	6
Mudzimwa	9	0	2	9	20

#### 4.11.4 Water use and conflict assessment

##### *Mhakwe irrigation scheme*

The Mhakwe Dam is a dry dam and is the major source of water for irrigation at the scheme. Mhakwe dam is used by livestock and maintaining the natural environment. There are 27 boreholes around the village which provide water for domestic purposes. Water from the Matanhu, and Shekani rivers is used at the fields outside the scheme for small gardens and to supplement rainwater. There is very minimal water demand from other competing water users. Hence there revitalisation of Mhakwe irrigation scheme is less likely to generate any potential conflicts from other competing water users.

##### *Farai irrigation scheme*

The gross crop water demands were estimated at 377,536 cubic meters per year with a peak water demand of 2,419 cubic meters per day. As indicated previously, surface river flows will be adequate to meet irrigation water demands during the wet season. But there is no significant flows at the project site during the dry season. However, flows persist during the dry season in the sand formation in the riverbed. There is a rocky shelf immediately downstream of the proposed pumphouse that would act as a natural barrier to sub-surface water, thereby creating a sand reservoir immediately upstream. An assessment of the volume of sand upstream of the aforementioned rocky ridge results in an estimate (assuming a uniform depth of 3m, 150m width and 1.6km long) of approximately 675,000m<sup>3</sup> of sand. Assuming a 35% extraction rate (<https://wedc-knowledge.lboro.ac.uk/resources/conference/23/Nissen.pdf>), this would equate to 250,000m<sup>3</sup> of water that is stored in the sand bed during the dry season. This would be sufficient to meet the gross irrigation water requirements during the dry season.

There are several water users both upstream and upstream of the irrigation scheme. These water users are involved in activities that are dependent on significant water withdrawals from the same resource. There are there irrigations schemes (Vimbanai, Rupangwana and Chibuwe). There is also Mukwasine Sugar Estate and out-growers further upstream. However, at the confluence of the Mkwesine and the Save Rivers exists the Tshovani Irrigation Scheme, with an area of approximately 400ha, which is drawing from this water source. Downstream water users include lodges and local communities. Due to all these significant water users, there is potential for competition with respect to the use of this precious water resource especially during the dry season which may result in potential conflicts. The solution to this challenge involves the installing an efficient irrigation system that will maximise the use of the available water resources. The flood irrigation system that is currently installed is largely water inefficient resulting in significant water loses. Climate proofing of the irrigation system through installing a highly water efficient drag horse irrigation system will help to promote water use efficiency resulting in minimising the risk of water use conflicts.

### *Musirizwi irrigation scheme*

The gross crop water demands were estimated at 119,865 cubic meters per year with a peak water demand of 1,050 cubic meters per day. The river flow rate will be sufficient to meet the water demands for most of the months at an assurance of 80% except for the dry month for October. The deficit will be met by provision of an NSD. A 1,000 m<sup>3</sup> NSD will be able to store sufficient volume of water to compensate for the shortfall.

There are significant water users mostly irrigation schemes both upstream and downstream of the irrigation scheme. Immediately upstream of the Musirizwi scheme is the Kushinga-Gambadziya Irrigation Scheme (Figure 13). This scheme is 27ha in extent and abstracts run of river flow from the Nyaututu River (also referred to as the Gambadziya River). This scheme is currently fully functional. The Nyaututu River drains water from approximately 40% of the Musirizwi Catchment area. Having assessed the late dry season flows in the river, it is assumed that at critical periods the water resource flowing down the Nyaututu River will be fully subscribed and that therefore only the remaining 60% of the catchment is available to the Musirizwi Irrigation scheme. While this is technically untrue for most of the year, when the Nyaututu River flows are in excess of requirement at Kushinga-Gambadziya, during critical periods of low flow it is likely that most of the water flowing down this river will be abstracted thus leaving the remaining 60% of the catchment available to Musirizwi Irrigation Scheme. It is possible that in the future, additional schemes will be constructed upstream, further reducing Musirizwi River flows at critical times of the year.

There is also Masocha irrigation scheme downstream that is also dependent on the same water resource. However, due to the dwindling water resources, conflicts are likely to arise due to water shortages. The solution to this challenge involves the installing an efficient irrigation system that will maximise the use of the available water resources. The flood irrigation system that is currently being used at Musirizwi is largely water inefficient resulting in significant water loses. Climate proofing of the irrigation system through installing a highly water efficient drag horse irrigation system will help to promote water use efficiency resulting in minimising the risk of water use conflicts.

### *Vimbanayi irrigation scheme*

There are several water users both upstream and upstream of the irrigation scheme. These water users are involved in activities that are dependent on significant water withdrawals from the same resource. Upstream water users include Green Fuels (PVT) Ltd which is involved in ethanol production as well as sugarcane



growing. There is also Mukwasine Sugar Estate and out-growers further upstream. However, at the confluence of the Mkwasine and the Save Rivers exists the Tshovani Irrigation Scheme, with an area of approximately 400ha, which is drawing from this water source. Downstream water users include two irrigation schemes which are Farai and Zuvarabuda irrigation schemes. Due to all these significant water users, there is potential for competition with respect to the use of this precious water resource especially during the dry season which may result in potential conflicts.

The members of the Vimbanayi irrigation scheme recollect that during the 2008, 2012 and 2018 seasons there was insufficient flow in the river to abstract normally and so they resorted to hiring machinery to dig a sump in the riverbed. These sumps were, apparently, approximately 4m deep, down to the original rocky riverbed, and enabled irrigation to continue. However, due to the slower moving sub-surface flow, the replenishment rate of the sump was lower than the abstraction rate and therefore the usual irrigation rate had to be curtailed. Analysis of medium resolution satellite imagery (Figure 39) show no surface flow in October of 2016. However, patches of surface water can be seen (dark patches), including at the Vimbanayi abstraction point, indicating that there is water below the surface that can be accessed.

The summary of our analysis of the Save River flows is that, while they can be significant during the wet season, they do taper off and, due to siltation and intrusive upstream management practices and offtakes, they are not, as a surface water resource, either natural or reliable for further large-scale irrigation abstraction without additional managed releases from the upstream storage reservoirs. However, due to expected significant sub-surface flows in the heavily silted riverbed, coupled with return flows entering the system from the Mkwasine Sugar Estate, the observation is that significant water remains in the system and is potentially available for small-scale abstraction. There is ongoing development of small-scale irrigation upstream of Vimbanayi and these schemes have the potential to jeopardise the water security of Vimbanayi at critical times. It would appear that the focus of upstream storage releases is primarily on supplying the large-scale commercial estates such as Middle Save and Chisumbanje. However, as irrigation development increases downstream it may become necessary for ZINWA to quantify the additional required water resource and increase releases into the river system from the upstream Rusape, Ruti, and Osborne dams.

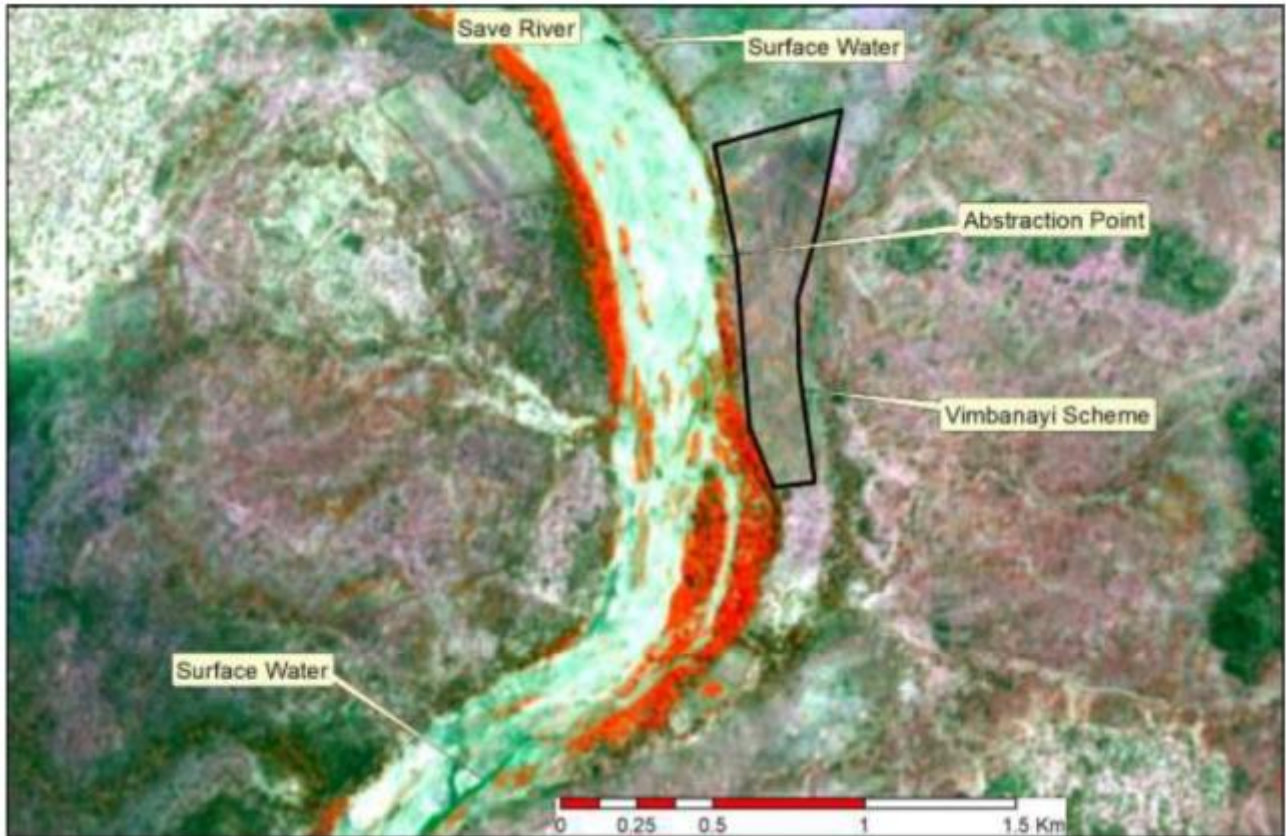


Figure 39: Medium Resolution Infrared Satellite Imagery showing Minimal Surface Water (Oct 2016)

While the surface water at Vimbanayi appears to be, for the most part, sufficient for irrigation for most of the year, there is potential, going forward, to look at sand abstraction from the riverbed during critical periods. Anecdotal evidence suggests that at Middle Save, during the drought of the early 1990s, 2 x 200hp sand-abstraction pumps were fitted to abstract subsurface flows from the Save River, abstracting a significant amount of water. These pumps were washed away during Cyclone Eline in 2000.

Assessment of the volume of sand by the scheme suggests a total of 150,000 m<sup>3</sup> per 100m of riverbed (370m wide x 4m deep by 100m length). Assuming a 35% extraction rate, this would equate to up to 50,000m<sup>3</sup> of water stored per 100m of river. These figures indicate that, should the surface water resources dwindle to unacceptable levels, the scheme can be resuscitated through sand abstraction of this stored resource.

### *Mudzimwa irrigation scheme*

#### *Scheme water demand*

The gross crop water demand for the scheme was estimated at 514,706 cubic meters per year with a peak water demand of 2,978 cubic meters per day. The lower Tanganda River, in the vicinity of the Mudzimwa scheme, has been heavily developed over the years for irrigation purposes. Figure 40 shows the location of pertinent irrigation schemes in the immediate vicinity of Mudzimwa.

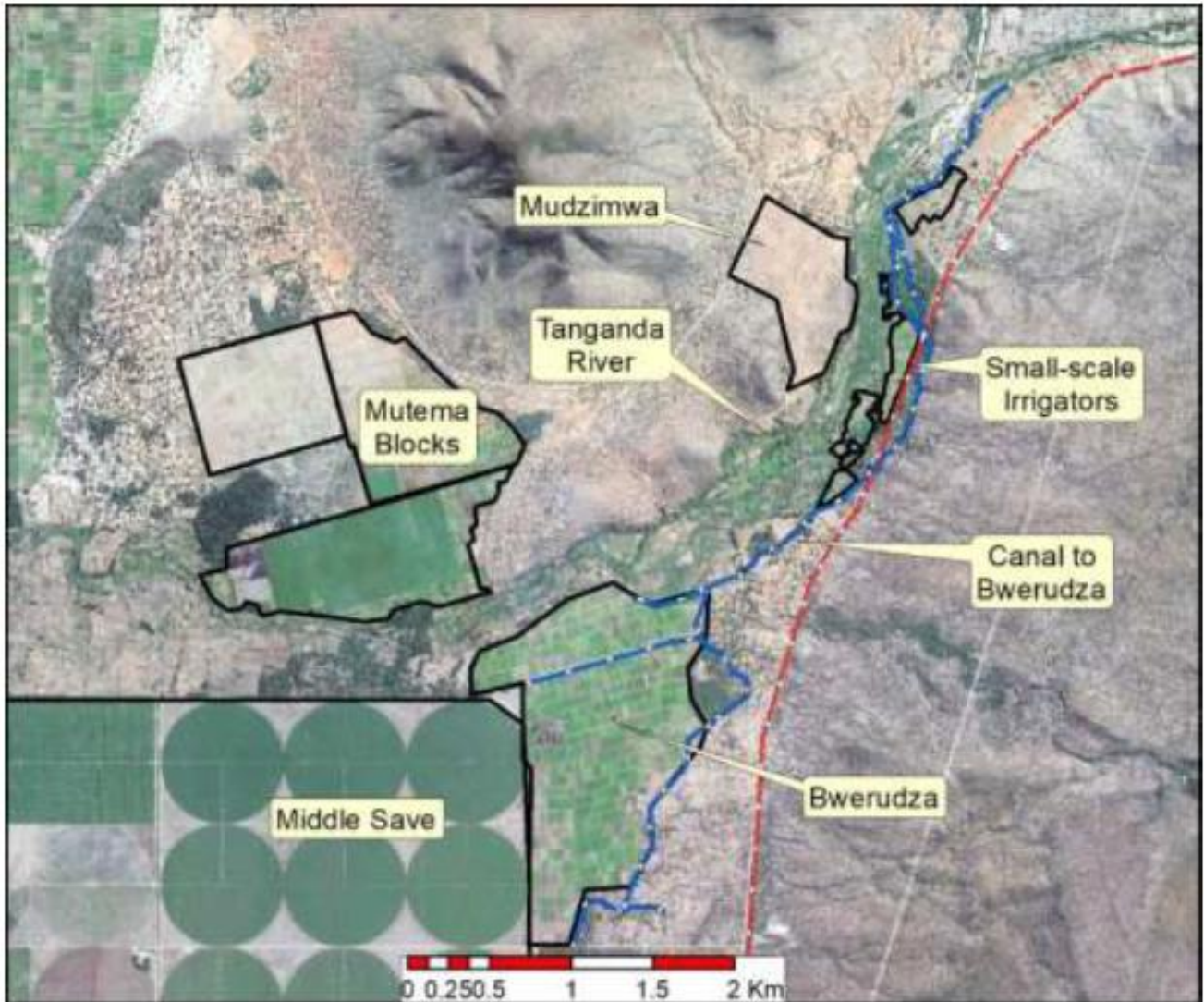


Figure 40: The scheme and immediate surrounds

These irrigation schemes are described in more detail as follows:

*Middle Save irrigation scheme:* The Middle Save scheme is a large-scale cropping area that abstracts water from both the Save River and from numerous boreholes. It does not use water from the Tanganda River.

*Mutema Irrigation Scheme:* The Mutema Irrigation Scheme was constructed in 1932, using water abstracted from the Tanganda River. The scheme covers a total area of 240ha, although only around 100ha appears currently to be active. There is a large banana plantation within the scheme developed as part of an out-grower contract farming initiative. In the 1970s it was realized that Tanganda River was not sufficiently reliable and as a result four (4) boreholes were sunk. During Cyclone Eline in 2000 the point of abstraction from the river was seriously damaged and the boreholes were extended.

*Bwerudza irrigation scheme:* The Bwerudza Scheme was established in 2006 with its main source of water being Tanganda River. The scheme is approximately 185ha in extent and apparently irrigates mainly winter crops as Tanganda River has proved to be unreliable in summer (late dry season). The canal offtake for the Bwerudza scheme lies upstream of the proposed Mudzimwa scheme meaning that, regardless of who might have prior rights on the water, physically the Bwerudza scheme abstracts their requirements leaving the balance for downstream users.

This scheme is a major water user on the Tanganda River and therefore as part of the hydrological calculations of available water for Mudzimwa, it is necessary to estimate a water consumption for the scheme. The assumption is that the members of this scheme will use water that is available up to a maximum. That maximum has been taken as 0.8 x ETo (potential evapotranspiration), the figure of 0.8 being an average of expected crop factor across the scheme at any one time. The expected monthly water requirements for Bwerudza are thus calculated as shown in Table 17. These figures are calculated as an instantaneous flow demand for 185ha assuming 10 hours of irrigation per day. Included in these flow rate figures are a 30% inefficiency in conveyance and application.

However, analysis of infrared satellite imagery does show ongoing cropping into the late dry season, albeit of a continuously decreasing area. The assumption is that what water is available in the Tanganda River gets used and that as the river flows decrease so does the irrigation activity. In reality, an analysis of historical infrared satellite imagery shows minimal irrigation activity occurring in the later dry season, with most activity curtailing around June, with some continuing into July. Figure 41 and Figure 42 exemplify this. The images are false colour composites where red and orange colours indicate active vegetation growth and greys and whites indicate a lack of vegetation activity. Surface water is usually black.

Table 17 Assumed Instantaneous Flow Rates Required for Bwerudza Irrigation Scheme

<b>Month</b>	<b>Irrigation Requirement (mm/month)</b>	<b>Flow rate at 10 hours irrigation/day (l/sec)</b>
Jan	42.1	101
Feb	33.7	81
Mar	39.4	95
Apr	80.3	193
May	70.2	169
Jun	53.9	130
Jul	66.7	161
Aug	88.4	213
Sep	110.7	266
Oct	120	289
Nov	77.9	188
Dec	47.8	115
<b>Total:</b>	<b>831.1</b>	



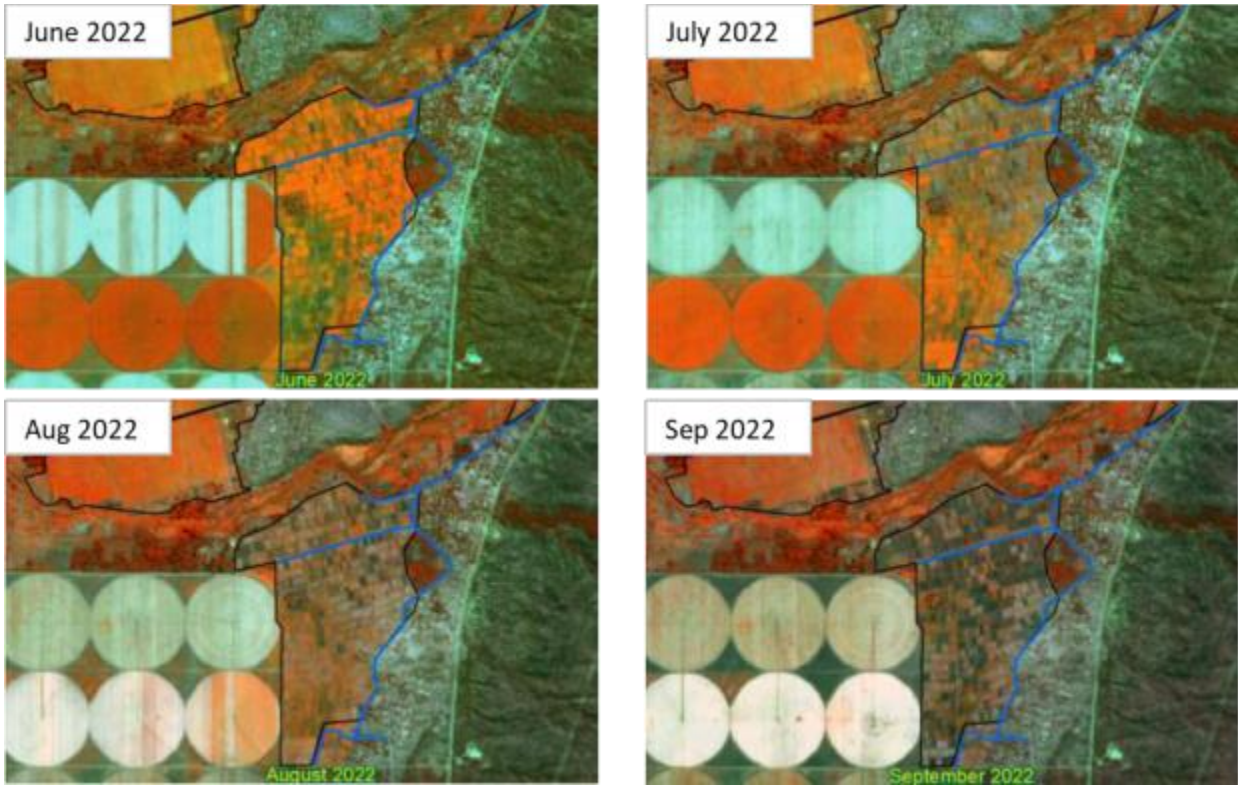


Figure 41: Bwerudza irrigation scheme, false colour composite (June to September 2022)

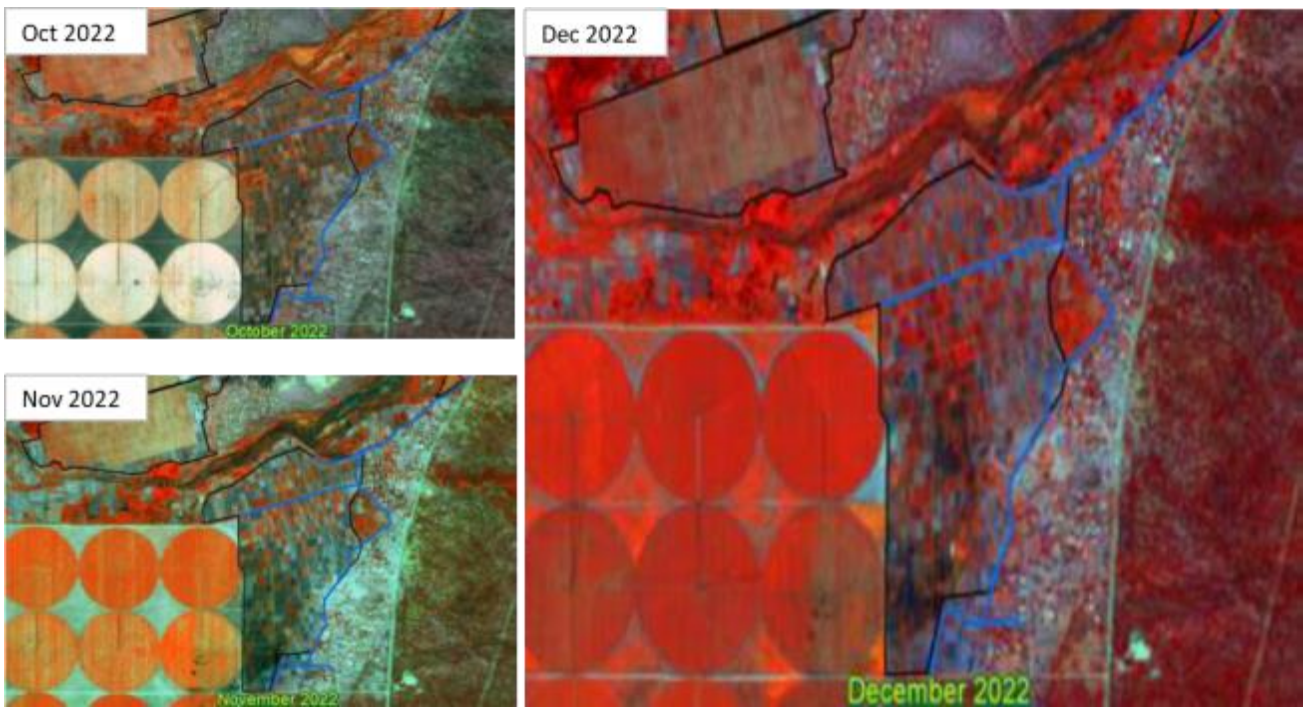


Figure 42: Bwerudza irrigation scheme, false colour composite (Oct to Dec 2022)

*New Year's Gift Estate:* The scheme lies approximately 20km east of the Mudzimwa scheme, in the upper Tanganda River catchment. This estate is a large-scale macadamia tree plantation with approximately 240ha of tree orchards. These orchards are irrigated directly from the Tanganda River using run-of-river flows. This irrigation directly reduces the river flows in the lower Tanganda. Figure 43 shows the macadamia plantations as well as the location of the estate relative to the rest of the catchment.

