NATIONAL PROJECT PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

Project/Programme Categories:	Food Security and Water Management
Country:	Zimbabwe
Title of Project/Programme:	**Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe**
Type of Implementing Entity:	Multilateral Implementing Entity (MIE
Implementing Entity:	United Nations Education, Scientific and Cultural Organisation (**UNESCO**)
Executing Entity:	Ministry of Lands, Agriculture, Water and Rural Resettlement
Amount of Financing Requested:	USD 5,000,000

Executive Summary

Erratic rainfall and poor water management practices have a direct negative impact on the water scarcity in the rural communities of Binga and Buhera, located in the Lower Gwayi and Upper Save catchments of Zimbabwe. As a result, water sources often dry up during the September to November dry season, causing the failure of crops and animal productive systems during this period. The largest burden of this water insecurity is put on women and particularly girls, as they are forced to miss out on other crucial opportunities, such as education, when fetching water and walking distances of up to 10 km and more. Even during the rainfall period, the water that is received is very limited (<400 mm) and unreliable, meaning that strategies are required to improve and protect livelihoods in periods with and without rainfall. Due to limited adaptation options, an increase in unsustainable activities along key value chains is observed, leading to land degradation and deterioration of key water sources. Poor land husbandry practices have degraded crucial water resources systems such as wetlands and natural sand dams, which is incrementally reducing their ability to provide ecosystem services. The other challenge, as in most poor areas in Zimbabwe, is related to poor value chains. Some business ventures such as beekeeping and goat rearing have not been successful because of the scale of the project and disorganized markets. These challenges are happening in a space where there is a weak institutional framework for farmers to participate viably in priority value chains, with weak adaptive capacities among the smallholder communities and low application of climate smart technologies.;

To address several of these challenges, this Project aims to increase local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation for food security and other productive uses in rural areas of Zimbabwe. To achieve this, an array of actions is required starting at national to local levels and involving institutional reforms and modelling, characterisation and quantification of the groundwater resources, knowledge generation and capacity development, and awareness raising through piloting and demonstration. The specific project objectives linked to the above are as follows:

1. To strengthen technical, institutional and human capacity at national and local levels for improved and sustainable utilization of groundwater;
2. To conduct comprehensive assessments of groundwater resources in two poverty-stricken and highly vulnerable sub-catchments of Lower Gwayi and Upper Save and develop sample plans for improving climate resilience through sustainable groundwater utilization;
3. To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote groundwater use and protection of groundwater sources;
4. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation by diversifying and strengthening the livelihoods of the most vulnerable population in four wards of Binga and Buhera;
5. To compile and disseminate lessons learnt from the project to facilitate future upscaling and replication of good practices in groundwater extraction and management.

These objectives are in line with those set by the Adaptation Fund aiming to "reduce the vulnerability and increase adaptive capacity to respond to climate change impacts, including variability at local and national level".

Abbreviations and acronyms

AF	Adaptation Fund
AfDB	African Development Bank
ARDA	Agricultural and Rural Development Authority
AGRITEX	Agricultural Technical and Extension Services
CAPEX	Capital Expenditure
COTTCO	Cotton Company of Zimbabwe
CSC	Cold Storage Company
DA	Designated Authority
DC	District Coordinator
DDF	District Development Fund
DEA	Directorate of Environmental Affairs
DRFN	Desert Research Foundation of Namibia
DWA	Department of Water Affairs
EE	Executing Entity
EIA	Environmental Impact Assessment
EIF	Environmental Investment Fund
EMA	Environmental Management Act, 20072003
EMA	Environmental Management Agency
EMP	Environmental Management Plan
ESAP	Economic Structural Adjustment Programme
ESG	Environmental Social and Gender
ESIA	Environmental and Social Impact Assessment
EU	European Union
GMB	Grain Marketing Board
GRN	Government of the Republic of Namibia
HIV	Human Immunodeficiency Virus
ICT	Information Communication Technology
IFAD	International Fund for Agricultural Development
IWRM	Integrated Water Resource Management
MLAWRR	Ministry of Lands, Agriculture, Water and Rural Resettlement
MECT	Ministry of Environment, Climate and Tourism
MIE	Multilateral Implementing Entity
MoF	Ministry of Finance
MTP	Medium Term Plan
TSP	Transitional Stabilisation Programme
RWH	Rainwater Harvesting
NCCP	National Climate Change Policy
NCCP	National Climate Change Policy
NDP	National Development Plan
NDP5	Fifth National Development Plan
NFIS	National Financial Inclusion Strategy
NIE	National Implementing Entity
NPCC	National Policy on Climate Change
NSA	Namibia Statistics Agency
NUST	Namibia University of Science and Technology
OPEX	Operational Expenditure
PFMS	Public Finance Management System
PM	Project Manager

PPP	Public Private Partnerships
PRAZ	Procurement Regulatory Authority of Zimbabwe
PSC	Project Steering Committee
PMU	Project Management Unit
RDC	Rural District Council
RE	Renewable energy
RO	Reverse osmosis
RTGS	Real Time Gross Settlement System
SADC	Southern Africa Development Community
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SDGs	Sustainable Development Goals
SGR	Strategic Grain Reserve
SI	Statutory Instrument
SIRDC	Scientific and Industrial Research and Development Centre
SME	Small and Medium Enterprises
STERP	Short Term Emergency Recovery Programme
TOR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
ZESA	Zimbabwe Electricity Supply Authority
ZIA	Zimbabwe Investment Authority
ZIMASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMFUND	Zimbabwe Multi-Donor Trust Fund
ZIMPREST	Zimbabwe Programme for Economic and Social Transformation
ZIMRA	Zimbabwe Revenue Authority
ZIMREF	Zimbabwe Reconstruction Fund
ZIMSTAT	Zimbabwe Statistics Agency
ZINWA	Zimbabwe National Water Authority

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A. Project Background and Context

Introduction

Population and Rainfall distribution

Zimbabwe is a landlocked country located in Southern Africa with a total land area of 390,757km^2. Situated between the Zambezi and the Limpopo Rivers, Zimbabwe shares borders with Zambia (797 km) in the north and northwest, South Africa (225 km) in the south, Mozambique (1,231 km) in the east and north-east, and Botswana (813 km) in the west and south-west (Fig 1). The landscape of Zimbabwe is defined by the great plateau, a major geographic feature in Southern Africa. Zimbabwe's altitude ranges between 197 – 2,592 m above mean sea level. About 80% of the country is situated more than 600 m above mean sea level (ZIMSTAT, 2012).

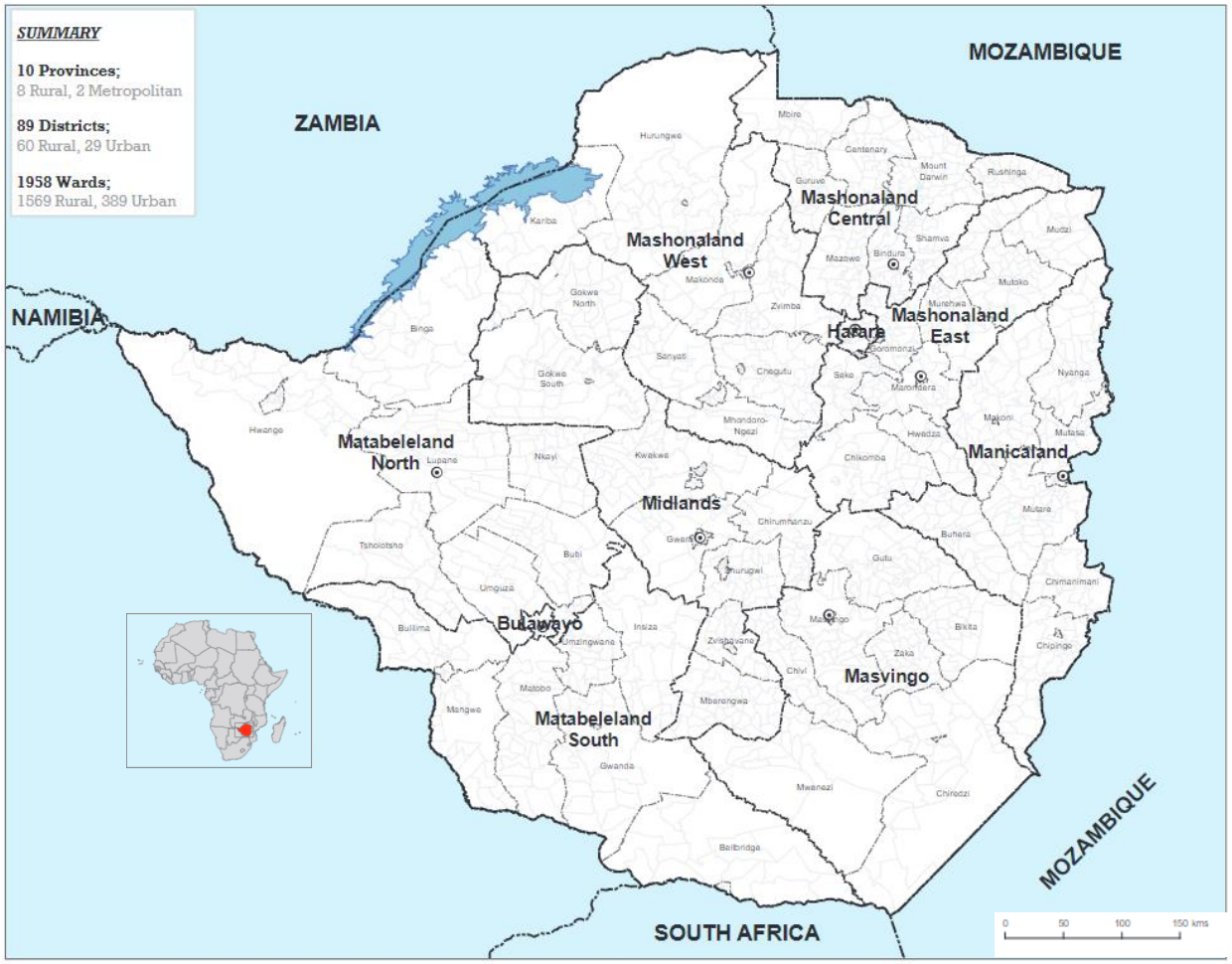


Figure 1 Location map of Zimbabwe
Source: OCHA

The agricultural area is estimated at 16.2 million ha, of which 4.1 million ha is cultivated and 12.1 million ha are permanent pastures. The country's forested area declined from over 22 million ha in 1990 to around 15 million in 2012 (FAOSTAT, 2015). In addition, savanna woodland interspersed with open grasslands covers much of the country and the dambo (seasonally

waterlogged low-lying areas) of the central watershed area (MENR, 2010). As a result, Zimbabwe provides habitats for abundant and diverse flora and fauna.

The population distribution of Zimbabwe, based on the 2012 national census figures, is presented in Fig 2. When calculated with the 2019 projected population of 14.65 million people, the population density of Zimbabwe is 37.5 people per square kilometre. From the 2012 census, the population was relatively young, with 41% of the population being below 15 years and about 4% aged 65 years and above. The sex ratio in the country was nearly 0.93. About 67% of the population was rural and 65% of households were headed by males whilst the literacy rate was 96%.

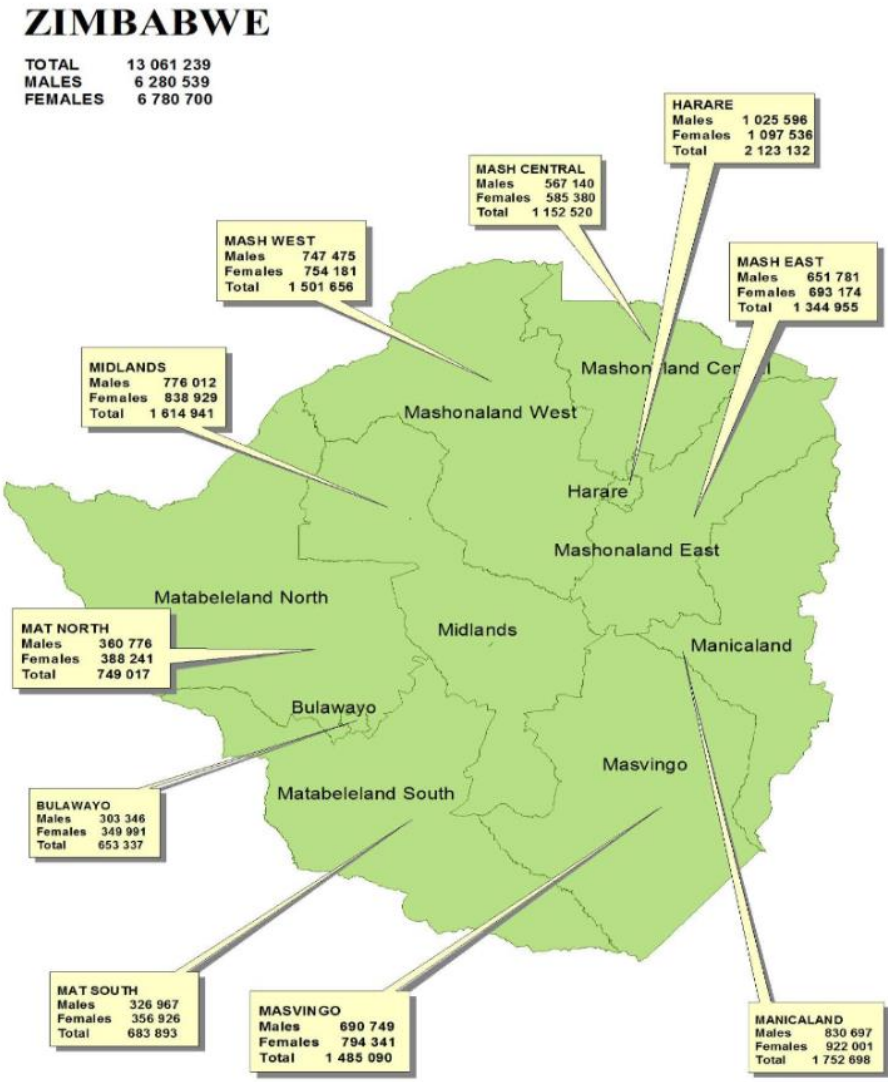


Figure 2 Population distribution in Zimbabwe based on 2012 population census
Source: Zimbabwe 2012 National Census Report

Zimbabwe is generally a water-scarce country with an average annual rainfall of 657 mm, ranging from over 1,000 mm in the Eastern Highlands to around 300-450 mm in the lowveld to the south (Fig 3). Only 37% of the country receives rainfall considered adequate for crop cultivation. Climate change projections for Zimbabwe indicate a significant negative trend in precipitation, both under the low, medium and high IPCC emission scenarios (Rainsphere, 2018). This will put additional

pressure on available water resources. The western part of Zimbabwe is generally arid, with little potential for dam sites because of the nature of soils, low rainfall and generally flat topography. The country is prone to frequent droughts and flush flooding, strongly correlated to El Niño events that are being worsened by climate change. Around 80% of the population is concentrated in areas where rainfall is unreliable and previous studies and surveys have shown that those with limited access to productive water are extremely vulnerable to climate change impacts. The country has experienced recurrent devastating droughts (1982/83, 1991/92, 2001/02, 2002/03, 2004/05, 2006/07, 2011/12 and 2015/16 farming seasons) directly impacting agriculture, food and water security.

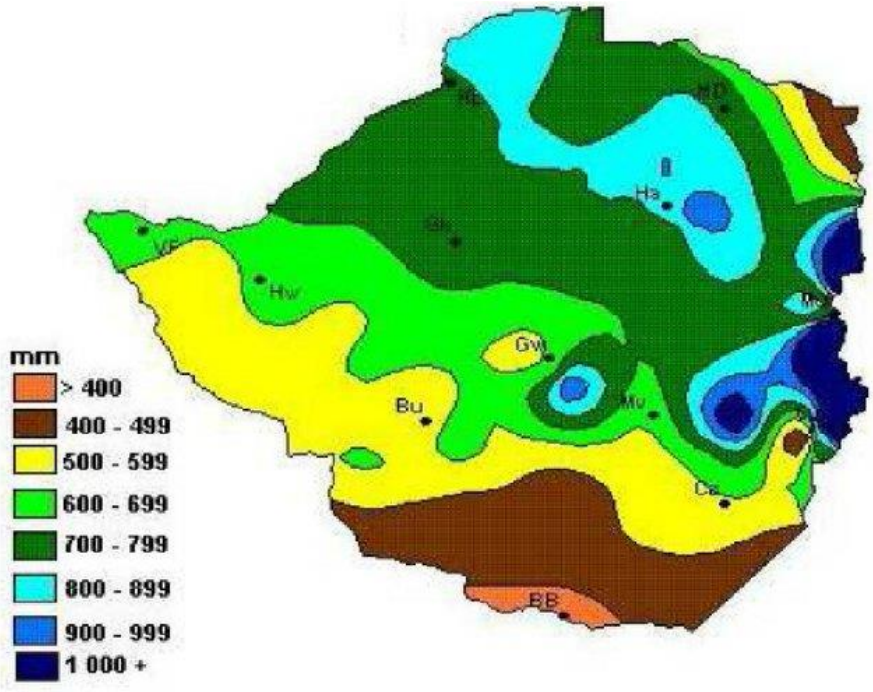


Figure 3 Mean annual rainfall distribution of Zimbabwe
Source: Zimbabwe Meteorological Services Department

Zimbabwe is divided into five agro-ecological regions which have provided the basis for land use planning and analyses (Fig 4). The zoning has been modelled along rainfall and weather patterns. The regions are classified from the highest rainfall areas region I and IIA (>750 mm annual rainfall), medium rainfall areas, region IIB and III (650 – 750 mm), and the lowest rainfall areas, region IV (450 – 650 mm) and V (<450 mm).

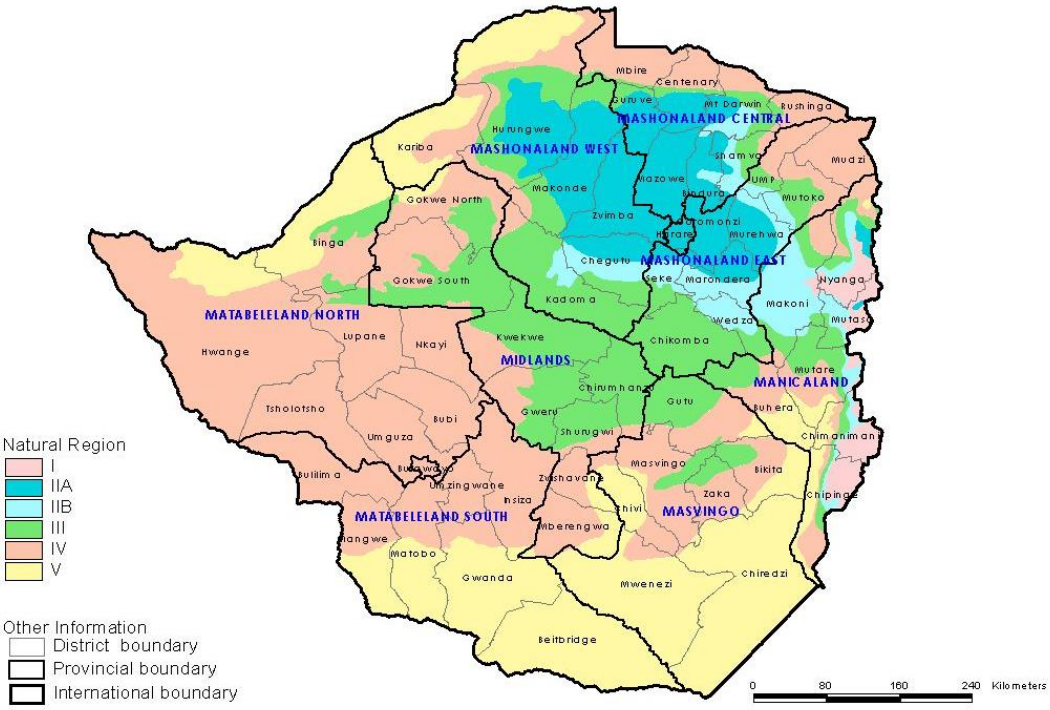


Figure 4 Agro-ecological regions of Zimbabwe
Source: http://www.fao.org/docrep/012/ak352e/ak352e00.htm

Zimbabwe's border to the north with Zambia lies along the Zambezi River and to the south with South Africa along the Limpopo River, both of which flow into Mozambique. All the river systems in Zimbabwe originate from the Central Watershed and drain towards international watercourses. As part of the water reforms, Zimbabwe was divided into seven catchment areas defined by the major river systems, i.e., the Gwayi, Sanyati, Manyame, Mazowe, Save, Runde and Mzingwane Catchments (Fig 5). The catchments were further divided into 47 Sub-catchments, largely organized along tributaries of the major river systems. Except for the Save and Runde, which join at the border with Mozambique and then flow as one river to the Indian Ocean, all other main rivers drain into either the Zambezi or Limpopo. There is also the Pungwe and Buzi with flow into Mozambique. However, while the Gwayi River drains into the Zambezi, the Nata (or Amanzamnyama) River, which is jointly administered with the Gwayi catchment, drains into the Makgadikgadi Pans in Botswana. The Zambezi is particularly important to the country as it produces most of its electricity.

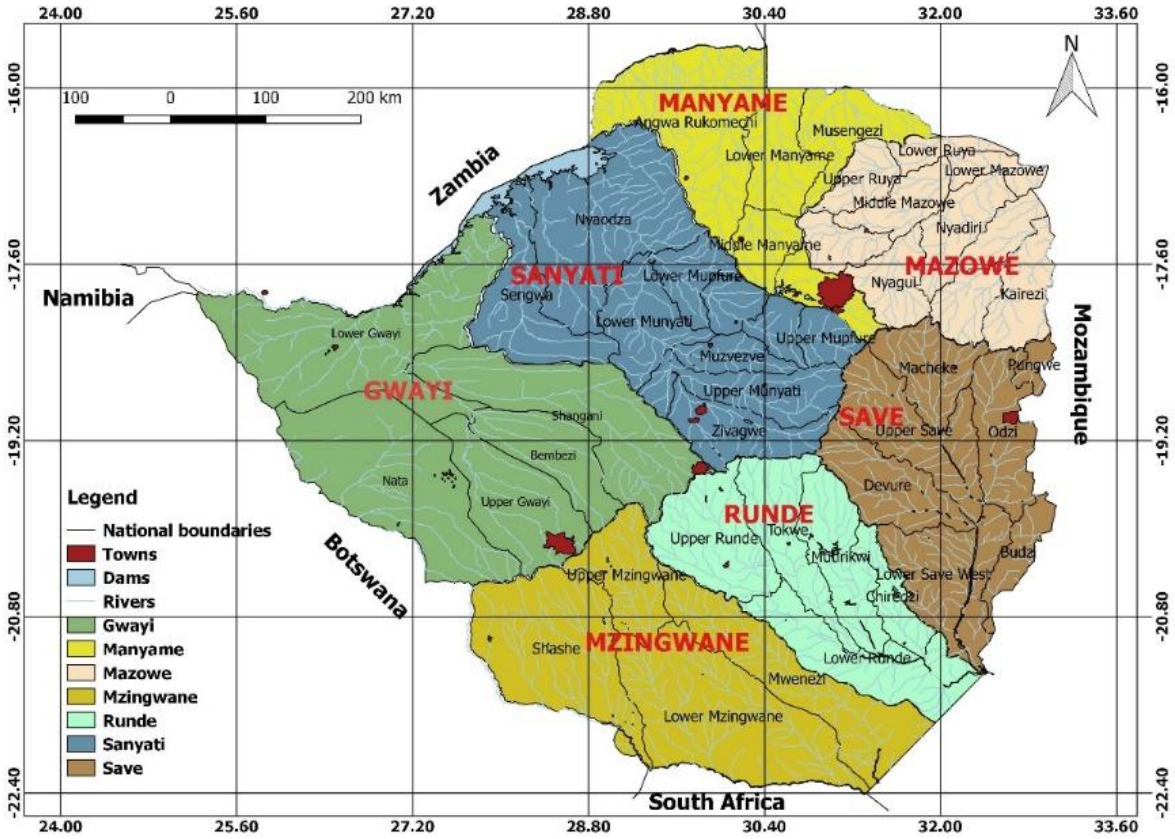


Figure 5 Seven main catchments of Zimbabwe

Table 1 shows the area of each catchment, the sub-catchments that feed into each catchment and the transboundary basin to which the catchment belongs.

Table 1 Characteristics of Zimbabwean catchment areas.

Catchment	Catchment area (km^2)	Sub-catchments	Transboundary basin
Gwayi	87,960	Nata, Upper Gwayi, Mbembesi, Shangani, Lower Gwayi	Zambezi, Nata
Mazowe	34,944	Kairezi, Middle Mazowe, Lower Mazowe, Nyadiri, Nyagui, Rwenya North, Rwenya South, Upper Mazowe, Upper Ruya	Zambezi
Manyame	40,497	Angwa-Rukomechi, Lower Manyame, Middle Manyame, Musengezi, Upper Manyame	Zambezi
Mzingwane	62,451	Shashe, Mwenezi, Upper Mzingwane, Lower Mzingwane	Limpopo
Runde	41,056	Upper Runde, Chiredzi, Tokwe, Mutirikwi, Lower Runde	Save
Sanyati	74,534	Sengwa, Zivagwe, Upper Munyati, Muzvezve, Lower Munyati, Upper Mupfure, Lower Middle Mupfure, Lower Mupfure, Lower Sanyati	Zambezi
Save	48, 448	Macheke, Pungwe, Odzi, Upper Save, Devure, Budzi, Lower Save	Save, Buzi, Pungwe

Source: Various sources.

Zimbabwe has limited groundwater resources mainly because the greater part of the country (about 60%) is underlined by hard ancient igneous formations that weather slowly and have limited fracturing, thus groundwater potential is low[1]. Groundwater accounts for a small proportion of total water use because of the low yielding Basement Complex aquifers that may exceed 60 m in thickness in some cases. The total groundwater potential is estimated to be 3.0 x 10^6 Mm^3, whose distribution varies across the country (Table 2).

Table 2 Major groundwater aquifers in Zimbabwe.

Catchment	Sub-catchment	Geology	Yield and comments
Gwayi	Upper Gwayi	Kalahari sands	100-1,000 m^3/d
		Nyamandlovu aquifer	100-1,000 m^3/d to augment Bulawayo water supply.
	Shangani	Varied	50-300 m^3/d
	Nata	Forest Sandstone	50-300 m^3/d
		Kalahari Sands	100-1,000 m^3/d
Manyame	Angwa	Varied	30-200 m^3/d
		Alluvium	2,550 m^3/d
		Lomagundiarenaceous	1,250 m^3/d
	Musengezi and Upper Manyame	Varied	63-200 m^3/d
	Lower and Middle Manyame	Varied	18-200 m^3/d
		Lomagundiarenaceous	1,250 m^3/d
Mazowe		Granitic rocks	60 m^3/d
		Greenstone	130 m^3/d
		Dolerites	150 m^3/d
Mzingwane	Shashe and Tuli	Alluvial deposits	100-5,000 m^3/d
	Lower Mzingwane	Alluvial deposits	100-5,000 m^3/d
	Mwenezi	Forest sandstone	50-300 m^3/d
Runde	Whole catchment	Granite and Greenstone	8,000 b/holes of which 2,500 have data. Agriculture and mining main consumers. Estimated that 20 per cent g/water utilized.
Sanyati	Mupfure, Muzvezve and Zivagwe	Greenstones	A few points for g/water monitoring.
	Sengwa	Karoo	Possibility using fossil g/water as few dam sites.
Save	Lower Save	Alluvial deposits	Huge groundwater potential. Up to 5,000 m^3/d. Estimated storage of 1,350,000 Ml. There are some monitoring boreholes.

Source: Ministry of Water Resources and Development (2012).

Four main aquifer systems in Zimbabwe have relatively high groundwater potential:

i. The Lomagundi dolomite aquifer, lying northwest of Chinhoyi, about 120 km northwest of Harare;
ii. The forest sandstone formation in the Nyamandhlovu area, close to Bulawayo; the formation is part of the Karoo aquifers shared between Botswana, Namibia, South Africa, Zambia and Zimbabwe;
iii. The Kalahari sands which are widespread in the southwestern part of the country and where exploitable groundwater resources are related to the thickness of the sands;

[1] (Davies and Burgess, http://gwd.org.za/sites/gwd.org.za/files/04%20J%20Davies_%20Zimbabwe%20paper%20final.pdf (Accessed 12 November, 2019)

iv. Alluvial deposits which mainly occur in the Save valley where they form a local aquifer, along the Zambezi, Manyame (Mushumbi pools area) and Musengezi rivers (Muzarabani areas).

Despite all these scarce groundwater resources, the country relies mainly on surface water resources. Internal renewable surface water resources are estimated at 11,260 million m^3/year and renewable groundwater resources at around 6,000 million m^3/year. About 5,000 million m^3/year is considered to be overlap between surface water and groundwater, thus total internal renewable water resources (IRWR) are 12,260 million m^3/year. Total flow in border rivers amounts to 39,900 million m^3/year, corresponding to both the Zambezi from Zambia and Limpopo from Botswana, but their accounted inflow is limited to 7,740 million m^3/year. Total renewable water resources are thus 20,000 million m^3/year, or 1,413 m^3/year per capita in 2014. This per capita value is projected to fall under the absolute water scarcity threshold of 500 m^3/year by 2030, due to population increase. Surface water leaving the country is estimated at 14,140 million m^3/year, of which 14,100 million m^3/year flows through the Mazowe river to Mozambique and 40 million m^3/year through the Nata river to Botswana[2].

Groundwater resources in Zimbabwe, for domestic and economic uses, are mostly extracted through boreholes, however, many boreholes tend to dry up during the peak of the dry season; forcing communities in rural areas to walk long distances to more reliable water points. In urban areas, the reliability of groundwater as a source of domestic water is compromised, and people often have to resort to digging up shallow wells. These are not sustainable water sources and have a greater variability in the water availability. Moreover, if not well protected, shallow wells expose consumers to safety risks for children and risks of waterborne diseases. An example is the cholera outbreak that occurred countrywide in 2008/9.

Zimbabwe and the SDGs

Zimbabwe has prioritized the 17 SDGs into three tiers over the 15-year life cycle of the SDGs because of the prevailing fiscal constrains in the country that necessitate a phased implementation approach, with an initial resource focus on enabling goals (Government of Zimbabwe, 2015). These enabling goals (Goals 2, 3, 5, 8 and 9) (Table 3) are categorized under Tier 1 and will be the areas of resources focus from 2016-2020. Other priorities (Goals 4, 6, 7, 11, and 14) will fall under Tier 2 with resources focus for 2021-2025; while long-term priorities (Goals 10, 12 and 15) have been categorized under Tier 3 to be addressed during 2026-2030. In addition to the three tiers, some goals (Goal 1, 13, 16 and 17) have been identified as cross cutting and will be an on-going resource focus over the life of SDGs (Government of Zimbabwe, 2015). Thus, Goal 6 relating to water and sanitation will be in Tier 2 and implemented during 2021-2025.

[2] http://www.fao.org/NR/WATER/AQUASTAT/countries_regions/Profile_segments/ZWE-WR_eng.stm

Table 3 List of Sustainable Development Goals

Goal	Description
Goal 1	End poverty in all its forms everywhere.
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
Goal 3	Ensure healthy lives and promote well-being for all at all ages.
Goal 4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all.
Goal 5	Achieve gender equality and empower all women and girls.
Goal 6	Ensure availability and sustainable management of water and sanitation for all.
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all.
Goal 8	Promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all.
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
Goal 10	Reduce inequality within and among countries.
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable.
Goal 12	Ensure sustainable consumption and production patterns.
Goal 13	Take urgent action to combat climate change and its impacts.
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective accountable and inclusive institutions at all levels.
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Water management, policies and legislation related to water use in agriculture

Water governance in Zimbabwe is guided by two pieces of legislation, namely the Water Act [Chapter 20: 24] and the Zimbabwe National Water Authority (ZINWA) Act [Chapter 20: 25]. The aim of the Water Act is to provide for the development and utilisation of Zimbabwe's water resources (Manzungu, 2001). The Water Act of 1998 also established stakeholder institutions, namely, Catchment Councils and Sub-Catchment Councils, through whom stakeholders are involved in the planning, development and use of water resources. By establishing stakeholder institutions, the Water Act aims at decentralizing water management to the users. The ZINWA Act established a national water authority and provided for its functions (Manzungu, 2001). ZINWA manages water resources countrywide on a commercial basis, provides technical support to the catchment councils, and supplies water to small urban local authorities, growth points and rural services centres.

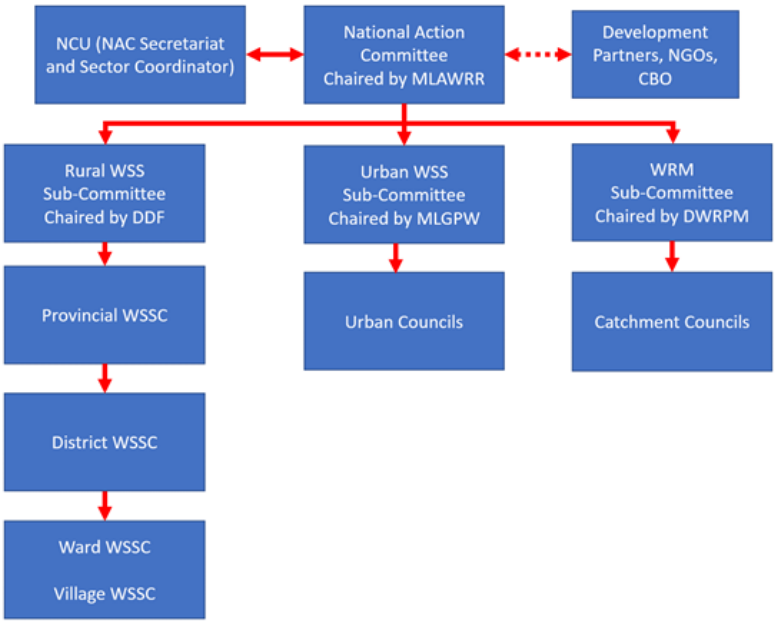
Table 4 shows the policy and legal instruments that address various aspects of water governance. Besides the Water and ZINWA Acts, there are other relevant laws that have a bearing on water resources management, which include the Environmental Management Act, Mines and Minerals Act, Public Health Act, Urban Councils Act and the Rural District Councils Act. Since water cuts across many sectors, the implementation of the various laws needs to be properly coordinated, given the number of institutions that are involved.

Table 4 List of national policies and legal Instruments related to water resources management in Zimbabwe

Sector	Instrument
Water	**Policy**
	2013 National Water Policy 2011 National Sanitation and Hygiene Strategy 2011-2015
	Legislation
	1998 Water Act [Chapter 20: 24]
	1998 Zimbabwe National Water Authority Act [Chapter 20: 25]
	Public Health Act (Chapter 15:09)
	Statutory Instrument 33 of 2000 Water (Catchment Councils) Regulations
	Statutory instrument 47 of 2000 Water (Sub-catchment Councils) Regulations
Environmental Protection and Management	**Policy** 2009 Environmental Policy and Strategies
	Legislation 2002 Environmental Management Act [Chapter 20: 29]
	Statutory Instruments 2007 Statutory 6 of 2007 Environmental Management (Effluent and Solid Waste Disposal) Regulations 2007
	2007 Statutory Instrument 7 of 2007 -Environmental Management (Environmental Impact Assessment and Ecosystems Protection) Regulations 2007.
Climate Change	**Communication**
	2012 Zimbabwe: Second National Communication to the United Nations Framework Convention on Climate Change 2012
	Strategy
	2015 Zimbabwe's National Climate Change Response Strategy
	2017 National Climate Policy
Mining	**Legislation**
	Mines and Minerals Act [Chapter 21:05]
Health	**Legislation**
	Public Health Act [Chapter 15:09]
	Statutory Instrument 638 of 1972 Public Health (Effluent) Regulations
Local Government	**Legislation**
	Urban Councils Act [Chapter 29:15]
	Rural District Councils Act [Chapter 29: 13]
Disaster Management	**Policy**
	Disaster Management Policy
Land Management and Planning	**Policy**
	Agricultural Policy, Irrigation Policy, Housing Policy
	Legislation
	Regional and Town Planning Act

Source: Adapted from Global Water Partnership (2013)

The Government of Zimbabwe addressed coordinating challenges in the water sector by introducing a new institutional structure termed the National Action Committee (NAC) on Water to have an overall oversight on the management of water resources in June 2010 (Fig 6).



Key:

MLAWRR	Ministry of Lands, Agriculture, Water and Rural Resettlement
MoHCW	Ministry of Health and Child Welfare
MoTCID	Ministry of Transport, Communication and Infrastructure Development
MoA	Ministry of Agriculture
MoLGPW	Ministry of Local Government and Public Works
MoECHI	Ministry of Ministry of Environment
MoE	Ministry of Education
MoWAGCD	Ministry of Women Affairs, Gender and Community Development
MoF	Ministry of Finance
DDF	District Development Fund
WRM	Water Resources Management
NAC	National Action Committee
NCU	National Coordinating Unit
WASH	Water Sanitation and Hygiene
WSS	Water Supply and Sanitation

Donors Group AfDb=African Development Bank; AusAid= Australian Agency for International Development; DFID=Department for International Development; EU=European Union; GTZ= German Technical Cooperation Agency; NGOs= Non-governmental Organizations; UNICEF=United Nations

Figure 6 National coordination structure for water resources management, water supply and sanitation in Zimbabwe

The rejuvenated NAC was mandated to have an expanded oversight on all aspects of water including its supply and management in both rural and urban areas. A similar previous committee had only focused on rural water supply. The NAC has three sub-committees, each dealing with specific issues: The Rural Water Supply and Sanitation Sub-Committee; the Urban Water Supply and Sanitation Sub-Committee and the Water Resources Management Sub-Committee. Table 5 gives the mandates of the various institutions. After the reorganization of the water sector under an expanded NAC in early 2010, the Government of Zimbabwe went on to develop a lower level coordination mechanism in July 2010 under the National Coordination Unit, which is a secretariat of NAC. A document on *Water and Sanitation Sector Coordination Mechanisms, Terms of Reference for the National Action Committee and its Substructures* laid the foundation. The main focus of the sub-committees is to improve and sustain water and sanitation coverage in rural areas of Zimbabwe, in line with the Sustainable Development Goals (SDGs) and other Zimbabwe set development goals and standards. One of the major achievements of the Rural NAC Sub-Committee is the development on an online WASH website and database (http://www.ncuwash.org/) to function as a repository for sector achievements, strategies, lessons

learnt, and documents pertaining to different sector evaluations and developments. This makes programme planning, monitoring and evaluation tasks easier to accomplish.

Table 5 Mandates of the main institutions involved in the management and protection of water resources

Name of institutions	Functions
Water agencies	
Ministry of Lands, Agriculture, Water and Rural Resettlement	Custodian of the country 's water resources and responsible for crafting and administering the legal and policy framework pertaining to water development and management.
Department of Water Resources Planning and Development	Formulation of policies for planning, development and management of water resources. Formulation of operational plans and standards for water resource management, wastewater and sewerage.
National Action Committee	Responsible for inter-sectoral coordination.
Zimbabwe National Water Authority	Responsible for planning and operational aspects of the water 's resources and providing technical assistance and secretarial services to Catchment and Sub-catchment Councils. Is also is a bulk water supplier in small urban centres, growth points and rural service centres.
Catchment Councils	Preparation of catchment outline plans, for the area under their jurisdiction, issue water permits, supervise sub-catchment areas, and resolve conflicts among water users.
Sub-catchment Councils	Regulate and supervise surface and ground water, monitor water use, undertake catchment protection, assist in data collection, and collect water related rates.
Environmental Management Agency	Protect water resources focusing on water quality, deforestation, land degradation, wetland protection

Source: Adopted from Manzungu (2011).

Fig 7 sets out the organizational arrangements for the principal institutions with responsibilities for the management of water resources in Zimbabwe, based on the Water Act of 1998 and the Zimbabwe National Water Authority (ZINWA) Act of 1998. Zimbabwe has seven catchments that are based on the seven major river basins in the country. Each catchment is administered by an elected catchment council, with technical support from ZINWA. The Minister responsible for Water provides guidance on policy matters through the Department of Water Resources Planning and Development.

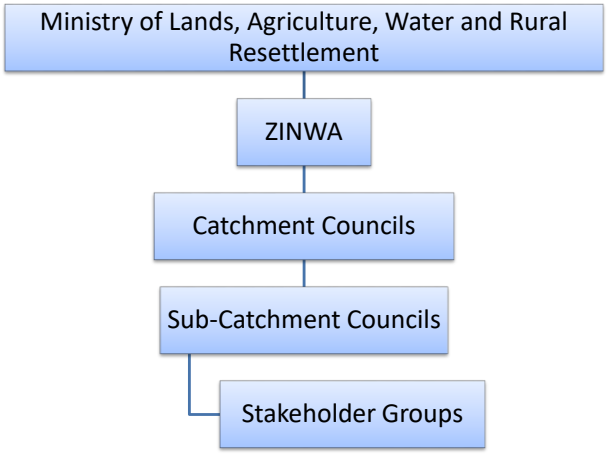


Figure 7 Water resources management framework in Zimbabwe

Each Catchment Council (CC) is established by a statutory instrument under the Water Act. The councils are composed of representatives of the sub-catchment councils in each catchment. The Catchment Manager's office provides technical and secretarial services to the respective catchment councils. The sub-catchment councils (SCC) are established by the Minister through a statutory instrument under the Water Act for any part of a declared river system that falls under the catchment council. The SCC is the operational arm of the CC. Its main function is to regulate and supervise the exercise of rights to water within the area for which it was established. It also performs any other functions that may be conferred upon it in terms of the Water Act. The stakeholders comprise the water users, members of government departments with legal responsibilities in the management of natural resources, and private organizations that represent interests in the basin or otherwise have a direct stake in water management in the catchment. The SCC is elected from representatives of water users.

Zimbabwe Climate Change Policy

Zimbabwe has developed a Climate Policy which guides climate change management in the country, enhances the national adaptation capacity, scales up mitigation actions, facilitates domestication of global policies and ensures compliance to the global mechanisms. Climate variability and change are mainly evident through their effects on water resources availability patterns. For adaptation to be effective, it is important to understand the sectoral vulnerabilities as a result of climate change impacts on Zimbabwe's water resources in order to ensure climate-resilient water sector policies and investments. The Climate Policy therefore proposes to:

- Undertake comprehensive hydrological analyses to understand vulnerability levels and identify potential adaptation actions for Zimbabwe.
- Periodically review existing national and water-related sectoral policies (such as agriculture, energy, environment) to ensure that they adequately address climate-related challenges.
- Develop sectoral related Master Plans such as the Water Master Plan, which explicitly integrate climate change.
- Strengthen conjunctive groundwater and surface water assessment, monitoring and regulation.
- Periodically review expected yields for each catchment taking into account temperature and precipitation changes expected under climate change.
- Ensure climate change is incorporated in water resources infrastructure design including the development of relevant guidelines.
- Ensure water sources for domestic consumption are within national standards radius of household reach.
- Ensure improved water supply for livestock, wildlife and environment in line with the changing climate.
- Promote water harvesting for domestic, animal, agriculture and industrial use.
- Maintain and promote the conservation of wetlands as part of a water/river source protection strategy in line with a changing climate.
- Establish a Centre of Excellence in Water and Climate Change to undertake essential research on the impacts of climate change on water resources.
- Increase support to transboundary water management.
- Strengthen the use of ICT and latest technologies in water resources assessment.

Differentiated Impacts of Climate Change on Women and Men

About two-thirds of the population of Zimbabwe is below the age of 25, and the majority are women (52%), (Zimbabwe Country Analysis Report, 2014). Gender inequality is evident in all spheres of life and it is supported and sustained by cultural and religious practices, patriarchal attitudes, power imbalances and lack of knowledge and skills on gender mainstreaming. Gender equality and women's empowerment are important to achieve socio-economic transformation of women in light of climate change, which seeks to reverse the efforts for gender equality, thus widening the gaps and amplifying inequities between women and men and other vulnerable groups (Fig 8). The division of labour between men and women follows tradition and cultural gender responsibilities. About 85% of women in Zimbabwe depend on agricultural activities for their livelihoods and rural women make up the majority of smallholder farmers who are also dependent on rain-fed agriculture and on climate sensitive economic activities like farming and rearing livestock. Additionally, water is not readily available to women in rural areas. One of the impacts of climate change is falling rainfall and the drying up of water sources. As women and children are mostly responsible for fetching water in most rural communities, the distances that women walk in search of water will increase. Taking note of the fact that rural women already have the responsibility of looking after children, the elderly and the sick, an additional impact of climate change is an increase in the workloads. Women, especially rural women, are responsible for ensuring food security for the entire household. Additionally, women are responsible for household duties, which include food preparation, fetching water for the household, caring for the sick and elderly, child rearing, and domestic management. Female and child headed rural households are most vulnerable to climate change since they have the least access to climate-proof productive resources.

Traditionally, men are responsible for food production, rearing cattle and financing the homestead. The livelihoods of men are also climate sensitive, however, men have better access to productive resources like land, finances, and jobs. Men and boys whose main source of livelihood is rearing cattle will find themselves having to walk long distances in search of pastures and water for their livestock. Additionally, climate change is having negative impacts on the environment. Poor rainfall has resulted in depletion of pastures and water sources. The remaining natural resources are hardly enough to support livestock and people, and hence they are overstretched. This has resulted in land degradation from grazing activities and drying of wetlands from farming activities. This is further increasing the vulnerability of both men and women to poverty, and further loss of livelihoods. Boys are at risk of dropping out of school in search of pastures and water for cattle. This is particularly a problem for boys coming from child headed households, and poor families who herd livestock for a living.

Depletion of natural resources due to climate change is reducing the access to resources like clean water, proper sanitation, and good nutrition from balanced diet. Climate change is also making men and women in rural areas and urban areas alike susceptible to diseases related to lack of clean water and sanitation and malnutrition. Again, women and child headed households are the most vulnerable since they have the least access to the scarce natural resources. The economic hardships compounded by climate change can also lead to the rise of early and unintended pregnancies amongst girls, child labour, as well as rise in Sexually Transmitted Infections.

The impacts of climate change are also far reaching. Industries whose value chains are climate sensitive are likely to go into decline if they fail to cope with climate change. This is likely going to result in increased unemployment amongst men since men account for the majority of the

workforce. The difference in the impacts that climate change is having on men and women, means that the climate change response-strategies and policies that the country should enact must be gender sensitive.

Figure 8 Women are the worst affected by climate change impacts – Photo shows women after Cyclone Idai disaster in Mozambique and Zimbabwe.
Source: Ezra Millstein/Mercy Corps

The strategic importance of groundwater resources in climate adaptation in Zimbabwe

Groundwater is the main drinking water source in rural parts of Zimbabwe. According to the 2012 census, about 38% of a total of 3 million Zimbabwean households fetched their water from boreholes and protected wells (Zimbabwe National Statistics Agency, 2012). The total annual abstraction of groundwater in the rural areas, from an estimated 40,000 boreholes, is estimated at 35 x 10^6 m^3. In addition to domestic use in rural and urban areas, groundwater supplies agriculture and industry in Zimbabwe. The total groundwater abstraction for the agricultural sector is estimated at 350 x 10^6 m^3. Groundwater is also abstracted for emerging towns known as Growth Points (e.g. Gokwe), urban centres (e.g. Bulawayo) and rural institutions (e.g. schools, health and business centres). Overall, groundwater presently contributes not more than 10% to the total water use in Zimbabwe (Sunguro *et al*. 2000).

There is a clear link between wealth and the use of water, with implications for livelihoods. More wealthy groups use more water, for all purposes, across all livelihood zones. Differences are especially pronounced in the dry season. There is evidence that for some income generating activities, poorer households suffer disproportionately when water is scarce (Open Report OR/11/031, BGS). In the agro-pastoral zones, poor households are less likely to be able to meet

minimum water needs for their livestock, particularly in the dry season and report, particularly in Buhera, that they receive lower prices at market as a result of poor livestock condition.

In rural areas, water is mainly abstracted through boreholes fitted with a hand pump, due to limited electrification. The standard hand pump in Zimbabwe has traditionally been the unique 'Zimbabwe bush pump' (Fig 9), which is relatively robust. However, lack of maintenance and support of all water supply infrastructure has led to increasing levels of failure. Electric borehole pumps are more common in urban areas, where there has been an increase in the number of private urban boreholes due to inadequate municipal water supply infrastructure.

Figure 9 Zimbabwe Bush Pump

ZINWA has a groundwater branch tasked with specifically looking into the management of the national groundwater resources. Catchment Councils have functions covering both groundwater and surface water, including: preparing an outline plan for river systems, determining applications and granting water permits, regulating and supervising the use of water, supervising the performance of functions by Sub-catchment Councils, and dealing with conflicts over water. However, due to the limited capacity and lack of adequate information regarding the quantity of groundwater, groundwater resource management poses a challenge to the councils. Recent developments in the major cities have seen a collapse in municipal water treatment and distribution systems, culminating in a shift towards the private use of groundwater at household and industrial levels. There has been a rise in bulk water suppliers abstracting huge volumes of groundwater. This has led to new challenges in dealing with conflict over falling groundwater levels in residential areas, which the catchment councils have inadequate capacity to deal with.

In addition to the Water Act (1998), groundwater regulations and guidelines were developed for Zimbabwe in 1999 to control groundwater development and management. The regulations and guidelines compliment the Water Act (1998) and have been formulated within a framework of integrated water resources management (IWRM). Monitoring of groundwater level fluctuation is currently confined to only three major aquifers. These are the Lomagundi Dolomite Aquifer (Sedimentary- fracture flow) situated in the north western part of the country, the Nyamadhlovu Sandstone Aquifer (Sedimentary-Intergranular and fracture flow) situated in the south western part of the country and the Save Alluvial Aquifer (unconsolidated aquifer) located in the south eastern part of the country. Water levels are measured using data loggers and readings are collected monthly. Chloride deposition has been monitored in six monitoring stations throughout the country but has been discontinued due to lack of funds. The information was used in the assessment of groundwater recharge rates. The ZINWA groundwater department also used to carry out chemical surveillance on groundwater and surface water but the programme was suspended due to lack of resources.

The main challenges encountered relate to lack of financial resources, logistical support and limited staff. Another challenge is related to vandalism of facilities by local communities. In certain instances, monitoring boreholes are clogged with debris; making water level recording impossible. Specialised entrances for data loggers and locking mechanisms are currently being manufactured for monitoring boreholes in the Save Alluvial Aquifer. It is desired to revive both the chloride deposition and chemical surveillance programmes and to have telemetric (real time) data collection for the water level fluctuations."

Although groundwater resources are generally limited in Zimbabwe, there are some areas with extensive groundwater storage and these could act as a natural buffer against climate change and variability. However, the aquifer productivity and groundwater potential vary (see Fig 10). Groundwater is the main source of water for more than 70% of the national population living in rural areas. Sparsely populated areas are particularly reliant on groundwater, with hand-dug wells historically playing a major role in rural and peri-urban areas. Other sources are boreholes, springs, sand dams and riverbank abstractions. Groundwater is a finite resource that can be depleted if use is not properly regulated. Sustainable groundwater abstraction could play a major role in achieving the following Sustainable Development Goals (SDGs) in Zimbabwe: 1) end poverty, 2) end hunger and promote sustainable agriculture, 6) sustainable water and sanitation, 8) inclusive sustainable economic growth, and 13) combating the impacts of climate change. As water supply coverage improves, new sources will be required in difficult-to-reach locations and tough hydrogeological conditions where the risk of drilling dry boreholes is high.

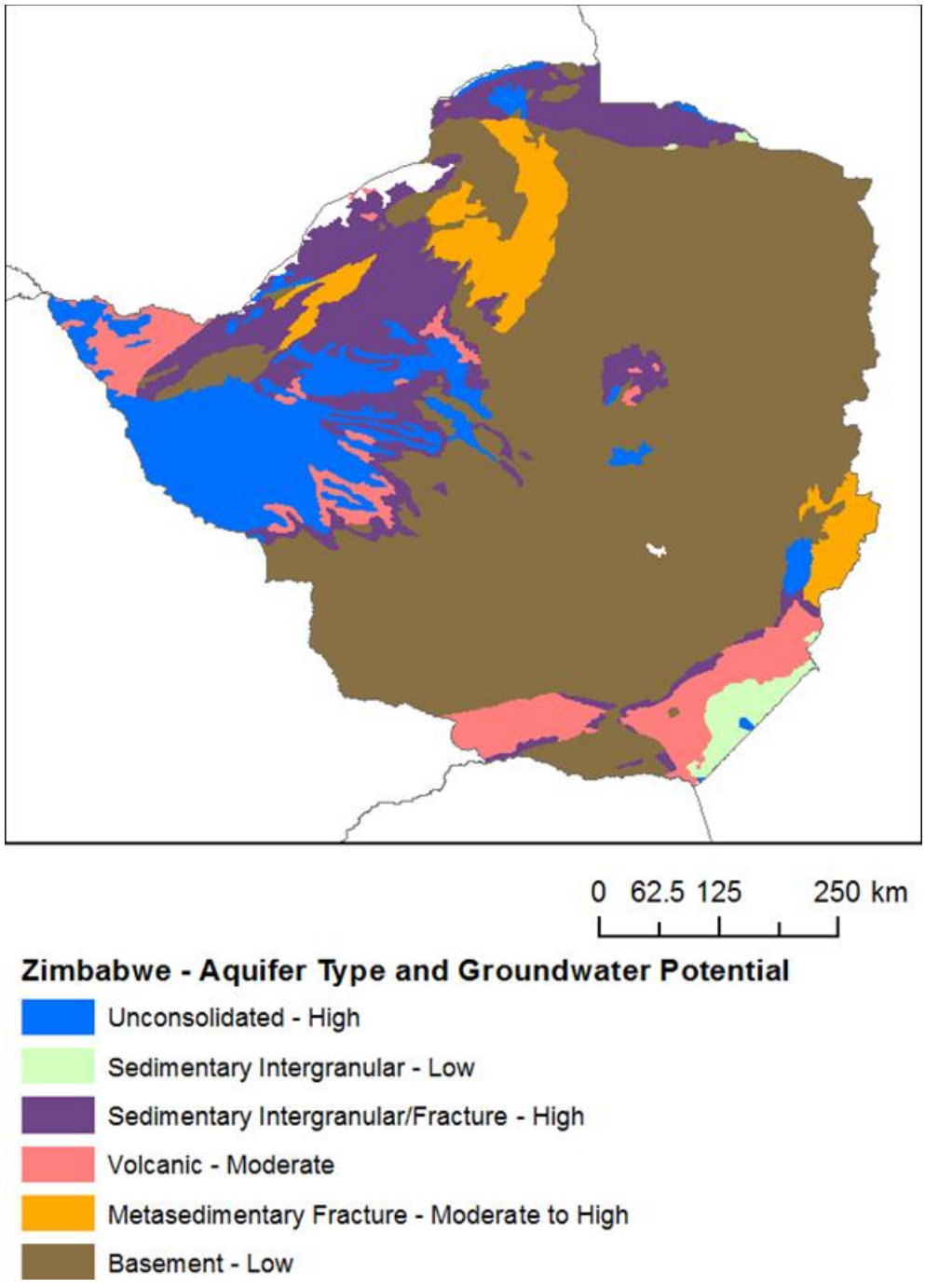


Figure 10 Hydrogeology Map of Zimbabwe
Source: http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Zimbabwe

Climate and environmental context of groundwater use

Over the past three decades, Zimbabwe has witnessed a significant increase in water wells and boreholes. These are financed by development programmes as well as investments by water users and local businesses. Not only do boreholes supply hand-pump water, they also play a substantial role in small as well as larger rural piped water supplies. However, the occurrence of borehole water is dependent on deep aquifers whilst shallow and deep wells can be dug almost

anywhere except rocky and Kalahari sand areas in Zimbabwe. Wells have generally been used for primary purposes such as household uses only. There are very promising prospects for sustainable utilization of groundwater for secondary uses such as food production/processing and livestock farming. More use of groundwater for agriculture will increase abstraction while the application of fertilisers, herbicides and pesticides is likely to affect groundwater quality. A whole systems approach for monitoring and managing groundwater quantity and quality is thus essential to ensure that long-term domestic and agricultural demands can be met in a sustainable manner without depleting or damaging the resource.

The lack of good scientific knowledge on groundwater resources in Zimbabwe, and Africa in general, undermines its potential to contribute to poverty reduction and economic development, and threatens its environmental sustainability. The required expertise and knowledge cover the extent and/or characteristics of shallow and deeper aquifer systems, including groundwater reserves in aquifer systems and the attendant pollution threats. It also includes recharge potential and dynamics and how these will be affected by climate change and land-use/landcover changes. How will these systems perform under unsustainable and increasing abstraction and climate change-induced variations in precipitation and in river flow regimes (natural or anthropogenic)? Fig 11 shows a conceptual framework for the sustainable exploitation of groundwater, whilst guarding against its depletion and reduction in quality. Fig 12 further shows how groundwater is affected by climate change and possible strategies to minimise this.

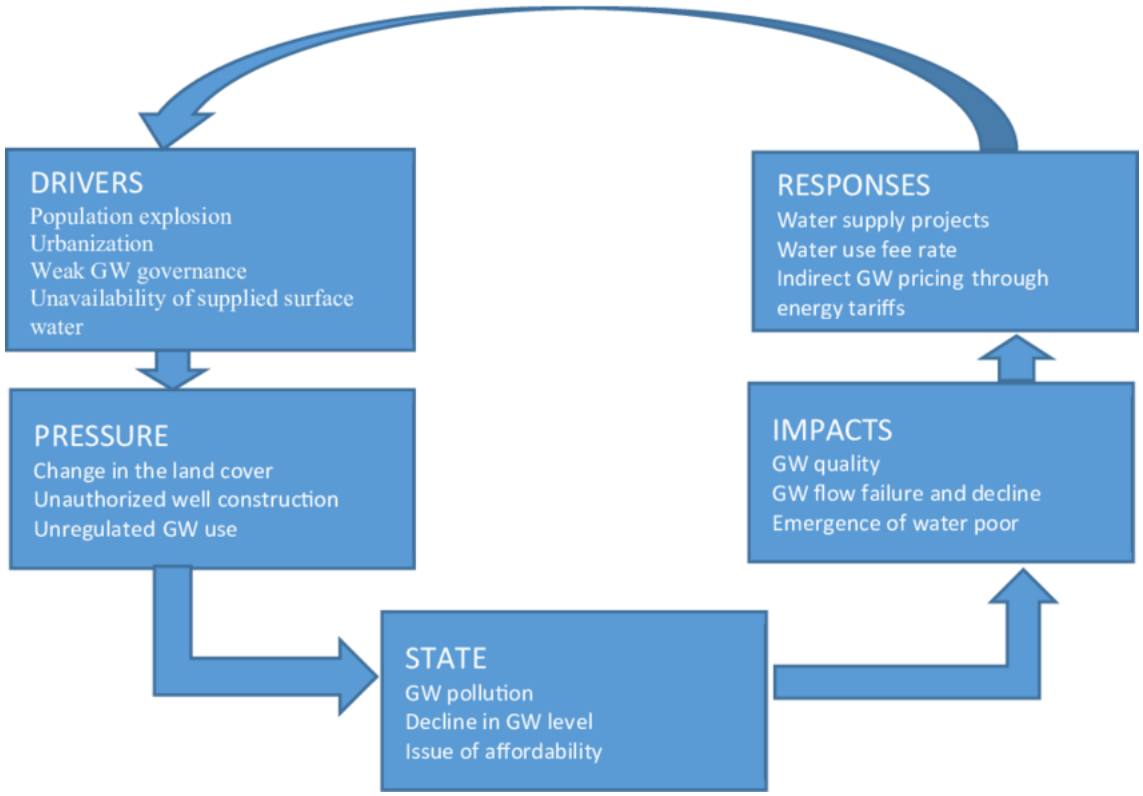


Figure 10 Conceptual framework depicting relationship of socio-political factors with groundwater
Source:
https://www.researchgate.net/publication/284068355_Strategic_assessment_of_groundwater_resource_exploitation_using_DPSIR_framework_in_Guwahati_city_India/figures?lo=1

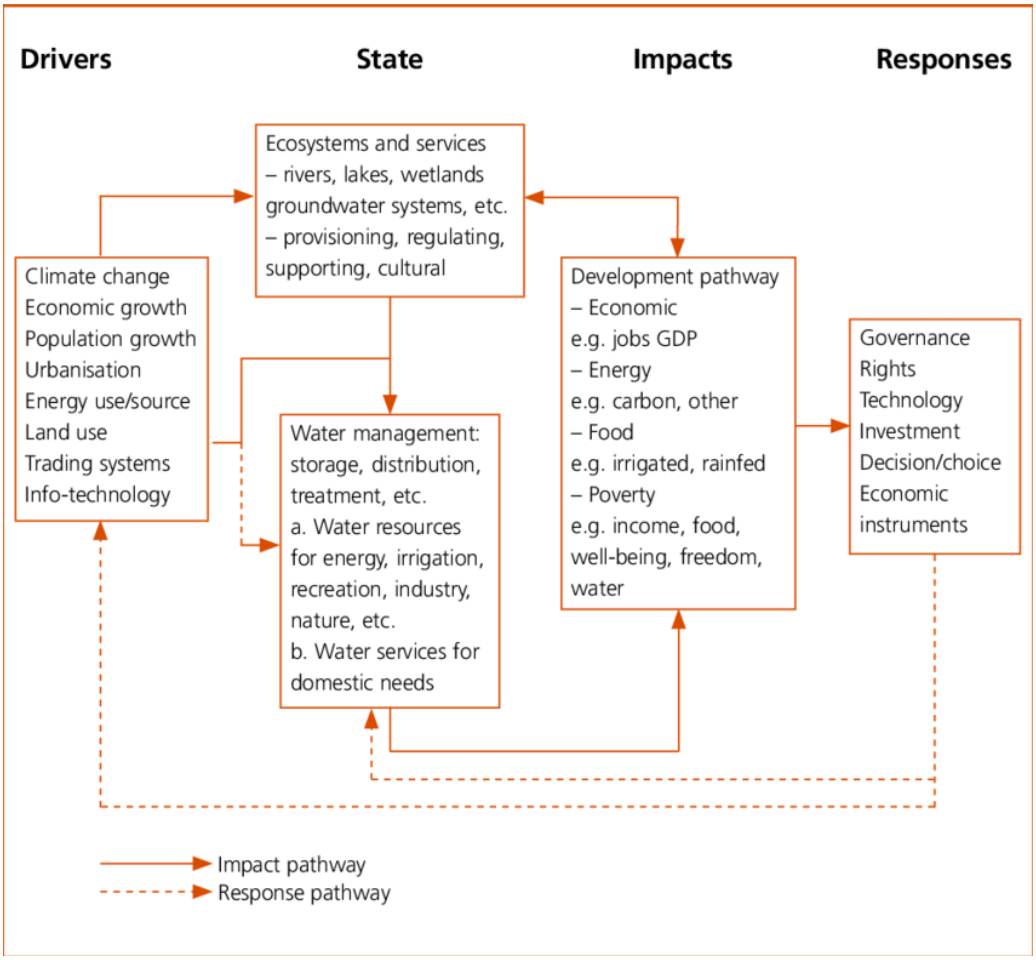


Figure 11 Conceptual framework on water ecosystem services and poverty
Source: https://www.researchgate.net/publication/242083820_Water_ecosystem_services_and_poverty_under_climate_change_key_issues_and_research_priorities/figures?lo=1

In Zimbabwe, policymakers have limited knowledge on the economic costs/benefits and potential contribution of groundwater to food security, health (domestic use), livelihoods and broader economic development. On the other hand, individual farmers are not well-positioned to address the wider implications of unsustainable use and groundwater depletion, and hence longer-term resilience. This project therefore seeks to demonstrate that knowledge-based and holistic catchment-based groundwater planning, sustainable use and management can overcome these constraints and significantly contribute to increased climate resilience. Sustainable groundwater management therefore requires improved understanding of the available resources, their vulnerabilities and resilience potential. This is done through carrying out detailed hydrogeological and geophysical investigations (supply) and sectoral groundwater use inventories (demand). There is very little groundwater monitoring in Zimbabwe, and hence no information systems and flow models, despite the existence of statutory instruments and financial mechanisms to do this. Robust monitoring networks and systems are required to monitor and track the resource status and trends and form the basis for the implementation of resilience measures.

Projected climate change impacts on Zimbabwe

Climate change is projected to affect the total annual rainfall patterns as well as its distribution within years throughout the world (Inter-governmental Panel on Climate Change, 2007).

Zimbabwe's long-term rainfall shows a negative trend which has become more pronounced over the past thirty years. Fig 13 shows the departure from the average mean rainfall between the years 1910 and 2009/10.

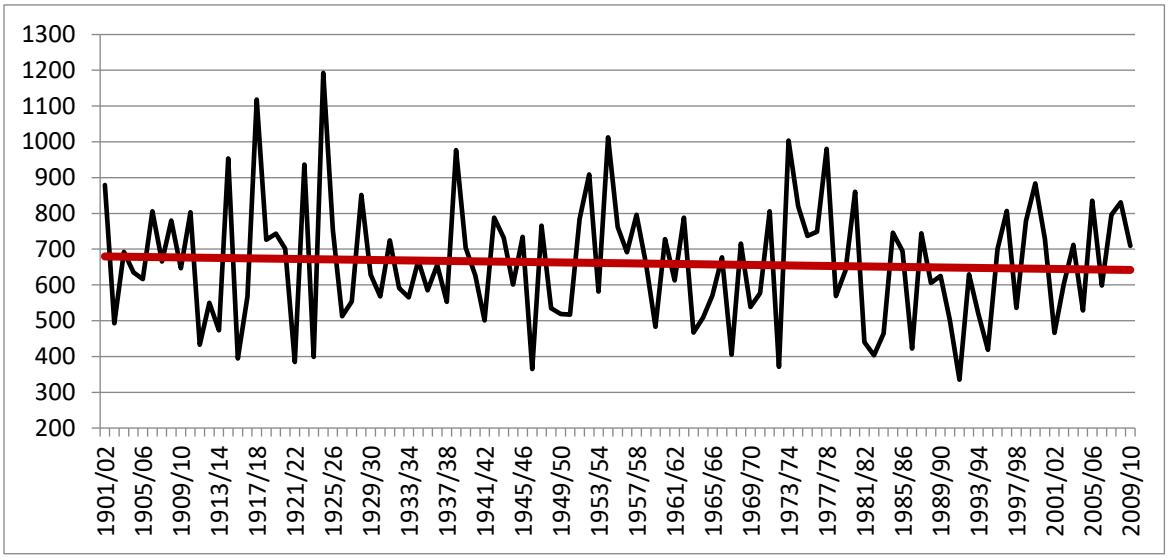


Figure 12 Zimbabwe Average Seasonal Rainfall (mm) 1901/02 to 2009/10
Source: Meteorological Office, Zimbabwe.

Besides the normal cyclic patterns that have been witnessed over the years, the number of years with below average rainfall has been increasing. In addition, the amplitudes of the deviations below the mean are increasing which suggests an increase in more severe dry years (Fig 14).

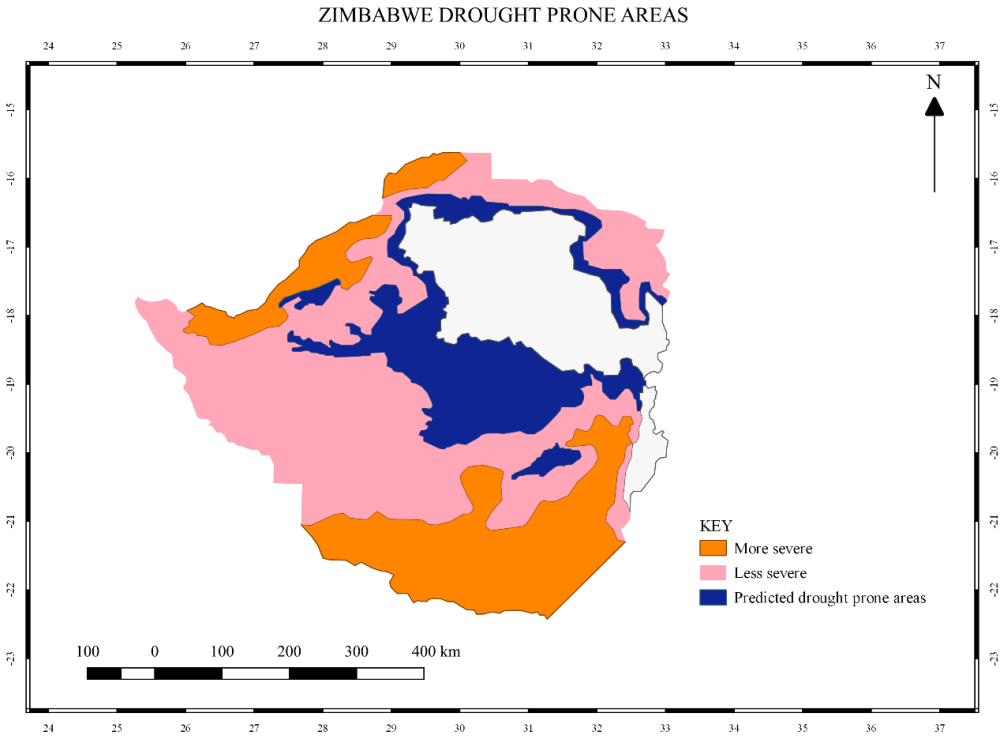


Figure 13 Drought-prone areas of Zimbabwe
Source: Kashangura (2014)

Climate change will impact on different sectors in different ways. While there is still debate on issues around climate change at global and national scales it is, however, generally agreed that a “do nothing” approach will become costly to governments. At local level, there is need for communities to engage in adaptation and mitigation strategies to minimize the impacts of climate change. The challenge for developing countries is data scarcity as there is no sound historical data to analyze at finer scales and then use models to project and have a clearer picture of how the future will unfold.

Zimbabwe is currently under a severe drought which seems likely to extend into the 2019/2020 rainfall season. The Kariba Dam is at its lowest water level since 1996, raising further risks to the hydropower plants that Zimbabwe and Zambia depend on for nearly half of their power supplies. The water levels fell to 10% of usable storage, according to data posted on the Zambezi River Authority’s website (www.zambezira.org). Large parts of Zambia and Zimbabwe are experiencing the worst drought in at least four decades, forcing the nations to cut generation from Kariba after water flows fell sharply in the Zambezi river that feeds it. Each country has implemented power cuts lasting as long as 18 hours a day as a result. The Victoria Falls, which is one of the main tourist attractions for Zambia and Zimbabwe, has been drastically affected (Fig 15). The two nations’ economies have suffered. Zambia’s will grow by less than 2% in 2019, the lowest in more than two decades, while Zimbabwe’s economy will contract by 7.1%, according to the International Monetary Fund.

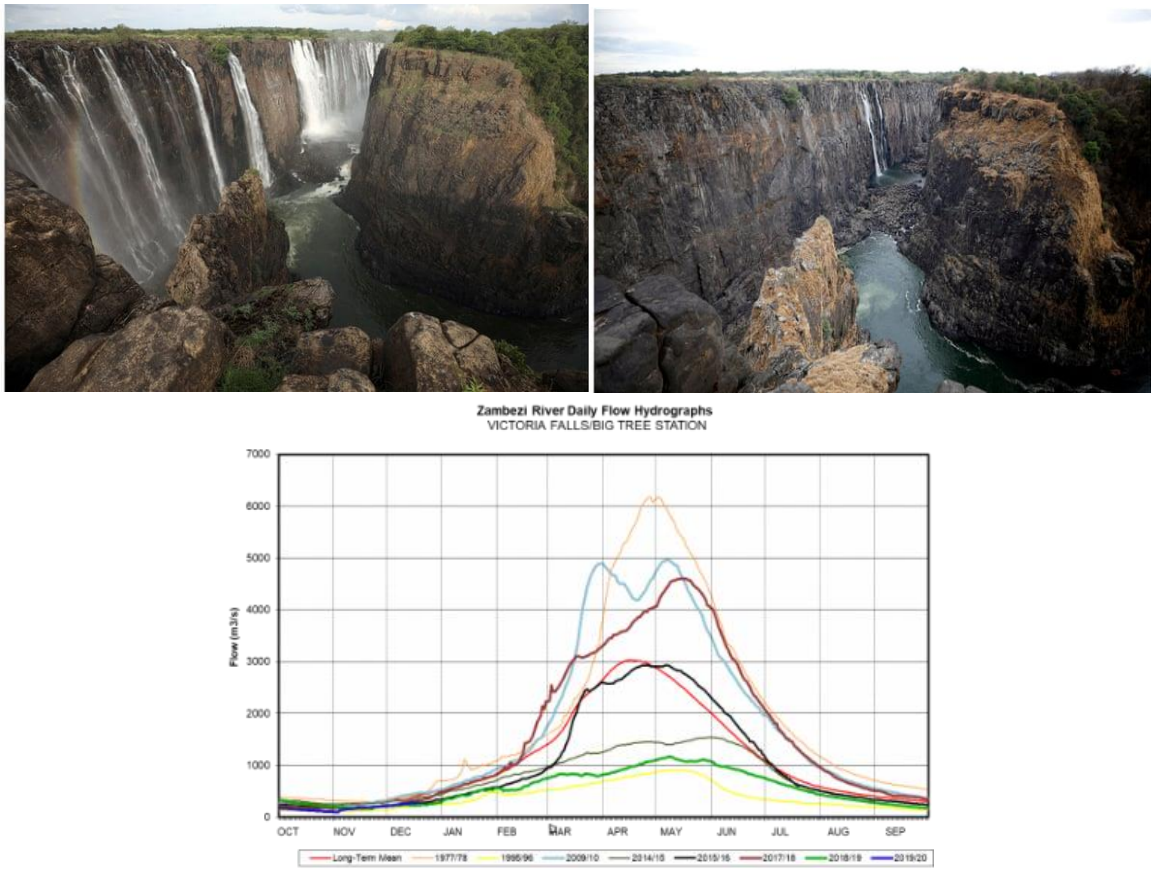


Figure 14 Victoria Falls, one of the “7 Natural Wonders of the World”, under normal (left) and 2019 drought conditions (right). The graph shows the trend in water flows at the Victoria Falls Big Tree station
Source: https://www.theguardian.com/world/2019/dec/07/victoria-falls-dries-to-a-trickle-after-worst-drought-in-a-century, and http://www.zambezira.org/hydrology/river-flows

Increasing water demand from socio-economic development and urbanization will result in more abstractions from river systems. This makes water systems particularly vulnerable to the adverse effects of climate change and biodiversity loss, both of which limit the ability of the basin to provide its key ecosystem service, i.e., the provision of clean water. Building resilience to climate-related and other shocks in the basin requires natural runoff into the rivers to be maintained and, wherever possible, increased. The current resource availability situation in river basins is already stressed. However, the situation could be stabilised over the coming years if appropriate management interventions are adopted. Kashangura (2014) applied climate changed-based model scenarios using projected climate change impacts (temperature and precipitation) and increased water utilisation for irrigation, to show that water scarcity would increase. While water scarcity is predicted to increase in many parts of the world, arid and semi-arid regions such as the Limpopo and Zambezi River basins, will suffer the most. These scenarios, if realized, will likely impact availability of water for domestic and agricultural use, creating water shortages and reduced agricultural productivity.

The Government of Zimbabwe, through its various agencies has taken a number of steps to respond to climate change. These include the development of the National Environmental Policy and Strategies in 2009 (Government of Zimbabwe, 2009); the development of Zimbabwe's National Climate Change Response Strategy (Government of Zimbabwe, 2015); the commissioning of a World Bank Study on Climate Change and Water Resources Planning; Development and Management in Zimbabwe (Davies and Hirji, 2014); the formulation of National Water Policy (Government of Zimbabwe, 2013), and the National Water Resources Masterplan (Government of Zimbabwe, 2019).

The Project

Summary of Problem to be addressed through the Project

The worst agro-ecological regions in Zimbabwe are in Regions IV and V, arid areas with rainfall less than 400 mm/annum. These areas are very hot (temperature ranges 25 – 35 ^{o}C). Surface water plays a minor role in these parts of Zimbabwe because of the generally flat terrain, high evaporation rates and seasonal rivers. These areas have shallow and deep aquifers with varying yields. It is not surprising that these areas are home to the poorest and most vulnerable communities who only use water for primary purposes such as household use and animal drinking. Climate change in Zimbabwe will result in more drought years and increasing flooding incidences, placing the lives of people in these regions at greater risk, the majority of whom are women and girls. The Government of Zimbabwe therefore believes that if these communities are trained to use groundwater in a sustainable way – without causing groundwater mining and catchment degradation – they could diversify and improve their livelihoods in the face of the changing climate. The choice of groundwater for mitigating climate change is also informed by the current Government thrust highlighted in the Climate Change Response Strategy, Climate Policy, Water Policy and the Draft National Water Resources Masterplan. The Government is also running an ambitious programme to drill at least five boreholes in each of the 210 parliamentary constituencies, with funding secured from the Chinese government. This will build synergies with the proposed Project.

Project Philosophy

This Project seeks to develop human, technical and institutional capacity through a framework for sustainably utilising groundwater for productive use in selected vulnerable rural communities. The Project philosophy is based on enhancing ecosystem resilience and reversing environmental

degradation; improving food security through better water stewardship, water harvesting and climate-smart agriculture; enhancing income security through livelihood diversification to improve coping mechanisms in times of extreme climatic events; and freeing up time and space of women and children for productive uses. To achieve this, the Project will develop key capacities at national, district and sub-catchment levels and mainstream groundwater, climate change and gender in sustainable sub-catchment planning and carry out pilot and demonstrations at local levels. The Project will complement current government efforts to develop a national water masterplan and regional groundwater initiatives through the SADC Groundwater Management Institute (SADC-GMI) based at Stellenbosch University in South Africa.

The Project's national component will assess the groundwater resources in selected two sub-catchments and develop/tackle the critical shortage of skilled groundwater technicians, scientists and managers. The Project will establish a National Groundwater Training and Research Centre at the University of Zimbabwe with the primary function of training technicians, undergraduate, postgraduate and postdoctoral scientists in advanced hydrogeological sciences and related technologies, as well as improving knowledge of groundwater connectivity and policy, and management issues confronting water managers. At district and sub-catchment level, the Project will train extension workers, NGO and community leaders on adaptive groundwater management, in-ground water harvesting, climate resilient and gendered catchment planning and management. At local level, the Project will pilot and demonstrate differentiated solutions and best practices in climate-smart development using groundwater.

Selection of Project areas

A systematic selection system was used for the project action areas. This resulted in the selection of Binga and Buhera districts. The statistics to justify the choice of these districts and awards are given in Table 6. The population densities are 10.43/km^2 for Binga, and 45.90/km^2 for Buhera. The percentages of female populations are 54.2% in Binga and 53.6%. According to the Zimbabwe Poverty Atlas of 2015 and the Zimbabwe 2015/16 food security and vulnerability situation - Food & Livelihoods Insecurity (ZimVAC 2015 Results) - these districts have the worst poverty prevalence and food insecurity and are situated in the worst agro-ecological regions of the country which receive less than 400 mm/year rainfall. Because these areas are arid or semi-arid, surface water storage is hampered by terrain, high temperatures in the dry season and high evaporation rates of >1,600 mm/year. A simultaneous assessment of district borehole density, poverty, food insecurity and agro-ecological regions shows that boreholes are having little impact in reducing vulnerability in low rainfall areas (Regions IV and V).

Table 6 Statistical data for the selected wards

District and Ward	Households	Population	Poverty Prevalence, %	Poverty Severity, %	GINI Index	Agro-ecological Region	Sub-catchment Council
Binga Ward 19	1,088	5,183	91.3	29.8	31.4	IV	Lower Gwayi
Binga Ward 25	879	3,963	90.4	28.5	31.1	IV	Lower Gwayi
Buhera Ward 20	1,607	7,194	81.4	20.3	32.6	IV	Upper Save
Buhera Ward 23	2,632	11,855	83.2	21.3	32.3	V	Upper Save
Total	6,206	28,195					

The Project preparation team further visited the selected areas for ground-truthing and to conduct household surveys and stakeholder consultations. The team also confirmed other humanitarian

and development projects on the ground so as to avoid duplication of efforts and ensure complementarity. Boreholes in some parts of Binga have saline water that has little use in productive purposes. There will therefore be less focus on boreholes, with most interventions centred on community and household exploitation of shallow aquifers, alluvial aquifers, in-ground and surface water harvesting, deep/shallow wells, springs, sand dams, etc. Rainwater harvesting will mainly focus on rooftop harvesting and ground storage techniques.

Detailed description of the Project areas

Project areas

Fig 16 shows the location of the chosen wards within the Binga and Buhera districts.

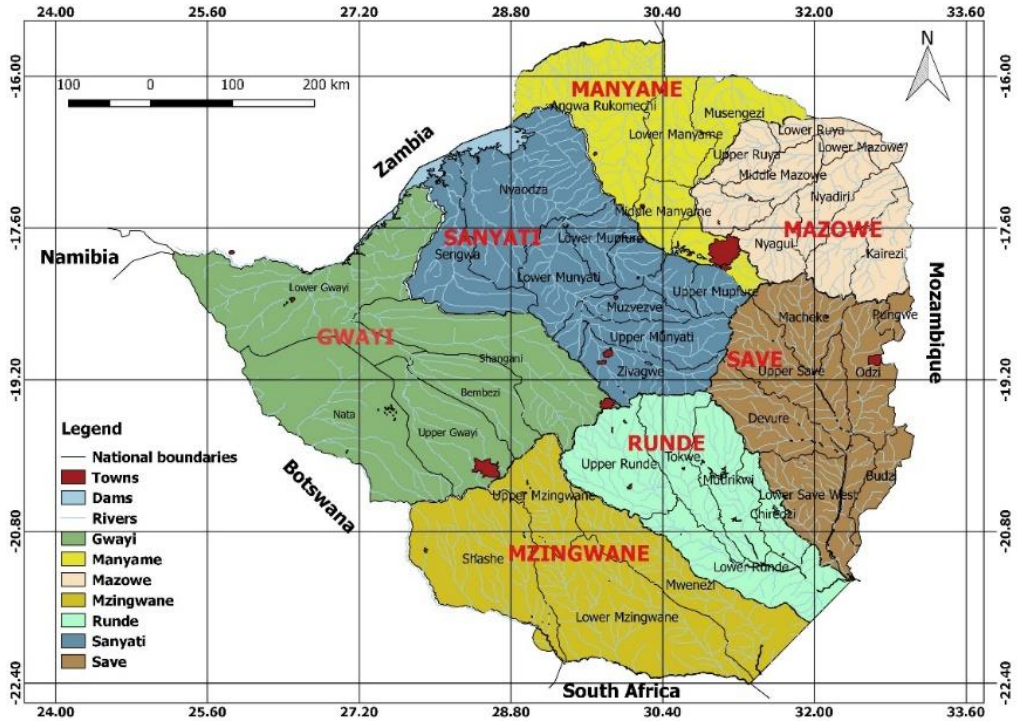


Figure 15 Maps for project wards

Preliminary work on groundwater mapping in the targeted wards in Binga and Buhera

Preliminary geological mapping of the underground rock formations for the targeted wards tailor-made for water exploration (Figs 16 and 17). The geological maps were useful in guiding the project preparation team to sites that potentially contain aquifers or large underground water deposits for possible productive exploitation. The maps feature detailed underground rock formations in the areas targeted by the Project.

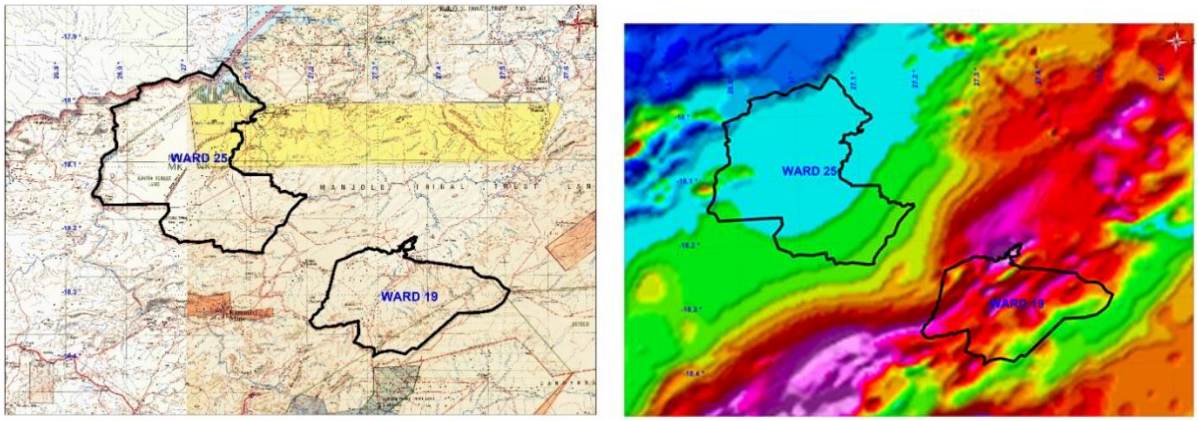


Figure 16 Topographic and Aeromagnetic Map of Binga Ward 19 and 25

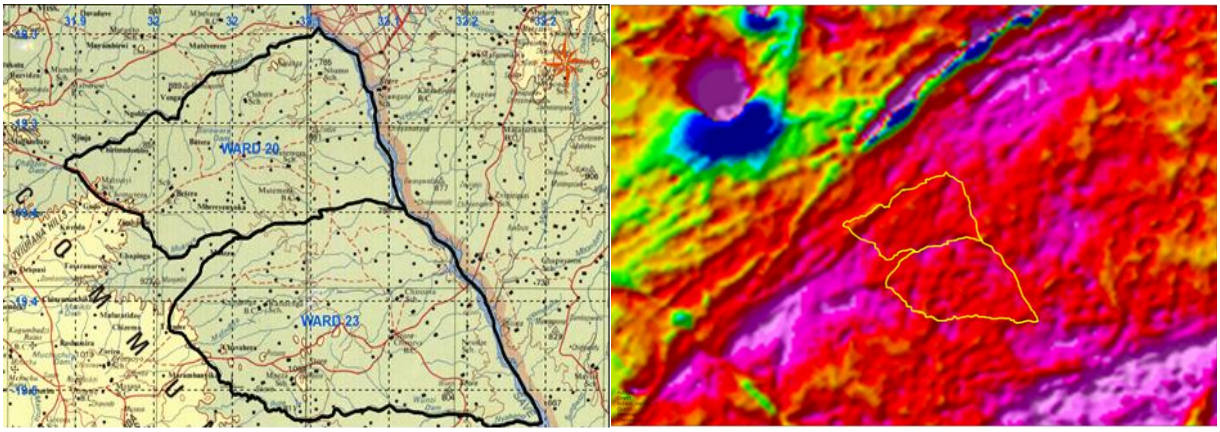


Figure 17 Topographic and Aeromagnetic Map of Buhera Ward 20 and 23

Access to Water in Binga and Buhera districts

Main sources of drinking water

Tables 7 and 8 show boreholes and wells are the main sources of water for Binga and Buhera. Wells and boreholes combined cater for the water needs of 94.47% of Buhera villagers interviewed during the field visits. Boreholes and wells in Binga on the other hand cater for the water needs of 59.39% of the villagers consulted during the research. Less than 5% of villagers in Buhera rely on rivers, springs and dams for water for domestic consumption.

Table 7 Main sources of water for Buhera and Binga districts

	District	
Rank	**Buhera**	**Binga**
1	Wells (72.84%)	Borehole (50.76%)
2	Borehole (21.63%)	Rivers (18.27%)
3	Rivers (4.33%)	Springs (11.68%)
4	Springs (1.20%)	Dams (10.66%)
5	Dam (0%)	Wells (8.63%)

Table 8 Sources of drinking water by Ward in Buhera and Binga Districts

		Buhera		Binga	
		Ward 20	**Ward 23**	**Ward 19**	**Ward 25**
Rank	1	Well	Well	Borehole	River
	2	Borehole	Borehole	Dam	Spring
	3	River	River	Well	Dam
	4	Spring	Spring	River	Well
	5	Dam	Dam	Spring	Borehole

The main water source for villagers in Buhera is wells. About 49% of villagers in Ward 20 use a personal water source, 30% use a communally owned water source and 21% access water from water sources owned by their neighbours. Only 40% of villagers in Ward 23 use personal water sources, 33% use communally owned water sources and 27% access water from water sources owned by neighbours.

The main sources of water for villagers in Ward 19 of Binga are boreholes, followed by dams and then wells. All these water sources are owned communally. The main water sources for villagers in Ward 25 are rivers, followed by springs, dams, wells and then boreholes. Again, all the water sources in Ward 25 are communally owned. It is also interesting to note that Ward 25 has more wells than Ward 19. However, these wells dry up during the year.

Time Spent Looking for Water

Fig 18 shows the time spent looking for water in the project wards. Villagers in Binga spend the highest amount of time looking for water compared to their colleagues in Buhera. The percentage of villagers in Buhera Ward 20 and 23 who spend less than an hour going to the water source is 90% and 85% respectively. Comparing this to the 78% and 50% of villagers in Binga Ward 19 and 25 who have access to a water source that is less than one hour's walk from their homesteads.

Villagers in Binga Ward 25 have the least access to water sources that are closer to their homesteads. 37% of villagers from this ward spend between one (1) and two (2) hours looking for water, 10% spend between two (2) to four (4) hours searching for water, and three (3) percentage of the villagers spend more than four (4) hours searching for water. The main source of water for these villagers is rivers, and springs. Villagers from this ward revealed that they walk as far as 10 km in search of water during the dry seasons of the year.

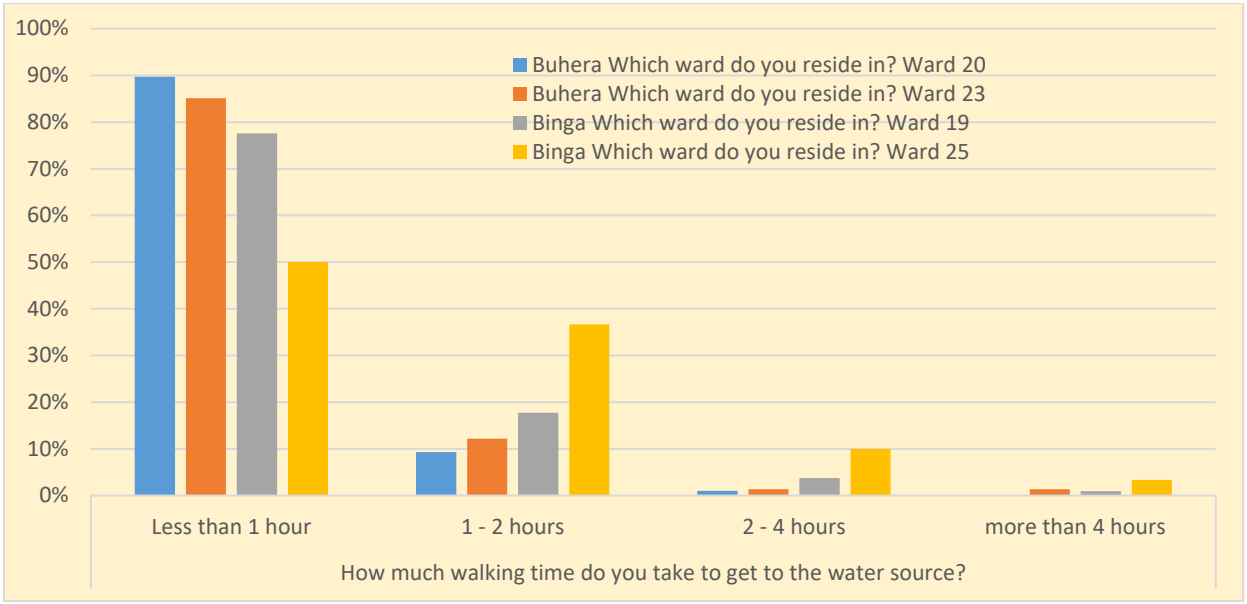


Figure 18 Time spent looking for Water

Responsibility of fetching for water

The responsibility to fetch water in both Binga and Buhera districts either falls on the mother or is shared between the mother and girl children (Fig 19). The implication is that in wards where villagers spend long hours fetching water, there will be days when girls miss school going to fetch water. Villagers in Binga spend the highest amount of time looking for water compared to their counterparts in Buhera. Villagers in Binga Ward 25 have the least access to water sources that are closer to their homesteads. 37% of villagers from this ward spend between one (1) and two (2) hours looking for water, 10% spend between two (2) to four (4) hours searching for water, and three (3) percentage of the villagers spend more than four (4) hours searching for water.

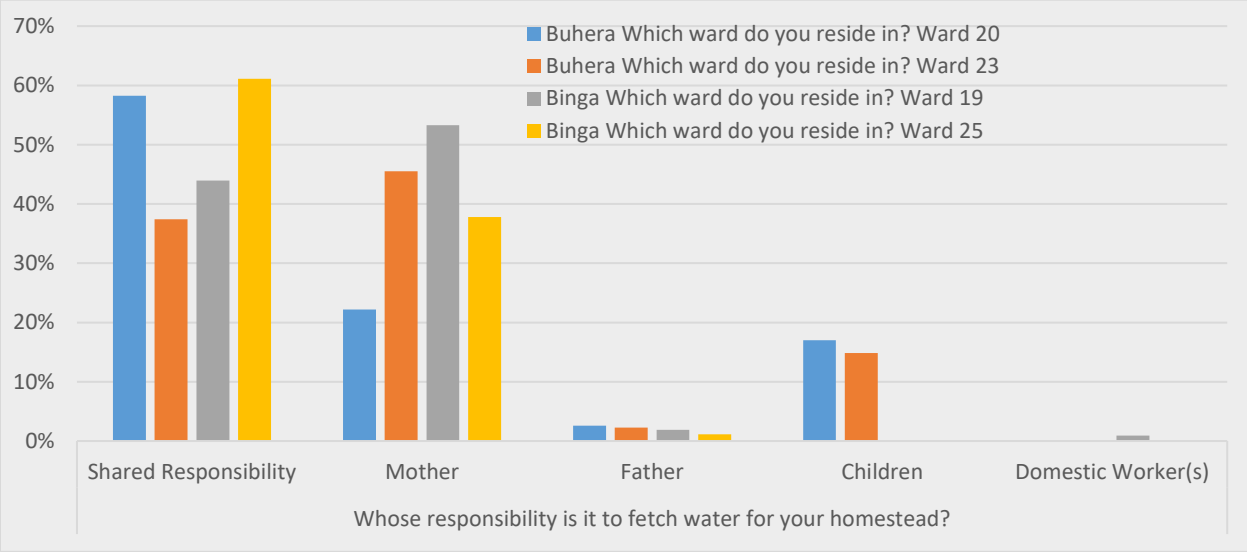


Figure 19 Responsibility of looking for water in Binga and Buhera project wards

Impacts of Lack of Access to Water on Education

In Binga Ward 25, schools have a shortage of teachers because of water challenges. Teachers prefer leaving the ward in search of teaching places in wards or districts with better access to

water. This affects the girl child mostly, since girls attend school fewer days in a year than boys do. Additionally, schools within the ward are underdeveloped because of lack of access to water.

Fig 20 is a picture of Katete Primary School in Binga Ward 25. The school relies on 15,000 litres of water per annum of drinking for its teachers and pupils. The source of drinking water is rainwater harvested during the rainy season. There are times in the past years when the school closed after it had run out of drinking water. The other alternative nearest source of drinking water for the school is a borehole located 10 km away from the school and outside Ward 25. Katete Primary School is currently under construction. However, construction work slowed because of lack of access to water. The school has six (6) teachers teaching primary school and only one teacher for the newly established secondary school. The Roman Catholic Church is constructing the school.

Figure 20 Katete Primary and secondary school in Ward 25 Binga. The school relies on 15 000 litres of water a year for drinking

Figure 21 is a picture of a primary school located in Lubanda Village in Binga Ward 25. The school does not have any watering source within its premises for either drinking or general purpose. The only source of water for the school is a community well that dries during the year. The school uses mud huts for both classroom for its students and accommodation for the teachers. Lack of access to water makes construction of modern-day classrooms difficult at the school. There is only one block at the school made of brick and mortar.

Figure 21 Picture of a primary school in Ward 25 Binga. The school does not have a borehole or well within its premises and relies on a community well to provide drinking water for its students

Vulnerability of Villagers to Drying up of their Water Sources in Binga and Buhera districts

The impacts climate change is having on men and women in Binga and Buhera is summarised in Table 9.

Table 9 Impacts climate change is having on men and women in Binga and Buhera

Impact	**Binga**		**Buhera**	
	Ward 19	**Ward 25**	**Ward 20**	**Ward 23**
Loss of livestock	×	×	×	×
Loss of livelihoods	×	×	×	×
Drying of water sources	×	×	×	×
Water conflicts	×	×	×	×
Women forced to walk long distances in search of water	×	×		
Girls missing school looking for water	×	×		
Food insecurity	×	×	×	×
Men forced to migrate in search of employment	×	×	×	×
Men forced to travel long distances in search of pastures and water for livestock	×	×	×	×
Increasing levels of poverty	×	×	×	
Forced migration	×	×	×	
Vulnerability to hygiene related diseases	×	×	×	
Schools teachers migrating from the area due to water shortages	×	×		

The main sources of water for villagers in Binga and Buhera districts are at risk of drying up during the year due to the effects of climate change (Fig 22). This leaves the villagers vulnerable to lack of access to water in the dry parts the year. In Binga Ward 25, the main sources of water for the villagers start drying up in April (Fig 23). Villagers walk long distances in search of water outside the ward.

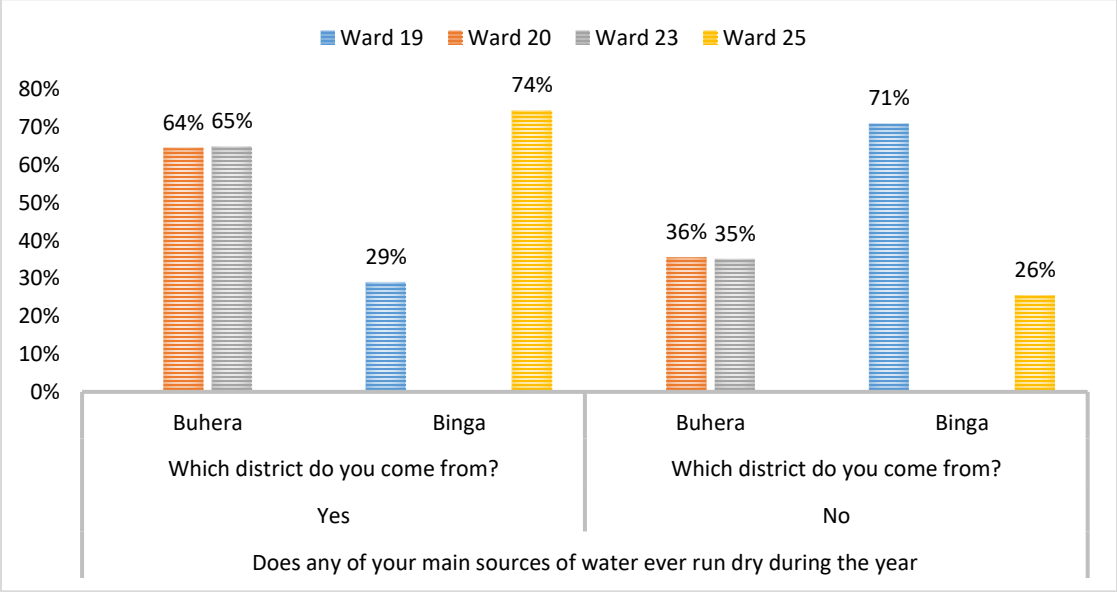


Figure 22 Water sources drying up during the year

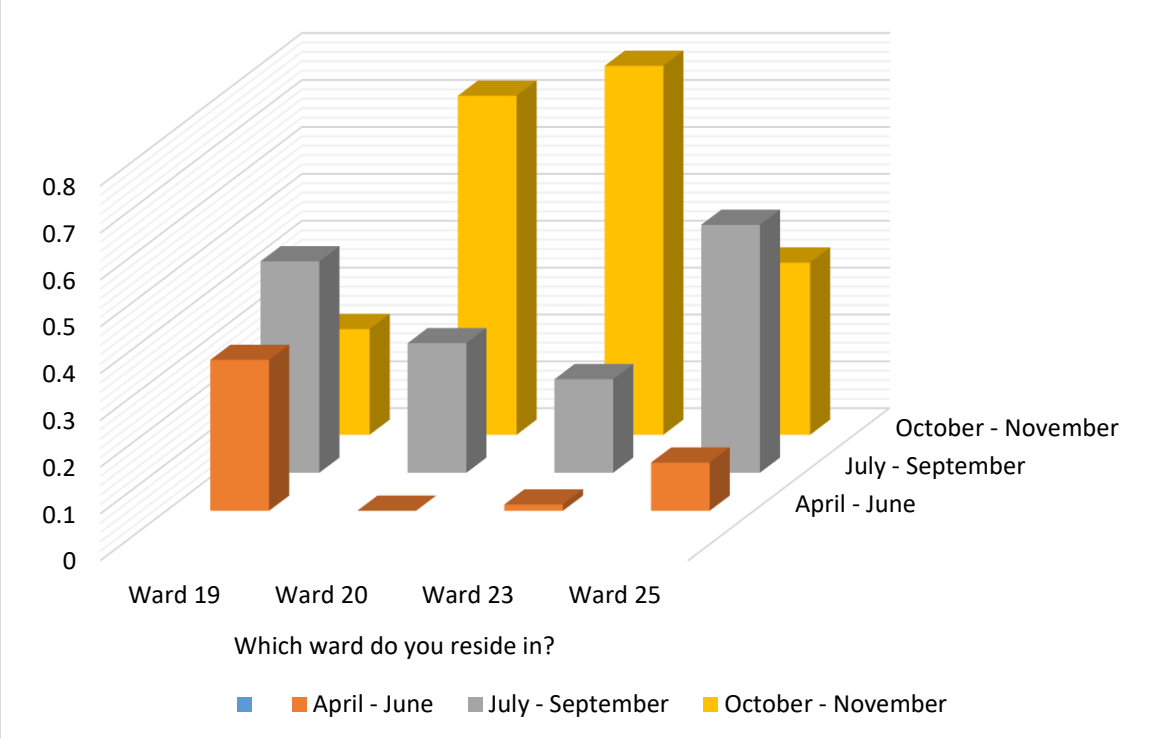


Figure 23 Time when water sources dry up

The most vulnerable ward in terms of water security is Binga Ward 25. About 74% of the homesteads from Binga Ward 25 use a water source that dries during the year. In Buhera, 64% and 65% of villagers from Ward 20 and 23 respectively have their water source dry up during the year. The main source of water for villagers in Buhera are wells, which account for 72% of the water needs of the households interviewed. The wells found in Buhera are hand dug, meaning that rudimentary methods of water divination would have been employed during water surveying. Additionally, due to the methods of well digging employed, wells found in Buhera are not deep enough to ensure water security for the villagers. Villagers in Binga Ward 19 have the most secure sources of water amongst the four wards visited. The main source of water for villagers in Binga Ward 19, are boreholes. About 74% of villagers from Binga Ward 19 access water from the same source throughout the year.

Water sources in Binga Ward 19 and 25 start drying during the period April to June whilst those in Buhera start drying up during the months July to September. The majority of the water sources in Buhera dry up during the months October to November. Fig 24 shows a dry weir close to Ward 19 in Binga. This weir dries up during the months of July to September. Before it dries up, it provides drinking water to at least 2,000 cattle daily.

Figure 24 Picture of a dry weir in Binga

The main alternative source of water for villagers from Binga Ward 25 is rivers followed by dams (Fig 25). It is important to note that Ward 25 villagers do not have access to boreholes as an alternative water source whenever their sources of water run dry. Villagers from Binga Ward 19 and the two wards in Buhera access water from rivers, boreholes, and dams whenever their water sources run dry during the year.

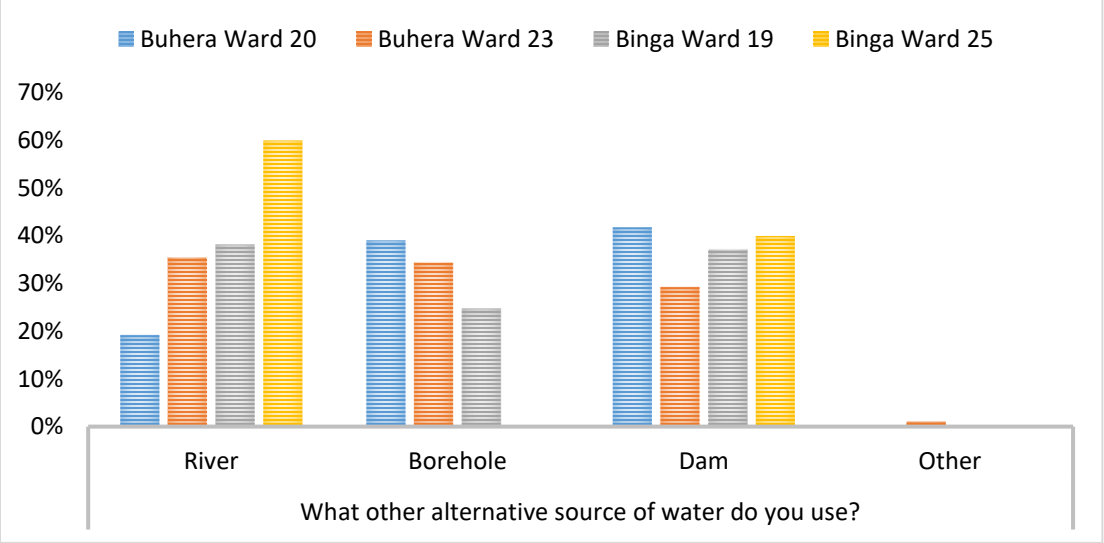


Figure 25 Alternative sources of water for villages whose water sources dry up during the year

Fig 26 shows the potential intervention strategies that villagers from Buhera Ward 20 and 23, and Binga Ward 19 and 25 thinks are appropriate and relevant to solving their water situations. About 81% and 74% of villagers in Buhera Ward 20 and 23 respectively, believe that drilling boreholes is the solution to water challenges within their wards. The remainder of villagers in Buhera Ward 20 and 23 believe that sinking more wells (7% for Ward 20 and 11% for Ward 23), improving on water harvesting (7% for Ward 20 and 2% for Ward 23) or combining groundwater exploitation and water harvesting (1% for Ward 20 and 5% for Ward 23) as the solutions to their water problems.

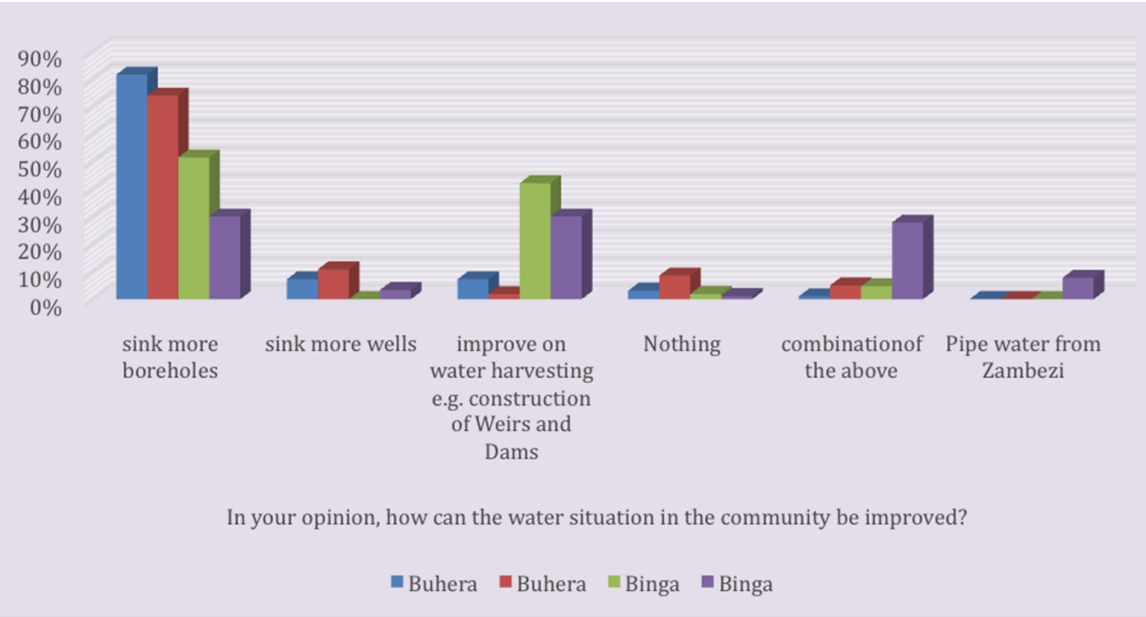


Figure 26 Potential intervention strategies that villagers from Buhera and Binga perceive appropriate and relevant to solving their water situations

The statistics gathered from Binga on the potential way forward in terms of solving the water problems within their areas slightly differ from the solutions proposed in Buhera. More villagers in

Binga compared to Buhera believed in water harvesting as key in solving water problems within their wards – probably due to high groundwater salinity in the area. The statistics of villagers proposing water harvesting in Binga were 42% for Ward 19 and 30% for Ward 25, compared to only 7% for Ward 20 and 2% for Ward 23 in Buhera. Apart from water harvesting, villagers in Binga proposed drilling of more boreholes (51% for Ward 19 and 30% for Ward 25); sinking more wells (0% for Ward 19 and 5% for Ward 25); combining water harvesting and borehole drilling (5% for Ward 19 and 28% for Ward 25); and piping water from the Zambezi River (0% for Ward 19 and 8% for Ward 25) as solutions to the water problems within their wards.

Livelihood Options for Villagers in Binga and Buhera districts

The main source of livelihood in both Binga and Buhera is farming, followed by other, then animal husbandry (Fig 27). Although villagers in Binga Ward 19 and 25 indicated during focus group consultations that they rely on selling livestock during dry months of the year, they did not consider animal husbandry as their source of livelihood. Rural Zimbabwean communities are farming communities and historically, communal farmers were the main suppliers of cereal crops like maize to the Grain Marketing Board. Helping villagers engage in efficient and productive farming is important in poverty alleviation and resilience building. The other livelihood activities that villagers in Binga and Buhera engage in are building, basket weaving, sculpting, furniture manufacturing, buying and selling, fishing, well digging, traditional beer brewing, piece jobs and shoe repair services. Villagers who embark on basket weaving indicated that low rainfall patterns make it difficult for them to get reeds that are suitable for their trade. Villagers whose source of livelihood is well digging indicated climate change is making most of the wells that they dig to dry up early.

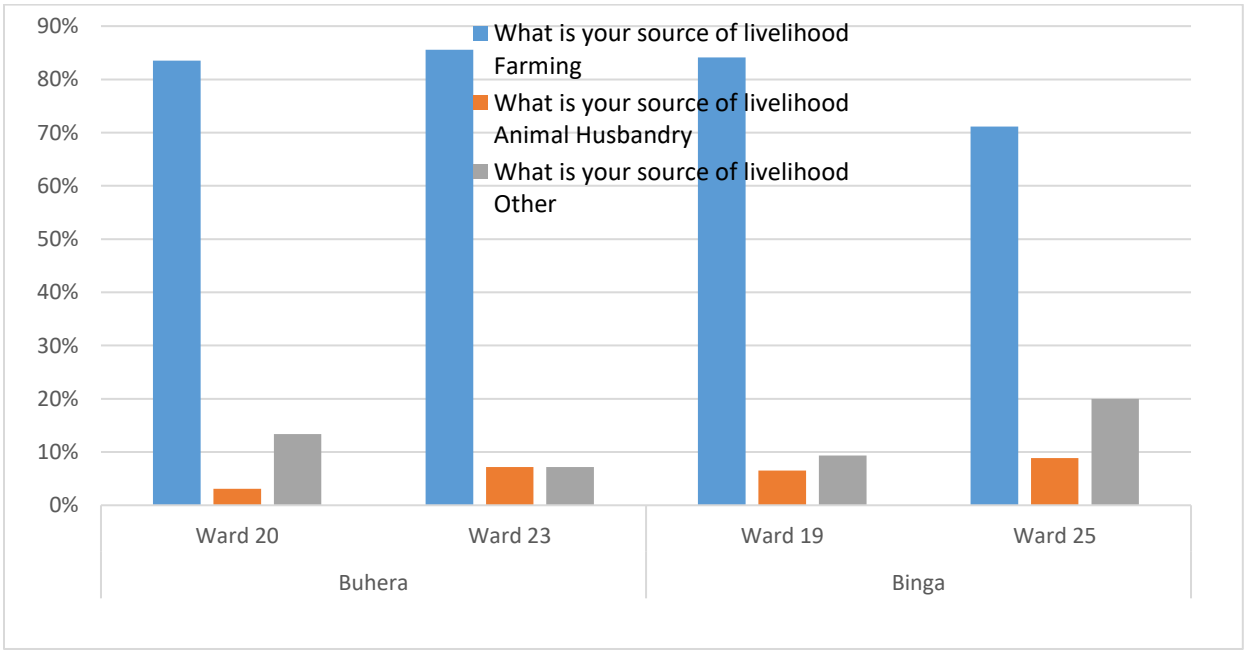


Figure 27 Main sources of livelihoods in the project wards of Binga and Buhera districts

Fig 28 shows some of the bricks moulded by villagers in Buhera. Villagers in Binga also engage in brick moulding. However, lack of access to water limits their operations.

Figure 28 A picture of villagers in Buhera engaging in brick moulding

Crop Farming in Binga and Buhera Districts

Some parts of Ward 19 and 25 in Binga have soils suitable for farming. However, these fertile pieces of land lack access to water and are therefore not available for productive/farming purposes. Additionally, the boreholes and wells found in Binga use manual hand pumps and are not suitable for large gardening projects. Villagers concentrate on doing small gardens next to perennial boreholes in Ward 19. Apart from gardening close to boreholes, rivers, and springs, villagers in Binga also engage in rainfed cotton farming, with free iputs from the Government. Cotton is mainly sold to the Cotton Company of Zimbabwe (COTTCO). However, climate change, mostly characterised by poor rainfall, significantly affects the cotton yields of the villagers.

Villagers in Buhera Ward 20 and 23 engage in growing roundnuts and groundnuts during the rainy season. These two crops require sandy soils and do very well with little moisture. The Grain Marketing Board provides the main market for roundnuts and groundnuts grown in Buhera. However, villagers indicated that the prices paid by GMB are low. Apart from GMB, some villagers also take their produce to Mbare Musika in Harare. Agricultural Technical and Extension Services (AGRITEX) Officers in Buhera revealed that Buhera has good soils suitable for growing small grains. Villagers are, however, reluctant to grow small grains because they are labour-intensive. Additionally, apart from small grains, AGRITEX Officers in Buhera also believe that soils in Buhera can support various agricultural activities if irrigation water is available.

Access to water affects ownership of gardens in Buhera (Fig 29). Gardens are found in homesteads that own wells or close to boreholes. Some villagers do gardening close to rivers and springs. Red Cross and GOAL once carried out gardening projects in Buhera. During the year 2004, the Red Cross established community gardens in Ward 23 Buhera. However, the gardens are no longer functional, as the rivers that used to water the gardens have dried up. Additionally,

the fence that used to secure the garden established by Red Cross was vandalised. Villagers are of the opinion that drilling deep boreholes can help bring sustainability to the irrigation schemes. Villagers who embark on gardening, irrigation farming and orchards requested for projects that provide them with access to markets for their crops.

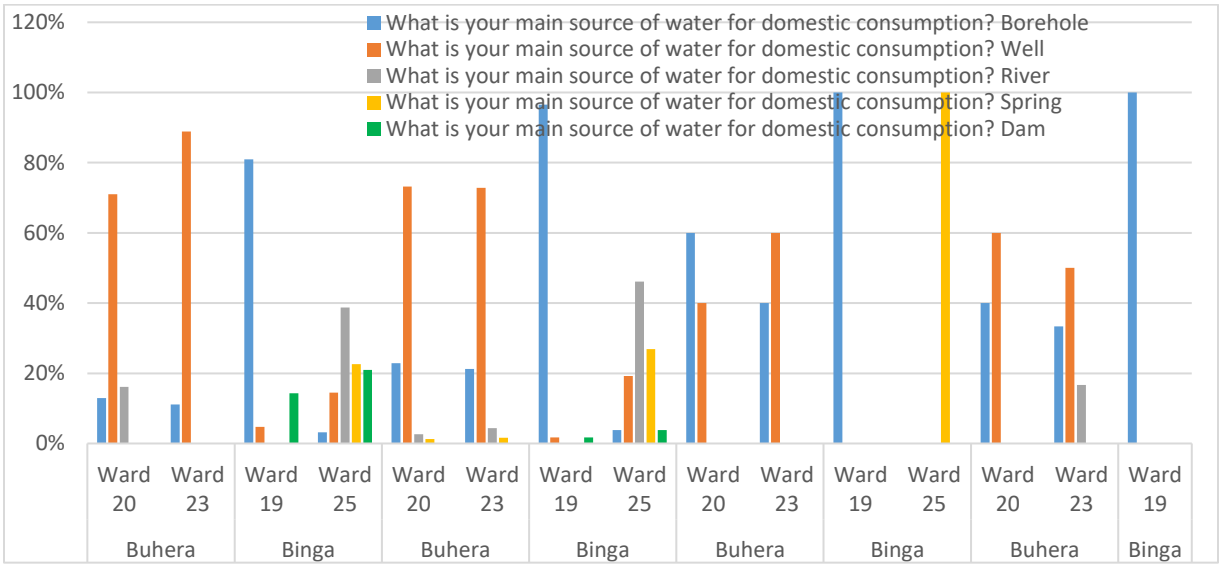


Figure 29 Gardening and orchard activities in Buhera and Binga

The majority of vegetable gardens in Binga are found next to boreholes. A few gardens are located close to rivers and springs. The type of gardens found in Binga are community-owned where two or three villagers combine efforts and establish a vegetable garden next to a common borehole. Due to water challenges, a number of households in Binga do not have vegetable gardens. Fig 30 is a picture of one of the community vegetable gardens located next to a borehole in Manyanda Village Ward 19. This garden serves three sub-villages within Manyanda.

Figure 30 A picture of a community garden located next to a borehole in Manyanda Village Binga

Animal Husbandry in Binga and Buhera Districts

Cattle is a source of wealth for the traditional Zimbabwean rural household and given the option, villagers from Binga and Buhera would stock as many cattle as possible. Men in Binga own more cattle than their female counterparts in Buhera (Fig 31). About 88% of men in Binga Ward 19 and 86% of men in Binga Ward 25 own at least three and above cattle. This is compared to 70% of men in Buhera Ward 20 and 80% of men in Buhera Ward 23 who own at least three cattle and above. The highest percentage of men owning more than eight (8) cattle comes from Binga Ward 19 and the highest percentage of men who do not own any cattle is in Buhera Ward 20.

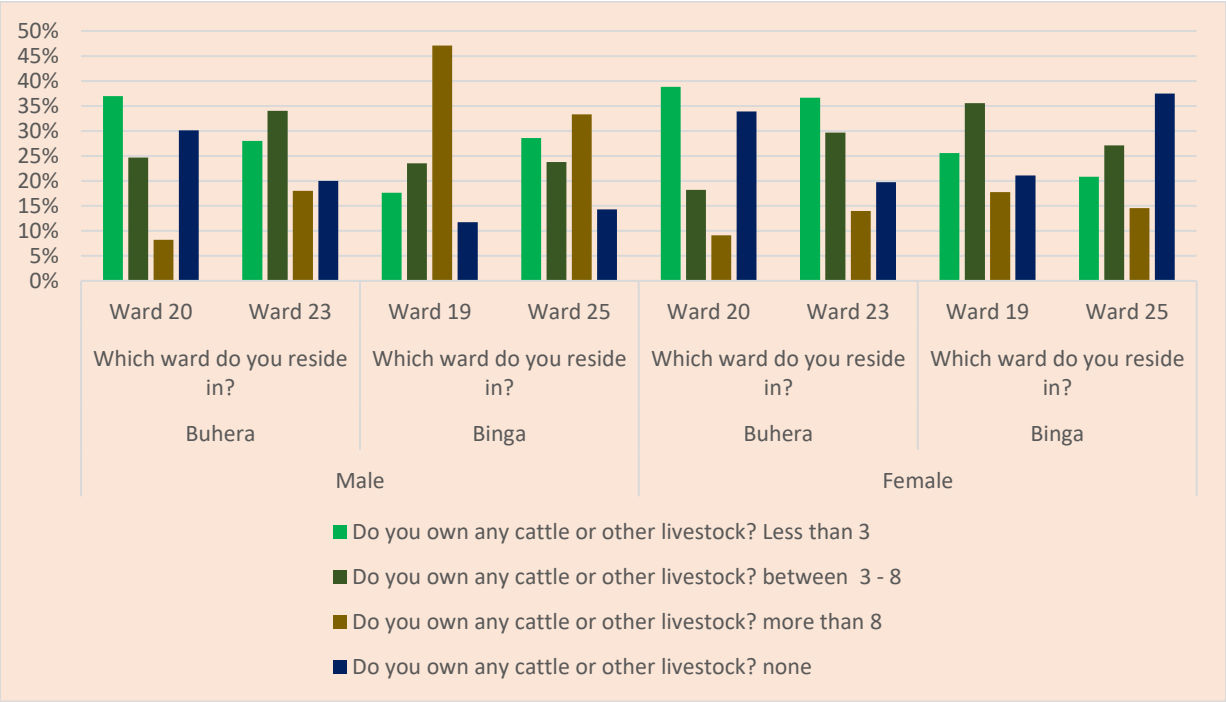


Figure 31 Cattle ownership in Binga and Buhera

The statistics of cattle ownership of women also follow the same trends as that of men. The highest percentage of women owning more than eight cattle comes from Binga Ward 19. However, the highest percentage of women who do not own any cattle also come from Binga Ward 25. It is important to note that although Binga produces the highest proportion of women without any cattle, of those women in Binga who own more cattle, they own more cattle than their counterparts in Buhera. Women and men in Binga Ward 25 survive on selling cattle and other livestock during periods of drought.

Rivers followed by wells are the main sources of drinking water for livestock in Buhera Ward 20 and 23 (Fig 32). The main source of water for livestock in Binga Ward 19 is boreholes followed by dams. Villagers from Binga Ward 25 get water for their livestock from rivers, followed by dams and springs.

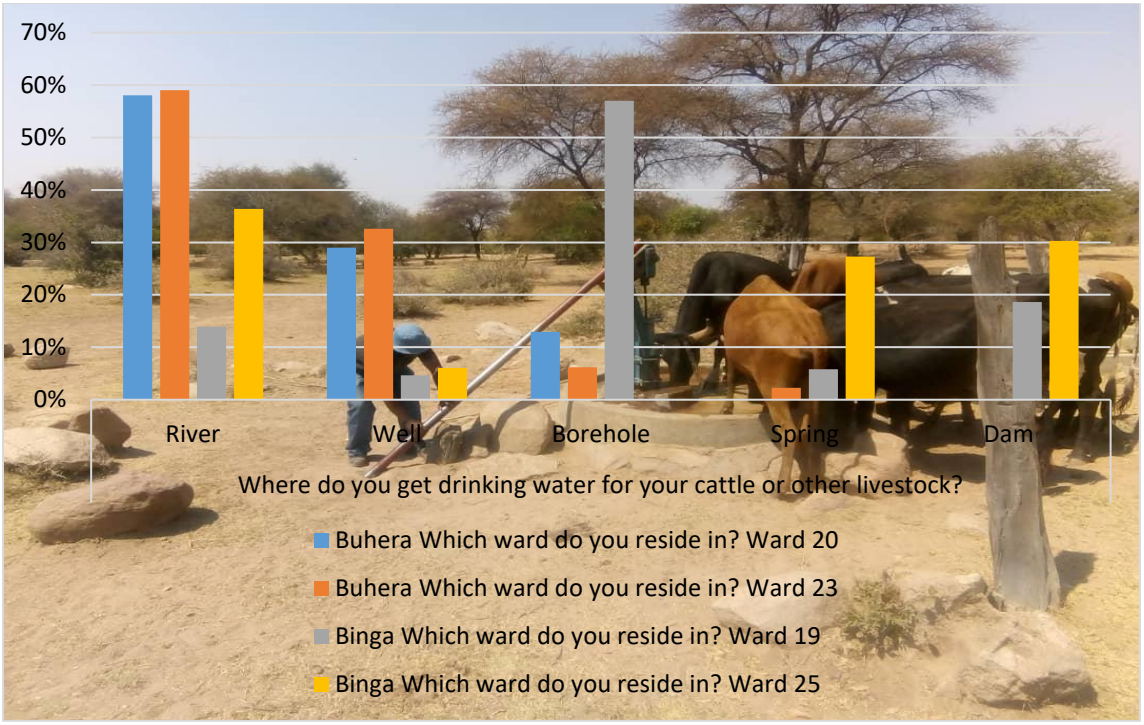


Figure 32 Sources of Drinking Water for Livestock

Focus group meetings with villagers, and interviews held with various stakeholders from Buhera Ward 20 and 23 revealed some factors affecting livestock ownership and wellbeing. Villagers lose many livestock due to lack of access to drinking water. Cattle owners from Ward 20 go for as long as three (3) months without dipping their animals because there is no water, potentially losing cattle to tick borne diseases. Poor animal husbandry practices in Buhera contribute to land degradation and siltation of both natural and man-made dams. Baravara dam in Ward 20 silted because of farming activities and cattle trampling. There are some NGOs in Buhera assisting villagers to restock livestock. Villagers revealed that Red Cross has been involved in Buhera since 2004 and some of the livelihood's projects implemented include goat rearing and beekeeping. An NGO called GOAL also had a cattle and goat project in Buhera. World Vision is implementing a feeding lots project in Buhera.

Villagers in Binga Ward 19 and 25 own many cattle. A typical borehole in Ward 19 serves at least 500 cattle and estimates are that Ward 19 alone is home to at least 5,000 cattle. This translates to an average of 10 cattle per household. However, the ownership of cattle is not evenly distributed among the households in Binga. Despite the large number of cattle in Binga, some households that do not own cattle or and any other livestock. The main source of capital, emergency income and livelihood for villagers (especially villagers in Ward 25) is trading livestock. One of the distinguishing features of Ward 25 is the large number of free-range pigs and chickens.

Focus group meetings and interviews with the chiefs in Binga revealed that villagers are losing cattle due to lack of access to drinking water. Additionally, livestock in Binga are susceptible to disease outbreaks. In Ward 19 there were no village chickens, the villagers revealed that the last outbreak of Newcastle disease wiped out the entire population of chickens in the village. Binga is also a red zone district for tsetse fly. This means that cattle from Binga do not fetch high prices if sold in markets outside of Binga. Villagers in Binga revealed that they spray their cattle as opposed to dipping them.

Access to Productive Resources for Villagers in Binga and Buhera Districts

In Binga, villagers access land for resettling free of charge. The chief is responsible for distributing land to the villagers. The Rural District Council sells business stands to villagers interested in setting up shops or other businesses at the designated business sites in Ward 19 and 25. Villagers provide for their own labour for the preparation of land or any other activities that need labour. Women provide labour for most activities, including building huts. The majority of men do not stay in Binga due to lack of employment opportunities and other livelihood options.

The main source of capital for setting up businesses comes from selling cattle and other personal savings. Access to water and transport affects the location of businesses in Ward 19 and 25. Businesses are located close to major roads and water sources. This forces villagers to travel very long distances to the nearest shops. Additionally, businesses that are located further inside the wards have challenges of restocking certain commodities. For instance, shops that sell bread to villagers in Ward 19 are located at Tinde Business Centre. This means that villagers from Ward 19 travel as far as 30 km in search of certain commodities. Business owners provide labour to operate the shops and the businesses located at business centres in Ward 19 and 25. Shop owners stay behind their shops or very close to the business/shopping centre. Access to additional capital for business expansion is a challenge for businesses located in Binga.

Chiefs are the custodians of land in Buhera and are responsible for freely distributing land to the villagers as and when the need arises. The Rural District Council sells business stands at designated areas to villagers interested in setting up business ventures in Buhera. Women provide most of the labour required to prepare the land and are mostly responsible for looking for water. The businesses operating in Ward 20 and 23 raised start-up capital from various sources. Some of the sources of capital include selling cattle, money from pension lumpsums, selling of farm product, vending, brewing traditional beer and crowd funding. Business owners work in their own businesses. Access to additional capital is a challenge to businesses operating in Buhera. Business owners indicated that high interest rates and amounts offered by microfinance institutions are not sufficient to fund meaningful business expansions. Access to water also limits the number of lines of business done at the business centres. Most business owners indicated that if access to water improves, they will either open canteens or butcheries.

Overview of Activities of District Development Fund, Rural District Councils, and Sub-Catchment Councils in Binga and Buhera Districts

Wards 19 and 25 of Binga are in the Lower Gwayi Sub-Catchment Council (SCC). The SCC issues permits for borehole drilling, but not for digging wells. There are 31 commercial boreholes in Binga, but no breakdown records per ward. The SCC is supposed to monitor the usage of boreholes on a quarterly basis. Currently the SCC does not have water quality records of boreholes. Boreholes in Binga dry up mainly due to drought, and destruction of wetlands by the villagers. A case in point are wetlands in Ward 25 that dried up due to farming and grazing activities of the villagers. The council now has a program in place to encourage villagers to conserve wetlands through embracing indigenous knowledge systems on protection of wetlands. The depth of boreholes in Binga ranges from 40 to 100 metres.

Water drawn from boreholes is for domestic consumption. However, some boreholes support gardening projects. Coal or peat adversely affects the quality of groundwater in Binga. Boreholes in Ward 7 and 23 produce salty water and the council closed some boreholes due to the high levels of water contamination. The District Development Fund drilled most of the boreholes in Binga. The funding for borehole drilling comes mostly from NGOs. Save the Children has been operational in Binga for more than 37 years and provided the funding to drill a considerable

number of boreholes in Ward 19. Once a borehole is drilled, a borehole minder (usually one of the villagers staying close to the borehole) is appointed and tasked with the maintenance and repairing of the borehole. The Rural District Council provides the materials needed to repair broken down boreholes.

Summary of problems to be addressed by the Project and Pathway to Impact

Given the analyses done in the preceding section, it is clear that water scarcity in Binga and Buhera is a present and continuing concern (Fig 33). Rainfall is seasonal and water sources dry up around September to early November. The failure of crops and animals during this period is key to the diversification of livelihoods as options for survival are limited. The burden on women and the girl child is enormous as they are forced to miss other crucial tasks in fetching water and walking distances of sometimes more than 10 km in some cases. Even during the rainfall period, the water that is received is very small (>400 mm), meaning that strategies are required to improve and protect livelihoods in periods with and without rainfall. There is also increased unsustainable activities along key value chains leading to land degradation and deterioration of key water sources. Poor land husbandry practices have degraded crucial water resources systems such as wetlands and sand dams. There is therefore increased pressure on the natural ecosystems, which is incrementally reducing their ability to provide ecosystem services. The other challenge, as in most poor areas in Zimbabwe, is related to poor value chains. Some business ventures such as beekeeping and goat rearing have not been successful because of the scale of the project and disorganized markets. These challenges are happening in a space where there is:

- Weak institutional framework/arrangements for farmers to participate viably in priority value chains;
- Weak adaptive capacities and systems especially among the smallholder communities;
- Low application of climate smart technologies by smallholders along value chains
- Inadequate/no policy measures /instruments by governments and authorities to support/incentivize actors along value chains to take up climate smart technologies and approaches; and
- Limited private sector/farmer driven technologies along value chains.

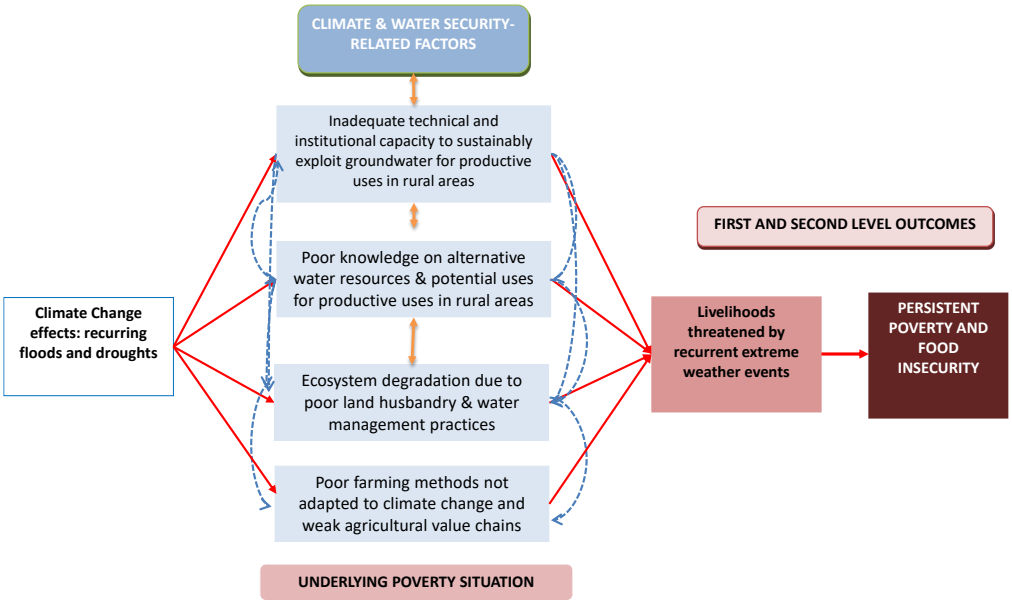


Figure 33 Conceptualization of problems facing Binga and Buhera

An interplay of these characteristics leads to less resilient livelihoods which is the main problem the Project seeks to address. The full implementation of proposed strategies and related actions requires increased human, financial and institutional capacity. The need for additional liquidity in agriculture is not new. Climate finance can play a catalytic role in supporting the agriculture sector to become part of the climate solution and help transform the sector to deliver inclusive and sustainable growth. The Programme will implement a set of concrete adaptation activities structured to build systemic capacities targeting systems, institutions, commodity value chains and communities. Fig 34 shows how the Project proposes to reach the intended impact.

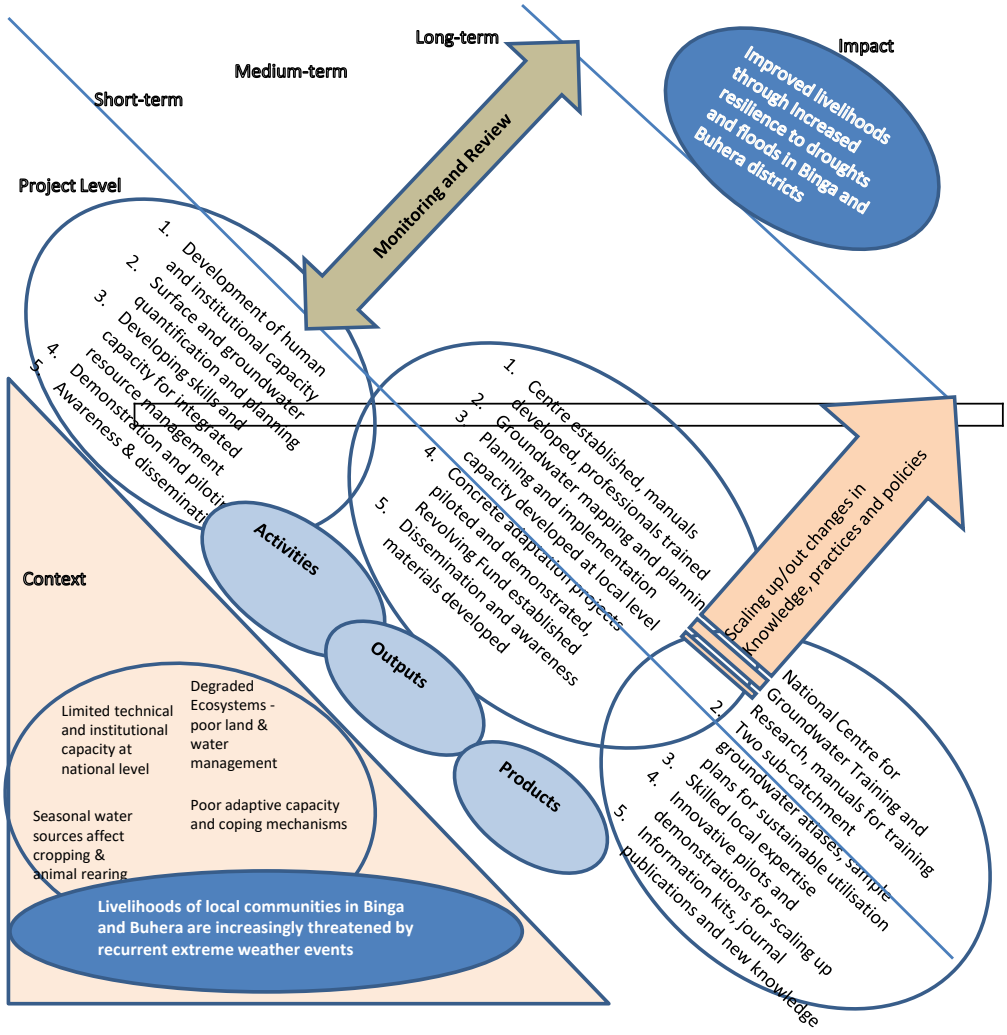


Figure 34 Proposed Project Pathway to Impact

Project / Programme Objectives:

The ultimate goal of this Project is to increase local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation for food security and other productive uses in rural areas of Zimbabwe. To achieve this, an array of actions are required starting at national to local levels and involving institutional reforms and modelling, characterisation and quantification of the groundwater resources, knowledge generation and capacity development, and awareness raising through piloting and demonstration. The specific project objectives linked to the above are as follows :

6. To strengthen technical, institutional and human capacity at national and local levels for improved and sustainable utilization of groundwater ;
7. To conduct comprehensive assessments of groundwater resources in two poverty-stricken and highly vulnerable sub-catchments of Lower Gwayi and Upper Save and develop sample plans for improving climate resilience through sustainable groundwater utilization;

8. To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote groundwater use and protection of groundwater sources;
9. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation by diversifying and strengthening the livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments;
10. To compile and disseminate lessons learnt from the project to facilitate future upscaling and replication of good practices in groundwater extraction and management.

These objectives are in line with those set by the Adaptation Fund aiming to "reduce the vulnerability and increase adaptive capacity to respond to climate change impacts, including variability at local and national level."

To avoid confusion on proposed action areas, it is emphasized and stated again here that Wards 20 and 23 of Binga are situated in Lower Gwayi Sub-Catchment. Wards 19 and 20 of Buhera are located in Upper Save Sub-Catchment.

Project / Programme Components and Financing

Table 10 Relationships among project components, activities, expected concrete outputs, and the corresponding budgets

Project/Programme Components	Activities	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. To strengthen technical, institutional and human capacity at national and local levels for improved and sustainable utilization of groundwater	1.1 Establish a National Centre for Groundwater Research and Training at the University of Zimbabwe	Output 1.1 National Centre for Groundwater Research and Training established at the University of Zimbabwe	Improved knowledge and capacity in groundwater science, policy and participatory management at national and local levels	400,000
	1.2 Assess the capacity of local and national institutions and identify training needs for managing groundwater in particular, and water resources in general	Output 1.2 Capacity needs of local and national institutions to manage groundwater and water resources in general assessed and training needs identified		
	1.3 Train groundwater technicians, scientists and managers at national and local levels in improved and sustainable utilization of groundwater	Output 1.3 At least 25 groundwater technicians, scientists and managers trained each year on improved and sustainable utilization of groundwater, via tailor-made or regular short courses, certificates, diplomas, undergraduate and postgraduate courses.		
	1.4 Develop practical guidelines and manuals for groundwater resources planning, development and management	Output 1.4 Practical guidelines and manuals for groundwater resources planning, development and management developed		

2. To conduct comprehensive assessments of groundwater resources in two poverty-stricken and highly vulnerable sub-catchments of Lower Gwayi and Upper Save and develop sample plans for improving climate resilience through sustainable groundwater utilization	2.1 Develop two groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments	Output 2.1: Groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments developed	Sustainable utilisation of groundwater based on sound scientific inventory of the resource; science-based formulation of groundwater management policy to improve management of the resource and further develop new groundwater-based resilience strategies and practical interventions.	300,000
	2.2 Develop two Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchments	Output 2.2: Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchment Councils developed.		
3. To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments by developing integrated catchment management plans that promote groundwater use whilst protecting groundwater sources	3.1 Update catchment management plans (River Systems Outline Plans) and structures by mainstreaming gender, climate change and sustainable groundwater management	Output 3.1 Existing catchment management planning guidelines and structures updated to clearly mainstream gender, climate change and sustainable groundwater management	Increased participation by the wider stakeholder community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.	150,000
	3.2 Revise Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-Catchments through stakeholder participation to address climate change and groundwater management issues	Output 3.2 The Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-catchments revised through stakeholder participation to address climate change and groundwater management issues		
	3.3 Strengthen the capacity of extension services and institutions to support communities in Lower Gwayi and Upper Save Sub-Catchments to undertake climate change adaptation activities	Output 3.3 Capacity of extension services and institutions strengthened to support communities in Lower Gwayi and Upper Save Sub-catchments to undertake climate change adaptation activities		
	3.4 Strengthen technical capacity of the two sub-catchment councils and Binga and Buhera Rural District Councils to manage and protect groundwater resources	Output 3.4 Technical capacity of the two sub-catchment councils and Rural District Councils strengthened to manage and protect groundwater resources		
	Output 3.5 Skills training for community members on sustainable technologies and smart agricultural techniques	Output 3.5 About 2,000 farmers in target areas trained on skills for sustainable technologies and smart agricultural techniques		

4. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation by diversifying and strengthening the livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments	4.1 Look and learn visits to best practice projects in Zimbabwe or regionally	Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally	Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to the impacts of climate change	3,290,000
	4.2 Pilot and demonstrate community-based ecosystem resilience and mitigation projects in selected four Wards in Binga and Buhera districts	Output 4.2 Four pilot climate-smart ecosystem mitigation and resilience projects implemented in two Project wards		
	4.3 Pilot and demonstrate community-based climate resiliency and livelihood enhancement projects in selected four Wards in Binga and Buhera districts	Output 4.3 Four climate-smart water and food security pilot projects using groundwater and rainwater harvesting at community level implemented		
	4.4 Pilot and demonstrate household climate resiliency, livelihood enhancement and diversification projects in the four wards in Binga and Buhera districts	Output 4.4 Climate-smart livelihood enhancement and diversification pilot projects using groundwater, rainwater harvesting and renewable energy for 2,000 households implemented		
	4.5 Establish a food security and livelihood enhancement revolving fund	Output 4.5 About 2,000 households in the four Project wards apply and access funding from the food security and livelihood enhancement revolving fund		
5. To compile and disseminate lessons learnt from the project to facilitate future upscaling and replication of good practices in groundwater extraction and management.	5.1 Establish a web-based information sharing and exchange platform for project participants	Output 5.1 Web-based information sharing and exchange platform for Project participants established	A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted	100,000
	5.2 Document and adopt good practices by key stakeholders	Output 5.2 Good practices documented and adopted by key stakeholders		
6. Project/Programme Execution cost				377,400
7. Total Project/Programme Cost				4,617,400
8. Project/Programme Cycle Management Fee charged by the Implementing Entity 8.5% - This total includes the costs over the five years of the Project Coordinating Units plus the M&E costs)				382,600
Amount of Financing Requested				5,000,000

Projected Calendar

Table 11 Proposed dates of the milestones for the proposed Project

Milestones	Expected Dates
Start of Project/Programme Implementation	September 2020
Mid-term Review (if planned)	February 2023
Project/Programme Closing	August 2025
Terminal Evaluation	June 2025

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Description of Project Components

The project consists of five components reflecting actions to build capacity at national and local levels and concrete adaptation and resilience measures in two vulnerable sub-catchments (chosen because they have some of the highest food insecurity and poverty levels in the country and fall under the worst agro-ecological regions IV and V). Interventions in these areas can be easily up-scaled to other wards at district level and to other sub-catchments and catchments at hydrological level. Zimbabwe has seven catchments and 47 sub-catchments as discussed in detail earlier.

The Project will start off with a two-day Inception Workshop to be held in the City Gweru, which is approximately central to the districts of Binga and Buhera. This will be attended by traditional chiefs, wards councillors, Binga and Buhera council representatives, Lower Gwayi and Upper Save represtiatives, Government ministries, ZINWA, Universities, etc. About 30 participants are targeted. This will be followed by kick-off meeting at local levels. These meetings will help to update project scope and mobilise stakeholders on their tasks and expectations.

Component 1. To strengthen technical, institutional and human capacity for improved and sustainable utilization of groundwater at national and local levels

Output 1.1 National Centre for Groundwater Research and Training: This proposed Centre will build capacity in groundwater knowledge and tackle the shortage of skilled groundwater technicians, scientists and managers in Zimbabwe. The Centre will be established in collaboration with the University of Zimbabwe and will be fully resourced by the Project. Other Universities teaching groundwater-related courses will be included in the governing structure of the Centre so as to allow for the sharing of equipment and knowledge and effective dissemination of groundwater technology. These universities are Chinhoyi University of Technology, Lupane State University, Midlands State University, National University of Science and Technology, and Zimbabwe Open University. This is also in line with the current thrust of the Government of Zimbabwe to increase sharing of resources and cooperation among universities and a new model of funding research in universities. The Centre will be run by staff recruited from the participating Universities who will work on secondment on three-year contracts. The staff establishment will consist of the Director, 3 Specialists, Programmes Officer, Receptionist. The profiles and TORs will be finalised at a four-day workshop to be held after the Inception Workshop which will be held within the first three months of the Project.

The Centre will be linked to the Southern Africa Development Community Groundwater Management Institute (SADC-GMI), a regional centre of excellence on groundwater management hosted by the University of the Free State in Bloemfontein, South Africa, for synergies and sustainability. The SADC-GMI has just completed a capacity needs assessment, which has highlighted the lack of capacity in SADC Member State institutions tasked with groundwater management, as a major hindrance in achieving sustainable groundwater management in the region (SADC-GMI, 2017). It is noted here that SADC-GMI was involved in meetings to discuss the establishment of the Centre. This gives us scope that the Centre will be more than a national centre, with high possibilities of training people from the SADC region and to get regional

facilitators/trainers where required. The link to SADC-GMI will be formalised through a memorandum of understanding at the beginning of the Project.

The Centre will train postgraduate and postdoctoral scientists in advanced hydrogeological and related technologies, as well as improving knowledge on groundwater science, policy and management issues confronting water managers. The Centre will also train district groundwater technicians, who will in turn train their district personnel up to the lowest level. National manuals and guidelines for groundwater development and implementation will be developed. The Centre will act as an entry for groundwater technologies in the country and it will advise the government on groundwater development issues. Tailor-made short courses for communities with groundwater-related issues will be offered at the Centre as well as in the communities themselves.

Output 1.2 Capacity needs of local and national institutions to manage groundwater and water resources in general assessed and training needs identified: The National Water Policy of 2013, the Water Act (Chapter 20:24), and the new National Water Resources Masterplan currently being finalised, cover issues of groundwater management. However, relevant institutions need to be revitalized in light of the current deficiencies in regulating and monitoring groundwater abstractions in view of climate change realities in the country. Although the Zimbabwe National Water Authority has a groundwater section and statutory instruments to guide groundwater development and utilisation are in place, it is evident from lack of up-to-date statistics that the monitoring of groundwater is inadequate in many sub-catchment councils. Groundwater regulation should go beyond boreholes and cover springs and wells as these are the predominant facilities in use in Zimbabwe. The aim will be to promote groundwater use not only for primary use, but mainly for secondary uses. Water ownership in Zimbabwe is not tied to land tenure as all water is vested in the President of the country who has the power to commandeer its use, especially in times of emergencies.

The Project will look into impediments to water governance, especially for communally-owned facilities such as boreholes, springs and sand dams and how these will be monitored to ensure economic and environmental sustainability. There is fear in the country that increased groundwater abstraction in towns such as Harare is leading to over-exploitation as witnessed by the shift in the groundwater table and the drying up of urban wetlands. Such challenges need to be guided against in this Project. At the economic side, this includes protection against livestock damage and financial contributions for repairs and maintenance. The Project will also tap into the ongoing SADC-GMI initiative on, “Policy, Legal and Institutional Development for Groundwater Management in the SADC Member States (GMI-PLI)”, which seeks to respond to gaps in the existing policy, legal and institutional frameworks for groundwater management in the region, and enhancing institutional capacity of governments in SADC Member States.

This output will be facilitated via a hired institutional reform expert who will carry out national consultations and develop a guiding document to be used by the Government in reforming the sector and introducing new guidelines that mainstream climate change and gender in groundwater management.

Output 1.3 At least 200 skilled groundwater technicians, scientists and managers at national and local levels trained in improved and sustainable utilization of groundwater: The Project will provide seed funding for purchasing state-of-the-art groundwater equipment for the training of groundwater technicians, scientists and managers, and for use by the Centre in outreach activities. Technicians will be trained in modern methods of well and borehole siting, drilling and protection, and groundwater monitoring. Of particular importance will be the training on borehole maintenance. Scientists and managers will also be trained on the holistic systems approach for

groundwater management. The holistic systems approach is a sustainable organised model which promotes coordinated development and management of water, land, and related resources, in order to not only maximize economic and social welfare, but also ensure equity and sustainability (Mayhew, 2009). The approach which monitors groundwater level and water quality is aimed at reversing resource degradation and stabilizing water harvesting and groundwater recharge systems through implementing actions such as artificial recharge, rainwater harvesting, water use efficiency, catchment and wetland protection, spring capture construction, sand dam construction and various techniques of surface and underground water harvesting, catchment protection, etc. Although the whole country will benefit from this in the medium to long-term, Project efforts will specifically emphasize on the target catchments (Gwayi and Save) and districts (Binga and Buhera) under the Project first. This is part of the transformative agenda of the Project to ensure that a critical mass is built around the Project area, with easy upscaling to other sub-catchments and wards.

1.4 Practical guidelines and manuals for groundwater planning, development and management: During the course of the implementation of the Project, at least five manuals and guidelines will be developed by the Centre in conjunction with the District Development Fund, the Zimbabwe National Water Authority, Ministry of Lands, Agriculture, Water and Rural Resettlement (MLAWRR). These will guide practitioners on groundwater planning and development, and the mainstreaming of gender and groundwater in climate resilient catchment development. The Project will also benefit from the guidelines and manuals being developed by the SADC-GMI, to avoid duplication of efforts and ensure standardisation of practices across the region. The manuals will be prepared by participating universities in the Centre and the Centre staff providing facilitation and quality control.