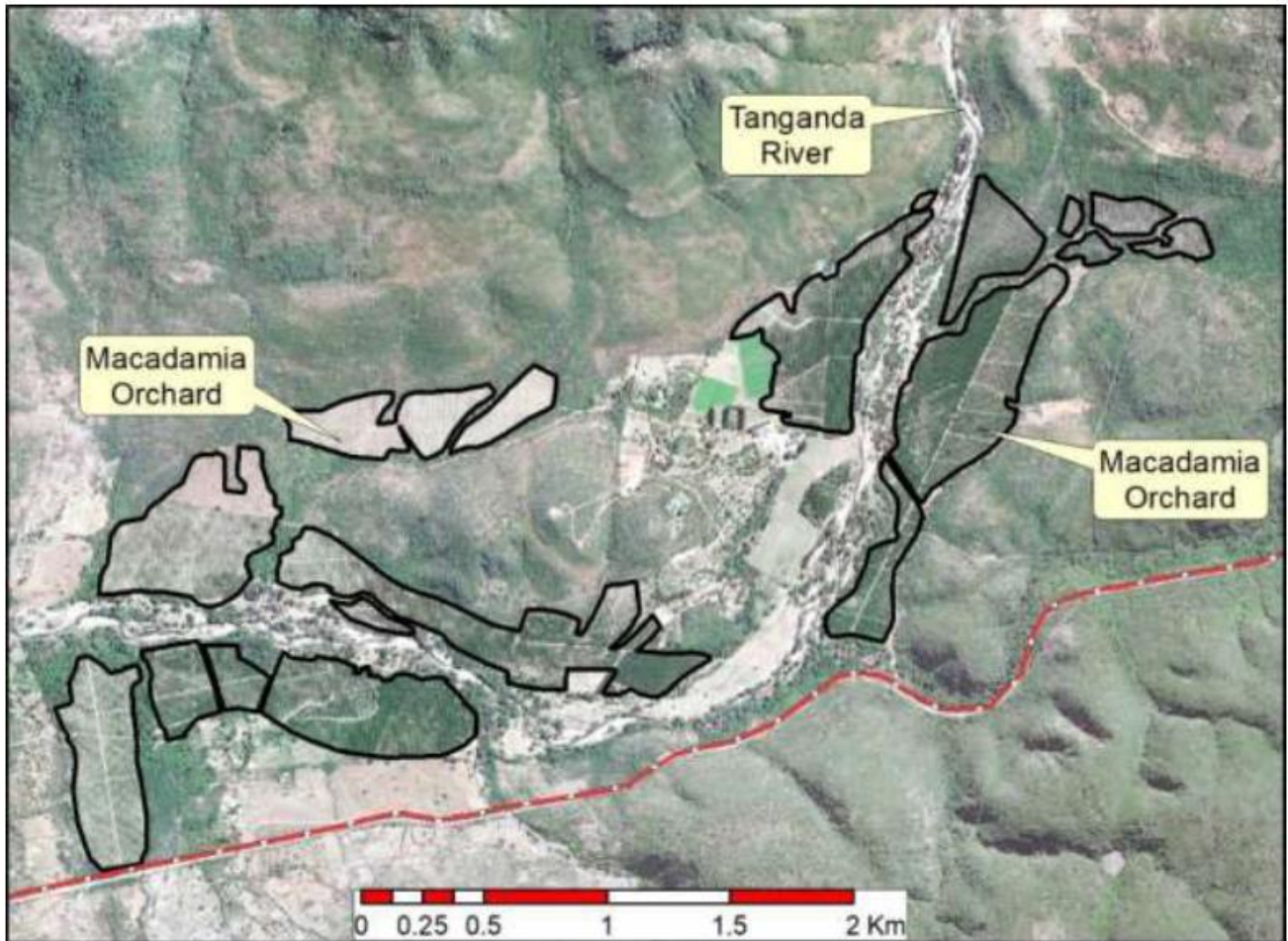


Figure 43: New Year's Gift Estate Macadamia Orchards

As with the Bwerudza scheme, an assessment of expected river abstractions needed to be made as these flows would not be available to downstream users. The catchment area of the Tanganda River upstream of the New Year's Gift abstraction point is approximately 115sq.km, or 47% of the upper Tanganda River catchment. The following irrigation abstractions were assumed for the estate, based on the FAO Cropwat irrigation scheduling model. These figures assume a 24-hour per day abstraction scenario as the presence of night storage dams implies that river abstraction is not limited to daylight hours. These figures assume a general efficiency of 80%. The Assumed annual irrigation requirement for New Year's Gift Estate is 796.1

Due to all these significant water users, there is potential for competition with respect to the use of this precious water resource especially during the dry season which may result in potential conflicts. The solution to this challenge involves the installing an efficient irrigation system that will maximise the use of the available water



resources. Climate proofing of the irrigation system through installing a highly water efficient drag horse irrigation system will help to promote water use efficiency resulting in minimising the risk of water use conflicts.

#### *4.11.4 Land tenure system*

Land surrounding the irrigation schemes is communally owned. Generally, households hold plots with sizes ranging from 1-5 ha. Present tenure relations in targeted schemes are governed by the Communal Land Act of 1982, according to which land is to be allocated only to persons who, according to the customary law of the community that has traditionally and continuously occupied land in the area concerned, are regarded as forming part of such community, or who, according to customary law, may be permitted to occupy or use such land. The land and all unimproved resources in the area are held in trust for communal area residents by local government, that is, Rural District Councils (RDCs).

Traditional leaders are not authorised by the Act to resolve disputes centred on land, as this right is the prerogative of RDCs, as specified in the Communal Land Act. According to the Communal Land Act, rights approved by a Rural District Council are not heritable or transferable in any other manner without the prior approval of the council. However, the underlying principle of land tenure is usufructuary rights, not private possession.

#### *4.11.5 Resettlement and displacement*

The construction and or revitalization of the targeted schemes will not result in any physical displacement of persons. No loss of private or public assets will result from the development of the schemes. The RDCs, local traditional leadership, political leadership, community land donors and targeted beneficiaries were consulted with respect to the development of the schemes. All the stakeholders are in support for the proposed developments.

#### *4.11.6 Land donation and plot allocation process*

The plot allocation process will be an inclusive process with the participation of all key stakeholders including land donors, community members, Irrigation Management Committees (IMCs), traditional leaders, local political leaders, relevant government departments, District Development Committees and the Rural District Council. As agreed in consultative meetings held so far, the land donors will be the primary beneficiaries followed by the local community members. The determination of individual plot sizes shall take into consideration inheritance matters as well as the land size to be donated. The Rural District Council (RDC) will provide leadership in the process of plot allocation. Separate discussions will be held with women and vulnerable groups to facilitate meaningful and inclusive participation.

The plot allocation and land donation issues will be monitored by the RDC, District Development Committee and AGRITEX. An impartial and effective grievance redress mechanism shall be rollout so that land donors and any other Project Affected Persons (PAPs) have access to a transparent, fair, and equitable mechanism that seeks to resolve their concerns or complaints in a timely manner should they arise. Relevant project information will be communicated to the PAPs at the right time in a language, format, and manner that is culturally appropriate, clear, and accessible to ensure transparency in the land transfer and allocation process. The voluntary land agreement forms are provided in Appendix 5. Future engagement processes shall be premised upon the following:

- **Access to information:** The stakeholder engagement process will ensure stakeholders have access to relevant project, and land transfer & allocation information. All the necessary information will be communicated to the PAPs at the right time in a language, format, and manner that is culturally appropriate, clear, and accessible to ensure transparency in the land transfer and allocation process.
- **Meaningful consultation with all relevant stakeholders:** The stakeholder consultation process shall be an ongoing and iterative throughout the project cycle. It will involve the voluntary participation of different categories of stakeholders which include land donors, targeted beneficiaries, Irrigation Management Committees (IMCs), traditional leaders, relevant government departments, Rural District Councils and Civil Society Groups. Different methods of consultations including interviews, focus group discussions and public meetings will be held to solicit the views of stakeholders.
- **Gender-responsivity and inclusivity:** Separate conversations will be held with women due to cultural norms which mostly provide them with less authority and mobility to participate in public meetings, and reporting requirements specified in the project's Gender Action Plan to ensure gender-disaggregated reporting for the land transfer & reallocation processes will be followed. Special transport arrangements will be made for the elderly and the disabled so that they can attend the stakeholder consultative meetings. Project Affected Persons (PAPs), in particular the land donors will be given sufficient time to express their views and follow up discussions will be held concerning the process of land transfer and allocation.
- **Accessible Grievance Redress Mechanism:** An impartial, effective grievance redress mechanism shall also be communicated and popularized in the project implementation areas so that PAPs have access to a transparent, fair, and equitable mechanism that seeks to resolve their concerns or complaints in a timely manner should they arise.
- **Compensation:** To compensate for the disturbance caused to landowners and ensure sufficient management of the negative impact caused, Land donors will be targeted as the primary beneficiaries to plot holding. However, the determination of plot sizes will be dynamic and variably applied taking into consideration inheritance matters as well as the land size to be donated. For instance, the land donor will be allocated a plot size that is proportionate to the size of land donated but not less than the minimum and not more than twice that which is allocated to non-land donors. The plot size allocation process will be transparent, inclusive and with effective participation of all the concerned stakeholders. With respect to inheritance, the constitution of the scheme will provide guidance on how such matters will be handled. Specific details on plot beneficiaries are provided in the land agreement forms.

#### *4.11.7 Training*

The Ministry of Small and Medium Enterprises and Cooperative Development is currently running training programmes in the country on how to run agricultural cooperatives. Targeted farmers also receive different types of training from the Department of Irrigation and AGRITEX. However, farmers still lack the skills to apply some principles to crop choices, marketing, cost calculations and overall profitability calculation. It is imperative the targeted farmers be trained on these principles.

#### *4.11.8 Education*

Table 18 shows the education level of the HH in all the schemes.





Table 18: Education level of the HH

Ward	Level of education of Household head						
	None	Primary level	ZJC	Ordinary level	Advanced level	Vocational training	Tertiary
Mhakwe	4%	35%	23%	36%	0	0	2%
Farai	2%	33%	16%	45%	1%	1%	2%
Musirizwi	3%	35%	19%	40%	0	0	3%
Vimbanayi	2%	33%	14%	46%	3%	1%	1%
Mudzimwa	1%	37%	24%	32%	1%	2%	3%

Analysis of data show that persons managing farming operations across the schemes are generally literate. They have attained at least some basic level of education. The high literacy level indicates that the beneficiaries are trainable on various irrigation practices including record keeping and management. However, some targeted trainings may be necessary for the illiterate group.

#### 4.11.9 Access to Agriculture Extension Services

Members of the irrigation schemes have access to extension services regardless of gender, social standing, age and physical abilities. In all the schemes, farmers will/ or are supported by an Agricultural Extension Officer (AEO) assigned through the Ministry of Agriculture, Lands, Water, Fisheries and Rural Development. The District Extension Officer is also available to support the AEOs.

#### 4.11.10 Financial issues

Farmers do not have access to loan schemes. Yields are very limited due to the effects of climate change such as prolonged dry spells. Most households within the sub-project areas raise income through selling produce from agriculture, remittances, fishing and sometimes mining.

#### 4.11.11 Ethnicity/language

The people living in project sites are mainly “shona” speaking, broadly from the Karanga, Manyika and Mandau dialects. There are Ndebele minority who came from Matabeleland in the area.

#### 4.11.12 Livelihoods

Agricultural production in the form of subsistence crop production and animal husbandry is the main source of livelihoods in all the targeted areas. The continuous failure of crops year after year due to the effects of climate change make their livelihoods vulnerable. Livestock rearing is mostly in the form of cattle and goat farming. Livestock production is challenged by the prevalence of terminal diseases such as January disease and droughts that destroy fodder and pastures. Most youths migrate to towns to seek employment. Other community members

are gainfully employed as teachers, nurses, shopkeepers etc. Table 19 shows the major sources of livelihoods in the areas.

Table 19: Sources of livelihoods

Source of income	Mhakwe	Farai	Musirizwi	Vimbanayi	Mudzimwa
Dryland crop	14.00%	41.00%	12.00%	8.00%	59.00%
Livestock production	6.00%	8.00%	6.00%	7.00%	11.00%
Casual labour	1.00%	1.00%	7.00%	4.00%	10.00%
Own business	3.00%	1.00%	2.00%	1.00%	3.00%
Remittances	8.00%	13.00%	4.00%	3.00%	12.00%
Cross boarder trading	1.00%	0.00%	2.00%	0.00%	1.00%
Petty trade	2.00%	16.00%	7.00%	1.00%	1.00%
Gathering natural products for sale	2.00%	9.00%	1.00%	4.00%	2.00%
Pension	1.00%	2.00%	0.00%	0.00%	0.00%
Begging assistance	0.00%	1.00%	0.00%	0.00%	0.00%
Gifts /donations	1.00%	5.00%	4.00%	5.00%	1.00%
Skilled trade	1.00%	2.00%	2.00%	3.00%	0.00%
Formal employment	0.00%	1.00%	0.00%	2.00%	0.00%
Irrigation crop production	60.00%	0.00%	52.00%	61.00%	0.00%
Rentals	0.00%	0.00%	1.00%	0.00%	0.00%
Artisan mining	0.00%	0.00%	0.00%	1.00%	0.00%

#### 4.11.13 Markets and Market linkages

Local markets exist within the communities. Marketing is always done as individuals and collectively in groups. Market exist in surrounding townships, nearby towns, schools, etc. Members of the scheme are linked to the markets through roads that lead to local business centres, schools, small scale miners and towns. The Government of Zimbabwe through the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development and its partners have developed a Kurima Mari App which comes in handy as it gives farmers contact details of agricultural inputs suppliers, agro-dealers dealers who buy or who can help in selling the farmer's produce and livestock. This app will be very useful in value chain development and marketing for the uplifting of marginal farmers. There is no need for internet or mobile data to use most of the functions on the app. The app can be used by anyone anywhere even in the most remote areas where there is no network coverage. The phone just needs battery to access all that vital information. Videos and podcasts can also be downloaded and viewed in the Kurima Mari App shown in Figure 44.

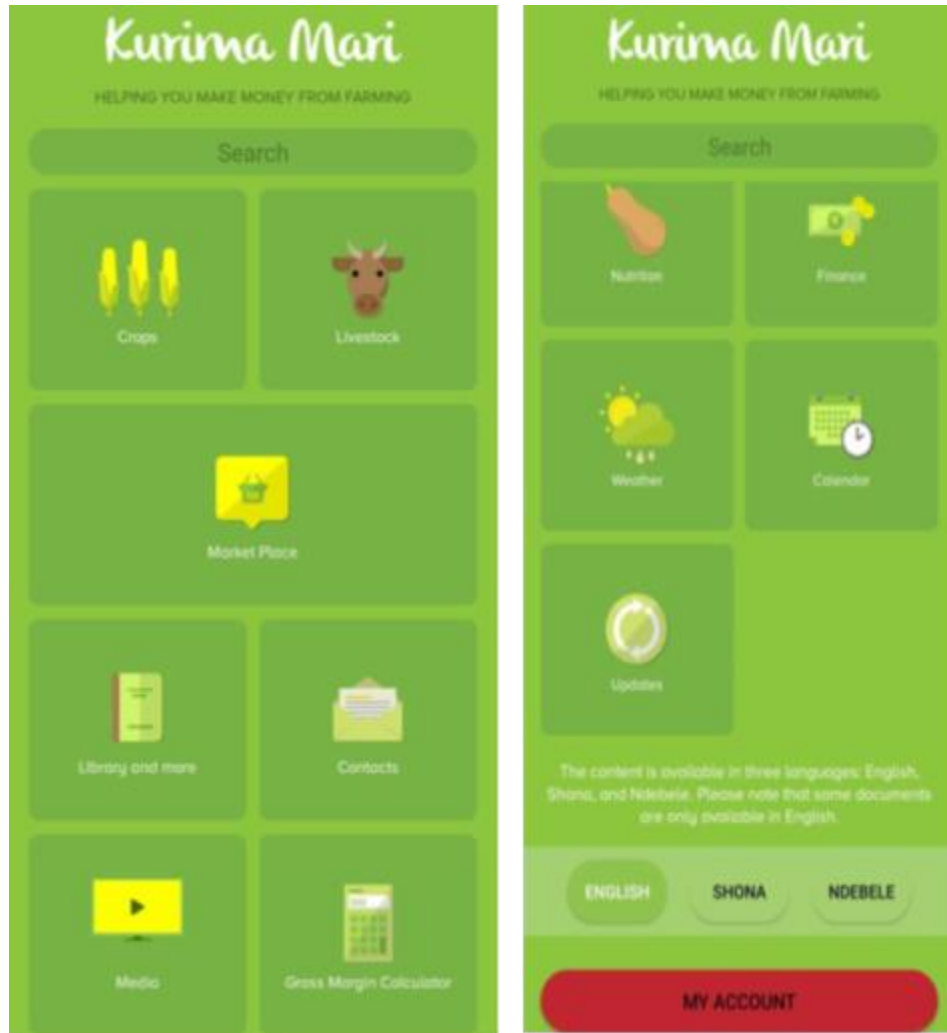


Figure 44: Kurima mari App

Farmers were given a platform to choose the crops that they were willing to grow. The AGRITEX officer participated in every group to provide guidance. An irrigation engineer and an Economist from the Ministry of Finance were also part of the group. Farmers were helped with crucial information that could guide in the choice of the crops. The reasons considered included, growing seasons, potential yields, pest and disease management needs, demand and availability of markets, market prices, handling, processing, contribution towards food security, water requirements, labour requirements, nutritional value, cultural considerations, Government policies, priorities and environmental considerations. The priority goes to “food security and generating income through high value crops and improved cash flow”.

#### 4.11.14 Health status and facilities

The sub-project sites are close to hospitals which provide medical care. Viral infections including flue and COVID-19, diarrhoea, HIV and sexually transmitted infections (STIs) are some of the diseases that are common in the area. Tuberculosis is also another common disease in the area. There are no incidences of malaria infections except for those whom would have visited malaria prone areas.



#### *4.11.15 Transport and communication*

Road is the main mode of transport in the project sites. Public buses, passenger vehicles, carts, motorbikes and bicycles are the road users. Sleighs are also used. Donkeys are widely used to carry goods and people too. ICTs are being embraced in the project area. There is a good coverage of telecommunication networks (Netone, Econet and Telecel) through which the public can access information from internet-based platforms. Social media is playing a pivotal role in information movement. Farmers get information through group communications. Television and radio broadcasts are other forms of communication in the area, and interpersonal channels are being used i.e. communicating through community leaders, farmer representatives and extension workers. It can be said that most important communication tools presented today is mass media because it is more effective and powerful on farmers for providing the new agricultural information. The Government of Zimbabwe undertake telecasting programmes designed and produced for current affairs like disease affecting crops and their remedies, requirement of fertilizers and pesticides, new techniques of harvesting of crops, market value of input and output of agro-products as well as machinery which affect agriculture and the farmers. Poor road network

#### *4.11.16 Gender Based Violence*

Gender based violence data was collected through interviews, group discussions and document review. The aim was to identify knowledge, attitudes and practices around GBV, services available, referrals, access challenges and prevalence rate of gender-based violence. Targets were community members and key informants, including multi-sectorial service providers, traditional and religious leaders. The target communities are well aware of Gender Based Violence (GBV) including Sexual Exploitation, Abuse and Harassment. It was noted that Government Departments and NGOs offer training and awareness campaign initiatives amongst farmers. The Department of Social welfare, Musasa Project and the Department of Women affairs have a record of providing training and awareness creation. Amongst other responsibilities, they monitor vulnerable women and children.

Gender based violence issues are handled differently by different players in the area. Some players provide awareness of gender responsive laws and services; the provision of health care, psychosocial support and legal aid to survivors of GBV; mobilizing men and young people to support gender equality; GBV prevention through community mobilization; and supporting GBV referral and coordination mechanisms at district and community level. The Musasa Project, Ministry of women affairs, and the Department of Social Welfare are working in area to prevent gender-based violence, to offer counselling and social and psychological support. Ward CCW officers deal with issues of GBV that affect children. Health facilities treat patients who are victims of GBV. They also offer counselling services. Community leaders, IMC offer support at the grass root level. Support groups also exist in the area. Churches play a role in behavioural moulding, counselling, and other support systems. Zimbabwe Republic Police (ZRP) offer policing services. They also have a section that deals with abuse and gender based violence.

## **5.0 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS**

### **5.1 Introduction**

The various components of the biophysical and socio-economic environment as described in previous sections are likely to be impacted upon as a result of the implementation of the sub-projects. The development of the irrigation schemes is expected to bring both positive and negative impacts of different magnitudes at different phases of development. This section identifies and analyses the likely adverse impacts and proposes the management options to avoid, minimize, mitigate and offset such impacts. The likely impacts are identified and analysed under four phases of development namely pre-construction, construction, operation and decommissioning. Impacts were analysed using the UNDP risk matrix (Refer to Table 3) which considers the following:

- Impact (e.g. consequences if the risk were to occur)
- Likelihood (e.g. the chance of the risk occurring)

### **5.2 Biophysical Impacts during the Pre-construction Phase**

The pre-construction phase will generate few negative impacts on the biophysical environment as shown in Table 20. The activities to be undertaken at the sites during the pre-construction phase are:

- topographic surveys
- geotechnical surveys
- soils surveys
- water quality sampling
- ecological assessments

The surveys could result in minor clearance of vegetation in cases where vegetation occurs along the line of sight and for placement of beacons. Localised digging would take place for sampling.