Table 12 Indicative work programme for Component 1

Output 1.1 National Centre for Groundwater Research and Training established
1.1.1 Develop a conceptnote, convene and conduct a four-day workshop at the University of Zimbabwe for local universities and SADC-GMI to set up a Centre for Groundwater Training and Research to develop its structures and TORs
1.1.2 Advertise, shortlist, interview and appoint staff for the Centre (Director, 3 Specialists, Programmes Officer, Receptionist)
1.1.3 Resource and capacitate the Centre through state-of-the-art groundwater development and monitoring equipment
1.1.4 Plan and convene a four-day workshop to develop a five-year strategic plan and budget for the Centre
Output 1.2 Capacity needs of local and national institutions to manage groundwater and water resources in general assessed and training needs identified
1.2.1 Prepare TORs, advertise, select and appoint an institutional reform specialist
1.2.2 Conduct an institutional gap analysis with a specific focus on groundwater, climate change and gender mainstreaming
1.2.3 Organise and conduct a one-day national workshop to review institutional gaps identified in Sub-component 1.2.2 and develop a training needs strategy
1.2.4 Present summary recommendations to government ministries for action
Output 1.3 Practical guidelines and manuals for groundwater resources planning, development and management developed
1.3.1 Identify and contract teams to prepare the guidelines and manuals
1.3.2 Convene and conduct a five-day workshop of universities, practitioners and SADC-GMI to formulate a training curriculum, at least five practical guidelines and manuals for groundwater planning, development and management

1.3.3 Prepare, review, edit and publish the 5 manuals
Output 1.4 At least 25 groundwater technicians, scientists and managers trained each year on improved and sustainable utilization of groundwater, via tailor-made or regular short courses, certificates, diplomas, undergraduate and postgraduate courses.
1.4.1 Recruit and partially fund 4 PhD and 8 MPhil students
1.4.2 Accredit regular course with the Zimbabwe Council for Higher Education and the short courses with the Zimbabwe Institution of Engineers for Continuous Professional Development (CPD) points
1.4.3 Conduct training of approved courses

Component 2. To conduct comprehensive assessments of groundwater resources in two poverty-stricken and highly vulnerable sub-catchments of Lower Gwayi and Upper Save and develop sample plans for improving climate resilience through sustainable groundwater utilization

The use of groundwater for productive purposes is limited although it is believed that some areas in Zimbabwe have high yielding boreholes (>20 m^3/hr). Recent challenges caused by recurrent droughts have shown that groundwater could be a viable alternative water supply in agriculture. The maps that have been used for identifying groundwater potential areas are very old and not robust enough to represent a comprehensive picture of the situation on the ground. Modern technologies can now do this in a much better way and cost-effectively (these include aeromagnetic surveys, advanced geophysical and remote sensing equipment and techniques). Identifying and quantifying groundwater for different areas and providing for their sustainable exploitation is the first step in promoting increased exploitation of groundwater. Sustainable exploitation requires monitoring resource usage and impact, together with appropriate corrective actions. The need to avoid groundwater over-exploitation or groundwater mining is the emphasis of this Project. Also required is the mapping and monitoring of groundwater quality. The study area of Binga, with its unique geology and salinity challenges, will offer an interesting case study on groundwater quality.

Key to achieving the objectives of the Project is to fully map out and understand the link and potential of groundwater both qualitatively and quantitatively through understanding the four wards' hydro geological properties. The approach for exploring for groundwater for commercial use is multi-pronged. The aim is to fully understand the geology of the host aquifers in all regions where groundwater will be extracted to support livelihood projects. This entails mapping broad structures that would otherwise host water e.g. shear zones, fractures, and depth of weathering. This will enable identification of water sources that have large recharge systems and are high yielding. There exists a potential to explore for water near major rivers such as Save in Buhera and Lubanda in Binga which have potential for trapped water due to very heavy siltation. The water depending on realised quantities could be used for the development of small-scale irrigation schemes for high value crop cultivation.

Output 2.1 Groundwater atlases for each of the two sub-catchments developed: In line with the current Water Resources Masterplan for Zimbabwe and the National Water Policy of 2013, the Project proposes to use modern technologies/techniques to carry out an extensive pilot study and mapping of groundwater potential, risks and vulnerabilities in the two proposed sub-catchments of Lower Gwayi and Upper Save. Considering the huge costs for a national campaign, starting small will give an insight into the complexity of the task before scaling up the exercise in future. This part will be carried out by local experts and will be supervised by the Ministry of Lands, Agriculture, Water and Rural Resettlement and ZINWA and respective Sub-catchment councils. The Centre established in Component 1 will also be heavily involved in order to gather knowledge, document lessons learnt and build capacity for upscaling the task to other catchment areas.

Backstopping will be provided by the SADC Groundwater Management Institute, the UNESCO Groundwater Management Unit at the Headquarters and the International Groundwater Resources Assessment Centre (IGRAC), a UNESCO Category 2 Centre. This will ensure quality control and sustainable skills transfers to the locals. The results will enable catchment authorities to properly plan, regulate and monitor the use of groundwater as an adaptation measure against climate change whilst also learning from effective case studies how to avoid over-exploitation of the resource, as well as any potential environmental impacts (e.g. water quality degradation and land subsidence).

On the mitigation side, this component will look at various catchment management strategies for recharging shallow and deeper aquifers and develop guidelines for sustainable utilization. An important inclusion in this component is the establishment of groundwater monitoring sites in the target wards, for monitoring both water quantity and quality. The measurement of quantity will take place seasonly, while that of quality will be twice a year, in summer and winter.The Zimbabwe Government is already in the process of encouraging the use of irrigation through the Command Agriculture programme and this Project will also help to extend and promote the sustainable use of groundwater for productive purposes by poor peasant farmers in arid and semi-arid areas in an environmentally sustainable manner. The atlases will inform the catchment managers of the available groundwater resources in the respective catchments, hence provide a basis for inclusion of groundwater in the overall water resources planning.

Output 2.2 Groundwater Development Action Plan for each sub-catchment: This is essentially an integrated land and water resources management plan aimed at enhancing ecosystem resilience, ensuring environmental sustainability and enhancing better water stewardship. Knowing the quantity and quality of groundwater is not enough if there is no action plan and rules on how it will be sustainably utilized. To support the National Water Masterplan, a Groundwater Development Action Plan for the sustainable development of groundwater which mainstreams gender, youth empowerment and expected climate change impacts will be developed for each sub-catchment through comprehensive stakeholder consultations. This plan will provide for the technical and financial resourcing of the programme and provide solutions and models for use in different villages. The Action Plan which will be formulated following a distinct procedure as laid out in Agenda 21 on conservation and management of resources for development. The Action Plan will address governance issues for groundwater use, the measurement of use and replenishment of groundwater, including water quality monitoring, as well as the impact on potential changes in river baseflow. Local community leadership: including councillors, chiefs, headmen, headmasters, *etc*, will be trained in practical skills for developing groundwater management plans and building climate resilience. Emphasis will also be on the targeted inclusion of women and youth leaders as these are more vulnerable to climate change and water scarcity, and are the drivers of change. This process will be led by hired water experts, social scientists, gender experts and government officials.

Model groundwater management and utilisation plans, developed through local stakeholder dialogue and focusing on women and youth empowerment, will be developed for each sub-catchment and this will be used to design specific ward pilot schemes. These will address specific ward groundwater issues, exposure risks and food security, and should show innovation in approaches and technologies and show direct links to community livelihood enhancement and improved food security. The UNESCO-supported 'Climate Risk Informed Decision Analysis: Collaborative Water Resources Planning for an Uncertain Future' (CRIDA)[3] will be used, and presents an innovative, bottom-up approach to identify vulnerability of the current and future water

[3] http://unesdoc.unesco.org/images/0026/002658/265895e.pdf

security at the local level, but also provides a pathway for the identification of robust adaptation strategies considering climate change uncertainties. As CRIDA is a participatory approach, it allows for active engagement with Local and Indigenous Knowledge Systems (LINKS), one of UNESCO's priority areas[4], as well as to ensure gender mainstreaming and equality, which is a UNESCO priority[5] to strengthen social inclusion in the decision-making process.

Table 13 Indicative work programme for Component 2

Output 2.1: Groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments developed
2.1.1 Develop TORs, advertise, select and recruit a local company to carry out extensive pilot study and mapping of groundwater potential, risks and vulnerabilities in the two proposed sub-catchments of Lower Gwayi and Upper Save
2.1.2 Conduct pilot groundwater mapping in Lower Gwayi and Upper Manyame sub-Catchment
2.1.3 Identify and establish groundwater monitoring sites in Binga Wards 19 and 25 and Buhera Wards 20 and 23
2.1.4 Develop potential, risks and vulnerability maps
Output 2.2: Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchment Councils developed
2.2.1 Develop TORs, advertise, select and recruit a facilitator for the development of sub-catchment action plans which mainstreams gender, youth empowerment and expected climate change impacts
2.2.2 Facilitator develops training materials for approval
2.2.3 Conduct two-day training courses in each sub-catchment for local community leadership: including councillors, chiefs, headmen, headmasters, etc, on practical skills for developing groundwater management plans and building climate resilience
2.2.4 Facilitate the development of Action Plans for each sub-catchment through two-day workshops through local stakeholder dialogue and focusing on women and youth empowerment, and this will be used to design specific ward pilot schemes (see Components 4.2 – 4,4)

Component 3. To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote and protect groundwater use

This component will focus on capacity building actions at district and sub-catchment levels, focusing on capacity of selected two sub-catchments so that they can upscale activities to other sub-catchments that will not be covered under this Project. The overlap between districts at administrative level and catchments and sub-catchments at hydrological levels in Zimbabwe is noted in the development of specific action plans. However, this will also be an advantage in terms of the wider reach of Project actions and future upscaling of the Project. The main purpose of this component is to build critical mass and capacity in carrying out various adaptation and resilience building measures beyond the life of this Project. The actions will be centred on four pilot projects in selected wards, under the two sub-catchments, that will be led by the MLAWRR through ZINWA and Agritex, with support from the National Centre for Groundwater Research and Training, SADC Groundwater Management Institute, the Groundwater Management Unit at UNESCO Headquarters and the International Groundwater Resources Assessment Centre (IGRAC), a UNESCO Category 2 Centre. The continued and strategic involvement of the National Centre for Groundwater Research and Training will be ensured at all levels as a knowledge management imperative.

[4] https://en.unesco.org/links
[5] https://en.unesco.org/genderequality

Output 3.1 Existing catchment management and planning guidelines revised to clearly mainstream gender, climate change and groundwater: River System Outline Plans (RSOP) are part of the water sector reforms introduced in 1998 and are reviewed every ten years. The plans for Lower Gwayi and Upper Save Sub-Catchments will be updated in line with the Project's thrust on climate change, groundwater and gender. Water resources specialists, climate change experts, social scientists and gender experts will be engaged to facilitate the revision of the catchment planning guidelines by incorporating aspects of gender and climate change, as part of the CRIDA approach. Stakeholder consultative workshops will be conducted during revision of guidelines, which will then be printed and disseminated to the different stakeholders through training workshops. Five workshops that will also incorporate the following areas are planned including one national, catchment and sub-catchment levels workshops:

- Climate Change mitigation and adaptation
- Resilience building
- Climate change leadership
- Climate smart agriculture solutions
- Framework and needs assessment of groundwater management at the local level
- Aquifer systems characterisation for groundwater management
- Groundwater monitoring and information management
- Groundwater regulation, allocation, licencing and institutions
- The role of stakeholder participation and communication in groundwater management
- Groundwater and food security
- Groundwater hazards
- Groundwater and the environment
- Groundwater and climate change

The workshops will reflect gender profiles of the targeted communities.

Output 3.2 The Sub-Catchment Management Plans of Lower Gwayi and Upper Save sub-catchments revised through stakeholder participation to address climate change and groundwater issues: In this Project, experts hired in sub-component 3.1 will facilitate the process of integrating climate change aspects and giving prominence to the role of groundwater in catchment outline plans. Stakeholder consultation workshops will be organised during the revision of the catchment outline plans, which will be printed and shared with all stakeholders. The plans will cover innovative systems and technologies related to: community-based mitigation and adaptation to climate change, resilience building, water chain approaches, water use efficiency, groundwater treatment, groundwater recharge, catchment protection, soil conservation, reduction of land degradation through supporting terraces, afforestation, climate smart agriculture, *etc*. As part of the CRIDA process, adaptation pathways will be developed, that consider climate change uncertainty, as well as any other drivers of change relevant for the local pilot case studies (e.g. population growth).

Output 3.3 Capacities of extension services and institutions at catchment level strengthened to support communities in the two selected sub-catchments to undertake climate change adaptation activities: Capacity needs assessments will be conducted for key stakeholders (regional and local government staff, extension workers, catchment management councils, ward water committees). A consultant will be hired to determine the capacity gaps among the different stakeholders to inform their training. A detailed training plan will be developed to guide the capacity building program for the Project. The consultant will also develop a detailed training plan highlighting the specific content with relevant examples to the prevailing conditions in each of the four wards. Training modules for the training-of-trainers (TOT) and field level trainings to build capacity of

stakeholders on a continuous basis will be conducted. TOT trainings will be undertaken to create a critical mass of trainers in prioritized adaptation and mitigation actions at community level. The following are some of the areas that the trainings will focus on:

- Community-based climate change mitigation and adaptation strategies
- Community resilience building
- Communality-based climate change leadership
- Climate smart agriculture solutions
- Local level framework and needs assessment of groundwater management
- Community-based aquifer systems characterisation for groundwater management
- Community-based groundwater monitoring and information management
- Community-based groundwater regulation, allocation, licencing and institutions
- The role of stakeholder participation and communication in groundwater management
- Community-based groundwater and food security
- Managing groundwater hazards at the local level
- Groundwater and the environment.

Information, Education and Communication (IEC) materials for awareness raising will be developed and disseminated.

Output 3.4 Technical capacity of the two sub-catchment councils and Rural District Councils strengthened to manage and protect groundwater: The Lower Gwayi and Upper Save sub-catchment councils do not have the capacity to communicate and monitor the status of groundwater resources within their areas of operations. The best they can do is measuring consumption (i.e. how much water villagers extract from the boreholes). These councils need to be capacitated with requisite communication skills, equipment and skills to measure borehole water quality, capacity tests, and sustainable yields to avoid groundwater mining. This ideally should be done throughout the year, in order to avoid over-extraction and the eventual drying up of groundwater resources within their catchments. Key people will also be provided with technical support to create and update the database of all the boreholes, wells, wetlands, springs, and any other water sources related to groundwater within their areas of operations. Through the project, the sub-catchment councils will be furnished with tools and equipment that will enable them to carry out robust groundwater monitoring. This includes computers and devices that enable creation of a robust database, and remote monitoring of groundwater resources to enable timely interventions to be taken to prevent underground water resources from reaching critical levels.

Output 3.5 Skills training for community members on sustainable technologies and smart agricultural techniques: In each of the selected 4 project wards, gendered groups will be trained on groundwater technologies such as groundwater exploration (boreholes and wells), well protection, borehole maintenance, deep well digging, technologies for water abstraction, spring capture, rainwater harvesting, drip irrigation systems, solar pump installations, windmill pumps, *etc*. Training will also cover practical aspects of ecosystem protection such as gully protection and reclamation, veld fire fighting and protection, landuse planning, etc. Community members will be trained on various fire suppression projects such as hay baling, thatch grass combing, small animals rearing, apiculture and fire guard construction. The project will also train at least 2,000 farmers/households on climate smart agriculture techniques such as intercropping with legumes, mulching, crop rotation, greater crop diversity and improving storage and processing, and improved feeding strategies, rotational grazing, grassland restoration, integrated crop and livestock, and manure management to improve agriculture productivity. In addition, in order to take advantage of improved water access, households will also receive training on other livelihood activities such as to poultry, piggery, fishery, orchards and horticulture. The emphasis will be on

women and youth trainees so as to empower vulnerable groups in society and thus increase their resilience. For easier upscaling and sustainability, the training will also be extended to other non-participating wards.

Table 14 Indicative work programme for Component 3

Output 3.1 Existing catchment management planning guidelines and structures updated to clearly mainstream gender, climate change and sustainable groundwater management
3.1.1 Develop TORs, advertise, select and appoint a team of water resources specialists, climate change experts, social scientists and gender experts
3.1.2 Consult key stakeholders and facilitate the revision of the catchment planning guidelines by mainstreaming groundwater, gender and climate change, as part of the CRIDA approach.
3.1.3 Validate, print and disseminate revised guidelines to the different stakeholders
3.1.4 Conduct one-day training workshops on revised catchment planning guidelines at national, catchment levels
Output 3.2 The Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-catchments revised through stakeholder participation to address climate change and groundwater management issues
3.2.1 Preparations for training workshop concept note by experts hired in sub-component 3.1.1.
3.2.2 Conduct one-day consultative workshops in Gwayi and Save catchments to revise catchment outlines as per sub-component 3.1.3 guidelines
3.2.3 Print and disseminate revised catchment outline plans
Output 3.3 Capacity of extension services and institutions strengthened to support communities in Lower Gwayi and Upper Save Sub-catchments to undertake climate change adaptation activities
3.3.1 Develop TORs, advertise, select and appoint an Human Resources expert to carry out a detailed skills inventory and needs assessment of extension services in the Binga and Buhera districts and Lower Gwayi and Upper Save sub-catchments, based on the Project objectives and thrust
3.3.2 Develop TORs, advertise, select and appoint a team of trainers based on the identified skilled gaps
3.3.3 In collaboration with the Centre for Groundwater Training and Research in sub-component 1.1, conduct three-day Training of Trainers skills training workshops of maximum five days in each of the Project districts
3.3.4 Develop and disseminate Information, Education and Communication (IEC) materials for awareness raising
Output 3.4 Technical capacity of the two sub-catchment councils and Rural District Councils strengthened to manage and protect groundwater resources
3.4.1 Led by the Centre for Groundwater Training and Research, assess the Lower Gwayi and Upper Save and the Binga and Buhera districts personnel in terms of the requisite communication skills, equipment and technical skills to measure borehole water quality, capacity tests, and sustainable yields to avoid groundwater depletion
3.4.2 Develop training materials for 2 two-day short training courses and accredit courses with the Zimbabwe Institution of Engineers and other relevant bodies
3.4.3 Conduct 1 two-day training courses per district/sub-catchment and evaluate
3.4.4 Procure and install tools and equipment that will enable Subcatchment and district councils to carry out robust groundwater monitoring
Output 3.5 About 2,000 farmers in target areas trained on skills for sustainable technologies and smart agricultural techniques
3.5.1 Using ToTs trained in sub-component 3.3.3 and backup from the Centre for Groundwater Training and Research, conduct at least ten 1-2 days training courses in each district of Binga and Buhera focusing on participants from the specific Project wards

3.5.2 Develop and disseminate Information, Education and Communication materials for awareness raising

Component 4. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation for diversifying and strengthening livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments

This Component will focus on Wards 19 and 25 in Binga, and Wards 20 and 23 Buhera districts which also coincide with the selected sub-catchments of Lower Gwayi and Upper Save where groundwater is available and communities are considered very vulnerable to climate change. The areas are arid or semi-arid, with very hot temperatures and low rainfall. Water development NGOs will be selected through competitive bidding to carry out the actual work, with assistance and supervision from Government departments, Rural District Councils and Sub-catchment authorities. This Component will complement groundwater resources planning with specific targeted actions that will enhance resilience against periodic water shortages and climate change and ensure environmental sustainability. The actions will boost natural recharge and discharge areas against climatic and socio-economic pressures as well as enhance water services and security. This will be done through rainwater harvesting, catchment and wetland protection, conservation livestock farming, improving water use efficiency through installation of water-saving irrigation techniques and cultivation of a wide range of drought-resistant crops for income diversification.

This Component aims to tap into Ecosystem Stewardship Principles (Chapin III *et al*., 2009)) whose broad objectives are to integrate three broadly overlapping sustainability approaches; (i) reducing vulnerability to expected changes; (ii) fostering resilience to sustain desirable conditions in the face of climate uncertainty; (iii) forward planning to manage uncertainties and turning them into opportunities through ideation and strategy. This, in part, will be achieved through a mix of indigenous knowledge systems and new technologies/techniques such as climate smart agriculture. Stewardship inevitably entails trade-offs, particularly between efficiency and flexibility and between immediate and long-term benefits (Kareiva *et al*. 2007; Chapin *et al.* 2009).

To work within the available budget and to maintain desired adaptation impact, this component is strategically structured as follows (see also Fig 35):

(i) Community-based ecosystem resilience projects in Bing Ward 19 and Buhera Ward 20
(ii) Community-based livelihood enhancement and diversification projects in Binga Ward 25 and Buhera Ward 23
(iii) Household livelihood enhancement and diversification in all the 4 Project wards.

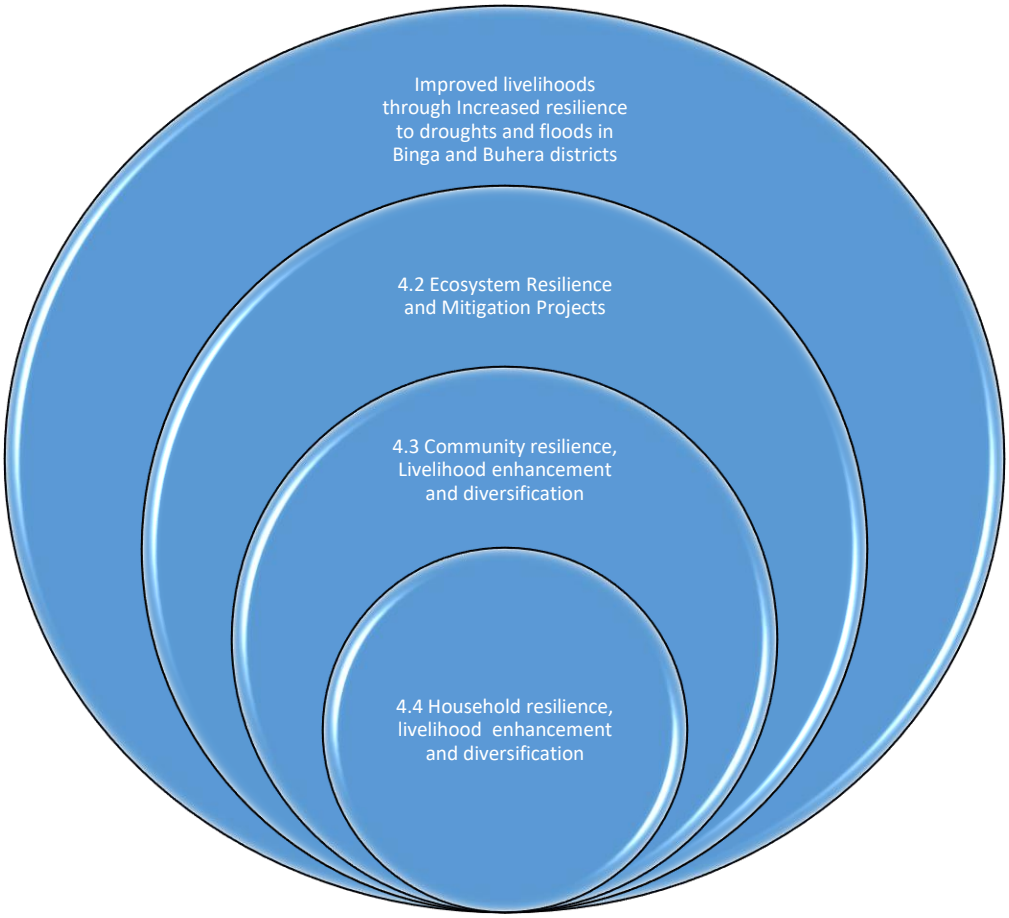


Figure 35 Conceptual framing of the project from community to household level

Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally: Farmers understand better by practical demonstration. A gender-balanced group of four members from each proposed ward demonstration project will be sponsored to visits best practice and pilot projects locally or regionally. The actual areas to visit will be determined at the Inception stage with input from other NGOs and Government participants who have experience in implementing projects in other areas. The projects to be visited may also be from other countries, in which case the number of delegates will be reduced in line with the budget. Delegate selection will depend on the nature of projects to be visited but will also look at potential change agents within communities.

Output 4.2 Pilot and demonstrate community-based ecosystem resilience and mitigation projects in selected four Wards in Binga and Buhera districts: Like the rest of rural Zimbabwean, Binga and Buhera districts have suffered serious land degradation and environmental destruction due to many reasons; among them livestock overstocking, poor land husbandry practices, gully erosion worsened by cyclones, perennial veldfires, wanton cutting down of trees for firewood, poor cultivation practices, etc. The net effect of this will be to reduce land productivity, affect local climates, diminish natural capital, and generally reduce resiliency of vulnerabble communities to climate change. Fig 36 further shows ground evidence of land degradation observed during the preparation of this Proposal. Although this Proposal is mainly concerned with groundwater utilisation, it cannot ignore land degradation on the supply side of groundwater, which is set to worsen with climate change. In Binga and Buhera, one of the major major effect evident on the ground is the drying up of almost all water sources in the dry season. The implication of this is

that both crop and livestock farming are severely constrained. This is crucial and cannot be ignored in this Project as it renders all other interventions futile. This sub-component is there included to tackle this and ensure ecosystem resilience.

Figure 36 Some ground evidence of land degradation in Binga and Buhera districts

The link between veldfires, land degradation and local climate is often elusive and is shown here in Fig 37. High levels of bare soils and erosion are evident. An analysis of the rate of landuse changes in Binga and Buhera reveals a high rate and extent of depletion of forestry resources.

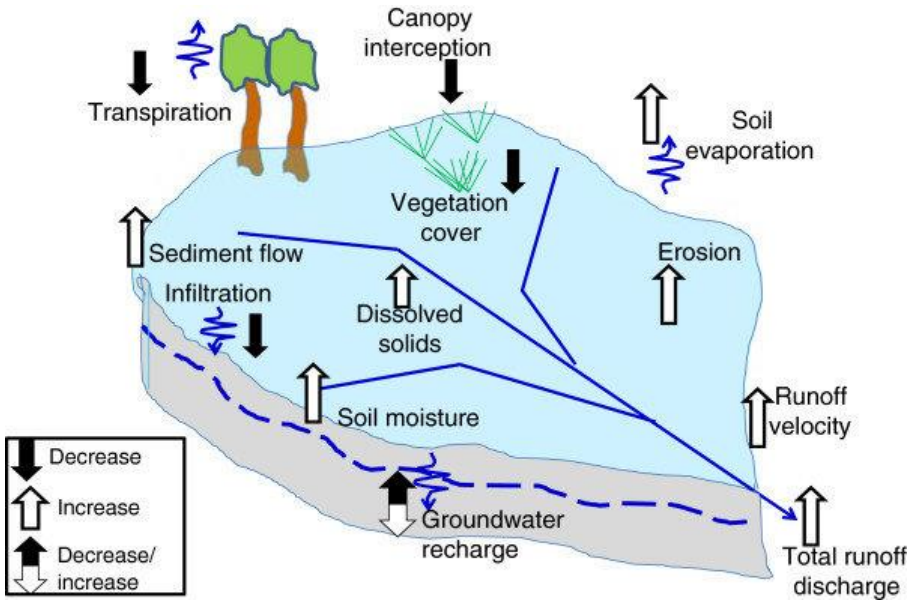


Figure 37 A conceptualisation of how veldfires affect catchment and hydrological processes, including groundwater recharge
Source: Nyamadzawo et al. (2013)

Figs 38 and 39 show raging bushfire/veldfire and the extent of veldfires in Zimbabwe based on data from the Environmental Management Agency (EMA) of Zimbabwe. Although this is from 2011, EMA produces annual reports on veldfires, demonstrating that this is a national concern and environmental menace. Bushfire/veldfires destroy and disrupt the natural ecosystem services that are vital in building community resilience and adaptive capacity to climate change (Folke *et al*., 2003; Nyamadzawo *et al*., 2013). They can burn deeper into the soil; affecting seed viability, microorganisms, organic content, water holding capacity, nutrients, and destroy old seed-bearing

trees. It is therefore proposed to reduce veldfires by training villagers in manual firefighting, controlled burning, and erection of fireguards. Documentary films will also be used to sensitize communities on the effects of veldfires. Deforestation will be addressed through better landuse planning (sub-Components 2.2 and 3.2) with each family setting aside about 0.1 hectares of its land for tree planting. This will lessen the pressure on natural forests caused by family timber and firewood requirements. Tree species to be planted will be chosen from those already adapted to the target areas, have a higher growth rate and have no known side-effects on the ecology of the area.

Figure 38 Raging bushfire and veldfire are detrimental to flora and fauna, inreasing climate change vulnerability

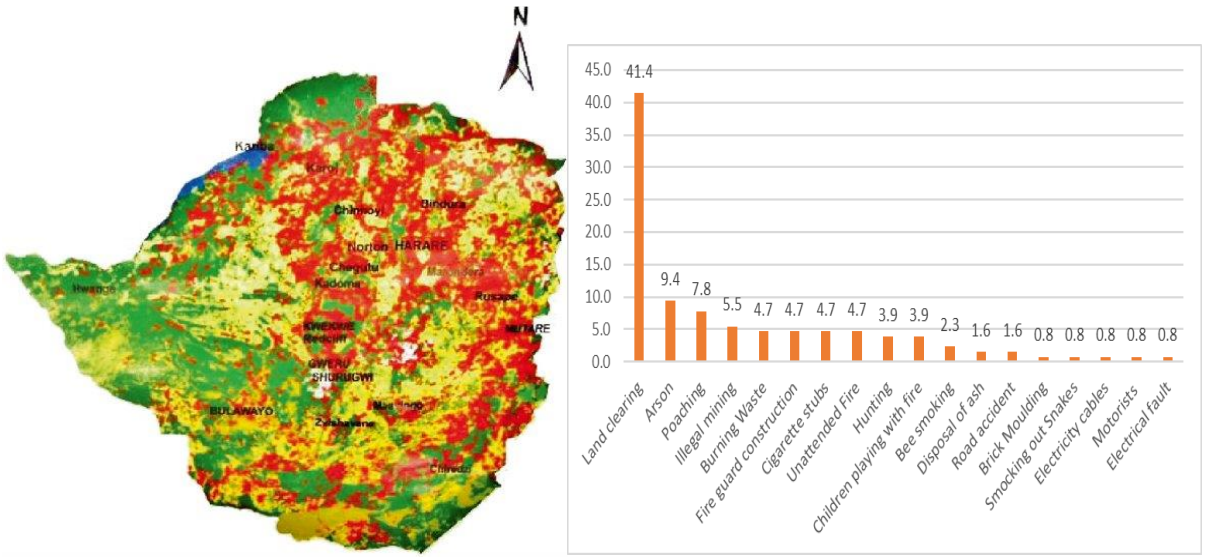


Figure 39 Extent of veldfires in Zimbabwe in 2011 shown by red shading and causes of veldfires in 2017
Source: EMA veldfire reports for 2011 and 2017

The depletion of forests for firewood use has effects on climate change, although literature is not conclusive on the effect of the actual use of firewood (Robinson, 2011; Junior *et al*., 2019). Burning firewood produces methane and black carbon particles that increase global warming. The demands and dependence on firewood requires stronger intervention at household level to provide alternative sources of energy for cooking, heating and lighting. These sources include biogas and cooking stoves which use less firewood, and cow dung (see Fig 40). It is futile to tell villages to stop cutting down trees when firewood is their sole source of energy for cooking. This sub-Component therefore proposes organised landuse planning and zoning at communal level, butressing sub-Component 2.2. Landuse categories will be demarcated by fencing, with land

reserved for heritage sites, wetlands, grazing, cropping, forestry, communal game ranching, etc, appropriately demarcated. Fencing and access control will be employed to demarcate land-uses, allowing for specific interventions to be carried out in each zoned area.

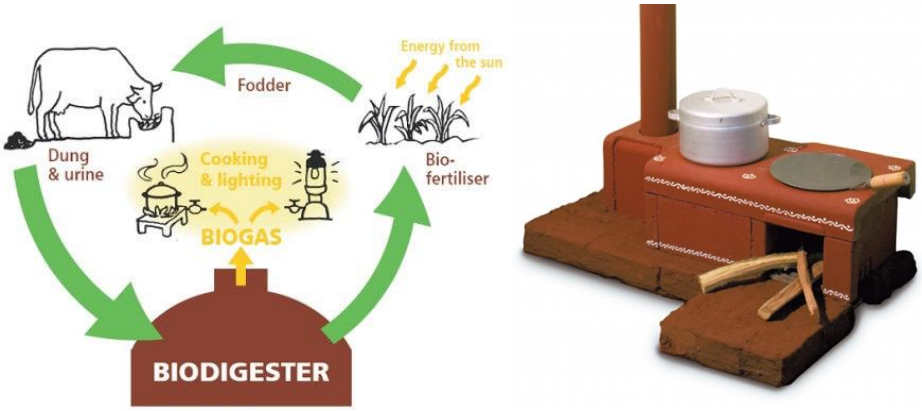


Figure 40 An integrated farming model and a wood-efficient and smokeless stove which can be used as an alternative source of power for cooking which reduce dependence on forestry resources.
Source: http://www.who.int/medical_devices

Following on the Grondwater Development Plans (sub-Component 2.2), the Catchment Planning Guidelines (sub-Component 3.1) and Sub-catchment Management Plans (sub-Component 3.2), landuse demarcation and protection will be effected based on professional designs and advice from a consulting firm. The firm will ideally be well versed in landue, forestry, ecosystem and environmental planning. The groundwater monitoring sites established under sub-Component 2.1 will also be linked to this sub-Component. The guidelines for streambank cultivation will be enforced by village heads and will inform Project interventions. Tree nurseries will be set up in each ward to provide seedlings for orchards and reforestation. The Project will provide extension services through Agritex and the Forestry Commission. Land degradation will also be addressed through gully protection and reclamation using methods such as sissal planting, contour planting, gabions, etc. fig 41 shows some of the gully protection measures in use in Zimbabwe. The choice of gully control and reclamation methods will depend on the available construction materials and scope of works to be carried out. If it is a small gully, vegetation can be planted in strips across the gully to reduce the velocity of water, trap silt, and prevent further erosion. Small dams can also be constructed using loose boulders, simultaneously contributing to rainwater harvesting.

Figure 41 Gullies in Binga and Buhera and some gully protection measures in use in Zimbabwe using sissal

Output 4.3 Pilot and demonstrate community-based climate resiliency and livelihood enhancement projects in selected four Wards in Binga and Buhera distrits: Rural areas in Zimbabwe are termed communal areas because of the land tenure system whereby households have non-title land for housing development and crop cultivation, whilst the rest is communally-owned. Village heads and chiefs are the custodians of the land on behalf of their communities.

Table xx shows the potential projects that were identified in Binga and Buhera wards, based on the source of water. Stakeholder consultations and assessments carried out in the project areas indicate that Ward 25 in Binga and Ward 23 in Buhera are best suited for community-based livelihood resilience projects. This is based on the fact that communities in these Wards have good past experience with projects of this nature and also have the potential to improve value chains. Community projects also require a sizeable source of water supply or potential to have one. This could be in the form of a borehole, dam, river, spring or sand dam. Rainwater harvesting is also considered, taking into account that surface water sources were seen to dry up before September and October of each year, and that some boreholes are saline. The drying up of the water sources affects animal rearing and garden projects, causing a disproportionate burden on women and the girlchild.

Table 105 Possible projects in different wards based on field investigations

Water Source	Crop Production Strategy	Animal Production Strategy	Bio-Digester	Managed Water Body
Groundwater extraction: boreholes, hand-dug wells, springs Rehabilitating and adopting existing boreholes for commercial water exploitation	High value horticulture using drip irrigation: potatoes, sweet potatoes, onions, baby marrows, green paper, cucumbers, green vegetables, etc 3 crops per year using combination of rainwater, weirs, in-ground rainwater harvesting and groundwater where all systems are available	Drought resistant animal varieties: cattle, goats, free range pigs, free range chickens, etc	Fuel Fertigation Processed manure	Fish farming Harvested off season storage Animal water Duck pools
Dams and Weirs Harvested during rainy season and from wetlands discharge	High value horticulture: potatoes, sweet potatoes, onions, baby marrows, green paper, cucumbers, green vegetables, etc 3 crops per year using combination of rainwater, weirs, in-ground rainwater harvesting and groundwater where all systems are available	Ducks Cattle Goats Fish	Fuel Fertigation Processed manure	Fish farming Harvested off season storage Animal water Duck pools
Rainfed	Developing value chains for drought resistant crops, and implementation of conservation agriculture/climate smart agriculture	Promotion of growing of free-range drought resistant livestock Developing markets for free range livestock		Dam and weir recharge

Table 16 Possible major projects in different wards based on field investigations

Suggested Project	District			
	Binga		Buhera	
	Ward 19	Ward 25	Ward 20	Ward 23
Irrigation schemes for horticultural farming			X	X
Growing drought resistant crops	X	X	X	X
Cattle ranging	X	X		
Free range pigs		X		
Goats	X	X		
Free range chickens	X	X	X	X

The selected interventions will be based on an integrated farming approach (IFA) as shown in Figure 42.

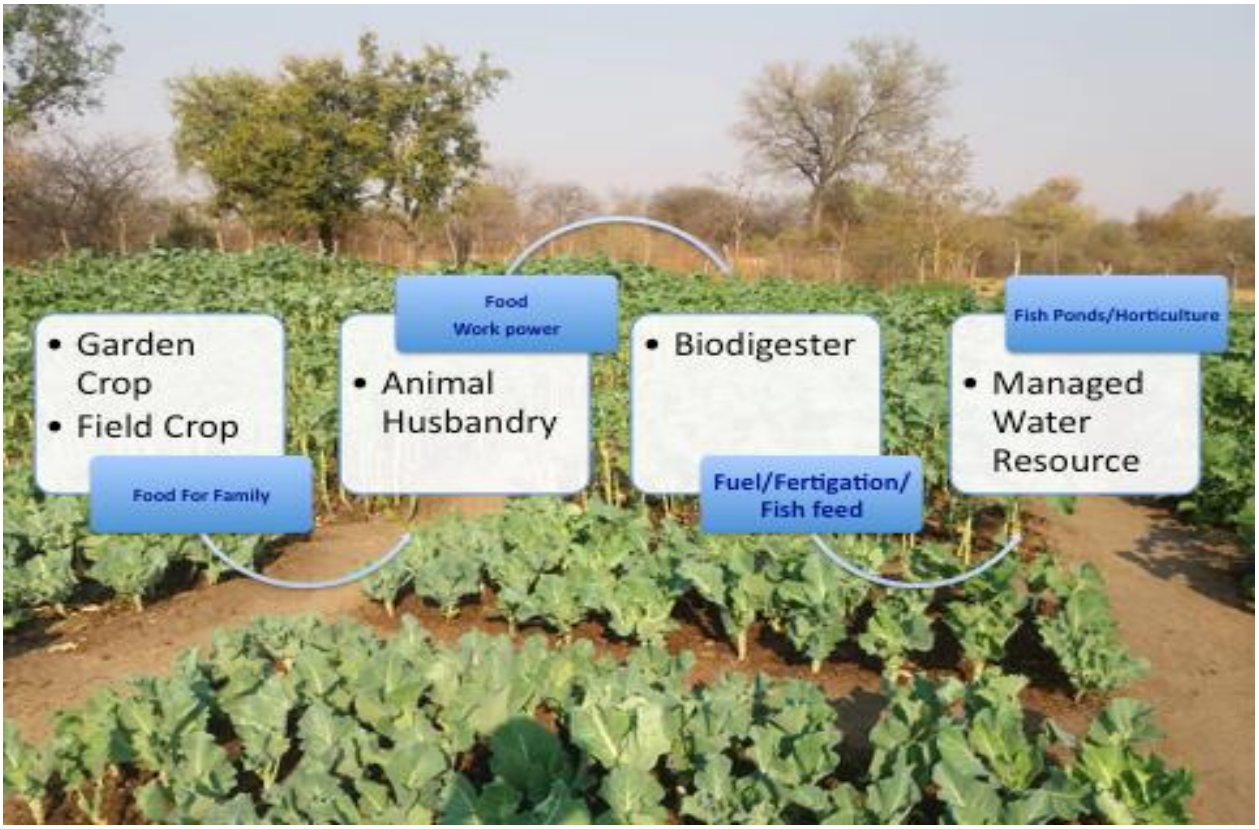


Figure 42 Project construction design components for all Wards

The IFA is developed along four stages: (i) Selection of a combination of crops and livestock that can be managed profitably by the communal and smallholder farmers, (ii) Crops are selected on the basics of importance, compatibility and attractiveness, (iii) Importance - by growing the crop combination the farmers should contribute to their own food security, with excess for sale or processing to enhance income generation and therefore achieve sustainable livelihoods, (iv) Compatibility - any by-products from the selected crops or animals will constitute inputs for one or more activities, (v) Attractiveness - local and or international financial investors are willing to inject finances into the growing of such crops by the communal and smallholder farmers.

Binga Wards 19 and 25

In Binga, the community-based climate resilience and livelihood enhancement project will be centred on river weir + borehole + sand dams + springs + water harvesting water supply matrix model. In-field Rainwater Harvesting (IRWH) will be used to supplement water supply. With IRWH, rainfall runoff is promoted on a 2 m wide strip between alternate crop rows and stored in basins. Water collected in the basins infiltrates deep into the soil beyond the surface evaporation zone. After the basins have been constructed no-till is applied and a crust forms on the runoff strip which enhances runoff. Mulch can be placed in the basins to further reduce water losses through evaporati on from the soil surface (Es) and to create a cooler cropping environment. The stored rainwater is used productively to grow a variety of grain and vegetable crops for household consumption. The IRWH technique conserves limited rainfall for longer periods and is thus a sustainable technique that contributes to climate change adaptation through increased plant available water, buffering during dry spells, increased yields and better rainwater productivity enabling food production.

The suitable livestock farming model proposed in Binga, taking into account accessibility and distance to markets, will be centered around cattle, goats, free range pigs, and wild animals. With regards to the cropping model, the Project component in Binga will focus on high value orchards based on indigenous tree species such as the *Moringa Oelifeira, masawu and baobab*, with improved value chains going all the way to value addition and marketing. In terms of organisational model, the projects will be run by women and youth clubs. On value chain model development, the Project will facilitate the breeding of animals and tree species, provide extension services, conduct training on postharvest technology, product value addition and processing, and marketing services. In terms of strategic location, public facilities such as schools and clinics will be preferred, for security and strategic reasons, and also taking into account the location of the ecosystem resilience project in sub-Compponent 4.2. A radio receiver and weather station will also be installed at a school or clinic to guide the local communities in making scientific decisions on farming and also act as a platform for disaster early warning and communication when local systems fail. To ensure sustainable capacity, the Project will collaborate with local universities and agricultural colleges in order to get students on attachment and free professional services by their mentors.

The project in Ward 19 is centred around Figure 43 where there is a dry river with potential to construct a weir. The preliminary location in the Ward is show in **Error! Reference source not found.**4. The site is at a confluence of two seasonal rivers. The site can be augmented by other groundwater sources subject to sub-Component 2 investigations. Access to the water here would cater for communal horticultural irrigation schemes, animal drinking and dipping, etc.

Figure 43 Photo on proposed site for the community resilience project in Binga Ward 19

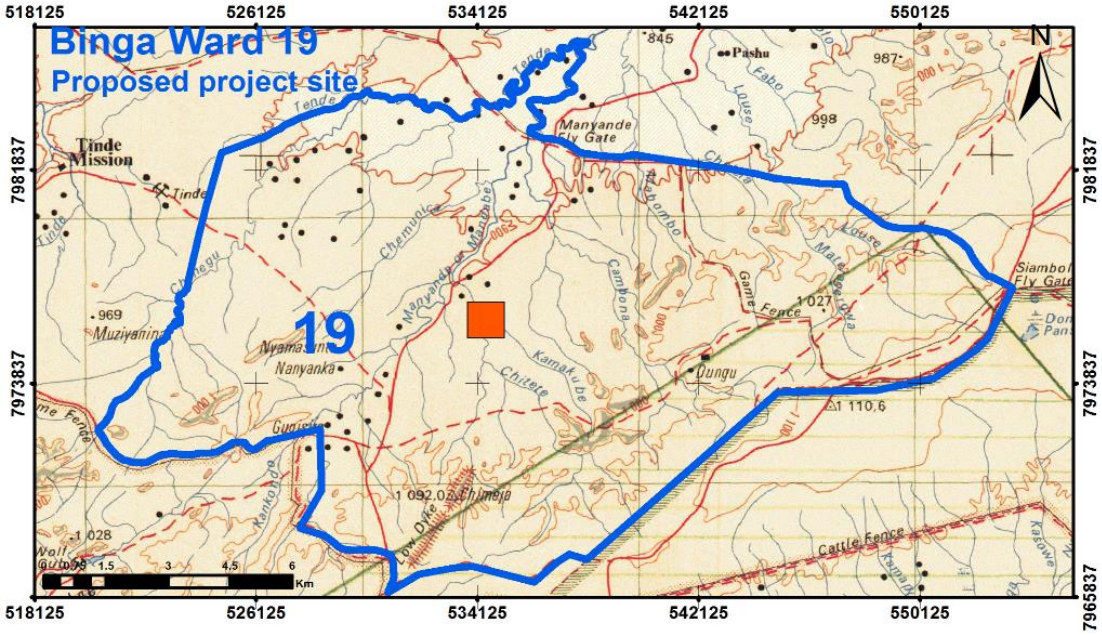


Figure 44 Map on proposed site for the community resilience project in Binga Ward 19 (red square)

The image in **Error! Reference source not found.**5 is a school in Katete village, in ward 25, which is proposed as the focal point of the community project. Figure 46 shows the location map. The drilling of a few solar-powered boreholes in this area would be ideal to first combat the issue of a serious lack of suitable water for domestic purposes. The ultimate aim is to develop some horticultural irrigation schemes and support livestock projects.

Figure 45 Photo on proposed site for the community resilience project in Binga Ward 25

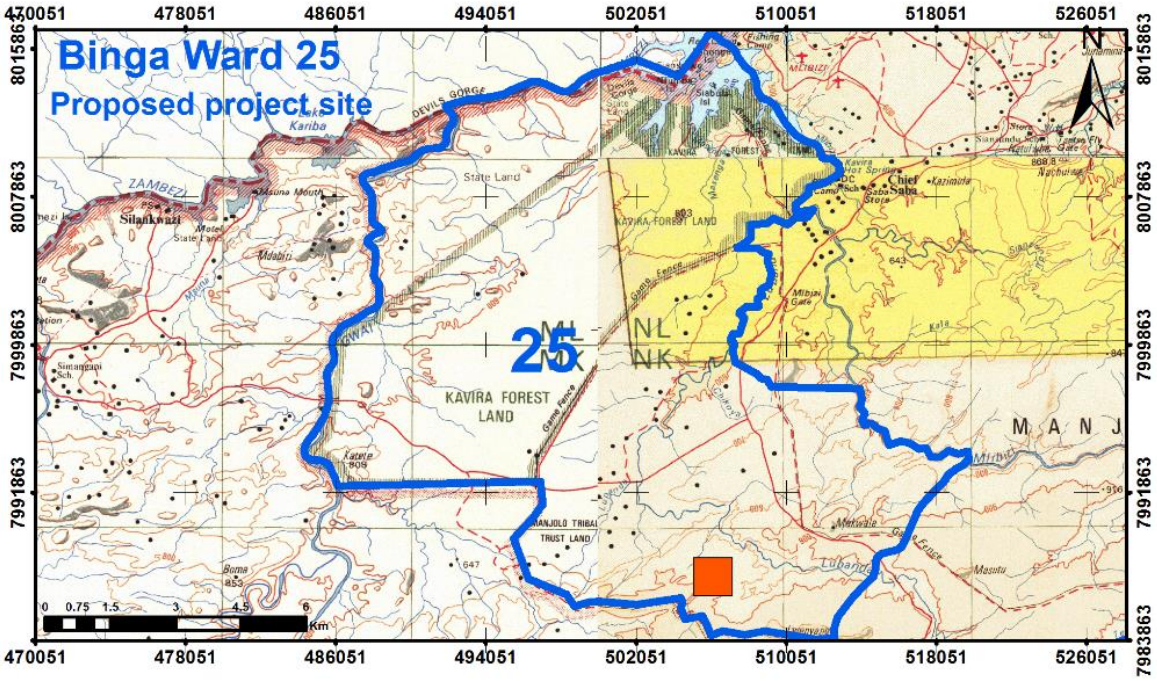


Figure 46 Map on proposed site for the community resilience project in Binga Ward 25 (red square).

On activities, the Project will focus on borehole drilling and maintenance, spring protection, fencing to control animal encroachment, construction of separate livestock drinking troughs, and protection of groundwater recovery/recharge areas, and sustainability of maintenance and repair functions. The Project will provide for the regular borehole monitoring (state, quantity and quality of water) by sub-catchment councils to prevent groundwater depletion (see sub-Component 2.2).

For water quanitity, the water level and water withdrawal will be measured by water level gauge and flowmeter, respectively. For water quality, physical parameters (temperature, turbidity and conductivity) and chemical parameters (pH, sulphate, total dissolved solids, ammonia, nitrate, nitrite, total hardness, dissolved oxygen, total nitrogen and phosphate) will be monitored in the four proposed sites in Binga and Buhera. Another two parameters, sodium and chlorine, will be checked in Binga because of the salinity in the groundwater. Five parameters - temperature, pH, dissolved oxygen, turbidity and conductivity will be measured on site; while waters samples will be collected and sent to analysis centre for analysing the other parameters.

Other project initiatives include rainwater harvesting and construction of sand dams to provide water for drinking, irrigation, livestock watering and sand dam construction for orchards and livestock drinking. At community level, rainwater harvesting options will be evaluated, drawing on a list of options such as gully plugs, contour bunds, gabion structures, percolation tanks, check dam/cement plugs, recharge shafts, dugwell recharge, IRWH, and groundwater dams/subsurface dykes. The selection of exact sites will be guided by the hydrogeological atlases developed for the sub-catchments under Component 2. These actions will ensure environmental sustainability by preventing and minimizing the non-desirable impacts of unsustainable usage of groundwater such as lowering ground water levels, water quality degradation, reduction in groundwater storage, land subsidence and depletions of surface water.

Focus will also be on communal livestock pest protection through water supplies for dip tanks or spay races, regular vaccinations, and chemicals for tsetse-fly control and other diseases so as to maintain adaptive capacity of communities. In Binga, which is a wildlife-infested district, protection from wildlife animals will be introduced via solar-powered electric fencing whilst modalities on benefit sharing from wildlife revenues will be pursued through the CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) project. At public facilities such as schools and hospitals, bio-digesters will be constructed based on feedstock from piggery, poultry and cattle dung. The gas can be used for cooking, lighting and refrigerating medicines and food, whilst the residues will be ploughed back into the fields as fertiliser. This will improve income security of these institutions and potentially generate employment opportunities.

Buhera Wards 20 and 23

The design of the project in Buhera Wards 20 and 23 under this Component is very similar to the one in Binga. In Buhera Ward 23, the community-based livelihood project will be centred on the borehole + riverbank abstraction + deep wells + IRWH + water harvesting water supply matrix model. The suitable livestock farming model, taking into account better accessibility and less distance to markets, will be cattle, goats, free range pigs, and wild animals. The suitable livestock farming model, taking into account accessibility and distance to markets, will be cattle breeding and pen fattening, piggery and poultry. Because of climatic conditions and human population densities, free range types will not be feasible. On cropping model, the Project component in Buhera will focus on high value orchards and irrigated horticulture with improved value chains going all the way to value addition and marketing. The proximity to the Save River offers great opportunities provided solar power is harnessed to pump the water from the river or riverbank abstractions. In terms of organisational model, the projects will also be run by women and youth clubs. On value chain model development, the Project will facilitate the breeding of animals and tree species, provide extension services, training on postharvest technology, product value addition and processing, and marketing services. In terms of location, public facilities such as schools and clinics will be preferred, for security and strategic reasons. A radio and weather station will also be installed at a school or clinic. To ensure sustainable capacity, the Project will also collaborate with nearest universities and agricultural colleges.

The photo in Figure 47 shows the proposed project site in Buhera Ward 20. The site is close to Save River, where there is good farming land suitable for high value horticultural production. Irrigation schemes set up here will also be beneficial to the community as it enables them to farm various cash crops.

Figure 47 Photo on proposed site for the community resilience project in Buhera Ward 20

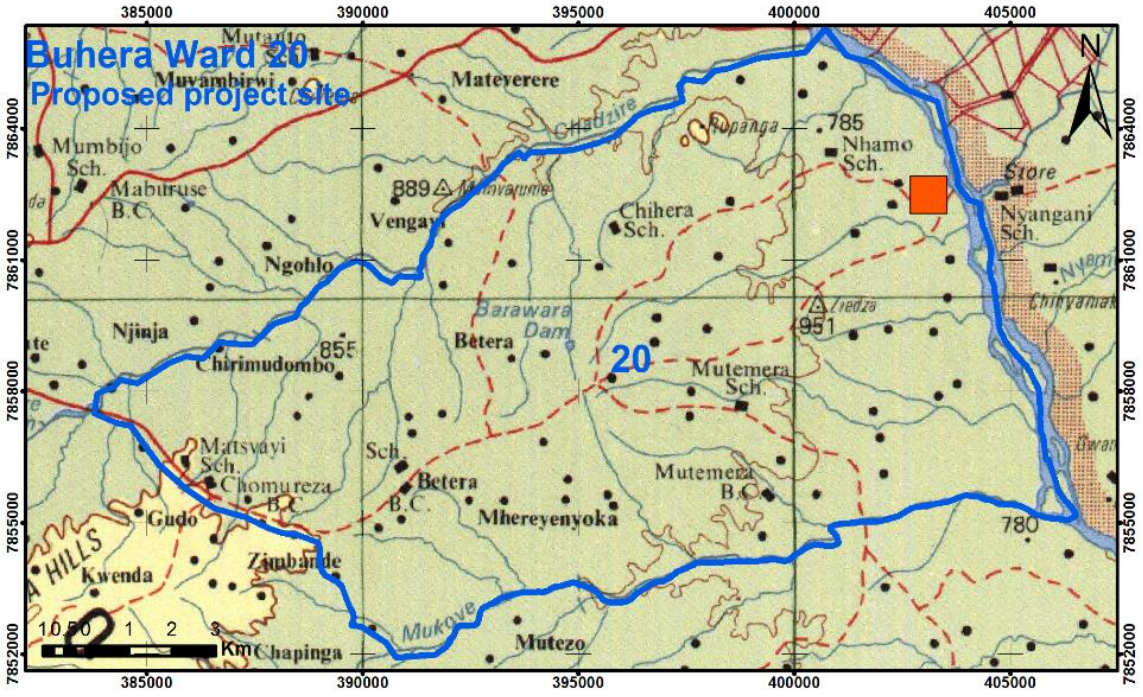


Figure 48 Map on proposed site for the community resilience project in Buhera Ward 20 (red square)

The photo in Figure 49 was taken from the proposed site for the community project in Buhera Ward 23. This prolific borehole in Ward 23, and the potential for high water yielding boreholes is high because of the contact zone there, the boundary that separates one rocky body from another.

Proposed projects in this area include irrigation schemes for maize, small grains and horticultural gardening. Adding another borehole would complement the good farming land in this ward and would boost the practice of horticulture and livestock projects.

Figure 49 Photo on proposed site for the community resilience project in Buhera Ward 23

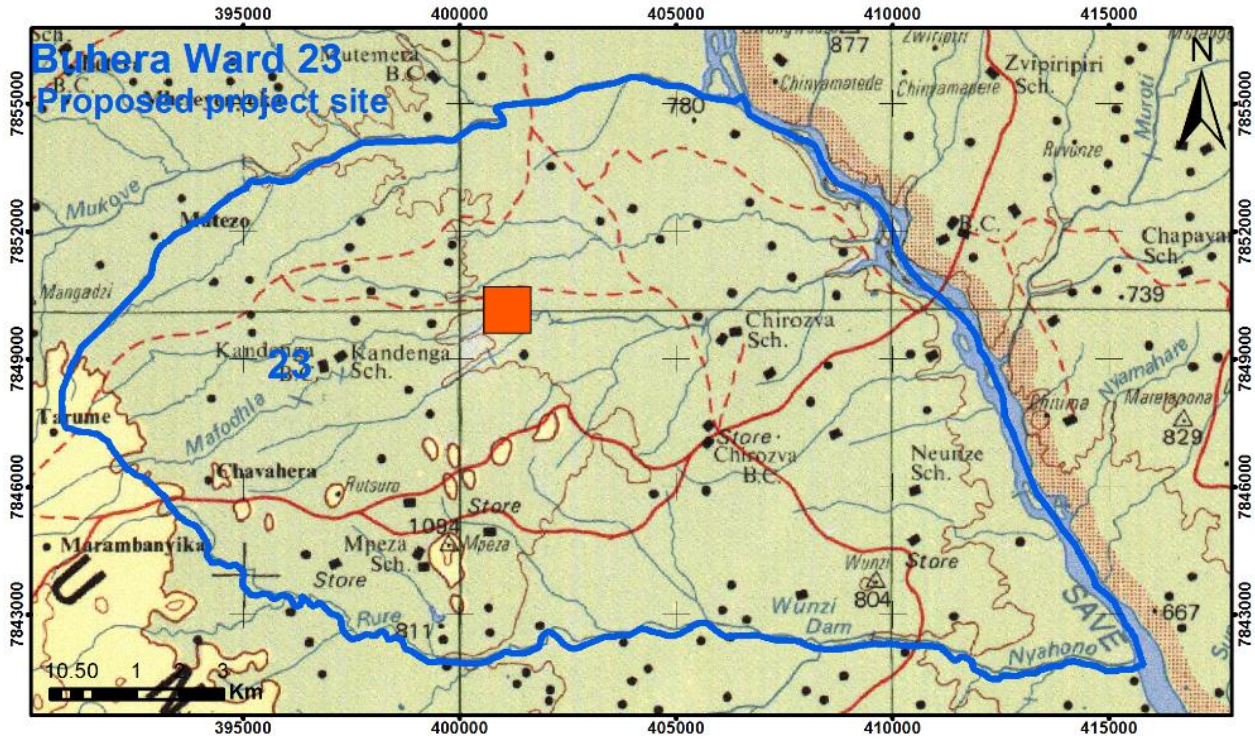


Figure 50 Map on proposed site for the community resilience project in Buhera Ward 23 (red square)

Output 4.4 Pilot and demonstrate household climate resiliency, livelihood enhancement and diversification projects in the four wards in Binga and Buhera districts: At household level, water security, food security and income security are all important and interdependent. If water supply fails, food security will be affected and households will then require income security to cope with impacts of climate extremes. In times of failure, income security needs to come from elsewhere if the household does not have enough crop and livestock asset bases. For poor communities, the primary target for income security could be the ecosystem services and goods around them. These could include forestry products, wetland vegetation, wildlife services, etc. In this sub-Component it is assumed that positively improving or expanding the asset base of a household will enhance adaptive capacity, and increase the ability of the household to positively respond to climate change impacts, thus reducing overall vulnerability. 'Asset base' refers to the financial, physical, natural, social, political and human capitals necessary to prepare a system to best respond to a changing climate. This category incorporates the importance of different kinds of capital, often informal, non-monetary or reliant on social networks. This sub-Component is based on the thinking shown in **Error! Reference source not found.**1.

Figure 51 Strategic activities to improve climate resilience through water, food, energy and income security at household level

Household access to water is crucial as even the long distances of 0.6 – 15 km travelled by women and children to fetch water in both Binga and Buhera cuts into the time that could be used by household members for income generation. Boreholes are only good for households if there are no alternatives within homesteads as borehole water is mainly used for primary purposes only. This Project emphasizes secondary uses which will guarantee income security and

diversified livelihoods. The livelihood activities in the target areas of Binga and Buhera are limited to cattle farming and rain-fed cereal production, because of the erratic nature of rainfall and frequent droughts experienced in the areas. The introduction of protected deep wells with large storage volumes, sand dams, water harvesting technologies and water saving technologies such as drip irrigation by the Project will ensure improved water access and water efficiency. As a result of improved water supply, the communities will be able to diversify livelihoods options from cattle and cereal production to poultry, piggery, fishery, orchards and horticulture.

To ensure sustainable use of groundwater, a number of activities will be carried out. The yield of wells will be improved by groundwater recharge. The available household rainwater harvesting techniques to be used to augment groundwater include: roof top rainwater, IRWH, runoff harvesting through recharge pits, recharge trenches, tubewells, and recharge wells. In-ground rainwater harvesting will also be used directly for crop cultivation. The in-field rainwater harvesting (IRWH) technique conserves limited rainfall for longer periods and is thus a sustainable technique that contributes to climate change adaptation through increased plant available water, buffering during dry spells, increased yields and better rainwater productivity, enabling food production. Drip irrigation will be used wherever possible in conjunction with high value crops, orchards or horticulture, whilst short-season crop varieties and small grains (sorghum, rapoko, millet) will be encouraged in view of the prevailing rainfall patterns in Binga and Buhera. The use of water saving technologies such as drip irrigation will greatly improve the irrigation water use inefficiencies, which currently range between 40 and 60%. Climate-smart agricultural techniques such as intercropping with legumes, mulching, crop rotation, greater crop diversity and improving storage and processing, and improved feeding strategies, rotational grazing, grassland restoration, integrated crop and livestock, and manure management will be piloted and demonstrated. Communities will also receive training in the different climate-smart agricultural techniques and different livelihood activities such as poultry, piggery, fishery, orchards and horticulture under Component 3.

Although not the main focus of this Project, but considering the vulnerabilities of the communities in Binga and Buhera to climate change impacts, it is difficult to ignore an important aspect of livelihood diversification as a coping measure in times of floods and droughts. In close liaison with other NGOs in the area, the Project will help to improve access to market for other livelihood diversification activities. The Project will support indirect water-based activities such as household utilisation of timber and non-timber forestry products such as timber sculptures, ornamental furniture, charcoal production, honey production, medicinal herbs, livestock feed production, etc. It will also support food preservation projects such as low-cost preservation technologies for vegetables, domestic and wild fruits, and grain protection techniques.

The Project seeks to focus household time on productive activities, hence food and income security. Against this, household energy needs consume considerable time for women and children in fetching firewood and destroys forests and the environment, thereby increasing community vulnerability. Women spend up to eight hours a day in household chores whilst the young children stay with them. Inefficient use of biomass in the traditional firewood stoves coupled with insufficient ventilation causes severe health hazards, and most of it affects women and girl children, as rural men traditionally do not spend much time in kitchens, except in the winter season. More than 90% of households in Binga and Buhera use firewood as a source of fuel for cooking and heating. Women often spend as long as two hours per day on average collecting fuelwood and leaf fodder, which leaves them with no time to do some meaningful income generating activities. Children are significantly involved in collecting firewood. This in turn also induces lower levels of schooling and child health. Paraffin (kerosene) is also a major source of lighting in rural Zimbabwe, and is expensive and also leads to ill health. Indoor air pollution from

paraffin lamps can cause fatal respiratory problems over time. The Project will support energy security through a variety of interventions such as smokeless energy efficient stoves to reduce firewood demand and solar lighting. Examples include beehive briquettes which are mainly charcoal briquettes made from char and clay mud mixed in certain proportion. Mud acts mainly as binding agent and reduces the rate of burning. Dried beehive briquettes produce a smokeless blue flame during burning for 2.5 to 3 hrs. It can be used for cooking and space heating. This could be an eco-friendly alternative clean source of household fuel to save electricity and wood fuel. Emission of harmful gases from burning briquette is very low as compared to wood and woody biomass which are commonly used by rural households. Agricultural residues are produced in abundance after harvesting and biomass charcoal briquetting techniques will be used for generating an alternative fuel that is cost effective and environmentally friendly and can also add income to the family. Bio-digesters, discussed in Component 4.3 above, are also a viable option at household level. Gender friendly technologies like biogas, improved cooking stoves, solar lanterns can empower rural women in many ways and contribute to climate resilience.

Output 4.6 Food security and livelihood enhancement revolving fund established: The population in the four Project wards is 28,000, consisting of more than 6,000 households. A revolving fund of USD500,000 will be established for about 2,000 households using rainwater harvesting and sustainable groundwater management techniques for productive purposes and financial experts will guide on the amount per family, repayment period, and grant/loan apportionment. Fieldwork research has already shown that some NGOs have already collaborated with banks/micro-finance institutions in running revolving funds. In this Project, the Government established Women's Bank and Empower Bank are very attractive options. Agronomists and extension workers will guide the farmers on good practice farming so that they will be able to pay back the loan – a measure of venture sustainability. The evaluation of the project would include its social, gender and environmental impacts in line with the Adaptation Fund policies. Other livelihood projects will also be assessed in relation to climate resilience. The revolving fund will ensure sustainability of project actions beyond the Project lifetime.

Table 17 Indicative work programme for Component 4

Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally
4.1.1 Government, UNESCO and Project partners meet to finalise look and learn visits, identify participants and book appointments
4.1.2 Identified team member conduct look and learn visits to projects locally and internationally and produce mission reports
Output 4.2 Four pilot climate-smart ecosystem mitigation and resilience projects implemented in two Project wards
4.2.1 Prepare TORs, advertise, select and appoint a consultant firm with specialisation on landuse, forestry, ecosystem and environmental planning to design and ecosystem protection plans for the 4 Project Wards based on sub-Components 2.2, 3.1 and 3.2
4.2.2 Consultant firm presents Inception Report, conducts fieldwork, presents draft report, makes corrections and present Final Report with detailed drawings and Social and Environmental Management Plan
4.2.3 Materials procurement and installation with supervision from Agritex, Forestry Commission, and EMA.
Output 4.3 Two climate-smart water and food security pilot projects using groundwater and rainwater harvesting at community level implemented
4.3.1 Planning meetings in Harare and in the Project wards to confirm the design the of the community resilience projects with Agritex, ZINWA, Forestry Commission, EMA, NGOs working in the area, and universities, based on plans developed in sub-Components 2.2, and 3.2

4.3.2 Goods and services procurement and installation with supervision from Agritex,Forestry Commission, and EMA.
Output 4.4 Climate-smart livelihood enhancement and diversification pilot projects using groundwater, rainwater harvesting and renewable energy for 2,000 households implemented
4.4.1 Develop a detailed data collection tool to profile all families in the four Project wards and collect the data using local Government extension workers and village heads
4.4.2 Using the demographic data collected in Output 4.4.1, develop and validate an intervention matrix or model to identify suitable interventions at individual level based on food, water, energy and income security
4.4.3 Procure goods and services and install interventions
Output 4.5 About 2,000 households in the four Project wards apply and access funding from the food security and livelihood enhancement revolving fund
4.5.1 Identify, negotiate and agree a collaborative arrangement and terms with a bank or micro-finance institution working in the Project districts
4.5.2 Appoint a financial advisor to work with selected bank to develop terms and guidelines for appraisal of business plans by beneficiaries accessing revolving funds
4.5.3 Prepare fund brochures and advertise for loan applicants using channels easily and fairly accessible to all potential beneficiaries in the four Project wards
4.5.4 Process applications and disburse funds
4.5.5 Provide field extension and advisory services to beneficiaries
4.5.6 Collect loan repayments

Component 5. To compile and disseminate lessons learnt to facilitate future upscaling and replication of good practices in groundwater extraction and management

Lessons learnt and good practices will be continuously documented and field shows conducted to share experiences among the demonstration projects. Multimedia and written documents/manuals will be prepared, validated and disseminated to key stakeholders. Professional multimedia personnel and authors will be hired to do this.

Output 5.1 Web-based and social media information sharing and exchange platform established for Project participants: A hired web design specialist will design an internet-based platform for Project participants to upload information for sharing. Social media such as Facebook, Whatsapp or Twitter, linked to the website, will also augment information sharing and dissemination. Staff in the project management team will be trained on how to operate and update the website.

Output 5.2 Good practices documented and adopted by key stakeholders: Good practices and key lessons from project interventions will be identified, documented (case studies, bulletins, drama, poems, videos, *etc*) and disseminated. Field shows amongst the participating wards will also help intra-project dissemination whilst short films, radio and TV shows will help disseminate to the wider audience at national/international levels. The knowledge and information will also be shared through the use of existing and popular platforms e.g. social media, SMS platforms and other forms that are easily accessible by the stakeholders.

Table 18 Indicative work programme for Component 5

Output 5.1 Web-based information sharing and exchange platform for Project participants established
5.1.1 Advertise, select and recruit a specialist website design specialist
5.1.2 Develop a website for the project with link to social media
5.1.3 Select and train Project staff on how to use and maintain website
Output 5.2 Good practices documented and adopted by key stakeholders
5.2.1 Identify and train Project staff on documenting good practices and project interventions
5.2.2 Conduct dissemination activities such as short films, radio and TV shows

B. Project economic, social and environmental benefits

Economic Benefits

The increased water availability will be used for productive purposes thereby enabling the vulnerable communities, particularly rural women who are the majority and most affected by climate-related shortages of water, to diversify their income, thus building more resilience to climate effects. The anticipated productive uses of water include cultivation of high value crops, fruit trees, animal husbandry, poultry farming, market gardening, etc. Communities in the two project districts are expected to benefit from the pilot integrated farming project set to be established through the project. Normal potato production is 24-30 t/ha but with the integrated farming farmers will be expected to yield between 30-40 t/ha. Moreover, all the inputs used are environmentally friendly and produced within the system further reducing on the cost of inputs and increasing profit for the farmers.

A revolving fund will be set up to kick-start these activities, with the Project catering for offsite investments such as drilling boreholes, drip irrigation kits, etc. Based on experiences elsewhere, this should improve income levels and reduce poverty levels. Thus, the project will mitigate the negative socio-economic impacts of drought such as water shortages, food shortages, absenteeism from school and loss of income by ensuring sustainable access to reliable domestic water supply as well as access to water for productive uses. In addition, the Project seeks to diversify livelihoods beyond the use of groundwater so that households have asset bases to support them in times of food shortages due to extreme climatic events. Improved incomes from irrigation will also be used to finance household water supply and sanitation. Irrigation projects at schools will be used to finance sanitation and hygiene improvements in schools. The losses suffered by farmers due to exposures to droughts will be greatly reduced by irrigation using groundwater and rainwater harvesting. The use of drought-tolerant varieties will also improve harvests. These varieties should be broadly tolerant to diseases but the need for additional pests and weeds control will be catered for by proceeds from irrigation and improved productivity in other project action areas. Awareness raising campaigns will be used to reduce veld fires and land degradation.

Social Benefits

This Project will train community members on climate change impacts and the whole array of actions they can take at personal and community levels to reduce their vulnerability. The target demographic for the community trainings, will ensure at least 60 percent women are provided with practical knowledge to adapt and mitigate the climate change impacts. It will use role playing, scenario developments and group discussions to explain and demonstrate the phenomenon of climate change and thus encourage communities to take appropriate action. Well-trained social scientists and gender experts will be used for the training.

The Project produces several economic and social benefits. It will provide additional water supply to the targeted communities and thus reduce the time spend by women and children fetching water. This time could be used for productive purposes such as working in fields and attending school. The activities proposed in this Project for enhancing groundwater recharge and in-ground rainwater harvesting will help to make water available even in times of droughts thereby mitigating the environmental impacts of drought on agricultural productivity, domestic water supply and groundwater dependent ecosystems. The availability of food will thus be improved by increased availability of water for irrigation systems and this will also enable crop cultivation throughout the year. The irrigation systems will also aim at cost-effectiveness and productivity enhancement by providing low-cost but efficient technologies to beneficiary families. The selection of beneficiaries

will also ensure the poorest and most vulnerable in society are properly selected and targeted. The project will improve access to food by focusing on enhanced productivity and promotion of climate-friendly crops for different regions. It will work with organisations working on producing drought-tolerant maize and other crop varieties such as sorghum, millet and rapoko. Farmers will also be trained on post-harvest loss management in order to maximise their profits. This intervention seeks to promote climate-proof agricultural activities for the community members, through the provision of sustainable water resources. This will directly impact, an initial target of 4000 households and at least 4000 women, with the aim improving the horticulture industry to attract more lucrative markets and provide a greater economic turn-over for the respective households. Other highly productive economic activities such as cattle ranging, rearing free range pigs and goats, etc, will be rolled out to 2500 women, and 2000 households, with care taken on developing downstream markets for the products, ensuring economic viability and sustainability.

Environmental Benefits

Zimbabwe's environmental situation in rural areas has continued to deteriorate over the past two decades due to poor land husbandry practices. Challenges relate to lack of proper soil and water management especially in newly resettled areas. Poor soil management techniques also result in loss of fertile topsoils, further impacting on agricultural productivity. In some cases, over-grazing is prevalent. Wetlands have been invaded for crop cultivation, affecting water flow and water quality. Veld fires are quite common and illegal mining rampant. A lot of mines have also closed without following appropriate mine closure procedures. The Project areas are faced with rampant ecosystem and environmental degradation, soil loss, and reduction in biodiversity, which contribute to low resilience to climate change with high risk of floods. The Project, will foster good land husbandry and water stewardship through improved land-use planning, separation of wildlife and grazing areas, protection of wetlands and heritage sites, recycling of agricultural residue as fertiliser after bio-digestion, gully protection and restoration, etc. Current borehole density in the three districts is less than 0.06/km^2. To avoid groundwater mining, the Project will avoid intensive drilling of boreholes and will mostly depend on deep wells which will be sparsely populated (>10/km^2) to have a significant impact on groundwater quantity. The land area that can be irrigated from a deep well rarely exceeds 1,000 m^2. Using drip irrigation, this area can be safely irrigated by wells with yields of more than 2 m^3/day, with allowance for other household water uses. Rural household wells are rarely less than 100 m apart. In addition, the available groundwater resource in each of the sub-catchment and main aquifers will be established in the research component of the project. This will culminate in a water balance of the main aquifers in the sub-catchment to establish the available resource, the current water uses and establish how much can be allocated to new abstractions.

The Project will result in the realization of further environmental benefits such as ecosystem protection and restoration through the implementation of the 'whole systems approach' which include activities such as catchment management (agroforestry, afforestation, groundwater recharge, gully control and restoration, contour ridges, terracing, etc), improved water availability through promotion of water saving irrigation technologies (drip irrigation), groundwater recharge and in-ground rainwater harvesting. In addition, the project will result in improved biodiversity and protection of wetlands through protection of water sources. Through these activities, the project will mitigate the potential negative environmental impacts of groundwater use such as over-extraction of the water resource, land degradation (due to livestock traffic to water sources), loss of biodiversity and destruction of wetlands. The whole systems approach to groundwater management to be implemented in this Project is shown in Figure 52. This is compared to the current traditional approach to groundwater utilization in Figure 53.

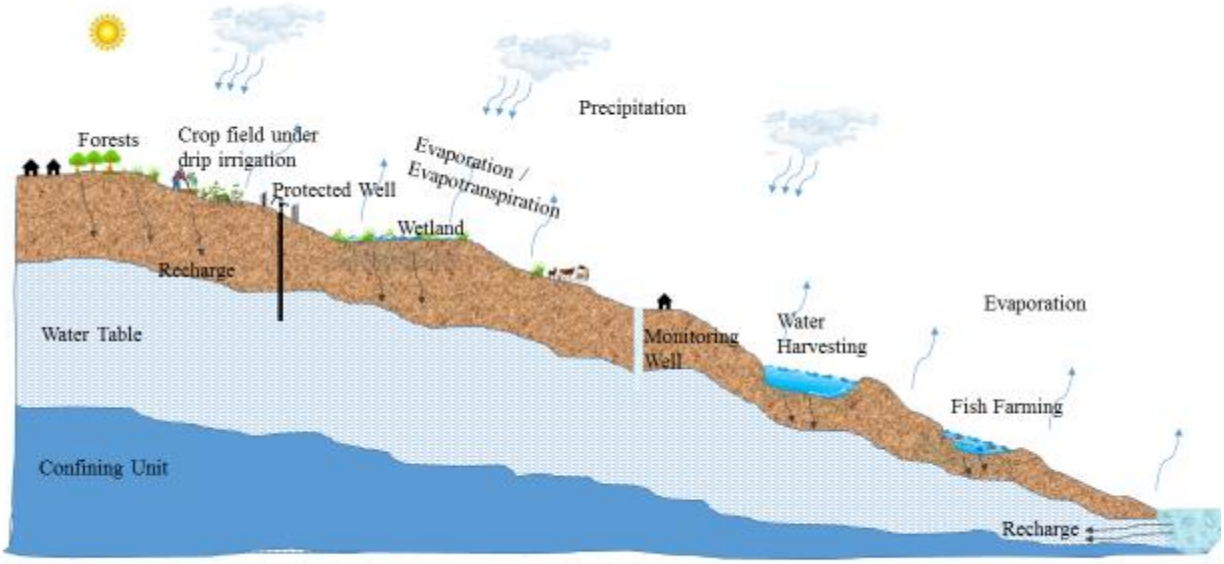


Figure 52 Sustainable Innovation Framework for Groundwater Utilization

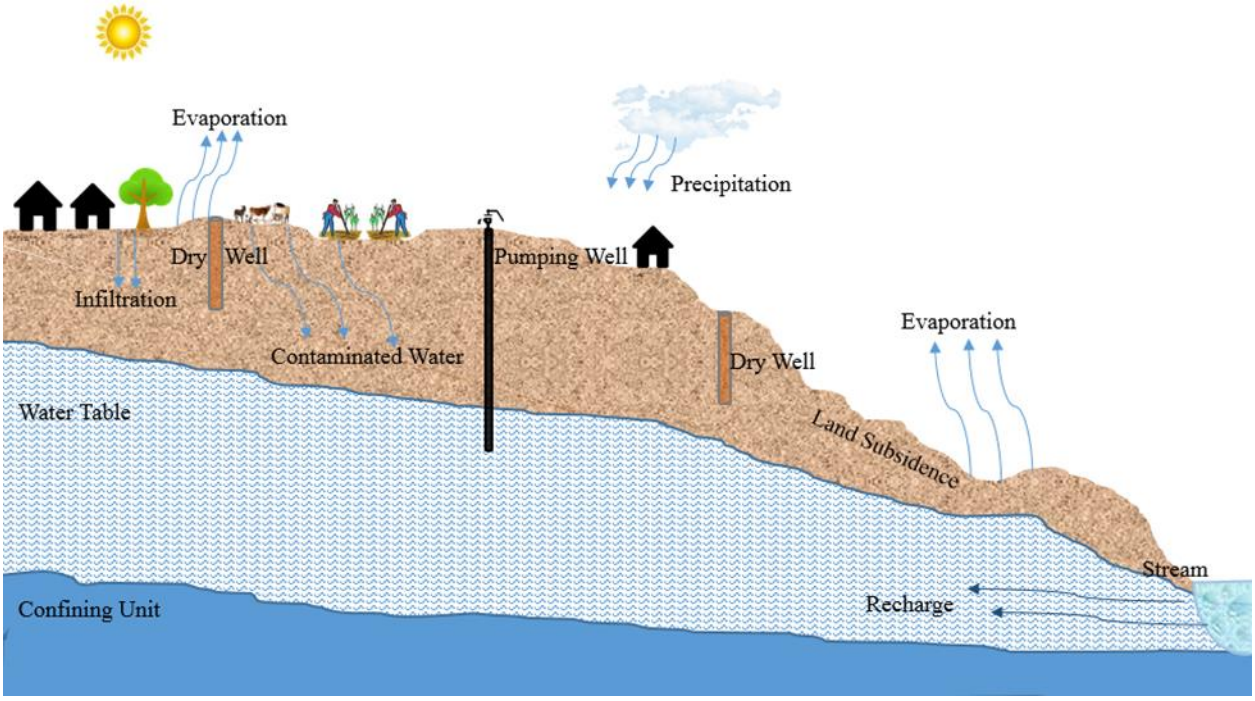


Figure 53 Traditional groundwater utilization

Error! Reference source not found. shows that unsustainable utilization of groundwater will result in over-extraction of the water resource as evidence by low ground water table and dry wells. In addition, land subsidence, land degradation (due to livestock traffic to water sources),

loss of biodiversity and destruction of wetlands are the other effects of unsustainable utilization of groundwater.

In contrast, through adoption of a whole systems approach Figure 54, there will be increased groundwater recharge, increased groundwater storage, water quality improvement and improvement of surface water. The project will thus stimulate the sustainable use of natural resources and improve the natural-resource base of the communities, which are still the main assets for income generation for vulnerable communities. The Project will reduce environmental damage from veldfires through community training on firefighting, control burning and erection of fireguards. The establishment of household tree plantations will help mitigate greenhouse gas emissions.

Avoiding or mitigating negative impacts

The project will implement a number of measures to ensure that all envisaged negative social or environmental impacts related to the project interventions are avoided or mitigated. The measures which are described in more detail in Annex 5 are shown in below:

The following measures will ensure that project activities are designed and implemented in a way that does not cause negative social or environmental impacts:

- Collaboration with the different departments within the Ministry of Lands, Agriculture, Water and Rural Resettlement and other relevant Ministries and government agencies such as Zimbabwe National Water Authority (ZINWA), Metrological Services Department, Ministry of Women Affairs, Community, Small and Medium Enterprises, Ministry. of Youth, Sport, Arts and Recreation, Ministry of Public Service, Labour and Social Welfare, Ministry of Local Government, Public Works and National Housing, Ministry of Justice, Legal and Parliamentary Affairs, Zimbabwe Gender Commission, Zimbabwe Human Rights Commission.
- Engage chiefs, and local leadership to help in ensuring that the project benefits reaches out to the vulnerable members of society
- Adoption of conservation farming, efficient water use technologies such as drip irrigation, water harvesting technologies and ground water recharge and water quality and water quantity monitoring to ensure sustainable utilization of groundwater resources
- Adoption of indigenous knowledge systems on the protection of wetlands
- Promotion of alternative sources of fuel, like biogas to prevent deforestation resulting from cutting down of trees for firewood.
- Putting in place institutional structures to implement and monitor the environmental and social impact mitigation measures for the project interventions.
- The community will also be involved in participatory monitoring and evaluation of project interventions.
- Inclusive catchment management planning, where relevant stakeholders at the community level including traditional leaders, women and youth should be involved in the development of catchment management and ground water management plans.

The project acknowledges the differentiated impacts of climate change on women and men, as a result, a number of measures will be put in place to avoid and/or mitigate any negative gender-

related impacts. The project will collect sex-disaggregated data and formulate gender-sensitive indicators for results frameworks. Mechanisms for selection of beneficiaries will be gender-sensitive in order to ensure that participation of men and women takes into consideration the differentiated impacts of climate change on men and women as well as other vulnerable groups youth, child-headed households and people living with disabilities. The project staff will include gender experts to ensure that consultations were responsive to various gender needs and roles such that project activities effectively respond to the unique needs of women and girls, men and boys, and promote equal opportunities to participate, and receive comparable social and economic benefits. The gender experts will also monitor and evaluate compliance of project activities with the Gender Policy of the Adaptation Fund. Project activities have been designed to be gender sensitive and to empower women. All project staff will be trained on gender-sensitive approaches. The project implementation will include partners such as Ministry of Women Affairs, Community, Small and Medium Enterprises, Ministry. of Youth, Sport, Arts and Recreation, Ministry of Public Service, Labour and Social Welfare and, Zimbabwe Gender Commission and Zimbabwe Human Rights Commission to ensure that gender considerations are mainstreamed in project activities.

C. Analysis of Project cost-effectiveness

The general problem in Zimbabwe on groundwater utilisation is lack of technical and institutional capacity. There is no focused university or technical college that deals specifically with groundwater. As a result, knowledge on groundwater as a resource is poor, despite the fact that rural communities and farmers rely on it a lot. This is unlike the situation in neighbouring Zambia where a lot of professionals are involved in groundwater management and the University of Zambia is regarded as one of the strongest universities on groundwater. The project will therefore use a portion of Project funds to address this under Components 1 and 2, which together are allocated US$0.8 million. This will build critical mass at national level that will be able to take the Project forward beyond the requested funding period. The envisaged National Centre for Groundwater Research and Training to be established at the University of Zimbabwe, using a very small budget, will build the necessary critical mass and momentum, by leveraging funds from beyond this Project. Using the Project funding and government allocations, two Post-docs, 5 PhDs and ten MPhils will be trained, and these would form the nucleus to train more people in future.

Project Component 3 will build capacity at local level and will train about 200 people, who will in turn train at least 2,000 people in the next ten years based on demand and government funding. About US$0.1 million will be allocated to Component 3 which will also establish robust frameworks for climate resilient catchment management. Furthermore, US$0.2 million will be allocated to Component 3, for building capacities of institutions and communities and for knowledge management.

The Project will allocate about US$2.7 million to Component 4 for implementing concrete adaptation actions for resilient and sustainable ecosystems, groundwater development, improving agricultural productivity and hedging it against climate change and other livelihood systems. Component 4 is the most critical as it will ensure that concrete investments in climate change adaptation are implemented in the two sub-catchments. The component will start by fixing the broader ecosystem within which current business as usual approaches have resulted in catchment degradation, deterioration of wetlands, lowering of groundwater tables, rampant cutting down of trees, etc. The benefits, and improvement in goods and services will be felt by wider community and the planting of trees will mitigate the effects of climate change and possibly raise/attract further funding. A sub-component will facilitate livelihoods enhancement and

diversification interventions at community level, taking into account that there are many shared resources in communal areas such as dip tanks, dams, boreholes, schools, etc. The benefits of these investments would include improved economic productivity and better livelihoods as a result of sustainable groundwater development, reduced catchment degradation, good agricultural practices, improved water infiltration and water harvesting.

The number of households in the four Project wards are estimated at 8,000. The Project will set up a revolving fund of US$0.5million that is estimated to fund about 2,000 small climate resilience projects based on full cost recovery. This could extend the project benefits to other households who will not have been covered directly by the Project in other intervening areas.

D. Project consistency with national or sub-national sustainable development strategies

The original project concept note was based on the then running Government five-year economic plan (2013 - 2018) called the “Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset)”. The plan’s vision was to move “towards an empowered society and a growing economy”, execution of which was “to provide an enabling environment for sustainable economic empowerment and social transformation to the people of Zimbabwe”. These points affirm an integrated, holistic approach to raising productivity, increasing food security and diversifying income in recognition of the complexity of rural development. It is important to note that ZimAsset identified agriculture as a key sector for economic growth and employment creation. Value addition activities were to be implemented to revitalize the agricultural sector and grow the economy rapidly; as such, agriculture was tasked with a 12.5% growth target for 2018. Additionally, an Agriculture Investment Plan and an Irrigation Development Master Plan, intended to reduce national dependence on rain-fed agriculture for sustained food security, was developed by the then Ministry of Agriculture, Mechanization and Irrigation Development.

It is now important to note that the ZimAsset development targets were met to varying degrees, especially in agriculture where the Government introduced Command Agriculture and Presidential Input Scheme for commercial and subsistence agriculture, respectively. The rainfall season 2017/18 was a particularly successful one as maize production more than doubled. In October 2018, the Government came up with a new economic blueprint – the Transitional Stabilisation Programme (TSP) October 2018 – December 2020, “Towards a Prosperous & Empowered Upper Middle-Income Society by 2030”. The realisation of Vision 2030 will be through the implementation of Strategic Programmes, supported by appropriate National Budgets. These are:

- A two and a quarter year “Transitional Stabilisation Programme” to run from October 2018 to December 2020.
- Two Five-Year Development Strategies, with the first one running from 2021-2025, and the second covering 2026-2030.

Opportunities for realisation of self-sufficiency and food surpluses that will see the re-emergence of Zimbabwe as a major contributor to agricultural production and regional food security in Southern Africa and beyond. With regards to livestock, the TSP contains measures supportive of full recovery, in terms of the size and quality of the national herd, with accompanying benefits for improved supply along the livestock value chain, and ultimately meeting national requirements, as well as those of the export markets. The TSP targets further strengthening of control and monitoring systems over the Special Agriculture Production Initiative (Command Agriculture) inputs supply and distribution chain. The Programme envisages greater involvement of the

domestic financial system in underpinning the financing of agriculture. Heavy reliance on Government support for Command Agriculture will be gradually reduced as initiatives to enhance private sector support gather momentum, that way overcoming potential development of voids in capacitating production by the farmer.

The TSP will also focus on supporting sustainable micro, small and medium enterprises growth and development through business linkages, market access, cluster development, business incubation and support services. With respect to environmental management, the TSP targets protection, restoration and promotion of sustainable use of terrestrial ecosystems, sustainable management of forests, fighting the veld fire scourge, combating desertification, halting and reversing land degradation and loss of biodiversity. Further, Government will integrate the necessary climate change mitigation measures into national policies, strategies and planning, to strengthen resilience and adaptive capacity to climate-related hazards and natural disasters. This includes promoting climate resilient water management systems, focusing on both crop and livestock production. This informed the development of intervention measures proposed in this Project.

To respond to and manage growing climate risks and hazards, the Government of Zimbabwe has formulated a number of key policies and plans, as well as strengthened the corresponding institutional frameworks. The GoZ has submitted an Intended Nationally Determined Contribution (INDC) to the UNFCCC that summarizes climate vulnerabilities and identifies long-term and near-term adaptation visions, goals and targets. In its INDC, Zimbabwe commits to promoting adapted crop and livestock development and climate-smart agricultural practices; strengthening management of water resources and irrigation in the face of climate change; and promoting practices that reduce risks of losses in crops, livestock and agricultural incomes, among other priorities. All these are addressed in this Project. In addition, Zimbabwe submitted three national Communications to the UNFCC in 1998, 2013 and 2017. The third communication presents up to date information on climate change issues in Zimbabwe focussing on climate change impacts, mitigation, vulnerability and adaptation, research and technology transfer and climate change education, training and awareness.

The GoZ has developed a National Climate Policy (2016) and a costed National Climate Change Response Strategy (2015) and has established a Climate Change Management Department (recently transferred from MLAWRR to the Ministry of Environment, Climate and Tourism) to coordinate and guide the national response to climate change. In light of the climate change impact on water resources, Zimbabwe has also received support from the World Bank to develop a National Water Master Plan. Zimbabwe is currently developing a National Adaptation Plan (NAP) with readiness funding from the Green Climate Fund. The GoZ has initiated a stocktaking exercise supported by UNDP for the National Adaptation Plan which it expects to finalise in 2018 and this involved consultations on gender for climate change adaptation which were used to inform the development of this Project. The stocktaking exercise will inform the development of the NAP. Zimbabwe is also planning the formulation of a Low Emission Development Strategy for 2019, supported by the UNDP-Russia Trust Fund for Development.

The proposed Project has a very high level of support from the Zimbabwean government, as the proposed interventions are an integral part of GoZ priorities as outlined above. The development of this proposal was at the request of the former Minister in charge of environment, water and climate. Zimbabwe identified water resources management and climate change adaptation as key priority areas in its national policies or program documents. The Government is prioritising groundwater exploitation in arid and semi-arid areas and is aiming to drill at least four boreholes in each of the 210 parliamentary constituencies. To address the various water resources related

challenges, Zimbabwe also launched a National Command Water Harvesting Programme in 2017 meant to enhance rainwater harvesting and help communities adapt and mitigate against the adverse impacts of climate change. It has declared the 1st of December of each year as the National Tree Planting day and set a target of planting 40 million tree by 2020. Zimbabwe adopted the principle of Integrated Water Resources Management (IWRM) in the Water Act of 1998 and this will be the basis for interventions underpinning this Project. The GoZ has also developed several guiding policies that are aimed at mitigating the adverse impacts of climate change and variability and to achieve reduction in poverty through environmentally sustainable development. This project will thus complement government efforts of providing sustainable access to water by vulnerable communities in water scarce areas by implementing a whole system's approach to groundwater management which ensures environmental sustainability of groundwater exploitation. The Water Policy of 2013 also supports the sustainable utilisation of groundwater, with emphasis on guarding against resource over-exploitation and deterioration.

E. Project compliance with relevant Zimbabwean technical standards and the Environmental and Social Policy of the Adaptation Fund

The Project will be implemented following the national standards of Zimbabwe related to environmental, water (surface and groundwater), wetlands and ecosystems management. Some project resources will be used to meet relevant standards for the management of critical natural resources taking into account the threats to critical ecosystems, water quality and quantity and also land degradation. The standards applicable to the Project include Environmental Impact Assessment (EIA) and Ecosystem Protection Regulations (2007), Catchment and Sub-catchment statutory requirements, Standards for drilling boreholes (SAZ ZWS6182013),Standard Association of Zimbabwe specifications (SAZ S560:1997), Water Quality regulations (SI6 of 2007), Wetland management guidelines and River Systems Outline Plans. Some of the guidelines include the location of toilets versus boreholes and wells (>30 m), streambank cultivation (>30 m), and maximum walking distances to water sources (<500 m). Since the project is mainly aiming at improving the state of the environment of the Gwayi and Save catchments, it is not expected to have any negative environmental impacts. To ensure this, the catchment and groundwater development action plans will consolidate preliminary studies we carried out as part of preparing this proposal.

The Water Act of 1998 and the Zimbabwe National Water Policy of 2013 has entrenched integrated water resources management as the principal management philosophy for water resources. Water is managed through seven catchment councils and below them are 57 sub-catchment councils. The drilling of boreholes is controlled by sub-catchment councils and an annual monitoring fee is charged. Drillers should be registered. There are no regulations specifically dealing with where boreholes are drilled but the quality of the water should meet national standards. Motorised boreholes are considered as non-primary use of water which should be charged at prescribed commercial rates. Other forms of groundwater such as springs and wells are not strictly regulated. Communal boreholes are managed by local Water Point Committees which are responsible for their repairs and maintenance through user contributions.

As part of the development of this proposal, a consultancy firm was commissioned to carry out a needs assessment and environmental and social impact assessment and advise on proposed project compliance with the environmental laws of Zimbabwe and the Environmental and Social Policy of the Adaptation Fund. In general, the assessments showed that the proposed project interventions complied with the 15 principles of the Environmental and Social Policy the Adaptation Fund as most of the activities were classified as no risk or low risk (see Annex 5).

However, the activities under Principle number 15 on Land, Water and Soil Conservation were classified as medium risk calling for appropriate mitigation measures to be taken.

The outcome from the environmental and social impact assessment gave us a good idea of what to include and what to avoid. However, this does not preclude us from carrying out detailed environmental and social impact assessments where the size of a sub-project warrants so in accordance with local stipulations. In order to demonstrate environmental sustainability, the project will adopt and implement the approach used by the SADC-GMI for pilot projects in the region:

1. Hire an independent consultant (Environmental and Social Experts) external to the project who will perform the assessment using the approach below.

    a. Review relevant Project documentation, legislation and standards (both the Funders and the National legislation)
    b. Develop a compliance matrix for the project.
    c. Project Screening and Assessment ((This can be at the high project level), or for selected sites. Utilizing the compliance matrix developed in (a), the primary focus will be on the identification of potential environmental and social risks and impacts, requirements for public consultation and disclosure and the potential requirement for further strategic management and mitigation measures.
        1. Conduct a gap analysis to identify any inconsistencies between national legislation and funders and recommend targeted measures or actions to address these gaps where necessary.
        2. Capture the findings and recommendations emanating from the above tasks in an Environmental and Social Sustainability (ESS) report. The report will detail identified potential risks, impacts and areas of non-compliance and then provide guidance and recommendations of targeted inputs and management measures
2. Management and Recommendations
3. Should the ESS report developed in 1(c) (ii) above, identify significant risks, impacts or areas of non-compliance, the consultant will assist the project in developing appropriate management and mitigation measures
4. Disclosure, Monitoring and Reporting.

The proposed interventions will have certain environmental public disclosure requirements as determined by both local legislation and that of the funder. The project will comply all the relevant national standards, the Environmental and Social Policy principles of the Adaptation Fund as well as adopt best practice international guidelines, for reducing vulnerability and promoting sustainable development while addressing climate change impacts. In addition, the implementation of the projects in accordance with various environmental and social compliance requirements will require regular monitoring, evaluation and reporting.

F. Duplication of Project with other funding sources

The Project design and consultative processes have ensured that the project is not duplicating current efforts in Zimbabwe. Instead, the Project seeks to complement other projects, including those by GoZ, UNDP, UNICEF, FAO, SADC-GMI, Plan International, *etc*. A list of projects currently under way or those already done in the targeted districts are presented in Table 19, based on the fieldwork and consultations conducted August – October 2019. The activities of

various NGOs in Buhera and Binga are the best proxies for reviewing both ongoing and past projects within the targeted wards.

Table 19 List of ongoing and past project implemented by NGOs and other Institutions in Binga and Buhera districts

Project Type	Implementing Organisation/NGO	Dates
Borehole Drilling and Rehabilitation	Save The Children	[1983 – present]
Solar Powered Borehole Drilling	Resilience Building Fund (ZRBF)	[2017 – present]
Borehole Drilling	Action Aid	
Borehole Drilling	World Vision [Dates not specified]	
Sand Abstraction	Save The Children	[1983 – present]
Water Harvesting	World Vision [Dates not specified]	
Gardening	Save The Children	[1983 – present
Conservation Agriculture	GOAL[dates not specified]	
Livestock Farming and Access to Livestock Markets/Value Chains	Save The Children	[1983 – present]

Save the Children and Zimbabwe Resilience Building Fund (ZRBF) have drilled boreholes and rehabilitated some boreholes in Binga District. Save the Children also initiated the harnessing of spring water for irrigation. Apart from borehole drilling and spring water harnessing, the NGO has also tried sand abstraction for livestock water in Ward 19 (Chinengo and Tinde villages). The project failed because the water extracted from the sands in these villages was very little and the sands would completely dry up during the months October to November each year. The proposed Project will complement these activities by ensuring that the exploitation of groundwater in the target areas of Binga and Buhera is sustainable through implementing actions which will preserve natural recharge and discharge areas against climatic and socio-economic pressures as well as enhance water services and security through rainwater harvesting, catchment and wetland protection, improving water use efficiency through installation of water-saving irrigation techniques and cultivation of a wide range of crops for income diversification. This project will also install solar on the boreholes in order to lessen the burden of pumping water associated with the traditional bush pump especially on women as well as increase crop productivity.

GOAL, a Non-Governmental Organisation, Agricultural Trust and River of Life Church are promoting conservation agriculture in Binga. Conservation farming is ideal for places like Binga since it uses methods that allow villagers to trap water in basins where it stays for long periods of time; land preparation techniques under conservation farming significantly improve the yields of farmers. The Tonga people who live in Zambia close to the Zimbabwean border are also using conservation farming to grow maize. The villagers yield an average of 5 tonnes of maize per hectare. This Project will complement these efforts by introducing and promoting other climate-smart agricultural techniques such as intercropping with legumes, greater crop diversity and improving storage and processing, and improved feeding strategies, rotational grazing, grassland restoration, integrated crop and livestock, and manure management will be piloted and demonstrated. Communities will also receive training in the different climate-smart agricultural techniques and different livelihood activities such as poultry, piggery, fishery, orchards and horticulture.

Action Aid (AA) and World Vision have projects focussed on value chain of goats, pigs and cattle. The thrust is to build resilience amongst the villagers by strengthening the value chains of goats and pigs reared in rural areas. One of the approaches recommended by Action Aid is grouping small-scale farmers and linking them with established big farmers who will buy products from the groupings of small-scale farmers and offer advice on breeding, feed and disease management. This Project will set-up a revolving fund of USD500,000 which will benefit about 2,000 households using rainwater harvesting and sustainable groundwater management techniques for productive purposes such as the goats and piggery project implemented by Action Aid. Agronomists and extension workers will guide the farmers on good practice farming so that they will be able to pay back the loan – a measure of venture sustainability.

Figure 54 Pictures of solar powered borehole drilled by ZRBF in Binga Ward 25

The Project also recognises that the ZINWA Act provides for the preparation of River System Outline Plans by each catchment and that these were prepared nearly a decade ago. It therefore supports the revision of these at sub-catchment level in two main catchments with targeted inclusion of gender, groundwater and climate change resilience, under sub-Component 2.2.

The departure point in this Project is the need to start from the national level and incrementally fixing the enabling environment and capacity needs right to the village level. In this Project, the broader ecosystem is also fixed before community and individual projects can come in, to ensure sustainability at both levels. Attention is therefore given to the reason why water sources dry up and hinder crop farming and animal husbandry to be sustained throughout the year and why wetlands, rivers and boreholes dry up around September to October period.

G. Description of knowledge management component to capture and disseminate lessons learned

At the outset of the project, a Knowledge Management Strategy will be developed. This strategy will detail processes for generating, capturing, sharing and disseminating learnings. The Knowledge Management Strategy will also set out how lessons from the project will be integrated with existing knowledge and how this will inform adaptive management of the project itself. The Project has considered capacity building and knowledge management and learning as one of its

main components as demonstrated by Components 1, 3 and 5. Important processes and lessons from project implementation will be properly documented and shared among stakeholders. These activities will be included as regular part of M&E and will be used in adjusting future project implementation. This component will also facilitate joint learning and experience sharing among various stakeholders. Moreover, selected wards falling under Lower Gwayi and Upper Save sub-catchments will be used as demonstration sites for others to learn from experiences of the Project. The Project design is such that the participating wards will be backed by their district superiors for upscaling to other wards, whilst the sub-catchments will also be backed by their superiors at catchment levels for upscaling to other sub-catchments. There are operational lessons the project can learn through other on-going and past projects. This includes projects on rural livelihoods, on-farm improvements, afforestation, wood-efficient cooking stoves, sanitation and hygiene improvements, *etc*. The project will also look up to gap analysis studies from such projects and build a library of knowledge on good practices.

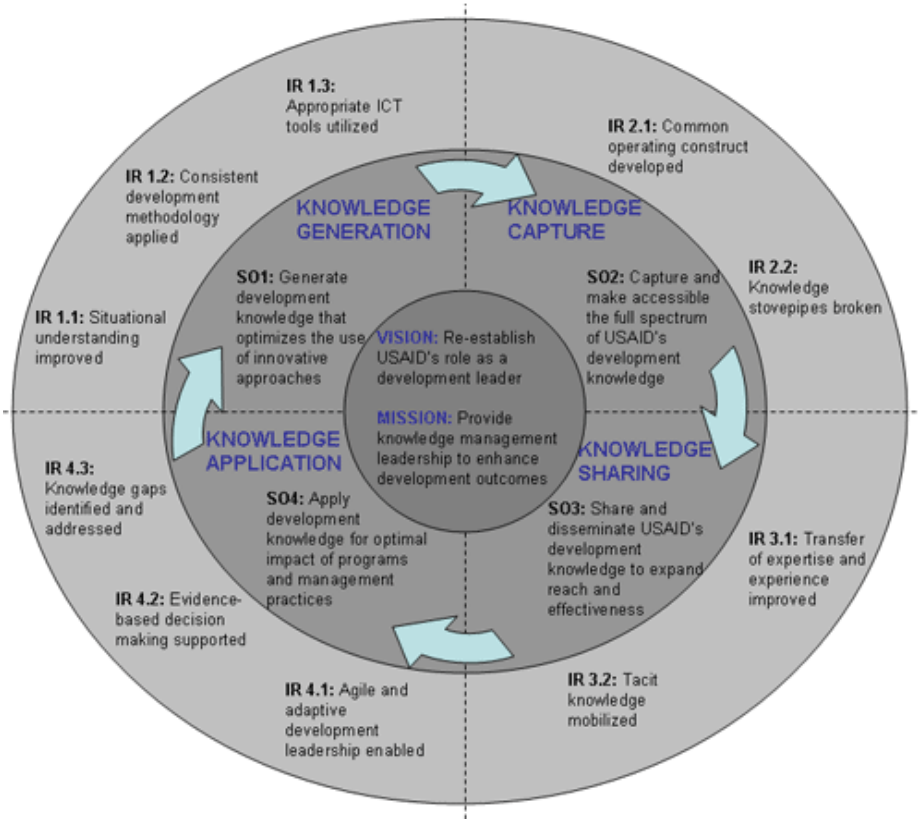


Figure 55 Knowledge Management Strategy of the Project
(Source: http://knowledgemanagementdepot.com/tag/km-strategy-template/)

H. Consultative process, including the list of stakeholders consulted

Responding to impacts of climate change requires a multi-disciplinary, multi-sectoral and multi-institutional approach because climate change is cross-cutting, affecting various sectors and groups of societies. The adopted project design facilitates multi-stakeholder participation and collaboration starting right from its development up to its implementation. It promotes consultations, participatory processes and dialogues among the various stakeholders of central government, NGOs, CBO, private sector, development partners, research/academics, catchment and sub-catchment councils, and local communities at ward and village levels. To this end, UNESCO together with the MLAWRR and the Department of Climate Change, which is the

National Designated Authority for the Adaptation Fund in Zimbabwe, have worked in close coordination during the formulation of this project concept.

The first consultation meeting was held on 22 February 2018 between UNESCO and the MLAWRR personnel to conceptualize the project. It was at this meeting that groundwater assessment and sustainable exploitation of groundwater by vulnerable communities were agreed on as activities that could reduce adverse impacts of, and risks posed by climate change in arid and semi-arid regions of the country. This was informed by outcomes from consultative workshops conducted earlier for the development of the National Adaptation Plan in Buhera, Chiredzi, Chimanimani, Tsholotsho, Gwanda, Matobo and Mwenezi. These district visits were conducted between 28th of May to 7th of June 2017. The consultative workshops in Mwenezi and Buhera districts (targeted in this Project) were attended by a total of 122 participants (52 Females and 70 Males) from various government ministry departments (Water, Agriculture, Health, Climate, Forestry, Environment and Local Government), NGOs, Universities and representatives from the communities. From the discussions, it was noted that although communities were practising many adaptation interventions, gaps and needs were identified such as the need for education and awareness, capacity building (strengthening local institutions, training of farmers and technical support) and research to improve adaptation options as well as research publications to communicate climate change impacts in the context of Zimbabwe. Prioritization of adaptation options was given to rainwater harvesting, sustainable groundwater exploitation, capacity building, rehabilitation of irrigation schemes and the use of water-efficient irrigation methods and investment in early warning systems. The importance of making sure climate change interventions go hand in hand with good management practices was also highlighted.

Other consultative workshops were held after the conception of the project idea to select and discuss the project components on 22 February and 10 April 2018. The workshops were attended mainly by key stakeholders from the various departments in MLAWRR, universities and other water and climate-related institutions. After the endorsement of the Project concept note by the Adaptation Fund in March 2019, a series of further consultations going down to the village levels were conducted. These covered national stakeholders in the capital Harare, Binga and Buhera district key informants, councillors, chiefs, headmen, and local stakeholders at ward and catchment/sub-catchment levels. The main proposal design and development committee was composed of experts from UNESCO, Chinhoyi University of Technology, University of Zimbabwe, MLAWRR, Department of Climate Change, Zimbabwe National Water Authority, Environmental Management Agency and the Upper Manyame Sub-catchment Council (Table 20).

Table 11 Proposal design team members

Name	Gender	Institution Represented
Innocent Nhapi	Male	Chinhoyi University of Technology
Maideyi Meck-Mabvira	Female	University of Zimbabwe
Webster Gumindoga	Male	University of Zimbabwe
Muchaneta Munamati	Female	UNESCO
Kuzivakwashe Nyarugwe	Male	Upper Manyame Sub-Catchment Council
Happymore Mbiza	Male	Vermex Products
Gilbert Matara	Male	NIOM Consultancy
Brighton Munyai	Male	SADC-GMI
Krasposy Kujinga	Male	WaterNet
Gerald Mundondwa	Male	Ministry of Lands, Agriculture, Water and Rural Resettlement

A consultant was commissioned to carry out a survey in the selected wards and give advice on key elements of the study. He also did a gender study and risk screening study and a social and environmental impact study of the four wards to be covered by the Project. The following issues, among others, were comprehensibly covered during consultations:

- The nature of the project and its specific role in enhancing climate resilience of the most vulnerable communities
- The activities focusing on adaptation measures to be included by the project
- Defining key stakeholders, their roles, responsibilities and contribution during Project implementation
- Project management structures
- Issues of environmental sustainability and ownership, especially by communities and local government
- Recognition of the role of women and youth in the implementation of the project
- Risk Screening of the Project based on the 15 principles of the Adaptation Fund's Environmental and Social Policy
- Identification of priority problems/issues and possible solutions
- Identification of risks and/or possible conflicts and resolution mechanisms
- Identification of projects/initiatives for possible collaboration and synergies.

Table 21 gives a list of stakeholders consulted from national to local level in the targeted wards. A comprehensive list with registers is shown in Annex 6

Table 21. List of key local stakeholders consulted in the development of this proposal
(a) Binga

Contact Person	**Organisation**	**Contact Details**
T. Rosen	Manager, Zinwa Gwayi catchment	0712239873
S. Mwinde	Lower Gwayi Sub-catchment	0772 550 523 smwiinde@gmail.com
Ndlovu	AGRITEX Supervisor	0712 327 401
Pashu	Chief, Ward 19	0713887138
Saba	Chief, Ward 25	0778385036/0739823984
Banda	District Administrator	0773 496 425, dabinga@yahoo.com
	Binga Rural District	0772 933 081, bingardc@gmail.com
Nyanyiwa	DDF	0713 613 825, knyanyiwa66@gmail.com
Moreblessing	NGO ZRBF	0772 802 914, moreblessing.mhlanga@gmail.com
Nyaradzo Ncube	Agritex Tinde Centre	0782360739
Mudimbwa	Environmental Management Agency	0773 507 343

(b) Buhera

Contact Person	Organisation	Contact Details
Mr Muyambo	Manager, Upper Save Sub-catchment	0772515246
Mr Nangatidza	Councillor, Ward 20	0714 260116
Supremo Nyakurimwa	RDC Buhera (Civil Technician)	0773697972
Mr Chiwamba	Sub-catchment officer	0773 557 315
Mandikate	DDF	0773623679
Nherera	DDF	0777673604
Mbonani	Agritex head	0773504098
Mavhiya	Agritex (Ward20)	0771264340
Mufadzanyasha	Agritex (Ward20)	0714009158
Chidhakwa	Agritex (Ward 23)	0774305749
Murinda	Agritex (Ward23)	0774590718
Mavhisa	District Administrator	0773021689
	Ward 23 Councilor	07713355285
Chirozva	Headman ward23	0779027081
	BR District Councilor	+26325206287
Chibvongodze	RDC Head	0772546389
Nyashanu	Chief	0712 503846
Betera	Headman Ward 20	0771390740
Mhandu	Environmental Management Agency	0773285798/ 0718161068
Choga	World vision	0773 092 836/0713 355 285

I. Justification for funding requested

The Climate Change Response Strategy of Zimbabwe makes an initial attempt to estimate the cost of national adaptation strategies to climate change, which is estimated at US$10 billion. However, there generally is limited detailed data for Zimbabwe on the projected economic costs of climate change and the additional costs and benefits of adaptation. Assessments undertaken so far in Africa indicate high benefits incurred by adaptation compared to costs. For example, appropriate adaptation measures could reduce the economic costs of climate change in Africa from ~2 to 1% of GDP by 2040 and from 10 to 7% of GDP in Zimbabwe by 2100 (GoZ, 2015). Adaptation measures need to be carefully planned for and managed to reduce the negative effects of climate change on socio-economic returns in Zimbabwe. It is estimated that in Zimbabwe, climate change, water-related disasters, such as floods, droughts, landslides, windstorms and hailstorms, contribute well over 80% of the natural disasters and destroys many hectares of crops annually, resulting in huge economic losses.

The Project targets building adaptive capacity and enhancing climate resilience of local communities through implementing concrete adaptation and mitigation actions. Unlike the usually sectoral-oriented projects, the proposed Project is designed to employ a more integrated and holistic approach of supporting communities in Binga and Buhera districts in their efforts to increase their resilience to droughts and improve their adaptation capacity to those risks while at the same time improving their livelihoods strategies and enhancing food security. The project starts by improving the enabling environment through strengthening of policies, institutions and human capacity. It then develops mitigation and adaptation measures at ecosystem level, before

dealing with community and household livelihood enhancement, diversification and resilience projects. Community-based climate adaptive actions on the ground will improve sustainable natural resources management and enhance agricultural productivity by these communities. Climate-responsive agronomic practices such as climate smart agriculture, water harvesting schemes and sustainable groundwater exploitation will not only improve agricultural productivity, but also make production more reliable, contributing to household food security. The adaptation activities of Component 4 therefore do not only increase the resilience of ecosystems and agricultural production systems to the risk of droughts, but also enhance the food security of the livelihoods in the catchments. The inclusion of sustainable energy will help to reduce wanton cutting down of trees and will reduce the time spent by women and children in fetching firewood at the expense of other productive uses of time.

J. Inclusion of sustainability of Project outcome in designing the Project

A project risk assessment exercise was carried out and covered also the environmental impact assessment of proposed project activities in line with environmental regulations of Zimbabwe. Some of the anticipated risks include environmental, economic, political and social risks. Environmental sustainability of the groundwater utilization will be through implementing activities that increase groundwater recharge and decrease discharge. Such activities include catchment management activities (agroforestry, afforestation, groundwater recharge, gully control and restoration, contour ridges, terracing, *etc*), improved water availability through promotion of water-saving irrigation technologies (drip irrigation), groundwater recharge and in-ground rainwater harvesting. These interventions will continue to provide benefits to communities beyond the Project lifespan so as to meet their current and future demands. The Project will consider monitoring and evaluation of environmental changes as part of the regular project M&E system. The economic sustainability of the Project will be hinged on the participatory and consultative process to build ownership of the Project by communities, local authorities and other key stakeholders. This process is expected to mobilize some resources for the implementation of the Project (including in-kind) and the continuity of the activities after the end of the Project. Technical, logistical, material and political support is expected from the different stakeholders and will be ensured through the various stakeholder coordination and collaboration structures that will be created by the Project Specifically, in the event of change in government or responsible minister, the new government or minister will be engaged so that they understand the need to carry out the project and its associated benefits. Project interventions such as irrigation schemes, water harvesting structures and technologies to reduce firewood usage (land degradation) will continue to provide benefits to communities beyond the Project lifespan. Investment plans and budgets developed will ensure future investments are implemented with ease based on available financial information and costing of investments.

The creation of stakeholder coordination and collaboration structures will ensure that technical expertise and experiences are continuously shared and utilized during implementation of activities in the sub-catchments, hence contributing to technical and technological sustainability. The introduction of some technologies will be undertaken through a credit arrangement (revolving fund) linked to catchment management that contributes to better technology adoption by communities while ensuring environmental protection. Communities will also be engaged in the local production of introduced technologies for easy dissemination.

Issues of social, cultural and other social values of local communities will be considered in proposing interventions. Recognition of the role of women and youth in the implementation of the

project by all stakeholders is also expected to contribute to sustainability. The Project appreciates the differences in livelihoods, social systems and identified interventions in response to those differences. The project activities will be further refined by communities through consultation and participatory processes before full scale implementation is undertaken. This will create ownership by communities to project interventions and to their sustainability.

Institutional sustainability will be achieved through the management structure included in the project design. The project will be executed through already existing government structures at national, catchment, and local levels. The structures and personnel will ensure sustainability of the project results beyond project lifecycle because institutions are permanent and will continue to execute their mandates after the Project and their capacities would have been built by the Project. Lastly, the Project Monitoring and Evaluation system, including mid-term review and phasing out strategy, will also contribute to sustainability of Project interventions.

All relevant national social and environmental standards of Zimbabwe, such as borehole drilling standards, river protection, irrigation policy, water policy, and climate change policy and water quality regulations will be respected while implementing the Project. The monitoring system of the project will therefore include monitoring environmental performance of the project through conducting environmental audits and reviewing project reports. It is also envisaged that for some specific interventions of the Project at the initial phase of the Project, some Project resources will be used to undertake environmental and social impact assessments for selected project activities, based on the guidance obtained from the Environment Management Agency (EMA) of Zimbabwe.

K. Overview of relevant environmental and social impacts and risks identified

Table 12 an overview of the environmental and social impacts and risks identified as being relevant to the project / programme

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law	Yes. The project complies with domestic law and policies and meets important environmental standards such as the Environmental Impact Assessment (EIA) and Ecosystem Protection Regulations (2007)	No negative impacts are anticipated but the project is expected to have positive environmental impacts. Where Project interventions are large enough to warrant an EIA, this will be done to comply with the law.
Access and Equity	Yes. The project promotes fair and equitable access to benefits of the project, although it deliberately tries to promote women, youths and marginalised groups in communities. The Project identifies activities that disadvantage women such as fetching water in rural areas and seeks to mitigate this so that the burden is reduced or eliminated.	Further assessment is required as the project may not be sufficiently accessible to all groups The project will closely monitor the targeting of all project beneficiaries to assure equal access of men, women youth and the most vulnerable. Indicators in this regard are included in the M&E scheme.
Marginalized and Vulnerable Groups	No initiatives are identified with orientation or execution that could generate a negative impact on	The Project intervention activities and other conservation methods need to be monitored closely in order to assure that

	marginalized and/or vulnerable groups. Project interventions are actually targeted at the vulnerable and marginalised groups and the activities do not have any negative impacts on these groups. A revolving fund is proposed so that vulnerable groups will have somewhere to start from. They will also benefit from livelihood diversification projects.	these measures are accompanied by livelihood improvement projects. Indicators in this regard will be included in the M&E scheme.
Human Rights	No activities are identified whose execution is not in line with the established national and international human rights. Project objectives promote basic human rights for equitable access to services and groundwater for irrigated agriculture and capacity building as well as access to information. The Project will be guided by the Zimbabwean constitution and other relevant laws which protect human rights.	Continuous monitoring will be required to ensure that the Project does not, at any time, violate human rights
Gender Equity and Women's Empowerment	The activities of the project deliberately promote a fair and equal access of men and women. The project promotes equal participation in decision-making processes by assuring women majority representation in all water-related committees, establishing participatory platforms for all stakeholders, balancing representation in the forums. The selection of beneficiaries will deliberately target women.	All project activities will be screened and analysed in order to take gender aspects into consideration. An in-depth gender analysis of the involvement of men and women in the options proposed as concrete adaptation activities will be undertaken in the initial project phase.
Core Labour Rights	The project respects the Zimbabwe Labour Relations Act and international labour standards as identified by ILO.	Further assessment is required, to ensure that the labour rights are strictly protected. This will be included in the M&E scheme.
Indigenous Peoples	The Project promotes and respects the rights and responsibilities set forth in the United Nations Declaration on the Rights of Indigenous Peoples.	Further assessments will be done to ensure that the culture and traditions of the indigenous people in the project areas such as the Tonga and Shangani people are respected
Involuntary Resettlement	The Project interventions do not require any resettlement of the target population.	The project will closely monitor the targeting of the project beneficiaries, particularly to assure that those people who have encroached on protected natural resources do not hhave access to the revolving fund and are involved in income generating activities. Indicators in this regard are included in the M&E scheme.
Protection of Natural Habitats	Project activities will not generally have negative impacts. It is clearly expected to have positive environmental impacts by improving the ecosystem of the areas. This includes protection and preservation of wetlands, protection and restoration of gullies, reforestation, control of veldfires, reduction in use of firewood, and demarcation of wildlife areas.	During the implementation of the all activities related to protection and management of wetlands, grasslands, forests shall be closely monitored to evaluate if the expected impact is achieved or if any unexpected negative side effects turn up. Indicators in this regard will be included in the M&E scheme.

Conservation of Biological Diversity	Project activities will not have a negative impact on biodiversity conservation as the project interventions are aimed at conserving biodiversity. In as much as the objective of the project is to conserve biodiversity, unintended environmental impacts may arise.	Consideration of direct and indirect project-related impacts on biodiversity will be conducted. Activities resulting in habitat loss, degradation and fragmentation, over exploitation, hydrological changes, nutrient loading and pollution will be assessed and management plans to mitigate impacts will be developed.
Climate Change	The project does not have any negative impact on climate change. The project interventions are actually aimed at addressing adverse effects of climate change. The reforestation projects will help to mitigate the impacts of climate change.	There is need to climate proof all project interventions. Though the application of the CRIDA approach, appropriate pathways will be identified for the selection of robust adaptation strategies.
Pollution Prevention and Resource Efficiency	The Project is aimed at environmental conservation activities that will improve the natural-resource base of the communities. Thus, the project will not generate any pollution. Instead the Project will reduce indoor pollution by adopting smokeless and efficient heating systems and biogas generation. It will reuse agricultural residues for bio-digestion and the sludge used as organic fertiliser. Water use efficiency will be assured by drip irrigation systems.	Salinization and chemical pollution from agricultural activities are to be monitored. Effluent and groundwater quality monitoring will identify any pollution.
Public Health	No adverse impact on public health is envisaged as the project interventions such as improved sanitation, hygiene and nutrition are expected to contribute to improvement of public health.	Irrigation could result in damp ground and mosquito breeding and would need to be monitored and mosquito-repellent plants cultivated.
Physical and Cultural Heritage	The project aims to protect physical and cultural heritage; thus, activities will not be implemented in such sites where there are physical and cultural heritages.	Local leadership will be kept engaged to ensure no violation of physical and cultural heritages.
Lands and Soil Conservation	Project interventions aimed at conserving the land and soil thus no negative impacts are expected. Climate smart agricultural techniques will be used to avoid land degradation and soil retention measures will be applied.	Soil erosion from cattle trampling to be monitored and managed.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Description of Project Implementation arrangement

Implementing Structure

The arrangements for Project implementation are shown in **Error! Reference source not found.**. At the national level, the project will be implemented by UNESCO as the Multilateral Implementing Entity, executed by the Ministry of Lands, Agriculture, Water and Rural Resettlement (MLAWRR) as the National Execution Entity (NEE) and supported by the Department of Climate Change under the Ministry of Environment, Climate, Tourism and Hospitality (MECTH) as the Designated Agent (DA). These three will have an overall oversight of the Project as represented in the Project Steering Committee (PSC) at the execution level. The PSC will have other members from ministries with interest in the Project such as the Ministry of Energy and Power Development, Ministry of Gender, Community and Small Enterprise Development, Ministry of Finance and Economic Development, and Ministry of Local Government and Public Construction. The PSC will meet twice a year to assess Project performance and advise on policy issues. It will work in close collaboration with key stakeholders such as the National Committee of the International Hydrological Programme and SADC Groundwater Management Institute.

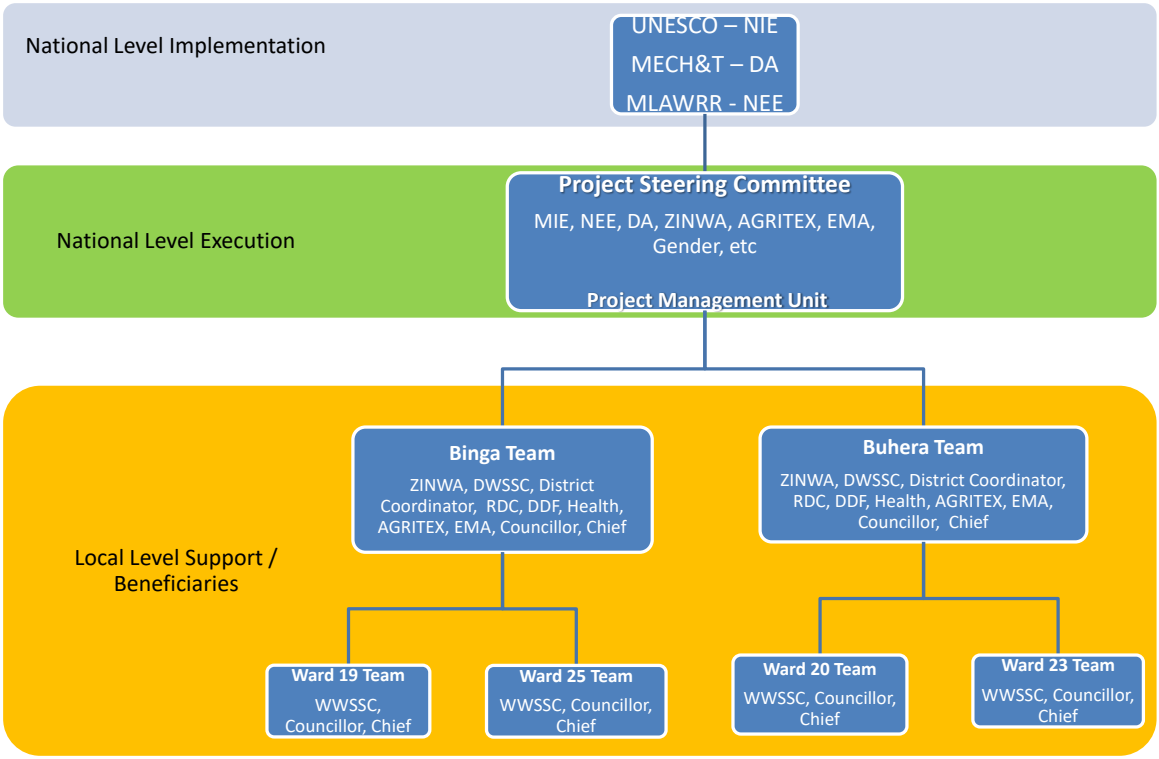


Figure 56 Proposed Project implementing structures at various levels

Regular feedback and communication on progress with Project implementation will be maintained through the PSC, Project Management Unit (PMU) reporting structures, and through the task teams that are established at district and ward levels. The Project Management Unit will report to the Director of Water Development in MLAWRR (who is a member of the steering committee.

Role of UNESCO

The role of UNESCO as the Multilateral Implementing Entity of the project is to bear full responsibility for the overall management of the project, including the financial, monitoring, and reporting responsibility. UNESCO will receive the funds and channel them to the Ministry of Finance and Economic Development. Some specific roles and responsibilities of UNESCO include, *inter alia*:

- Advise and oversee project implementation
- Liaise with and report to Adaptation Fund
- Establish protocols for annual progress reporting
- Facilitate formal scheduled project evaluations
- Ensure compliance with the Environmental and Social Policy of the Adaptation Fund, and other essential operational frameworks
- Disburse funds to the EE and monitor expenditure

Role of Project Steering Committee

The Steering Committee has the following functions:

- Supporting SANBI to ensure overall compliance with the spirit, policies and procedures of the AF. Supporting the NIE to build a coordinated adaptation response that delivers tangible outcomes. Guiding the development of and endorse the NIE investment strategy, ensuring optimal linkages with the policy environment and that projects are driven by country needs
- Setting up and oversee the project review process, including guiding the development of terms of reference for reviewers, setting up the review panel, and considering the recommendations of reviewers.
- Endorsing projects for submission to the AF, ensuring appropriate linkages with AF criteria and facilitating appropriate consultation with and, where necessary, endorsement from relevant spheres of government. From time to time this may involve promoting agreement on the roles of relevant institutions in implementing AF projects and facilitate the resolution of disputes among project partners.
- Promoting cooperation between relevant South African Institutions and funding agencies to enhance synergy and avoid duplication between adaptation efforts, to leverage additional resources where appropriate, and to support information management and flows between and feedback between the NIE and the NCCC and IGCCC and contribute towards climate finance and climate change adaptation policy development.

Role of MLAWRR

The MLAWRR is the National Execution Entity for the Project, with overall responsibility for project implementation over the five-year period and will thus stand accountable for both project and financial management. The MLAWRR through its Directorate of Water Resources Planning and Development and ZINWA will take the lead in executing the project. ZINWA will coordinate local activities through the catchment and sub-catchment councils selected for this

Project. ZINWA, through the various catchment councils, has already established governance structures in the two sub-catchments and these will be strengthened and used for the coordination of project implementation. At the local level, two project execution offices will be based at Lower Gwayi and Save sub-catchment council offices. The project execution offices will closely collaborate with local district structures in the execution of the project in line with the catchment planning guidelines. These structures include the District Coordinator's office, District Development Fund, and the Binga and Buhera Rural District Offices. Incidentally, these are the key organisations in the District Water Supply and Sanitation Committees (DWSSC).

At the ward level, project implementation in facilitated through the Ward Water Supply and Sanitation Committee (WWSSC). Key member in this are the Sub-catchment councillors, ward councillor and traditional chiefs. In addition, there will also be AGRITEX officers, Environmental Health Technician, and Youth and Gender officers. The role at this level is to facilitate project implementation and mobilise community support.

As EE, the MLAWRR will sign the grant agreement with UNESCO and will be accountable to UNESCO for the disbursement of funds and the achievement of the project objectives and outcomes according to the approved work plan. MLAWRR will particularly be responsible:

- coordinating activities to ensure the delivery of agreed outcomes;
- certifying expenditures in line with approved budgets and work-plans;
- facilitating, monitoring and reporting on the procurement of inputs and delivery of outputs;
- approval of Terms of Reference for consultants and tender documents for sub-contracted inputs;
- reporting to UNESCO on project delivery and impact; and
- monitoring compliance with the Adaptation Fund Environmental and Social Policy.

The Project implementation will be managed in close collaboration with project sub-executing entities. The MLAWRR will report any unintended social and environmental risks that are detected through the project monitoring, evaluation and reporting processes to UNESCO via the PSC, together with a proposed risk management plan that shows how these risks will be mitigated. In response to this, the UNESCO and PSC may propose the redirection of project funds to risk management activities, or the withholding of the next tranche of payment until satisfactory risk management actions are determined and agreed.

Project stakeholders will be made aware of the Project's grievance procedures should they wish to raise any issues and concerns, including those related to project risk management. At the ward and component levels, Task Teams will be established to support local-level coordination and governance (for the former), and technical integration across partner organisations and with related initiatives and ongoing programmes of work (for the latter).

Role of Project Management Unit

The Project will be administered by a PMU that is housed within the MLWARR and that reports to the Director of Water Resources Development and Management. The PMU will be responsible for providing technical leadership to the Project, managing and coordinating Project activities, providing oversight on the day to day operations of the Project including procurement, financial management and reporting, communications, monitoring and evaluation of project performance, reporting and serving as secretariat for the PSC. The PMU will include the following key positions:

- Project Manager (on secondment)
- Finance and Procurement Officer (on secondment)
- Project Officer (on secondment)

- Gender and Social Expert (external recruitment).

A Project Manager will be appointed from within the Government civil service and stationed at the MLAWRR headquarters to ensure liaison on project activities among and between the government ministries, the Project sub-catchment councils, the field offices, local governance structures and other stakeholders. The project will be guided by various committees including the Project Steering Committee, DWSSC and WWSSC. In addition, existing structures such as the ward councillors, the catchment and sub-catchment council structures and Zimbabwe IHP Committee will provide the necessary guidance to the project and ensure that the needs of the local communities are met.

Indicative Terms of Reference for the Project Manager:

Coordination functions:

- Provide strategic leadership to the implementation of the Project.
- Ensure management of all programme processes, deliverables, finances, procurement and contracting of service providers that results in the achievement of the Project outcomes.
- Ensure compliance with MIE and Adaptation Fund requirements, including ensuring effective procurement, administration, reporting, disbursement and financial management procedures.
- Ensure the coordination and effective implementation of project activities, through effective governance structures.

Technical functions:

- Provide leadership on content regarding all Project components.
- Build relationships with government departments in order to sustain and replicate Project outcomes, and to capture these in ongoing and future policy processes.
- Manage relationships with a diverse range of partners and stakeholders (private sector, public sector, NGOs and academic), resulting in their continued mobilisation and support of the Project.

A Gender and Social Expert will form part of the PMU, and work closely with lower level structures and other project partners in all five components to ensure that there is equitable representation of women and other vulnerable groups as project beneficiaries, in training and capacity-building programmes, and in project decision-making structures at all levels. The Gender and Social Expert will be responsible for:

- developing a Gender and Social Action Plan that will include: i) a rapid assessment undertaken in beneficiary communities; ii) indicators and targets regarding the inclusion of vulnerable groups in project activities, training, representation on project structures and receipt of Project benefits; iii) measures to ensure transparency, fairness and equity in selection processes for Project benefits; and iv) measures to encourage and support the participation of identified vulnerable groups and individuals in the various project activities; training/building the capacity of implementing partners to incorporate gender and social concerns into their work on the project;
- playing an ongoing advisory role to these partners during the five years of project implementation; and
- monitoring the progress on achieving Project targets relating to gender and social indicators.

In the recruitment of PMU staff, gender expertise as an important area of technical expertise will be included in the terms of reference. All Project personnel will be trained in gender concepts

such as a gender mainstreaming approaches and with respect to the sectors in which this Project is taking place. Sufficient gender capacity within the Project supervision function of UNESCO is available to fulfil its oversight role in working with executing entities as implementing partners on the ground. Core Project staff will be trained to ensure compliance with UNESCO and Adaptation Fund policies and procedures. Main focus will be on ensuring that the MLAWRR and other project partners are able to competently detect environmental and social risks in future project planning, monitoring, evaluation and reporting processes. All project staff will be selected on a competitive basis according to UNESCO and government procurement and human resource policies.

Most PMU staff will be contracted for a period of 4 or 5 years. The Project Manager and Financial and Procurement Officer will be employed for a longer period to allow for project closure. All PMU staff will report to the Project Manager. The MLAWRR will provide suitable office space for the PMU staff on full-time service contracts, as well as the necessary office furniture and support services.

Grievance Handling

During Project inception workshops and component launch workshops, stakeholders will be advised that any concerns relating to the design or management of the Project, including social and environmental risks, should be raised with MLAWRR through the PMU. Where these are not adequately addressed, these may be escalated to the project PSC and, where necessary, UNESCO.

Project accounting and procurement processes

As the Executing Entity, the MLAWRR will be responsible for undertaking the fiduciary responsibilities of the Project. Some of the partners may operate different accounting systems, but they shall maintain sound financial records in accordance with applied accounting standards acceptable to the Government of Zimbabwe as defined by the Ministry of Finance and Economic Development. The Project will have separate accounts in USD and Zimbabwean Dollar. The following will be elaborated between UNESCO and MLAWRR at Project inception phase:

- financial management systems and financial flows;
- ii) Adaptation Fund reporting requirements;
- audits and revenue management;
- iv) Standard Chart of Accounts and Adaptation Fund account categories;
- sub-executing entity agreements; and
- vi) capacity requirements (financial, processing and procurement capabilities).

B. Description of measures for financial and Project risk management

A number of financial and project risks are anticipated in this Project and measures will be taken to manage the identified risks. During Project preparation, a team was commissioned to study and give a detailed report on anticipated financial and project risks. This report is given as Annex B. A summary of these risks and mitigation measures are described in the Table 13.

Table 13 Identified Project risks, their levels and proposed risk management measures

Identified Risks	Risk Level	Risk Management Measures
Change in government or responsible Minister may result in delay in implementation of project	Medium	The project team will engage the new government or Minister so that they understand the need to carry out the project and its associated benefits.
Communities fail to support project activities and they are not informed	Medium	The project will carry out awareness campaigns and hold stakeholder meetings to explain the project to the

		communities. Local leadership will be involved in these meetings.
Inadequate funding to complete the project (e.g. due to costs increases)	Low	The project will explore various channels to secure resources, consider alternative implementation approaches or restructure the project in consultation with the Adaptation Fund.
Changes in the political environment	Medium	The project might defer project activities until conditions are suitable or restructure project and choose areas which are least affected priority areas.
Human capacity	Medium	The project will make use of expertise from UNESCO's Centres of Excellence in cases where available human capacity is not sufficient.
Climate change	High	Effects of climate change such as flooding may make some areas inaccessible. The project ise designed in such a way that activities in flood-prone areas will be carried out before or after the rainy season.
Competing interests between different stakeholders regarding accessing and use of water and other natural resources	Low	Establish multi-stakeholders' dialogue forum.
High expectations by communities and local government for quick investments on the ground	High	More awareness raising programs for understanding the policy-practice linkage helps.
Mismatch between the catchment and administrative boundaries	Low	Promote catchment-based management and development.
Inadequate baseline data/resource potential	Medium	The baseline situation was studied in detailed but there might be some exceptions. Establish baseline situation during implementation.
Low technology adoption rate by communities	Low	Promotion and demonstration of new technologies and practices.
Local communities with limited participation and willingness to promote project initiatives	Low	Increase sensitization at local community level, working with available local structures, active involvement of community organizations in project implementation.
Failure to involve adequate representation of vulnerable communities, particularly women, and therefore failure to create ownership of the project at the community level at project sites.	Low	The project will avoid a top down approach and create community ownership of the project interventions by building the capacity of community members at an early stage in the project. Engagement and capacity building will adopt a gender-sensitive approach, as guided by the Gender and Social Expert on the PMU. The development of detailed implementation plans will be undertaken in a participatory manner, encouraging input from all community members, especially women. This will also assist with the inclusion of traditional knowledge. This participatory approach was adopted during the design phase, when traditional authorities were consulted.
Poor collaboration amongst the relevant technical institutions	Medium	The relevant institutions should be involved right from the project inception and continuously be involved in planning, implementation, Project review, and reporting.
Project resource capture	Low	Follow transparent and participatory process (using catchment management structures) in selecting beneficiaries of the project using some agreed criteria. E.g., defining criteria and process to select community members that are eligible to access the revolving fund.

Ineffective management of project funds affects project implementation.	Low	The project will have clear separation of roles and strengthen accountability and auditing. A Financial and Procurement Manager will be recruited to strengthen the PMU and ensure appropriate management of project funds. In addition, UNESCO oversight and account audits will ensure that there is no ineffective use of project funds.
Fluctuations in exchange rate (USD: ZWL) which could affect the funding available for implementation and lead to budgetary constraints.	High	The Financial and Procurement Manager will closely monitor the USD: ZAR exchange rate and communicate any implications to the Project Manager so that project management can be adaptive. The PMU and MLAWRR officials will collaborate closely with UNESCO should exchange rates fluctuate to the extent that budget reallocations are required. In this event, budget reallocations shall be made in such a way that the achievements of project outcomes are compromised as little as possible.
Delay in project implementation due to government bureaucracy, long and inefficient procurement processes.	Low	Do proper planning (including developing a procurement plan). Negotiate with Government to get a special support or treatment that can facilitate implementation.

C. Measures for environmental and social risk management

As shown before, the Project complies with domestic law and policies. In general, the Project promotes fair and equitable access to benefits of the project. No initiatives are identified with orientation or execution that could generate a negative impact on marginalized and/or vulnerable groups. Some activities, such as the livelihood improvement projects, irrigation and animal husbandry are targeting women, single-headed households and marginalized groups. No activities are identified whose execution are not in line with the established international human rights. Project objectives promote basic human rights for equitable access to service and water for irrigated agriculture and capacity building as well as access to information. The Project promotes equal participation in decision-making processes by assuring women representation in all committees, establishing participatory platforms for all stakeholders, balancing representation in the forums.

The Project respects the labour standards as identified by ILO. The Project promotes and respects the rights and responsibilities set forth in the United Nations Declaration on the Rights of Indigenous Peoples. In some local communities exist different tribes, but no sharp distinction between indigenous and non-indigenous people can be made. The Project does not only increase the adaptation capacity of the local population and the resilience of the ecosystems, but also reduces greenhouse gas emissions through the introduction of improved stoves and reforestation initiatives. The Project will contribute to efficient use of water, prevention of water pollution and monitoring water quality. Furthermore, the Project will minimize material resource use. The Project will not have negative impacts on public health but will actually contribute to improved health conditions of the communities by ensuring access to water in sufficient quantities and acceptable quality The Project will not have any activity that affects physical and cultural heritages. Their protection/conservation will rather be promoted by the Project. Soil conservation, reduction of land degradation through supporting terraces, afforestation and catchment management are covered in Component 3 of the Project.

D. Description of monitoring and evaluation arrangements and budgeted M&E plan

Introduction

The project will be monitored through the Monitoring and Evaluation (M&E) activities described below. The M&E budget is provided in Table 14.The M&E system for the Project will be developed and used to closely monitor and evaluate the Project. Monitoring and evaluation will be done through production of annual reports, quarterly implementation reviews, technical reports and regular supervision missions to enhance success. A more detailed baseline survey will be carried out at the beginning of the project to prepare a detailed M&E plan that will streamline project objectives, indicators and methodologies of data collection. A joint review mission to the project sites are also planned to be conducted twice in a year. UNESCO as implementing entity supervises the M&E activities of the project, ensuring that the MLAWRR and its agencies undertake the evaluation and prepare the yearly reports. The MLAWRR will set up Project structures headed by a Project Manager. Quarterly Progress Reports will be prepared by the Project Management Unit and verified by UNESCO. Annual Project Reports will be prepared to monitor progress covering:

- Progress made towards project objectives and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project outcome (annual);
- Lessons learned/good practices;
- Annual expenditure reports;
- Reporting on project risk management.

In terms of financial monitoring, the Project Team will provide UNESCO with certified periodic financial statements. Audits on the project will follow UNESCO financial regulations and rules as well as applicable audit policies. Annual Work Plans and Quarterly Work Plans will be used to refine project delivery targets and re-align project work in close consultation and endorsement by UNESCO. An independent Mid-Term Review is planned for June 2022, midway through project implementation, to determine progress made in achieving outcomes and identify any adjustments required. An independent terminal evaluation will also be conducted.

Forecasting, Reporting, Monitoring and Evaluation activities

Inception Phase

A Project Inception Workshop will be held within the first 3 months of project start with those with assigned roles in the project organisation structure, as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first-year annual work plan. The workshop will address a number of key issues, such as:

- Ensure all partners fully understand and take ownership of the project.
- Detail the roles, support services and complementary responsibilities of UNESCO staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as necessary.
- Based on the project results framework, finalise the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting and M&E requirements. The M&E work plan and budget will be agreed and scheduled.

- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Agree on the Terms of Reference for the PSC and plan and schedule the PSC meetings. Roles and responsibilities of all project organisation structures will be clarified, and meetings planned. The first PSC meeting should be held within the first 6 months following the Inception Workshop.

An Inception Workshop report will be prepared and shared with participants to formalise various agreements and plans decided during the meeting. In the Inception phase, UNESCO will engage directly with the MLAWRR and other project partners on the operating procedures that will apply to the management of the project, and that will be necessary to ensure compliance with UNESCO and Adaptation Fund policies and procedures. An Operating Procedures Manual will be developed to support this process. In relation to the Environmental and Social Policy of the Adaptation Fund, attention will be given to ensuring that activities do not impact adversely on any priority biodiversity areas or ecosystem support areas, and that there are no negative impacts on local communities, including vulnerable groups and indigenous people. No such adverse impacts are anticipated.

Reporting Frequency and Risk Management
Progress will be monitored quarterly via quarterly reports that are submitted to and collated by the PMU and submitted to UNESCO. These will align with the agreed annual project work plan and will include qualitative, quantitative and financial information using a quarterly reporting template that will be used internally and by all sub- executing entities. Before funds to be disbursed, the MLAWRR will need to submit detailed quarterly forecasts to UNESCO that are built up from anticipated project activities.

To strengthen risk screening and ensure that no unintended negative impacts are caused or not mitigated, the MLAWRR will be required to submit a basic environmental and social risk table with their forecasts. These tables are to be submitted to the UNESCO for verification prior to forecast approval. Project activities that pose social or environmental risks will not be approved during the detailed quarterly forecasting process. Selected interventions will not be approved if they pose risks or entail environmental assessments, other than those that are granted exemption, as per local regulations. Special attention will be given to the monitoring of unanticipated environmental and social risks in the quarterly reporting process. UNESCO will work closely with MLAWRR to ensure that PMU staff have the capacity to undertake the required screening, and to provide the necessary scrutiny.

Annual Reporting
Annual Project Implementation Reports will be prepared by the PMU and submitted to UNESCO in order to monitor progress made since project start and in particular for the previous reporting period. These annual reports will include:

- progress made toward project objective and project outcomes – each with indicators, baseline data and end-of-project targets (cumulative);
- project outputs delivered per project outcome (annual);
- lessons learned/good practice;
- expenditure reports; and
- risks and adaptive management, with a particular focus on environmental and social risks as identified in the AF ESP.

A reporting template for the Annual Project Implementation Report shall be prepared by UNESCO in consultation with the Adaptation Fund Secretariat.

Periodic Monitoring through site visits
UNESCO will conduct visits to project sites based on the agreed schedule in the project's Inception Report or Annual Work Plans to assess first-hand project progress.

Independent Project Mid-Term Evaluation
The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. This Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. The mid-term evaluation will include a focus on environmental and social risks, and ensure compliance with the AF ESP.

Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the Project's term. The organization, Terms of Reference and timing of the Mid-Term Evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-Term Evaluation will be prepared by UNESCO based on guidance from the Adaptation Fund.

Project Terminal Evaluation and Reporting
An independent Terminal Evaluation will take place three months prior to project closure and will be undertaken in accordance with UNESCO guidance. The Terminal Evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The terminal evaluation will include a focus on environmental and social risks, and ensure compliance with the AF ESP. It will provide recommendations for follow-up activities and will require a management response from the MLAWRR. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response.

During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarise the results achieved (objectives, outcomes, outputs), risk management, lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Monitoring and Evaluation Work Plan and Budget

Table 14 M&E activities, responsibilities, budget and time frame

Type of M&E activity	**Responsible Parties**	**Budget USD** *Excluding project team staff time*	**Time frame**

Inception Workshop and Report, Component Launch Workshops	Project Leader UNESCO, MLAWRR	Indicative cost: USD7,300	Within first three months of project start up
Verification of baselines	Project Leader UNESCO	USD3,470	In first year
Annual project implementation report	Project Leader and team UNESCO	None	Annually
Periodic status/ progress reports	Project Leader and team UNESCO, MLAWRR	None	Quarterly
Mid-Term Evaluation	Project Leader and team UNESCO External Consultants (i.e. evaluation team)	Indicative cost: USD14,200	At the mid-point of project implementation.
Terminal Evaluation	Project manager and team, UNESCO External Consultants	Indicative cost: USD17,400	At least three months before the end of project implementation
Project Terminal Report	Project manager and team UNESCO, MLAWRR Local consultant	0	At most three months after the end of the project
Audit	Project manager and team UNESCO	Indicative cost per year: USD5,000 Total: USD25,000	Yearly
Visits to field sites	UNESCO Government representatives	Paid for with UNESCO fees	Yearly
Knowledge management	Project manager and team. All sub project executants Government representatives	USD30,000 (Output 5.2 budget)	Throughout the project and at mid-point, at project termination
Project monitoring	Project manager and team. All sub project executants Government representatives	USD27,600 (MLAWRR operating costs) Part of the operating costs from all Component budgets Contribution from UNESCO fees	
TOTAL indicative COST ***Excluding project team staff time and UNESCO costs***		**USD 129,970**	

Note: Costs included in this table are part and parcel of the Total Budget and Workplan, and not additional to it.

E. Results framework for the project proposal

Project Results Framework

The Results Framework of the project is shown in Table 24 and defines success indicators for project implementation and the respective means of verification. An M&E system for the project will be established, based on the indicators and means of verification. This Results Framework, including its indicators, targets and means of verification, will be reconfirmed during the Inception Phase of the Project. Any changes to the Results Framework require approval by the Project Steering Committee.