Table 20: Potential biophysical impacts during the pre-construction phase

Activity	Aspect	Impact	Likelihood rating	Level of impact Rating	Score	Significance of risk
Topographic surveys,	Vegetation clearance (Combined area to be cleared is very small <1 ha)	Loss of biodiversity	5	1	5	Low
		Loss of habitat	5	1	5	Low
	Digging during pegging	Loss of archaeological artefacts	2	1	2	Low
		Animal/ huma injuries	2	1	2	Low
Geotechnical surveys and soils surveys,	Generation of dust	Air pollution	2	1	2	Low
	Digging of pits	Injuries/death to animals traps	2	3	6	moderate
Water quality sampling	Collection of water samples	Disturbance of aquatic life	2	1	2	low
Collection of vegetation data	Reduction of the canopy cover of vegetation	By cutting out branches and leaves for identification	2	1	2	Low
Vehicle and machinery use	Generation of noise	Noise pollution	2	2	4	low
	Fuel usage	Resources depletion	5	1	5	Low
	Oil spills and leaks	Land/water pollution	2	2	4	Low
	Vehicle use leading to air emissions	Air pollution	5	1	5	Low

### **5.3 Biophysical Impacts during the Construction Phase**

Most of the biophysical impacts will be experienced during the construction phase and operational phase. During the construction phase there is a lot of movement to and from the site. The major activities associated with this phase which gives rise to biophysical impacts are as follows:

- Land clearing for setting up the irrigation equipment. In all schemes, there are activities already happening primarily through rain-fed agriculture, hence vegetation clearing will be very minimal
- Upgrading of the access roads
- Setting up of a site construction camps
- Haulage of construction materials and their storage
- Excavation for rising / pumping mains
- Borrowing of sand and gravel from borrow pits
- Extraction of river sand for construction
- Setting out and installation of the irrigation infield infrastructure and pipe network.
- Generation of waste materials from construction and domestic activities
- Movement of vehicles and operation of machinery
- Compaction of the soil

Table 21 provide the anticipated biophysical impacts during the construction stage.



Table 21: Potential biophysical impacts during the construction phase

Activity	Aspect	Impact	Likelihood Rating	Impact Rating	Significance Rating	Significance Rating
Setting out and determination of property boundaries	<ul style="list-style-type: none"> <li>Clearing of vegetation during surveying and setting out of the construction zones and property boundaries</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity loss</li> </ul>	5	1	5	Low
Collection of soil data- soil auguring and profiling	<ul style="list-style-type: none"> <li>By digging pits for profiling and by auguring</li> <li>Geotechnical surveys</li> </ul>	<ul style="list-style-type: none"> <li>Injury or death to animals</li> </ul>	5	1	5	Low
Archaeological impact assessment	<ul style="list-style-type: none"> <li>Trenching</li> </ul>	<ul style="list-style-type: none"> <li>Injury or death to animals</li> </ul>	5	1	5	Low
Siting of the proposed irrigation infrastructure	<ul style="list-style-type: none"> <li>Land clearing (But very limited)</li> </ul>	<ul style="list-style-type: none"> <li>Vegetation loss</li> </ul>	4	2	8	Moderate
	<ul style="list-style-type: none"> <li>Movement of labour</li> </ul>	<ul style="list-style-type: none"> <li>Soil compaction</li> </ul>	2	2	4	Low
Setting up of construction camps	<ul style="list-style-type: none"> <li>Opening of site to make way for structures</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity loss</li> </ul>	2	2	4	Low
Extraction of course aggregates, pit and river sand for use during construction	<ul style="list-style-type: none"> <li>Scarring of the land</li> </ul>	<ul style="list-style-type: none"> <li>Land and river bank degradation</li> <li>Unsightly landscape mutation</li> </ul>	5	2	10	Moderate
	<ul style="list-style-type: none"> <li>Destabilisation of the soil</li> </ul>	<ul style="list-style-type: none"> <li>Water quality degradation</li> </ul>	2	2	4	Low
	<ul style="list-style-type: none"> <li>Creation of borrow pits</li> </ul>	<ul style="list-style-type: none"> <li>Injuries to animals and human beings</li> </ul>	5	2	10	Moderate
	<ul style="list-style-type: none"> <li>Creation of borrow pits</li> </ul>	<ul style="list-style-type: none"> <li>Land degradation</li> </ul>	5	2	10	Moderate
	<ul style="list-style-type: none"> <li>Increased water runoff</li> </ul>	<ul style="list-style-type: none"> <li>Water pollution</li> </ul>	5	2	10	Moderate
Digging and laying out of the water supply and pipe network	<ul style="list-style-type: none"> <li>Digging</li> <li>Vegetation clearing</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion</li> </ul>	5	2	10	Moderate

Activity	Aspect	Impact	Likelihood Rating	Impact Rating	Significance Rating	Significance Rating
		<ul style="list-style-type: none"> <li>Vegetation loss</li> </ul>				
Domestic activities at the site camps	<ul style="list-style-type: none"> <li>Use of fire in cooking, lighting cigarette</li> </ul>	<ul style="list-style-type: none"> <li>Fire outbreaks resulting in loss of biodiversity, destruction of life and property due to fire breakouts</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Open defecation</li> </ul>	<ul style="list-style-type: none"> <li>Increased spread of diseases</li> </ul>	2	4	8	Moderate
	<ul style="list-style-type: none"> <li>Improper disposal of solid waste</li> </ul>	<ul style="list-style-type: none"> <li>Land pollution</li> </ul>	2	1	2	Low
Movement of vehicles and construction equipment	<ul style="list-style-type: none"> <li>Movement of vehicles</li> <li>Use of diesel and petrol</li> </ul>	<ul style="list-style-type: none"> <li>Contamination of surface and ground water from fuel leaks</li> <li>Loosening of soil and its subsequent washing away into streams</li> <li>Air pollution</li> <li>Water pollution</li> </ul>	3	3	9	Moderate
Solid waste generation and disposal	<ul style="list-style-type: none"> <li>Disposal of putrescible (biodegradable) domestic waste</li> <li>Disposal of non-putrescible construction waste especially paper and rubble</li> <li>Disposal/ spillage of hazardous waste such as paints</li> </ul>	<ul style="list-style-type: none"> <li>Littering, effect on aesthetics</li> <li>Pollution of soil and water resources</li> </ul>	3	2	6	Moderate
Hazardous substances releases	<ul style="list-style-type: none"> <li>Release of hazardous substances during construction (e.g. accidental spills and leaks) leading to soil, surface or groundwater contamination.</li> </ul>	<ul style="list-style-type: none"> <li>Water and soil pollution</li> </ul>	3	2	6	Moderate

Activity	Aspect	Impact	Likelihood Rating	Impact Rating	Significance Rating	Significance Rating
Excavation of trenches for irrigation infrastructure	<ul style="list-style-type: none"> <li>Excavations</li> <li>Movement of construction vehicles and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Soil disturbances, loosening of soils and their exposure to erosion</li> <li>Disturbing the soil profile.</li> <li>Loss of archaeological artefacts</li> <li>Dust and noise</li> </ul>	5	2	10	Moderate
Construction of the irrigation infrastructure and ablution facilities	<ul style="list-style-type: none"> <li>Vegetation clearing to make way for irrigation infrastructure. This will also result in the loss of habitats particularly for snakes and other small mammals in the area</li> <li>Creation of artificial surfaces</li> <li>The presence of artificial structures</li> </ul>	<ul style="list-style-type: none"> <li>Loss of vegetation and habitats</li> <li>Increase in storm water runoff</li> <li>Loss of aesthetic aspects associated with artificial structures</li> </ul>	3	2	6	Moderate
			4	2	8	Moderate
			2	2	4	Moderate
Land preparation and landscaping	<ul style="list-style-type: none"> <li>Soil disturbances</li> <li>Vegetation clearance</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion</li> <li>Loss of vegetation</li> </ul>	5	2	10	Moderate
Construction and maintenance	<ul style="list-style-type: none"> <li>Dust and emissions from construction and maintenance activities could affect human health, vegetation and wildlife.</li> </ul>	<ul style="list-style-type: none"> <li>Air pollution</li> </ul>	2	1	2	Low
Construction and maintenance	<ul style="list-style-type: none"> <li>Noise and vibration from construction and maintenance equipment, traffic and activities, may disturb sensitive noise receptors (human, fauna).</li> </ul>	<ul style="list-style-type: none"> <li>Noise and Vibration</li> </ul>	2	1	2	Low

#### **5.4 Biophysical Impacts during the Operational Phase**

Most of the project's biophysical impacts are confined to the construction phase. The anticipated biophysical impacts associated with the operation phase will emanate from the following activities

- Land preparation - land levelling, tillage
- Irrigating
- Application of natural and synthetic fertilisers
- Application of agrochemicals
- Weeding
- Harvesting
- Post-harvest processing
- Storage
- Transportation of inputs and produce

Table 22 summarises the anticipated biophysical impacts associated with the operation phase of the sub-projects.

#### **5.5 Biophysical impacts during the decommissioning phase**

Decommissioning of the scheme is anticipated to take place when there is serious breakdown of critical systems and irrigation infrastructure. Table 23 summarises the anticipated biophysical impacts associated with the decommissioning phase of the sub-projects.

#### **5.7 Socio-economic impacts during all phases of Project development**

Table 24 show the socio-economic impacts at all development phases of the sub-projects



Table 22: Potential biophysical impacts during the operational phase

Activity	Aspect	Impact	Likelihood	Impact rating	Score	Significance of risk
Land preparation & Land leveling	<ul style="list-style-type: none"> <li>Loosening of soil by use of machinery</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion</li> <li>Sedimentation and siltation of rivers</li> </ul>	5	2	10	Moderate
Land tillage	<ul style="list-style-type: none"> <li>Loosening of soil.</li> </ul>	<ul style="list-style-type: none"> <li>Soil erosion</li> <li>Sedimentation and siltation of rivers</li> </ul>	5	2	10	Moderate
Soil fertility management	<ul style="list-style-type: none"> <li>Altering chemical components of the soil due to fertilizer application</li> </ul>	<ul style="list-style-type: none"> <li>Soil pollution</li> <li>Salinization</li> <li>Water pollution</li> </ul>	5	2	10	Moderate
Surface water management	<ul style="list-style-type: none"> <li>Tilling and land utilisation</li> </ul>	<ul style="list-style-type: none"> <li>Sedimentation &amp; siltation of dams</li> <li>Pollution of surface water from agricultural activities</li> </ul>	5	2	10	Moderate
Irrigation of crops	<ul style="list-style-type: none"> <li>Water use</li> <li>Excessive irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Depletion of water resources</li> <li>waterlogging</li> </ul>	4	2	8	Moderate
	<ul style="list-style-type: none"> <li>poor-quality water</li> </ul>	<ul style="list-style-type: none"> <li>Salinization of soils</li> </ul>	3	3	9	Moderate
Weeds, pest and disease control	<ul style="list-style-type: none"> <li>Application of pesticides, herbicides, weedicides and insecticides</li> </ul>	<ul style="list-style-type: none"> <li>Soil pollution,</li> <li>Water pollution</li> <li>Destruction of biodiversity</li> <li>Chemical exposures</li> <li>Generation of aerosols</li> </ul>	3	3	9	Moderate
Waste management	<ul style="list-style-type: none"> <li>Generation Disposal of plastic waste, packaging material for fertilizers, seeds, agrochemicals and</li> <li>Disposal of decomposed farm produce</li> <li>Burning of crop residues</li> </ul>	<ul style="list-style-type: none"> <li>Land pollution</li> <li>water pollution</li> <li>soil pollution</li> <li>biodiversity loss</li> </ul>	3	2	6	Low

Activity	Aspect	Impact	Likelihood	Impact rating	Score	Significance of risk
Transportation of materials	<ul style="list-style-type: none"> <li>• Use of vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Air pollution</li> </ul>	3	2	6	Low
Land tillage and transportation of materials	<ul style="list-style-type: none"> <li>• Use of machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Noise and vibration</li> </ul>	3	2	6	Low
	<ul style="list-style-type: none"> <li>• Use of vehicles and machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Soil and water pollution from oil leaks</li> </ul>	3	2	6	Low
	<ul style="list-style-type: none"> <li>• Use of vehicles and machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Accidents</li> </ul>	3	2	6	Low
Land clearing	<ul style="list-style-type: none"> <li>• Clearing of vegetation may result in introduction of invasive alien species</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction of invasive species</li> </ul>	5	2	10	Moderate

Table 23: Biophysical impacts at decommissioning phase

Activity	Aspect	Impact	Likelihood	Impact rating	Score	Significance of risk
Demolition of structures	<ul style="list-style-type: none"> <li>• Generation of debris</li> <li>• Noise generation</li> </ul>	<ul style="list-style-type: none"> <li>• Land pollution</li> <li>• Noise Pollution</li> </ul>	1	1	1	Low
			3	1	3	Low
Vehicle movement	<ul style="list-style-type: none"> <li>• Vehicles emissions, noise generation</li> <li>• Dust generation</li> <li>• Fuel usage</li> </ul>	<ul style="list-style-type: none"> <li>• Air, water and noise pollution</li> <li>• Depletion of natural resources</li> </ul>	3	1	3	Low
			4	1	4	Low
Removal of irrigation equipment	<ul style="list-style-type: none"> <li>• Excavation to remove buried pipes</li> <li>• Loosening of soils</li> <li>• Generation of dust</li> </ul>	<ul style="list-style-type: none"> <li>• Accidents and Incidents</li> <li>• Air pollution</li> <li>• Soil erosion</li> </ul>	3	1	3	Low

Table 24: Socio-economic impacts at all phases of development

Activity	Impact	Impact rating	Likelihood	Score	Significance
Construction or agricultural development	<ul style="list-style-type: none"> <li>Displacement or damage to cultural heritage by construction activities, harm to local setting, amenity value, etc. due to construction or agricultural development e.g. the damage to graves at Musirizwi schemes</li> </ul>	4	2	8	Moderate
	<ul style="list-style-type: none"> <li>Change to intangible cultural heritage due to increased access, and interaction with workforce</li> </ul>	2	2	4	Low
Labour Influx resulting in Interaction between workforce and local communities	<ul style="list-style-type: none"> <li>Labour influx may lead to sexual exploitation, abuse and harassment (SEAH) of women and girls</li> </ul>	5	2	10	Moderate
	<ul style="list-style-type: none"> <li>Increased occurrence of communicable diseases, including HIV/AIDS and sexually transmitted Infections (STDs) and COVID-19 infections</li> </ul>	3	2	6	Low
Employment creation and increased productivity	<ul style="list-style-type: none"> <li>An increase of women's income (through project-sponsored activities) and other empowerment interventions may result in gender-based violence in some households.</li> </ul>	3	3	9	Moderate
Construction and maintenance	<ul style="list-style-type: none"> <li>Poor construction management practices may lead to adverse effects on safety, human health and wellbeing.</li> </ul>	3	3	9	Moderate
Water irrigation	<ul style="list-style-type: none"> <li>Changes in exposure to water borne and water related diseases, especially those associated with water dwelling disease vectors (new areas of standing water created) or poor sanitary conditions.</li> </ul>	3	3	9	Moderate
Poor working conditions	<ul style="list-style-type: none"> <li>Poor management of occupational health and safety leading to accidents, injuries and illnesses among workers (e.g. risks of working close to water); mental health issues due to remote or enclosed living.</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Differences in nationality, ethnicity, religion, etc. may lead to discrimination and harassment, and differences (perceived or real) in working conditions between workers may lead to resentment.</li> </ul>	5	2	10	Moderate



Activity	Impact	Impact rating	Likelihood	Score	Significance
In-migration	<ul style="list-style-type: none"> <li>Individuals are likely to migrate into the area which may cause conflict with resident communities and put pressure on resources and infrastructure.</li> </ul>	2	2	4	Low
Workforce-Community Interactions	<ul style="list-style-type: none"> <li>Real or perceived disruption to normal community life, through the physical presence of a workforce; in particular, potential for conflicts to occur over water use.</li> </ul>	2	2	4	Low
Economic Development and Employment	<ul style="list-style-type: none"> <li>Direct employment of local population in workforce, and stimulation of local economy through demand for goods and services will enhance livelihoods and economic activity in local communities; potential for adverse effects if expectations not met and community relations are not well managed.</li> </ul>	2	2	4	Low
Impoverishment of land donors	<ul style="list-style-type: none"> <li>As land is acquired, some affected members lose part or all of their land to irrigation (<b>e.g., Musirizwi and Mudzimwa irrigation schemes</b>)</li> </ul>	5	2	10	Moderate
Conflicts	<ul style="list-style-type: none"> <li>Conflicts over plot allocation</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Conflict with non-irrigation scheme members over water for livestock and domestic uses</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Conflict over irrigation management leadership selection (Irrigation Management Committee appointment)</li> </ul>	2	3	6	Low
	<ul style="list-style-type: none"> <li>Inequality and competition over water sharing among irrigation members</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Conflicts from allocation of inputs amongst members</li> </ul>	3	3	9	Moderate
	<ul style="list-style-type: none"> <li>Conflicts between upstream and downstream users over water use.</li> </ul>	3	3	9	Moderate
Theft of agricultural products and irrigation equipment	<ul style="list-style-type: none"> <li>Loss of agricultural produce</li> <li>Disruption of operations leading to poor yields</li> </ul>	2	2	4	low
Human animal conflicts	<ul style="list-style-type: none"> <li>Destruction of crops by animals in the scheme</li> </ul>	2	2	4	low

## 5.8 Positive Environmental and Social impacts

The identified positive environmental and social impacts are presented in Table 25.

Table 25: Positive Environmental and Social Impacts

Impact	Source of Impact	Enhancement Measure	Responsible Agent
Enhanced Agricultural Production	Irrigated agriculture improves crop water availability leading to crop success.	<ul style="list-style-type: none"> <li>Practice crop diversification</li> <li>Improve access to inputs</li> <li>Provide training on agribusiness</li> <li>Enhance access to markets</li> </ul>	<ul style="list-style-type: none"> <li>FARMERS</li> <li>AGRITEX</li> <li>DOIR</li> </ul>
Increased food and nutrition security and income	Farming throughout the year, high yields.	<ul style="list-style-type: none"> <li>Practice crop diversification</li> <li>Improve access to inputs</li> <li>Provide training on agribusiness</li> <li>Enhance access to markets</li> </ul>	<ul style="list-style-type: none"> <li>FARMERS</li> <li>AGRITEX</li> <li>DOIR</li> </ul>
Creation of employment opportunities	During construction During the operational phase	<ul style="list-style-type: none"> <li>Prioritize employment of locals</li> <li>Competitive salaries</li> <li>Better working conditions</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>DOIR</li> <li>AGRITEX</li> <li>FARMERS</li> </ul>
Increased water availability for agricultural development	climate proofed optimizes the use of water	<ul style="list-style-type: none"> <li>System maintenance</li> <li>Promote water conservation methods of farming to ensure that enough water is available all the time.</li> </ul>	<ul style="list-style-type: none"> <li>FARMERS</li> <li>DOIR</li> </ul>
Reduced pressure on grazing land, improved animal health	Increased fodder production will result in reduced pressure on grazing land	<ul style="list-style-type: none"> <li>Provide relevant training</li> <li>Provide equipment maintenance support</li> </ul>	<ul style="list-style-type: none"> <li>DOIR</li> <li>AGRITEX</li> </ul>
Enhanced knowledge and skills on better agronomic practices	Training from DOI, AGRITEX, MUSASA PROJECT	<ul style="list-style-type: none"> <li>Periodic training</li> </ul>	<ul style="list-style-type: none"> <li>Musasa project. Social services department</li> <li>AGRITEX</li> <li>DOIR</li> </ul>

Impact	Source of Impact	Enhancement Measure	Responsible Agent
Improved knowledge base of the beneficiaries	Training of beneficiaries may lead to enhanced capacity in the deployment of the technologies required to improve production and support project management	<ul style="list-style-type: none"> <li>• Periodically review and implement the capacity building plan</li> </ul>	<ul style="list-style-type: none"> <li>• DOIR</li> <li>• AGRITEX</li> <li>• EMA</li> </ul>

## **6.0 ENVIRONMENTAL & SOCIAL IMPACT MANAGEMENT PLAN**

This section describes the mitigation and management measures to be implemented during the sub-project development to manage and prevent where possible the environmental and social impacts. These mitigation measures are outlined in this report according to their phase of implementation to allow for ease of reference and prioritisation of actions. Table 26 provides a summary of these impacts and mitigation measures.



Table 26: Environmental and Social Management Plan

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
<b>PRE-CONSTRUCTION &amp; CONSTRUCTION PHASE</b>						
Aesthetics	Loss of aesthetics as most areas will be opened up due to clearance of vegetation (e.g Mudzimwa)	<ul style="list-style-type: none"> <li>Only vegetation in areas directly affected by proposed Irrigation Schemes activities will be cleared.</li> <li>Revegetation of disturbed areas</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>Farmers</li> </ul>	1000.00
Land	Seeding of land by the community land donors may lead to their impoverishment	<ul style="list-style-type: none"> <li>Ensure that land donors are the primary beneficiaries during the process of plot allocation.</li> <li>Ensure that the land donors get plot size that is commensurate to the size they have donated as may be agreed by all stakeholders.</li> <li>Ensure meaningful consultation is conducted in good faith with all potential land donors.</li> <li>Ensure that the land donors have access to a fair system of grievance redress,</li> <li>Implement a system for project monitoring and reporting</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>MLAWFRD</li> <li>IMC</li> <li>RDC</li> <li>PMU</li> <li>AGRITEX</li> </ul>	1000.00
	Cleared vegetation will expose soils to erosion processes	<ul style="list-style-type: none"> <li>Confine clearing to project site</li> <li>Careful planning of phasing and timing of construction activities.</li> <li>Clearing shall be restricted to the proposed work site and routes only to allow smaller birds, mammals, reptiles an opportunity to migrate into undisturbed areas close to their similar habitats.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>Farmers</li> </ul>	0.00
	Leaks of oil, fuel, hydraulic fluid from the	<ul style="list-style-type: none"> <li>Servicing of vehicle to be done at approved dealers with proper containment facilities</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	5000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
	construction machinery may contaminate soils	<ul style="list-style-type: none"> <li>Regular inspections of vehicles, mobile equipment and machinery to check for oil and fuel leaks</li> <li>Provide drip trays to stationary vehicle and machinery to prevent drips and small leaks onto the ground.</li> <li>Develop and implement the spill prevention control procedure</li> </ul>				
Land	Waste from camp sites and irrigation scheme leading to land pollution	<ul style="list-style-type: none"> <li>Apply the waste management hierarchy (Avoid, Reduce, Re-use and Recycle)</li> <li>Encourage waste segregation and provide designated waste bins</li> <li>Use construction waste such as rubbles to rehabilitate any open pits created during the construction period;</li> <li>Provide training on waste management</li> <li>Erect waste management signage at suitable sites</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>Farmers</li> </ul>	2000.00
Surface and Ground Water	Leaks of oil, fuel, hydraulic fluid from the construction machinery may contaminate local water resources	<ul style="list-style-type: none"> <li>Use of machines which are in good condition</li> <li>Maintenance of vehicles to be done by approved dealers with proper facilities</li> <li>Servicing of equipment to be done on facilities that are contained (oil interceptors and lining)</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	5000.00
Air Quality	Movements of machinery around the cleared sites will generate dust and exhaust fumes.	<ul style="list-style-type: none"> <li>Application of dust control measures such as reducing traffic movements and water sprinkling on exposed areas to reduce dust.</li> <li>Land clearing, removal of topsoil and excess materials, location of haul roads, tips and stockpiles should be planned with due consideration to meteorological factors (e.g. precipitation, temperature, wind direction, and speed) and location of sensitive receptors.</li> <li>Conduct personal dust monitoring at all working sites</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	5000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>Vehicles should be in good working condition and be regularly serviced to reduce on exhaust fumes.</li> <li>Avoid operations during heavy winds</li> <li>Provide employees with adequate Personal Protective Equipment (PPE)</li> <li>Implement speed controls</li> </ul>				
Flora and Fauna	Impacts on habitats and species from habitat alteration and degradation	<ul style="list-style-type: none"> <li>Only vegetation in areas directly affected by proposed scheme infrastructure and activities will be cleared.</li> <li>Habitat rehabilitation and ecosystem restoration of areas no longer required to occur as soon as possible after construction.</li> <li>Put in place wildlife management initiatives in the buffer zone such as CAMPFIRE for the communities to preserve wildlife whilst earning income from tourist activities.</li> <li>Incentivize the protection and conservation of natural forests and their ecosystem services, and enhance other social and environmental benefits</li> <li>Clear all the invasive species in line with national guidelines for the control of invasive species</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>Farmers</li> </ul>	5000.00
Noise and Vibrations	Earthmoving machinery operations will cause increased noise and vibrations.	<ul style="list-style-type: none"> <li>Natural vegetation and topography will be maintained to prevent any unwanted noise from reaching the nearby communities.</li> <li>Vehicle and machinery must be well serviced</li> <li>Road route selection and siting of construction facilities accompanied where necessary by noise attenuation measures.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	3000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>• Conduct risks assessments prior to any possible blasting operations during excavation and trenching.</li> <li>• Implement speed limit controls</li> <li>• Stationary vehicles and machines must be switched off at all times</li> <li>• Provide adequate PPE such as ear muffs</li> </ul>				
Cultural Heritage	<p>Impact on graves at Musirizwi irrigation scheme</p> <p>Displacement or damage to cultural heritage sites by construction activities, harm to local setting, amenity value, etc. due to construction</p> <p>Change to intangible cultural heritage due to increased access, and interaction with workforce</p>	<ul style="list-style-type: none"> <li>• Identified graves must be fenced off during construction as was proposed by the relatives and traditional leaders</li> <li>• Careful site selection and siting of all project components, taking account of community consultation/specialist surveys i.e. the design of the irrigation technology shall ensure that that the graves are not tempered with</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• MLAWFRD</li> </ul>	2000.00
	<p>The loss of tangible forms of cultural and archaeological importance during site clearance.</p>	<ul style="list-style-type: none"> <li>• Newly discovered forms/material of cultural and archaeological importance will be reported following the chance find procedure provided as Appendix 2</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Ministry of Lands, Agriculture, Fisheries, Water and Rural Development</li> </ul>	0.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Health and Safety	Injury or death to contract worker(s) or local community member (s) at construction site  Road traffic accidents	<ul style="list-style-type: none"> <li>• Conduct Hazard Identification and Risk Assessment for all work sites and implement suitable management controls following the risk mitigation hierarchy (e.g. elimination, substitution, engineering control, administrative control, and PPE)</li> <li>• Implement good “housekeeping” and management procedures;</li> <li>• Implement Emergency Preparedness and Response Plan which include provision of first aid response equipment and the related trainings</li> <li>• Provide training and regular maintenance of machinery and equipment;</li> <li>• Provide training on road safety</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	1000.00
	Increased spread of STIs and HIV & AIDS	<ul style="list-style-type: none"> <li>• Implementation of a health management system for the construction workforce, to ensure it is fit for work</li> <li>• Development of workplace policy on HIV &amp; AIDS in line with the national policy and legislation and making it known to all.</li> <li>• Training and awareness raising for workforce on HIV/AIDS and other STDs, and communicable diseases; health awareness raising campaigns for communities on similar topics.</li> <li>• Promoting condom use and respect for sexual rights.</li> <li>• Provision of voluntary counselling and testing and treatment services.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• PMU</li> <li>• MLAWFRD</li> </ul>	1000.00
	Increased spread of Covid 19 infections	<ul style="list-style-type: none"> <li>• Practicing social distancing</li> <li>• Improved personal hygiene</li> <li>• Wearing of face masks</li> <li>• Daily temperature screening</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• PMU</li> <li>• MLAFWRD</li> </ul>	1000.00



Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>Providing COVID-19 awareness training to contractors and farmers</li> </ul>				
	General Safety	<ul style="list-style-type: none"> <li>Erect warning signposts around the proposed irrigation schemes construction sites.</li> <li>A perimeter security fence will be erected around the proposed scheme for protection against unauthorised entry.</li> <li>Security personnel will be employed for protection against unauthorised entry.</li> <li>Flood light provision for night work lighting and security</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>MLAFWRD</li> </ul>	50000.00
Procurement Activities	Procurement of local goods and services for development of irrigation system and workforce could deplete resources available for local communities.	<ul style="list-style-type: none"> <li>Procedures for sustainable local procurement, in consultation with local authorities and community leaders.</li> <li>Local capacity building to foster community resilience.</li> <li>Monitoring of local prices; exploration of corrective measures (e.g. alternative sourcing) if appropriate.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>PMU</li> </ul>	0.00
Sexual Misconduct	Influx of workers to the project implementation areas and their potential interaction with women and girls may lead to Sexual Exploitation, Abuse and Harassment (SEAH) of women and girls	<ul style="list-style-type: none"> <li>Implement the code of conduct on SEAH to be signed by Project personnel and contractor workers</li> <li>Awareness training on the issues associated with sexual exploitation shall be provided with the help of Ministry of Woman Affairs.</li> <li>Formulation and operation of project GRM</li> <li>Empower women and girl child with more responsibilities in the irrigation scheme.</li> <li>Encourage counselling and support group sessions</li> <li>Report any act of sexual misconduct to project disciplinary committee and to the police.</li> <li>Investigation any sexual exploitation cases reported.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>PMU</li> </ul>	1000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Gender Based Violence	An increase of women's income (through project-sponsored activities) could lead to gender-based violence in some households.	<ul style="list-style-type: none"> <li>• Conduct awareness and sensitization sessions through platforms such as Farmer Field Schools (FFS)</li> <li>• Implement the Project GRM</li> <li>• Investigation of GBV cases reported</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Victim,</li> <li>• PMU</li> <li>• ZRP</li> </ul>	1000.00
Labour and Working Conditions	<ul style="list-style-type: none"> <li>• Poor management of occupational health and safety leading to accidents, injuries and illnesses among workers (e.g. risks of working close to water); mental health issues due to remote or enclosed living.</li> <li>• Differences in nationality, ethnicity, religion, etc. may lead to discrimination and harassment, and differences (perceived or real) in working conditions between workers may lead to resentment.</li> </ul>	<ul style="list-style-type: none"> <li>• Employment practices and working conditions should conform to International Labour Organisation (ILO) Standards and national regulations.</li> <li>• Reduce labour influx by tapping into the local workforce;</li> <li>• Promotion of fair and equitable labour practices for the fair treatment, non-discrimination, equitable worker opportunities, minimum wage and prohibition of employment of children in line with the Employment Act;</li> <li>• Ensure work contracts provide terms and conditions of employment which stipulate among other things working hours, rest hours, remuneration, intervals at which remuneration will be paid, working hours, provision of termination and disciplinary rules applicable to employees in line with national labour laws</li> <li>• Establishment, management and promotion of a healthy, management-worker relationship;</li> <li>• Promotion of health, safe, secure and comfortable accommodation that does not impact negatively on the employees and the communities in the surrounding areas; and</li> <li>• Protection of workers' rights including migrants and third-party workers in line with Labour Laws</li> <li>• Clear and comprehensive health and safety reporting and grievance procedure system should be established, and be freely available to all of the workforce</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>• Contractor-</li> <li>• Labour Officer</li> </ul>	1000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>Ensure that worker organisations/representatives are established</li> </ul>				
Child Labor & Safety	Construction activities may result in risk of child labor	<ul style="list-style-type: none"> <li>Implement recruitment Policy in line with labour laws and international standards</li> <li>Conduct risk assessment of all construction activities and identify risks management options</li> <li>Child safety training</li> <li>Reference Checking &amp; Pre-screening interviews</li> <li>Criminal History checks</li> <li>Working with children checks</li> <li>Probation period &amp; Code of Conduct</li> <li>Implement Project GRM</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> <li>PMU</li> </ul>	1000.00
Workforce-Community Interactions	Real or perceived disruption to normal community life, through the physical presence of a workforce; in particular, potential for conflicts to occur over water use.	<ul style="list-style-type: none"> <li>Adoption of a Stakeholder Engagement Plan, as a framework for early and ongoing community consultation.</li> <li>Implementation of a Grievance Procedure (see Grievance Procedure and Redress Mechanisms</li> <li>Works procedures, defining a Code of Appropriate Conduct for all workers, including acceptable behaviour with respect to community interactions.</li> <li>Adoption of a Sustainable Water Management Plan, which takes existing community usage into consideration.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	1000.00
<b>OPERATIONAL PHASE</b>						
Soil and Water	Application of fertilizers, herbicides and insecticides leading to soil and water pollution	<ul style="list-style-type: none"> <li>Practice integrated pest/vector management programme</li> <li>Avoid use of products that fall in Classes Ia (extremely hazardous) and Ib (highly hazardous) of the WHO Recommended Classification of Pesticides by Hazard</li> <li>Use only approved pesticides and avoid the use of banned pesticides</li> <li>Ensure that pesticides are handled, stored, applied and disposed of in accordance with FAO International Code of Conduct on the Distribution and Use of Pesticides</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>IMC</li> <li>MLAFWRD</li> <li>FARMERS</li> <li>AGRITEX</li> </ul>	2000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>• Training of farmers on safe handling, storage, use and disposal of agrochemicals</li> <li>• Testing the soil for pesticides residues</li> <li>• Chemical warehouses/stores should be situated from water sources as well as livestock and food storage areas.</li> <li>• Ensure products are stored in their original packaging;</li> <li>• Regular inspection of stored products to ensure their condition</li> <li>• Keep SDS at appropriate locations in storage facilities</li> <li>• Ensure chemical stores have appropriate ventilation</li> <li>• Use of mechanical weed control such as ridging, hand hoes.</li> <li>• Good crop husbandry methods including early planting, early harvesting.</li> </ul>				
	Vegetation clearing leading to soil erosion.	<ul style="list-style-type: none"> <li>• Confine clearing to project site</li> <li>• Careful planning of phasing and timing of construction activities.</li> <li>• Clearing shall be restricted to the proposed work site and routes only to allow smaller birds, mammals, reptiles an opportunity to migrate into undisturbed areas close to their similar habitats.</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>• IMC</li> <li>• MLAFWRD,</li> </ul>	0.00
	Physical and Chemical degradation of the soil.	<ul style="list-style-type: none"> <li>• Incorporate nitrogen-fixing legume crop plants and cover crops in the cropping cycle</li> <li>• Draw up balanced fertilizer programs for each soil management unit based on soil fertility results.</li> <li>• Conduct periodic soil analysis to detect changes in soil fertility.</li> <li>• Provide farmers with training in nutrient management.</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>• Farmers</li> <li>• AGRITEX</li> </ul>	5000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Fauna and flora	Loss, fragmentation and degradation of habitat, and severance of animal migration routes and pathways	<ul style="list-style-type: none"> <li>Careful siting of all project components, with advice from biodiversity authorities/wildlife specialists.</li> <li>Rehabilitation of cleared areas with native species, and ecosystem restoration in habitats of conservation value, using specialist advice and input so as to maintain the integrity of the habitat, backed up by a long-term monitoring programme and corrective actions as necessary.</li> <li>Clearing shall be restricted to the proposed work site and routes only to allow smaller birds, mammals, reptiles an opportunity to migrate into undisturbed areas close to their similar habitats.</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>Forestry Commission</li> <li>FARMERS</li> </ul>	1000.00
	Introduction of invasive species leading to biodiversity loss	<ul style="list-style-type: none"> <li>Use of certified seeds</li> <li>Sourcing planting material from reliable suppliers</li> <li>Clear invasive species using mechanical or physical means</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>Farmers</li> <li>MLAFWRD</li> </ul>	1000.00
Soil resources	Sedimentation and siltation of rivers due to erosion	<ul style="list-style-type: none"> <li>Construction of storm diversion drains or barrages</li> <li>Construction of contour ridges</li> <li>Construction of silt checks</li> <li>Construction of gabion retaining walls and riverbank training</li> <li>Construction of gabion checks to reduce flow velocities</li> <li>No cultivation within the buffer zones.</li> <li>Training of famers on soil erosion control, management of gullies, watershed protection and sustainable land use</li> <li>Afforestation program of the catchment areas</li> <li>Use of water efficient irrigations systems to reduce the risk of erosion</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>FARMERS</li> <li>ZINWA</li> <li>EMA</li> <li>DOIR</li> <li>PMU</li> <li>IMC</li> <li>AGRITEX</li> </ul>	2000.00



Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Water resources	Depletion of water resources	<p>Promote water use efficient practices e.g.</p> <ul style="list-style-type: none"> <li>• Determine crop water requirements based on local and internationally recognized guidelines to avoid over irrigation</li> <li>• Adopt climate-smart crop value chains to minimize significant water usage.</li> <li>• Develop and implement irrigation scheduling</li> <li>• Adopt water conservation practices such as mulching</li> <li>• Install water efficient irrigation technologies such as the drag horse irrigation system</li> <li>• Conduct inspections of water irrigation infrastructure to detect any possible leakages and attend to them promptly</li> <li>• Provide training on irrigation operation and maintenance</li> <li>• Conduct periodic environmental flow analysis</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>• DOI</li> <li>• IMC</li> <li>• FARMER</li> <li>• ZINWA</li> <li>• AGRITEX</li> </ul>	5000.00
	Leaks of oil, fuel, contaminate local watercourses	<ul style="list-style-type: none"> <li>• Servicing of vehicle to be done at approved dealers with proper containment facilities</li> <li>• Regular inspections of vehicles, mobile equipment and machinery to check for oil and fuel leaks</li> <li>• Implement the spill prevention and control procedure in the event of accidental leakages</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>• MLAFWRD</li> <li>• Contractor</li> </ul>	500.00
	Contamination of ground water due to farming operations	<ul style="list-style-type: none"> <li>• Practice integrated pest/vector management programme</li> <li>• Avoid use of products that fall in Classes Ia (extremely hazardous) and Ib (highly hazardous) of the WHO Recommended Classification of Pesticides by Hazard</li> <li>• Use only approved pesticides and avoid the use of banned pesticides</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>• EMA</li> <li>• MLAFWRD</li> </ul>	5000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
		<ul style="list-style-type: none"> <li>Ensure that pesticides are handled, stored, applied and disposed of in accordance with FAO International Code of Conduct on the Distribution and Use of Pesticides</li> <li>Training of farmers on safe handling, storage, use and disposal of agrochemicals.</li> <li>Testing the soil for pesticides residues</li> <li>Early detection of pollution by routine ground water monitoring.</li> </ul>				
Air pollution	Burning of crop residues leading to air pollution	<ul style="list-style-type: none"> <li>Avoid burning of crop residues</li> <li>Consider using crop residues as animal feed</li> <li>Prohibit burning of pesticide-treated agricultural wastes and by-products</li> <li>Reduce the risk of fire by minimising the build-up of potential fuel sources and controlling weeds and invasive species</li> <li>Provide training on the impacts of burning pesticides containers on human health</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>EMA</li> </ul>	500.00
Land	Seeding of land by the community land donors may lead to their impoverishment	<ul style="list-style-type: none"> <li>Ensure that land donors are given the first priority and that they are primary beneficiaries during the process of plot allocation.</li> <li>Ensure that the land donors get plot size proportionate to the land donated.</li> </ul>	2023	2024	<ul style="list-style-type: none"> <li>MLAWFRD</li> <li>IMC</li> <li>RDC</li> </ul>	0.00
	Inefficient waste management during construction, operation and maintenance leading to excess consumption of	<ul style="list-style-type: none"> <li>Examine alternative product formulations and packaging (e.g., biodegradable material).</li> <li>Promote plastic waste reusing</li> <li>Dispose waste at designated dumping sites</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>Farmers</li> </ul>	1000.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
	materials, generation of wastes/emissions, pollution of soils and water.	<ul style="list-style-type: none"> <li>Promote waste minimisation through efficient application of fertilisers</li> <li>Provide waste bin for the temporary storage of empty pesticides and herbicides containers.</li> <li>The containers should be disposed at designated places agreed by the Rural District Councils</li> <li>Do not burn or bury empty packaging</li> <li>Empty pesticide containers, foil seals, and lids should be triple rinsed, and washings must be used sprayed back onto the field or disposed of as hazardous waste</li> </ul>				
Community Health	New standing water created can increase the risk of spread of waterborne diseases	<ul style="list-style-type: none"> <li>Implement environmental management measures for vector control: e.g., monitoring for key vectors; contact avoidance via site selection; focal insecticide and molluscicide application.</li> <li>Facilitate programmes/measures to ensure appropriate sanitary and medical facilities are available</li> </ul>	2022	2023	Ministry of Health and Child Care	1000.00
Cultural Resources	<ul style="list-style-type: none"> <li>Disturbance to graves</li> <li>Change to intangible cultural heritage due to increased access, and interaction with workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the identified graves are fenced off, and maintained.</li> <li>Implement the chance find procedure (Appendix 2)</li> </ul>	2023	2080	<ul style="list-style-type: none"> <li>IMC</li> <li>Community leaders</li> <li>Farmers</li> </ul>	5000.00
<b>DECOMMISSIONING PHASE</b>						

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Closure Plan activities during decommissioning of the Proposed Irrigation Schemes						
Soils	Exposed surfaces are prone to erosion.	<ul style="list-style-type: none"> <li>Re-vegetation will be done on proposed Irrigation Scheme sites and access roads.</li> <li>Loose soil will be compacted.</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>IMC</li> <li>MLAFWRD</li> <li>EMA</li> </ul>	1000.00
	Contaminated surfaces may contaminate surrounding soils through runoff	<ul style="list-style-type: none"> <li>Removal of contaminant through physical/chemical/biological treatment processes</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>EMA</li> </ul>	1000.00
Fauna and flora	Loss of terrestrial habitat and biodiversity in indigenous trees	<ul style="list-style-type: none"> <li>Re-vegetation with indigenous trees and grass.</li> <li>Practice Apiculture in the buffer zone</li> <li>Put in place wildlife management initiatives in the buffer zone such as CAMPFIRE for the communities to preserve wildlife whilst earning income from tourist activities.</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>National Parks and Wildlife Authority</li> </ul>	1000.00
Surface water	Erosion and sedimentation of the dam	<ul style="list-style-type: none"> <li>Proper maintenance of diversion drains around proposed irrigation schemes</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>FARMERS</li> </ul>	2000.00
Ground water	Contamination of groundwater	<ul style="list-style-type: none"> <li>There will be low contamination levels to groundwater, hence ensure monitoring</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>EMA</li> </ul>	500.00
Health and Safety	The safety of the public may be affected by inadvertent access to the irrigation sites	<ul style="list-style-type: none"> <li>Ensure safe removal and keeping of all valuable equipment and machinery</li> <li>Warning signposts will be erected around the electricity transmission line area and transformer areas.</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>IMC</li> </ul>	500.00

Environmental & Social Domain	Aspects and Impacts	Proposed Mitigation Measures	Timing of management actions		Responsibility	Cost (USD)
			Start	End		
Water transmission line stability	The erosion of soil will occur on exposed surfaces.	<ul style="list-style-type: none"> <li>Land will be re-vegetated with grass and indigenous trees</li> <li>Monitoring of decommissioned water transmission line as per the updated scheme closure plan</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>EMA,</li> <li>MLAFWRD</li> </ul>	1000.00
	Slope failure	<ul style="list-style-type: none"> <li>Monitoring of water supply pipeline slope and re-vegetation of the slopes.</li> </ul>	2080	2085	<ul style="list-style-type: none"> <li>MLAFWRD</li> </ul>	1000.00



## **7.0 ENVIRONMENTAL AND SOCIAL MONITORING PLAN**

### **7.1 Introduction**

This section provides an environmental monitoring plan for the project. The proposed monitoring plan will be implemented in its entirety in order to (1) properly assess the performance and effectiveness of the adopted mitigation measures, (2) identify the extent of environmental impacts predicted, (3) determine project compliance with regulatory requirements and to assist in adopting remedial action and further mitigation measures if found to be necessary. The proposed monitoring plan for the sub-projects covers several elements including:

- Water and soil quality
- Air quality
- Waste management
- Soil erosion
- Working conditions including Health and Safety
- Conflicts over resource use
- Child labor and forced labor
- Gender Based Violence and its different forms

### **7.2 Monitoring plan**

The monitoring plan is based on the specific impact areas that are identified and includes a detailed description of the monitoring parameter(s), method (s), frequency of monitoring and the monitoring agent. For certain parameters, sampling and analysis are necessary to assess the extent of the impact, while for other parameters, surveys, visual inspection and photographic documentation by experienced personnel are required. Monitoring efforts however, would be in vain in the absence of an organized record keeping practice. Table 27 provide the environmental and social monitoring plan.