Table 24. Project Results Framework

Project Strategy	Indicator	Baseline	Target	Source of Verification	Risk and Assumptions
The ultimate goal of this Project is to increase local communities' adaptive capacity and resilience to climate change through increased groundwater exploitation for food security and other productive uses in rural areas of Zimbabwe	% of households exploiting groundwater for food security and other productive uses	The communities currently lack access to groundwater for food security and other productive uses and their capacity to adapt to impacts of climate change is weak	By the end of the project cycle, 2,000 out of the 8,000 households in the project areas will have access to and use groundwater for food security and increased their adaptive capacity and resilience to climate change	Baseline survey report Annual report End of project reports	Climate-smart interventions introduced by the project will result in greater difference compared to conventional practices Groundwater will be available closer to beneficiaries in adequate amounts
Outcome 1: Improved knowledge and capacity in groundwater science, policy and participatory management at national and local levels	Number of technical, institutional and human capacities strengthened for improved and sustainable utilization of groundwater at national and local levels	The current knowledge and capacity on groundwater science, policy and participatory management issues is weak and inadequate at both national and local levels	By the end of the project at least 100 people will be trained on groundwater science, policy and participatory management issues at national and local levels	Annual and end of project reports Technical reports Implementation reviews	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening
Output 1.1 National Centre for Groundwater Research and Training established at the University of Zimbabwe	A National Centre for Groundwater Research and Training established	There is currently no centre dedicated for groundwater research and training in Zimbabwe	By the end of the project cycle, a fully functional National Centre for Groundwater Research and Training will be established	Annual and end of project reports Technical reports Implementation reviews	All the required technical expertise and financial resources are available
Output 1.2 Capacity of local and national institutions to manage groundwater and water resources in general revamped	Number of revamped local and national institutions for managing groundwater in particular, and water resources in general	The current local and national institutions for managing groundwater are weak and inefficient	By the end of the project cycle, all the local and national institutions for managing groundwater will be revamped	Annual and end of project reports Technical reports Implementation reviews	There is cooperation from the responsible authorities to implement identified changes
Output 1.3 At least 100 groundwater technicians, scientists and managers trained each year on improved and sustainable utilization of groundwater, via tailor-	Number of skilled groundwater technicians, scientists and managers trained	There is lack of human capacity in groundwater management	By the end of the project cycle at least 250 groundwater technicians, scientists and managers will be trained	Implementation reviews End of year reports Training manuals Training reports	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening

made or regular short courses, certificates, diplomas, undergraduate and postgraduate courses.					
Output 1.4 Practical guidelines and manuals for groundwater resources planning, development and management developed	Number of practical guidelines and manuals for groundwater planning, development and management developed	There is no comprehensive guidelines and manuals on groundwater planning, development and management	A set of practical guidelines and manuals will be developed and distributed to all relevant institutions	Annual and end of project reports Technical reports Implementation reviews Practical guidelines and manuals	Experts are identified to develop the manuals and guidelines
Outcome 2: Sustainable utilisation of groundwater based on sound scientific inventory of the resource; science-based formulation of groundwater management policy to improve management of the resource and further develop new groundwater-based resilience strategies and practical interventions.	Number of sub-catchments where comprehensive assessments of groundwater resources are carried out	The assessments of groundwater resources are outdated and incomplete in the project target areas	Four comprehensive assessment reports on groundwater resources will be produced in the two target sub-catchments	Annual and end of project reports Technical reports Implementation reviews Assessment reports	Human capacity and expertise is available to carry out the groundwater assessments
	Number of sample plans for sustainable groundwater utilization in improving climate resilience developed	Currently, there are no plans for sustainable groundwater utilization in the project target areas	Two sample plans for sustainable groundwater utilization will be developed in the project target areas	Annual and end of project reports Technical reports Implementation reviews Sample plans	Human capacity and expertise is available to carry out the groundwater assessments
Output 2.1: Groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments developed	Number of groundwater atlases for each of the two sub-catchments developed	There are no groundwater atlases available for the two sub-catchments	Two groundwater atlases will have been developed for the two sub-catchments	Annual and end of project reports Technical reports Implementation reviews Groundwater atlases	Local human capacity and expertise is available to develop the groundwater atlases
Output 2.2: Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchment Councils developed.	Number of Groundwater Development Action Plans developed	There is currently no comprehensive Groundwater Development Action Plans	Two Groundwater Development Action Plans will be developed for Lower Gwayi and Upper Save sub-catchments	Annual and end of project reports Technical reports Implementation reviews Groundwater Development Action Plans	Human capacity and expertise are available to develop the Groundwater Development Action Plans
Outcome 3: Increased participation by the wider stakeholder	% of beneficiaries who participate in water	The current level of participation by stakeholders in water	Level of participation by stakeholders in water resource management	Annual and end of project reports Technical reports	Beneficiaries are willing to participate in water

community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.	resource management issues % of beneficiaries who have access to information and guidelines that support better catchment planning and sustainable use of groundwater	resource management issues in target areas is low % of target beneficiaries in project target areas who have access to information and guidelines that support better catchment planning and sustainable use of groundwater is very low	issues in target areas will improve by 80% All the beneficiaries will have access to information and guidelines that support better catchment planning and sustainable use of groundwater	Implementation reviews Training reports Annual and end of project reports Technical reports Implementation reviews Assessment reports	resource management issues Beneficiaries are interested in accessing the information and guidelines that support better catchment planning and sustainable use of groundwater
3.1 Update catchment management plans (River Systems Outline Plans) and structures by mainstreaming gender, climate change and sustainable groundwater management	Number of catchment management planning guidelines revised	The current catchment management planning guidelines are outdated and do not reflect the emerging issues of climate change, gender and groundwater	Two catchment management planning guidelines will be revised for Lower Gwayi and Upper Save sub-catchments	Annual and end of project reports Technical reports Implementation reviews Catchment management planning guidelines	Human capacity and expertise are available to revise the catchment management planning guidelines
3.2 Revise Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-Catchments through stakeholder participation to address climate change and groundwater management issues	Number of Sub-Catchment Management Plans revised	The sub-catchment management plans are outdated and do not reflect the emerging issues of climate change, gender and groundwater	Two sub-catchment management plans will be revised for Lower Gwayi and Upper Save sub-catchments	Annual and end of project reports Technical reports Implementation reviews Sub-catchment management plans	Human capacity and expertise is available to revise the catchment management planning guidelines
3.3 Strengthen the capacity of extension services and institutions to support communities in Lower Gwayi and Upper Save Sub-Catchments to undertake climate change adaptation activities	Number of extension services and institutions with strengthened capacities	Capacities of extension services and institutions at catchment level are inadequate to support communities in the two selected sub-catchments to undertake climate change adaptation activities	Capacities of extension services and institutions at catchment level will be strengthened to support communities in the two selected sub-catchments to undertake climate change adaptation activities	Annual and end of project reports Technical reports Implementation reviews Training manuals Training reports	Human capacity and expertise is available to build and strengthen capacities of extension services and institutions

3.4 Strengthen technical capacity of the two sub-catchment councils and Binga and Buhera Rural District Councils to manage and protect groundwater resources	Number of community members trained on sustainable technologies	Sub-catchment and rural district authorities have low technical and institutional capacity to manage groundwater sustainably	Sub-catchment and rural district authorities in Binga and Buhera have received equipment for effective groundwater management and have been trained on how to use it	Annual and end of project reports Technical reports Implementation reviews Training manuals Training reports	Beneficiaries interested in training and willing and capable to absorb and apply training and capacity strengthening
Output 3.5 Skills training for community members on sustainable technologies and smart agricultural techniques	Number of farmers trained on climate-smart agriculture techniques and other livelihood activities	Agriculture productivity is low and livelihood options in target districts are limited and communities do not have capacity to improve production and diversify	At least 2,000 farmers trained on climate-smart agriculture techniques and other livelihood activities (poultry, piggery, orchard and horticulture	Annual and end of project reports Training reports Implementation reviews	Beneficiaries are interested in training and human expertise is available
Outcome 4: Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to the impacts of climate change.	Number of pilot and demonstration projects established in project target areas in order to demonstrate concrete climate change adaptation measures	Livelihood options of communities in target areas are limited and not resilient to effects of climate change	Four pilot water and food security demonstration projects using groundwater and water harvesting for climate-smart irrigation projects established	Annual and end of project reports Technical reports Implementation reviews Photos of projects Videos	Beneficiaries are interested in carrying out the pilot and demonstration projects
Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally	Number of look and learn visits to best practice projects in Zimbabwe or regionally made	Few looks and learn visits to best practise projects in Zimbabwe and in the region have been made	At least three look and learn visits will have been made in Zimbabwe and two in the region	Annual and end of project reports Technical reports Implementation reviews	Authorization is given to visit the different places
Output 4.2 Four pilot climate-smart ecosystem mitigation and resilience projects implemented in two Project wards	Number of pilot and demonstrate community-based ecosystem resilience and mitigation projects	Massive land degradation resulting in loss of natural capital (forestry resources, wetlands, groundwater) for climate resilience and mitigation	At least one ecosystem protection project in each Project ward	Annual and end of project reports Technical reports Implementation reviews Photos and video clips	Beneficiaries appreciate benefits and are interested in carrying out ecosystem protection projects
Output 4.3 Two climate-smart water and food security pilot projects using groundwater and rainwater harvesting at community level implemented	Number of pilot climate-smart water and food security projects using groundwater and rainwater harvesting at community level	Food security in target wards is hampered by insufficient water and inappropriate farming methods which do not take into account climate change	At least four pilot climate-smart water and food security projects using groundwater and rainwater harvesting at community level	Annual and end of project reports Technical reports Implementation reviews Photos and video clips	Beneficiaries appreciate benefits and are interested in carrying out ecosystem protection projects

Output 4.4 Climate-smart livelihood enhancement and diversification pilot projects using groundwater, rainwater harvesting and renewable energy for 2,000 households implemented	Number of households participating in livelihood enhancement and diversification projects using groundwater and rainwater harvesting	Food security in target wards is hampered by insufficient water and inappropriate farming methods which do not take into account climate change	Pilot climate-smart livelihood enhancement and diversification projects using groundwater and rainwater harvesting for 1,000 households	Annual and end of project reports Technical reports Implementation reviews Photos and video clips	Beneficiaries appreciate benefits and are interested in carrying out ecosystem protection projects
Output 4.5 About 2,000 households in the four Project wards apply and access funding from the food security and livelihood enhancement revolving fund	Amount of money set aside for the food security and livelihood enhancement revolving fund established	There is currently no revolving fund targeted for food security and livelihood enhancement programmes	A revolving fund will be established	Annual and end of project reports Technical reports Implementation reviews Bank account	Beneficiaries identify viable projects and there is buy-in from financial service providers
Outcome 5: A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted.	A sustainable framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted	Currently there is no framework for improved groundwater utilisation to reduce vulnerability to climate change	A framework for improved groundwater utilisation to reduce vulnerability to climate change will be developed	Annual and end of project reports Technical reports Implementation reviews Framework	Human capacity and expertise is available to develop the framework
Output 5.1 Web-based information sharing and exchange platform for Project participants established	An information sharing exchange platform established	Information sharing mechanisms are very weak	A web-based information sharing, and exchange platform will be established	Annual and end of project reports Technical reports Implementation reviews Web-based information exchange platform	Human capacity and expertise is available to develop the platform and beneficiaries are keen to access information
Output 5.2 Good practices documented and adopted by key stakeholders	Number of good practices documented and adopted by key stakeholders	Documentation of good practices in groundwater extraction and management is poor	Good practices in groundwater extraction and management will be documented and adopted	Annual and end of project reports Technical reports Report on good practices	Stakeholders are willing to adopt the good practices

Project Milestone Time Framework

Table 25. Project milestone time framework

		Year 1				Year 2				Year 3				Year 4				Year 5			
		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Inception Workshop																					
Component 1	To strengthen technical, institutional and human capacity for improved and sustainable utilization of groundwater at national and local levels																				
Expected Outcome 1	Improved knowledge and capacity at national and local levels on groundwater science, policy and participatory management issues																				
Activity 4.1	Establish a National Centre for Groundwater Research and Training																				
Activity 4.2	Revamp local and national institutions for managing groundwater in particular, and water resources in general																				
Activity 4.3	Train at least 300 skilled groundwater technicians, scientists and managers at national and local levels in improved and sustainable utilization of groundwater																				
Activity 4.4	Develop practical guidelines and manuals for groundwater planning, development and management																				
Component 2	To conduct comprehensive assessments of groundwater resources in two poverty-stricken and most vulnerable sub-catchments of Lower Gwayi and Upper Save and thus develop sample plans for sustainable groundwater utilization in improving climate resilience																				

Expected Outcome 2	Sustainable utilisation of groundwater based on sound scientific resource inventory; science-based policy to better manage resources and further develop new groundwater-based resilience strategies and practical interventions.																					
Activity 2.1	Develop two groundwater atlases for each of the two sub-catchments																					
Activity 2.2	Develop two Groundwater Development Action Plans for each sub-catchment																					
Component 3	To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote and protect groundwater use																					
Expected Outcome 3	Increased participation by the wider stakeholder community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.																					
Activity 3.1	Revise existing catchment management planning guidelines to clearly mainstream gender, climate change and groundwater																					
Activity 3.2	Revise Sub-Catchment Management Plans of Lower Gwayi and Upper Save sub-catchments through stakeholder participation to address climate change and groundwater issues																					
Activity 3.3	Strengthen capacities of extension services and institutions at catchment level to support communities in the two selected sub-catchments to undertake climate change adaptation activities																					
Activity 3.4	Sub-catchment and rural district authorities in Binga and Buhera have received equipment for effective groundwater management and have been trained on how to use it																					
Activity 3.5	Train at least 2,000 farmers on adoption of climate-smart agriculture techniques and other																					

	livelihood activities (poultry, piggery, orchard and horticulture)																					
Component 4	To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation for diversifying and strengthening livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments																					
Expected Outcome 4	Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to impacts of climate change																					
Activity 4.1	Look and learn visits to best practice projects in Zimbabwe or regionally																					
Activity 4.2	Pilot and demonstrate community-based ecosystem resilience and mitigation projects in four Project wards																					
Activity 4.3	Pilot and demonstrate community-based livelihood enhancement and climate resiliency projects in four Project wards																					
Activity 4.4	Pilot and demonstrate household livelihood enhancement, diversification and climate resiliency projects in four Project wards																					
Activity 4.5	Establish a food security and livelihood enhancement revolving fund																					
Component 5	To compile and disseminate lessons learnt to facilitate future upscaling and replication of good practices in groundwater extraction and management																					
Expected Outcome 5	A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted																					

Activity 5.1	Establish web-based information sharing and exchange platform for project participants																				
Activity 5.2	Document and adopt good practices by key stakeholders																				
End of year project evaluation																					
Mid-term project evaluation																					
End of project evaluation																					

F. Project alignment with the Results Framework of the Adaptation Fund

Table 26. Project Alignment with the Results Framework of the Adaptation Fund

Project Objective(s)[6]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
4. To strengthen technical, institutional and human capacity for improved and sustainable utilization of groundwater at national and local levels	1.1. Fully functional National Centre for Groundwater Research and Training will be established 1.2. All local and national institutions for managing groundwater revamped 1.3. At least 50 groundwater technicians, scientists and managers trained each year 1.4. A set of practical guidelines and manuals on groundwater use developed and distributed to all relevant institutions	**Outcome 2**: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses **Outcome 7**: Improved policies and regulations that promote and enforce resilience measures	2.4. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks 7. Climate change priorities are integrated into national development strategy	400,000
2. To conduct comprehensive assessments of groundwater resources in two poverty-stricken and highly vulnerable sub-catchments of Lower Gwayi and Upper Save and develop sample plans for improving climate resilience through sustainable groundwater utilization	2.1. Two groundwater atlases developed for the two sub-catchments 2.2. Two Groundwater Development Action Plans developed for Lower Gwayi and Upper Save, sub-catchments	**Outcome 5**: Increased ecosystem resilience in response to climate variability and change induced stress	5. Ecosystem services and natural assets maintained or improved under climate variability and change induced stress	300,000
3. To strengthen the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote and protect groundwater use	3.1. Two catchment management planning guidelines and structures revised for Lower Gwayi and Upper Save sub-catchments 3.2. Two sub-catchment management plans revised for Lower Gwayi and Upper Save sub-catchments 3.3. Capacities of extension services and institutions at catchment level	**Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.4. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses 3.2. Modification in behavior of targeted population	150,000

[6] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

	strengthened to support communities in the two selected sub-catchments to undertake climate change adaptation activities 3.4. Sub-catchment and rural district authorities in Binga and Buhera have received equipment for effective groundwater management and have been trained on how to use it 3.5. At least 2,000 community members received training on climate-smart agriculture techniques and sustainable technologies			
4. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation for diversifying and strengthening livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments	4.1. At least three look and learn visits made in Zimbabwe and two in the region 4.2. Three pilot climate-smart ecosystem mitigation and resilience projects 4.3. Three pilot climate-smart water and food security projects using groundwater and rainwater harvesting at community level 4.4. Pilot climate-smart livelihood enhancement and diversification projects (piggery, poultry, fishery, orchards, horticulture) using groundwater and rainwater harvesting for about 2,000 households. 4.5. Revolving fund established and functional	**Outcome 4:** Increased adaptive capacity within relevant development and natural resource sectors **Outcome 6:** Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress 6.1 Percentage of households and communities having more secure (increased) access to livelihood assets 6.2. Percentage of targeted population with sustained climate-resilient livelihoods	3,290,000
5. To compile and disseminate lessons learnt to facilitate future upscaling and replication of good practices in groundwater extraction and management	5.1. A web-based information sharing, and exchange platform established 5.2. Good practices in groundwater extraction and management documented and adopted	**Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.4. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses 3.2. Modification in behaviour of targeted population	100,000

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
1. Improved knowledge and capacity at national and local levels on groundwater science, policy and participatory management issues	1.1 The knowledge and capacity on groundwater science, policy and participatory management issues at national and local levels improved	***Output 2.1***: Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events ***Output 7:*** Improved integration of climate-resilience strategies into country development plans	2.4.4. No. of staff trained to respond to, and mitigate impacts of, climate-related events 7.4. No., type, and sector of policies introduced or adjusted to address climate change risks	400,000
2. Sustainable utilisation of groundwater based on sound scientific resource inventory; science-based policy to better manage resources and further develop new groundwater-based resilience strategies and practical interventions.	2.1 Four comprehensive assessment reports on groundwater resources produced in the four target sub-catchments 2.2 Four sample plans for sustainable groundwater utilization developed in the project target areas	***Output 5:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.4. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)	300,000
3. Increased participation by the wider stakeholder community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.	3.1 Level of participation by stakeholders in water resource management issues in target areas improve by 80% 3.2 All the beneficiaries have access to information and guidelines that support better catchment planning and sustainable use of groundwater	***Output 3***: Targeted population groups participating in adaptation and risk reduction awareness activities	3.4.1 No. and type of risk reduction actions or strategies introduced at local level	150,000
4. Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to impacts of climate change	4. Four pilot water and food security demonstration projects using groundwater and rainwater harvesting for climate-smart irrigation projects established	***Output 4:*** Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability ***Output 6:*** Targeted individual and community livelihood strategies strengthened in relation to	4.4.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types) 6.4.4.No. and type of adaptation assets (physical as well as knowledge) created in support of	3,290,000

		climate change impacts, including variability	individual-or community-livelihood strategies 6.4.2. Type of income sources for households generated under climate change scenario	
5. A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted	5. A framework for improved groundwater utilisation to reduce vulnerability to climate change developed	***Output 3***: Targeted population groups participating in adaptation and risk reduction awareness activities	3.4.1 No. and type of risk reduction actions or strategies introduced at local level 3.4.2 No. of news outlets in the local press and media that have covered the topic	100,000

G. Detailed budgets and budget justification

Table 27. Detailed budget with budget notes

Components	Outputs	Amount Year 1 USD	Amount Year 2 USD	Amount Year 3 USD	Amount Year 4 USD	Amount Year 5 USD	Total (USD)	Budget Notes
Outcome 1 Improved knowledge and capacity in groundwater science, policy and participatory management at national and local levels	Output 1.1 National Centre for Groundwater Research and Training established.	164,724	28,581				193,305	1
	Output 1.2 Capacity needs of local and national institutions to manage groundwater and water resources in general assessed and training needs identified.	24,400					24,400	2
	Output 1.3 Practical guidelines and manuals for groundwater resources planning, development and management developed	0,00	58,695				58,695	3
	Output 1.4 At least 25 groundwater technicians, scientists and managers trained each year on improved and sustainable utilization of groundwater, via tailor-made or regular short courses, certificates, diplomas, undergraduate and postgraduate courses.	42,000	35,467	35,467	10,666		123,600	4
	Sub-Total Outcome 1	**231,124**	**122,743**	**35,467**	**10,666**		**400,000**	
Outcome 2 Sustainable utilisation of groundwater based on sound scientific inventory of the resource; science-based formulation of groundwater management policy to improve management of the resource and further develop new groundwater-based resilience strategies and practical interventions.	Output 2.1: Groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments developed.	211,600	40,000				**251,600**	5
	Output 2.2: Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchment Councils developed.	0,00	48,400				**48,400**	6
	Sub-Total Outcome 2	**211,600**	**88,400**				**300,000**	

Outcome 3 **Increased participation by the wider stakeholder community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.**	Output 3.1 Existing catchment management planning guidelines and structures updated to clearly mainstream gender, climate change and sustainable groundwater management.	27,600					**27,600**	7
	Output 3.2 The Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-catchments revised through stakeholder participation to address climate change and groundwater management issues.	13,000					**13,000**	8
	Output 3.3 Capacity of extension services and institutions strengthened to support communities in Lower Gwayi and Upper Save Sub-catchments to undertake climate change adaptation activities.	37,900					**37,900**	9
	Output 3.4 Technical capacity of the two sub-catchment councils and Rural District Councils strengthened to manage and protect groundwater resources.	11,500	4,250	4,250	4,250	4,250	**28,500**	10
	Output 3.5 About 2,000 farmers in target areas trained on skills for sustainable technologies and smart agricultural techniques.	0,00	21,500	21,500			**43,000**	11
	Sub-Total Outcome 3	**90,000**	**25,750**	**25,750**	**4,250**	**4,250**	**150,000**	
Outcome 4 **Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to the impacts of climate change**	Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally.	21,000					**21,000**	12
	Output 4.2 Four pilot climate-smart ecosystem mitigation and resilience projects implemented in two Project wards.	83,000	200,000	200,000	200,000	200,000	**883,000**	13
	Output 4.3 Two climate-smart water and food security pilot projects using groundwater and rainwater harvesting at community level implemented.		330,000	300,000	300,000	300,000	**1,230,000**	14
	Output 4.4 Climate-smart livelihood enhancement and diversification pilot projects using groundwater, rainwater harvesting and renewable energy for 2,000 households implemented.	26,000	157,500	157,500	157,500	157,500	**656,000**	15
	Output 4.5 About 2,000 households in the four Project wards apply and access funding from the food security and livelihood enhancement revolving fund.	38,000	109,975	117,342	117,342	117,341	**500,000**	16
	Sub-Total Outcome 4	**168,000**	**797,475**	**774,842**	**774,842**	**774,841**	**3,290,000**	

Outcome 5 **A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted**	Output 5.1 Web-based information sharing and exchange platform for Project participants established.	13,500					**13,500**	17
	Output 5.2 Good practices documented and adopted by key stakeholders		30,625	18,625	18,625	18,625	**86,500**	18
	Sub-Total Outcome 5	**13,500**	**30,625**	**18,625**	**18,625**	**18,625**	**100,000**	
Total Components Cost		**211,996**	**848,000**	**848,000**	**848,000**	**636,004**	**4,240,000**	
Project Execution cost (8.5%)		**18,870**	**75,480**	**75,480**	**75,480**	**56,610**	**377,400**	
Total Project Cost		**230,866**	**923,480**	**923,480**	**923,480**	**692,614**	**4,617,400**	
Project Management Fee charged by the Implementing Entity (8.0%)		**19,130**	**76,520**	**76,520**	**76,520**	**57,390**	**382,600**	
Amount of Financing Requested		**249,996**	**1,000,000**	**1,000,000**	**1,000,000**	**750,004**	**5,000,000**	

Budget Notes

Project Components, Outputs	Notes	Budget Activities	Total (USD)	Budget Expenditure Notes (USD)
Outcome 1 **Improved knowledge and capacity in groundwater science, policy and participatory management at national and local levels** **Total: 400,000**				
Output 1.1 National Centre for Groundwater Research and Training established	1	1.1.1. Develop a concept note, convene and conduct a four-day workshop at the University of Zimbabwe for local universities and SADC-GMI to set up a Centre for Groundwater Training and Research to develop its structures and TORs	24,200	Facilitation and Administration costs: $4,700. Traveling and Accommodation costs: $19,500
		1.1.2. Advertise, shortlist, interview and appoint staff for the Centre (Director, 3 Specialists, Programmes Officer, and Receptionist)	2,000	Advertisement costs. Interview panel to include any other two deans from other universities who will be available.
		1.1.3. Resource and capacitate the Centre through state-of-art groundwater development equipment	142,905	Office, laboratory, and field equipment costs.
		1.1.4. Plan and convene a four-day workshop to develop a five year-strategic plan and budget for the Centre	24,200	Facilitation and Administration costs: $4,700. Traveling and Accommodation costs: $19,500.
		Sub-Total	**193,305**	
Output 1.2 Capacity needs of local and national institutions to manage groundwater and water resources in	2	1.2.1 Prepare TORs, advertise, select and appoint an institutional reform specialist.	1,000	Advertisement costs.

general assessed and training needs identified		1.2.2 Conduct an institutional gap analysis with a specific focus on groundwater, climate change and gender mainstreaming.	10,000	Done by the institutional expert covering training institutions and organisations involved in groundwater at national and local levels.
		1.2.3 Organise and conduct a one-day national workshop to review institutional gaps identified in Sub-component 1.2.2 and develop a training needs strategy	11,400	Costs includes facilitation, venue hire, lunch and cordials, travelling and subsistence, accommodation.
		1.2.4 Present summary recommendations to government ministries for action.	2,000	Report production and mini workshop with senior Government officers and Centre personnel.
		Sub-Total	**24,400**	
Output 1.3 Practical guidelines and manuals for groundwater resources planning, development and management developed	3	1.3.1 Identify and contract teams to prepare the guidelines and manuals.	500	Advertisement and courier services costs.
		1.3.2 Convene and conduct a five-day workshop of universities, practitioners and SADC-GMI to formulate a training curriculum, at least five practical guidelines and manuals for groundwater planning, development and management.	42,195	Facilitation and Administration costs: $6,400. Traveling and Accommodation costs: $35,795.
		1.3.3 Prepare, review, edit and publish the 5 manuals.	16,000	Selected authors develop training materials, present them for review before finalisation. 2 Reviewers for the materials costs included.
		Sub-Total	**58,695**	
Output 1.4 At least 25 groundwater technicians, scientists and managers	4	1.4.1 Recruit and partially fund 4 PhD and 8 MPhil students.	81,600	Project only partially covers stipends for 36 months for PhD and 24 months for MPhil.

		1.4.2 Accredit regular course with the Zimbabwe Council for Higher Education and the short courses with the Zimbabwe Institution of Engineers for Continuous Professional Development (CPD)	2,000	Costs include meeting to review documents before submission and upon receiving feedback from Zimche and Zimbabwe Institution of Engineers.
		1.4.3 Conduct training of approved courses	40,000	Budget to cover running costs related to conducting the training costs and some guest lecturers from non-UZ lecturers
		Sub-Total	**123,600**	
Outcome 2 **Sustainable utilisation of groundwater based on sound scientific inventory of the resource; science-based formulation of groundwater management policy to improve management of the resource and further develop new groundwater-based resilience strategies and practical interventions.** **Total: 300,000**				
Output 2.1: Groundwater atlases for Lower Gwayi and Upper Save Sub-Catchments developed.	5	2.1.1 Develop TORs, advertise, select and recruit a local company to carry out extensive pilot study and mapping of groundwater potential, risks and	4,000	National advertisement and procurement costs.
		2.1.2 Conduct pilot groundwater mapping in Lower Gwayi and Upper Manyame sub-Catchment.	207,600	Hired consultant costs to conduct extensive geophysical investigations and produce ground water maps for the two sub-catchments.
		2.1.3 Identify and establish groundwater monitoring sites in Binga Wards 19 and 25 and Buhera Wards 20 and 23	40,000	Two borehole monitoring sites in each ward at $5,000 each. Drilling by ZINWA.
		2.1.4 Develop potential, risks and vulnerability maps	0	Costs included 2.1.2.
		Sub-Total	**251,600**	
Output 2.2: Groundwater Development Action Plans for Lower Gwayi and Upper Save Sub-Catchment Councils developed.	6	2.2.1 Develop TORs, advertise, select and recruit a facilitator for the development of sub-catchment action plans which mainstreams gender, youth empowerment and expected climate change impacts.	2,000	National advertisement and selection costs for an individual to facilitate the development of action plans

		2.2.2 Facilitator develops training materials for approval.	8,000	Development of training materials present them for review before finalisation. Reviewers for the materials costs included.
		2.2.3 Conduct two-day training courses in each sub-catchment for local community leadership: including councillors, chiefs, headmen, headmasters, etc, on practical skills for developing groundwater management plans and building climate resilience	17,400	Facilitation and Administration costs: $4,600. Traveling and Accommodation costs: $12,800.
		2.2.4 Facilitate the development of Action Plans for each sub-catchment through two-day workshops through local stakeholder dialogue and focusing on women and youth empowerment, and this will be used to design specific ward pilot schemes (see Components 4.2 – 4,4)	21,000	Facilitation and Administration costs: $8,200. Traveling and Accommodation costs: $12,800.
		Sub-Total	**48,400**	
Outcome 3 **Increased participation by the wider stakeholder community, who are aware of water resource management issues and have access to tailored information and guidelines that support better catchment planning and sustainable use of groundwater.** **Total: 150,000**				
Output 3.1 Existing catchment management planning guidelines and structures updated to clearly mainstream gender, climate change and sustainable groundwater management.	6	3.1.1 Develop TORs, advertise, select and appoint a team of water resources specialists, climate change experts, social scientists and gender	2,000	Advertisement and selection costs for a team of experts to review catchment planning guidelines.
		3.1.2 Consult key stakeholders and facilitate the revision of the catchment planning guidelines by mainstreaming groundwater, gender and climate change, as part of the CRIDA approach.	8,000	Key informant interviews and document reviews Costs include expert's time.
		3.1.3 Validate, print and disseminate revised guidelines to the different stakeholders.	3,000	Documents reviewed by three experts Final document packaged for online and hardcopy distribution.
		3.1.4 Conduct one-day training workshops on revised catchment planning guidelines at national, catchment levels.	14,600	Three workshops envisaged. Workshops target 20-30 participants from Government, ZINWA, NGOs, councillors
		Sub-Total	**27,600**	

Output 3.2 The Sub-Catchment Management Plans of Lower Gwayi and Upper Save Sub-catchments revised through stakeholder participation to address climate change and groundwater management issues.	7	3.2.1 Preparations for training workshop concept note by experts hired in sub-component 3.1.1.	2,000	Preparatory meeting at national and sub—catchment level in conjunction with the facilitators.
		3.2.2 Conduct one-day consultative workshops in Gwayi and Save catchments to revise catchment outlines as per sub-component 3.1.3 guidelines.	8,000	Two workshops envisaged. Workshops target 20-30 participants from Government, ZINWA, NGOs, and councillors.
		3.2.3 Print and disseminate revised catchment outline plans.	3,000	Review by two experts'costs. Final document packaged for online and hardcopy distribution.
		Sub-Total	**13,000**	
Output 3.3 Capacity of extension services and institutions strengthened to support communities in Lower Gwayi and Upper Save Sub-catchments to undertake climate change adaptation activities.	8	3.3.1 Develop TORs, advertise, select and appoint an Human Resources expert to carry out a detailed skills inventory and needs assessment of extension services in the Binga and Buhera districts and Lower Gwayi and Upper Save sub-catchments, based on the Project objectives and thrust.	2,000	National advertisement and selection costs for an individual to carry out skills inventory and needs assessment.
		3.3.2 Develop TORs, advertise, select and appoint a team of trainers based on the identified skilled	2,500	Advertisement and recruitment costs.
		3.3.3 In collaboration with the Centre for Groundwater Training and Research in sub-component 1.1, conduct three-day Training of Trainers skills training workshops of maximum five days in each of the Project districts.	29,900	Facilitation and Administration costs: $4,600. Traveling and Accommodation costs: $25,300.
		3.3.4 Develop and disseminate Information, Education and Communication (IEC) materials for awareness raising.	3,500	Review by two experts costs. Final document packaged for online and hardcopy distribution costs.
		Sub-Total	**37,900**	
Output 3.4 Technical capacity of the two sub-catchment councils and Rural District Councils strengthened to manage and protect groundwater resources.	9	3.4.1 Led by the Centre for Groundwater Training and Research, assess the Lower Gwayi and Upper Save and the Binga and Buhera districts personnel in terms of the requisite communication skills, equipment and technical skills to measure borehole water quality, capacity tests, and sustainable yields to avoid groundwater depletion.	2,500	Travel to the two project districts.

		3.4.2 Develop training materials for 2 two-day short training courses and accredit courses with the Zimbabwe Institution of Engineers and other relevant bodies.	1,000	Materials developed in-house by the Centre.
		3.4.3 Conduct 1 two-day training courses per district/sub-catchment and evaluate.	8,000	Costs are related to travelling and conducting the courses in Binga and Buhera.
		3.4.4 Procure and install tools and equipment that will enable Subcatchment and district councils to carry out robust groundwater monitoring.	17,000	Office equipment, motorcycles for field visits, groundwater quality and quantity monitoring equipment.
		Sub-Total	**28,500**	
Output 3.5 About 2,000 farmers in target areas trained on skills for sustainable technologies and smart agricultural techniques.	10	3.5.1 Using ToTs trained in sub-component 3.3.3 and backup from the Centre for Groundwater Training and Research, conduct at least ten 1-2 days training courses in each district of Binga and Buhera. focusing on participants from the specific Project wards	40,000	Trainings conducted in the field with less costs for venue, food and travelling Each training session to have 20-30 participants.
		3.5.2 Develop and disseminate Information, Education and Communication materials for awareness raising.	3,000	Review by one expert cost. Trainings costs Final document packaged for online and hardcopy distribution costs.
		Sub-Total	**43,000**	
Outcome 4 Livelihoods of communities in demonstration wards improved and diversified, reducing vulnerability to the impacts of climate change **Total: 3,290,000**				
Output 4.1 Look and learn visits to best practice projects in Zimbabwe or regionally.	11	4.1.1 Government, UNESCO and Project partners meet to finalise look and learn visits, identify participants and book appointments.	1,000	Travelling and meeting cost Administration costs.
		4.1.2 Identified team member conduct look and learn visits to projects locally and internationally and produce mission reports.	20,000	Travelling, accommodation, subsistence and development costs.

		Sub-Total	**21,000**	
Output 4.2 Four pilot climate-smart ecosystem mitigation and resilience projects implemented in two Project wards.	12	4.2.1 Prepare TORs, advertise, select and appoint a consultant firm with specialisation on land use, forestry, ecosystem and environmental planning to design and ecosystem protection plans for the 4 Project Wards based on sub-Components 2.2, 3.1 and 3.2.	3,000	Advertisement and selection costs for a consultant firm. Contract signing.
		4.2.2 Consultant firm presents Inception Report, conducts fieldwork, presents draft report, makes corrections and present Final Report with detailed drawings and Social and Environmental Management Plan.	80,000	Lump sum contract + supervision costs.
		4.2.3 Materials procurement and installation with supervision from Agritex, Forestry Commission, and EMA.	800,000	Procurement of fence, poles, tree seedlings and awareness campaign materials in the 4 wards: **$500,000.** Fire protection activities, land use demarcation, fencing, tree planting, awareness campaigns, wetland protection, and gully protection in the 4 wards: **$300,000.**
		Sub-Total	**883,000**	
Output 4.3 Two climate-smart water and food security pilot projects using groundwater and rainwater harvesting at community level implemented.	13	4.3.1 Planning meetings in Harare and in the Project wards to confirm the design the of the community resilience projects with Agritex, ZINWA, Forestry Commission, EMA, NGOs working in the area, and universities, based on plans developed in sub-Components 2.2, and 3.2.	30,000	Costs include meetings, travelling to project sites, accommodation, subsistence, fieldwork surveys, mapping, sample collection and analysis for water and soils, condition analysis, value chain analysis

		4.3.2 Goods and services procurement and installation with supervision from Agritex, Forestry Commission, and EMA.	1,200,000	Dam construction, weir construction, repair of existing infrastructure, irrigation equipment, drilling of boreholes, provision of water supply systems, labour hire, provision of orchard trees, supply of farming inputs and field travelling Cost breakdown per ward: Binga Ward 19: $500,000 Binga Ward 25: $300,000 Buhera Ward 20: $200,000 Buhera Ward 25: $200,000
		Sub-Total	**1,230,000**	
Output 4.4 Climate-smart livelihood enhancement and diversification pilot projects using groundwater, rainwater harvesting and renewable energy for 2,000 households implemented.	14	4.4.1 Develop a detailed data collection tool to profile all families in the four Project wards and collect the data using local Government extension workers and village heads.	20,000	Transport and fieldwork costs. Printing and stationery costs
		4.4.2 Using the demographic data collected in Output 4.4.1, develop and validate an intervention matrix or model to identify suitable interventions at individual level based on food, water, energy and income security.	6,000	Procurement of data analysis software, Hiring of a data analysis expert.
		4.4.3 Procure goods and services and install interventions.	630,000	Procurement of fencing, irrigation equipment, and farming inputs at household level in the 4 wards. Fieldwork costs. Hiring of experts for installation.
		Sub-Total	**656,000**	
Output 4.5 About 2,000 households in the four Project wards apply and access funding from the food security and livelihood enhancement revolving fund.	15	4.5.1 Identify, negotiate and agree a collaborative arrangement and terms with a bank or micro-finance institution working in the Project districts.	20,000	Costs includes meetings with bank officials in Harare and travel to Binga and Buhera for due diligence checks with bank local branches
		4.5.2 Appoint a financial advisor to work with selected bank to develop terms and guidelines for appraisal of business plans by beneficiaries accessing revolving funds.	15,000	Consultancy costs, travels and consultations with leadership in beneficiary areas. Training of community leaders so that they understand the facility better.

		4.5.3 Prepare fund brochures and advertise for loan applicants using channels easily and fairly accessible to all potential beneficiaries in the four Project wards.	3,000	Design of brochures, printing and dissemination costs.
		4.5.4 Process applications and disburse funds.	419,900	Revolving loan disbursement.
		4.5.5 Provide field extension and advisory services to beneficiaries.	20,000	Hired bank and extension workers.
		4.5.6 Collect loan repayments	22,100	Hired bank.
		Sub-Total	**500,000**	
Outcome 5 **A framework for improved groundwater utilisation to reduce vulnerability to climate change developed and adopted** **Total: 100,000**				
Output 5.1 Web-based information sharing and exchange platform for Project participants established.	16	5.1.1 Advertise, select and recruit a specialist website design specialist.	2,000	Advertisement and selection costs.
		5.1.2 Develop a website for the project with link to social media.	10,000	Consultant costs.
		5.1.3 Select and train Project staff on how to use and maintain website.	1,500	Consultant costs
		Sub-Total	**13,500**	
Output 5.2 Good practices documented and adopted by key stakeholders	17	5.2.1 Identify and train Project staff on documenting good practices and project	12,000	Coaching of project staff. Professional editing and publication costs.
		5.2.2 Conduct dissemination activities such as short films, radio and TV shows	74,500	Specialist activities and equipment hire. Cost of airtime on radio and TV.
		Sub-Total	**86,500**	
Total Components Cost			**4,240,000**	
Project Execution cost (8.5%)			**377,400**	
Total Project Cost			**4,617,400**	
Project Management Fee charged by the Implementing Entity (8.0%)			**382,600**	
Amount of Financing Requested			**5,000,000**	

Table 28. Budget on the Implementing Entity management fee use

Category	Budget notes	Year 1	Year 2	Year 3	Year 4	Year 5	Total (USD)
Management	Staff salaries (or part thereof) for finance, procurement, admin and project management staff	45,912	45,912	45,912	45,912	45,912	**229,559**
Operating costs	Travel and subsistence, workshop and catering costs associated with project oversight and governance activities	19,130	19,130	19,130	19,130	19,130	**95,652**
Equipment	Costs associated with the provision of equipment to the MIE secretariat including computers and associated peripherals	7,653					**7,653**
Auditing and consulting services	Costs for external consulting services, notably external audits and other technical support	5,356	5,356	5,356	5,356	5,356	**26,781**
Administration costs	Printing, photocopying, telecoms and other costs related to office operations	4,591	4,591	4,591	4,591	4,591	**22,956**
Total (USD)		**82,642**	**74,989**	**74,989**	**74,989**	**74,989**	**382,600**

Table 29. Explanation and a breakdown of the execution costs

Project Execution cost (8.5%)	**377,400**	
	42,000	*1x Project Manager for 60 months, salary top up, seconded from Government Civil Service*
	36,750	*1 x Financial and Procurement Manager, salary top up, seconded from Government Civil Service*
	31,500	*1 x Project/ Admin Officer, salary top up, seconded from Government Civil Service*
	87,500	*1 x Social and Gender Expert, external recruitment*
	78,198	*Operating costs, including Inception Workshop and kick-off meetings*
	40,000	*Equipment and transport for Project Staff*
	10,000	*Verification of baselines*
	10,216	*Mid-term evaluation*
	15,822	*Terminal evaluation*
	25,413	*Annual audit*

H. Include a disbursement schedule with time-bound milestones.

	Upon Agreement Signature	Year 1	Year 2	Year 3	Year 4	Year 5	Total (USD)
Schedule Date (Tentative)	Sept 2020	Dec 2020	Dec 2021	Dec 2022	Dec 2023	Dec 2024	
Project Funds	211,996	848,000	848,000	848,000	848,000	636,004	**4,240,000**
EE Fee	18,870	75,480	75,480	75,480	75,480	56,610	**377,400**
MIE Fee	19,130	76,520	76,520	76,520	76,520	57,390	**382,600**
Total (USD)	**249,996**	**1,000,000**	**1,000,000**	**1,000,000**	**1,000,000**	**750,004**	**5,000,000**

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PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[7]

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

(Enter Name, Position, Ministry)	Date*: (Month, day, year)*
Mr. Washington Zhakata *Director, Climate Change Management Department* *Ministry of Environment, Climate, Tourism and Hospitality Industry*	Date*: 13 January 2020*

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Professor Hubert Gijzen *Regional Director and Representative* *UNESCO Regional Office for Southern Africa* (Implementing Entity Coordinator)	
Date: *13 January 2020*	Tel.: +263-4-776775/9 Email: h.gijzen@unesco.org
Project Contact Person: Dr. Koen Verbist, Programme Specialist *UNESCO Regional Office for Southern Africa*	
Tel.: +263-4-776775/9 Email: k.verbist@unesco.org	

[6] Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

ANNEXES

Annex 1: Endorsement Letter from National Designated Authority

All communications should be addressed, "The Secretary for Environment, Climate, Tourism and Hospitality Industry"

P Bag 7753 Causeway,
Zimbabwe
Telephone: 701681/3
Fax: 252673

Your Ref.:
Our Ref:

ZIMBABWE

MINISTRY OF ENVIRONMENT, CLIMATE, TOURISM AND HOSPITALITY INDUSTRY
11th Floor, Kaguvi Building
Cnr 4th Street/Central Avenue
Harare

13 January 2020

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Endorsement of Strengthening Local Communities' Adaptive Capacity and Resilience to Climate Change through Sustainable Groundwater Exploitation in Zimbabwe

In my capacity as the Designated National Authority for the Adaptation Fund in Zimbabwe, I confirm that the above national project is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project titled: ***Strengthening Local Communities' Adaptive Capacity and Resilience to Climate Change through Sustainable Groundwater Exploitation in Zimbabwe*** to be funded by the Adaptation Fund. If approved, the project will be implemented by United Nations Education, Scientific and Cultural Organisation (UNESCO) Regional Office for Southern Africa and executed by the Ministry of Lands, Agriculture, Water and Rural Resettlement.

DIRECTOR–CLIMATE CHANGE MANAGEMENT
Min. of Environment, Water & Climate
13 JAN 2020
P BAG 7753, CAUSEWAY, HARARE
ZIM. TEL: 04-701681-3

W. Zhakata
Director, Climate Change Management Department/ UNFCCC/ Adaptation Fund/ GCF Focal Point
For Secretary for Environment, Climate, Tourism and Hospitality Industry

c/o afbsec@adaptation-fund.org

Annex 2: Support Letter from University of Zimbabwe

UNIVERSITY OF ZIMBABWE

PRO VICE CHANCELLOR
(ACADEMIC AFFAIRS)

Memo

Professor Rosemary Moyana

TO : Prof Muchuweti, Dean, Science

DATE : 07 November 2019

Cc: Vice Chancellor
Chairman, Geology Department

Re: **REQUEST TO HOST THE GROUND WATER DEVELOPMENT CENTRE AT UNIVERSITY OF ZIMBABWE- GEOLOGY DEPARTMENT**

The Vice Chancellor has approved your request to host the ground water development Centre at the University of Zimbabwe, Geology Department. Congratulations for such a project. I wish you all the best as you host this ground water development Centre.

Kind regards.

R Moyana (Professor)

General Telephone Line: 303211 Extn: 11104
Email Addresses : pvcacademic@admin.uz.ac.zw
rmoyana@admin.uz.ac.zw
mmakuyana@admin.uz.ac.zw

Direct Telephone Line: 303257

Annex 3: A needs assessment /consultative report of Binga [Ward 19 and 25] and Buhera [Ward 20 and 23]

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7. Summarised List of Ongoing and Past Project implemented by NGOs and other Institutions Way Forward Resilience Building and Adaption Strategy Proposals

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    Situational Analysis of the Wards Combined
    Recommended Project per Ward by Location and Expected Impacts using IFA Project Model

Cost Estimation for the proposed project interventions
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Borehole Checklist

Introduction

NIOM Consultancy conducted a needs assessment research in Binga (Ward 19 and 25) and Buhera (Ward 20 and 23). The purpose of the field visits was to gather data to be used in informing project interventions and implementation strategies for the project: Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.

The specific objectives of the needs assessment study was to gather data that can be used to answer the following objectives:

- Carry out a preliminary assessment of groundwater resources in the target areas including potential, challenges and opportunities for sustainable utilization of the resource
- Assess capacities of catchment and sub-catchment councils in managing water resources
- Assess the differentiated climate change impacts on men and women and differentiated capabilities
- Assess access to productive resources such as water, land, labour and capital
- Review of past and ongoing similar projects in the target areas to identify synergies
- Identify and describe various livelihood options and activities and the respective value chains.
- Develop concrete pilot actions that can be developed in each of the targeted areas, and proposal of four wards for project implementation.

1. Presentation of Data

Maps of Villages visited and Demographic information of villagers participating in the research

This section of the report presents the maps of the villages visited, and discusses the demographic profile of the villagers that participated in the research in detail.

Total Households Visited

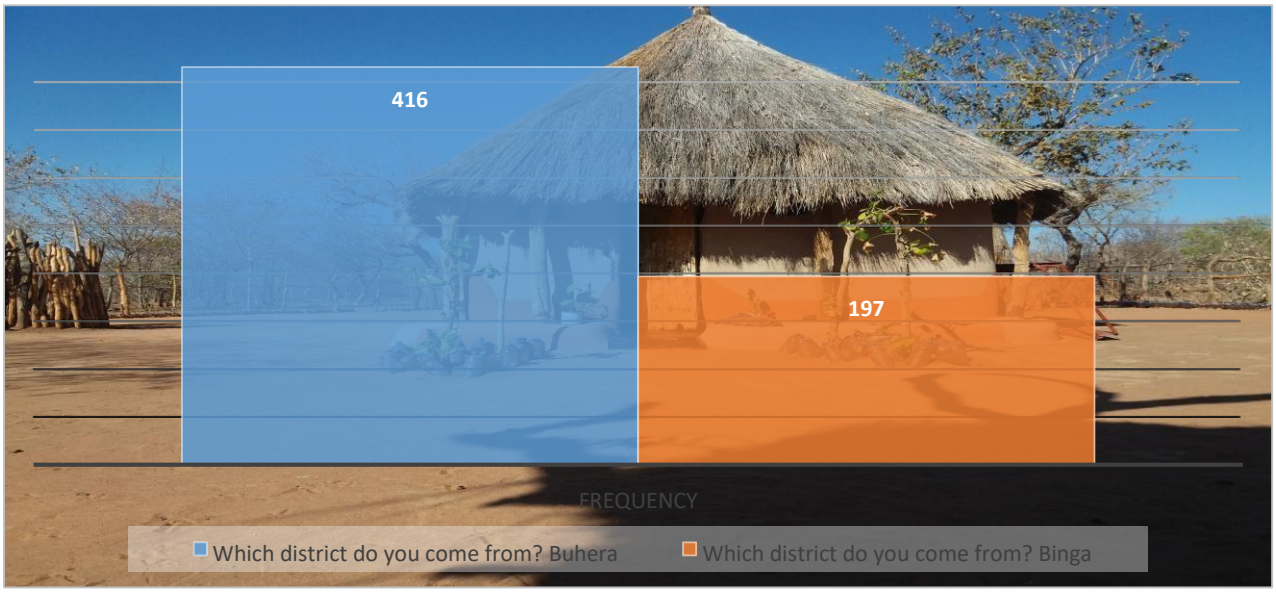


Figure 1: Total Household Visited

Six hundred and thirteen (613) homesteads participated in the stakeholder consultations done in Binga and Buhera combined. Sixty eight percent (68%) of the homestead participating in the research came from Buhera and 32% of the homesteads participating in the research came from Binga.

Breakdown of Homesteads visited based on villages – Binga Ward 19

Figure 2: Breakdown of Homesteads visited based on villages – Binga Ward 19

Homesteads from five villages in Binga Ward 19 participated in the research. The highest number of participants came from Manyanda village; the lowest number of participants came from Bungu village. Manyanda village was the most accessible, had more boreholes and was better populated than the other four villages.

Breakdown of Homesteads visited based on villages – Binga Ward 25

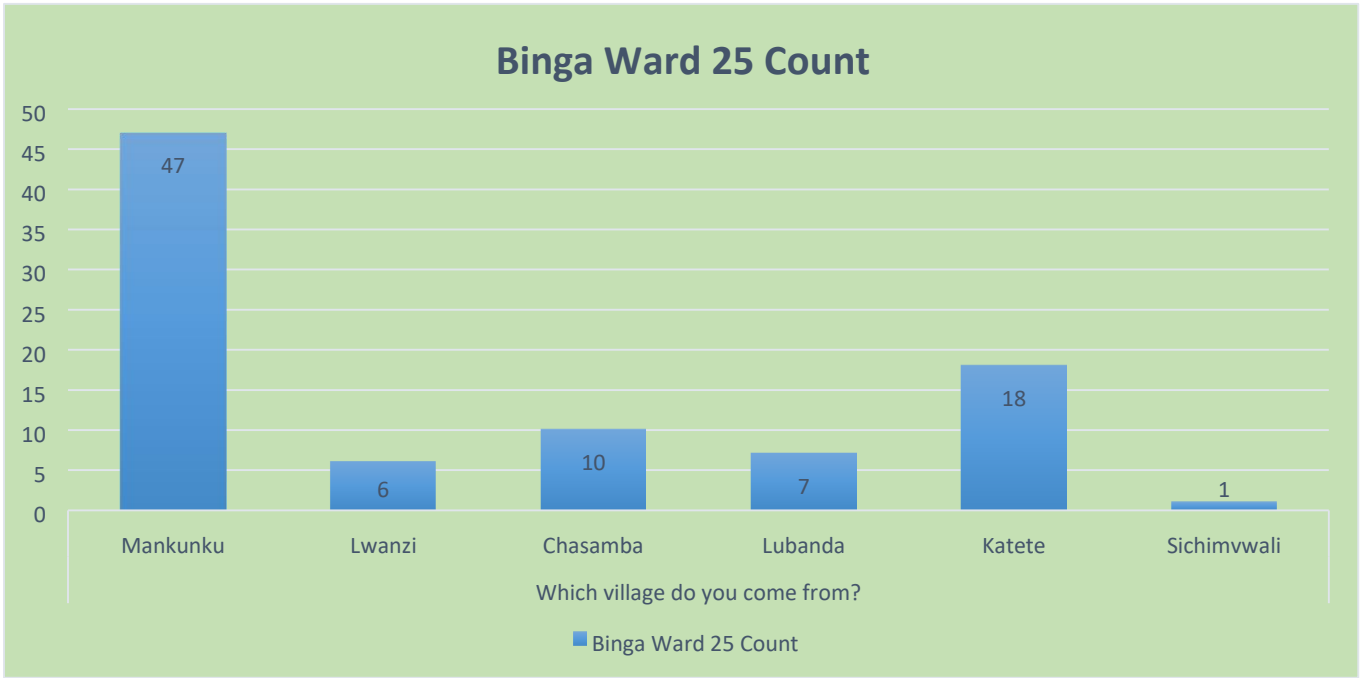


Figure 3: Breakdown of Homesteads visited based on villages – Binga Ward 25

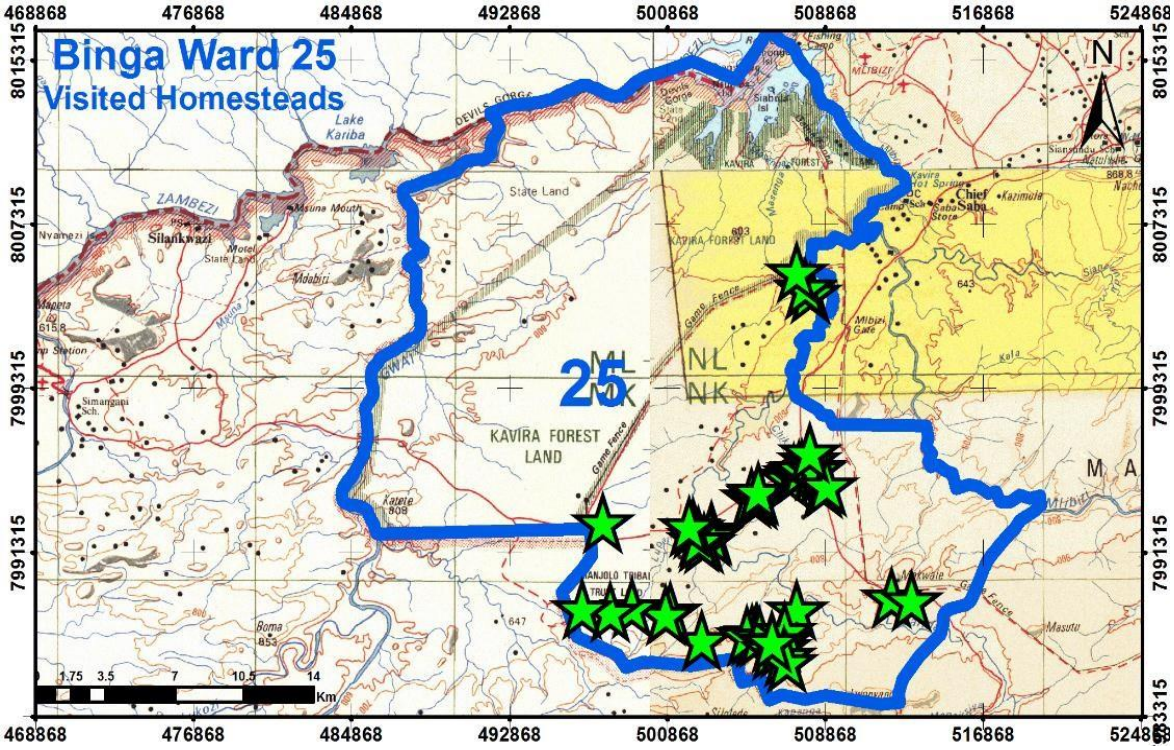
Six (6) villages from Ward 25 participated in the research. The highest number of participants came from Mankunku village and the lowest number of participants come from Sichimwali village. Sichimwali village is the least accessible and is located close to Kavira forest.

Maps of visited Homestead in Binga

The Maps below shows the distribution visited in Binga Ward 19 and 25. The maps reveals the settlement patterns of the villages in Binga Ward 19 and 25. Villages in both Ward 19 and 25 are spread either along major roads or along rivers. Ward 25 is sparsely populated and the distances between villages are long. Half of Ward 25 is Kavira Forest Land. The forest is a game reserve and has landmines. Some villages like Katete falling under Ward 25, appears outside the map of Ward 25. This is indicative of ward boundaries that have expanded over the years.

Settlements in Ward 19 follow similar patterns as those in Ward 25. Villages tend to be located close to roads. Incidentally, boreholes in Ward 19 are located close to major roads. Some points of homesteads visited, lie outside Ward 19 boundaries. This again is indicative of ward boundaries having expanded over the years. The map of Ward 19, shows villages occupying a little over half the ward. Boreholes are the main source of water for villagers in Ward 19 and these boreholes tend to follow the same distribution as that shown by the location of villagers. Settlements tend to grow close to water sources. However, despite boreholes following the same settlement patterns as villages, a significant number of villagers within Ward 19 walk long distances in search of water.

Maps of villages in Binga



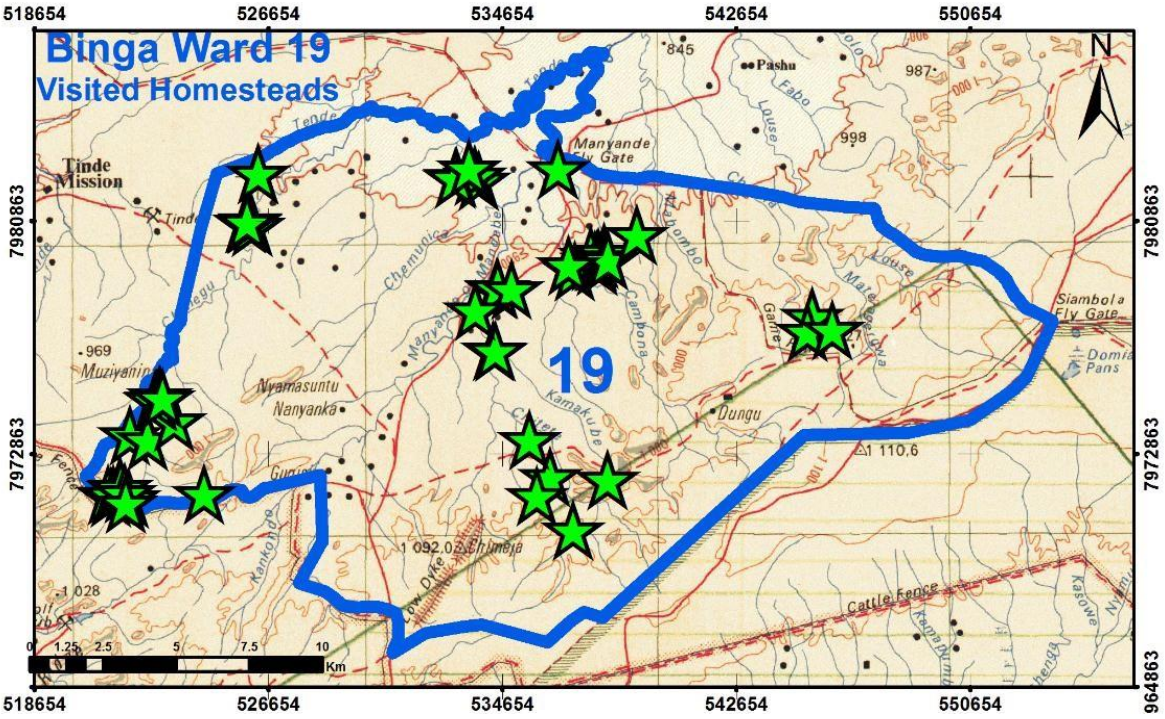


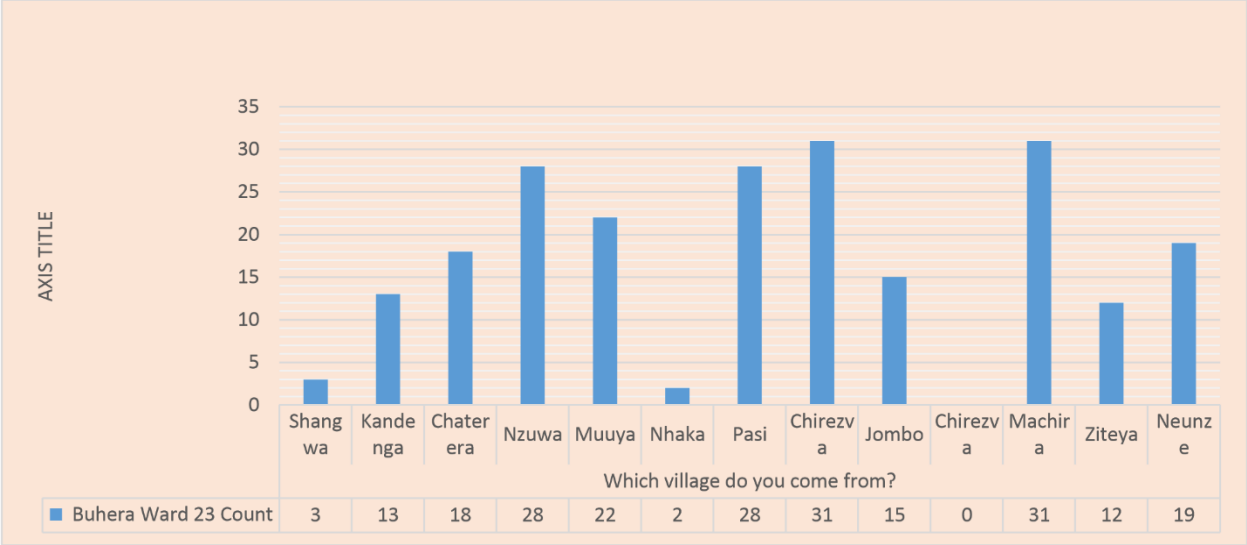
Figure 41: Map showing visited homesteads in Binga – Source Primary data

Breakdown of villages visited in Buhera Ward 20

Figure 5: Breakdown of villages visited in Buhera Ward 20

Ten (10) villages were interviewed in Buhera Ward 20.

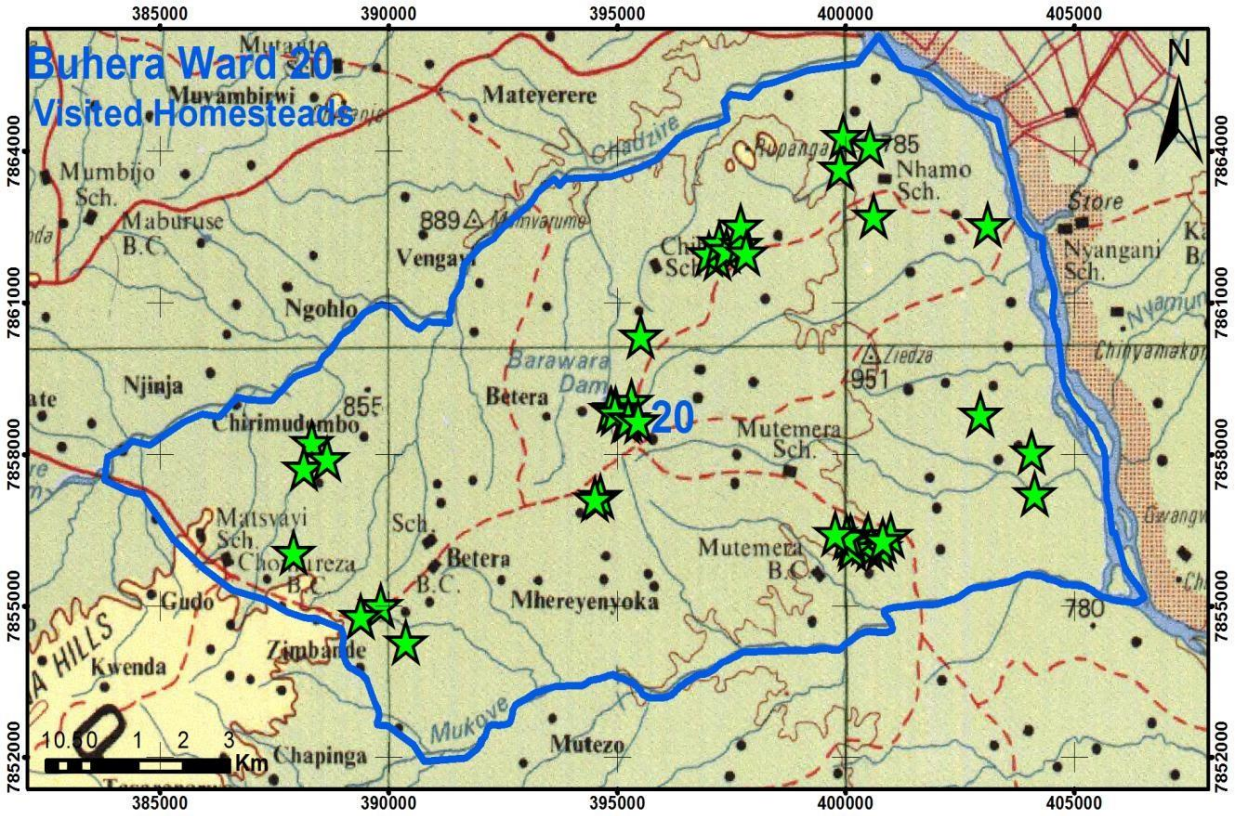
Breakdown of villages visited in Buhera Ward 23



Buhera Ward 23 Count

Figure 6: Breakdown of villages visited in Buhera Ward 23

Maps of Villages visited in Buhera



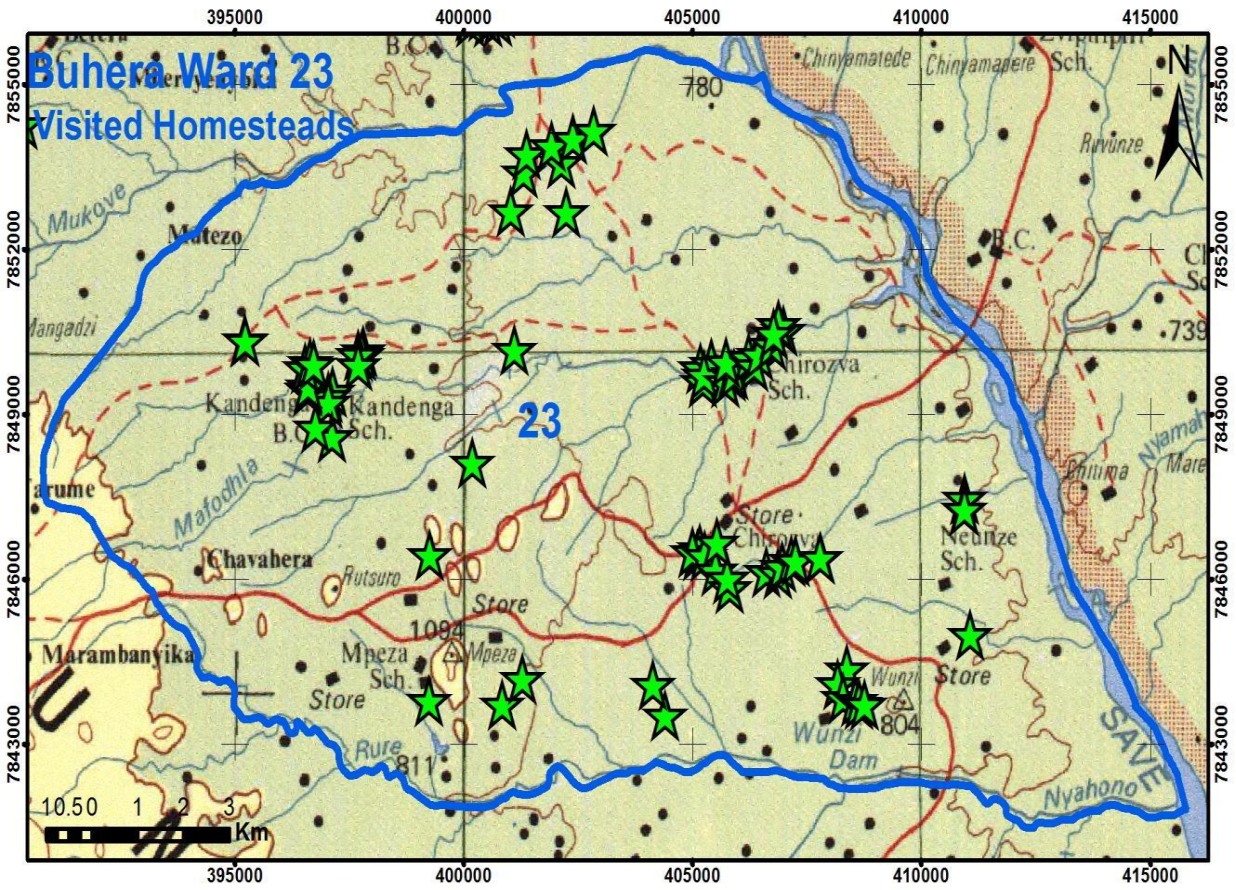


Figure 7: Maps of homesteads/villages visited in Buhera

Figure 7 above shows maps of some of the homesteads visited in Buhera. The spread of villages is evenly distributed, and covers most parts of the ward. Additionally, villages in Buhera are densely populated. Again, points on the map show that ward boundaries for Ward 20 and 23 expanded over the years.

Gender Composition of the research participants

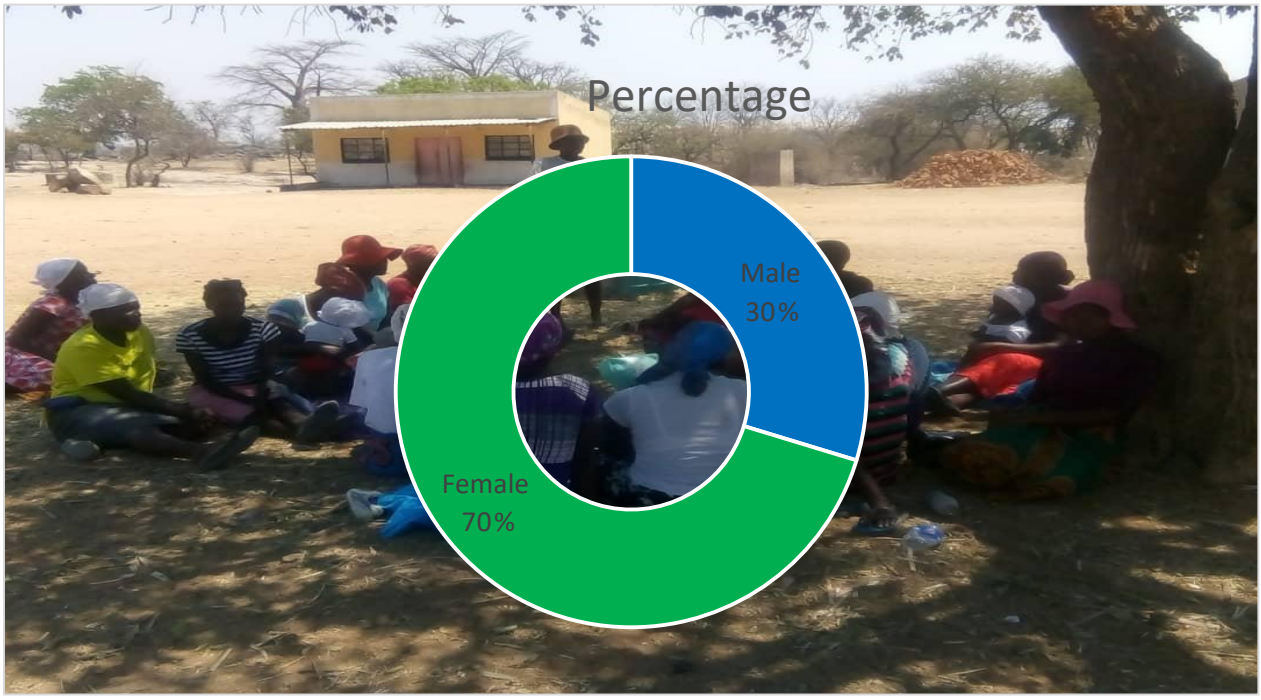


Figure 8: Gender Composition of the research participants

Age distribution of the research participants

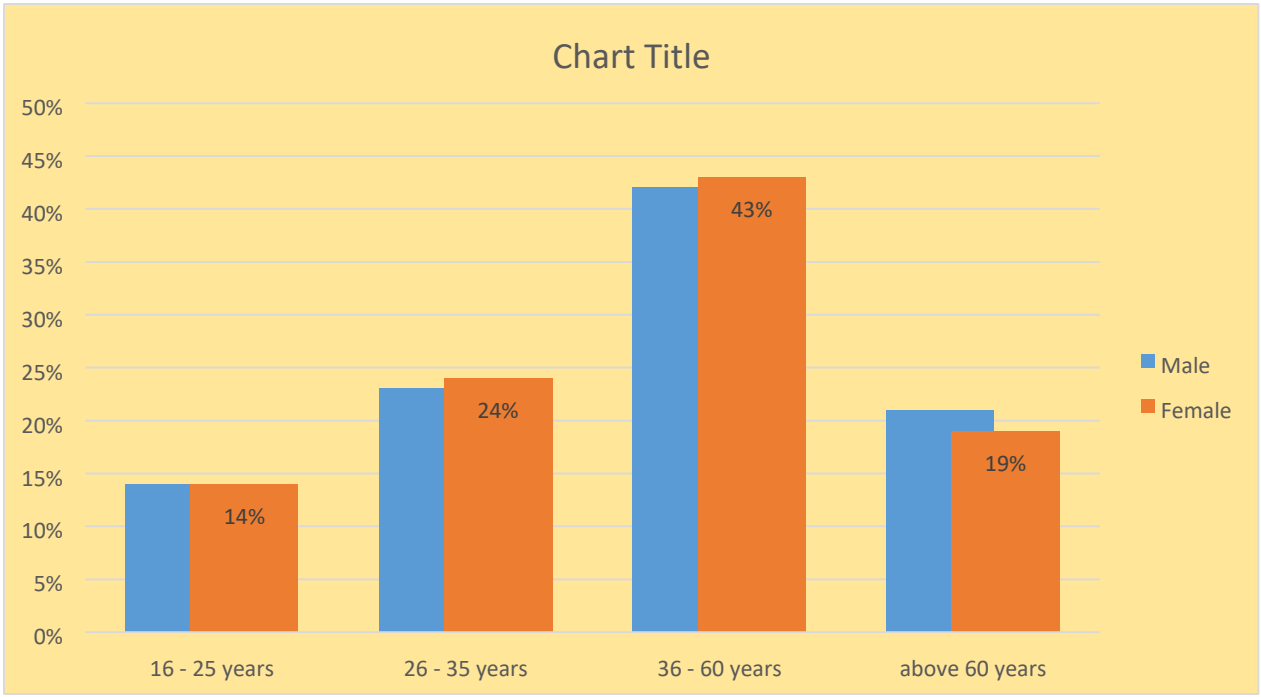
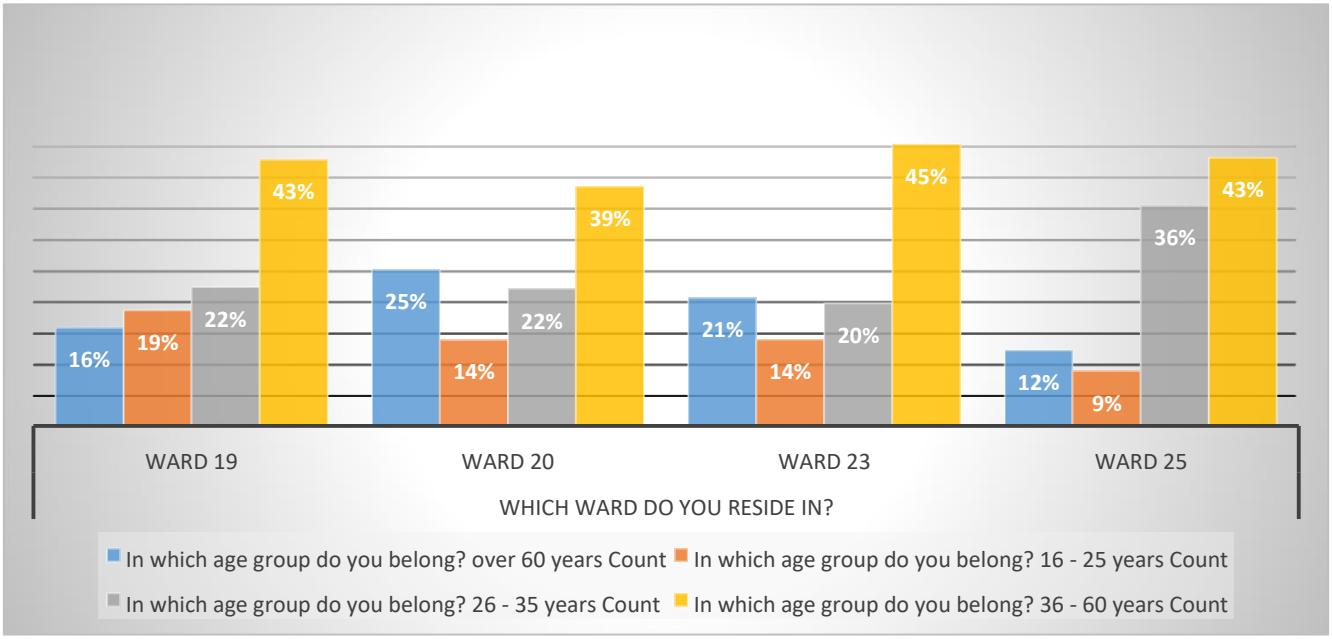


Figure 9: Age distribution of the research participants

The majority of the participants were women in the age group 36 years to 60 years. 70.3% of the research participants were women. Generally, men do not to stay in rural areas due to lack of employment and other livelihood enhancing opportunities. It is important to highlight that lack of employment and other livelihood opportunities in rural areas affect men and women alike. However, culturally, it is the duty of women to stay at home, raise children, and look after the homestead. This cultural bias in the sharing of responsibilities makes women more vulnerable than men to the effects of climate change. Women cannot make the decision to migrate on their own.

Age Distribution by location



Age Distribution by Location

Figure 10: Age Distribution by location

The diagram above shows the age distribution by location. There are no material differences amongst the wards and districts on age distribution. The majority of the participants during the research for all the wards fall into the 36 – 60 years age category, and the 6 – 25 years age group had the least number of participants in all the four wards.

Family Sizes of Homesteads Visited

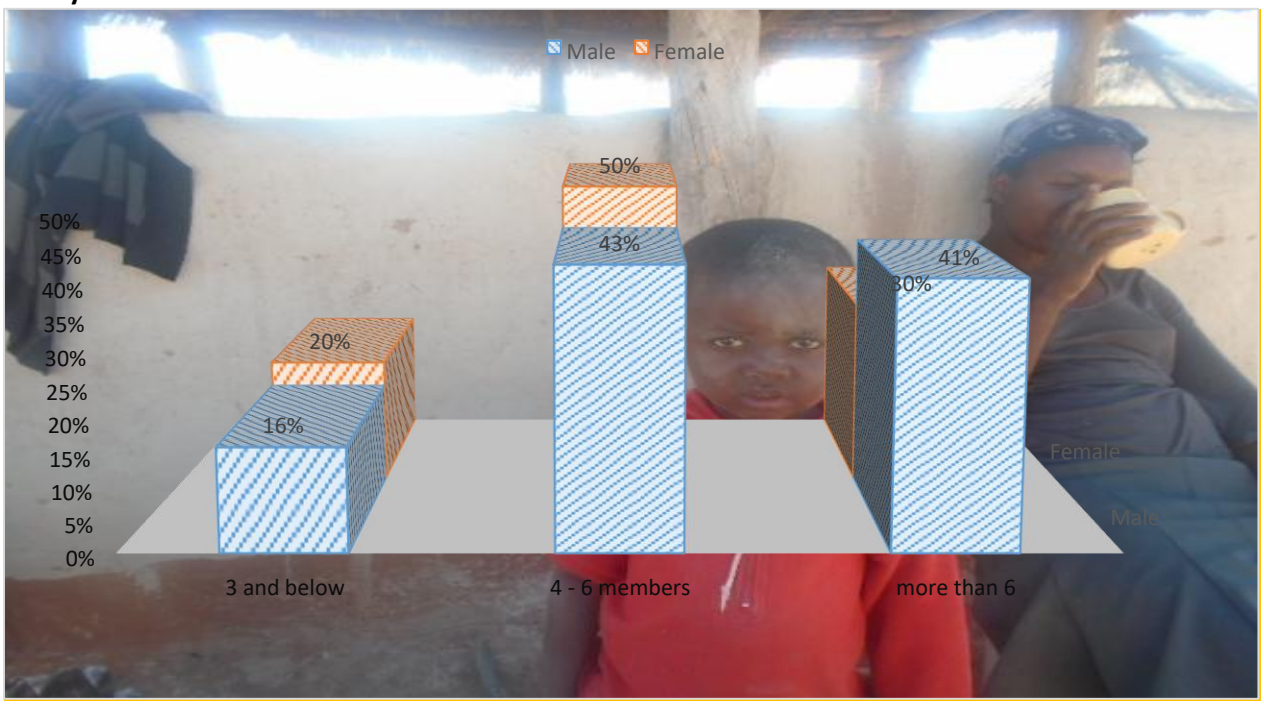


Figure 11: Family Sizes of Homesteads Visited

The diagram above shows the combined statistics of family sizes of homesteads interviewed during the needs assessment. 48.3% of visited homesteads has between four to six family members. 33.4% has more than 6 family members. Traditionally, the average number of children per family was ten or more. Statistics collected indicate family with an average size of five (5) members, which approximately translates to an average of three (3) children per family. Compared with the traditional norms, birth rates in rural areas are falling.

People Living with Disabilities

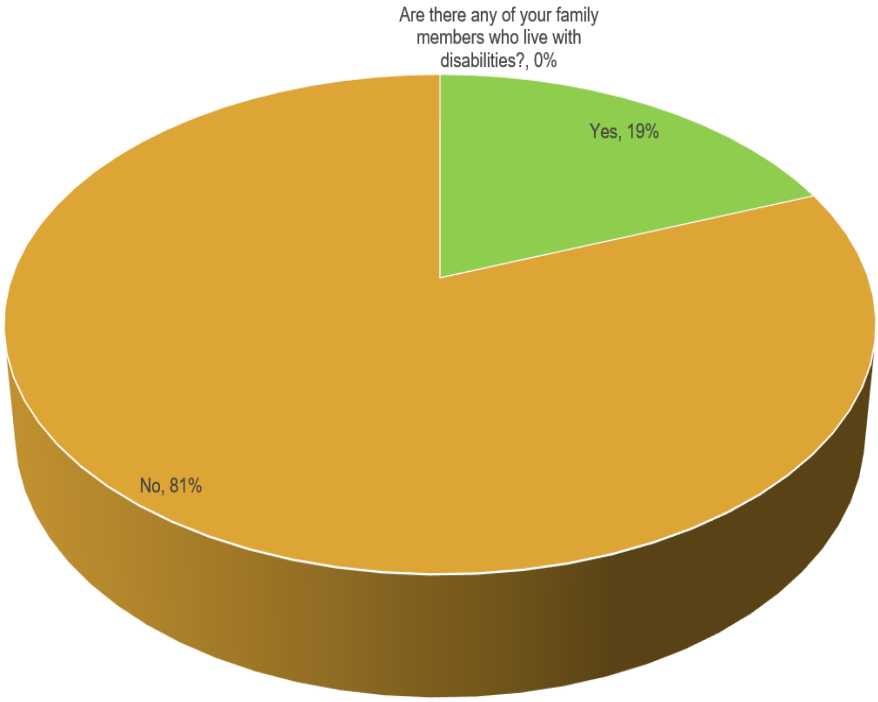


Figure 12: People Living with Disabilities

Figure 12 shows the percentage of households visited that has family members living with one form of disability or another. Nineteen point zero nine percent (19.09%) of the households participating in the research had family members living with some form of disability. The common forms of disability encountered range from mental impairment due to natural causes, dementia, crippled legs, blindness and deafness. Researchers, however, noted that households were uncomfortable discussing the disabilities affecting their family members.

Segregating Disabilities by Location

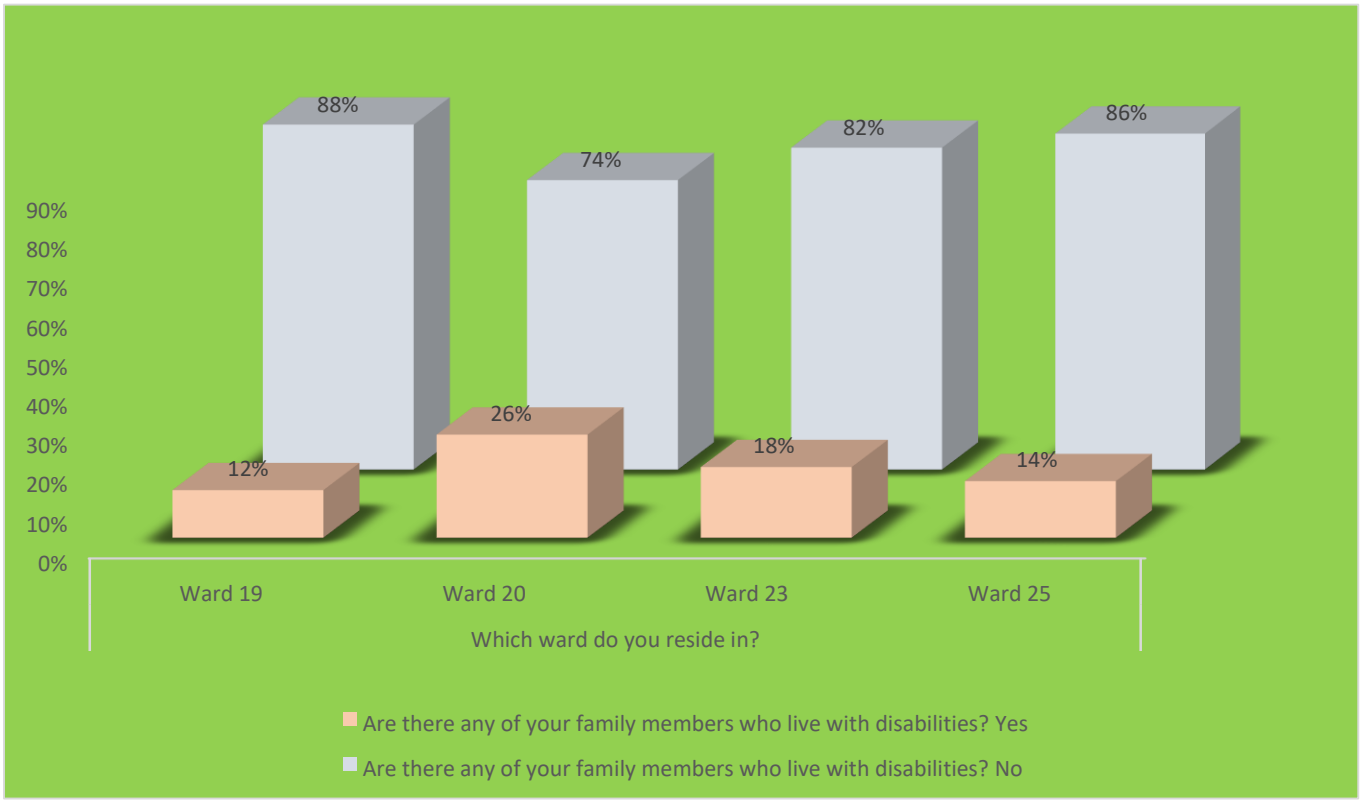
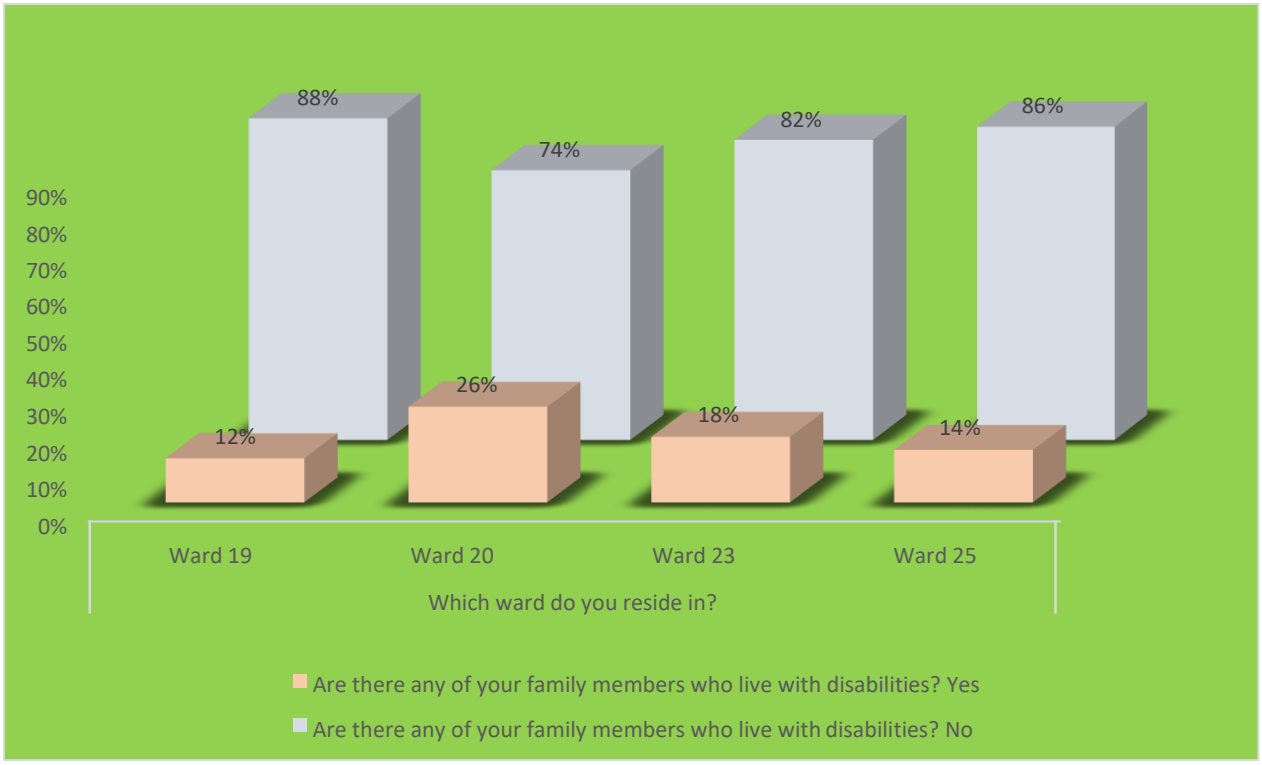


Figure 13: Segregating Disabilities by Location



The Wards with the highest number of households looking after people with disabilities are Buhera Ward 20 (26%) and Buhera Ward 23 (18%).

Marital Status

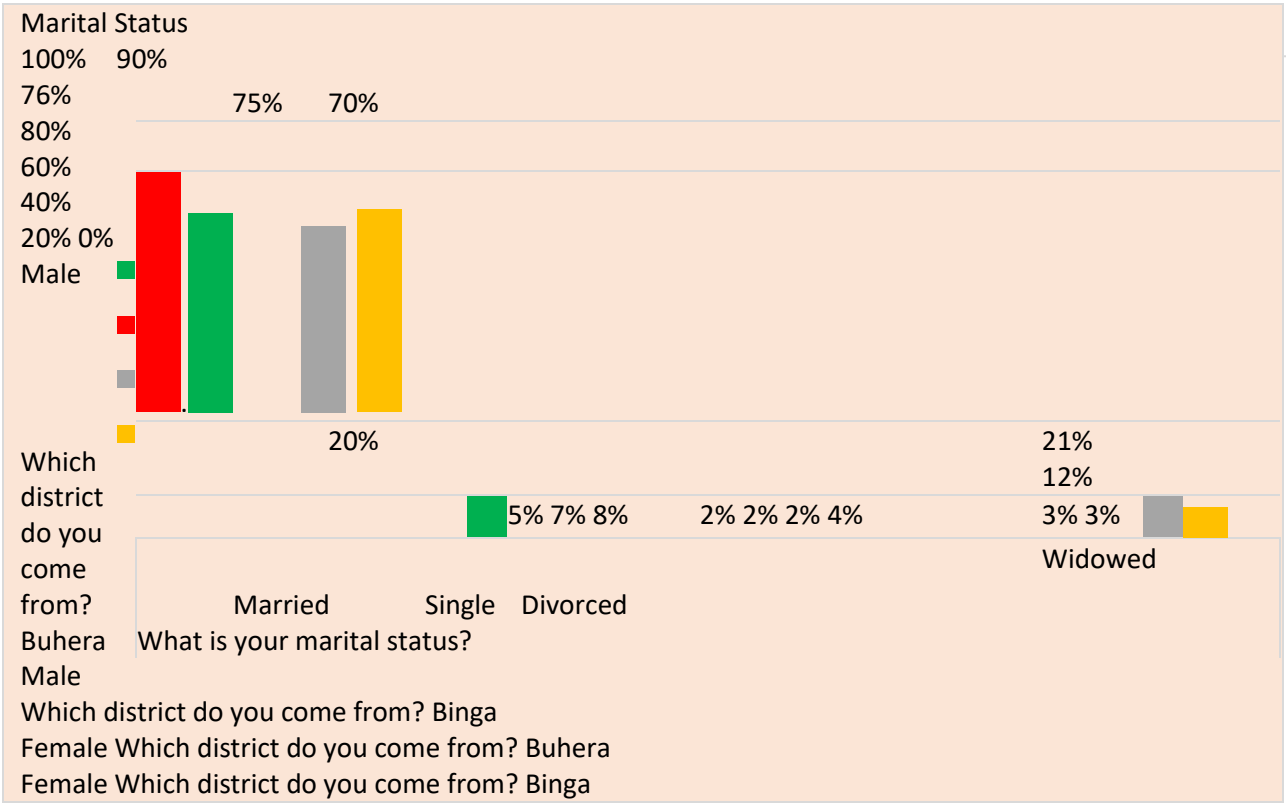


Figure 14: Marital Status

The majority of the participants during the stakeholder consultations were married. 71.39% of participants in Buhera were married compared to 80.2% of participants from Binga. Richer information is obtained if the statistic on marriage is further segregated based on age and location. The purpose of further segregation of data by age is to gain an understanding of the level of vulnerability of rural women. Women who are married at an early stage are the most vulnerable to the effects of climate change, since they generally lack opportunity for self-development.

Widowed Participants Based on villages visited

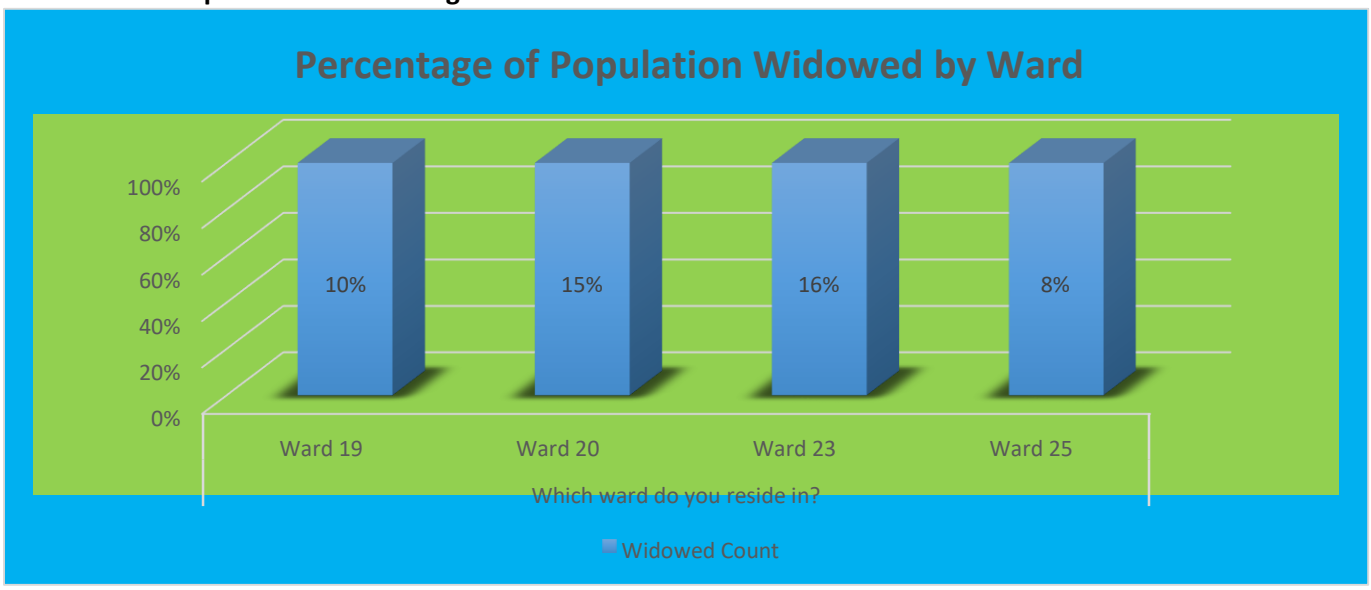


Figure 15: Widowed Participants Based on villages visited

2. Analysis of Data Collected from the Field

Assessment of Water Resources in Binga and Buhera

This section of the report presents an analysis of data collected during the assessment of groundwater resources in Binga and Buhera. The variables covered during the assessment of groundwater and water resources in Binga and Buhera are an analysis of geological maps showing the distribution of boreholes and wells in Binga and Buhera; main sources of water; quality of water from these sources; and the potential for groundwater extraction in both districts.

Main Sources of Water

Breakdown of the Main Sources of Water by Ward

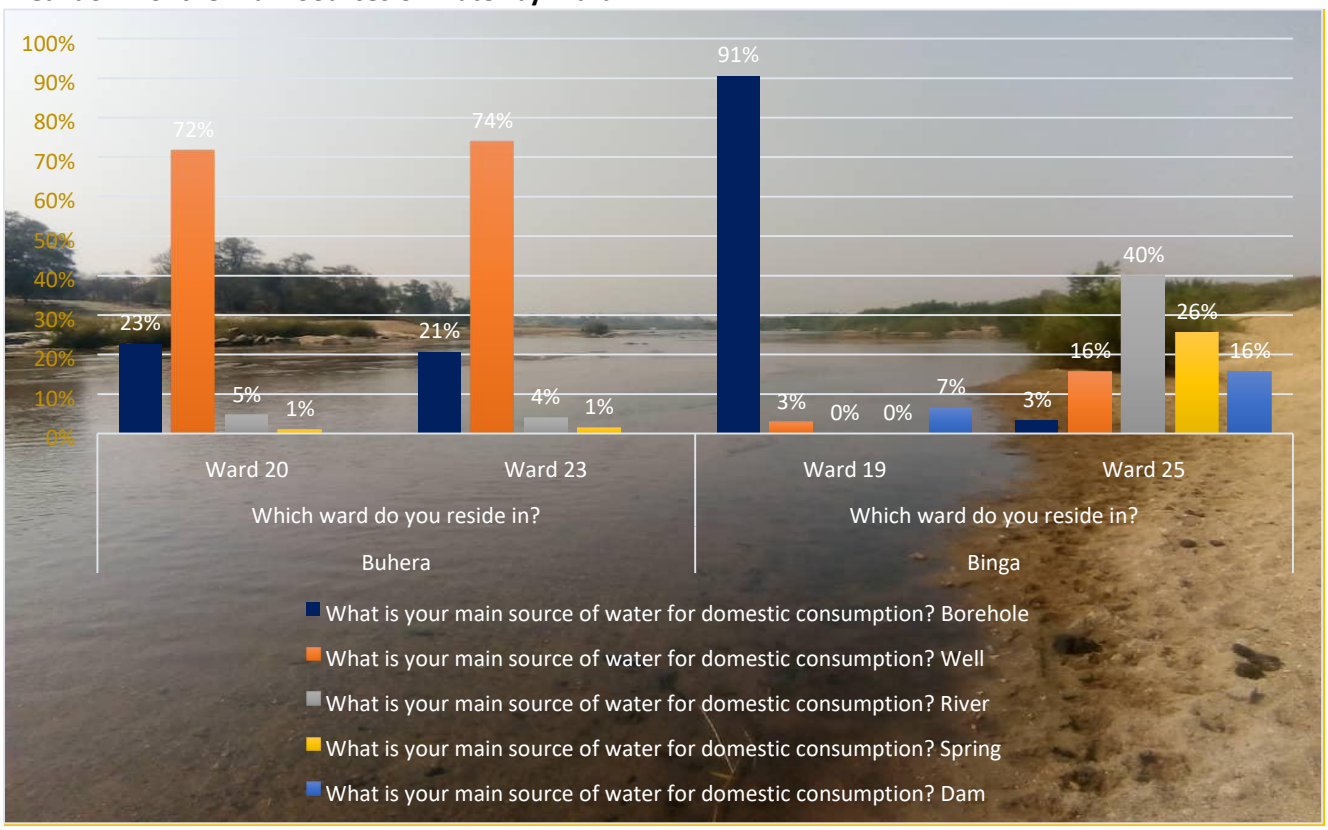


Figure 16: Breakdown of the Main Sources of Water by Ward

Overall Rankings of Main Sources of Water by District

The rankings of the main sources of water for Binga and Buhera are as follows:

	District	
Rank	**Buhera**	**Binga**
1	Wells (72.84%)	Borehole (50.76%)
2	Borehole (21.63%)	Rivers (18.27%)
3	Rivers (4.33%)	Springs (11.68%)
4	Springs (1.20%)	Dams (10.66%)
5	Dam (0%)	Wells (8.63%)

Table 1: Table ranking sources of water for Binga and Buhera

The main source of water for villagers in Buhera are wells whilst the main source of water for villagers in Binga are boreholes. Wells and boreholes combined cater for the water needs of 94.47% of Buhera villagers interviewed during the field visits. Boreholes and wells in Binga on the other hand cater for the water needs of 59.39% of the villagers consulted during the research. Less than 5% of villagers in Buhera rely on rivers, springs and dams for water for domestic consumption.

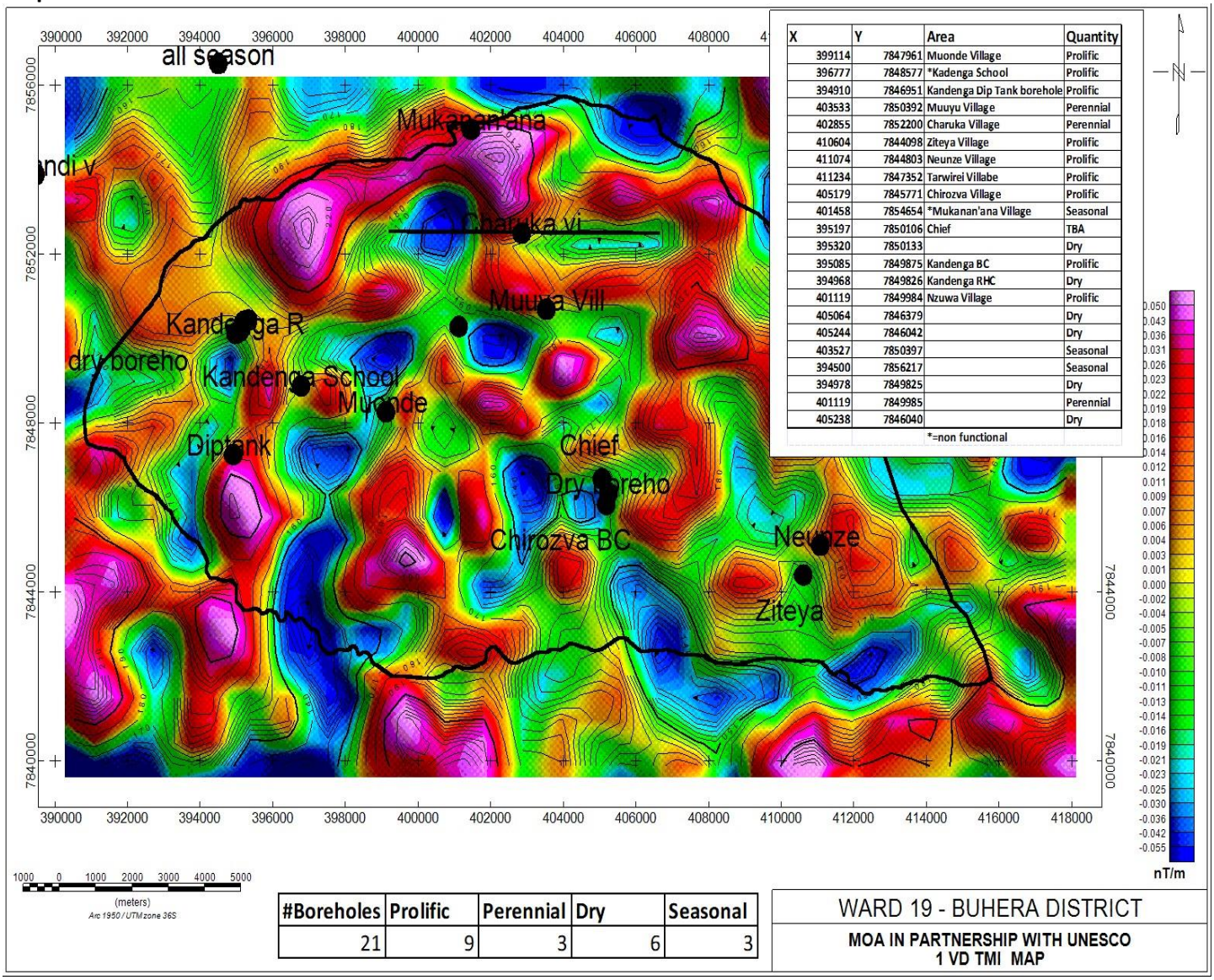
Rankings of Main sources of Water by Ward

		Buhera		**Binga**	
		Which ward do you reside in?		**Which ward do you reside in?**	
		Ward 20	**Ward 23**	**Ward 19**	**Ward 25**
Rank	1	Well	Well	Borehole	River
	2	Borehole	Borehole	Dam	Spring
	3	River	River	Well	Dam
	4	Spring	Spring	River	Well
	5	Dam	Dam	Spring	Borehole

Table 2: Rankings of Main sources of Water by Ward

Maps and History of Boreholes and Wells Visited in Binga and Buhera

Maps of Boreholes visited in Buhera - Ward 23



X	Y	Area	Quantity
399114	7847961	Muonde Village	Prolific
396777	7848577	*Kadenga School	Prolific
394910	7846951	Kandenga Dip Tank borehole	Prolific
403533	7850392	Muuyu Village	Perennial
402855	7852200	Charuka Village	Perennial
410604	7844098	Ziteya Village	Prolific
411074	7844803	Neunze Village	Prolific
411234	7847352	Tarwirei Villabe	Prolific
405179	7845771	Chirozva Village	Prolific
401458	7854654	*Mukanan'ana Village	Seasonal
395197	7850106	Chief	TBA
395320	7850133		Dry
395085	7849875	Kandenga BC	Prolific
394968	7849826	Kandenga RHC	Dry
401119	7849984	Nzuwa Village	Prolific
405064	7846379		Dry
405244	7846042		Dry
403527	7850397		Seasonal
394500	7856217		Seasonal
394978	7849825		Dry
401119	7849985		Perennial
405238	7846040		Dry

*=non functional

Figure 17: Aeromagnetic Map of Buhera Ward 19 overlain by visited boreholes

Figure 17 above is a map showing the distribution of boreholes and wells visited in Buhera. The aeromagnetic map shows a north south low magnetic features that are generally the host of underground water. Most boreholes lie within structures and low magnetic horizons.

The main source of water for villagers in Buhera Ward 20 and 23 is wells. The Maps show that wells and boreholes in both wards are evenly distributed. In fact, most the households interviewed had access to a personal well or a neighbour's well. In most of cases villagers lived less than one hour away from the nearest well. Ward 23 had more wells compared to Ward 20.

Maps of Boreholes Visited in Buhera – Ward 20

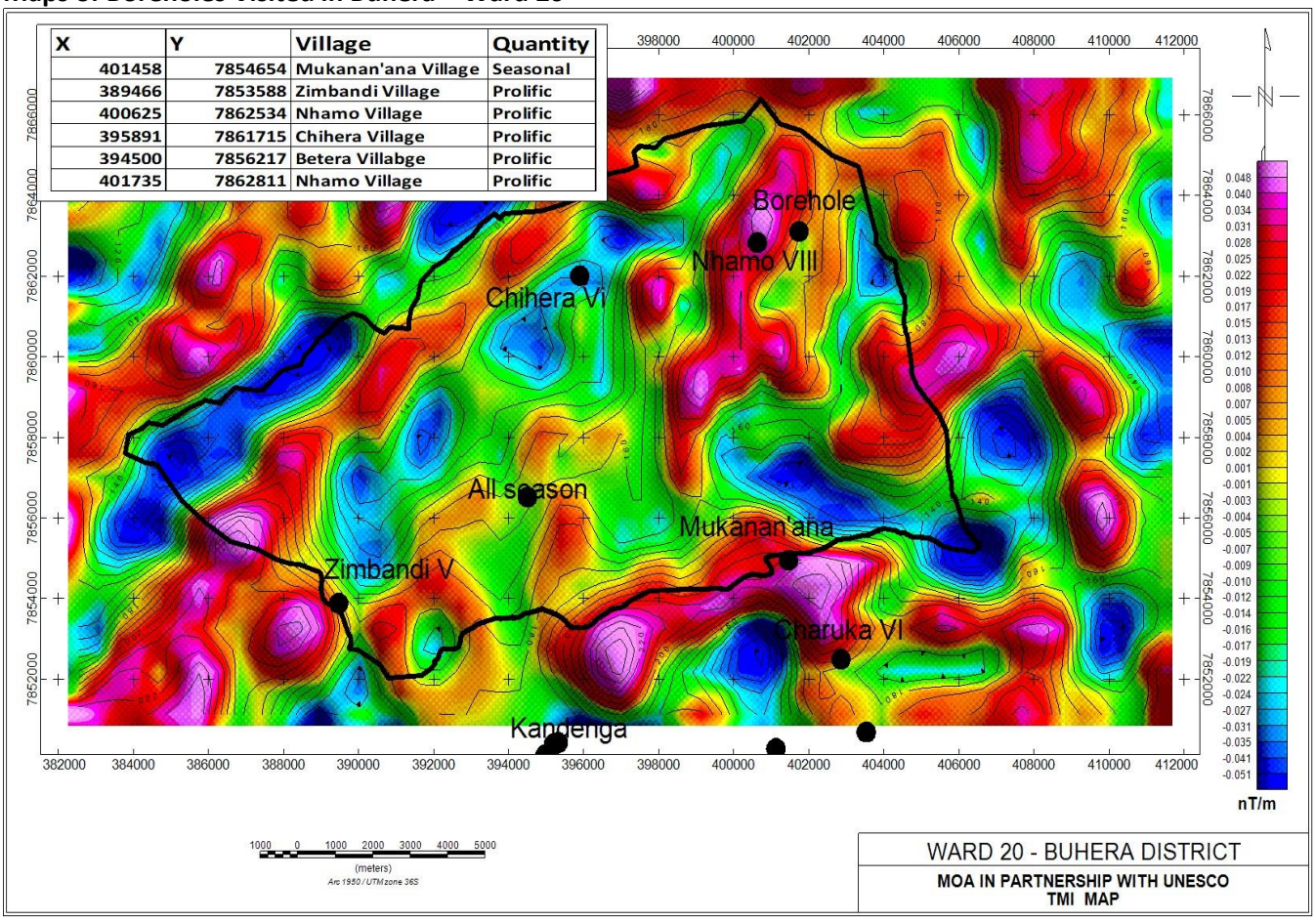
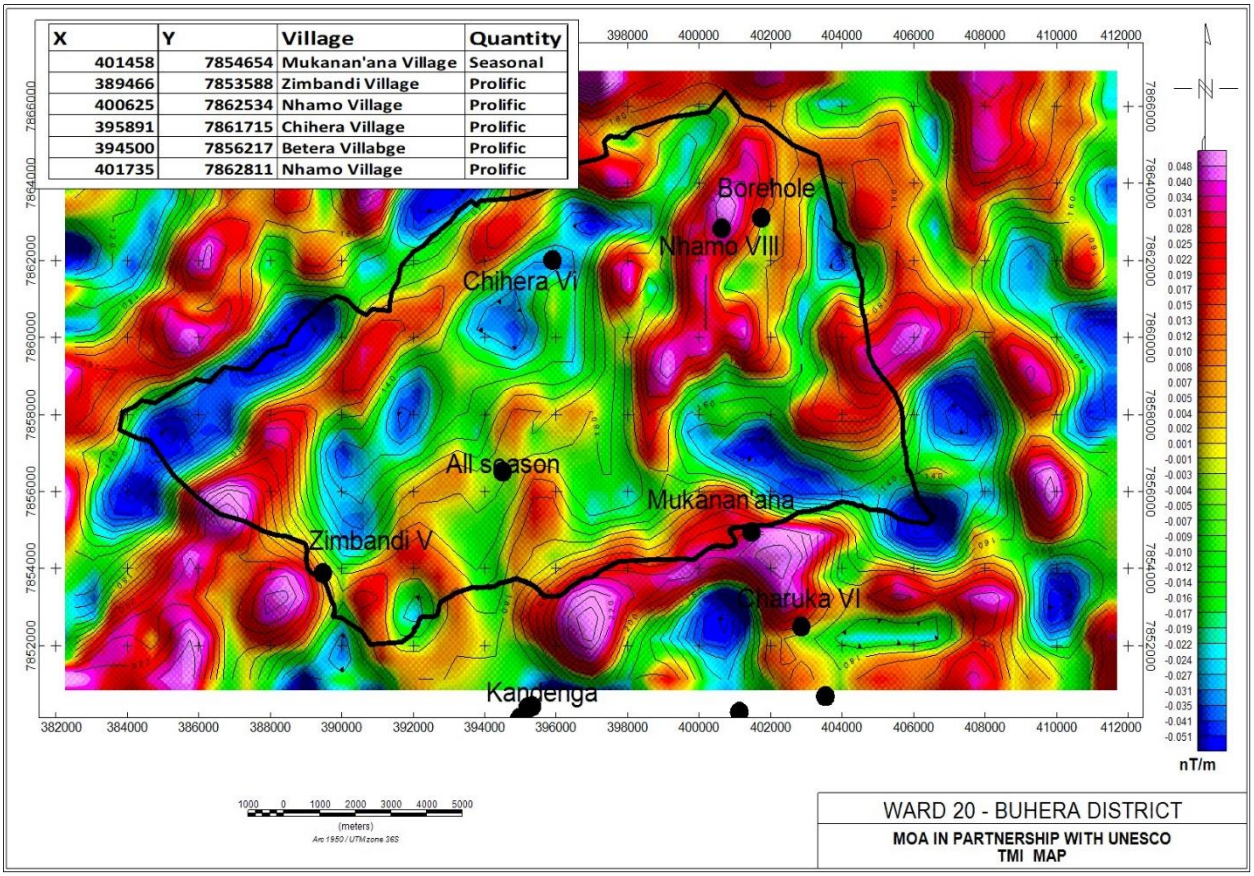


Figure 18: Aeromagnetic Map of Buhera Ward 20 overlain by visited boreholes

Figure 18 above shows north-east south-west trending magnetic anomalies. Chihera Village borehole lies on a magnetic anomaly while Nhamo Village borehole is on a north south magnetic feature



The definition of a wet borehole is one that villagers report not to dry up during the year. Seasonal boreholes run dry during certain times of the year. Two of the boreholes visited were dry i.e. they used to produce water in the past but are no longer yielding any water.

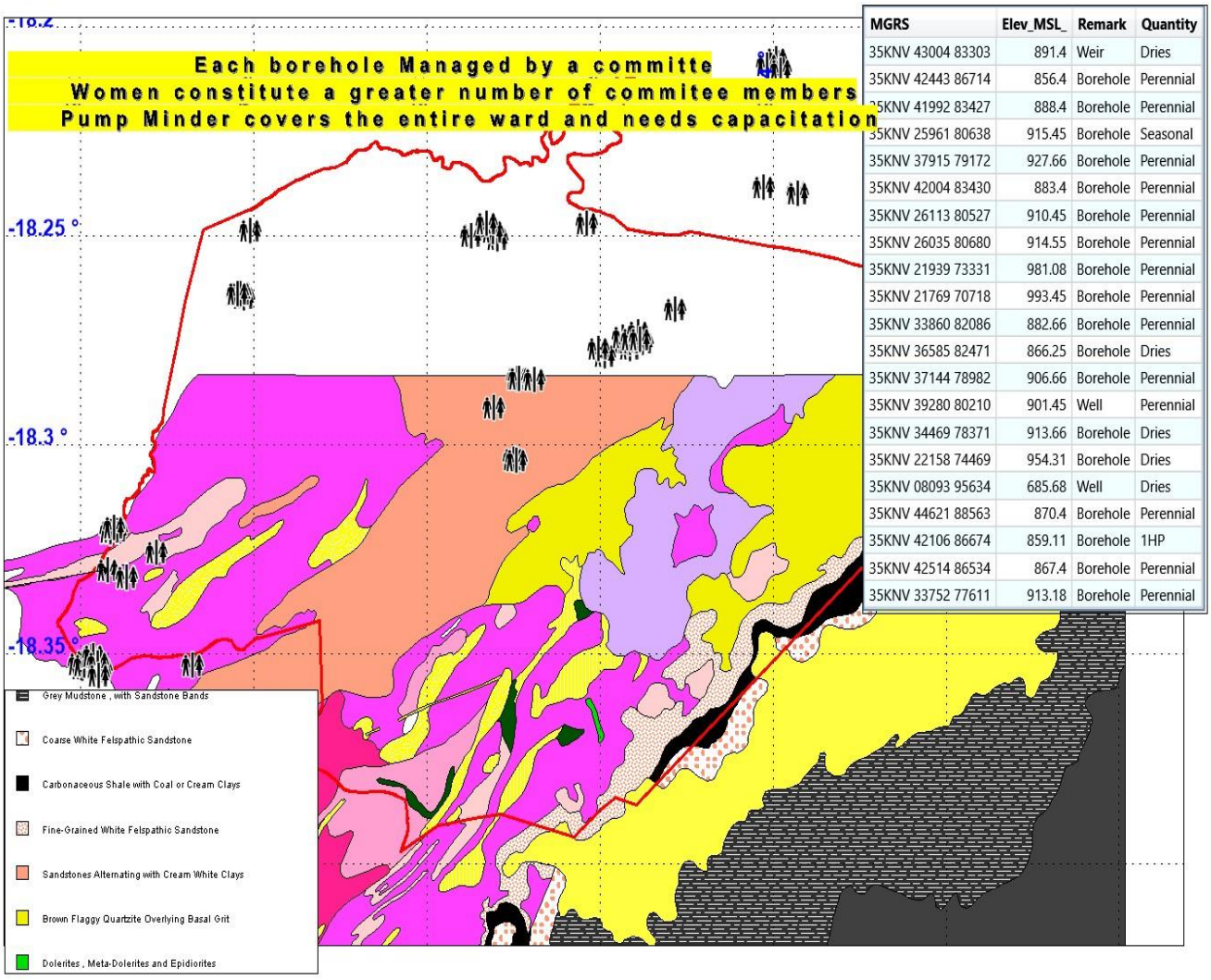
Additional information on boreholes visited in Buhera

Location	Type	Elevation above sea level	Details and history
Kandenha Primary School	Well	832.73m above sea level	Well produces water
Muonde Village - Zibute	Borehole	848 meters above sea level	Borehole supplies more than 80 families with water
Kandenga Secondary School	Borehole	833.25 meters above sea level	The borehole is prolific, and the engine works well. However, the water tank is dead and the school does not have water.
Kandenga Village	Dip borehole Kandenga	856.71meters above sea level	Dip borehole. Villagers did not have the history of the borehole

Muuya Village	Borehole	755.39 meters above sea level	The borehole is perennial
Charuka Village	Borehole	750.91 meters above sea level	The borehole is perennial
Ziteya Village	Borehole	716.14 meters above sea level	Wet and prolific borehole. During drought periods, or times of the year when wells in the area run dry, the boreholes serves a radius of fourteen (14) km. The borehole is currently broken down and awaits repairs
Location	Type	Elevation above sea level	Details and history
Neunze Village	Borehole	699.76 meters above sea level	Wet and prolific borehole. However, there is no arable land close to the borehole. It is the only borehole in the village and it is located right at the edge of the village. Therefore, most villagers in Neunze village do not have access to this borehole and rely on wells and Save river for water.
Tarwirei Village	Borehole.	719.34 meters above sea level	Wet and prolific borehole. It is the only borehole in the village and it is 48 meters deep
Chirozva Borehole	Borehole	776.14 meters above sea level	Wet borehole that supplies Chirozva clinic and dip tank.
Mukananána village	Borehole	728.22 meters above sea level	Wet borehole, but is non-functional. The hand pump of the borehole died one (1) year ago
Zimbandi Village	Well	755.33 meters above sea level	Well is 15 meters deep and yields a maximum of 400 litres/ 2 drums of water per day
Zimbandi Village	Well	763.23 above sea level	Prolific well. Well is 13 meters deep
Zimbandi Village	Borehole	881.62 meters above sea level	Prolific borehole
Nhamo village	Borehole	793.59 meters above sea level	No information was obtained for this borehole
Chihera Village	Borehole	803.41 meters above sea level	Borehole is 102 meters deep. No additional information was obtained for this borehole

Table 5: History of boreholes visited in Buhera

Maps of Boreholes visited in Binga – Ward 19



MGRS	Elev_MSL_	Remark	Quantity
35KNV 43004 83303	891.4	Weir	Dries
35KNV 42443 86714	856.4	Borehole	Perennial
35KNV 41992 83427	888.4	Borehole	Perennial
35KNV 25961 80638	915.45	Borehole	Seasonal
35KNV 37915 79172	927.66	Borehole	Perennial
35KNV 42004 83430	883.4	Borehole	Perennial
35KNV 26113 80527	910.45	Borehole	Perennial
35KNV 26035 80680	914.55	Borehole	Perennial
35KNV 21939 73331	981.08	Borehole	Perennial
35KNV 21769 70718	993.45	Borehole	Perennial
35KNV 33860 82086	882.66	Borehole	Perennial
35KNV 36585 82471	866.25	Borehole	Dries
35KNV 37144 78982	906.66	Borehole	Perennial
35KNV 39280 80210	901.45	Well	Perennial
35KNV 34469 78371	913.66	Borehole	Dries
35KNV 22158 74469	954.31	Borehole	Dries
35KNV 08093 95634	685.68	Well	Dries
35KNV 44621 88563	870.4	Borehole	Perennial
35KNV 42106 86674	859.11	Borehole	1HP
35KNV 42514 86534	867.4	Borehole	Perennial
35KNV 33752 77611	913.18	Borehole	Perennial

Figure 19: Geology Map of Binga Ward 19 overlain by visited boreholes The map above shows that distribution of boreholes and wells in Binga Ward 19. The boreholes are hosted within the sandstones and quartz schists. The granites are poor aquifers and host few boreholes that dry up during the winter season. An interesting feature of boreholes assessed during

Map of Boreholes visited in Binga – Ward 25

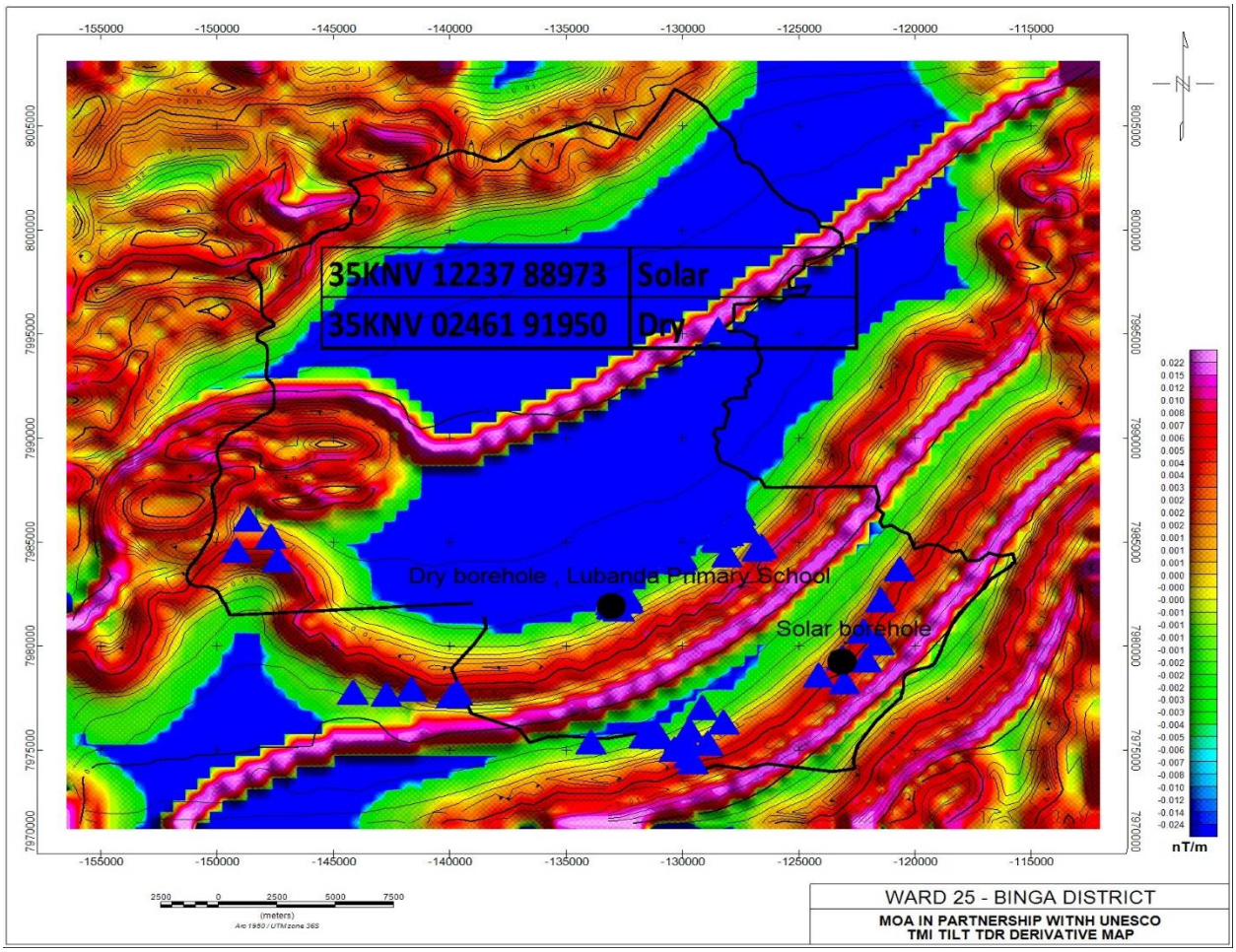


Figure 20: Aeromagnetic Map of Binga Ward 25 overlain by visited boreholes and homesteads

Binga ward 25 has not been mapped under the Zimbabwe Geological Survey Bulletin series. The area is generally overlain by Aeolian Sands within a basin. Regional aeromagnetic maps, Figure 20 shows a layered sequence of siltstones, sandstones, mudstones and brits. The underground water is hosted within the sandstones as evidenced in Ward 19.

Additional information on the boreholes assessed in Binga

Location	Type	Notes	Elevation(MSL)
Manyanda Village	Borehole	The borehole is more than 80m deep and does not run out of water throughout the year	856.4 meters above sea level
Pashu Village	Borehole	This borehole produces water throughout the year.	888.4 meters above sea level
Manyanda Village	Borehole	The borehole is 60 meters deep and serves three hundred and twenty households. The borehole also waters five hundred and twenty cattle.	927.66 meters above sea level
Location	Type	Notes	Elevation(MSL)

Chief Pashu Homestead	Borehole	This borehole is located at the chief's homestead. It is 50 meters deep and serves three villagers in Ward 19.	883.4 meters above sea level
Chinengo Village	Borehole	The borehole provides drinking and irrigates a community garden located next to it. The borehole also provided water to Chinego primary school and shops located a few hundred meters from the borehole.	910.45 meters above sea level
Chinengo Clinic	Borehole	Borehole serves the clinic and produces water throughout the year.	914.55 meters above sea level
Ward 19	Borehole	This a community borehole, that was drilled in 1964, and produces water throughout the year	981.08 meters above sea level
Ward 19	Borehole	Another community borehole in Ward 19 that produces water throughout the year.	993.45 meters above sea level
Lobengula Cave	Borehole	Lobengula borehole	913.66 meters above sea level
Ward 19	Borehole	It is the oldest borehole in Ward 19. The borehole is more than 80m deep	870.4 meters above sea level
Ward 19 Orphanage	Borehole	This borehole serves the orphanage. It is 75 meters deep and is electrified.	859.11 meters above sea level
Ward 25	Borehole	This is a solar powered wet borehole. The borehole is under construction. Upon its commissioning, the borehole will provide piped water to the	950.94 meters above sea level
		villagers and support a vegetable irrigation scheme.	

Table 1: History of wet boreholes in Binga

Location	Type	Notes	Elevation(MSL)
Lubanda Primary School – Ward 25	Borehole	The borehole is dry	634.94 meters above sea level

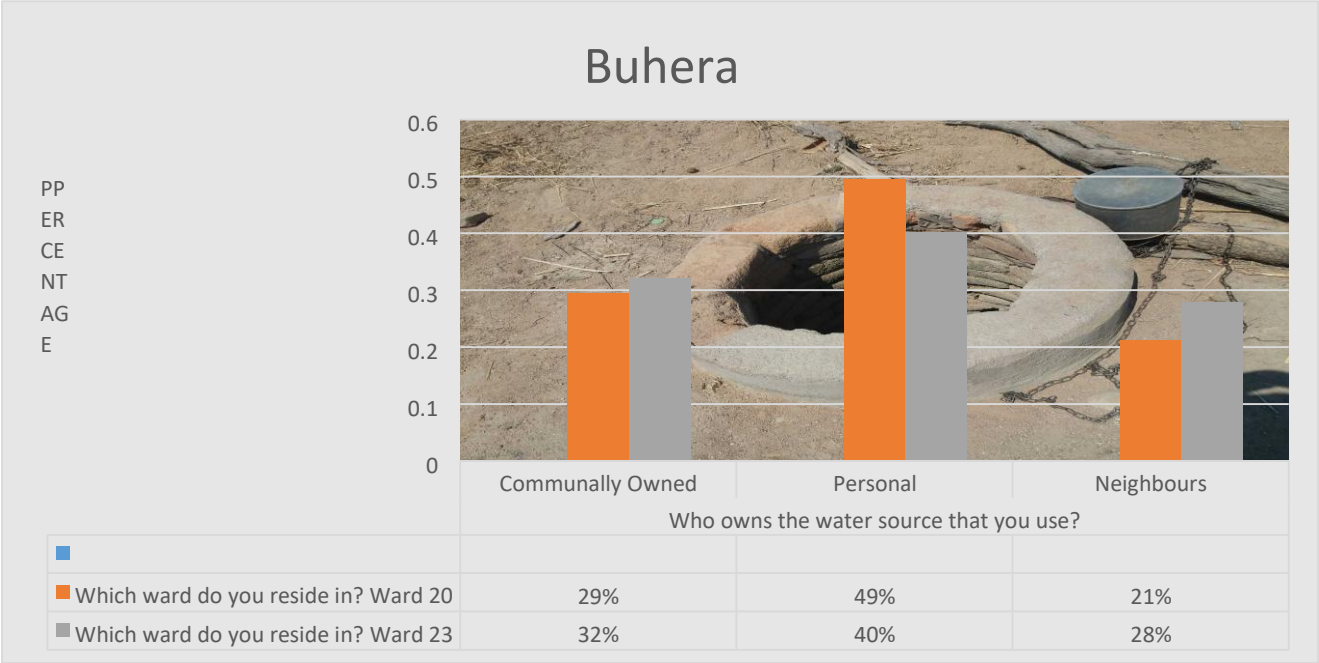
Table 2: History of dry borehole in Binga

Location	Type	Notes	Elevation
Malaliya Village	Borehole	This borehole serves villagers in Malaliya and is seasonal	915.45 meters above sea level
Malaliya	Borehole	A community community borehole which is seasonal	882.66 meters above sea level
Malaliya Village	Borehole	Malaliya Dam borehole. It is 54m deep and was drilled in 2011. The borehole has never dried but it is now yielding few litres	954.31 meters above sea level

Table 3: History of seasonal boreholes

Figure 21: A picture of villagers fetching water at a borehole in ward 19 Binga

Type of Ownership of Water Source



Which ward do you reside in? Ward 20	29%	49%	21%
Which ward do you reside in? Ward 23	32%	40%	28%

Figure 22: Type of Ownership of Water Source

Buhera

The main water source for villagers in Buhera are wells. 49% of villagers in Ward 20 use a personal water source, 30% use a communally owned water source and 21% access water from water sources owned by their neighbours. 40% of villagers in ward 23 use personal water sources, 33% use communally owned water sources and 27% access water from water sources owned by neighbours.

The villagers in Buhera indicated that they do not have boreholes specifically meant for their communities except for those located close to shopping/business centres and schools. Some villages do not have boreholes, or only have one borehole to cater for all the watering needs for the community. Vengesa village has only one borehole that is supposed to serve one hundred and eighty five (185) households. Makanyisa village again has only one borehole that is supposed to serve one hundred and eight (108) households.

Type of Water Ownership Binga

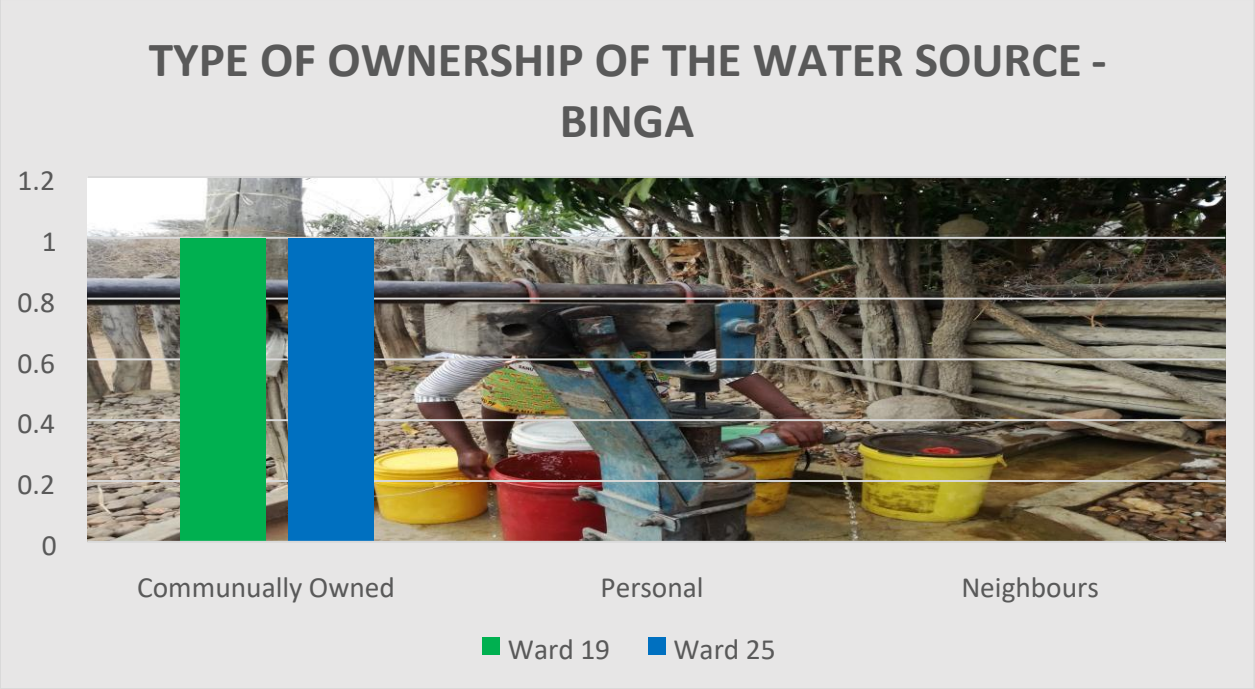


Figure 23: Type of Water Ownership Binga

Binga
The main sources of water for villagers in Ward 19 are boreholes, followed by dams and then wells. All these water sources are owned communally. The main water sources for villagers in Ward 25 are Rivers, followed by springs, followed by Dams, wells and then boreholes. Again, all the water sources in Ward 25 are communally owned. It is also interesting to note that Ward 25 has more wells than Ward 19. However, these wells dry up during the year.

Quality of Water

Binga
The water quality of boreholes located in Binga Ward 19 is of acceptable quality. Underground water found in Binga Ward 25 is generally salty. The quality of surface water drawn for open sources like rivers, dams, and springs varies. Generally, the quality of water drawn from dams found in both Ward 19 and 25 is very poor. The main pollutant of dam water is algae, and villagers often refer to dam water as green water. Additionally, competition for water between villagers, their livestock and wild animals also significantly affect the quality of dam water in both wards.

Figure 24: A picture of water drawn from one of the dams in Binga

Figure 25 *(below)* is a picture of the typical quality of water drawn dams found in Binga Ward 19 and 25. In the event of a borehole or well drying up or not easily accessible, villagers resort to using this water for consumption and other domestic uses. NGOs like Save the Children provide villagers with water purification tablets. A picture below shows the effect of the water purification tablets on water.

Figure 25: A picture showing the effect of water purification tablets on water drawn from a dam

Figure 25 is a picture showing the effect of water purification tablets on water drawn from a dam close to Malaliya village in Ward 19 Binga. Villagers living in this part of the village do not have access to a borehole and use dam water for all household purposes including drinking.

Buhera

Generally, the boreholes found in Buhera produce water whose quality is acceptable. Villagers revealed that some boreholes produce salty water that is not very suitable for human consumption. A case in point is the borehole located at Mupeza School in Ward 23. The borehole produces salty water, which the villagers indicated that it at times causes runny stomach.

3. Differentiated Impacts of Climate Change on Men and Women

Questionnaires, focus group meetings, mixed group meetings and consultations with stakeholders provided data on the differentiated impacts of climate change on men and women. The impacts climate change is having on men and women in Buhera is summarised in the table below:

Impact	**Binga**		**Buhera**	
	Ward 19	**Ward 25**	**Ward 20**	**Ward 23**
Loss of livestock	×	×	×	×

Loss of livelihoods	×	×	×	×
Drying of water sources	×	×	×	×
Water conflicts	×	×	×	×
Women forced to walk long distances in search of water	×	×		
Girls missing school looking for water	×	×		
Food insecurity	×	×	×	×
Men forced to migrate in search of employment	×	×	×	×
Men forced to travel long distances in search of pastures and water for livestock	×	×	×	×
Increasing levels of poverty	×	×	×	
Forced migration	×	×	×	
Vulnerability to hygiene related diseases	×	×	×	
Schools teachers migrating from the area due to water shortages	×	×		

Table 3: Impacts climate change is having on men and women in Buhera

Time Spent looking for Water

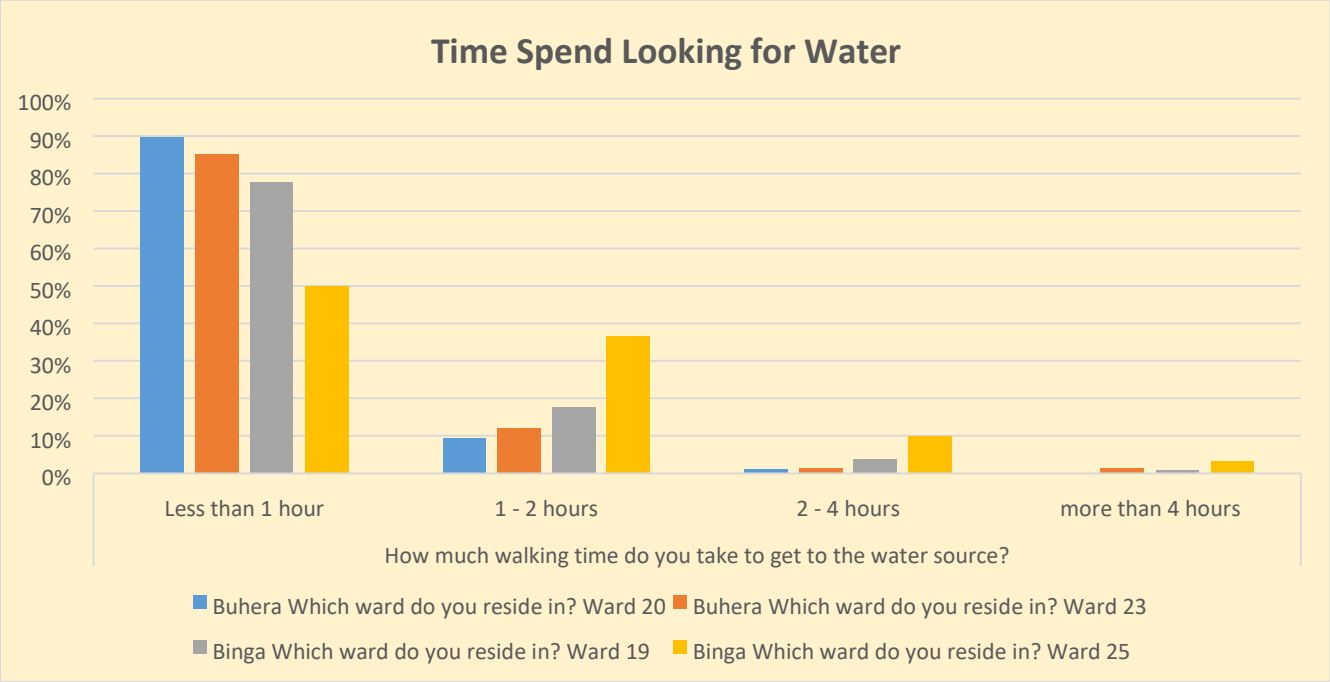


Figure 26: Time Spent looking for Water

The diagram above and table below shows the amount of time that villagers in Binga and Buhera spend going to look for their water sources. Villagers in Binga spend the highest amount of time looking for water compared to their colleagues in Buhera. The percentage of villagers in Buhera Ward 20 and 23 who spend less than an hour going to the water source is 90% and 85% respectively. Comparing this to the 78% and 50% of villagers in Binga Ward 19 and 25 who have access to a water source that is less than one hour's walk from their homesteads.

Villagers in Binga Ward 25 have the least access to water sources that are closer to their homesteads. 37% of villagers from this ward spend between one (1) and two (2) hours looking for water, 10% spend between two (2) to four (4) hours searching for water, and three (3) percentage of the villagers spend more than four (4) hours searching for water. The main source of water for these villagers is rivers, and springs. Villagers from this ward revealed that they walk as far as ten (10km) kilometres in search of water during the dry seasons of the year.

Responsibility of looking for water

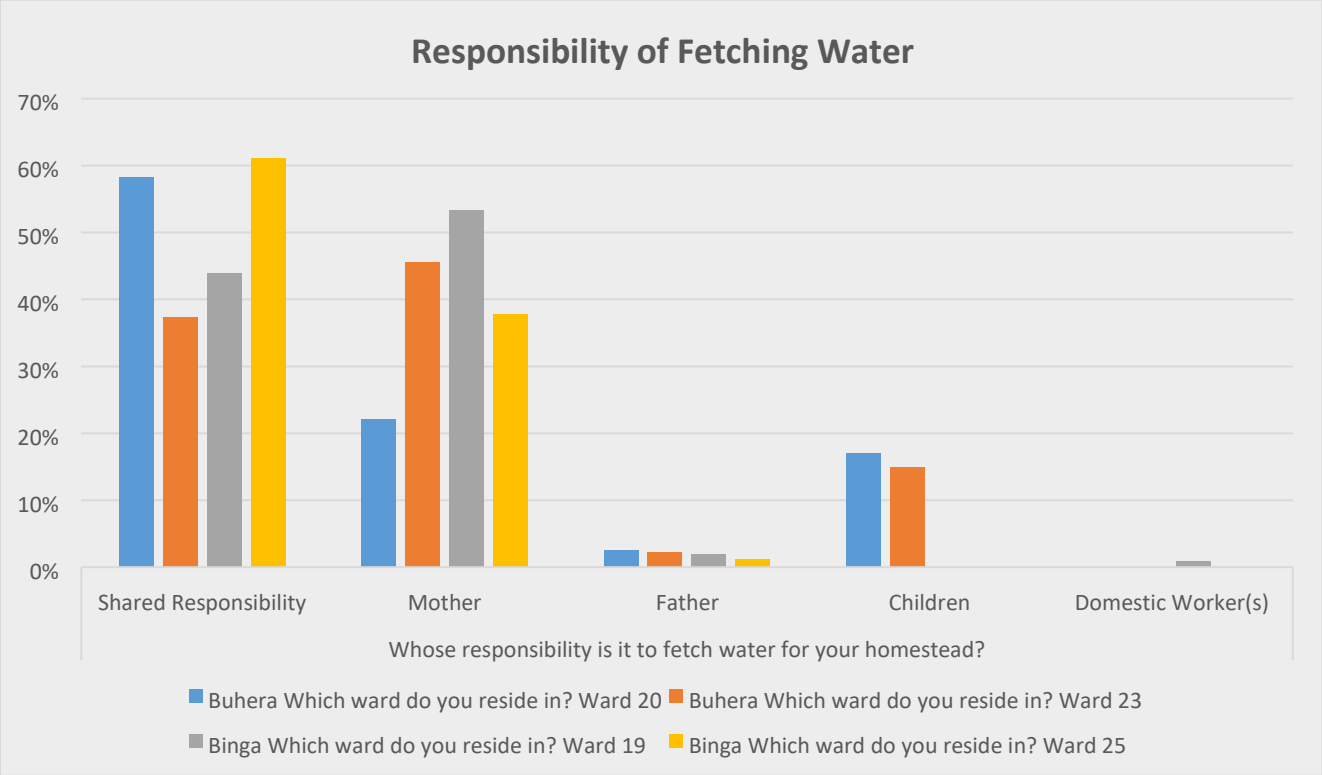


Figure 27: Responsibility of looking for water

The responsibility to fetch water in both Binga and Buhera districts either falls on the mother or shared between the mother and girl children. The implication is that in wards where villagers spend long hours fetching water, there will be days when girls miss school going to fetch water.

Impacts of lack of access to water on education

In Binga Ward 25, schools have a shortage of teachers because of water challenges. Teachers prefer leaving the ward in search of teaching places in wards or districts with better access to water. This affects the girl child mostly, since girls attend school fewer days in a year than boys do. Additionally, schools within the ward are underdeveloped because of lack of access to water.

Figure 2823: Katete Primary and secondary school in Ward 25 Binga. The school relies on 15 000 litres of water a year for drinking

Figure 28 is a picture of Katete Primary School in Binga Ward 25. The school relies on fifteen thousand (15 000) litres of water per annum of drinking for its teachers and pupils. The source of drinking water is rainwater harvested during the rainy season. There are times in the past years when the school closed after it had run out of drinking water. The other alternative nearest source of drinking water for the school is a borehole located 10km away from the school and outside Ward 25.

Katete Primary is currently under construction, however, construction work slowed because of lack of access to water. The school has six (6) teachers teaching primary school and only one teacher for the newly established secondary school. The secondary school teacher teaches all subjects in all the forms [form one (1) to form four (4)]. The Roman Catholic Church is constructing the school.

Figure 29: Picture of a primary school in Ward 25 Binga. The school does not have a borehole or well within its premises and relies on a community well to provide drinking water for its students

Figure 29 is a picture of a primary school located in Lubanda Village in Binga Ward 25. The school does not have any watering source within its premises for either drinking or general purpose. The only source of water for the school is a community well that dries during the year. The school uses mud huts (round buildings appearing in the picture) for both classroom for its students and accommodation for the teachers. Only two (2) teachers were present at the school when we visited the field during the stakeholder consultations. Lack of access to water makes construction of modern day classrooms difficult at the school. There is only one block at the school made of brick and cement.

Vulnerability of villagers to drying up of their water sources

The main sources of water for villagers in all the two districts [Binga and Buhera] visited are at risk of drying up during the year due to the effects of climate change. This leaves the villagers vulnerable to lack of access to water during the year. In Binga Ward 25, the main sources of water for the villagers start drying up in April. Villagers will walk long distances in search of water outside the ward.

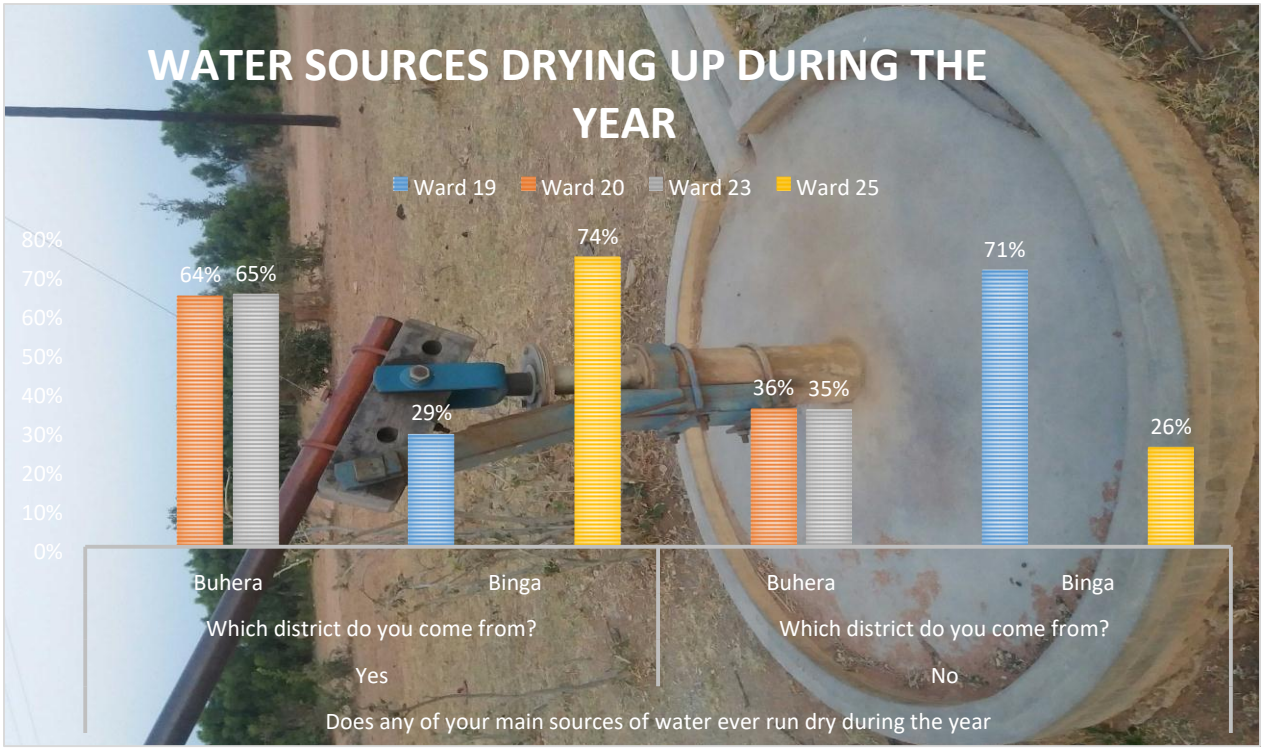


Figure 30: Water sources drying up during the year

The most vulnerable ward in terms of water security is Binga Ward 25. Seventy four percent (74%) of the homesteads from Binga Ward 25 use a water source that dries during the year. In Buhera, sixty four percent (64%), and sixty five percent (65%) of villagers from Ward 20 and 23 respectively have their water source dry up during the year. The main source of water for villagers in Buhera are wells, which account for seventy-two (72%) percent of the water needs of the households interviewed. The wells found in Buhera are hand dug, meaning that rudimentary methods of water divination would have been employed during water surveying. Additionally, due to the methods of well digging employed, wells found in Buhera are not deep enough to ensure water security for the villagers.

Villagers in Binga Ward 19 have the most secure sources of water amongst the four wards visited. The main source of water for villagers in Binga Ward 19 are boreholes. Seventy four percent (74%) of villagers from Binga Ward 19 access water from the same source throughout the year.

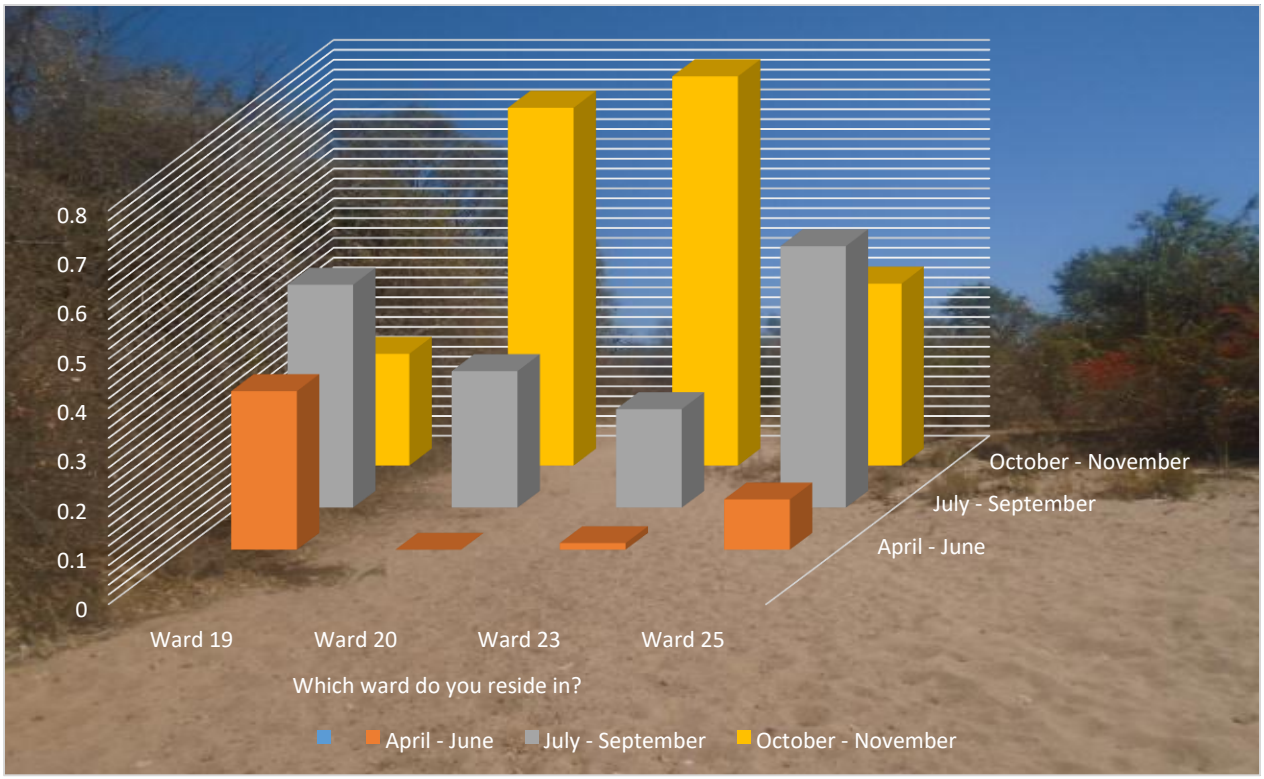


Figure 31: Time when water sources dry up

Water sources in Binga Ward 19 and 25 start drying during the period April to June. Water sources in Buhera start drying up during the months July to September, the majority of the water sources in Buhera dry up during the months October to November. At least fifty percent (50%) of the homesteads in Binga Ward 19 and 25 who indicated that their water source dry up, have their water sources drying up during the month July to September. The majority of the water sources in Buhera dry up during the period October to November.

The background picture to the graph is the dry riverbed of Lubanda River in Binga Ward 25.

Figure 32: Picture of a dry Weir in Binga.

Figure 32 is a picture of a dry Weir close to Ward 19 in Binga. This Weir dries up during the months of July to September. Before it dries up, it provides drinking water to at least 2000 cattle on a daily basis.

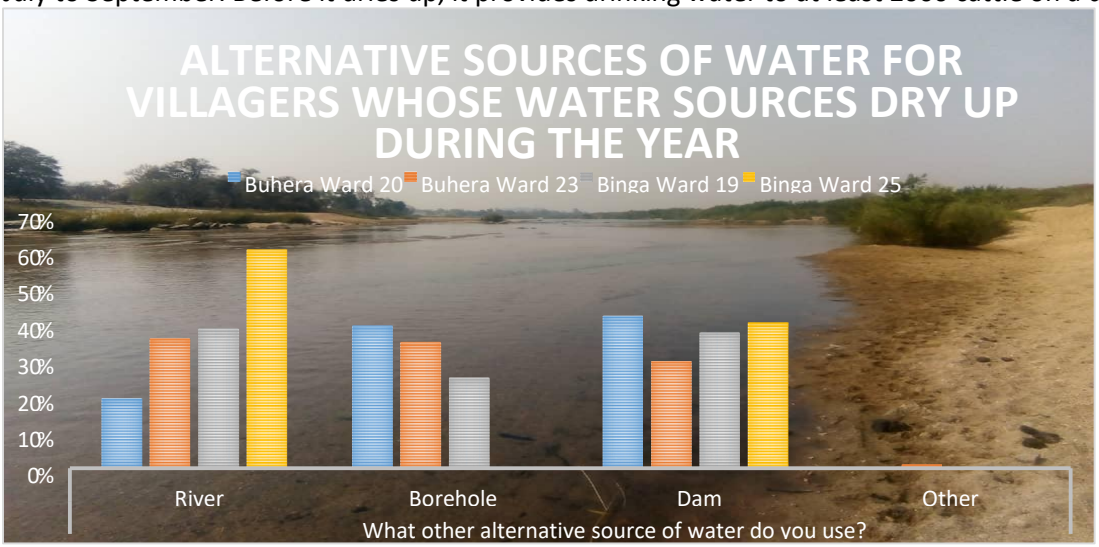


Figure 33: Alternative sources of water for villages whose water sources dry up during the year.