Table 27: Environmental and Social Monitoring Plan

Social/Environmental Issue	Monitoring Indicator	Monitoring tools and techniques	Monitoring Frequency	Monitoring Agent	Estimated cost (USD)
GBV and its different forms of manifestations e.g., Sexual exploitation, abuse and harassment	<ul style="list-style-type: none"> <li># Of GBV cases received</li> <li># Of health care provider trained on clinical management and psychological support</li> <li>Existence of written protocols for the assistance and care of GBV cases</li> <li>Number of institutions (public/ NGOs/CBOs) providing psychological or counselling services related to GBV</li> </ul>	<ul style="list-style-type: none"> <li>Interviews</li> <li>Document reviews e.g., Complaints register &amp; reports</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>Ministry of Health and child care</li> <li>Ministry of women affairs, gender and community development</li> <li>NGOs</li> </ul>	\$5000
Child labor & forced labor	<ul style="list-style-type: none"> <li>Number of cases reported</li> <li>Company polices on health and safety</li> </ul>	<ul style="list-style-type: none"> <li>Observations</li> <li>Review of records</li> <li>Complaints registers</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>Ministry of Labour</li> <li>MLAFWRD, IMC, Traditional leadership</li> <li>NGOs, ZRP</li> </ul>	\$1000
Poor working conditions	<ul style="list-style-type: none"> <li># Of Accidents/incidences reported</li> <li>Levels of occupational health stressors (dust, noise, vibration, etc)</li> <li>Adequacy of PPE</li> <li>Dangerous equipment</li> <li>Work contracts</li> </ul>	<ul style="list-style-type: none"> <li>Field Measurements</li> <li>E&amp;S monitoring &amp; audit reports</li> <li>Site visits &amp; inspections</li> <li>Document review (e.g., accident register, work contracts)</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>PMU</li> <li>MLAWFRD</li> </ul>	\$3000.00
Impoverishment of land donors	<ul style="list-style-type: none"> <li>Size of land allocated to land donors.</li> </ul>	<ul style="list-style-type: none"> <li>Document reviews</li> </ul>	Bi-annually	<ul style="list-style-type: none"> <li>RDC</li> <li>PMU</li> </ul>	\$2000
	<ul style="list-style-type: none"> <li>Average yield per hector</li> </ul>	<ul style="list-style-type: none"> <li>Surveys</li> <li>Document reviews</li> </ul>	Annually	<ul style="list-style-type: none"> <li>PMU</li> <li>Food and Nutrition Council (FNC)</li> </ul>	\$2000

Social/Environmental Issue	Monitoring Indicator	Monitoring tools and techniques	Monitoring Frequency	Monitoring Agent	Estimated cost (USD)
	<ul style="list-style-type: none"> <li>Food Consumption Score (FCS)</li> </ul>	<ul style="list-style-type: none"> <li>Surveys</li> <li>Document reviews</li> </ul>	Annually	<ul style="list-style-type: none"> <li>Committee</li> <li>Food &amp; Nutrition</li> </ul>	0.00
	<ul style="list-style-type: none"> <li># of complaints</li> </ul>	<ul style="list-style-type: none"> <li>Document Reviews</li> <li>Interviews</li> </ul>		<ul style="list-style-type: none"> <li>AGRITEX</li> <li>PMU</li> </ul>	0.00
Water and land use conflicts	<ul style="list-style-type: none"> <li># Of complaints received</li> </ul>	<ul style="list-style-type: none"> <li>Document reviews (Complaints registers)</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>IMC</li> <li>MLAWFRD</li> <li>Traditional leadership</li> </ul>	\$300
Health and Sanitation problems	<ul style="list-style-type: none"> <li>Condition of portable water and sanitation facilities</li> </ul>	<ul style="list-style-type: none"> <li>Inspections</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>MoHCC</li> <li>PMU</li> <li>DoI</li> </ul>	\$1000
	<ul style="list-style-type: none"> <li>Prevalence of water related diseases</li> </ul>	<ul style="list-style-type: none"> <li>Document review</li> <li>Interviews</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>MoHCC</li> </ul>	\$1000
	<ul style="list-style-type: none"> <li>Number of cases recorded</li> </ul>	<ul style="list-style-type: none"> <li>Document review e.g. clinical records &amp; complaints registers</li> </ul>	Daily	<ul style="list-style-type: none"> <li>Ministry of Health and Child Care,</li> <li>UNDP PMU</li> </ul>	\$1000
Theft of agricultural products and irrigation equipment	<ul style="list-style-type: none"> <li># Of theft cases reported</li> </ul>	<ul style="list-style-type: none"> <li>Inspections &amp; audits</li> <li>Document reviews</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>IMC</li> <li>MLAWFRD</li> </ul>	\$1500
Human/animal conflicts	<ul style="list-style-type: none"> <li># Of cases recorded</li> </ul>	<ul style="list-style-type: none"> <li>Document reviews</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>UNDP PMU</li> <li>Parks and wildlife</li> </ul>	\$300
Loss of biodiversity	<ul style="list-style-type: none"> <li>Biodiversity indices</li> <li>Area of land cleared.</li> </ul>	<ul style="list-style-type: none"> <li>Observations</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>EMA</li> <li>Forestry commission</li> <li>Parks and wildlife Authority</li> </ul>	\$100.00

Social/Environmental Issue	Monitoring Indicator	Monitoring tools and techniques	Monitoring Frequency	Monitoring Agent	Estimated cost (USD)
Loss of archaeological artefacts during excavation and trenching	<ul style="list-style-type: none"> <li># Archaeological/ heritage sites damaged</li> </ul>	<ul style="list-style-type: none"> <li>Observations</li> <li>Document reviews</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>NMMZ</li> <li>Farmers</li> <li>Traditional leaders</li> </ul>	\$500.00
Waste management	<ul style="list-style-type: none"> <li>Types and volume of waste generated/disposed</li> <li>Availability and use of waste bins</li> </ul>	<ul style="list-style-type: none"> <li>Document review</li> <li>Field measurements &amp; estimations</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>Contractors</li> <li>EMA</li> <li>IMC</li> </ul>	\$500.00
Fossil fuel combustion	<ul style="list-style-type: none"> <li>Carbon footprint</li> </ul>	<ul style="list-style-type: none"> <li>Measurement of carbon footprint</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>EMA</li> </ul>	\$500.00
Land/water pollution from fuel and oil spills	<ul style="list-style-type: none"> <li>Oil &amp; grease</li> </ul>	<ul style="list-style-type: none"> <li>Sample analysis</li> <li>observations</li> </ul>	Daily	<ul style="list-style-type: none"> <li>EMA</li> </ul>	\$200.00
Soil erosion	<ul style="list-style-type: none"> <li>Gully formation</li> <li>Siltation of rivers</li> <li>Vegetation cover</li> </ul>	<ul style="list-style-type: none"> <li>Observations</li> <li>GIS and remote sensing tools</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>MLAFWRD</li> <li>EMA</li> <li>IMC</li> </ul>	\$1000.00
Soil and water pollution	<ul style="list-style-type: none"> <li>Pesticides residues in soil &amp; water</li> <li>Soil and water quality (full chemical and microbial analysis)</li> </ul>	<ul style="list-style-type: none"> <li>Laboratory analyses</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>IMC</li> <li>EMA</li> </ul>	\$2000.00
Air pollution from vehicle and machinery use	<ul style="list-style-type: none"> <li>Air quality parameters (e.g. PM5, PM10, TSP, GhG Emissions)</li> </ul>	<ul style="list-style-type: none"> <li>Field measurements (PM5, PM10)</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>Contractors</li> <li>NSSA</li> </ul>	\$1000.00
Noise pollution from machinery use	<ul style="list-style-type: none"> <li>Noise levels (dBA)</li> </ul>	<ul style="list-style-type: none"> <li>Sound Level Meter</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>Contractor</li> <li>NSSA</li> </ul>	\$1000.00
Water depletion	<ul style="list-style-type: none"> <li>Water availability</li> <li># of cases of water use conflicts reported</li> </ul>	<ul style="list-style-type: none"> <li>Observations &amp; Measurements</li> </ul>	Weekly	<ul style="list-style-type: none"> <li>FARMERS</li> <li>ZINWA</li> </ul>	\$3000.00
Water loses	<ul style="list-style-type: none"> <li>Quantity of water used (ML)</li> <li>Condition of irrigation equipment</li> </ul>	<ul style="list-style-type: none"> <li>Inspections</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>ZINWA</li> <li>MLAFWRD</li> <li>Farmers</li> </ul>	\$2000.00
Agro-chemical use	<ul style="list-style-type: none"> <li>Type and quantity of agrochemicals used by farmers</li> </ul>	<ul style="list-style-type: none"> <li>Measurements</li> <li>Observations</li> </ul>	Weekly	<ul style="list-style-type: none"> <li>MLAFWRD Farmers</li> <li>EMA</li> </ul>	\$500.00

Social/Environmental Issue	Monitoring Indicator	Monitoring tools and techniques	Monitoring Frequency	Monitoring Agent	Estimated cost (USD)
	<ul style="list-style-type: none"> <li>weed and pest management practices implemented;</li> </ul>				



## **8.0 CAPACITY DEVELOPMENT AND TRAINING**

### **8.1 Introduction**

Environmental and Social Safeguards (ESS) have globally become the “gold standard” for environmentally and socially sound development. ESS aim to prevent and mitigate undue harm to people and their environment in the implementation of specific development projects, and to ascertain that project benefits reach the target population. International donors such as the Green Climate Fund (GCF) and international development agencies such as the UNDP have made Environmental and Social Safeguarding a mandatory and non-negotiable requirement in project implementation processes. In this regard, building capacity towards safeguards implementation through providing the related trainings is essential to impart safeguards related knowledge and skills to Responsible Parties (RPs) in order improve project performance and enhance sustainable development outcomes.

### **8.2 Training and Capacity Building**

The Project through the PMU has developed the training plan (Table 28) which provides a series of training and awareness raising events on environmental and social safeguards to various stakeholders involved in the implementation of the sub-project activities. The trainings are intended to strengthen institutional and individual capacities of the stakeholders involved in implementing the sub-project activities. Participants will be drawn from different institutions and organizations including the PMU, Responsible Parties (RPs), farmers, partners and other stakeholders. The trainings will focus primarily on raising awareness and increasing the common understanding around the environmental and social safeguards and other sub-topics which are relevant to successfully implement the Environmental and Social Management Plan (ESMP). The training plan is intended for use by the PIU, and RPs to deliver successful training programmes on various safeguards topics. The training plan contains 11 modules which are:

- The Concept and Practice of Environmental and Social Safeguards
- Contractor Management – E&S Principles
- Environment, Social, Health and Safety Management for Contractors
- Implementation and Monitoring of the Environmental and Social Management Plan (ESMP)
- Grievance Redress Mechanism (GRM)
- Stakeholder Engagement
- Gender Related Impacts including Sexual Exploitation, Abuse and Harassment (SEAH)
- Emergency Preparedness and Response
- Road Traffic Safety
- Integrated Production and Pest Management
- Chemicals Risk Reduction

Table 28: Environmental and Social Safeguards Training

S/N	Training Module	Content	Learning Objective	Target Audience	Pedagogic Methods	Duration (Hrs)	Facilitator (s)
1	The Concept and Practice of Environmental and Social Safeguards	<p>This module focuses on the concept of environmental and social safeguards, their significance and relevance. Special topics to be covered include:</p> <ul style="list-style-type: none"> <li>• National and UNDP safeguards policies and standards</li> <li>• Tools and techniques on risk identification, prediction and management</li> <li>• Structure and content of the Bank’s E&amp;S quarterly progress Report</li> <li>• Identification of E&amp;S safeguard plans and their relevance</li> <li>• Challenges in implementing E&amp;S measures</li> </ul>	<ul style="list-style-type: none"> <li>• Participants to gain knowledge Bank’s policies and procedures and be able to identify E&amp;S issues through the concept of safeguards.</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• RPs</li> </ul>	<ul style="list-style-type: none"> <li>• Presentations &amp; Discussions</li> <li>• Interactive questions – answer sessions</li> <li>• Brainstorming sessions</li> <li>• Case studies</li> </ul>	8hrs	<ul style="list-style-type: none"> <li>• E&amp;S Specialist (PMU)</li> </ul>
2	Contractor Management – E&S Principles	<p>The Module will cover key aspects which include:</p> <ul style="list-style-type: none"> <li>• Key Definitions</li> <li>• Role of contractors in promoting health and safety in work sites</li> <li>• Selected high risk tasks requiring control</li> <li>• Contractor labour standards requirements</li> <li>• Tools for monitoring contractor performance</li> </ul>	<ul style="list-style-type: none"> <li>• Participants to understand the importance of managing contractors to promote Health and Safety in workplaces</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• RPs</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation, discussions</li> <li>• Case studies</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>• E&amp;S Specialist (PMU)</li> </ul>
3	Environment, Social, Health and Safety Management for Contractors	<p>The Module will train and create awareness to contractors on E&amp;S issues that result from their works and their reporting obligations. Special topics to be covered include:</p>	<ul style="list-style-type: none"> <li>• Enhance understanding of the Project E&amp;S risks and working tools</li> </ul>	<ul style="list-style-type: none"> <li>• Contractors</li> <li>• Supervising Engineers</li> </ul>	<ul style="list-style-type: none"> <li>• Presentations on concepts, and international standards</li> <li>• Case studies</li> </ul>	8Hrs	<ul style="list-style-type: none"> <li>• E&amp;S Specialist</li> </ul>

S/N	Training Module	Content	Learning Objective	Target Audience	Pedagogic Methods	Duration (Hrs)	Facilitator (s)
		<ul style="list-style-type: none"> <li>Hazard Identification and Risk Analysis (HIRA)</li> <li>Development of Aspects and Impacts Registers</li> <li>Accident investigation, Root Cause analysis and Accident reporting</li> <li>Emergency Preparedness and Response</li> <li>First Aid</li> <li>Complaints Handling</li> <li>E&amp;S Contractual Obligations during Project Implementation</li> </ul>	<ul style="list-style-type: none"> <li>To broaden their understanding on E&amp;S obligations including reporting aspects in line with Bank Requirements</li> </ul>		<ul style="list-style-type: none"> <li>Presentations on reporting tools</li> </ul>		
4	Implementation and Monitoring of the Environmental and Social Management Plan (ESMP)	<p>The module will focus on special topics which include:</p> <ul style="list-style-type: none"> <li>E&amp;S risks &amp; Management Measures</li> <li>Roles and Responsibilities in ESMP Implementation</li> <li>E&amp;S Monitoring &amp; Expected Outcomes</li> </ul>	<ul style="list-style-type: none"> <li>To understand project E&amp;S risks, and how to manage and monitor them</li> </ul>	<ul style="list-style-type: none"> <li>PIU</li> <li>RPs</li> <li>Contractors</li> <li>Beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>Presentations on concepts, and international standards</li> <li>Case studies</li> <li>Presentations on reporting tools</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>E&amp;S Expert</li> </ul>
5	Grievance Redress Mechanism (GRM)	<p>The module focus on special topics which include:</p> <ul style="list-style-type: none"> <li>Structure of the Project Level GRM</li> <li>Procedure for handling, submitting and responding to grievances</li> <li>Establishing Grievance Redress Committees</li> <li>Roles and Responsibilities of GRM Implementers</li> <li>AfDB's Independent Recourse Mechanism</li> </ul>	<ul style="list-style-type: none"> <li>To inform learners about the GRM and its intended purpose</li> <li>Inform learners about the different types of grievances</li> <li>To inform learners about the present arrangements for grievance handling</li> <li>To describe procedures for submitting complaints</li> <li>To educate learners on how to</li> </ul>	<ul style="list-style-type: none"> <li>PIU</li> <li>RPs</li> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	8hrs	<ul style="list-style-type: none"> <li>Safeguards Expert</li> </ul>

S/N	Training Module	Content	Learning Objective	Target Audience	Pedagogic Methods	Duration (Hrs)	Facilitator (s)
			fill the complaint form <ul style="list-style-type: none"> <li>To inform learners on the process of establishing Grievance Redress Committees and the functions of those committees</li> <li>Procedure for handling grievances of Sexual Exploitation and Abuse (SEA)</li> </ul>				
6	Stakeholder Engagement	The module focus on special topics which include: <ul style="list-style-type: none"> <li>Stakeholder engagement – definitions</li> <li>Objective and requirements for engagement</li> <li>Stakeholder engagement during implementation</li> <li>Key factors for effective stakeholder engagement</li> </ul>	<ul style="list-style-type: none"> <li>To understand who and how to engage stakeholders, and key factors to consider during stakeholder engagement</li> </ul>	<ul style="list-style-type: none"> <li>PMU</li> <li>RPs</li> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>E&amp;S Specialist</li> </ul>
7	Gender Related Impacts	The Module will create awareness and train stakeholders on how to prevent and mitigate cases of Sexual Exploitation, Abuse and Harassment (SEAH). Special topics will include: <ul style="list-style-type: none"> <li>Background to SEAH in Bank financed operations</li> <li>Definition of SEAH</li> <li>SEAH Risk Assessment</li> <li>SEAH Risk Prevention &amp; Mitigation</li> <li>Principles of SEAH</li> </ul>	<ul style="list-style-type: none"> <li>To understand how to prevent and mitigate SEAH</li> <li>To understand procedures for reporting SEAH cases</li> </ul>	<ul style="list-style-type: none"> <li>RPs</li> <li>PIU</li> <li>Contractors</li> <li>Project Beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>E&amp;S Specialist</li> <li>Ministry of Women, Gender and Community Development</li> </ul>

S/N	Training Module	Content	Learning Objective	Target Audience	Pedagogic Methods	Duration (Hrs)	Facilitator (s)
		<ul style="list-style-type: none"> <li>SEAH Prevention &amp; Response Mechanisms</li> <li>Key Data in Reporting SEAH</li> </ul>					
8	Emergency Preparedness and Response	<p>The module focus on special topics which include:</p> <ul style="list-style-type: none"> <li>Anticipated disasters, emergencies &amp; accidents</li> <li>Roles and responsibilities emergency control</li> <li>Emergency preparedness and response procedures e.g. spill prevention and control, trench collapse, fire control, working at heights , flood control, electrical hazards , etc.</li> <li>First aid</li> <li>Resources for responding to emergencies</li> <li>Communicating and reporting on emergencies</li> </ul>	To raise awareness to Project staff, contractors and visitors on preparing for and responding to emergency incidents, and to establish a state of readiness which will enable prompt and effective response to possible events	<ul style="list-style-type: none"> <li>RPs</li> <li>PMU</li> <li>Contractors</li> <li>Project Beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>E&amp;S Specialist</li> </ul>
9	Road Traffic Safety	<p>The module focus on special topics which include:</p> <ul style="list-style-type: none"> <li>Road Traffic Safety and AfDB's Operational Safeguards</li> <li>Causes of Road Accidents</li> <li>Typology of actors involved in road traffic accidents</li> <li>Effective control measures</li> </ul>	<ul style="list-style-type: none"> <li>Enhancing understanding of safety issues around the use of vehicles and other forms of road traffic</li> </ul>	<ul style="list-style-type: none"> <li>Project staff and authorized drivers</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	2hrs	<ul style="list-style-type: none"> <li>ZRP</li> <li>Safeguards Expert, PMU</li> </ul>
10	Integrated Production and Pest Management	<p>The module focus on special topics which include:</p> <ul style="list-style-type: none"> <li>The terms Integrated, Production, Pest and Management defined</li> <li>IPPM defined</li> <li>Shortcomings of Economic Threshold Level</li> </ul>	<ul style="list-style-type: none"> <li>To be able to define the terms: Integrated, Pest, Production and Management</li> <li>To name and explain the four principles of IPPM</li> </ul>	<ul style="list-style-type: none"> <li>Farmers</li> <li>Extension staff</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	8hrs	<ul style="list-style-type: none"> <li>AGRITEX</li> </ul>



S/N	Training Module	Content	Learning Objective	Target Audience	Pedagogic Methods	Duration (Hrs)	Facilitator (s)
		<ul style="list-style-type: none"> <li>The difference between an insect and a pest</li> <li>The differences between pest control and pest management</li> <li>The transition from Pest control to pest management</li> <li>Methods of pest management in IPPM The four principles of IPPM</li> <li>The parameters required to make a pest management decision in IPPM</li> <li>The steps in pest management decision making in IPPM</li> </ul>	<ul style="list-style-type: none"> <li>To define Economic Threshold Level (ETL) in conventional pest management</li> <li>Name the different methods of pest management in IPPM</li> </ul>				
11	Chemicals Risk Reduction	<p>The module will dwell on special topics which include:</p> <ul style="list-style-type: none"> <li>Classes of agricultural chemicals based on target, mode of action, spectrum of selectivity and formulation</li> <li>Toxicity of Chemicals</li> <li>Entry points of chemicals into the body</li> <li>Pointers to chemical risk reduction</li> </ul>	<ul style="list-style-type: none"> <li>To classify agricultural chemicals</li> <li>To explain parameters used to classify toxicity of chemicals</li> <li>To explain the entry points and ways of chemicals into the body and the environment</li> <li>To explain the different methods of reducing the risk associated with chemical use</li> </ul>	<ul style="list-style-type: none"> <li>Farmers</li> <li>Extension officers</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	4hrs	<ul style="list-style-type: none"> <li>Safeguards Specialist</li> </ul>
12	Soil and water conservation	<p>The module will dwell on special topics which include:</p> <p>Engineering and bioengineering works for erosion control (drains, ridges, silt checks, gabions, etc)</p>	<ul style="list-style-type: none"> <li>To explain the different methods of erosion control</li> </ul>	<ul style="list-style-type: none"> <li>Farmers</li> </ul>	<ul style="list-style-type: none"> <li>Presentation, discussions</li> <li>Brain storming</li> <li>Case studies</li> </ul>	16hrs	<ul style="list-style-type: none"> <li>MoLAWFRD – Mechanisation Department</li> </ul>

## 9.0 COST ESTIMATE IN IMPLEMENTATION OF THE ESMP

### 9.1 Environmental Budget

As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow areas, safety, signage, provision of temporary drains, etc., the costs for which will be included in the design costs of specific projects. Therefore, costs of these items have not been included in the ESMP implementation budget. Only those items not covered under budgets for construction are considered in the ESMP budget. The costs of personal protective equipment to construction workers shall be borne by contractor as part of conditions of contract. In addition, the sources of funds for mitigation measures during construction stage including monitoring are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works.

### 9.2 Estimated cost for implementing the ESMP

The total cost for implementing the ESMPs shown in Table 29. The average itemized cost is provided in Table 30

Table 29: Environment and social management plan implementation cost

Name of scheme	Cost (USD)
Mhakwe	34,572.00
Farai	37,572.00
Musirizwi	41,572.00
Vimbanayi	39,572.00
Mudzimwa	39,572.00

Table 30: Itemised cost for implementing the ESMPs (Average)

Management Plan	Estimated cost (USD\$)
Inspections and audits	2400.00
Baseline and monitoring field soil testing	5000.00
Ecological Monitoring	3100.00
Water Quality Monitoring	4600.00
Training	2,000.00
Stakeholder Engagement Workshops	2,400.00
Waste management	3,000.00
Air quality monitoring	2,500.00
Erosion and Sediment Control	2,100.00
Grievance Redress Mechanism	8372.00
Health and safety management	2100.00

## 10.0 PUBLIC CONSULTATION AND ENVIRONMENTAL AND SOCIAL DISCLOSURE

### 10.1 Process for Consultation

Stakeholder consultations were conducted at the proposed irrigation scheme sites. The stakeholders consulted include government ministries and departments, targeted beneficiaries. The consultations were done through questionnaires, interviews, FDG tools (Appendix 4) and meetings. The stakeholders were informed prior to making the visits for conducting the public consultation meetings. Notifications were done through the Irrigation Management Committee (IMCs) and the AGRITEX officers. Plate 20 show meeting with the farmers at the irrigation site (March 2023). Attendance registers for the meetings were also generated.



Plate 20: Meeting with the project beneficiaries

A summary of the proposed intervention and revitalisation activities were shared with the stakeholders. The explanations about the proposed irrigation systems designs, the project infrastructure development, and the potential benefits and negative effects were highlighted. During public consultations, a summary containing the information about deliberations was made.

### 10.2 Disclosers during the Public Consultation

The discussions solicited for the perceptions and observations by the different stakeholders as well as issues that may be as a result of the development project. The discussions captured the following aspects.

- The details of the project components and the activities involved.
- Infrastructure to be implemented to revitalise the irrigation scheme.
- Potential negative environmental impacts that may be as a result of the irrigation development
- potential positive impacts that may arise from the irrigation development
- possible ways to avoid, reduce and or mitigate, the negative impacts
- possible ways to enhance the positive impacts
- participation of the local communities in the project development and project management
- Conflict Management - Grievance Redress Mechanism

The description of the project, potential positive and negative impacts of the irrigation development were

given to the participants.

From the findings, local communities were in support of revitalisation of the scheme as they could clearly envisage the multifaceted benefits arising from its execution. The following is a summary of the views raised by local communities and farmers:

- The project would contribute towards food security for the area and the province as a whole.
- The project would contribute towards the stimulation of economic development of the business centres in the area.
- The project will result in the creation of employment opportunities along the whole value chain
- The project will result in the generation of revenue to farmers, service providers such as the local SMEs, the local authorities, and other stakeholders
- It was noted that the identified graves be fenced off
- Surveys must ensure that there are adequate water supplies, consistent supply of power, proper drainage, proper agronomic practices and most importantly, implementing the project in an environmentally sustainable manner.
- There were also concerns about the likelihood of environmental pollution arising from the use of agrochemicals such as fertilisers, pesticides, weedicides and herbicides. Stakeholders expressed fear of pollution of the pastures and nearby water sources
- It was suggested that the development will need to have a proper Environmental Management Plans formulated to guide the implementation of the project. This will aid in mitigating negative environmental impacts likely to arise from the project.
- The establishment of the proposed development was identified as a possible solution to increased security in the area as affluent communities generally have low crime rates.
- Parents feared the issues of prostitution, sexual harassment and improper sexual activity amongst the youth due to influx of people into the area in search for employment, markets for their products and for buying produce from the farmers.
- Due to the limited land size, some aspiring farmers had fears of being excluded during the plot allocation process.
- Those who donated their land wished to have more land being allocated to the than the rest of the farmers.

Institutional stakeholders were consulted in the same manner and appraised about the development. They also gave their views and opinions which are summarised in Table 31.

Table 31: Views from Government Departments and agencies

Stakeholder Identity	Comment and positive impacts	Anticipated Negative Impacts	Mitigation
Ministry of Lands, Agriculture, Water, Fisheries and Rural Development - Department of Irrigation	<ul style="list-style-type: none"> <li>• The project improves food security</li> </ul>	<ul style="list-style-type: none"> <li>• Depletion and pollution of water resources</li> </ul>	<ul style="list-style-type: none"> <li>• To install water efficient technologies</li> <li>• Adopt irrigation scheduling</li> </ul>
Ministry of Youths, Arts, Sports and Recreation	<ul style="list-style-type: none"> <li>• Fulfilment of vision 2023</li> <li>• Employment creation</li> <li>• Youth in agribusiness</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
District Development Fund	<ul style="list-style-type: none"> <li>• Enhanced water supply and food security</li> </ul>	<ul style="list-style-type: none"> <li>• Feasibility studies need to identify ESS issues</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen community engagement efforts</li> </ul>
Ministry Of Women Affairs Community, Small And Medium Enterprises Development	<ul style="list-style-type: none"> <li>• Better food security</li> <li>• Good nutrition in the community</li> <li>• Employment opportunities for youth</li> </ul>	<ul style="list-style-type: none"> <li>• Male jealousy as contractor workforce interact with community women. This can trigger Gender Based Violence</li> <li>• Competition can cause divisions in the community.</li> <li>• Sexual exploitation and harassment of women and girls in the community</li> </ul>	<ul style="list-style-type: none"> <li>• Implement the GBV management Plan</li> <li>• Provide training on sexual exploitation, abuse and harassment</li> </ul>
Chipinge Rural District Council	<ul style="list-style-type: none"> <li>• Fully support the project</li> <li>• Improved food security</li> <li>• Enhanced nutrition</li> <li>• Improved income</li> <li>• Employment creation</li> <li>• Beneficiation through downstream industries (coming)</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity loss,</li> <li>• Water conflicts</li> <li>• water borne diseases,</li> <li>• Oil spillage from machines</li> </ul>	<ul style="list-style-type: none"> <li>• Employ locals</li> <li>• Make availability of potable water</li> <li>• Ensure that ablution facilities are constructed</li> <li>• Adopt climate proofed irrigation technologies</li> <li>• Implement afforestation programmes</li> </ul>



Stakeholder Identity	Comment and positive impacts	Anticipated Negative Impacts	Mitigation
Ministry Of Health And Child Care	<ul style="list-style-type: none"> <li>• Employment creation</li> <li>• Improved nutrition</li> <li>• Enhanced food security</li> </ul>	<ul style="list-style-type: none"> <li>• Waterborne diseases and other communicable diseases e.g cholera and diarrhoea</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure proper drainage to avoid standing water</li> </ul>
Ministry Of Home Affairs - Zimbabwe Republic Police	<ul style="list-style-type: none"> <li>• Improved livelihoods</li> <li>• Growth of economy through selling the produce</li> </ul>	<ul style="list-style-type: none"> <li>• Theft of equipment and assets</li> </ul>	<ul style="list-style-type: none"> <li>• Safeguard properties and equipment through employing security personnel</li> </ul>
Zimbabwe National Water Authority	<ul style="list-style-type: none"> <li>• Agrees with the development</li> <li>• Scheme to apply for abstraction agreements from Zinwa so that they pay for water to Zinwa and relevant sub catchment councils</li> <li>• Improve nutritional status of the community</li> <li>• Improves livelihood</li> <li>• Increases household income</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in farming area of those owning land around settlement area</li> <li>• Cutting down of trees around project area</li> </ul>	<ul style="list-style-type: none"> <li>• Make sure affected land owners are allocated more irrigable area in the scheme</li> <li>• Afforestation</li> </ul>
AGRITEX	<ul style="list-style-type: none"> <li>• Agrees with the development</li> <li>• Food security and income generation</li> </ul>	<ul style="list-style-type: none"> <li>• Mismanagement of the environment may lead to environmental degradation and disputes</li> </ul>	<ul style="list-style-type: none"> <li>• Collective action plans</li> <li>• Develop and implement best agronomic practices</li> <li>• Integrated pest and vector control</li> </ul>
Parks And Wildlife Management Authority	<ul style="list-style-type: none"> <li>• Economic - improved agricultural output for local and national food security.</li> <li>• Social- improved infrastructure building towards vision 2030</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
National Museums and monuments of Zimbabwe	<ul style="list-style-type: none"> <li>• Improved livelihoods for communities in affected areas.</li> <li>• Increased access to water for communities</li> </ul>	<ul style="list-style-type: none"> <li>• Potential destruction of cultural heritage in the development of the scheme</li> </ul>	<ul style="list-style-type: none"> <li>• Project proponent to liaise with National Musiums and Monuments of Zimbabwe in the event that cultural heritage sites are identified</li> </ul>

Stakeholder Identity	Comment and positive impacts	Anticipated Negative Impacts	Mitigation
Land management and administration- Department of Lands	<ul style="list-style-type: none"> <li>• Agrees with the development</li> <li>• Raised production and improved standard of living</li> <li>• Improved food security</li> <li>• Peace of Mind in the benefiting communities</li> </ul>	<ul style="list-style-type: none"> <li>• If not managed well erosion may rise</li> <li>• Accumulation of salts may occur if not properly managed</li> </ul>	<ul style="list-style-type: none"> <li>• Proper soil management must be done</li> <li>• Ensure proper consultations are done with involvement of local communities and traditional leaders</li> </ul>
Forestry commission	<ul style="list-style-type: none"> <li>• Fully supports the development.</li> <li>• Improvement of livelihoods</li> <li>• Income generation</li> <li>• Employment creation.</li> <li>• Reduced rural to urban migration</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
Rural electrification authority	<ul style="list-style-type: none"> <li>• Fully supports the development.</li> <li>• Improving people's livelihoods and Income</li> </ul>	<ul style="list-style-type: none"> <li>• High initial cost</li> <li>• Negatively affects animals that live in water e.g. Fish</li> </ul>	<ul style="list-style-type: none"> <li>• Proper governance of the scheme</li> </ul>
Zimbabwe Electricity Transmission and Distribution Company (ZETDC)	<ul style="list-style-type: none"> <li>• Food security</li> <li>• Employment creation</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
Ministry of Local Government	<ul style="list-style-type: none"> <li>• Improvement in livelihoods level, improved food production and infrastructure development</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
Zimbabwe Republic Police (ZRP)	<ul style="list-style-type: none"> <li>• Employment</li> <li>• Food security</li> <li>• Income generation</li> </ul>	<ul style="list-style-type: none"> <li>• Politicising the project hence misguiding project resources</li> </ul>	<ul style="list-style-type: none"> <li>• Nil</li> </ul>

### **10.3 Future Consultation and Information Disclosure**

The sub-projects shall ensure that stakeholders are continuously engaged as part of the consultation process in relation to activities involving the development of the irrigation schemes. Key stakeholders include local communities, beneficiaries, relevant government departments, industry groups, civil society organisations, etc. Information to be shared with stakeholders shall among other things include the ESMP and the progress in its implementation. Stakeholders shall be engaged in accordance with the Stakeholder Engagement Plan (SEP) – see section 10.4. This ESMP shall be made available to the public at local, district, provincial and national levels. At local level, a summary ESMP translated into local language (shona) will be made available to the Irrigation Scheme Management Committee (IMC) as well as at a local district office. A full ESMP document will be made available to the public both at EMA provincial and national offices. Furthermore, digital copies of the ESMP will be disclosed through online platforms such as the UNDP country office website and the UNDP transparency portal to enhance public access.

### **10.4 Stakeholder engagement plan**

Meaningful, effective and informed stakeholder engagement and participation will be undertaken that will seek to build and maintain over time a constructive relationship with stakeholders, with the purpose of avoiding or mitigating any potential risks in a timely manner. The scale and frequency of the engagement will reflect the nature of the activity, the magnitude of potential risks and adverse impacts, and concerns raised by affected communities.

Meaningful, effective and informed consultation processes will seek to identify priorities of stakeholders and will provide them with opportunities to express their views at all points in the scheme’s decision-making process on matters that affect them and allows the affected persons to consider and respond to them. Topics the stakeholders will be able to express their views on will include but are not limited to: goals and strategies; social and environmental risks and impacts; proposed mitigation measures; sharing of development benefits and opportunities; and implementation issues. The consultation processes will possess the following characteristics:

- Free of external manipulation, interference, coercion, and intimidation.
- Gender and age-inclusive and responsive.
- Culturally appropriate and tailored to the language preferences and decision-making processes of each identified stakeholder group, including disadvantaged or marginalized groups.
- Based on prior and timely disclosure of accessible, understandable, relevant and adequate information, including draft documents and plans.
- Addresses social and environmental risks and adverse impacts, and the proposed measures and actions to address these.
- Seeks to empower stakeholders, particularly marginalized groups, and enable the incorporation of all relevant views of affected people and other stakeholders into decision-making processes,
- Documented and reported in accessible form to participants, in particular the measures taken to avoid or minimize risks to and adverse impacts on the Project stakeholders.
- Consistent with the States’ duties and obligations under international law.

The Stakeholder Engagement Plan for the schemes is illustrated in Table 32.

Table 32: Stakeholder Engagement Plan

Objective of Stakeholder Engagement	Engagement Method	Location	Timeline	Stakeholders	Output	Responsibility
<ul style="list-style-type: none"> <li>Disseminate information about the project and its components</li> <li>Identify key environmental and social issues</li> </ul>	<ul style="list-style-type: none"> <li>Meetings</li> <li>Workshops</li> </ul>	<ul style="list-style-type: none"> <li>Irrigation sites</li> <li>RDC offices</li> <li>Harare for Head offices</li> </ul>	Year 1 and 2	<ul style="list-style-type: none"> <li>Farmers</li> <li>IMC</li> <li>Partners</li> <li>AGRITEX Officers</li> <li>Traditional leadership</li> <li>Councillors</li> <li>RDCs</li> <li>Other Government Departments</li> </ul>	<ul style="list-style-type: none"> <li>Project Design Document</li> <li>Project Implementation plan</li> <li>Key environmental and social issues</li> </ul>	<ul style="list-style-type: none"> <li>DOIR</li> <li>PMU</li> <li>Contractor's ESMP Team</li> </ul>
<ul style="list-style-type: none"> <li>Gather information on socioeconomic and environmental baseline settings</li> </ul>	<ul style="list-style-type: none"> <li>Key Informants Interviews</li> <li>Direct Observations</li> <li>Meetings</li> <li>Focus Group Discussions</li> <li>Questionnaires</li> </ul>	<ul style="list-style-type: none"> <li>Respective sites</li> <li>Irrigation scheme sites</li> <li>Affected Villages</li> <li>RDC offices</li> <li>Mutare provincial offices</li> <li>Harare for Head offices</li> </ul>	Year 1&2	<ul style="list-style-type: none"> <li>DOIR staff</li> <li>Partners</li> <li>AGRITEX Officers</li> <li>Traditional leadership</li> <li>Councilors</li> <li>RDCs</li> <li>IMC</li> <li>Farmers</li> <li>Other Government Departments</li> </ul>	<ul style="list-style-type: none"> <li>Minutes</li> <li>Completed Questionnaires</li> <li>Baseline information</li> </ul>	<ul style="list-style-type: none"> <li>PMU</li> <li>Contractor's SHE officer</li> </ul>
<p>Identify environmental and social impacts &amp; associated mitigation measures &amp; develop the ESMP</p> <p>Review and update ESMP</p>	<ul style="list-style-type: none"> <li>Key Informants Interviews</li> <li>Focus Group Discussions</li> <li>Questionnaires</li> </ul>	<ul style="list-style-type: none"> <li>Proposed Scheme sites</li> <li>RDC offices</li> <li>Mutare provincial offices</li> </ul>	Year 1 to 7	<ul style="list-style-type: none"> <li>DOIR staff</li> <li>Partners</li> <li>AGRITEX Officers</li> <li>Traditional leadership</li> <li>Councilor</li> <li>RDCs</li> <li>IMC</li> <li>Farmers</li> </ul>	<ul style="list-style-type: none"> <li>Minutes</li> <li>Completed Questionnaires</li> <li>Baseline reports</li> </ul>	<ul style="list-style-type: none"> <li>PMU</li> <li>Contractor's SHE officer</li> </ul>

Objective of Stakeholder Engagement	Engagement Method	Location	Timeline	Stakeholders	Output	Responsibility
		<ul style="list-style-type: none"> <li>• Harare for Head offices</li> </ul>		<ul style="list-style-type: none"> <li>• Other Government Departments</li> </ul>		
Sharing of Project Information and ESMP among stakeholders	<ul style="list-style-type: none"> <li>• Meetings</li> <li>• Phone calls</li> <li>• Emails</li> <li>• Social media platforms</li> </ul>	<ul style="list-style-type: none"> <li>• RDC Offices</li> <li>• Irrigation sites</li> <li>• RDC offices</li> <li>• Mutare provincial offices</li> <li>• Harare for Head offices</li> </ul>	Year 1 to year 7	<ul style="list-style-type: none"> <li>• DOIR staff</li> <li>• Partners</li> <li>• AGRITEX Officers</li> <li>• RDCs</li> <li>• IMC</li> <li>• Contractors and Consultants</li> </ul>	<ul style="list-style-type: none"> <li>• Minutes</li> <li>• Attendance register</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• Contractor's ESMP Team</li> </ul>
<ul style="list-style-type: none"> <li>• Raising awareness on SEAH prevention and response &amp; GRM on Project Stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder meetings</li> <li>• Workshops</li> </ul>	<ul style="list-style-type: none"> <li>• Respective wards</li> <li>• Irrigation sites</li> <li>• Affected Villages</li> <li>• RDC Offices</li> <li>• Harare for Head offices</li> </ul>	Year 1 - 7	<ul style="list-style-type: none"> <li>• DOIR staff</li> <li>• Partners</li> <li>• AGRITEX Officers</li> <li>• Traditional leadership</li> <li>• Councilor</li> <li>• Chipinge/Chimanimani RDC</li> <li>• IMC</li> <li>• Farmers</li> <li>• Other Government Departments</li> </ul>	<ul style="list-style-type: none"> <li>• Minutes</li> <li>• Attendance register</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• Contractor's ESMP Team</li> <li>• District's Office</li> </ul>
<ul style="list-style-type: none"> <li>• Build capacity on key E&amp;S Management</li> </ul>	<ul style="list-style-type: none"> <li>• Workshops</li> </ul>	<ul style="list-style-type: none"> <li>• Respective wards</li> <li>• Irrigation scheme sites</li> <li>• Affected Villages</li> <li>• RDC offices</li> </ul>	Year 6 and year 7	<ul style="list-style-type: none"> <li>• DOIR staff</li> <li>• Partners</li> <li>• AGRITEX Officers</li> <li>• Traditional leadership</li> <li>• Councilor</li> <li>• RDCs</li> <li>• IMC</li> <li>• Farmers</li> </ul>	<ul style="list-style-type: none"> <li>• Minutes</li> <li>• Attendance register</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• Contractor's ESMP Team</li> </ul>



Objective of Stakeholder Engagement	Engagement Method	Location	Timeline	Stakeholders	Output	Responsibility
		<ul style="list-style-type: none"> <li>• Mutare provincial offices</li> <li>• Harare for Head offices</li> </ul>		<ul style="list-style-type: none"> <li>• Other Government Departments</li> <li>• Contractors and Consultants</li> </ul>		
<ul style="list-style-type: none"> <li>• Ensuring project information is continuously shared among stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Meetings</li> <li>• Phone calls</li> <li>• Emails</li> <li>• Social media platforms</li> <li>• Workshops</li> <li>• Reports</li> </ul>	<ul style="list-style-type: none"> <li>• Respective wards</li> <li>• Irrigation sites</li> <li>• Affected Villages</li> <li>• RDC offices</li> <li>• Mutare provincial offices</li> <li>• Harare for Head offices</li> </ul>	The lifespan of the project	<ul style="list-style-type: none"> <li>• DOIR staff</li> <li>• Partners</li> <li>• AGRITEX Officers</li> <li>• Traditional leadership</li> <li>• Councilor</li> <li>• RDCs</li> <li>• IMC</li> <li>• Farmers</li> <li>• Other Government Departments</li> </ul>	<ul style="list-style-type: none"> <li>• Minutes</li> <li>• Progress reports</li> <li>• Attendance register</li> </ul>	<ul style="list-style-type: none"> <li>• PMU</li> <li>• Contractor's ESMP Team</li> </ul>

## **11.0 ENVIRONMENTAL AND SOCIAL COMPLIANCE FRAMEWORK**

The PIU and the MoLAWFRD shall ensure that the management measures provided in the ESMP are wholly implemented and monitored to ensure that the operation is in line with national requirements, UNDP safeguard policies and standards and the Project ESMF. In addition, the PIU shall ensure the contractor has adequate technical, human and financial resources to effectively implement and monitor the ESMP.

### **11.1 Responsibilities for ESMP implementation and Monitoring**

*Project Management Unit (PMU):* The PMU will provide technical oversight in the implementation and monitoring of the ESMP in line with the project ESMF. The Environmental and Social Safeguards (ESS) Specialist under the PMU shall be responsible for monitoring the implementation all aspects of the ESMP. Key responsibilities of the ESS specialist shall include but not limited to the following:

- Review the Contractor's Environment and Social Management Plan (C-ESMP), including all updates and revisions at frequencies specified in the Contractor's contract
- Monitor the Contractor's implementation of, and compliance with, the Environmental and Social Management Plan;
- Review all other applicable contractor's documents related to ESHS aspects including the health and safety plan, Emergency Preparedness and Response Plan, Labor Management Plan, Security Management Plan and Sexual Exploitation, Abuse and Harassment (SEAH) prevention and response action plan;
- Review and consider the Environment, Social, Health and Safety (ESHS) risks and impacts of any design change proposals and advise if there are implications for compliance with ESMP, consent/permits and other relevant project requirements;
- Undertake monthly ESHS audits or supervisions and/or inspections of any sites where the Contractor is undertaking activities under its contract to verify the Contractor's compliance with ESHS requirements (including where appropriate its SEAH obligations). This may include review of the Contractor's accident logs, community liaison records, monitoring records and other ESHS related documentation
- Determine remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ESHS obligations.
- Ensure representation of stakeholders such as ministry staff, beneficiaries and local communities at relevant meetings including site meetings, and or progress meetings to discuss and agree appropriate actions to ensure compliance with ESHS obligations;

- Ensure that the Contractor’s actual reporting (content and timeliness) is in accordance with the Contractor’s contractual obligations;
- Review and critique, in a timely manner, the Contractor’s ESHS documentation (including regular reports and incident reports) regarding the accuracy and efficacy of the documentation.
- Undertake liaison, from time to time and as necessary, with stakeholders to identify and discuss any actual or potential ESHS issues;
- Operationalize, fine-tune and maintain the Project grievance redress mechanism including types of grievances to be recorded and how to protect confidentiality e.g. of those reporting allegations of Gender Based Violence (GBV)/SEAH; and
- Conduct periodic meetings with the Contractor’s designated health and safety personnel and ensure that accident prevention measures are always in place in line with the Contractor ESMP; and
- Conduct an end of sub-project environmental and social compliance audit and identify any outstanding ESHS issues requiring further attention in order to ensure responsible exit.

*Responsible Parties (RPs):* The RPs together with the PMU will provide technical oversight in the implementation and monitoring of the ESMP in line with the Project ESMF. The responsibilities of the RPs in relation to the implementation of the ESMP include:

- Monitor the Contractor’s implementation of, and compliance with, the Environmental and Social Management Plan;
- Review and consider the Environment, Social, Health and Safety (ESHS) risks and impacts of any design change proposals and advise if there are implications for compliance with ESMP, consent/permits and other relevant sub-project requirements;
- Undertake periodic supervisions and/or inspections of any sites where the Contractor is undertaking activities to verify the Contractor’s compliance with ESHS requirements
- Ensure representation of stakeholders such as ministry staff, beneficiaries and local communities at relevant meetings including site meetings, and or progress meetings to discuss and agree appropriate actions to ensure compliance with ESHS obligations;
- Ensure that the Contractor’s actual reporting (content and timeliness) is in accordance with the Contractor’s contractual obligations;
- Provide the training on Operation and Maintenance of agricultural equipment and best agronomic practices to avoid, minimise, mitigate or offset the environmental and social impacts

*The Contractor:* The contractor shall implement the agreed Contractor ESMP (C-ESMP) to prevent and minimize harm and nuisances on local communities. The duties of the Contractor shall include but not limiting to:

- Comply with relevant and applicable legislative requirements governing the environment, social and public health and safety;
- Work within the scope of contractual agreements and other tender conditions;
- Organize representatives of the construction team to participate in the joint site inspections
- Carry out any corrective actions instructed by the PMU or Supervising Contractor;
- In case of non-compliances/discrepancies, carry out investigation and implement mitigation and remedial measures to reduce environmental and social impacts;
- Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental and social impacts;

*Government Agencies, local communities & CSOs:* The Environmental Management Agency (EMA), other government agencies and CSOs will be responsible for overall external monitoring of the implementation of this ESMP. Government agencies and CSOs will provide technical support and participate in training and sensitization of stakeholders (if requested) to enhance understanding of the national environmental and social safeguard instruments.

*Farmers:* The farmers will be responsible for implementing the ESMP particularly during the operational phase of the sub-project.

## **11.2 Compliance with legal and contractual requirements**

The civil works activities shall comply not only with contractual environmental protection and pollution control requirements but also with environmental and social protection and pollution control laws of the Republic of Zimbabwe. The PMU shall monitor progress and program of the works to check that relevant environmental and social laws are not being violated, and that any potential for violating the laws can be prevented. The Contractor shall submit all relevant environmental and social documents to the PMU including the updated environmental and social work progress report. The PMU shall also have access, upon request, to the SHE Site log-book and grievance register. After reviewing the documents, the PMU shall advise the contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the PMU through its audits and supervision mission concludes the Contractor is violating environmental protection and pollution control requirements, the PMU shall advise the Contractor immediately, and may also order temporary cessation of works.

### **11.3 Corrective Actions and Disciplinary Procedure**

Corrective actions and disciplinary procedures will be set out, and where possible, included in contractual agreements. Without disciplinary action there is a risk that environmental and social management measures will not be implemented. Where the PMU finds that the Contractor has violated the environmental and social measures set out in their contractual agreement(s), corrective action, and in extremes, disciplinary action will be taken. If a violation is detected during a site visit, the Project Manager will be notified and the means of rectification communicated in writing. The Contractor will discuss with the PMU and agree on the realistic deadline for rectifying the violation. If the violation is reported to the PMU by some other entity, the PMU will conduct a site visit and, similarly, issue a warning and deadline for implementing corrective actions. The PMU will return to the site on the scheduled deadline to determine progress in implementing the corrective actions. If no mitigation measure has been implemented, the PMU will notify the Contractor in writing to, inform them of the disciplinary action to be taken with copies of the same notification submitted to the Project Focal Point.

### **11.4 Reporting Arrangements**

A system of reporting of the ESMP commitments is required. This will apply to the contractor and the PMU. Each of these parties will provide reports on the actions taken in the previous reporting period to implement the ESMP as provided in Table 33.