The main alternative source of water for villagers from Binga Ward 25 is rivers followed by dams. It is important to note that for these villagers residing in Ward 25 they do not have access to boreholes as an alternative water source whenever their sources of water run dry. Villagers from Binga Ward 19 and all the two wards assessed in Buhera access water from rivers, boreholes, and dams whenever their water sources run dry during the year.

4. Livelihood Options for Villagers in Binga and Buhera
Sources of livelihood in Binga and Buhera

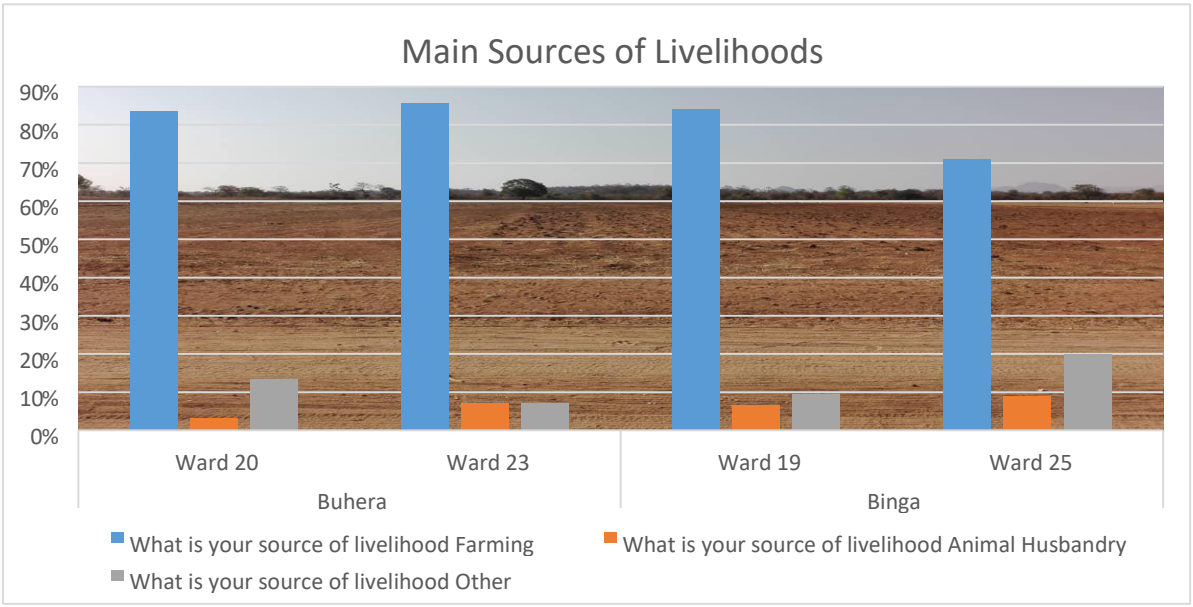


Figure 34: Main sources of livelihoods

The main source of livelihood in both Binga and Buhera is farming, followed by other, then animal husbandry. Although villagers in Binga Ward 19 and 25 indicated during focus group consultations that they rely on selling livestock during dry months of the year, they did not consider animal husbandry as their source of livelihood. Rural Zimbabwean communities are farming communities and historically, communal farmers were the main suppliers of cereal crops like maize to the Grain Marketing Board. Helping villagers engage in efficient and productive farming is important in poverty alleviation and resilience building.

The other livelihood activities that villagers in Binga and Buhera engage in building, basket weaving, sculpting, furniture manufacturing, buying and selling, fishing, well digging, traditional beer brewing, piece jobs and shoe repair services. Villagers who embark on basket weaving indicated that low rainfall patterns make it difficult for them to get reeds that are suitable for their trade. Villagers whose source of livelihood is well digging indicated climate change is making most of the wells that they dig to dry up early.

Figure 35: A picture of villagers in Buhera engaging in brick moulding

Figure 35 shows some of the bricks moulded by villagers in Buhera. Villagers in Binga also engage in brick moulding, however, lack of access to water limits their operations.

Farming activities in Binga and Buhera

Field Cropping in Binga and Buhera

Binga:

Some parts of Ward 19 and 25 in Binga have soils suitable for farming. However, these fertile pieces of land lack access to water and are therefore not available for productive/farming purposes. Additionally, the boreholes and wells found in Binga use manual hand pumps, and are not suitable for big gardening projects. Villagers concentrate on doing small gardens next to perennial boreholes in Ward 19. Apart from gardening close to boreholes, rivers, and springs, villagers in Binga also engage in cotton farming.

The Presidential inputs scheme is the main source of inputs for the cotton grown in Binga. The Cotton Company of Zimbabwe (COTTCO) provides the main market for the cotton grown in Binga. Villagers rely on natural rains to water their cotton, however, changes in climatic conditions mostly characterised by poor rainfall, is significantly affecting the cotton yields of the villagers.

Buhera:
Villagers in Buhera Ward 20 and 23 engage in growing roundnuts and groundnuts during the rainy season. These two crops require sandy soils and do very well with little moisture. The Grain Marketing Board provides the main market for roundnuts and groundnuts grown in Buhera. However, villagers indicated that the prices paid by GMB are low. Apart from GMB, some villagers also take their produce to Mbare Musika in Harare. Agricultural Technical and Extension Services (AGRITEX) Officers in Buhera revealed that Buhera has good soils suitable for growing small grains. Villagers are however reluctant to grow small grains because they are labour intensive. Additionally, apart from small grains, AGRITEX Officers in Buhera also believe that soils in Buhera can support various agricultural activities if irrigation water is available.

Gardening in Binga and Buhera

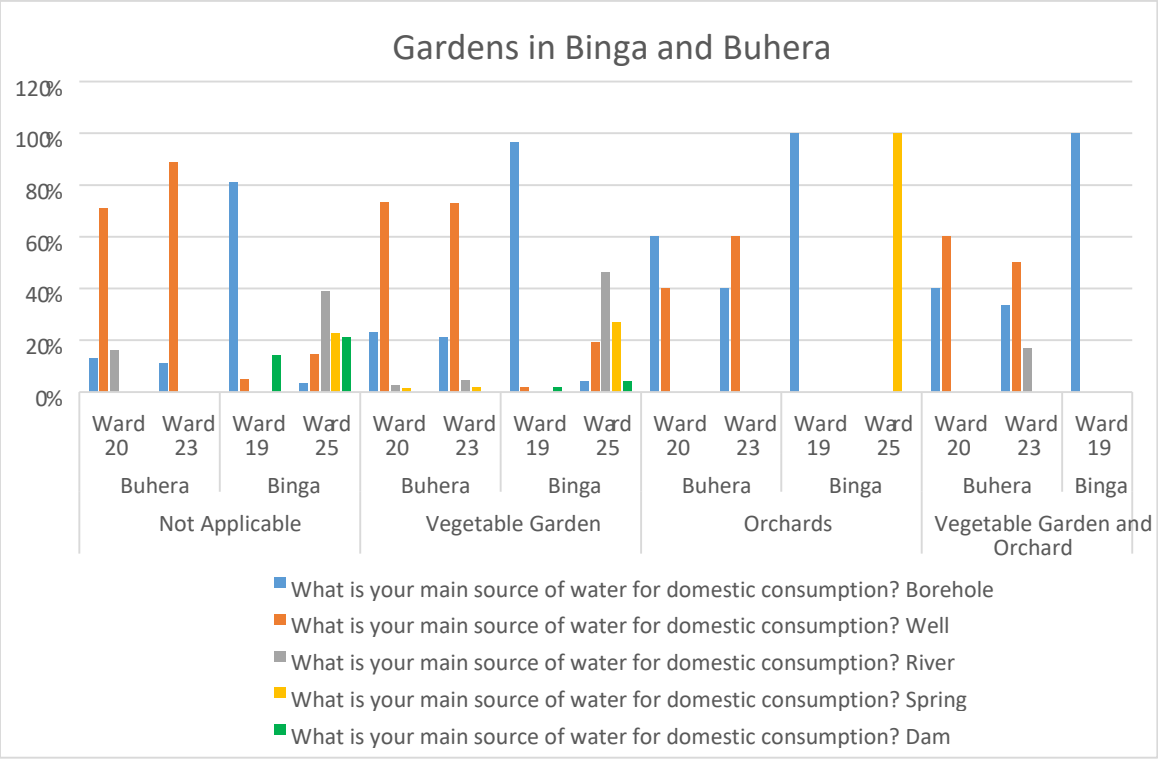


Figure 36: Gardening in Buhera and Binga

Buhera
Access to water affects ownership of gardens in Buhera. Gardens are found in homesteads that own wells or close to boreholes. Some villagers do gardening close to rivers and springs. During the year 2004, the Red Cross established community gardens in Ward 23 Buhera. Red Cross and GOAL once carried out gardening projects in Buhera. However, the gardens are no longer functional, as the rivers that used to water the gardens have dried up. Additionally, the fence that used to secure the garden

established by Red Cross was vandalised. Villagers are of the opinion that drilling deep boreholes can help bring longevity to the irrigation schemes.

Villagers who embark on gardening, irrigation farming and orchards requested for projects that provide them with access to markets for their crops.

Binga

The majority of vegetable gardens in Binga are found next to boreholes. A few gardens are located close to rivers and springs. The type of gardens found in Binga are community owned where two or three villagers combine efforts and establish a vegetable garden next to a common borehole. Due to water challenges, a number of households in Binga do not have vegetable gardens. Below is a picture of one of the community vegetable gardens located next to a borehole in Manyanda Village Ward 19. This garden serves three sub-villages within Manyanda.

Figure 37: A picture of a community garden located next to a borehole in Manyanda Village Binga

Animal Husbandry in Bing a and Buhera

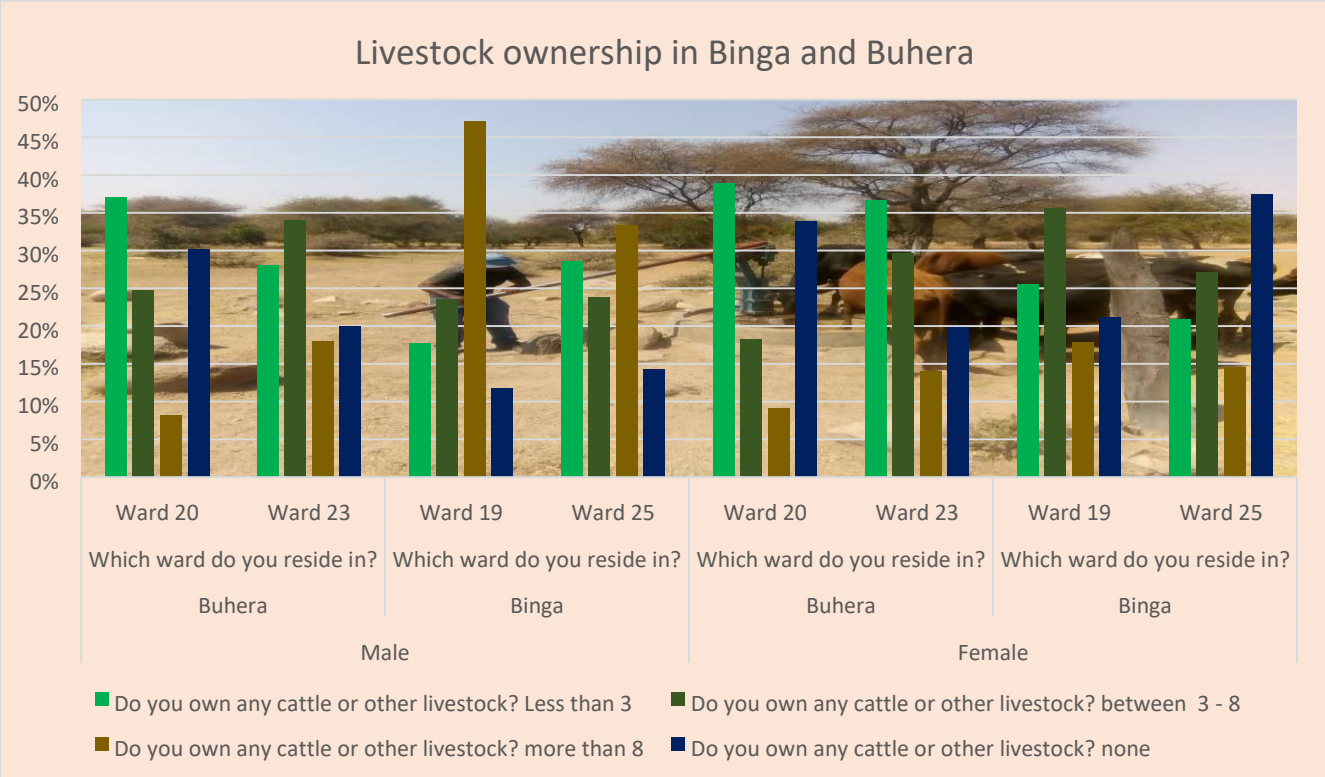


Figure 38: Cattle ownership in Binga and Buhera

Cattle is a source of wealth for the traditional Zimbabwean rural household and given the option, villagers from Binga and Buhera would stock as many cattle as possible.

Men in Binga own more cattle than their female counterparts in Buhera. 88% of men in Binga Ward 19 and 86% of men in Binga Ward 25 own at least three and above cattle. This is compared to 70% of men in Buhera Ward 20 and 80% of men in Buhera Ward 23 who own at least three cattle and above. The highest percentage of men owning more than eight (8) cattle comes from Binga Ward 19 and the highest percentage of men who do not own any cattle is in Buhera Ward 20.

The statistics of cattle ownership of women also follow the same trends as that of men. The highest percentage of women owning more than eight cattle comes from Binga Ward 19. However, the highest percentage of women who do not own any cattle also come from Binga Ward 25. It is important to note that although Binga produces that highest proportion of women without any cattle, of those women in Binga who own more cattle, they own more cattle than their counterparts in Buhera. Women and men in Binga Ward 25 survive on selling cattle and other livestock during periods of drought.

Sources of Drinking Water for Livestock

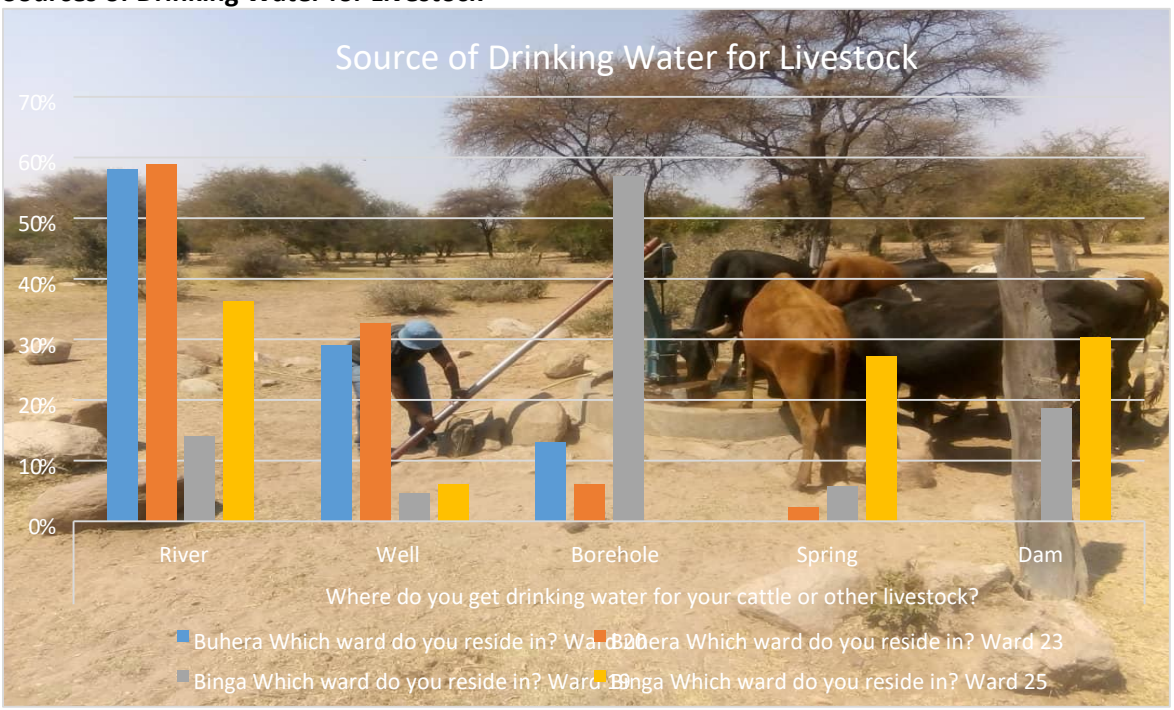


Figure 39: Sources of Drinking Water for Livestock

Rivers, followed by wells are the main source of drinking water for livestock in Buhera Ward 20 and 23. The main source of water for livestock in Binga Ward 19 is boreholes followed by dams. Villagers from Binga Ward 25 get water for their livestock from rivers, followed by dams and springs.

Factors affecting livestock production in Binga and Buhera

Buhera

Focus group meetings with villagers, and interviews held with various stakeholders from Buhera Ward 20 and 23 revealed the following factors affecting livestock ownership and wellbeing in Buhera:

- Villagers are losing many animals due to lack of access to drinking water for livestock.
- Villagers from Ward 20 revealed that lack of access to water is forcing cattle owners to go for as long as three (3) months without dipping their animals. This has resulted in some villagers losing cattle to tick borne diseases
- It is also noted that the animal husbandry practices in Buhera contribute to land degradation and siltation of both natural and man-made dams. Baravara dam in Ward 20 silted because of farming activities and cattle trampling on the dam.
- Inconsistent, infrequent and inconsistent dipping of cattle in Ward 20 and 23 puts livestock at risk of tick-borne diseases. Some villagers in Ward 23 revealed that they can go for the period between dipping stretches up to five or six months without dipping their cattle.

- There are some Non- Governmental Organisations (NGOs) in Buhera assisting villagers to restock livestock. Villagers revealed that Red Cross has been involved in Buhera since 2004 and some of the livelihoods projects implemented include goat rearing and beekeeping. An NGO called GOAL also had a cattle and goat project in Buhera. World Vision is implementing a feeding lots project in Buhera.

Binga

Villagers in Binga Ward 19 and 25 own many cattle. A typical borehole in Ward 19 serves at least five hundred (500) cattle and estimates are that Ward 19 alone is home to at least five thousand (5000) cattle. This translates to an average of 10 cattle per household. However, the ownership of cattle is not evenly distributed amongst the households in Binga. Despite the large number of cattle in Binga, some households that do not own cattle or and any other livestock. The main source of capital, emergency income and livelihood for villagers (especially villagers in Ward 25) is trading livestock. One of the distinguishing features of Ward 25 is the large number of free-range pigs and chickens.

Focus group meetings and interviews with the chiefs in Binga revealed that villagers are losing cattle due to lack of access to drinking water. Additionally, livestock in Binga are susceptible to disease outbreaks. In Ward 19 there were no village chickens, the villagers revealed that the last outbreak of Newcastle disease wiped out the entire population of chickens in the village. Binga is also a red zone district for tsetse fly. This means that cattle from Binga do not fetch high prices if sold in markets outside of Binga. Despite the large number of cattle, residents in Wards 19 and 25, researchers did not stumble upon any dip tanks for cattle in both wards. Villagers in Binga revealed that they spray their cattle as opposed to dipping them.

5. Access to Productive Resources for Villagers in Binga and Buhera

Access to Land, Labour and Capital

Binga

Villagers access land for resettling free of charge. The chief is responsible for distributing land to the villagers. Land for setting up shops and other businesses comes at a cost. The Rural District Council sells business stands to villagers interested in setting up shops or other businesses at the designated business sites in Ward 19 and 25. Villagers in Ward 19 and 25 provide for their own labour for preparation of land or any other activities that need labour. Women provide labour for most activities, including building huts. The majority of men do not stay in Binga due to lack of employment opportunities and other livelihood options.

The businesses operating in Ward 19 and 25 indicated that the main source of capital for setting up their business came from selling cattle and other personal savings. Access to water and transport affects the location of businesses in Ward 19 and 25. Businesses are located close to major roads and water sources. This forces villagers to travel very long distances to the nearest shops. Additionally, business that are located further inside the wards have challenges of restocking certain commodities. For instance, shops that sell bread to villagers in Ward 19 are located at Tinde Business Centre. This means that villagers from Ward 19 travel as far as 30km in search of certain commodities. Business owners provide labour to operate the shops and the businesses located at business centres in Ward 19 and 25. Shop owners of the shops visited stay behind their shops or very close to the business/shopping centre. Access to additional capital for business expansion is a challenge for businesses located in Binga.

Buhera

Villagers in Buhera access land for resettling free of charge. Chiefs are the custodians of land and are responsible for distributing land to the villagers as and when the need arises. The Rural District council sell business stands at designated areas to villagers interested in setting up business ventures in Buhera.

Villagers provide for their own labour for preparation of land or any other activities that need labour. Women provide most of the labour needed to prepare the land and are mostly responsible for looking for water.
The businesses operating in Ward 20 and 23 raised start-up capital from various sources. Some of the sources of capital include selling cattle, money from pension lump sum, selling of farm product, vending, brewing traditional beer and crowd funding. Business owners work in their own businesses. Access to additional capital is a challenge to businesses operating in Buhera. Business owners indicated the high interest rates and amounts offered by microfinance institutions are not big enough to fund meaningful business expansion. Access to water also limits the number of lines of business done at the business centres. Most business indicated that if access to water improves, they will either open canteens or butcheries.

6. Activities of District Development Fund, Rural District Councils, Catchment and Sub-Catchment Councils in Binga and Buhera

The catchment council in Binga has policies for groundwater extraction. A permit is required before one drills a borehole or digs a well. Villagers do not seek permits before digging wells. The catchment council revealed that there are 31 commercial boreholes in the area of Binga. However, the specific number of boreholes per ward were not confirmed. Wards do not provide the council with statistics on the number of boreholes within their wards. The catchment council in Binga monitors the usage of boreholes on a quarterly basis. The council assesses boreholes based on the quantity of water yielded by the boreholes. Currently the council does not have a means to measure the quality of water produced by the boreholes.
Boreholes in Binga dry up mainly due to drought, and destruction of wetlands by the villagers. A case in point are wetlands in Ward 25 that dried up due to farming and grazing activities of the villagers. The council now has a program in place to encourage villagers to conserve wetlands through embracing indigenous knowledge systems on protection of wetlands. The depth of boreholes in Binga ranges from 40 metres to 100 metres.
Water drawn from boreholes is for domestic consumption. However, some boreholes support gardening projects. Coal negatively affects the quality of underground water in Binga. Boreholes in Ward 7 and 23 produce salty water and the council closed some boreholes within those wards due to the high levels of water contamination. The council also supplies residents of Binga with water.
The District Development Fund drilled most of the boreholes in Binga. The funding for borehole drilling comes mostly from NGOs. Save the Children has been operational in Binga for more than thirty-seven (37) years and provided the funding to drill a considerable number of boreholes in
Ward 19. Once a borehole is drilled, a borehole minder (usually one of the villagers staying close to the borehole) is appointed and tasked with the maintenance and repairing of the borehole. The Rural District Council provides the materials needed to repair broken down boreholes.

7. Review of ongoing and past projects in Binga and Buhera Districts

The activities of various Non-Governmental Organisations in Buhera and Binga are the best proxies for reviewing both on going and past projects within the targeted wards. Additionally, initiatives taken by community members to improve their livelihoods are considered. In fact, the past and current initiatives from community members form a good basis for recommending potential projects within the four wards targeted by the research. The common theme coming out of the four wards during the needs assessment visits is that villagers do not prefer prescribed projects. This can also explain the failure of donor funded projects once the source of funding stops.

Summarised List of Ongoing and Past Project implemented by NGOs and other Institutions

Project Type	Location	Implementing Organisation/NGO
Borehole Drilling and Borehole Rehabilitation	Binga Ward 19 and 25	Save The Children [1983 – present] Zimbabwe
Solar Powered Drilling	Binga Ward 25	Resilience Building Fund (ZRBF) [2017 – present]
Borehole Drilling	Binga Ward 18	Action Aid [Dates not specified]
Borehole Drilling	Buhera Ward 20 and 23	World Vision [Dates not specified]
Sand Abstraction	Binga Ward 19	Save The Children [1983 – present]
Water Harvesting	Buhera	World Vision [Dates not specified]
	Binga Ward 19 and 25	Save the Children [1983 – present]
	Binga	Action Aid [Dates not specified]
Gardening	Binga Ward 19	Save The Children [1983 – present
	Buhera Ward 20 and 23	World Vision [Dates not specified]
	Buhera Ward 20 and 23	Red Cross [2004 – date not specified]

	Binga Ward 25	Zimbabwe Resilience Building Fund (ZRBF) [2017 – present]
Conservation Agriculture	Binga	GOAL [dates not specified]
Livestock Farming and Access to Livestock Markets/Value Chains	Binga Ward 19 and 25 Buhera Ward 20 and 23 Binga and Buhera Buhera Ward 20 and 23	Save The Children [1983 – present] World Vision [Dates not specified] GOAL [Dates not specified] Red Cross [dates not specified]

Table 4: Summarised List of Ongoing and Past Project implemented by NGOs and other Institutions

Details of Past and Ongoing Projects in Binga and Buhera Binga Projects

Various Non-Governmental Organisations (NGOs) have been active in Binga Ward 19 and 25 for a considerable number of years. Villagers from Ward 19 and 25 pointed out a number of different initiatives taken by the NGOs in order to help alleviate poverty within the Binga community. The researchers concentrated more on project initiative targeted at alleviating water stress and projects built around water.

Save the Children: Save the children has been active in Binga since 1983 and implemented food security projects through gardening initiatives. Additionally, the NGO supported agriculture by providing inputs and training to villagers. Besides empowering villagers through gardening initiatives and agricultural activities, the NGO has also assisted villagers with aid in terms of foodstuffs and cash transfers. In the past, the NGO collaborated with Agribank to give loans to villagers with the intention of capacitating villagers to be self-sustaining. Two villagers who benefited from this collaboration initiative between the NGO and Agribank successfully ventured into the kapenta business. Regrettably, these two reside in the District but not the Wards under focus. Additionally, the NGO has provided start-up training kits to villagers across the District including the Wards under focus but most have not fared well because of water scarcity.

The NGO has drilled boreholes in Ward 19 and 25 and has done rehabilitation to some of the boreholes. Additionally, the NGO initiated the harnessing spring water for irrigation. The NGO revealed that part of the reason behind the few boreholes in Ward 25 is attributed to the constant resettling patterns of villagers in the Ward. Villagers relocate whenever the father of the homestead dies. Binga Rural District Council in the past condemned water development projects in areas of Ward 25 close to Kavira Forest due to the presence of landmines in the area. Apart from borehole drilling and spring water harnessing, the NGO has also tried sand abstraction for livestock water in Ward 19 (Chinengo village and Tinde village). The project failed because the water extracted from the sands in these villages was very little and the sands would completely dry up during the months October to November each year. The NGO recommended adoption of water harvesting techniques since Binga at times during the rainy season can

receive as much as 67 millimeters in twenty-four (24) hours, but all that water if not harvested will be lost within just a few days.
An NGO named GOAL is active in teaching villagers conservation agriculture in Binga. Conservation farming is ideal for places like Binga since it uses methods that allow villagers to trap water in basins where it stays for long periods of time; land preparation techniques under conservation farming significantly improve the yields of farmers. The Tonga people who live in Zambia close to the Zimbabwean border are also using conservation farming to grow maize. The villagers yield an average of five (5) tonnes of maize per hectare. The other organisations promoting conservation farming in Binga are the Agricultural Trust and River of Life Church.
Apart from providing education of conservation farming, the NGO has also implemented animal husbandry projects in Binga and linked villagers with meat markets. MC Meats collaborated with Save the Children in providing a market for meat for villagers in Binga. The animal husbandry projects implemented by Save the Children included a goat husbandry project that linked villagers with abattoirs in Hwange and Bulawayo. The project is no longer operational. The reasons cited as leading to the failure of the project include the low prices offered for goats that led villagers to pull out of the arrangement. Additionally, the number of goats that villagers were sending to the abattoirs were too few to sustain abattoirs operations. Save the Children recommended that if the goat project is to be implemented, the minimum number of goats per household should be between 30 and 50 animals. Any number below that will not have a meaningful impact on the livelihood of the villagers. Besides goats, the NGO has also done cattle projects in Binga. The project focused on crossbreeding and introduction of new breed tolerant to diseases and drought. Artificial insemination with the intention of improving the genes was also tried in the past.
Action Aid: Action Aid (AA) is another NGO active in Binga and Buhera. Although the NGO is not active in Binga Ward 19 and 25, it has operations in Binga Ward 18. The NGO focus on value chain of goats and pigs. The thrust of the NGO is to build resilience amongst the villagers by strengthening the value chains of goats and pigs reared in rural areas. One of the approaches that the NGO recommends is grouping small-scale farmers and linking them with established big farmers who will buy products from the groupings of small-scale farmers and offer advice on breeding, feed and disease management. Action Aid is currently working on establishing Goat Improvement Centres (GIC). GICs will be responsible for buying goats from farmers and will provide farmers with information on how to improve on goat husbandry practices.
The activities of Action Aid are not only limited to animal husbandry. Water harvesting through the construction of weir dams, and harnessing and piping spring water for irrigation purposes are some of the initiatives of Action Aid in both Binga and Buhera. The NGO has also drilled boreholes in Binga and is considering investing in solar powered boreholes in Binga. The NGO seeks to empower youth and women through provision of vocational training skills as well as engaging youths in agricultural projects. The interesting feature of Action Aid is how the NGO is embracing technology in aiding its resilience building initiatives. The NGO has a pilot 2-way application called Agropal that links small-scale farmers, AGRITEX officers, markets, and large-scale farmers.

Zimbabwe Resilience Building Fund (ZRBF): ZRBF has been active in Binga since 2017 and is involved in gardening and innovative centres. The NGO drilled a solar powered borehole in Binga Ward 25. According to ZRBF, the greatest risk to projects is vandalism of infrastructure.

Figure 40: Pictures of solar powered borehole drilled by ZRBF in Binga Ward 25

Figure 40 is a solar powered borehole drilled by ZRBF in Binga Ward 25. Water drawn from the borehole will be used to irrigate gardening projects in villages close to the borehole. Additionally, the borehole will provide piped water for villagers that are reasonably close to it.

Buhera Projects

Various NGOs are active in Buhera. The notable NGOs operating in Buhera are World Vision, and Red Cross.

World Vision: The focus of the NGO is livestock production and their emphasis is on cattle and goats. The organisation targets small scale farmers. According to officials from World Vision, farmers in Ward 23 are good at taking up projects and are cooperative during project consultations. The livestock projects currently implemented by World Vision are aimed at improving the breed of cattle in Buhera, commercialisation of cattle production and production of fodder in drought prone areas. The medium to long-term plan of the organisation is to establish the establishment of cattle business centres managed by private players like KOALA. The intention of involving private players is to facilitate cattle production through knowledge impartation.

The Water Sanitation and Hygiene arm of World Vision drilled boreholes in Ward 23. Additionally, World Vision intends to construct weir dams, and install solar boreholes in Ward 23. Water from these projects will irrigate pastures in the various feeding lots that the NGO will set up in the ward. The other NGOs active in Buhera include Action Aid that is implementing a dairy project. Red Cross has implemented gardening projects in Ward 20 and 23.

NIOM gathered from the various interviews held with NGOs operating in Buhera that Buhera is highly politicised, therefore there is need for consultations with all the relevant stakeholders in order to make the project successful. Additionally, it is important to profile the ages of beneficiaries of donor funds. Experience has shown that the older the person gets without having done anything meaningful with their lives at an early age, the higher the chances that donor funds will not change the person. Traditionally, men own cattle and women are involved in small livestock. Thus, for livestock projects to succeed, they should be modelled along the traditional livestock ownership trends.

8. Way Forward – Resilience Building and Adaption Strategy Proposals

Results of the baseline studies in this section are applied to inform the potential courses of action that the project can adopt. The proposed resilience building and adoption strategy proposals presented in this section are centred on the development and exploitation of groundwater. The understanding behind the proposed adoption strategies is the need to increase access to groundwater for domestic and productive use, to improve food security amongst the vulnerable communities, and poverty reduction through resilience building.

8.1 Proposed Interventions for the five (5) project components.

8.1.1. Component 1 – To strengthen technical, institutional and human capacity for improved and sustainable utilization of groundwater at national and local levels.

The proposed interventions for component one (1) based on the stakeholder consultations done in Binga and Buhera are as follows:

Proposed Interventions			
Buhera		**Binga**	
Ward 20	**Ward 23**	**Ward 19**	**Ward 25**
1. Training well diggers on modern methods of water divination, and well digging. Local well diggers dig wells found in Ward 20. These wells dry up during the year because either they are not properly sited or are not dug to the correct depth. Additionally, well diggers must be capacitated with technology and scientific knowledge on digging wells and securing wells to ensure increased water security.	**1. Training well diggers on modern methods of water divination, and well digging** Local well diggers dig wells found in Ward 20. These wells dry up during the year because either they are not properly sited or are not dug to the correct depth. Additionally, well diggers must be capacitated with technology and scientific knowledge on digging wells and securing wells to ensure increased water security.	**1. Providing training and capacity to pump minders** Local pump minders maintain boreholes in Ward 19. A pump minder is a villager with the responsibility to repair the borehole if it develops problems. Pump minders lack capacity to repair boreholes. Additionally, there are no formalised methods to ensure continuity in the maintenance of the boreholes in the event of the death of the pump minder **2. Training water management communities on localised groundwater management, and assist them to develop manuals and guidelines on groundwater planning and management** Water management committees manage boreholes in Ward 19. The majority of members of this committee are women. These committees should be given training on water management, and assisted to develop formal manuals on how to plan and manage their groundwater resources at local levels. These water management committees should be linked to subcatchment councils.	**1. Training villagers on how to harness spring water** Springs, Rivers, and dams are the main sources of water for villagers in ward 25. Selected villagers must be trained on how to harvest spring water for productive agricultural use. Additionally, select villagers will form water committees that are entrusted with the mandate of assessing water needs, groundwater resource planning and management within Ward 25.

8.1.2. To conduct comprehensive assessments of groundwater resources in two poverty stricken and most vulnerable sub-catchment councils of Lower Gwayi and Upper Save, and thus develop sample paths for sustainable groundwater utilisation in improving climate resilience

The proposed interventions are based on the results of the stakeholder consultations done in Binga Ward 19 and 25, and Buhera Ward 20 and 23.

Proposed Project Interventions			
Buhera		**Binga**	
Ward 20	**Ward 23**	**Ward 19**	**Ward 25**
1. Surveying for sites where commercial boreholes can be drilled Wells are the main source of water for villagers in this ward. However, these wells dry up during the year. There is need to do comprehensive assessments of groundwater resources within this	1. Surveying for sites where commercial boreholes can be drilled Wells are the main source of water for villagers in this ward. However, these wells dry up during the year. There is need to do comprehensive assessments of groundwater resources within this	4. Rehabilitating and adopting existing boreholes for commercial water exploitation Boreholes are the main source of water for villagers within this ward. The majority of boreholes assessed within this ward do not dry up during the year.	1. Surveying for sites where commercial boreholes can be drilled Rivers, springs and dams are the main sources of water for villagers in this ward. There is need to do comprehensive assessments of groundwater resources within this ward to locate sites

ward to locate sites where commercial boreholes can be drilled. Rehabilitation and adopting existing boreholes for commercial exploitation. The boreholes currently found in Ward 20 are suitably designed for commercial exploitation. There is need to install either solar pumps or wind powered pumps at the existing boreholes so that they can draw water in a manner that supports sizeable farming activities. Assessment of size and potential yields of the groundwater resources on the existing boreholes within the ward. The villagers interviewed during the stakeholder consultations did not have any information on the size of	ward to locate sites where commercial boreholes can be drilled. Rehabilitation and adopting existing boreholes for commercial exploitation. The boreholes currently found in Ward 23 are suitably designed for commercial exploitation. There is need to install either solar pumps or wind powered pumps at the existing boreholes so that they can draw water in a manner that supports sizeable farming activities. Assessment of size and potential yields of the groundwater resources on the existing boreholes within the ward. The villagers interviewed during the stakeholder consultations did not have any information on the size of	However, the boreholes found in this ward use hand pumps and are therefore not suitable to support commercial exploitation of water. Assessment of size and potential yields of the groundwater resources on the existing boreholes within the ward. The villagers, and pump minders interviewed during the stakeholder consultations did not have any information on the size of groundwater resources of the boreholes operational within the ward. There is therefore need to do comprehensive assessment and mapping of the size, yield, water quality, and suitability of groundwater resources of the current operational boreholes for commercial exploitation	where commercial boreholes can be drilled. There is only one borehole within this Ward, and this borehole is powered by solar.

groundwater resources of the boreholes operational within the ward. There is therefore need to do comprehensive assessment and mapping of the size, yield, water quality, and suitability of groundwater resources of the current operational boreholes for commercial exploitation	groundwater resources of the boreholes operational within the ward. There is therefore need to do comprehensive assessment and mapping of the size, yield, water quality, and suitability of groundwater resources of the current operational boreholes for commercial exploitation		

8.1.3. To strengthen capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote and protect groundwater use

Proposed Project Interventions
1. Providing capacity and training sub-catchment councils to monitor groundwater resources within Binga and Buhera. The Lower Gwayi and Upper Save sub-catchment councils do not have the capacity to monitor groundwater resources within their areas of operations. The best they can go is measuring consumption (i.e. how much water villagers extract from the boreholes). These councils need to be capacitated with equipment and training that enables them to perform the following activities when monitoring groundwater: a. Measuring water quality produced by boreholes b. Measuring the quantity water under ground and juxtapose it with the demand for water for each borehole. This ideally should be done throughout the year, in order to avoid over-extraction and the eventual drying up of groundwater resources within their catchment **2. Providing equipment and technical support to sub-catchment councils that enables them to create and update the database of all the boreholes, wells, wetlands, springs, and any other water sources related to groundwater within their areas of operations.**
The Lower Gwayi and Upper Save sub-catchment councils do not have the capacity to create database that maps and keeps track of the health of all the boreholes, wells, wetlands, and water sources related to groundwater within their areas of operations. The sub-catchment councils should be equipped with the necessary computers and devices that enable creation, and remote monitoring of groundwater resources within their areas of operation. This will enable timely interventions to be taken to prevent underground water resources from reaching critical levels. 3. Providing capacity and technical training to sub-catchment councils to restore and protect wetlands within their areas of operation. Wetlands are responsible for recharging underground water bodies. Wetlands in Binga and Buhera have dried or are at serious risk of drying due to the activities of villagers within those areas. Sub-catchment councils should be given the capacity to protect existing wetlands, and where possible restore former wetlands within Binga and Buhera. Protection of wetlands include giving the councils capacity to go and teach villagers on the importance of wetlands, and train them methods of ensuring the protection of wetlands.

8.1.4. To pilot and demonstrate concrete climate change adaptation measures based on sustainable groundwater exploitation for diversifying and strengthening livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments

Solutions to current Water Challenges Villagers are facing

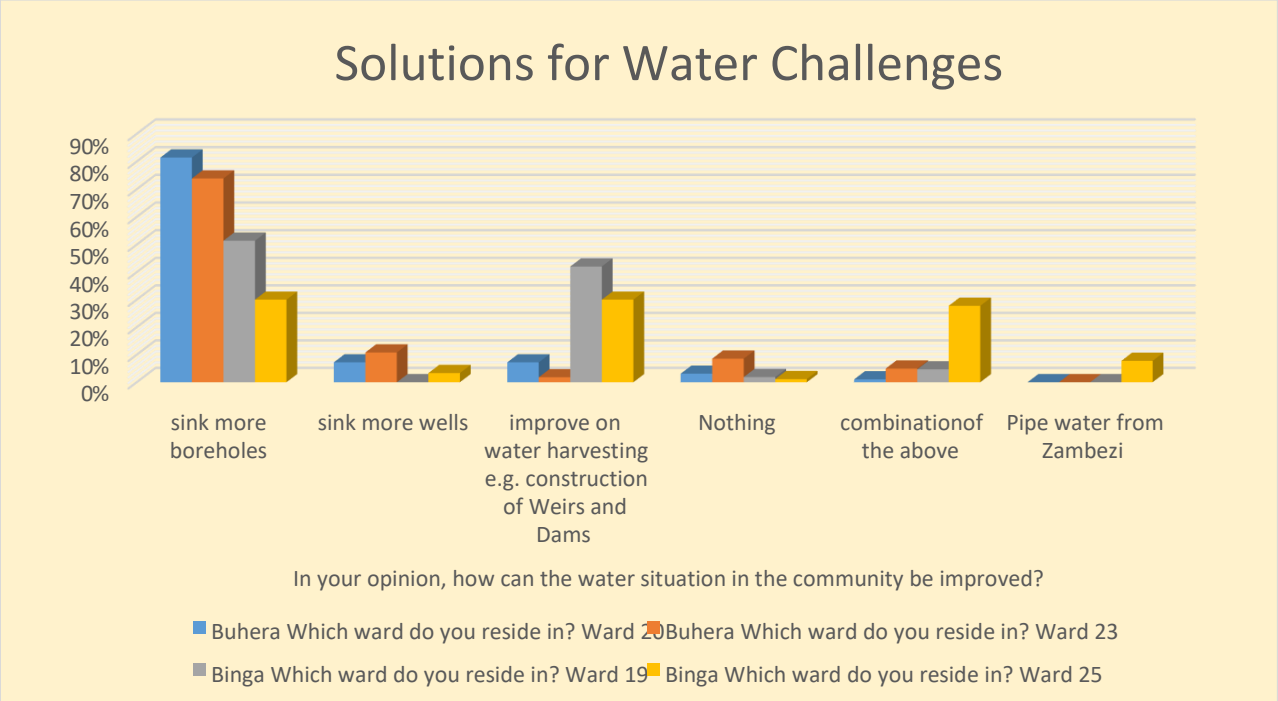


Figure 41: Solutions to current Water Challenges Villagers are facing

The graph above shows the potential intervention strategies that villagers from Buhera Ward 20 and 23, and Binga Ward 19 and 25 think as appropriate and relevant to solving their water situations. 81% and 74% of villagers in Buhera Ward 20 and 23 respectively, believe that drilling boreholes is the solution to water challenges within their wards. The remainder of villagers in Buhera Ward 20 and 23 believe that sinking more wells [7% for Ward 20 and 11% for Ward 23], improving on water harvesting [7% for Ward 20 and 2% for Ward 23] or combining groundwater exploitation and water harvesting [1% for Ward 20 and 5% for Ward 23] as the solutions to their water problems.

The statistics gathered from Binga on the potential way forward in terms of solving the water problems within their areas slightly differ from the solutions proposed in Buhera. More villagers in Binga compared to Buhera believed in water harvesting as key in solving water problems within their wards. The statistics of villagers proposing water harvesting in Binga were 42% for Ward 19 and 30% for Ward 25, compared to only 7% for Ward 20 and 2% for Ward 23 in Buhera. Apart from water harvesting, villagers in Binga proposed drilling of more boreholes [51% for Ward 19 and 30% for Ward 25]; sinking more wells [0% for Ward 19 and 5% for Ward 25]; combining water harvesting and borehole drilling [5% for Ward 19 and 28% for Ward 25]; and piping water from the Zambezi River [0% for Ward 19 and 8% for Ward 25] as solutions to the water problems within their wards.

Situational Analysis of the Wards Combined

Before developing and implementing potential proposals, it was important to conduct a situation analysis to determine the potential and challenges. This analysis serves as a useful tool for determining the wards' strengths and weaknesses, and any opportunities and threats (SWOT). The table shows a situational analysis in the four wards and possible action plans.

Strength	**Weaknesses**	**Action Plan on Weaknesses and Threats**
Visible local leadership structures in place in all wards. **Action:** Leverage on these local leadership structures to implement livelihood projects within the community.	Poor soils in majority of areas of the wards.	• Rearing small livestock. • Carry out livelihood projects which do not require intensive use of soil e.g. Beekeeping. • Use of holistic management approach to increase soil cover. • Training of local leadership, NGOs, national and local government institutions on technical skills on how to train communities to do sustainable livelihood practices. • Building of weirs upstream of Lubanda River which act as silt traps.
Good soils in some areas suitable for farming activities. **Action:** Irrigation farming activities can be carried out if water is made available at the right quantities.	Dry region. Receive low rainfall not suitable for heavy agricultural farming activities	• Drilling of high yielding boreholes on aquifers identified if any in the wards. • Implement livelihood projects which require less water. E.g. Beekeeping • Construction of weirs or dams as a way holding water and as a recharge system. • Use of holistic management approach at ward level to increase soil cover by vegetation to increase groundwater recharge.

Wards in Buhera are located along Save River. **Action:** Geological assessments to estimate the quantities of underground water trapped under the sandy soils which characterize the river base. • The flood plains have good soils and can be used for irrigation farming if substantial amounts of water are obtained. Aquaculture farming in the river.	People have a donor syndrome attitude. This creates lack of ownership on projects implemented, causing projects to fail soon after the donor disengages from the project.	• Consider diversity and not only focus on farming as a source of livelihood e.g. cultural tourism in Binga. • The selection of potential projects for each ward should consider inputs from villagers to foster ownership to ensure continuity of projects. • Set up value chains by leveraging on each ward's strengths and opportunities to attract people who come originally from the villages but currently staying in urban areas. • This may lead to increased production since people with capital will be attracted to back to the villages. • Encourage government and NGOs not to offer free food handouts, unless there is a natural disaster. • Set production targets for communities involved in various livelihood projects so that they can access valuable markets.
Communities have a large number of economically active individuals, especially women. **Action:** Leverage on this strength by capacitating individuals on how to efficiently and effectively produce products. Working hard but also smart.	Low groundwater tables in wards, hence most boreholes and wells run dry during the year. This hinders productivity to occur throughout the year.	• Drill deeper boreholes to obtain larger quantities of water. • Consider facilitating implementation of projects which require less utilization of water resources.

Boreholes located in key settlement areas which are schools and shopping centers. **Action:** Review of the groundwater quantity and ascertain whether commercially viable livelihood projects can be implemented. Monitor groundwater utilization.	Lack of participation by women, girls and boys to community meetings.	• Engage local women leadership at churches and other platforms to encourage women to participate in livelihood initiatives. • Engage teachers, parents and community leaders to encourage boys and girls to participate in livelihood initiatives.

T*able 5: A situational analysis of the in the four wards and possible action plans.*

The List of Suggested Projects Target Area

Suggested Project	District			
	Buhera		Binga	
	Ward 20	Ward 23	Ward 19	Ward 25
Irrigation schemes for horticult ural farming	×	×		
Growing drought resistant crops	×	×	×	×
Cattle ranging			×	×
Free range pigs				×
Goats			×	×
Free range chickens	×	×	×	×

Proposed Interventions for Buhera and Binga

The proposed interventions for Binga and Buhera are discussed in this section of the report. For each Ward, three areas were identified were the projects would be undertaken. These have been marked as indicated on the maps below where the major project for each Ward is marked in red and the complimentary minor projects marked in blue.

The interventions are as follows:

a. Groundwater development,

b. Small Scale Farming Model based on potential of discovered groundwater resources.

Recommended Project per Ward By Location and Expected Impacts using IFA Project Model

Figure 42. Proposed site of a dam in Ward 19 binga

In this area in ward 19, there is a dry river where there is potential to construct a dam and weirs. The site is at a confluence of two seasonal rivers. Access to the water here would cater for some irrigation schemes, that would support horticulture as well.

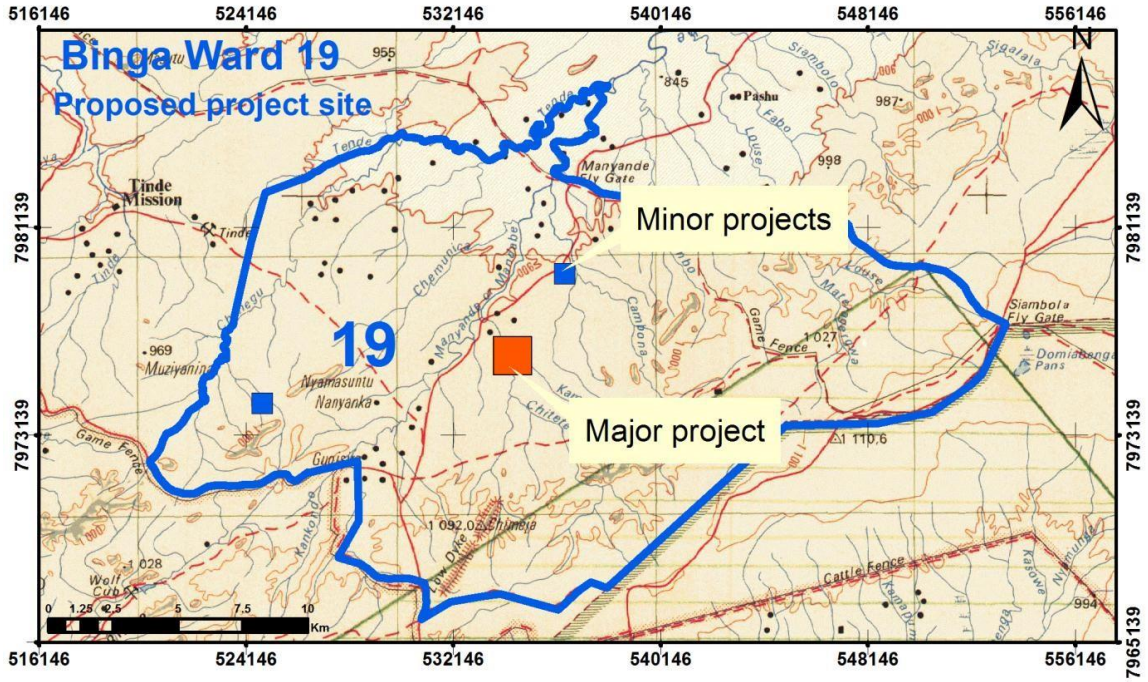


Figure 43. Proposed project sites for projects in Ward 19 Binga

The site above is in a valley and is confluence of two rivers with a narrow exit bordered by two hills which makes it very ideal and cost effective to construct a dam wall across. The surrounding area has red fertile soils ideal for setting up a shared infrastructure irrigation scheme.

Figure 44. Proposed area for major project Ward 25 Binga

The image above is a school in Katete village, inward 25. the drilling of a few solar-powered boreholes in this area would be ideal to 1st combat the issue of a serious lack of suitable water for domestic purposes. Then thereafter look to develop some irrigation schemes to support horticulture projects.

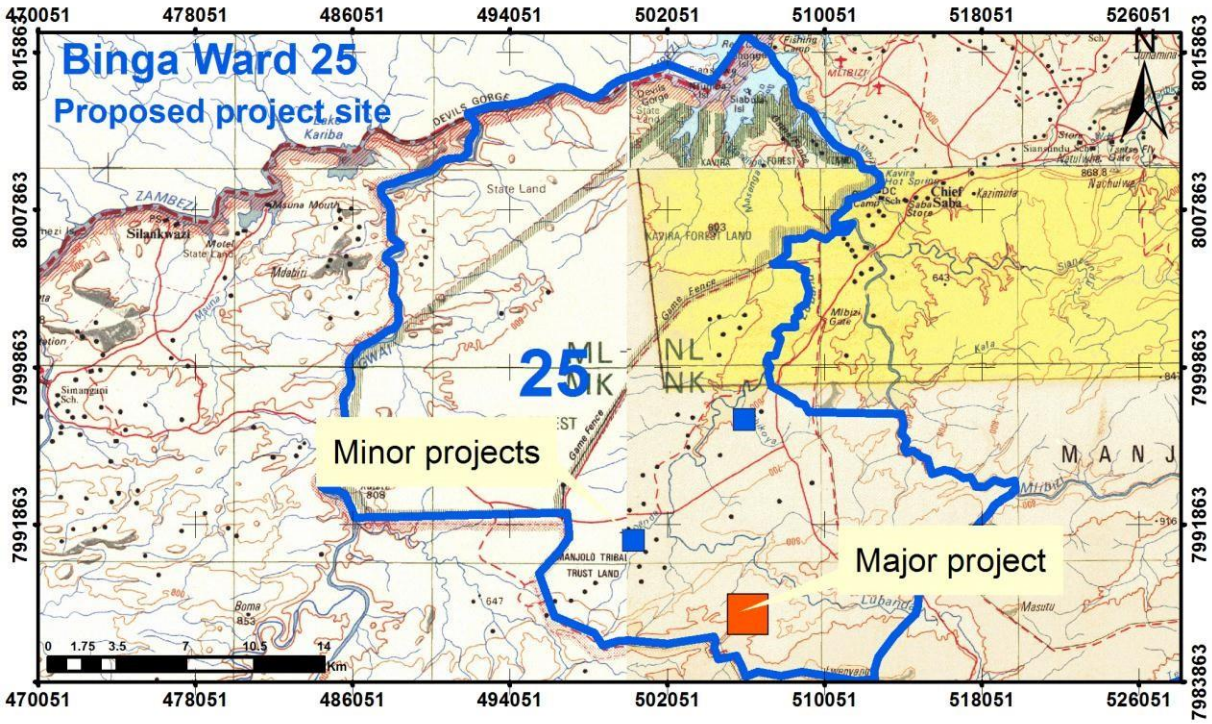


Figure 45. Proposed project sites for Ward 25 Binga

Figure 46. Proposed project area for Ward 20 Buhera (Save River in background) Close to Save river, where there is good farming land in this area horticulture will be an effective intervention. Irrigation schemes set up here will also be beneficial to the community as it enables them to farm various cash crops.

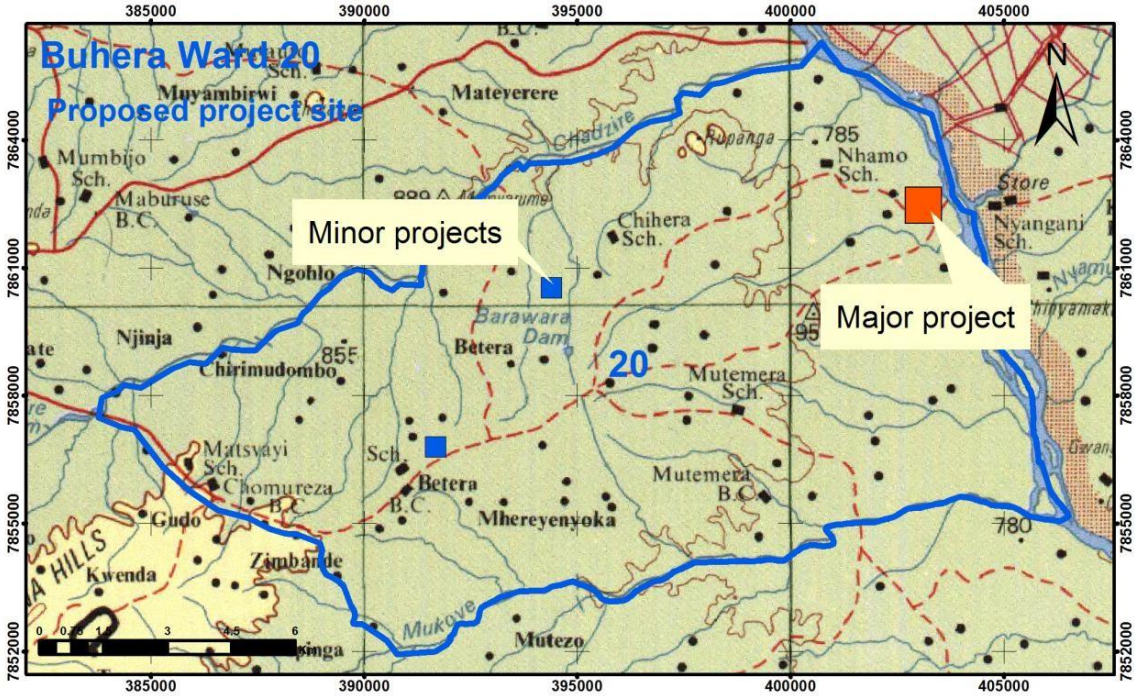


Figure 47. Proposed project sites for Ward 20 Buhera

Figure 48. Proposed project site for ward 23 Buhera (good soils and fields and good ground water potential)

This a prolific borehole in ward 23, and the potential for high water yielding boreholes is high because of the contact zone there, the boundary which separates one rocky body from another. Proposed projects in this area include irrigation schemes for maize, small grains and gardening. Adding another borehole would complement the good farming land in this ward and would boost the practice of horticulture and livestock projects.

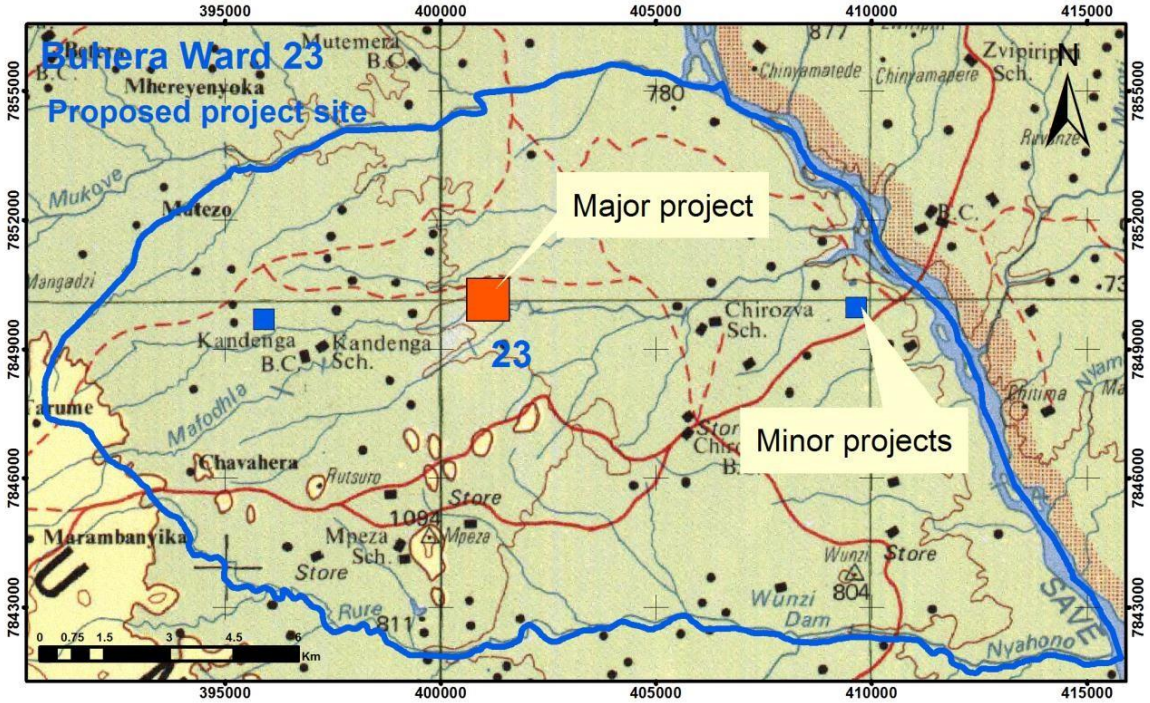


Figure 49. Proposed project sites for Ward 23

a. Groundwater exploration, extraction and Irrigation Development

Key Focus: Greater understanding of groundwater capabilities and potential capacities for use in potential for irrigation development, horticulture and animal husbandry promotion.

The overall objective is to promote inclusive and sustainable development of selected agro and food sector value chains, in line with the priorities and technology driven ground water mapping and harvesting.

Key to achieving the objectives of the project is to fully map out and understand the link and potential of groundwater both qualitatively and quantitatively through understanding the 4 Wards hydro geological properties. This will effectively address the both grown, climate change adaptation and attractiveness to curb rural population migration to the already crowded urban centers. The other overriding benefit is the achievement of being a driver of inclusive rural economic growth and sustained food security outcomes.

The approach for exploring for ground water for commercial is multi-pronged. The aim is to fully understand the geology, which hosts aquifers in all regions where boreholes will be drilled. This entails mapping broad structures that would otherwise host water e.g. shear zones, fractures, and depth of weathering. This will enable identification of water sources that have large recharge systems and are high yielding. This is achieved through the combined use of magnetics, VLF (very low frequency) electromagnetics and follow-up resistivity on the mapped shears/fractures. In cases were fractures systems are mapped, it is essential to identify dip and dip direction to enable drilling and intersecting the fracture zone at the appropriate depth.

There exists a potential to explore for water near major rivers such as Save in Buhera and Lubanda in Binga which have potential for trapped water due to very heavy siltation. The water depending on realised quantities could be used for development of small-scale high value crop cultivation.

Technical assistance under specific value chain support projects through managed water resources is expected to contribute to increased and strengthened producer and trade linkages to these selected areas, which is in line with the projects strategic goal of mobilizing a significant scale of harnessing water potential in agro-food production.

The overall objective would be to promote inclusive and sustainable development of the selected agro and food sector value chains, in line with the priorities and techno-economic viability to drive enhanced sustainable economic transformation, food security and resilient livelihoods.

The global project will thus:

- Support institutional capacity building water management and harvesting techniques and for value chain development for agricultural development.

- Provide technical advice and direct investment support to promote the establishment or upgrading of value chains

- Introduce good practices in water management pilot development of irrigation schemes along selected agro value chains

- Promote the uptake of scaling up strategies

- Disseminate the investment promotion and scaling up strategy to leverage appropriate financing and investment support for small and medium scale and linked agro enterprises

Technical assistance projects implemented, focusing on capacity building of food processing enterprises, the improvement of quality infrastructure for irrigation development, and the organizational strengthening of primary water supplies to rural and small holder farmers

Proposed Projects and Modelling

Key Focus: Technical assistance projects defined to support capacity building of smallholder rural farmers and food processing industries, and enhance trade support

An integrated model of productive use of water and land structured resources is proposed as a potential catalyst to facilitation of a process of primary processing from the major district towns into smaller selected growth points. This integrated approach will be achieved through creating and capacitating strong market bases of raw materials, labour force and economic activities in the communal areas and building of processing plants nearer the farms.
Facilities will be structured to add value to the farm output thereby reducing post- harvest losses significantly and increasing income potential and focused growth for each area of intervention. Minor processing will include simple activities like packaging farm output, slaughtering, cutting and freezing livestock or the establishment of a central point of harvest delivery and marketing (e.g. an auction floor). The establishment of the model project and adoption of simple technologies such as bio digesters that promotes recycling and treatment of waste products for secondary value addition present an opportunity for learning, modification, innovation and continuous research in incremental post- harvest product utilization and monitoring of effectiveness over time. There already exists a reasonable technical resource base to build on the required systems with co-financing potential possibilities with organizations such as Action Aid, World Vision, Save the Children, ZRBF and ZERA (Zimbabwe Electricity Regulatory Authority), which have bio digester construction and other projects ongoing. Wastes from processing facilities such as abattoirs can be effectively utilized as additional feedstock to bio digesters. Bio digester waste can be utilized for fertigation.

A resurgence of Private Sector, sector specific organizations such as the Rabbit Breeders Association, The Road Runners Association (free-range chicken), Goat Breeders Association, Mushroom Growers Association and many more which from a Private Sector perspective will benefit the rural farmers given strong linkages and strategic direction in both technical assistance and breed input source and market. Farming of some of the products represented will be beneficial in terms of the space requirements and as grazing comes under threat from reduced rainfall.

Moreover, it different and high meat yielding species especially for goat meat processing, free range chickens and free-range pigs can be strengthened. More adaptive foraging species of plants suited to harsh conditions such as moringa can be adopted. Plants such as Neem can again be adopted, as they have high potential for substitution in treating animals for different conditions such as tick and insect control over and above the normal traditional dipping.
Maximizing value addition at each stage of the production allows communities to obtain maximum returns from their produce, thereby improving livelihoods. Also, through value addition excessive use of groundwater will be reduced as the number of livelihood projects relying on it as a key input. Below is a

table showing potential projects and their value chain linkages, which can be implemented in the selected wards.
Key to achieving the objectives of the project is to fully map out and understand the link and potential of groundwater both qualitatively and quantitatively through understanding the four (4) Wards hydro geological properties. The approach for exploring for ground water for commercial use is multipronged. The aim is to fully understand the geology, which hosts aquifers in all regions where groundwater will be extracted to support livelihood projects. This entails mapping broad structures that would otherwise host water e.g. shear zones, fractures, and depth of weathering. This will enable identification of water sources that have large recharge systems and are high yielding.
There exists a potential to explore for water near major rivers such as Save in Buhera and Lubanda in Binga which have potential for trapped water due to very heavy siltation. The water depending on realised quantities could be used for development of small-scale high value crop cultivation irrigation schemes.

b. Small Scale/Communal Farming Modelling based on the potential of discovered groundwater resources

An integrated model of productive use of water and land structured resources is proposed as a potential catalyst to facilitation of poverty reduction and resilience building for villagers/communal farmers. The model seeks to promote the development of value addition initiatives of farm output within the project's targeted areas as a method of increasing project positive impact by creating upstream and downstream employment within the area. This integrated approach is achieved through creating and capacitating strong market bases of raw materials, labour force and economic activities in the communal areas and building of processing plants nearer the farms.
Facilities will be structured to add value to the farm output thereby reducing post-harvest losses significantly and increasing income potential and focused growth for each area of intervention. Minor processing will include simple activities like packaging farm output, slaughtering, cutting and freezing livestock or the establishment of a central point of harvest delivery and marketing (e.g. an auction floor for livestock).
The farming model also employs the use of simple technologies such as bio digesters to promote recycling and treatment of waste products. This reduces or eliminates negative environmental impacts of farm waste products. Additionally, effluent from bio digesters is a good substitute for fertilizers. This implies that the thrust of the model is organic farming, which has improved nutritional benefits on both the farmer, and the final market consuming the farm produce. Additionally, fertilizers increase the acidity of the soil overtime. The bio digesters can be located either at the homestead of the farmer or at community level. There already exists a reasonable technical resource base to build on the required systems with co-financing potential possibilities with organizations such as Action Aid, World Vision, Save the Children, Zimbabwe Resilience Building Fund and ZERA (Zimbabwe Electricity Regulatory Authority), which have bio digester construction and other projects ongoing. Wastes from processing facilities such as abattoirs can be effectively utilized as additional feedstock to bio digesters.

The resurgence of organizations such as the Rabbit Breeders Association, The Road Runners Association (free-range chicken), Goat Breeders Association, Mushroom Growers Association and many more which from a Private Sector perspective will benefit the rural farmers given strong linkages and strategic direction in both technical assistance and breed input source and market. Farming of some of the products represented will be beneficial in terms of the space requirements and as grazing comes under threat from reduced rainfall.

Moreover, it different and high meat yielding species especially for goat meat processing, free range chickens and free-range pigs can be strengthened. More adaptive foraging species of plants suited to harsh conditions such as moringa can be adopted. Plants such as Neem can again be adopted, as they have high potential for substitution in treating animals for different conditions such as tick and insect control over and above the normal traditional dipping.

The Farming Model Implementation Process Mapping

1. Identification of the right mix of crops for the farmers

The first stage of the model is to do a selection of the right mix of crops that can be grown profitably by the smallholder farmers. Such crops will be aimed at assisting the smallholder farmer to utilise his land in the most productive way. Crops that will be targeted are those that offer the best prospects for growth and local community development (UNIDO and FAO, 2009). This prioritisation process will emphasise the potential for agriculture commercialisation and agro-industrial development at the local growth points.

The following criteria will be used for selecting crops to be grown by the smallholder farmers:

a. Crops importance to the economy on the basic of (UNIDO, 2009):

    1. Population involved in the production, marketing, processing and related services from income generation and employment perspectives

    2. Relevance in terms of food security

    3. Potential for regional exportation.

b. Availability of inputs needed for farming the selected crops. The inputs needed by the crops will include seed, fertilisers and chemicals. The project will also be looking at the capacity levels needed for profitable production of the crop.

    1. How many hectares of land must be committed to the production of the crop?

    2. Is the crop attractive to the local industry and financial investors?

    3. Level of impact that the crop has on the local value chain.

All the crops that can be potentially grown in a given area shall then be listed and tested using the above criterion. The crops that would have scored high on the above test shall then be considered for farming by the smallholder farmers.

2. Organising Farmers and Helping them Come up with Business Models

The second stage of the model is the organisation of farmers and the construction of business models for each farming group based on the identified crop mix. If the identified crops fall in one farming season then a calculation on how much of the land of the smallholder farmer that needs to be apportioned for the farming of the crop will be done. A business model will then be constructed that will clearly show the following:

1. Land size of each farmer or community

2. The crop/product mix of that is intended for farming and how much of the land of the smallholder farmer or community will be committed for the farming of each crop

3. The cycle in which the crops will be grown (that is if the crops fall into different farming seasons)

4. Available markets and market alternatives for the smallholder farmers i.e. is it going to be sold directs to the final market or indirectly to agro-processors

5. Funding requirements by each farmer or community

6. Projects of the costs and profits expected from each farming venture

This stage will then lead to the next stage of the model

3. Organising Markets for the farm produce

This stage of the model will involve the identification of well-paying markets for the crops that will be produced on the farms. Such market might include agro-processors or selling directly to organised markets e.g. auction floors for tobacco. If the crops have to go through agro-processors then this step will form the first step of mapping the value chain of a product. (See chapter two). An estimation of the size of the market shall also be made and the logistical constraints encountered when trying to supply that market.

Integrated Farming Approach methodology (IFA) The IFA Model objectives

An Agro-Business model that seeks to achieve the following objectives:

1. To contribute towards food security and sustainable livelihoods development for resource constrained smallholder farmers by facilitating a more advanced and focused model of productive use of land

2. Develop appropriate climate compatible energy solutions for the farming community by building capacity of local communities to access and use renewable energy sources for livelihood diversification and improvement. (innovation platform)

3. Decentralization of industry and industrial activities to selected locations in the rural areas in the medium to long term

4. Generate and disseminate policy lessons to improve rural food and energy security under a changing climate.

Structure and stages of the model

The strength of the IFA model is the achievement of the above-mentioned objectives through organised mentorship farming. This model seeks to address the shortcomings of the current practices of contract farming which do not transfer skills and economic value to the communal and smallholder farmers.

The following are the stages in the model development:

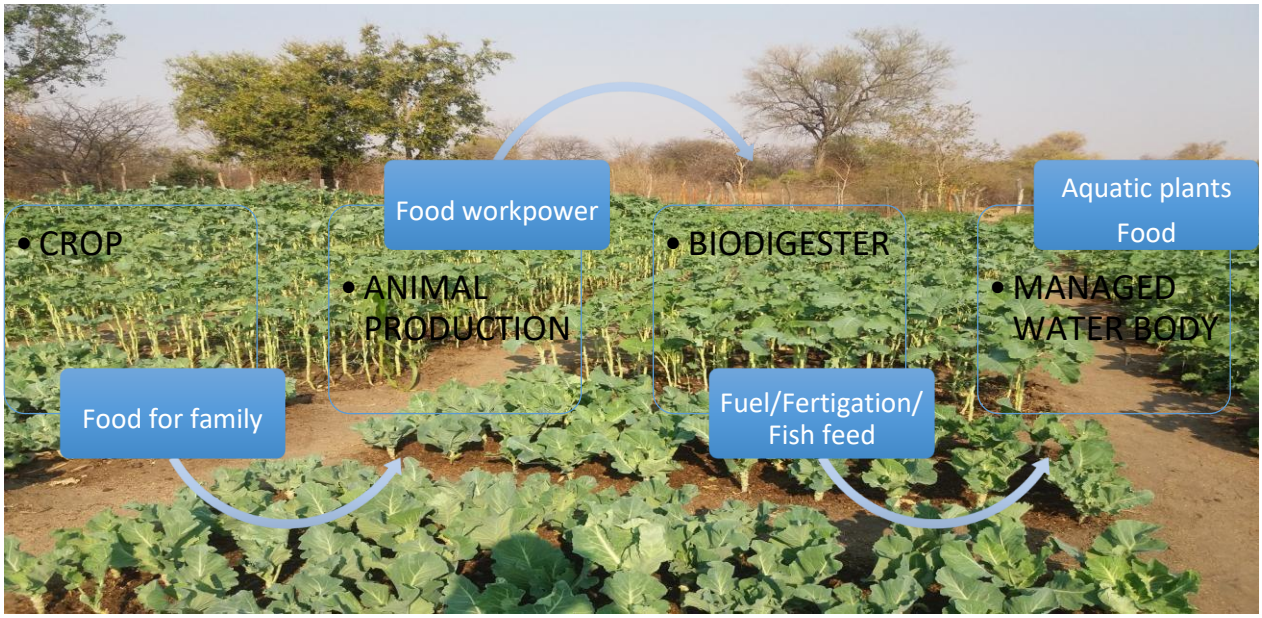
1. Selection of a combination of crops and livestock that can be managed profitably by the communal and smallholder farmers. The crops shall be selected on the basics of importance, compatibility and attractiveness.

a. Importance - by growing the crop combination the farmers should contribute their own food security with food security with excess for sale or processing to enhance income generation and therefore achieve sustainable livelihoods

b. Compatibility- Any by-products from the selected crops or animals will constitute inputs for one or more activities

c. Attractive - Local and or International financial investors should be willing to inject finances into the growing of such crops by the communal and smallholder farmers.

Mapping the value chain of the selected crops. At this stage we will be determining the markets and market sizes for the selected crops, the processing that needs to be done to the crop before it reaches the market and the current processors of the crop (including their capacities), identification of the potential areas where the selected crops can be grown and the inputs and infrastructure requires for the effective farming of the selected crops, the current suppliers of the inputs (including their current capacities).