Table 33: Types of reports, Frequency, Content and Distribution

Report	Responsibility	Destination	Content
Weekly H&S register	Contractor's SHE officer(s)	PMU to check when supervising& monitoring	<ul style="list-style-type: none"> <li>• All daily events related to SHE and follow up on activities</li> </ul>
SHE Monthly Report	Contractor's SHE officers	PMU	<ul style="list-style-type: none"> <li>• Monthly summary of all events</li> <li>• Implementation of the ESMP</li> <li>• Program for the following month</li> <li>• Training progress</li> <li>• Needs identification</li> <li>• Improvement Recommendation</li> </ul>
Annual Progress Reports	PMU	GCF	<ul style="list-style-type: none"> <li>• Monthly summary of all events, compliance and monitoring results should form a major part of the reports to be submitted</li> </ul>

## 12.0 GRIEVANCE REDRESS MECHANISM

The proposed development of an irrigation schemes is aimed at improving the living standards and quality of life of the beneficiaries of the scheme and the community at large whilst maintaining the ecological integrity of its environs. However, conflicts and dissatisfaction may arise at any given time relating to the design, implementation or assessment of the irrigation schemes. Potential grievances could be very broad in scope. They can be environmental issues related to depletion and degradation of resources e.g. land and water, air pollution, noise, etc; social issues e.g. land and water use conflicts, maintenance bill management, theft, GBV, Sexual Exploitation and Abuse (SEA), sexual harassment, etc.) An effective grievance redress mechanism in the irrigation acts as a formal system through which stakeholders can lodge any grievance that arise. The grievance redress mechanism proposed in this section will make complaints be resolved in a free, fair, transparent, timely, efficient and economical manner. Any grievance that may arise need to be effectively redressed to avoid reversing the gains of implementing the irrigation scheme.

Effective grievance redress mechanisms help to:

- ensure accountability by providing a channel through which stakeholders can hold actors accountable for their obligations and commitments
- serve as an early warning system by helping to identify problems and close gaps in a timely and cost-effective manner, thereby avoiding escalation of problems into more entrenched or complex disputes
- identify recurring problems or grievances that may escalate by helping to identify underlying systemic issues that need to be addressed
- ensure respect for rights by providing a channel through which human rights abuses can be detected and redress obtained
- tackle corruption by providing a secure channel for victims and whistle-blowers to seek and achieve redress.

### 12.1 Grievance Redress Mechanism (GRM)

The Project will set up a Grievance Redress Mechanism (GRM) on traditional conflict-resolution flows as well as administrative and project-based steps to ensure community members or any stakeholders have the opportunity and means to raise their concerns, complaints and suggestions. A four tier redressal structure is proposed to address complaints that may emanate from the implementation of sub-project activities. It represents different stakeholders at the various levels of the conflict resolution process. Within the first 3-6 months of project commencement, the project will set up the GRCs, select the district/provincial GRM focal points, disclose the specific GRM information to stakeholders through manuals and brochures. The overall responsibility for the coordination of the GRM lie with the Safeguards Officer in the Project Management Unit (PMU). All grievances received under the project shall be recorded at the grievance database kept at the PMU (see appendix 4).

#### **First tier of Redress: - Local/Community level GRC**

Local/community level Grievance Redress Committees (GRCs) shall be established in each proximate cluster of beneficiary communities and shall comprise of nominated members representing a well spread out demography, including women, girls and youth. The members of the GRC shall be selected following a

participatory process. Local interest groups such as relevant Civil Society Organisations (CSOs), community leaders and reputable community associations shall also participate in the selection of the GRC members or be a part of such committee. A representative of the local traditional authority shall be included as a key member of the GRC.

The community-based GRCs through its secretary shall receive and register grievances and submit the same grievance(s) to the PMU through the Grievance Submission Form. Apart from registering grievance, the committee shall seek to resolve grievances at this level with the support of the PMU when required. However, grievances that are beyond the capacity of the Local GRC to resolve shall be escalated or referred to the District/Province GRC and subsequently the PMU or other appropriate organs such as the Police or the Judiciary.

### **Second tier of Redress: District level GRC**

In a case that a grievance is not resolved at community level GRC to the satisfaction of the complainant, the grievance may be referred to the next tier of redressal, which is at the district level. The GRM focal person at district level and the Safeguards Officer will coordinate with the relevant government departments, in nominating the Committee members depending on the nature of the complaint. The necessary circulars will be issued so that the committee could convene whenever required. The complainant may decide to take the matter to the next level of grievance redress or a legal or any other recourse if s/he is not satisfied with the resolutions at the second tier GRM.

### **Third tier of Redress: Provincial level GRC**

In a case that a grievance is not resolved at District level GRC to the satisfaction of the complainant, the grievance may be referred to the next tier of redressal, which is at the Provincial level. The GRM focal person at Provincial level and the Safeguards Officer will coordinate with the relevant government departments, in nominating the Committee members depending on the nature of the complaint. The necessary circulars will be issued so that the committee could convene whenever required. The complainant may decide to take the matter to the next level of grievance redress or a legal or any other recourse if s/he is not satisfied with the resolutions at the third tier GRM.

### **Fourth Tier of Redress: Project focal point**

The Project focal point will act as the Apex to hear and adjudicate on appeals against all other GRM Committee decisions. Pending cases shall be presented by the Project focal point of each of the Subcommittees to the PSC. The Project focal point will establish an adhoc committee that will review and resolve any appeals against the other GRM Committees. Unresolved grievances by the committee shall be referred to Arbitration or to the court of Law. The committee, while handling a complaint may request any staff for its assistance and/or may constitute a special committee if required.

### **Grievance Redressal at Arbitration/Court of Law**

In the event that there is dissatisfaction from affected parties that cannot be resolved within the project's proposed grievance resolution process, the Project Steering Committee shall refer the dispute or difference to arbitration within 30 days. It should be noted that arbitration only works where the parties to a dispute agree to resolve a difference through arbitration. Where there is no consent, then a court of jurisdiction may

be used to resolve a dispute. The Court is the final instrument for the resolution of all grievances that may not have been addressed by the Project GRM. Figure 45 illustrates the GRM.

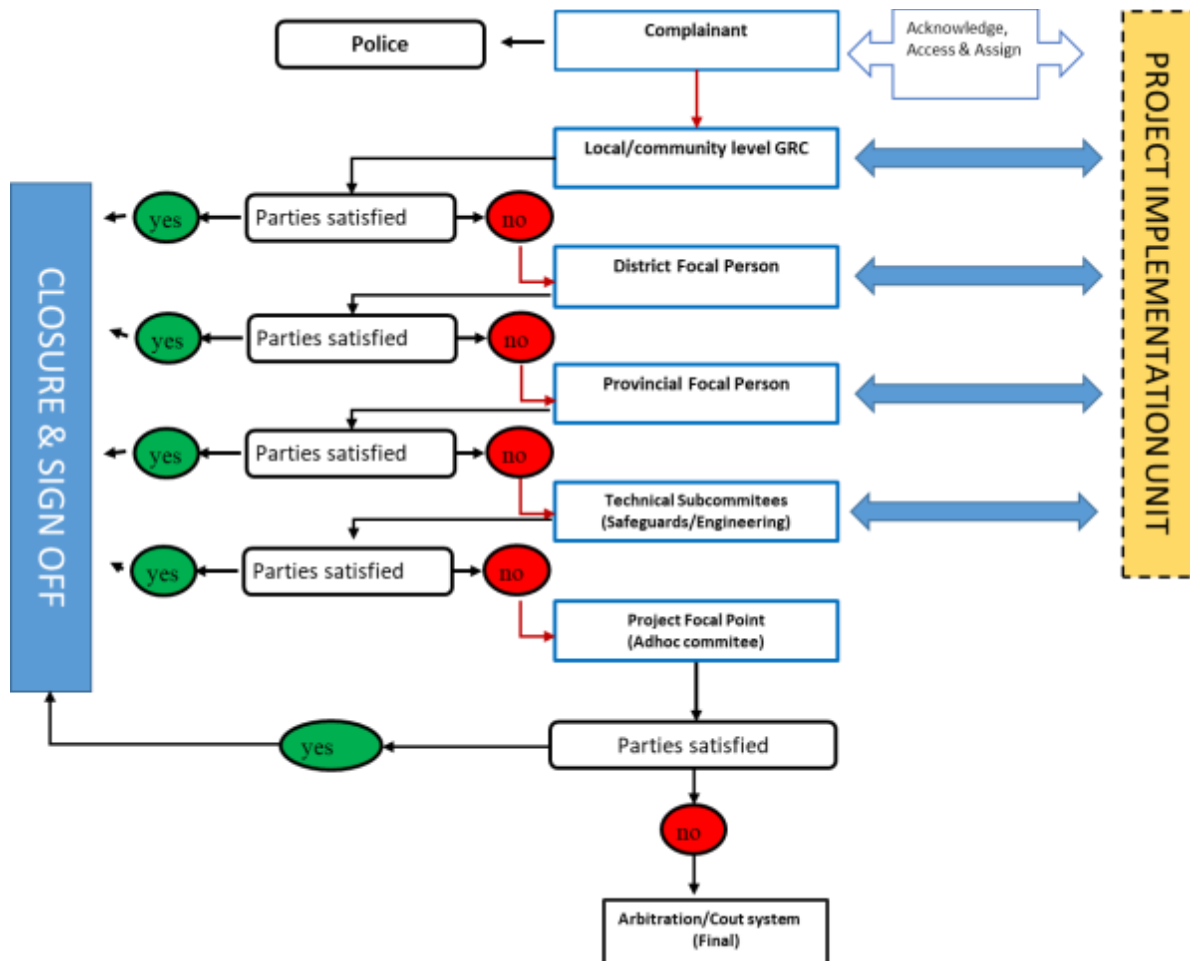


Figure 45: Project Resolution Process

Table 34 presents the suggested timelines for resolving grievances

Table 34: Timelines for resolving grievances

Receiving and Registering grievance	Within 1 day
Acknowledge, Assess and Assign	Within 2 days
Develop Response	Within 14 days
Provide Feedback	Within 21 days
Implement Response	Within 21 days
Close Grievance	Within 1 month

## 12.2 UNDP Accountability Mechanism

In addition to the project-level GRM and national grievance redress mechanisms, complainants have the option to access UNDP's Accountability Mechanism, which include the Social and Environmental Compliance Unit (SECU) and the Stakeholder Response Mechanism (SRM).

### *Social and Environmental Compliance Unit (SECU)*

UNDP established SECU to ensure accountability to individuals and communities. SECU responds to complaints that UNDP may not be meeting its social and environmental commitments. Any person or community who believes the environment or their wellbeing may be affected by a UNDP-supported project or programme may file a complaint. A representative, such as a civil society organization, may also file a complaint on behalf of affected communities. People who file complaints may request that SECU protect their names and identities.

### *Stakeholder Response Mechanism (SRM)*

The Stakeholder Response Mechanism helps project-affected stakeholders, governments and others partners jointly resolve concerns and disputes. It is available when implementing partner and UNDP project-level stakeholder engagement processes have not successfully resolved issues of concern. UNDP Country Office management normally leads in stakeholder response; a headquarters function will also support the SRM.

Any person or community potentially affected by a UNDP-supported project may file a request for a response from the Stakeholder Response Mechanism, if they have raised their concerns with Implementing Partners and/or with UNDP through standard channels for stakeholder consultation and engagement and have not been satisfied with the response.

If a person or community has a concern about the ability of the UNDP Country Office to respond fairly and effectively to the request, they have the option to file the request directly with the Stakeholder Response Mechanism at UNDP Headquarters in New York. Requests can be sent to the SRM through the Internet or through the mail.

### *Where to File the Request*

Aggrieved stakeholders can submit grievances to SECU or requests to SRM through the UNDP Country Office or directly to UNDP Headquarters in New York. Requests can be made through online, email, toll-free telephone hotline (in any language), mail, or an in-person meeting with the Country Office Designee,

- **By phone** Call (costs are incurred by caller) using 001 (917) 207 4285. Skype is an affordable way to place such a call.
- **Submitting a Request by Post (in any language)** to: Attn: SECU/SRM, OAI, UNDP, 1 U.N. Plaza, 4th Floor New York, NY USA 10017
- **Submitting a Request by Email (in any language)** to: [secuhotline@undp.org](mailto:secuhotline@undp.org) / [stakeholder.response@undp.org](mailto:stakeholder.response@undp.org)
- **Social Media Apps.** Grievances can be sent through WhatsApp, Viber and Signal using 001 (917) 207 4285, or through our WeChat account @SECUSR

## 12.3 Approach to GRC

Affected person/aggrieved party can approach to GRC for redress of his/their grievances through any of the following modes-



- (a) Web based: A separate corner will be developed at the program website so that public / community/ affected person can register their complaint in the online column.
- (b) Telecom based: A toll free no. Will be issued by the PICU / PIU so that general public can register their complaint through telephone / mobile phone to the PIU/PICU office.
- (c) Through Community Based Prominent Person: The local representative of the CBPP/AEN appointed for the purpose will collect the problems and issues of the community or affected person and pass on the same to PIU / PICU.

#### 12.4 Cost of Implementing the GRM

An average budget estimate of USD 14683 is proposed for operationalizing the GRM presented in this report. A summary breakdown is provided in Table 31.

Table 35: Cost of implementing and operating the GRM

<b>TASK</b>	<b>AMOUNT (USD)</b>	<b>PERSON RESPONSIBLE</b>
Preliminary stakeholder engagements/awareness building	\$2331.00	<ul style="list-style-type: none"> <li>• GRM Coordinator</li> <li>• Environmental and Social Safeguards Committee</li> </ul>
Orientation and training workshop,	\$2240.00	<ul style="list-style-type: none"> <li>• GRM Coordinator at PMU</li> </ul>
Preparation of communication materials (awareness and instructive materials), including suggestion boxes	\$1631.00	<ul style="list-style-type: none"> <li>• GRM Coordinator</li> <li>• Communication Consultant</li> </ul>
Establish Telephone hotlines, Internet, Email and social platforms (Facebook, WhatsApp)	\$1631.00	<ul style="list-style-type: none"> <li>• GRM Coordinator</li> <li>• Communication Consultant</li> </ul>
Set up of GR infrastructure at PMU, including meetings and logistics	\$1029.00	<ul style="list-style-type: none"> <li>• PMU</li> <li>• GRM Coordinator</li> </ul>
Logistic support to key community- based GRC members	\$4200.00	<ul style="list-style-type: none"> <li>• GRM Coordinator,</li> </ul>
Conduct GRM evaluation	\$1631.00	<ul style="list-style-type: none"> <li>• M&amp;E Specialist</li> </ul>
<b>TOTAL</b>	<b>\$14683.00</b>	

### **13.0 CONCLUSION AND RECOMMENDATION**

The development of the proposed irrigation schemes is slated to engender significant positive impacts on food production, climate resilience, employment, economic development, livelihoods and quality of life. Marketing and climate smart crop value chain will come with economic expansion and diversification that would lead to stimulation of economic both local and national development. The local economy would be improved. There would be creation of employment to several people in the area and beyond throughout the whole project cycle. There would be improved public accessibility to health and education, knowledge and skills enhancement of agriculture related activities, information exchange and strengthened social capital. That kind of development promotes women and youth empowerment. There will also be increased resilience and improved well-being of vulnerable beneficiaries. With proper management, the irrigation schemes would promote good governance.

Despite these positives, the sub-projects are likely to bring negative environmental and social risks. Biophysical negative impacts include surface and groundwater depletion and pollution; nutrient leaching; waterlogging; degradation of air quality; biodiversity loss, land pollution, soil erosion, noise pollution, sedimentation and siltation of rivers and dams. The anticipated social risks include conflicts related to land, water and scheme management. Influx of a youthful and active population group into the area that may lead to cultural changes and modifications, poor labor conditions, increased crime rates, sexual exploitation and abuse, prevalence of HIV and Sexually Transmitted Infections. Water borne diseases, child labour, gender bias, Sexual harassment and Exploitation (SEA) and Gender Based Violence (GBV) are other problems. There could also be animal-human beings' conflicts, accidents, health and safety incidents. However, these environmental and social risks are likely to be low or moderate and can be addressed through straight forward application of environmental siting, permitting requirements, pollution prevention, design criteria, construction standards, and training and awareness raising.

In spite of the implementation of the safeguards measures articulated in the ESMP, grievances may arise during the course of implementation of sub-project activities. Hence the project Grievance Redress Mechanism shall be rolled out to all the sub-project implementation areas. The aim of the Grievance Redress Management System is to respond to and settle or redress any grievances, complaints, queries or clarifications from stakeholders in a manner that is legitimate, reliable, transparent, cost-effective, accessible and culturally appropriate to all parties. The project GRM represents a multi-tier redressal structure with grievance redress taking place at local/community level, district level and provincial level all the way to the Project Focal Point. The project stakeholders shall be sensitised to take their complaints or grievances to the GRM committees established at each level whenever they feel aggrieved.

We conclude that, if the environmental and social safeguard measures proposed in this ESMP are fully implemented at all phases development, the benefits that the sub-projects will bring to the communities will far outweigh the negative impacts. Therefore, a green light should be given to the development of the Lot 3 Irrigation Schemes.

## 14.0 APPENDICES

### Appendix: 1 Framework legislation and compliance mechanisms

Legislation	Compliance strategy	Permits / License / Certificate / Reporting required	Monitoring agent
The Constitution of Zimbabwe Amendment Act (2013)	The project shall ensure that human rights principles are mainstreamed in sub-project develop processes	ESMP clearance certificate	EMA
Environmental Management Act [Chapter 20:27]	The project will carry out environmental and social studies for the sub-project in line with EMA requirements	ESMP clearance certificate	EMA
SI 7 of 2007 (EIA and Ecosystems protection regulations)	The project will ensure that biophysical studies are conducted to identify any potential impact on natural ecosystems including sensitive ecosystems	ESMP clearance certificate	EMA
	The project shall apply for the renew of an ESMP certificate within six months from the date of expiry (planning and construction phases)	ESMP clearance certificate	
S.I 10 of 2007 (Hazardous Waste Management Regulations)	The project will ensure that all hazardous waste is managed in accordance with the provisions of the ESMP.	ESMP clearance certificate	EMA
S.I 268 of 2018 (Hazardous Substance, Regulations)	The project shall implement the ESMP, and ensure that any potential hazardous waste is managed in a responsible and sustainable manner	ESMP clearance certificate	EMA
Zimbabwe National Water Authority Act (Chapter 20:25)	The project shall apply for water abstraction permits during the construction and operation phases of the project	Water Permit	ZINWA
S.I 206 2001 (Water permits and regulations)	The project shall apply for a water abstraction permit during the construction and operation phases of the project	Water Permit	ZINWA
Factories and Works Act [ Chapter 14:08] of 1996	The project will ensure that the ESMP is fully implemented to prevent any forms of workplace related accidents and incidences	ESMP clearance certificate	NSSA /EMA
Statutory Instrument 72 of 2009	The project shall implement the ESMP to control any forms of air pollution from sub-project activities	ESMP clearance certificate	EMA
Statutory Instrument 7 of 2011 (Prohibition and Control of Ozone Depleting Substances)	The project shall implement the ESMP and ensure that no ODSs shall be used during the construction and operational phases of the sub-project	ESMP clearance certificate	EMA
SI 68 of 1990 (Accident Prevention and Workers Compensation Schemes)	The contractors shall implement the C-ESMP to ensure that operations do not harm or present any form of injuries to their employees	C-ESMP	NSSA
Public Health Act [Chapter 15:09]	The ESMP shall be implemented to ensure that nuisances such as dust, noise and waste	ESMP clearance certificate	EMA and Ministry of

Legislation	Compliance strategy	Permits / License / Certificate / Reporting required	Monitoring agent
Revised Edition of 1996	are managed during all phases of sub-project development		Health AND Child Care (MoHCC)
Public health (COVID-19 Prevention, containment and treatment) Regulations, 2020	The project will develop and implement a Covid 19 Management Plan that is compliant to national regulations and WHO Covid 19 protocols	ESMP clearance certificate	MoHCC
National Museum and Monument of Zimbabwe Act [Chapter 25:11]	The project will ensure that the ESMP is implemented to ensure that cultural heritage is protected. A chance find procedure will be activated if any tangible forms of cultural heritage are encountered during construction activities.	ESMP clearance certificate	National Monument and Museum, Zimbabwe
Chiefs and Headmen Act [Chapter 29:01]	The project shall ensure that traditional laws and protocols are observed, and that local leadership is consulted to avoid misusing sacred areas or degrading traditional values.	ESMP clearance certificate	Traditional leadership
Rural District Councils Act (Chapter 29:13)	The project shall implement an ESMP to ensure proper waste management practices are adopted during the implementation of sub-project activities.	ESMP clearance certificate	RDCs
Forest Act (Chapter 19:05)	The project shall implement the ESMP to control any potential destruction of biodiversity and forestry resources due to sub-project activities	ESMP clearance certificate	Forestry commission
Parks and Wildlife Act (Chapter 20:24)	The project shall implement an ESMP to ensure proper management of wildlife resources that include indigenous plants, wild animals, fish, etc	ESMP clearance certificate	Parks and Wildlife Authority
Labour Act (Chapter 28:01)	The project shall implement a labour management plan and ensure that employee rights are respected	ESMP clearance certificate	NSSA
National Museums and Monument Act (Chapter 25:11)	The project shall implement the ESMP and ensure that the chance find procedure is activated in the event that tangible forms of cultural heritage are encountered	ESMP clearance certificate	National Museums and Monuments Department
Pesticides Regulations, SI 144 of 2012	The project shall implement the ESMP and ensure that only registered pesticides are used during the operation phases of the sub-project	ESMP clearance certificate	MoLAWFRD
Communal Land Act (20:04)	The sub-project shall acquire land use rights from the Rural District Councils, and also ensure that stakeholder consultations are properly done with the current land users	Land use rights Voluntary land use agreements	RDCs

## **Appendix 2: Chance Find Procedure**

### *Purpose of the chance find procedure*

The chance find procedure is a project-specific procedure developed specifically for the Project “*Building the climate resilience for vulnerable agricultural livelihoods in Southern Zimbabwe*”. The procedure outlines actions required if previously unknown tangible forms of cultural or archaeological importance are encountered during project construction phase. A Chance Find Procedure is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

### *Scope of the chance find procedure*

This procedure is applicable to all activities conducted by the personnel, including contractors that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. The procedure outlines the roles and responsibilities and the response times required from both project staff, and the National Museums and Monuments of Zimbabwe (NMMZ).

### *Induction/Training*

All personnel, especially those working on excavations and or trenching are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

### *Chance find procedure*

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify the site foreman who will then notify the site Manager and the Safety, Health and Environment (SHE) Officer;
3. The site SHE officer shall record details in Incident Report Form and take photos of the find;
4. The site SHE officer shall ensure the discovered site or area is delineated and secured to prevent any damage or loss of removable objects. In cases of removable relics or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. The SHE officer shall inform the relevant local authority and the NMMZ immediately and in writing within 7 days from the find;
6. The site SHE officer shall provide the NMMZ team with photos, other information as relevant for identification and assessment of the significance of heritage items;

7. The Department of National Museums and Monument shall investigate the find and provide response in writing.
8. Decisions on how to handle the find shall be taken by the NMMZ. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
9. Construction works shall resume only after permission is granted from the responsible authorities.
10. All records of communication with decision making authorities including conclusions and recommendations/guidance, implementation reports shall be kept.

#### Additional information

##### Management options for archaeological site

Site avoidance. If the boundaries of the site have been delineated, attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option)

Mitigation. If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.)

Site Protection. It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of visibility fencing around the site or covering the site area. The exact prescription would be site- specific.

##### Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

##### *Replicable heritage*

Where tangible cultural heritage that is replicable<sup>1</sup> and not critical is encountered, mitigation measures will be applied. The mitigation hierarchy is as follows:

Avoidance;

Minimization of adverse impacts and implementation of restoration measures, in situ;

Restoration of the functionality of the cultural heritage, in a different location;

Permanent removal of historical and archaeological artefacts and structures;

Compensation of loss where minimization of adverse impacts and restoration not feasible.

---

<sup>1</sup> Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular eras and cultural values they represent are well represented by other sites and/or structures.



### Non-replicable heritage

Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage.

Nonreplicable<sup>2</sup> cultural heritage must not be removed unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and

Any removal of cultural heritage must be conducted using the best available technique advised by the Department of National Museums and Monuments

### Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above.

### EMERGENCY CONTACTS

National Museums and Monuments of Zimbabwe

Address: 107 Rotten Row, Penrose Hill Building Causeway, Harare, Zimbabwe

Tel: +263 24 2774208.

E-Mail: [natmus@nmmz.co.zw](mailto:natmus@nmmz.co.zw)

Website: <http://www.nmmz.co.zw/>

---

<sup>2</sup> Nonreplicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents, or (ii) cultural heritage is unique or relatively unique in linking several periods in the same site. Examples of non-replicable cultural heritage may include an ancient city or temple, or a site unique in the period that it represents

### Appendix 3: Stakeholder consultation tools

#### A. FDG Discussion Guide

#### ENVIRONMENTAL AND SOCIAL DATA FDG TOOL – LOT 3 IRRIGATION SCHEMES

Name of scheme	
Ward No	
District	
Province	
Chief	
GPS Coordinates	
Date of establishment	
Existing status (take photos)	
Irrigation Management Committee Constitution	
Size of scheme (ha)	
Individual plot size (ha)	
Land tenure system	
Current land use	
<b>Challenges at the scheme</b>	
Environmental <ul style="list-style-type: none"> <li>• Human wildlife conflict</li> <li>• Natural hazards</li> </ul>	
Social	
Technical <ul style="list-style-type: none"> <li>• (Energy, water, conveyancing, pumps, etc)</li> </ul>	
Economic <ul style="list-style-type: none"> <li>• Markets, prices of inputs, etc</li> </ul>	
<b>Water Source, availability, and Use</b>	
Water source <ul style="list-style-type: none"> <li>• (river, dam, borehole)</li> </ul>	
Water availability (Quantity)	
Water users (downstream)	
Water users (upstream)	
Potential water conflicts	
<b>Cultural Heritage</b>	
Tangible & intangible forms of cultural heritage	
Sacred sites	
<b>Biophysical setting</b>	
Soils (Susceptibility to erosion)	
Vegetation <i>Types</i> <i>Invasive species</i>	
Faunal species	
General Air quality	

Geology	
<b>Socio-economic</b>	
Education <ul style="list-style-type: none"> <li>Schools</li> <li>Distance walked</li> </ul>	
Health <ul style="list-style-type: none"> <li>Clinics</li> <li>Services provided</li> <li>Distance walked.</li> </ul>	
Vulnerable groups	
GBV service providers and local NGOs	
Economic activities	
Road Network	
Telecommunication	
Language	
Access to labour	
Trainings	
Crop preferences	
Irrigation technology preferences	
Other	

**B. HOUSEHOLD QUESTIONNAIRE**

**INTRODUCTION**

The Government of Zimbabwe through the Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD) in partnership with UNDP is implementing a seven-year project “Building the climate resilience for vulnerable agricultural livelihoods in Southern Zimbabwe”. One of the project components focuses on the revitalization of 15 existing irrigation schemes and the establishment of 6 new schemes in 15 priority districts of Manicaland, Masvingo and Matabeleland South Provinces. ....irrigation scheme is one of the schemes in Manicaland Province targeted for construction/ revitalization under the project. As a key stakeholder in the area, we kindly request your views on the project. The information will be used to identify potential environmental and social risks of the sub-project and ways of managing them.

**A. RESPONDENTS INFORMATION**

1. NAME \_\_\_\_\_ SEX:  M  F

2. AGE (YEARS): 6-20  21-25  26-30  31 and above

3. **MARITAL STATUS:** SINGLE  MARRIED  DIVORCED  WIDOWED  SEPERATED

**B. SOCIO-ECONOMIC INFORMATION**

4. What is your employment status? EMPLOYED  SELF EMPLOYED

UNEMPLOYED

a) Specify occupation

type\_\_\_\_\_

b) What is your estimated monthly income from employment activities?

\$0-19  \$20-50  \$51-100  \$101-\$200  > \$201

5. What is your highest level of education?

6. PRIMARY  SECONDARY  UNIVERSITY  VOCATIONAL  OTHER

Other / vocational specify

7. What is your current residential address

\_\_\_\_\_

8. How long have you been living at this address? 0-5 years  6-10 year  10-15 years

>16 years

\_\_\_\_\_

9. Which diseases are common in the area?

Malaria  TB  Diarrhea  bilharzia  others

10. Do you have access to a hospital near where you live? YES  NO

11. How far is the hospital from where you live? 0-2KM  2-4KM  4-10KM  >10KM

b. What type of hospital services do you get?

General  Baby  Clinic ernity Surgery Other

### C. GCF PROJECT

12. Are you aware of proposed construction/ revitalisation of the irrigation schemes  
Yes  No

13. How did you get to know about the above mentioned project?

---

14. From your own point of view, does the project bring benefits to the project area and the province at large?

Yes  No

15. If yes, what are the benefits?

---

---

---

---

16. Since you started staying in this area which plants and animals existed

Species name/English names/Shona names	Uses/benefits

17. Are there any environmental and social impacts you foresee due to this project?

Yes  No

Explain: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

18. Do you have any concerns to address to the proponent?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_

---

FOR OFFICIAL USE ONLY

Date of interview: \_\_\_\_/\_\_\_\_/\_\_\_\_



**Appendix 4: Grievance log sheet at PMU**

PROJECT TITLE: GCF BUILDING CLIMATE RESILIENCE		GRIEVANCE LOG SHEET - PMU											
S/N	NAME OF COMPLAINANT	CONTACT DETAILS	DESCRIPTION OF COMPLAINT	DATE RECEIVED	CHANNEL GRIEVANCE RECEIVED (Suggestion Box; Toll-free Line, email, letter etc.)	UNIT/ CONTRACTOR COMPLAINED OF	RISK PRIORITY INDEX	LOCATION (DISTRICT, PROVINCE)	GENDER	ACTION TAKEN/AGREED RESOLUTION	FEEDBACK GIVEN Y/N?	OUTCOME	DATE GRIEVANCE CLOSED
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

**Appendix 5: Voluntary land Agreement Forms**

Voluntary Land Agreement Form – Mudzimwa Irrigation Scheme

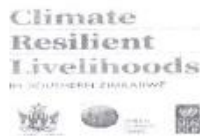
DISTRICT ADMINISTRATOR  
Ministry of Local Government  
Rural and Urban Development  
  
P. O. BOX 140, CHIPINGE  
TELEPHONE: 2546/7



ZIMBABWE

ENGINEER  
DEPARTMENT OF IRRIGATION  
MANICALAND PROVINCE  
23 MAR 2023  
P.O. BOX 220, CHIPINGE

**Ministry of Lands, Agriculture, Fisheries, Water and Rural Development**



Green Climate Fund Project "Building Climate Resilience of Vulnerable Agricultural Livelihoods in Southern Zimbabwe"

**VOLUNTARY LAND DEVELOPMENT AGREEMENT  
BETWEEN**

Land-Owner(s) – See Annex 1

DEPARTMENT OF AGRICULTURAL  
TECHNICAL AND EXTENSION SERVICES  
  
P.O. BOX 130  
CHIPINGE, ZIMBABWE

AND

POSITION	NAME	ID NUMBER	SIGNATURE	DATE
CHAIR	Mudzimwa Cloud	13-147936-J-13	<i>[Signature]</i>	23/03/23
SECRETARY	myrabe Simba	13-191119-X13	<i>[Signature]</i>	23/03/23
TREASURER	BAROPO GEORGE	24-068496-H13	<i>[Signature]</i>	23/03/23
COMMITTEE MEMBER	Lovness Manda	13-147887-F13	<i>[Signature]</i>	22/03/23

THE FARMERS (represented by IMC)- Mudzimwa Irrigation Scheme

DEPARTMENT OF AGRICULTURAL  
TECHNICAL AND EXTENSION SERVICES

P.O. BOX 130  
CHPINGE, ZIMBABWE

ENGINEER  
DEPARTMENT OF IRRIGATION  
MANICALAND PROVINCE

23 MAR 2023

Acknowledging that the Mushonwa Irrigation Scheme farmers represented by the Irrigation Management Committee members specified above have been given land by the Land Owners in the presence of Traditional Authority through the Headman or Village Head, for Irrigation Scheme development and use.

Acknowledged that the asset under construction and development (in this case, the asset is the Mushonwa irrigation scheme) is communal and addresses the project's developmental objective of increasing resilience and enhance livelihoods of the most vulnerable rural communities in southern Zimbabwe. The asset will be for public use to ensure that communities using it are resilient to climate change risks and hazards. The Land Owners, herein listed in Anex 1 have immediately seized to unilaterally control the specified land with boundaries'

Boundary	36K	UTM	Remark
	0436143	7773423	Near Borehole

**Signed**

Office	Name	Signature
Headman/Village Head	Mushonwa T.	<i>[Signature]</i>
Ward Councillor	Rodrick Simang	<i>[Signature]</i>
Ministry of Local Government (RDC)	RODRICK MANHANGA	<i>[Signature]</i>
Ministry of Local Government (DDC)	CHAMUSCA SALA	<i>[Signature]</i>
Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (AGRITEX)	TEWE B	<i>[Signature]</i>
Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (DOI)	MUGARIWA A	<i>[Signature]</i>

Now both Parties, the Mushonwa IMC and the communal landowners have agreed to cooperate as specified in this agreement to make use of the asset (herein referred to as Mushonwa irrigation scheme) for their socio-economic development.

The land within the asset (Mushonwa Irrigation scheme) to be constructed and developed, specified as .....ha, and demarcated on the area layout annexed to this agreement, will be used by the community/ beneficiaries each defined season within the calendar year.

DEPARTMENT OF AGRICULTURAL  
TECHNICAL AND EXTENSION SERVICES

ENGINEER  
DEPARTMENT OF IRRIGATION  
MANICLAND PROVINCE

23 MAR 2023

ANNEX 1. LAND OWNERS.....

P.O. BOX 190  
CHIPINGE, ZIMBABWE

IRRIGATION SCHEME

P.O. BOX 2720, MUTARE

DATE

LAND OWNER'S NAME	ID NUMBER	SIGNATURE/ THUMPRINT	DATE
Cicoci Bakoto	24-0684964 13		23/03/23
Benjamin Mubwa	13-08338-V-13		23/03/23
Kusoka Fungwa	13-079444-C-13		23/03/23
Kemets Phiso	58-0031712-13	KHGO.	23/03/23
Aiston Mabangu	13-109788 M		23/03/23
Godknow M	13-116954 H		23/03/23
CHRIS FAKARAZI	13-035645 B <sup>13</sup>		23/03/23
PAUL Mabangu	13-178743K B		23/03/23
Knock Mukusha	04-068582 04		23/03/23
Peter mudanwa	13-109723Y-13		23/03/23
Ngonjani M	—		23/3/23
Gwasirai M	—		23/3/23
KUMBIRA: G MABANGURE	13-180700X 13	K9	23/03/23
MUTEMA Eugen	—		23/03/23
LAST BIRSEPIKSE	13-162955-J-13		23/03/23
Simon Mudzimwa	13-252697 E 13	Simon	22/03/23
PETER BIRSEPIK	13-1-13		23/03/23
JEREMIAH SAMUEL	13-181593S 13		23/3/23
MUGETCHO GLADMAN	13-122003W 13		23/3/23
RESEMI MGECHO	13-202501T 13		23/03/23
Amos Mgecho	13-0113839 13		23/03/23
Munozya Mgecho	13-337218A 04		23/03/23



ENGINEER  
DEPARTMENT OF IRRIGATION  
MANICALAND PROVINCE  
P.O. BOX 205 MUTARE  
ZIMBABWE

ANNEX 1. LAND OWNERS.....IRRIGATION SCHEME 3 MAR 2023

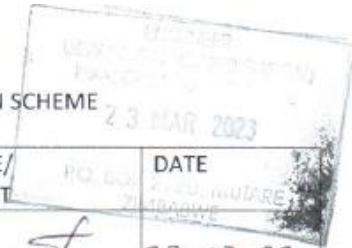
LAND OWNER'S NAME	ID NUMBER	SIGNATURE/ THUMPRINT	DATE
Chawhete Nancy	13-043823 S 13	[Signature]	23/03/2023
Dube Naume	75-049879 E 15	Dube Naume	23/03/2023
Mariyona Eliza	13-157423W13	M. E.	23/03/2023
Panda Maybina	13-187435W13	X	23/03/2023
Ozickair Mutumwa	13-063494Z13	X	23/03/2023
Chipo Makongya	63-1050453 E13	Chipo Makongya	23/03/2023
Lucy Simango		X	23-03-2023
Chiburumanda			
Locadiffer	13-129451R-13	Locadiffer	23-03-2023
Juliet Fabarou	13-035421 K 13	X	23/03/23
Bonitace Sithole	13-165299 C 13	X	23/03/23
Nelly Neching	44-002405 D 44	NWEC	23/03-23
Chipo Mubhelela	13-039275 J13	Ch. Mu	23/03/23
Anati Chinyaka		X	23/03-23
Marambe			
Aurilla	13-035383 R 13	X	23/03-23
Chipo Chohweta		X	23/03-23
Rhoda Mwarea	13-036697 E 13	X	23/03/23
Iyanai Bwari	13-158946 L13	X	04/11/75
Francisca Mtisi	63-800265 N13	Fmtisi	23/03/23
Maudeni Mudehema	13-160261 F 13	Pl. M.	23/03/23
Virginia Muchano	13-110975 J13	Aluchano	23/03/23
Salameira		X	
Semen masheke		X	

ANNEX 1. LAND OWNERS.....IRRIGATION SCHEME

LAND OWNER'S NAME	ID NUMBER	SIGNATURE/ THUMPRINT	DATE
Allen Mugecho	13-64325K13	Allen	23/03/23
Cleves Mugecho	13-114354913	Cleves	23/03/23
Trust Sigante	13-165983A13	Sigante	23/03/23
John Sigante	13-174634X13	Sigante	23/03/23
Mvingston Sigante	13-104786D13	Sigante	23/03/23
TAMBAKANI Chankani	13-186590213	Tanka	23/03/23
TAMVANTU Tambani	13-142587N13	Tanka	23/03/23
Nyasha Tambani	13-150917H13	Nyasha	23/03/23
Cephas Tomu	13-170122A13	Cephas	23/03/23
Kazuo Muregeya	13-194992H13	Kazuo	23/03/23
Respect Chwata	13-250410 T 13	Respect	23/03/23
Captain Harare	13924823-F1	Harare	23/03/23
Dingirwe Gilbert	13228854 L13	Gilbert	23/03/23
JOHN RAMBIKI	13-121908 S 13	John	23/03/23
MWAKHAYA LINDA	13-141745 S 13	Linda	23/03/23
EMILSON SIGANTE	13-078646 V 13	Emilson	23/03/23
FUNGI MWARAJA	13-154681 Q13	Fungi	23/03/23
BAROY MUAJUMA	13-217532 S 13	Baroy	23/03/23
LODREI MUIJUMA	13-249274 J 13	Lodrei	-
KISHA BINAGINCE	13-078819 G 13	Kisha	11
REFAIC MARAMBO	TS-191663 S13	Refaic	
Tigmore		Tigmore	23/03/23
TABARISA Mugecho	13-036152 F13	Tabarisa	23/03/23

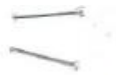


ANNEX 1. LAND OWNERS.....IRRIGATION SCHEME



LAND OWNER'S NAME	ID NUMBER	SIGNATURE/ THUMPRINT	DATE
CHARUMANKI JOTIMANI	13-243714 Q 13	<i>[Signature]</i>	23-03-23
Boniface Mtambo	13-212505513	<i>[Signature]</i>	23-03-23
Prasen Sibamba	13-114441 B 13	<i>[Signature]</i>	23-03-23
GODFREY DAKORUMU	13-121734 D 13	<i>[Signature]</i>	23-03-23
Mukhalala Tadiwa	13-293739 G 13	<i>[Signature]</i>	23/03/23
T. Benias Mutema	75-076418 B 13	<i>[Signature]</i>	23/03/23
N. Rodgers	75-47579 E 13	<i>[Signature]</i>	23-3-23
T. Mudiwani	13-036207 P 13	<i>[Signature]</i>	23-3-23
CHARLES MUSINDU	13-012529 C 13	<i>[Signature]</i>	23-03/23
Rhoda Simang	13-106575 R 13	<i>[Signature]</i>	22/03/23
Elina K		<i>[Signature]</i>	23/03/23
L. Mbeva	12-022042 S 13	<i>[Signature]</i>	23/03/23
Violet C.	12-038951 K 13	<i>[Signature]</i>	22/03/23
Letricia N.	75-387797 G 12	<i>[Signature]</i>	23/03/23
Gift Mankwanda	12-178575 S 13	<i>[Signature]</i>	22/03/23
Lina Somani	14-123391-R 13	<i>[Signature]</i>	23/03/23
Vincent Karani	13-211477 H 13	<i>[Signature]</i>	22/03/23

Voluntary Land Agreement Form – Musirizwi Irrigation Scheme



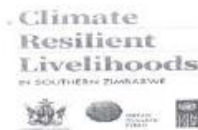
DISTRICT ADMINISTRATOR  
Ministry of Local Government  
Rural and Urban Development  
  
P. O. BOX 140, CHIPINGE  
TELEPHONE: 2546/7



ZIMBABWE

ENGINEER  
DEPARTMENT OF IRRIGATION  
MUSIRIZWI PROVINCE  
23 MAR 2023  
P.O. BOX 2700, MUTARE  
ZIMBABWE

**Ministry of Lands, Agriculture, Fisheries, Water and Rural Development**



Green Climate Fund Project "Building Climate Resilience of Vulnerable Agricultural Livelihoods in Southern Zimbabwe"

**VOLUNTARY LAND DEVELOPMENT AGREEMENT  
BETWEEN**

DEPARTMENT OF AGRICULTURAL  
TECHNICAL AND EXTENSION SERVICES  
  
P.O. BOX 130  
CHIPINGE, ZIMBABWE

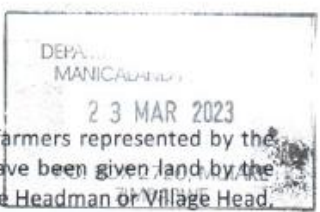
Land-Owner(s) – See Annex 1

DEPARTMENT OF AGRICULTURAL  
TECHNICAL AND EXTENSION SERVICES  
P.O. BOX 130  
CHIPINGE, ZIMBABWE

**AND**

POSITION	NAME	ID NUMBER	SIGNATURE	DATE
CHAIR	E. Maunde	13-0084034713	<i>E. Maunde</i>	
SECRETARY	NetSai Mhatsika	13-193592113	<i>NetSai Mhatsika</i>	
TREASURER	Nyaradzo Manjira	13-135940113	<i>N. Manjira</i>	
COMMITTEE MEMBER	Josiah Hworega	44-023121579	<i>J. Hworega</i>	

THE FARMERS (represented by IMC)- ..... *Musirizwi* ..... Irrigation Scheme



Acknowledging that the Musikwini Irrigation Scheme farmers represented by the Irrigation Management Committee members specified above have been given land by the Land Owners in the presence of Traditional Authority through the Headman or Village Head, for Irrigation Scheme development and use.

Acknowledged that the asset under construction and development (in this case, the asset is the Musikwini irrigation scheme) is communal and addresses the project's developmental objective of increasing resilience and enhance livelihoods of the most vulnerable rural communities in southern Zimbabwe. The asset will be for public use to ensure that communities using it are resilient to climate change risks and hazards. The Land Owners, herein listed in Anex 1 have immediately seized to unilaterally control the specified land with boundaries'

Boundary	36K	UTM	Remark
	0453871	7735015	Near the Shed

**Signed**

Office	Name	Signature
Headman/Village Head	Johnson Mubanga Sam	
Ward Councillor		
Ministry of Local Government (RDC)	Tawai Marango	
Ministry of Local Government (DDC)	Chamunorwa Sika	
Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (AGRITEX)	DESIRE MUBARA	
Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (DOI)	KARENYI GORGE	





Now both Parties, the Musikwini IMC and the communal landowners have agreed to cooperate as specified in this agreement to make use of the asset (herein referred to as Musikwini irrigation scheme) for their socio-economic development.

The land within the asset (Musikwini Irrigation scheme) to be constructed and developed, specified as 32 ha, and demarcated on the area layout annexed to this agreement, will be used by the community/ beneficiaries each defined season within the calendar year.





15.5kw		IRRIGATION	
MUSIRIZWI -B-		SEX	PEQ NO
		ID. NO	
1	INI HERBERT MSONGO NDATENDERA KUTI	M 42-054707 M13 MUNDA WANGU	18 UITE
2	INI MADIO MANGWANDA NDATENDERA KUTI	M 13-080742-X13 MUNDA WANGU	16 UITE
3	INI CHAPO MABISO NDATENDERA KUTI	F 13-1782182-P13 MUNDA WANGU	19 UITE
4	INI JOSEPHINE <sup>KOBERA</sup> NDATENDERA KUTI	F 44-023121-S44 MUNDA WANGU	17 UITE
5	INI MARIA MAGYMENTI NDATENDERA KUTI	F 13-051409-R13 MUNDA WANGU	14 UITE
6	INI LEWIS MHLANGA NDATENDERA KUTI	M 13-023904-R13 MUNDA WANGU	15 UITE
7	INI MISHECK MKOSANA NDATENDERA KUTI	M 13-018591-M13 MUNDA WANGU	20 UITE
8	INI SARAH SITHOLE NDATENDERA KUTI	F 13-272387-G13 MUNDA WANGU	22 UITE
9	INI MATHEW MHLANGA NDATENDERA KUTI	M 13-248960-S13 MUNDA WANGU	21 UITE
MUTAPE AGRITEX DRC.		VANHU VESE	VAKATE

CELL	<u>D/B</u>	SIG
077 154 4248 WE IRRIGATION	25/12/60	
078 466 2756 WE IRRIGATION	05/06/62	M.A.U. Mangwanda
WE IRRIGATION	02/02/70	
077 566 9283 WE IRRIGATION	01/11/64	Josephine Kuorcia
WE IRRIGATION		
<del>077 4848 543</del> 077 484 4848 WE IRRIGATION	14/11/1936	LEVIS MITCHELL
S IRRIGATION		Dina
078 6353 489 WE IRRIGATION	06/11/1970	
WE IRRIGATION	01/03/90	Marshall
DELANA NAZVO		VILLAGE ROAD BANGIRA P.O. BOX 332 CR. MUMORI CELL: 071 009583 DATE: 13/03/2023..... J. Mathuna

DEPARTMENT OF AGRICULTURE,  
TECHNICAL AND EXTENSION SERVICES  
P.O. BOX 120  
LILONGWE, MALAWI



**Appendix 6: Summary ESMPs translated into local language (Shona)**



Summary ESMP  
Musirizwi\_Shona.doc



Summary ESMP  
Mudzimwa\_Shona.do



Summary ESMP  
Mhakwe\_Shona.docx



Summary ESMP  
Farai\_Shona.docx



Summary ESMP  
Vimbanayi\_Shona.doc