WATER SOURCE	CROP	ANIMAL PRODUCTION	BIODIGESTER	MANAGED WATER BODY
Groundwater extraction Rehabilitating and adopting existing boreholes for commercial water exploitation	Vegetable gardens Main Targets: Potato Sweet Potato Onion Others... 3 Crops per year using combination of rain weir and ground water where all systems are available	Cattle Goats Free range Pigs Free range Chickens Fish	Fuel Fertigation Processed manure	Fish Farming Harvested Off Season Storage Animal water Duck pools
Dams and Weirs Harvested during rainy season and from wetlands discharge	Vegetable gardens Main Targets: Potato Sweet Potato Onion Others... 3 Crops per year using combination of rain weir and ground water where all systems are available	Ducks Cattle Goats Fish	Fuel Fertigation Processed manure	Fish Farming Harvested Off Season Storage Animal water Duck pools

Rain	Developing value chains for drought resistant crops, and implementation of conservation agriculture/climate smart agriculture	Promotion of growing of free range drought resistant livestock Developing markets for free range livestock		Dam and Weir recharge

WATER SOURCE	CROP AND AREA	ANIMAL PRODUCTION	BIODIGESTER SIZE	INFRASTRUCTURE
Groundwater extraction Rehabilitating and adopting existing boreholes and wells for commercial water exploitation	Gardens 0.5 – 1Ha 3 Crops per year using combination of rain weir and ground water where all systems are available	 50 Goats 50 Free range Pigs 1000 Free range Chickens Fish	2-5 m3	Solar Pump installation Fish Pond Animal fencing Animal pens Chicken sheds

Dams and Weirs Harvested during rainy season and from wetlands discharge	Vegetable gardens Main Targets: Potato Sweet Potato Onion Others... 3 Crops per year using combination of rain weir and ground water where all systems are available	Ducks Cattle Goats Fish	5 – 10m3 Might requires seasonal support from ground water source	Solar Pump installation Dam Weir Animal fencing Animal pens Chicken pens
Rain	Developing value chains for drought resistant crops, and implementation of conservation agriculture/climat e smart agriculture	Promotion of growing of free range drought resistant livestock Developing markets for free range livestock	**5 – 10m3** **Requires support from ground water source**	Solar Pump installation Dam Weirs Ground Water Recharge System development

NOTES:

The Models above attempt to match the varieties and quantities and size of infrastructure which could be selected based on a matrix of factors.
The most important factors which will guide the decision-making process will thus be:

1. The available size of land for the farmer or community
2. The availability of a perennial supply of water
3. The availability and proximity of services in the immediate area

Processing of horticultural products Component 1: Modelling Integrated value chain development (IFA model) with a strategic ground water development, empowerment of Youth and Women in rural and new resettlement of communities	Horticultural produce (High), Labor (Low), Sunshine (High), Electricity (Low), Land (Small), Capital (Medium), Market demand (High) and Water (Low)Outcome 1: Development strategies and policies relevant to each sectoral value chain from conception with concrete guidelines and measurable in quality standards and repeatability of result	Dried onions, mufushwa, dehydrated green paper, etc.1.1: Relevant policies and strategies for small holder based value chains reviewed, and CCA mainstreaming measures targeting selected and piloted 1.2: Youth and gender equality policies strengthened through active participation and consultations with rural communities clarity of purpose 1.3: Pilot model on value addition and beneficiation with active waste management and recycling developed for private/ public up take 1.4: Stakeholders, MoA/MID/Agritex are trained on support initiatives and measures to enable them to provide support and field extension services to industry, rural community projects 1.5: Value chain development for selected climate resilient pilot product is mapped and guidelines adopted for evaluation of environmental impacts and benefits
Processing of milk Component 2: Pilot demonstrations on resilience for value addition models for rural community's development focusing on water efficient farming technologies, primary value addition and recycling and treatment of waste products for secondary value addition	Milk (High), Electricity (Medium), Market demand (High), Labor (Low), Capital (High), Technical skill (Medium), Land (Small) and Water (Low). Outcome 2.1: Increased resilience, adaptive capacities and independence of community projects on external inputs for projects sustenance Outcome 2.2: Improved sustainability of ground and harvested water resources in targeted areas	Making powdered milk, cream separation, butter making and cheese making,2.1: Pilot water, land and forestry efficient farming technologies that ease pressure on surface and ground water resources, minimize land degradation and deforestation 2.2: Train the Trainer principle is adopted with each trainer ideally selected from Agriculture training institutions and additional skills imparted at the demonstration site before being released to the community to provide localized technical guidance and assistance

Livestock Fattening Component 3: Localizing the understanding of ground water as a basis to build, sustain and empower with emphasis on women and youths as key custodian partners	Livestock (high), land (medium), water (high), feed (high), market demand (high), labor (high) and capital (high). Outcome 3: Build and strengthen owner driven localized community development enhancement project initiatives supported by management built in reporting and management information systems	Quality livestock for slaughter 3.1: Trained trainers capacity enhanced through scheduled development, trend and knowledge sharing briefs held at least twice a year and bringing together Trainers from all areas and sites under schemes across the country 3.2: Graphic training materials produced on effects and solutions related to efficient ground water usage 3.3: Gender balance ratios achieved through selection/recruitment of enhanced Train the Trainer program on equal representation basis
Processing of livestock Component 4: Project monitoring and evaluation	Livestock (High), Labor (Medium), Capital (High), Market demand (High), Electricity (Medium), Water (Medium), Land (medium), and Technical skills (Medium). Outcome 4: Establishment of Hub and Spoke interactive information monitoring and delivery electronic platform with specific pre-set data collection templates	Leather, processed meat, glue, etc. 4.1: Information disseminated to Trainers through established electronic platforms and in turn shared with local communities through established platforms and briefs at regular pre-set times 4.2: Information gathered from communities centralized and documented

Cost Estimation for the proposed project interventions

Particular		Allocation				Total
		Binga		Buhera		
		Ward 19	Ward 25	Ward 20	Ward 23	
Groundwater Extraction 40% allocation	Water Exploration					
	Drilling and equiping new boreholes					
	Rehabilitating and equiping existing boreholes					
	Siting and Construction of dams/weirs					
	Rehabilitation existing dams/weirs	329,000.00	329,000.00	329,000.00	329,000.00	**1,316,000**
Implementation of IFA model 60% allocation	Crop and vegetable production, Animal Husbandry, Biodegesters, Local value addition, Fisheries,	493,500.00	493,500.00	493,500.00	493,500.00	**1,974,000.00**

INDEX 1 - STAKEHOLDER CONSULTATIONS
BINGA
1. Binga Chief Pashu Interview

Date of meeting:	September 25 & 27, 2019	
Location:	Pashu, Binga	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Chief Pashu Interview	
Chief Pashu	Official	Chief Pashu
NIOM	Officials	Mr. Matara Mr. Gumede Mr. Gara Mr. Murwira Mr. Nyabunze Mrs Ncube Ms Ndebele

Key Points from Chief Pashu (Ward 19)

- Water is a priority despite our proximity to the Lake Kariba.
- Historically we were promised to have tap water in our homes after being removed from the Zambezi.
- In Binga we have big rivers which pass through the district but dams were built upstream and therefore they do serve us.
- People in Tonga are highly politicized therefore you may face resistance from them if they think the project is political.
- We have pieces of land which are fertile and have not been used as a result of lack of access to water for productive purposes.
- We have a lot of boreholes which were drilled in Ward 19 by Save the Children, but however some of our trusted boreholes are now running dry. Save the Children has been operating in the district for the past 37 years. The boreholes drilled are not mechanized and we need them to be mechanized. People now want dams to capture rain water for productive purposes.
- The boreholes which have been drilled have not changed our lifestyles because we cannot use the water for bigger projects.
- A lot of our area has coal and the water needs to be treated before it is consumed. The water also is salty in some areas.
- Cattle are dying in their hundreds because of lack of water.

- We have one dam which was pegged recently and it is now at the designing stage. We have 2 other sites which are not yet pegged. Tinde, Manyanda, Mulindi and Nakapande rivers are sites were dams could be built.

- Siltation is problematic especially along Tinde River. A dam along the river silted at Chinego area. The major causes of siltation are the sandy soils which are prevalent in Binga, overstocking livestock and streambank cultivation.

- Specific mechanized boreholes are needed at Tinde area so that large irrigation farming is carried out.

- Lusulu is the bread basket for Binga. There are no rivers but there is fertile land. Coal was discovered in the area and therefore can be a challenge when it comes to use of borehole water. Lusulu produces food for 6 districts in which include Gokwe, Binga, Tsholotsho, Nkayi, Bubi and Lupane.

- In Binga there is only one irrigation scheme which is Kariangwe Scheme.

- Villagers are now getting into cooperatives for building weirs so as to capture rain water and utilize it for productive use. Most weirs run dry 3 months after the end of the rainy season thus are not able to sustain the intentions of villagers which is of getting bigger producing all year round.

- The weirs are the low hanging fruits.

- We do not like NGOs they come here with already concluded projects which they implement without consulting us. ADRA is coming to feed children and old people, but we do not need these food packages we want viable projects which can allow people earn money for themselves. We would prefer seed than food.

- Under Pashu ward we have 6 villages, 60 000 people, 38 schools (secondary and primary) and 9 clinics, only 5 of which are functioning. As the Chief, Chief Pashu has three wards under him which are; Pashu, Tinde and Dobola wards.

- Some schools have no boreholes and these include; Siyadindi, Simaliza and Katete.

Inspections in Areas under Chief Pashu

- It was revealed that 3000 cattle depend on the Sayili weir but it had dried up in August. It was also revealed that at the site of the weir there used to be a natural pool historically and that is the reason why the site was chosen for the weir.

- There are 128 stock cards with an average of 20 cattle per card.

- Windmills are ideal in the areas under Chief Pashu because the area is flat and there is a lot of wind.

- Zunde Ramambo has about 100 hectares of fertile land and we plan to produce maize, sorghum and citrus fruits.

- We noted that Pashu Secondary and Primary schools' had a windmill which was not working and needed repair.

- It was revealed that 520 cattle drink water at Kambana 2 borehole · It was revealed that there are 8 weirs in Ward 19.

- It was noted that there was a heritage site in Ward 19 in Lobengula village. The site is called The Lobengula cave.

2. Binga Chief Saba Interview

Date of meeting:	September 27, 2019	
Location:	Chief Saba, Binga	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with Chief Saba	
Chief Saba	Official	Chief Saba
NIOM	Officials	Mr. Matara Mr. Gumede Mr. Gara Mr. Murwira Mr. Nyabunze Mrs Ncube Ms Ndebele

Key Points from Chief Saba (Ward 25)

- We have hot springs in the ward.
- There are no boreholes in a lot of areas, wells are there but most of them are dry.
- Land for farming is very good but there is no water to utilize it.
- Boreholes which are in the area, some of them are broken and need repair. The water from some of the boreholes is salty and not drinkable.
- There are a few people near the Forestry area.
- The Ward is generally very sparsely populated because of water scacity
- The forestry area covers almost half the ward

3. Binga Ward 19 - Focus Group Minutes Manyanda Village

Date of meeting:	September 26/09/ 2019
Location:	Manyanda Village
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.
Purpose:	Focus Group Meeting

Ward 19 Binga	Official	Chief Pashu
NIOM	Officials	Mr. Matara Mr. Gara Mr. Murwira

Focus Group Manyanda Village

- 4 youths were represented and they were all males · 5 villages were represented.
- 16 men responded to the focus group meeting as compared to 30 women who responded.
- Key Points from the Men group.

- Activities done as a source of livelihood; cotton farming, gardening, livestock rearing, blacksmiths and sculpting.
- Climate change has affected their planning system especially for cotton farming. Fertilizes provided as inputs at times burn crops when it fails to rain. Climate change is reducing their crop yield and resulting in death of our livestock.
- It was revealed that none of the participants present had ever considered migrating or had migrated from Binga before.
- It was revealed that the people had access to land but did not have access to water.
- Water was owned by the community, whilst land is family owned.
- It was revealed at times boreholes breakdown and take time to repair. They need mechanical equipment so that they can properly construct small dams.
- They plant vegetables normally in the dry season. They also do piece jobs (provide part time labor) for survival.
- Some boreholes are locked during the night and are unlocked in the morning so that water is shared equally among community members.
- Villagers have designed a duty roster, which is used to manually pump water from the borehole for livestock to drink during the dry season.
- It was suggested that there was need for construction of more dams and boreholes should be left for domestic consumption only. Dams will be used for livestock drinking and other productive uses. It was suggested that more boreholes be drilled.
- Due to people queuing for water at boreholes naturally conflicts arise for one reason or another. It was revealed that some people are very harsh to livestock when they want to drink water.
- It was revealed that the RDC gives villagers free pipes for repairing boreholes, however they are not given transport to bring the pipes were they are needed. Some of the boreholes were drilled by the RDC.
- The councilor is the middleman between the RDC and the villagers and the chiefs are for local decision making and land demarcation.
- The community maintains the boreholes by themselves with the assistance of pump minders.
- It was revealed that water from boreholes was of acceptable quality.
- Save the Children and DDF drilled boreholes and all had been successful.
- It was revealed that potential NGOs should consider consulting with the community before they implement their projects. It was suggested that they also consider population growth in their plans
- It was highlighted that if water was made available the villagers would do large-scale irrigation and everyone will have a job to do. Livestock will also live well.
- Villagers indicated some of the projects they would prefer if access to water was strengthened.

Table 1: Number of villagers per project and their input proposals

Project	Number	Key Stakeholder Inputs
Cattle	10	We need a market for selling our livestock.
Gardening	12	We need suitable transport amd market for perishables.
Irrigation farming	6	We need contract farming
Chickens	4	We need markets and good prices.
Goats	5	We need reliable transport so that we can take them to bigger cities, which have a larger market.
Consolidated Farming (Livestock and irrigation farming	8	We need contract farming
Buying and Selling	2	We need access to capital at affordable interest rates so that we can stock.

4. Binga Ward 25 Interview with the Councilor

Date of meeting:	September 26/09/ 2019	
Location:	Ward 25	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Local Councilor Interview	
Ward 25 Binga	Official	Councilor
NIOM	Officials	Mr. Gara Mr. Murwira

Ward 25 Key Points

- It was revealed from interviews with the councillor that the deepest borehole drilled was 70-90 meters deep.
- From general observations ward 25 looked less developed compared to ward 19 and our assumption is that it is because of lack of access to water.
- We noted that villagers in some instances walk almost 7km to fetch water from Lubanda River.
- People do not find time to do other productive initiatives as they would be busy fetching water for the better part of the day.
- We observed that people in ward 25 had access to Radio Zimbabwe signal as a result of their proximity to Kamativi Base station.
- We observed that in most parts of Lubanda village is rocky with no good arable soils.
- It was revealed that people survive from selling their livestock.

- We noted that some groups of people in the ward survive on weaving and selling baskets.
- We observed that people want dams but feel that they will dry up before the new rainy season starts therefore it is not a lasting solution. Siltation is also a concern considering the soils in area and the vegetation cover.
- There are 10 small dams in ward constructed by DDF and only 4 currently still have water.
- People is Lubanda keep a fair size number of free range pigs
- People in the village Lubanda participate in food for work for them to obtain food to feed for themselves.

5. Binga Ward 19 Group

Date of meeting:	September 26/09/ 2019	
Location:	Ward 19	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Transient Walks - General Observations	
Ward 19 Binga	Official	Chief Pashu
NIOM	Officials	Mr. Matara Mr. Gara Mr. Murwira

Binga Ward 19 – Transient Walks - General Observations

- Noted that mostly women were the ones fetching water at the boreholes using 20 litre buckets.
- WE observed children of school going age which were fetching water for domestic use during school time.
- We observed that for every borehole which had water there was a community garden located nearby.
- Most cattle in the Ward looked healthy and there were also plenty of goats in the areas possibly out numbering the cattle in the ward.
- We also observed that women were the ones doing the irrigation of gardens with water from boreholes. It was revealed that most able-bodied men did not stay and work in Binga.
- We observed that men in the ward liked to play football judging by the number of soccer fields which were dotted across the ward.
- We observed that most households did not have chickens and it was revealed that chickens were killed by the Newcastle outbreak.

6. Binga Contacts List

Contact person	Agency	Phone number
T Rosen	ZInwa Sub catchment manager	0712239873
S Mwinde	Lower gwayi subcatchment area	0772 550 523 smwiinde@gmail.com
Ndlovu	AGRITEX Supervisor	0712 327 401
Pashu	CHIEF ward 19	0713887138
Saba	Chief ward 25	0778385036/0739823984
Banda	DA	0773 496 425 dabinga@yahoo.com
	BINGA RURAL DISTRICT	0772 933 081 bingardc@gmail.com
NYANYIWA	DDF	0713 613 825 Knyanyiwa66@gmail.com
MOREBLESSING	NGO ZRBF	0772 802 914 moreblessing.mhlanga@gmail.com
Nyaradzo Ncube	Agritex Tinde Centre	0782360739
Mudimbwa	EMA	0773 507 343

Buhera

7. Buhera Chief Nyashanu Interview

Date of meeting:	September 11, 2019	
Location:	Kandenga Village, Buhera	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with Chief Nyashanu	
Chief Nyashanu	Official	Chief Nyashanu
NIOM	Officials	Mr. Matara Mr. Gumede Mr. Gara Mr. Murwira Ms. Nyambo Mr. Nyabunze

Key Points

- Buhera is generally a dry area
- You should get information you want from the people directly; I will organize that you will meet the people.
- There is a borehole drilled at the Chief's homestead but currently no water is being drawn out.
- Government officials operating in the district do not come from Buhera hence some of them do not want to develop the area.
- Government did not respond to our plea when we wanted to reconstruct a bridge which had collapsed some years ago.
- There are a lot of areas with no boreholes and people are surviving on river water which is polluted.
- Areas which need immediate attention with regards to access to clean water are those near Save River.
- It was suggested that there was need for construction of more dams and boreholes should be left for domestic consumption only. Dams will be used for livestock drinking and other productive uses. It was suggested that more boreholes be drilled.
- Often people que for water especially during dry season and at times some minor conflicts arise. In some circumstances they are taken to the local headman for resolution. These normally occur especially between people with and without large herds of livestock.
- RDC gives villagers free pipes for repairing boreholes, however they are not given transport to bring the pipes where they are needed. Some of the boreholes were drilled by the RDC and others by various NGOs but there is no clear maintenance apart from local ill-equipped pump minders.
- The councilor is the middleman between the RDC and the villagers and the chiefs are for local decision making and land demarcation.

8. Buhera District Administrator Interview

Date of meeting:	September 10, 2019	
Location:	Buhera Centre, Buhera	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with District Administrator	
District Administrator	District Administrator	Mr Mavhisa

NIOM	Officials	Mr. Matara Mr. Gumede Mr. Gara Ms. Nyambo

Key Points

- Irrigation schemes will be ideal in this district.
- Some people in the district have developed donor syndrome and do not want to work.
- Livestock (cattle) has been affected by January disease.
- Small grains do well in the district.
- People are not interested in commercial farming of small grains because they are labour intensive.
- People in the district have embraced World Vision's Feedlot concept.
- The uptake of projects from people is very poor, there is need for a shift in approach whereby engagement is done and not prescribing projects to people.
- Overall if engagement is remodeled and water sources strengthened there will be far greater results.
- Dams should be considered as most rain water is not harvested in the district
- There is a need to strengthen education on land degradation and methods to minimize.

9. Buhera Centre Agritex Interview

Date of meeting:	September 10, 2019	
Location:	Buhera Centre	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with the Agritex Buhera Centre	
Agritex Buhera Centre Offices	Officials	Mr. Mafukidze Mr. Mwandifura Mr. Pfekenye Ms. Chierengo
NIOM	Officials	Mr. Gumede Mr. Gara Mr. Nyabunze

Key Points from Agritex Officials

- In ward 20 and 23 there are good soils which are suitable for various agricultural activities.
- Aquaculture is also another viable livelihood option which can be carried out in the wards.
- Water points for livestock should be considered in the project.
- The mode of extraction of water from the ground should be considered.
- Livestock (cattle) has been affected by January disease.
- Dams and weirs to harvest rainwater should be constructed
- Soil erosion and river siltation has become a major challenge
- There is a need to strengthen education on land degredation and methods to minimise.
- The Agritex officers do not have sufficient tools and transportation to effectively monitor and train villagers
- It was revealed that all villagers at the meeting had lost their livestock due to poor rainfall as a result of climate change. I
- It was also established that cattle were now dipping after 5 months leading to them being susceptible to tick diseases.
- It was revealed that 2019 had been plagued by an outbreak of January desease resulting in deaths of many cattle. Actual numbers could not be established as Villagers tended to underdeclare as they quickly sold any animals that showed signs and symptoms to illegal meat dealers.

10. Buhera Agritex Officers and Headman
Interview

Date of meeting:	September 11, 2019	
Location:	Mudawose Clinic,Ward 23, Chirozva Village Buhera	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with the Agritex Field Officers and Headman	
Mudawose Clinic	Agritex Officials Headman	Mr. Chidhakwa Mr. Murinda Mr. Mbozhera Mr. Chirozva
NIOM	Officials	Mr. Matara Mr. Gara Ms Nyambo

Key Points

- Nzungu and nyimo are key crops in Buhera. Prices from GMB are very low, thus people get better prices from private players.
- Southern Part of Buhera is a prime area for cattle, but it is prone to diseases.
- Poor dipping services provision from government is causing diseases like January diseases. This has led to the cost of livestock farming.
- There used to be a market centre for cattle. This removed the middleman so that farmers got value for their cattle and crops. Farmers need market linkages and training of our farmers.
- Nzungu and nyimo require sandy loom soils and require less moisture.
- Roadrunners and goats are a good form of livestock which can be reared in the area.
- Consideration of cattle fattening to complement World Vision project.
- Form groups of child headed families and empower them.
- Ward 20 & 23 there are places which are sacred. Some of them include Mupeza Mountain and Madziva eshumba.
- EMA is protecting the area around Nyazvidzi River.

11. Buhera Focus Group Meetings Chirozva

Date of meeting:	September 12, 2019	
Location:	Chirozva	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Focus Group Meeting	
Ward Focus Group	Official	Chiefs Headman.
NIOM	Officials	Mr. Matara Mr Gumede

Focus Group Meetings

A Focus group meeting where carried out at Chirozva Village in ward 23 on September 13, 2019. In ward 23 it was noted there were 27 villages. Participants were split into two broad categories, which are men and women. It was noted that men turned out in large numbers as compared to women.

Findings for Focus Group Meeting in Chirozva Village

1. Men Group

- 40 men attended the focus group meeting. Elderly men constituted over 60%nearly all those who attended the meeting.

- Farming activities were identified as the main sources of livelihood in the ward. Other livelihood alternatives which were identified are livestock rearing, gardening, sculpting, furniture manufacturing, well digging, making ice-lolly, traditional beer brewing, piece jobs and shoe repair services.

- Concerns were raised on the recent weather patterns which seem to have adversely affected both agriculture yield and livestock. The table 1 shows some of the effects which were highlighted by the villagers:

Table 1: Effects of water shortages on livelihoods

Items	Effect
Boreholes	Drying up early before the new rainy season
Wells	Drying up early before the new rain season begins. This also is affecting people who making a living from digging wells.
Crops	Drying up as result of lack of moisture
Livestock	Cattle and goats dying as a result of lack moisture.
Wild Fruits	Wild fruits no longer bearing fruit due to drought.

- It was revealed that all villagers at the meeting had lost their livestock due to climate change. It was also established that cattle were now dipping after 5 months leading to them being susceptible to tick diseases.

- Schools, dip tanks and business centers are places where you find most of the boreholes located. Therefore, the way they are set up makes people staying far from the centers travel long distances in search for clean drinking water.

- It was also revealed that some villages had no boreholes at all and they had to go to another village.

- Villagers revealed that most of the boreholes were sunk by NGOs, whilst the DDF does the repair of boreholes.

- Villagers noted that the RDC role was to provide services to them, but said they have never heard of the sub-catchment councils.

- It was established that Red Cross and Goal had carried out projects in gardening for the community. However, it was noted that they were no longer functioning because the rivers had dried up in which water was being drawn. Villagers said NGOs should consider carrying out surveys of groundwater and drill boreholes so that there is permanent water supply.

- It was highlighted that weir dams should be constructed so as to capture rainfall.

- Villagers also revealed that not all of them wanted to be prescribed on which projects to do but would prefer to have access to water permanently so that they can various projects they wish to do. Table 2 shows number of villagers per project of their choice;

Table 2: Number of villagers per project and marketing proposals

Project	Number	Key Points to marketing
Cattle	12	We need a national market for selling our livestock.
Gardening	14	We need contract farming and suitable transport for perishables.
Brick molding	2	We need to be provided with space at shopping complexes so that we can sell our products. We need boreholes in our villages to be located in places we can easily access them.
Irrigation farming	8	We need contract farming
Chickens	3	We need contract farming, big companies like Irvines should bulk buy from us.
Free range chickens	1	We need contract farming.
Goats	4	We need reliable transport so that we can take them to bigger cities, which have a larger market.
Orchards	4	We need contract farming, big companies like Matanuska should bulk buy from us
Consolidated Farming (Livestock and irrigation farming	3	We need contract farming
Buying and Selling	1	We need access to capital at affordable interest rates so that we can stock.

2. Women Group

- Only 9 women attended the scheduled meeting.
- They are carrying out cooperative gardens to get food but the boreholes are not yielding enough water anymore.
- Climate change is causing frequent occurrences' of drought. Plants and animals are dying as a result of these droughts.
- There are also outbreaks of diseases that are killing livestock.
- Most women rent land on which they farm.
- At times verbal fights are happening between members of the public due to water shortages.
- Projects that have been carried out by other organizations were on cooperative gardens and livestock production.
- Some of the projects struggled as a result of conflicts between leadership and some due to failed management by those in charge.

12. Buhera Focus Group Meetings Kadenga

Date of meeting:	September 12, 2019	
Location:	Kadenga	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Focus Group Meetings	
Ward Focus Group	Official	Chiefs Headman.
NIOM	Officials	Mr. Gara Ms. Nyambo Ms. Chierengo Mr. Nyabunze

Focus Group Meetings

Focus group meetings where carried out at Kandenga Village in ward 23 on September 13, 2019. In ward 23 it was noted there were 27 villages. Participants were split into two broad categories, which are men and women. It was noted that men turned out in large numbers as compared to women.

Findings for Focus Group Meeting in Chirozva Village

3. Men Group

- 44 men attended the focus group meeting. Elderly men constituted nearly all those who attended the meeting.

- Farming activities were identified as the main sources of livelihood in the ward. Other livelihood alternatives which were identified are livestock rearing, building, gardening, basket weaving, sculpting, furniture manufacturing, buying and selling, fishing, well digging, making ice-lolly, traditional beer brewing, piece jobs and shoe repair services.

- It was revealed that extreme weather patterns were affecting the livelihoods of villagers. The table 1 shows some of the effects which were highlighted by the villagers:

Table 1: Effects of water shortages on livelihoods

Items	Effect
Boreholes	Drying up early before the new rainy season
Wells	Drying up early before the new rain season begins. This also is affecting people who making a living from digging wells.
Crops	Drying up as result of lack of moisture
Livestock	Cattle and goats dying as a result of lack moisture.
Fishing	Fishing areas are drying up before the new rain season.
Wild Fruits	Wild fruits no longer bearing fruit due to drought.
Reeds	Due to dryness reeds, which are used in the weaving of baskets, are now in short supply.

- It was revealed that all villagers at the meeting had lost their livestock due to climate change. It was also established that cattle were now dipping after 5 months leading to them being susceptible to tick diseases.

- 10 villagers have considered leaving Buhera because of shortages of water. They said they preferred areas, which were up north or east of Buhera.

- Schools, dip tanks and business centers are places where you find most of the boreholes located. Therefore the way they are set up makes people staying far from the centers travel long distances in search for clean drinking water.

- It was also revealed that some villages had no boreholes at all and they had to go to another village. It was also noted that most of the boreholes in the village had broken down and some had salty water, which was not suitable for human consumption. At Mupeza school water from the borehole is salty which at times cause running stomach.

- Villagers revealed that most of the boreholes were sunk by NGOs, whilst the DDF does the repair of boreholes.

- Villagers noted that the RDC role was to provide services to them, but said they have never heard of the sub-catchment councils.

- It was established that Red Cross and Goal had carried out projects in gardening for the community. However, it was noted that they were no longer functioning because the rivers had dried up in which water was being drawn. Villagers said NGOs should consider carrying out surveys of groundwater and drill boreholes so that there is permanent water supply.

- It was highlighted that weir dams should be constructed so as to capture rainfall and stop it from flowing into Save River which eventually gets to Indian Ocean.

- Villagers also revealed that not all of them wanted to be prescribed on which projects to do but would prefer to have access to water permanently so that they can various projects they wish to do. Table 2 shows number of villagers per project of their choice;

Table 2: Number of villagers per project and marketing proposals

Project	**Number**	**Key Points to marketing**
Cattle	6	We need a national market for selling our livestock.
Gardening	14	We need contract farming and suitable transport for perishables.
Brick molding	2	We need to be provided with space at shopping complexes so that we can sell our products. We need boreholes in our villages to be located in places we can easily access them.
Building	2	Cement prices are affecting our trade.
Irrigation farming	2	We need contract farming
Chickens	3	We need contract farming, big companies like Irvine should bulk buy from us.

Beekeeping	1	We need to be provided with chemicals and be able to sale our produce at a central place.
Weaving	1	We need local art centers where we can sale our products.
Turkeys	1	We need contract farming.
Goats	2	We need reliable transport so that we can take them to bigger cities, which have a larger market.
Orchards	4	We need contract farming, big companies like Matanuska should bulk buy from us
Fishing	1	We need access to fishing permits. We need access to bigger markets so that we can sell in bulk.
Consolidated Farming (Livestock and irrigation farming	1	We need contract farming
Buying and Selling	1	We need access to capital at affordable interest rates so that we can stock.

2. Women Group

- Only 7 women attended the scheduled meeting.
- People struggle a lot to get food. They are carrying out cooperative gardens to get food. · Climate change is causing frequent occurrences' of drought. Plants and animals are dying as a result of these droughts.
- There are also outbreaks of diseases that are killing livestock.
- Most women rent land on which they farm.
- There are conflicts between leaderships. People at times accuse each other of witchcraft because of hate and jealousy.
- Fights are happening between members of the public due to water shortages.
- Projects that have been carried out by other organizations were on cooperative gardens and livestock production.
- The projects failed as a result of conflicts between leadership and some due to failed management by those in charge.

13. Buhera Focused Group Meeting Baravara

Date of meeting:	September 13, 2019	
Location:	Baravara	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Focus Group Meetings	
Ward Focus Group	Official	Chiefs Headman.
NIOM	Officials	Mr. Gara Mrs Chidkakwa

Findings for Focus Group at Baravara Shopping Center Ward 20.

In ward 20 a focus group meeting was carried out Baravara Shopping Centre on September 14, 2019. Participants were split into two broad categories, which are men and women. It was noted that men turned out in large numbers as compared to women.

1. Men Group

- It was noted that there are 18 villages in ward 20. Of the 18 only 9 villages were represented.
- 18 men came for the focus group meeting. Two youths were identified with the group.
- It was noted that almost all forms livelihood were the same between wards. However, wielding was identified as one of the alternative sources of livelihood.
- It was established in this ward that cattle were taking up to 3 months without dipping. From the people present it was noted that 14 of them had lost their livestock as a result of water shortages and tick borne diseases.
- It was noted that Baravara dam was affected by siltation caused by upstream farming activities and cattle trembling. It was also revealed that the fence which used protect the dam was stolen.
- It was noted that youth had considered moving out of Buhera due to water shortages affecting their sources of livelihoods. An elderly said he once he migrated from Buhera to Chivhu only to return after some time.
- It was established that boreholes in the ward should be drilled more than 75 meters.
- It was also revealed that most of the villages had no boreholes meant for them except for those at shopping centers and schools. It was revealed that Vengesa village has 185 households, which use a single a borehole. Makanyisa village has 108 households that use one borehole.
- It was establish that for the ward the water table is too deep making it impossible to dig wells manually.

- It was revealed that people were farming in river banks which was causing rivers to quickly to dry up
- It was noted that the council was not visible and the people were not aware of the subcatchment council.
- It was established had been involved in the ward since 2004 doing livelihood projects which include cooperative gardens, providing 20 drip kits, provision of 20 treadle pumps, women goats and guinea fowl project, beekeeping project.
- It was revealed that treadle pumps were given to older people who could not use them, hence the project did not bear fruit. For the goats project it was revealed that only 2 male goats are left and they cannot be able to breed with the many female goats in the ward.
- It was also establish that for one of the Red Cross project on a cooperative garden the fence was stolen hence the project is no longer viable. However, the other was still functioning.
- It was also established that Goal had a project on cattle in the ward.
- It was noted that roads needed to be repaired so that they can be able to transport their produce efficiently.
- It was also noted that the ward needed to have a similar market day as the one, which is done in ward 23 so that they will not need to travel long distances to sale their produce on the market day.

2. Women Group

- Farming is our main source of livelihood.
- Climate change causing drought, destruction of buildings.
- Goal established bull and goat projects in the ward.
- Red Cross established a gardening project in the ward.

14. Buhera SME Questionnaire responses Chirozva Bus Centre

Date of meeting:	September 13, 2019	
Location:	Chirozva Business Centre	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with SMEs	
	Agritex Officials Headman	Mr. Chidhakwa Mr. Chirozva
NIOM	Officials	Mr. Matara Mr. Gara Mr Nyabunze

Questions	Response 1	Response 2	Response 3	Response 4	Response 5	Response 6	Response 7	Response 8	Response 9	Response 10
Sector	Retailing	Welding	Retailing	Retailing	Retailing	Retailing	Retailing	Fast Food	Retailing	Retailing
Number of employees	No employees	No employees	No employees	No employees	5 employees	No employees	1 employee	No employees	No employees	2 employees
Capital to Start Business	Sold 6 cattle	Sold farm produce	Sold small items	Sold farm produce	Sold small items	Sold farm produce	Sold farm produce and traditional beer	Sold farm produce	Mukando (crowdfunding)	From pension
How easy was it to get startup capital	I could not obtain a good prices for my cattle	At first it was difficult	It was not easy	At times goats would eat our produce	It was not easy	It was not easy	It was not easy	It was not easy	It was difficult	Not difficult
Main Market	Church members	Community	Community	Community	Community	Community	Community	Community	Community	Community

Challenges in accessing labour and capital	I have never attempted to obtain loans	Failing to access capital for expansion	We tried to obtain loans from microfinances but the interest rates are not favourable. Currently obtaining loans from relatives and friends	Economic challenges are not allowing us to obtain capital	Engaged microfinance	Inflation is affecting us in accessing capital	Trustworthy people are difficult to obtain. Increase in interest rates hinder obtaining capital	Interest are high	Interest rates are high. Also transport costs are high.	Amounts offered by microfinances to us are not big enough
Access to Borehole/well	I obtain from my home since the borehole and well close by are now dry	My business does not need water	From wells and boreholes	Not easily accessible	No water	No access	No access	No access	Yes a well at the shop	No access
Owner of	Bore hole	N/A	Well are	Individuals	Individuals	Individuals	Individuals	Individuals	Owned by the	Individuals

borehole/well	is for the community and the well for an individual		owned by individuals and borehole by the community						owner of the building	
Ways in which business will improve due to access to water.	I will be able to do other businesses like catering	N/A	We will not lose customers as some request for water first before they buy. If we do not have water they will go to the next shop	It saves our customers the burden of looking for water and focus on buying	Business will improve as churches would consider holding conferences in the area	I would start a butchery	I would build another shop	I would build a bigger canteen	I would be able to buy my own stand and build my own shop	I will buy everything to improve my business

Buhera Contact List

Organisation	contact	Contact details.
Buhera Catchment manager	Mr Muyambo	0772515246
Councillor ward 20	Mr Nangatidza	0714 260116
RDC buhera (civil technician)	Supremo Nyakurimwa	0773697972
Sub-catchment officer	Mr Chiwamba	0773 557 315
DDF	Mandikate	0773623679
DDF	Nherera	0777673604
Agritex head	Mbonani	0773504098
Agritex (Ward20)	Mavhiya	0771264340
Agritex (Ward20)	Mufadzanyasha	0714009158
Agritex (Ward 23)	Chidhakwa	0774305749
Agritex (Ward23)	Murinda	0774590718
DA	Mavhisa	0773021689
Ward 23 councillor		07713355285
Headman ward23	Chirozva	0779027081
BR District councillor		+26325206287
RDC Head	Chibvongodze	0772546389
Chief	Nyashanu	0712 503846
Headman ward 20	Betera	0771390740
EMA	Mhandu	0773285798/ 0718161068
World vision	Choga	0773 092 836/0713 355 285

APPENDIX 2
NON-GOVERNMENTAL ORGANISATIONS (NGO) INTERVIEWS
15. Binga Acton Aid

Date of meeting:	October 11, 2019	
Location:	Milton Park, Harare	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interview with Action Aid	
	Official Contact Details	Mr Eben Tombo +263 772164448/9 or Info.zimbabwe@actionaid.org/Zimbabwe
NIOM	Officials	Mr. Matara Mr. Murwira

Key Points.

- Leading the Resilience Building Fund under the UNDP and Min of Agriculture, Swedish **
- Focusing on Value Chains (mainly Pork and Goat) Goat predominantly in Buhera.
- RBF active in 18 wards in Binga.
- Value Chains strengthening project in partnership with (EC; Agriculture programme) and have put an integration (Zvikomborero farm) in Goat value chains
- To increase the value chain there is need to link small farmers to commercial ones as well as putting small farmers into groups to promote team work. The bigger farmers can now buy from small farmers, can offer tips and help, with breeding, feed, disease etc.
- Are pushing forward the start of Goat Improvement Centres (GIC) where farmers can sell their goats, get information they need, learn innovative ways to practice goat husbandry, share information and practices together.
- Developing of resilience plans at ward level and district level, and strengthening resilience structures in place already moving them away from reactionary stance to a preparatory one when combating human-wildlife conflict in Binga (elephants, crocodiles)
- Are into water harvesting (weir dams), as well as harvesting water from spring and moving it in pipes for use irrigation use.
- Working with Youth to empower them, teaching vocational skills (carpentry) to improve livelihoods, as well as agriculture projects (goat husbandry)
- Involving youth in ICT as well, using bulk sms; Frequency monitoring systems to advise and communicate with farmers to help them prepare (commodities, disasters etc)

- Have a pilot 2-way application Agropal linking small scale farmers, agritex, large scale farmers, markets.
- Working with Ocfin, Greetrade, ISFP, in agriculture prijcts
- Focusing on Youth and Women empowerment
- Binga is a fishing area, so working with Sub-aqua team to provide training and kit to have readily available team in cases of water related accidents (drowning and croc attacks)
- AA has drilled many boreholes in binga and done the rehabilitation, but struggle with lacking information pertinent to drilling sustainable boreholes and could use help from NIOM when planning on drilling otjer boreholes.
- Are planning on investing solar powered boreholes in binga.

16. Binga Save The Children Interview

Date of meeting:	October 10, 2019	
Location:	Fife Avenue, Harare	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interview with Save the children	
	Official Contact Details	Mr Kanengoni +263 772 535111 or +263 772336458 ezekiel.kanengoni@savethechildren.org
NIOM	Officials	Mr. Matara Mr. Murwira

Key points

- Has been in Binga since 1983
- Has been involved in Food security programmes through gardening, has supported agriculture by providing inputs & training.
- Providing aid in terms of food stuffs and cash transfers.
- Drilled boreholes and has done rehabilitation on them.
- Harnessed springs for irrigation
- Have taught household economics, linking households to services and markets

- Partnered with Agribank to give loans to farmers, to give the capacity to sustain themselves, and to curb donor syndrome (has been successful 2 guys have started a kapenta business and have manage sustain it.
- Have provided start-up kits and training as well working with Silveira house
- GOL (NGO) worked on teaching Conservation agriculture. As well as improving livestock projects by teaching value chains and linking farmers to markets. In partnership with MC Meats.
- Water development needs to be the priority in Binga because of the serious lack of.
- Water harvesting needs to be done, because Binga can receive about 67mls of rain in 24 hours, but after a few days all that water is gone.
- Part of the reason there few boreholes in ward 25 Binga is mostly because of villagers resettling regularly (traditional reason in the case where the father of the household dies the entire family usually moves on). As well as the fact that the RDC has condemned water development in the area close to the game reserve because of landmine there.
- Conservation agriculture is a good project to introduce in Binga district as it focuses on trapping the little available water in basins where it last longer. the use the Shaka hoe, and cattle drone ripper, (Conservation Agri used in matepatepa used for wheat production and yielded 10tonnes per hectare it involved planting in the rip line)
- Across the border in Zambia with other Tonga people conservation farming works and yields 5tonnes per hectare in maize.
- Agriculture trust as well as River of life Church have been promoting conversation agriculture)
- Goat husbandry projects started in Binga even had abattoirs from Hwange and Bulawayo involved, but failed to impact because the value chain system was flawed.
- Goats had little impact because of low pricing, so abattoirs pulled out, because of small volumes being moved as well
- To do goat husbandry sustainably a good value chain system must be set up, farmers need to have at least 30 -50 goats to make sizable impact on livelihoods.
- Sand abstraction was tried in Chinegu and Tinde for livestock water but because of very little water in the sand it wasn't very useful (October to November completely dry). the yield of water is higher in April.
- Used a joma pump for the process. people weren't interested in pumping the water especially when their pools of water around for the livestock.
- Boreholes drilled in the areas of involvement by STC were from 55 to 70 m.
- STC good at mobilizing and linking people to markets, resources etc.
- Have done cattle projects and focused on crossbreeding and introducing new breeds to combat issues of disease and draught resistance, also into artificial insemination to improve genes.

17. Buhera MERCI CORPS1 – Questionair Interview

Date of meeting:	September 10, 2019	
Location:	Murambinda Centre	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	NGO Inteview	
MERCI CORPS	Was Officer	Mr. Dangiso Ncube
NIOM	Officials	Ms Nyambo Mr. Gara

INTERVIEW RESPONSE MERCI CORPS

1. What are the core activities of your NGO in the community?

   - Answer: Water access, sanitation, hygiene, ten latrines in ward 5
   - Cyclone response 10 wards of Buhera
   - ISUVALA promote market for small livestock

2. What type of challenges do you face in working with members of the communities?

   - ANSWER: they have faced resistance with the Apostolic sect(managed the resistance by leaving the water guard with the headman)

3. What activities or project initiatives have you implemented to increase the community's access to water for the community?

   - Answer: we are targeting borehole drilling of 10 boreholes (still in process)

4. How long ago were the initiatives implemented?

   - Answer: April ending September

5. What is the biggest risk to continuity of the water initiative?

   - Answer: failure to rehabilitate boreholes

6. What activities or projects have you implemented to improve the livelihoods of community members through underground water abstraction?

- Answer: reduction of diseases through WASH programs Ø Water provision through borehole drilling.

7. What is your advice on proposed project?

   - Answer: Borehole rehabilitation and drilling

8. How can it help build synergies on what you are doing?

   - Answer: Borehole drilling facet water access for hygiene Ø Water quality

9. What are you doing to ensure gender sensitivity and stakeholder participation in your project?
   - By including more women in water point committees (making the chairperson for the committee a woman)
   - Community health clubs

18. Buhera World Vision Murambinda Interview

Date of meeting:	September 11, 2019	
Location:	Murambinda, Buhera	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with the World Vision Official	
World Vision Murambinda	Official Contact Details	Mr. Choga Email address: slchoga@gmail.com Mobile: 0773 092 836/0713 355 285
NIOM	Officials	Mr. Matara Mr. Gara Mr. Murwira

Key Points

- Focus mainly on Livestock and we are targeting an average of 10 wards with the highest number of cattle. We are targeting small holder farmers for cattle and goats.
- Farmers in ward 23 are good at project up taking and they participate during consultations. This in contrast with those from ward 20.
- WASH carried out projects in ward 23 of drilling boreholes for drinking water. Contact **Bothwell Mhashu** from WASH for more information on the project **(0772 633 578/ 0713 964 228).**
- With the livestock project they intend to do breed improvement, commercialization of cattle farming, fodder production in drought prone areas, construction of weir dams, solar boreholes for irrigation of pastures and water for livestock.
- They intend to construct cattle business centres which are going to be managed by private players like Koala. The private players will also train farmers on livestock farming.

- Other NGOs carrying out projects in the District include Action Aid which is doing a dairy project.
- Have been carrying out projects in Buhera for the past 15 years and new programmes are done incrementally.
- Buhera is very much political and has a high donor syndrome perception. Therefore stakeholder engagement is key.
- Men are involved in heavy livestock (cattle) and women are involved in small livestock.
- When dealing with youths consider age, the older they are and have not been doing anything for themselves chances are they will not produce positive results if they get donor support.

19. World Vision HQ Interview

Date of meeting:	October 4, 2019	
Location:	Mt Pleasant, Harare	
Engagement:	Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe.	
Purpose:	Interviews with the World Vision Operations manager.	
World Vision Offices Harare	Official Contact Details	Mr. Email address: amon_matsongani@wvi.org Mobile: +263 773 235 089
NIOM	Officials	Mr. Matara Mr. Murwira

Key points

- World Vision have specific projects targeting
  - Education ii) WASH
  - Livelihoods

- Enhancing irrigation projects in Chakohwa and in Chimanimani covering from 1-40 hectares, being drawn from electric powered boreholes.
- Close to Nyanyadzi they have raised water to surface to supply piped water to the community and the borehole supplies water for an 8km radius.
- They have a WASH Project in Mukumbura where they have an irrigation system currently covering a space of 1-2 hectares and are hoping to grow it to be able to cover a larger space of 10 – 15 hectares.
- They also have a beef enterprise project in Mukumbura where there looking to grow the number of cattle in that area over 5 years.
- The beef projects are looking at linking livestock owners to markets, breed improvement.

20. Zimbabwe Resilience Building Fund (ZRBF) Interview
Interview Questions -NGOs, CBOs

1. What are the core activities of your NGO in the community?
   Resilience Building through supporting the adaptive, absorptive and transformative capacities of the communities

2. What type of challenges do you face in working with members of the communities?
   The main challenge is around the drought situation which has constrained the communities` absorptive capacities. This has negatively affected participation

3. What activities or project initiatives have you implemented to increase the community's access to water for the community?
   Supported the construction of weir dam, two piped water schemes, installed pressure pumps on 8 boreholes, constructed 40 cattle water troughs, installed 3 solar powered pumps on garden and CLICs

4. How long ago were the initiatives implemented?
   From 2017 and ongoing

5. What is the biggest risk to continuity of the water initiative?
   Vandalism of infrastructure

6. What activities or projects have you implemented to improve the livelihoods of community members through underground water abstraction?
   Community gardens and innovation centers

7. What is your advice on proposed project?
   Not sure about the project

8. How can it help build synergies on what you are doing?
   No idea

9. What are you doing to ensure gender sensitivity and stakeholder participation in your project?

   Deliberately ensure women are in leadership positions

A Needs Assessment Questionnaire (villagers/residents of targeted areas) Section A – Demographic Information

1. Which area do you come from? ☐ Binga ☐ Buhera

2. Which ward do you reside in? ……

3. What is your gender? Male ☐ Female ☐ Prefer not to say ☐

4. In which age group do you belong? 16 – 25 ☐ 26 – 35 ☐ 36 – 60 ☐ over 60 ☐

5. What is your marital status? Married ☐ Single ☐ Divorced ☐ widowed ☐

6. How big is your family? 3 and below ☐ 4 – 6 ☐ above 6 ☐

7. What is your main source of livelihood? ……

8. Who is the breadwinner in the family? Father ☐ mother ☐ other ☐

9. Does any of your family members with disabilities? Yes ☐ No ☐

SECTION B – WATER USAGE

10. What is your main source of water for domestic consumption? Borehole ☐ Well ☐ River ☐ Municipal ☐

11. How far away is your water source from where you stay? Within my homestead ☐ 1km – 3 km from my homestead ☐ 3km – 6km from my homestead ☐ more than 6km from my homestead ☐

12. Who owns the water source that you use? Communially owned ☐ Personal ☐ neighbours ☐ ☐

13. If the water source is not yours, how much time do you spend in a day collecting water?

Less than 1 hour ☐ 1hour – 2 ☐ hours 2 hours – 4 hours ☐

More than 4 hours ☐

14. Whose responsibility is it to fetch water for your homestead?

Shared responsibility ☐ The girl Mother ☐ child ☐

All the children ☐

15. Are there any costs involved in fetching water for your household?

Yes ☐ No ☐

16. Do you own any cattle or other livestock?

Yes ☐ No ☐

17. Where do you get drinking water for your cattle or other livestock?

River ☐ tapped water well ☐ borehole ☐ ☐

18. Do you own a vegetable gardern?

Yes ☐ No ☐

19. If your answer is yes, where is your garden located?

Near the river banks close to my ☐ homestead ☐

In an area designated for gardens ☐

20. What is the main source of water for your garden?

Borehole ☐ Well ☐ River ☐ Rainwater ☐

Section C – Impact of Water Usage

21. Does any of your main sources of water ever run dry during the year?

Yes ☐ No ☐

22. If your answer is yes, what other alternative sources of water do you use?

……..

23. Has there ever been any form of conflict between your family and other community members over water? ☐ Yes

No ☐

24. How has the way in which your draw your water affected your relationships with your neighbours and other community members?

Strengthen relationships ☐ strained relationships ☐

Has had no effect at all ☐

25. In your opinion, how can the water situation in the community be improved?

……

1.1. Borehole Checklist Form

Particular	Yes	No	Comments
Is the borehole or well protected? If Yes, write comments on the type of protection being used for the borehole or well			
Who owns the borehole or well? How many people draw water from the borehole for personal or productive uses? Who funded the drilling of the borehole or digging of the well?			
Is the borehole water suitable for human consumption? Has the borehole water been tested for suitability of human consumption			
Who authorised the drilling of the borehole or digging of the well?			
Approximately, how far away from the nearest compound, house, hut or other place of habitation is the borehole.			
What is the source of power for the borehole? (Hand powered, solar powered or electricity powered)			
Is the borehole seasonal?			
How deep is the borehole?			
Has the borehole ever been contaminated before?			
Is there a risk of the contamination of the borehole water in future? If yes, what are the risk factors that might lead to contamination of the borehole water in future			
What is the recharge mechanism for the borehole?			
Is there a risk of the borehole drying up in the future? What are the the risk factors that might lead to the drying up of the borehole			
Is it possible to rehabilitate the borehole for productive use? If yes, what type of rehabilitation is needed on the borehole?			

Annex 4: Gender Assessment Report

Table of Contents

Introduction

The gender assessment is a tool that identifies the differences in gender roles, livelihood activities, needs, opportunities and risks for men and women targeted by the groundwater project. Conducting gender assessments ensures the integration of gender-responsive project implementation and monitoring arrangements, and creation of gender responsive indicators. Information gathered during the gender assessment provides the basis for subsequent gender mainstreaming actions during project implementation. Additionally, the gender assessment informs the planning and overall project design; and identifies the gender-responsive activities needed during project implementation, monitoring and evaluation.

Gender Assessment Methodology

The methodology for the gender assessment for the Adaptation Fund Project Proposal on Sustainable Groundwater Management in Pilot areas of Zimbabwe used a combination of desktop research and community consultations.

The following documents were used during the desktop research:

- National Gender Assessment Report (FAO)
- National Gender Policy (2013)
- National Climate Change Response Strategy (2013 – 2017)
- The National Constitution of Zimbabwe
- Gender, Women's Economic Empowerment and Financial Inclusion in Zimbabwe Report.

Primary data for the gender assessment was collected to fill in the gaps identified during literature review (desktop research). The key stakeholders interviewed during the gender assessment are Ministry of Women Affairs, Gender and Community Development, various Non-Governmental Organisations, villagers in Binga and Buhera, leadership structures within the targeted wards in Binga and Buhera.

Gender Specific Legal and Cultural Context

This section describes the legal and cultural context within which the Adaption Fund project "Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation" will operate. The laws and policies, which have a bearing on the project, are analysed, and the cultural concepts regarding the rights, responsibilities, and relationships between members of the different genders are analysed. Importantly, the targeted districts belong to different cultures, the Shona (Buhera) and the Tonga (Binga), thus gender mainstreaming for the project also needs to take note of the key differences between these cultures, if they exist.

Legal and Policy Environment of Zimbabwe.

The legal and policy environment in Zimbabwe is progressive in terms of promoting gender equality. The country is signatories to a number of international protocols, treaties, conventions, and other instruments that seek to promote gender equality. Additionally, Zimbabwe created an enabling environment for mainstreaming gender into the development of the country.

The relevant policy instruments signed and ratified by Zimbabwe include:

- Convention on the Elimination of all Forms of Discrimination against Women (CEDAW);
- Beijing Platform for Action;
- Protocol to the African Charter on Human and People's Rights on the Rights of Women;
- Universal Declaration of Human Rights;
- International Convention on Economic, Social and Cultural Rights;

- Convention on Civil and Political Rights (CCPR);
- Equal Remuneration Convention (ERC); · Protocol to the African Charter on Human and People's Rights on the Rights of Women 2005 (The Maputo Protocol);
- Millennium Declaration of 2000;
- United Nations Sustainable Development Goals (SDGs);
- Convention on Prohibition of Discrimination in Occupations;
- Convention on the Elimination of the Worst Forms of Child Labour;
- Convention on Economic, and Social and Cultural Rights (ECOSOC);
- The 2004 Solemn Declaration on Gender and Equality in Africa;
- SADC's Gender and Development Protocol which was adopted in 2008. The protocol advocates for gender parity in all sectors and sets out 28 substantive targets for achieving gender equality by 2015;

Zimbabwe also subscribes to the COMESA Gender Policy which fosters gender equality and equity at all levels of regional integration and cooperation; and · Declaration of the AU Summit on: 2015 Year of Women's Empowerment and Development towards Africa's Agenda 2063. The Declaration encourages AU member States to increase mechanization, technological innovation, education and skills development for women, intensify the financial inclusion of women in agribusiness and empower women with knowledge and skills to use modern technologies in agribusiness and agricultural value chains. Another key dimension is to enforce women's rights to productive assets including land and their access to public procurement processes in agribusiness

The government of Zimbabwe enacted various legislation driven by the above-mentioned instruments. According to FAO (2017), there seventeen (17) pieces of legislations that are driven by the various international and regional instruments and policies that Zimbabwe is a signatory. The notable of these legislations include: Matrimonial Causes Act (1987), Maintanance Act (1999), Administration of Estate Act (1997), Sexual Offenses Act (2001), Education Act (2004), Labour Act (2005), and Domestic Violence Act.

In 2013, Zimbabawe reached two key milestones in promoting gender equality. The country adopted the new National Constitution, and drafted the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (popularly known as ZimAsset). The National Constitution is very progressive in ensuring that gender equality prevails in Zimbabwe. It accords women the rights to custodianship and guardianship, and makes void all customs, laws, cultural practices and traditions that violate women's rights. ZimAsset on the other hand promoted gender mainstreaming in all the productive sectors of the economy. A key result area of the policy was gender equality and equity. The concept of gender equality and equity aligns very well with one of the fifteen Environmental and Social Assessment Principles of the Adaption Fund.

Zimbabwe is still making more progress in ensuring gender equality and equity. The Agricultural Development Framework (2013 – 2032) incorporates gender mainstreaming agricultural development in the country. Post 2013, Zimbabwe created the National Gender Policy (2013 – 2017). Again, the policy emphasises gender equality and equity in all spheres of national

development. In fact, the policy recommends a list of strategies for each economic sector in Zimbabwe that ensures gender equality and equity. The National Climate Change Response Strategy (2013), which the national policy on dealing with climate change and how to help communities within Zimbabwe adapt and build resilience to climate change, is gender responsive. According to the policy, unequal access to productive resources between men and women negatively affects women's migratory and adaptive capacity to climate change.

Institutional Arrangements to Support Gender Equality and Equity

a. Ministry of Women Affairs, Gender and Community Development

The Ministry of Women Affairs, Gender and Community Development (MWAGCD) drives the government of Zimbabwe gender equality and equity agenda. The ministry is represented almost everywhere in Zimbabwe and has representatives going down to village level. The Ministry's mandate is to ensure that:

- women become key participants in the economy through meaningful involvement in all key sectors of the economy.
- Economic opportunities for women, namely the quantity and quality of women's economic involvement in leadership and ownership of the means of production, beyond their mere presence as workers.
- Educational empowerment of women, which is the most fundamental prerequisite for empowering women in all spheres of life.
- Political empowerment, particularly with reference to equal representation and meaningful involvement of women in decision-making at all levels in the public and private sectors including in local government; access to and control of land and other resources, as well as preserving the environment.
- The health and well-being of women through access to sufficient nutrition, healthcare and reproductive health facilities, and to issues of fundamental safety and integrity of persons.
- Community development with regard to taking charge of and controlling the basic means of securing water, providing food, fuel and overseeing family health and diet.

The MWGCD strategy is to use women's economic empowerment as a tool for achieving long-term national economic growth and poverty reduction. Women's empowerment and gender equality is key priority of the Zimbabwean government in its bid to attain sustainable economic growth and meet the Millennium Development Goal 3. MWGCD primarily falls under the Social Security and Poverty Reduction cluster of ministries, however, due to the cross-cutting nature of gender, the ministry participates in almost all the other clusters of ministries.

MWGCD, has a number of initiatives aimed at empowering women that include community gardens established at ward level. The project targets at least 50 women at ward level with access to water and gardens, with the overall objective of eliminating food shortages that villagers normally experience during the months December to January of each year.

The following are some of the key achievement of the MWGCD with regards to gender equality and equity:

- The National Gender Policy 2013–2017 is in place and has also put in place gender focal points in all government ministries and parastatals.

- Development of general guidelines on gender mainstreaming - a tool for all gender focal persons and government officials.
- Initiation of dialogue to set up a Gender Commission in 2012. The Gender Commission was approved in September 2015

Additionally, MWGCD implemented the following:

- BBWEEF 2012;
- National Plan of Action for Women, Girls, Gender and HIV and AIDS (2007–2010);
- Accelerated Country Action on Women, Girls, Gender and HIV and AIDS (2010– 2015); and,
- Agricultural Sector Gender Mainstreaming Strategy

Falling within the MWGCD's mandate is the compilation of the country's CEDAW report for periodic review. The Ministry calls for contributions from different government departments, reflecting progress made on gender issues and women's empowerment.

The issues of concern regarding rural women include:

- The burden of rural women's multiple roles;
- The challenges faced by rural women in accessing health facilities; and
- The challenges faced by rural women in accessing safe water and energy.

The MWGCD collaborates with various stakeholders: government ministries, CSOs in the several implementation platforms, and initiatives such as the Beijing Platform of Action and CEDAW recommendations. A theme group, the National Gender Forum (coordinated by UN WOMEN) was established to provide a platform for regular dialogues between the government and the civil society.

The National Gender Forum is made up of women NGOs, academics, representatives from the private sector with an interest in gender equality, representatives of girl child organizations and faith-based organizations. The group meets quarterly to share progress made in implementing gender equality.

b. **Department of agricultural technical and extension services (AGRITEX)**

The department of AGRITEX falls under the MAMID. It has highly decentralized structures extending to the ward and village levels. Through its specialist branches (Agronomy, Land Use, Agribusiness and Farm Management, and Training) at provincial and district offices, it provides technical and advisory services, regulatory services, farmer training, food production technology (including post-harvesting processing and product development), dissemination of technologies and market-oriented extension for sustainable farming.

One of its sections, the Training Branch, is responsible for developing an in-service training curriculum for AGRITEX personnel and farmer group leadership. The curriculum includes gender mainstreaming. About 50 percent of the field extension staff in AGRITEX is female. Although this is at a lower level in the AGRITEX Organogram, this field is where AGRITEX makes the greatest impact. The Training Branch services are also on radio and national television.

Cultural Context

Zimbabwe is a patriarchy society. The customary laws and traditional practices positions women as minors and view them as inferior to men. This is especially true in the Shona, Ndebele and other ethnic groups native to Zimbabwe. The cultural position of women is an impediment to the advancement and economic empowerment of girls and women. Where resources are limited, resources are diverted the advancement of boys' education, healthcare at the expense of girls. Boys and men are regarded as permanent members of the family and hence receive priority when it comes to receiving inheritance. The cultural norms and practices relegate women to performing and remaining in unpaid domestic labour, subsistence agriculture and low-paid wage work.

Men do not necessarily have to live permanently with their families, a situation that often lead to splitting of the family unit. This results in households headed by men who either work away from home or have a polygamous family that is dispersed. Occasionally, the assumed male head supports the family inadequately. He simply makes the major decisions and owns whatever property has been in the family that is managed by his wife or wives. The women, with help from their children, develop and maintain property that is officially in their husbands' names. The men cut costs by making the women work supposedly in the interest of the family.

The cultural position of women also affects how women access land, and their ability to retain ownership of land and property, including property they had before marriage. Women cannot directly access land or make claim to it except through their male relatives or husbands. Additionally, customary law allows the husband, by virtue of matrimonial power, to dispose of land, and any other family assets on behalf of the family. This includes property acquired during marriage or before the marriage.

Customarily, widows cannot inherit the husband's estate because a man's claim to the family inheritance takes precedence over a woman's, regardless of the woman's age or seniority in the family. Therefore, eviction of widows and orphans from the land by their in-laws upon the death of their husbands/fathers is a widespread practice in the country.

Furthermore, rural women farm for a living on land in communal areas run by traditional chiefs. According to custom, chiefs allocate land to male heads of households, but a woman does not automatically inherit this land upon her husband's death. Consequently, women may be evicted from the land when widowed. Those who remain on the land do so at the pleasure of their in-laws or traditional leaders. Childless widows are often evicted, as are young widows who refuse to be physically "inherited" by a male relative of their late husband, often a brother.

Zimbabwe recognises three type of marriage: registered customary marriages, unregistered customary marriages, and civil marriage. It is not yet compulsory for marriages to be registered, and hence rural women who have the least access to the judicial system are married under unregistered customary marriages. This accounts for almost 80% of married women living in the rural areas. The worrying phenomenon in rural areas is the large number of early marriages affecting almost entirely young girls. The Constitution of Zimbabwe outlaws child marriages, and there is now need for all the laws of the country to be aligned and institutions to be capacitated to ensure enforcement of the law especially in remote parts of the country.

Demographics and Gender Disparities – An overview of Zimbabwe

A summary of Zimbabwe's demographics and gender disparities with respect to access to resources for women living in rural areas is discussed in this section of the report.

Demographics and Poverty

Zimbabwe has a total population above thirteen million, 52% of the population is female, and 48% is male. The majority of the population lives in rural areas. The percentage of the population living in urban areas is only 33%. The country has a youthful population with the age group 15-34 years comprising 36 percent. Zimbabwe has a population density of 33 persons per square km and the average size of household is 4.2 persons. About 65 percent of households in Zimbabwe are headed by males and 35 percent by females. Child headed households are relatively high with 0.8 percent of all households being headed by children under the age of 18 years (35 percent female-headed and 61 percent male-headed households) (FA0, 2017).

Access to Land and Resources

According to the National Gender Policy (2012), the 1998 Human Development report on Zimbabwe described the country as a society that is highly unequal in terms of access, control and ownership of resources. The 1995 Poverty Assessment Study Survey report indicates that 61 per cent of Zimbabwean households are poor and 31 per cent of the households headed by females have a greater incidence of poverty than those headed by males. Zimbabwe ranks only 109 in the global gender related development index. This is a reflection of the general low status of women with respect to access, control and ownership of economic resources and positions in decision-making processes.

The land reform implemented at the start of the current new millennium sought to address the cultural and traditional barriers that women face when accessing land by introducing quotas on the distribution of land between men and women. The policy of the Zimbabwean government is that women are entitled to 20% of A2 (large-scale farming land). Additionally, women are entitled to apply for resettling village land in their own right. Traditionally, women access land through their husbands, fathers or male relatives. Despite this departure of policy from traditional and cultural norms, women accessed less than 10% of agricultural land under the land reform exercise. Factors cited as causes to these disparities between policy position and actual land ownership include: non implementation of the policy; poor representation of women in the land allocation committee, traditional patriarchal practices that limit or prevent married women from owning land in their own right. Traditionally, men own resources including land in a marriage setup. Additionally, rural women still lack access to productive land due to the chief's limited understanding of government policy on land allocation and the rights of women under the new policy.

The efforts of the government in ensuring that women are financially included are quite visible, notable and very commendable. Due to various government initiatives, women's access to bank credit improved and in December 2017 the total direct loans to women was $432. 36 million. This was a 39% increment from the total loans accessed by women the previous year. Additionally, the Reserve Bank of Zimbabwe established empowerment facilities with banks aimed at lending to target groups like youths, Medium and Small-Scale Enterprises, small-scale farmers, and women. The bank licensed the Women's Bank, focused at serving the needs of women. However, the access of rural women to these facilities is still very limited. The majority

of women in Zimbabwe live in rural areas and lack access to financial services, and hence still remain financially excluded.

Health, Nutrition, and Food Security

The Zimbabwean National Constitution guarantees the right to health care, food, water and shelter for all. Zimbabwe is facing economic challenges that making access to health, nutrition and general food security at risk. The effects are particularly adverse on rural women. Rural women travel long distances to health care centres, lack access to drugs and have limited personnel care. Additionally, women in rural areas are responsible for giving home based to care to sick family members, and look after the elderly. This leaves rural women with limited time to engage in productive activities to uplift their livelihoods.

Zimbabwe has the following policies aimed at promoting the health of its citizens: National Health Strategy, Reproductive Health Policy, and National HIV and AIDS policy. These policies emphasis on the importance of equality in access to health care, with particular focus on women. The national policy makers realised the importance of designing HIV and AIDS service delivery mechanisms that do not negatively affect women. Flaws in the HIV and AIDS delivery system are more adverse on women compared to men. The efforts that Zimbabwe has made to address the issues related to gender in the health sector aim at reducing the maternal mortality ratio by less than 75%; ensuring that hygiene, sanitation and nutritional needs are met for all; universal access to HIV and AIDS treatment; and recognition and supporting care givers.

The government of Zimbabwe is committed towards the Campaign on Accelerated Reduction of Maternal Mortality in Africa (CARMMA), and in improving access to maternal health in the country.

The positive outcomes from the various government initiatives adopted by the government of Zimbabwe include improvement in the prevalence of HIV from 33% in 1990 to a little over 15% in 2007; free maternal care for women in rural areas, and increased access to treatment. These successes are just a starting point, there still exist large disparities in access to health care between the different genders exist. A study done by the Zimbabwe Demographic Health Survey revealed that an alarming 374 women die each month due to pregnancy complications. Additionally, the number of births attended by a skilled health worker is also declining. The prevalence of HIV is still high amongst young women in the age group 15 years to 24 years compared to young men in same age category.

Inadequate Access to Services

Women of all ages tend to stay in rural areas while men migrate to urban areas in search of employment and other livelihood enhancing opportunities. Women staying in rural areas spend most of their time engaged in activities where they are not remunerated. This walking long distances looking for water, looking after the elderly, and the sick. Additionally, women are historically disadvantaged in terms of education, access to economic resources, discriminated against, and social excluded. These disadvantages emanate from ethnic cultures and the structuring of local societies. Zimbabwe has in turn adopted gender mainstreaming to ensure the empowerment of women and increase the participation of women in the mainstream economy, and sub-economies.

There are a number of polices in place to empower women and increase their access to productive resources. However, there exist gaps in these policies resulting in the continued exclusion of women from the economy. The National Gender Policy does not specifically target

rural women; however, it tackles gender issues that affect rural women. A case in point was the adoption of the Campaign on Accelerated Reduction of Maternal Mortality in Africa (CARMMA), which provided free maternal care for rural women. Women were entitled to receive 20% of the total land redistributed during the land reform. However, they only accessed 15% of the land distributed. Reasons to under-allocation of land to women include poor representation of women in the land allocation committee, and ignorance of traditional leaders responsible for reallocating resettling land on the government's policy on the women's quota on land during the land reform.

Gender division of labour and gender-based power structure

Gendered Division of Labour

Zimbabwe faces economic challenges leading to high levels of unemployment, low savings and investment, increasing poverty levels and economic inequalities in the ownership of resources. Zimstats (2014) published that women labourers in the formal agricultural sector out number males employed in the same sector. Additionally, rural women constitute the majority of subsistence communal farmers in Zimbabwe and contribute at least 70% of household and family labour in rural communities. Apart from agriculture, women in formal employment is only 37% of the women population in the nation compared to 62% of formally employed men. On average, the real income of women is at least three times less than that of males. Women are at risk of structural unemployment at a rate of 70% compared to 56% for men. This means that the majority of women are inadequately skilled.

Gender-based power structures

There exists conflict between traditional practices and the national legislative framework. The traditional and cultural practices of ethnic groups found in Zimbabwe prevents women from owning productive resources such as land in their own right. Women have access to land through either their husbands, fathers or other close male relatives. Additionally, ownership of high value livestock is skewed towards men, with women owning small livestock such as chickens, goats and sheep. Customary inheritance laws more often than not dispossess women, since the laws give first priority to males. Women in a patriarchy family set ups found in Zimbabwe still exercise power within the family set up, however, this power is exercised over junior female members within the family.

Zimbabwe has enacted laws since independence in 1980 that seek to redress the traditional and cultural disadvantages of women. Thus, there is a gradual shift from the traditional gender-based power structures with women exercising more control over productive resources, occupying decision making positions, and gaining employment. Factors contributing to this shift in power structure include a favourable policy and regulatory environment, an increasing number of women gaining education, and an increasing number of men migrating into urban areas and outside the country leaving women in-charge of the household in rural areas.

Differentiated impacts of climate change on and capabilities of men and women

The effects of climate change on Zimbabwe are evidenced by an increase in surface temperatures, shorter winters, increased drought frequencies, and reduced rainfall during none drought years. Such a scenario has impacts on Zimbabwe's economy which is primarily agro-based with over 70 per cent of the population living in rural areas and dependent on climate sensitive livelihoods such as arable farming and livestock rearing among others.

The Government of Zimbabwe regards climate change as one of the threats to the country and its people and is also of the view that climate change has the potential to undermine many of the positive developments made in meeting the country's development goals. Both climate

change and policies to minimize its effects have enormous socioeconomic and environmental implications. The challenge for the country is how to develop adaptation and mitigation strategies that can reduce the diverse and complex impacts of climate change. To this effect, the government has development a National Climate Change Response Strategy, which details the broad strategies to be followed by each sectors of the economy. However, the strategy document is not gender mainstreamed, although women (especially rural women) are the most vulnerable to the impacts of climate change.

There is still not enough in-depth studies on the impacts of climate change on men and women in Zimbabwe. The majority of women in Zimbabwe stay in rural areas and have responsibility of looking after the homestead and raising children whilst men go to urban areas in search of employment. The livelihood of rural women depends on climate sensitive activities like farming and rearing livestock. Additionally, water is not readily available to women in rural areas. One of the impacts of climate change is falling rainfall and the drying up of water sources. Thus, women in rural areas will lose their means of livelihoods as crops and livestock fail due to droughts. The distances that rural women walk in search of water will also increase, as the water sources in rural areas dry up due to increasing ground temperatures and falling rainfall. Taking note of the fact that rural women already have the responsibility of looking after children, the elderly and the sick, an additional impact of climate change is an increase in the workloads of rural women.

The division of labour between men and women follows tradition and cultural gender responsibilities. Women, especially rural women, are responsible for ensuring food security for the entire household. Food security encompasses production, distribution and utilisation of food. Additionally, women are responsible for household duties, which include food preparation, fetching water for the household, caring for the sick and elderly, child rearing, and domestic management. Female and child headed rural households are most vulnerable to climate change since they have the least access to productive resources.

The impacts of climate are also far reaching. Industries whose value chains are climate sensitive are likely to go into decline if they fail to cope with climate change. This is likely going to result in increased unemployment amongst men since men account for the majority of the workforce. The difference in the impacts that climate change is having on men and women, means that the climate change response-strategies and policies that the country should enact must be gender sensitive.

Traditionally, men are responsible for food production, rearing cattle and financing the homestead. The livelihoods of men are also climate sensitive. However, men have better access to productive resources like land, finances, and jobs. Men and boys whose main source of livelihood is rearing cattle will find themselves having to walk long distances in search of pastures and water for their livestock

Additionally, climate change is having negative impacts on the environment. Poor rainfalls has resulted in depletion of pastures and water sources. The remaining natural resources are hardly enough to support livestock and people, and hence they are overstretched. This has resulted in land degradation from grazing activities and drying of wetlands from farming activities. This is further increasing the vulnerability of both men and women to poverty, and further loss of livelihoods. Boys are at risk of dropping out of school in search of pastures and water for cattle. This is particularly a problem for boys coming from child headed households, and poor families who herd livestock for a living.

Depletion of natural resources due to climate change is reducing the access to resources like clean water, proper sanitation, and good nutrition from balanced diet. Climate change is also making men and women in rural areas and urban areas alike susceptible to diseases related to lack of clean water and sanitation and malnutrition. Again, women child headed households are the most vulnerable since they have the least access to the scarce natural resources.

Multi-dimensional vulnerability exacerbated by climate change

The following factors exacerbates the impacts of climate change amongst rural women and men in Zimbabwe: resettlement in arid areas that have poor rains and soils (sandy and less fertile soils), high levels of poverty incidences, and high levels of unemployment. Additionally, productivity in the economy, including agriculture, which is the main source of livelihood for rural population in Zimbabwe, is declining. The causes for declining productivity in communal farming include back-to-back years of drought, loss of soil due to land degradation, and increasing cost of agricultural inputs beyond the reach of the rural population.

Project target areas (Binga Ward 19 and 25, and Buhera Ward 20 and 23) and gender related issues arising from community consultations.

The targeted areas of Binga and Buhera lie in natural region IV that receive low rainfall. The population residing in the areas are identified as chronically vulnerable and at most risk to the negative impacts of climate change. The poverty prevalence in Binga Ward 19 and 25 is at least 90% and poverty severity averages 28%. The statistics for Buhera Ward 20 and 23 stands at 81% poverty prevalence and 20% poverty severity.

A gendered approach was adopted for community consultations during the needs assessment study whose results feed into this gender assessment report. Community consultations were done in Binga Ward 19 and 25, and Buhera Ward 20 and 23. To ensure a comprehensive and inclusive coverage of the targeted population, community members were engaged through household interviews, focus group meetings, and consultations of the traditional leadership in Binga Ward 19 and 25 as well as Buhera Ward 20 and 23. Further consultations were done through interviews with key institutions such as the officials from the Ministry of Women Affairs, Gender and Community Development who have the nation's mandate to ensuring gender equality and women's empowerment. Inclusion of all sectors of the society, particularly the most vulnerable members of the community was ensured through engagement of representatives of all socio-economic groups in respective communities; elderly, women and child headed families, people living with disabilities, youths, traditional (chiefs and headmen) and political leadership (councillors).

All engagements with community members were done using the local languages. Men and women were consulted collectively as well as individually to fully capture their respective needs and priorities on the negative impacts of climate change, livelihoods options and climate change adaptation methods. Gender specialists were engaged during the needs assessment study.

The table below highlights the impacts that climate change is having on women and men in Binga Ward 19 and 25, and Buhera Ward 20 and 23.

Impact	Gender Group affected	Binga		Buhera	
		Ward 19	Ward 25	Ward 20	Ward 23
Loss of livestock	Men and Women	×	×	×	×
Loss of livelihoods	Men and Women	×	×	×	×
Drying of water sources	Men and Women	×	×	×	×
Water conflicts	Men and Women	×	×	×	×
Women forced to walk long distances in search of water	Women and girls	×	×		
Girls missing school looking for water	girls	×	×		
Food insecurity	Women	×	×	×	×
Men forced to migrate in search of employment	Men	×	×	×	×
Men forced to travel long distances in search of pastures and water for livestock	Men and boys	×	×	×	×
Increasing levels of poverty	Men and Women	×	×	×	
Forced migration	Men and Women	×	×	×	
Vulnerability to hygiene related diseases	Men and Women	×	×	×	
Schools teachers migrating from the area due to water shortages	Girls and Boys	×	×		

Envisaged project responses to the climate change-related gender disparities

The livelihoods of men and women residing in Binga and Buhera are climate sensitive and negatively impacted by loss of wetlands, water sources, and land degradation. There is need for the project to implement strategies that protect lands, wetlands, and water sources used by villagers. Exploitation of groundwater resources will build the villagers resilience to climate change by giving them access to a water sources that is more reliable and available throughout the year. This is particularly beneficial to women and girls who walk very long distances in search of water for domestic consumptions. Increasing access to productive resources like land and capital is improved if there is going to be a deliberate effort by policy makers to have

awareness campaigns targeting women and people who are in leadership structures in the rural areas on the rights and entitlements of women provided for by national laws, strategies and policies. There is also need for the implementers of the project to have an equitable representation of women in decision-making structures of the project to ensure that women are not disadvantaged in how they access benefits of the project.

Women constitute a higher proportion of the population in rural areas, but lack access to land and productive resources. Women and child headed families are most vulnerable and tend to be amongst the poorest homesteads in rural areas. The interventions under the Adaptation Fund groundwater exploitation project must target more women, and the proposed split between women and men be at least 52% women and 48% men. This is representative of the population make up of rural communities. The project can adopt the water management method currently used in Binga. A water committee manages boreholes in Binga Ward 19. The majority of members of the water committee are women.
Women are engaged in communal farming and small livestock (chickens, goats, and pigs) rearing. These are not only sensitive to changes in climate, but they are also at risk of failing due to land degradation, and loss of pastures due to overgrazing. Conservation farming should be a part of the project interventions in the targeted areas. Additionally, training villagers on the importance of wetlands, and the benefits of not overstocking livestock is key in ensuring success and sustainability of the project.

Some gender specific interventions per project component are presented below:

Component 1 – there is need to include more women and provide more training to water management committees in the project's targeted areas. In Binga water management committees whose majority of members are, women are responsible for managing boreholes. These need further capacity building and training, especially on how to mobilise finances for borehole repairs which is one of the main challenges leading to non-repairs of broken-down boreholes.

Component 3 – Consultations on the development of the management planning guidelines for sub-catchment councils should be gender mainstreamed. Community members especially women must be consulted and the negative impacts that climate change is having on how they access water captured. Training rural women conservation farming and water harvesting to improve yields on their subsistence farming activities.

Component 4 – Designing project interventions in a way that does not exclude women and vulnerable groups within the project-targeted communities. For example, livestock intervention project must emphasise on covering the types of livestock that are traditionally owned by women. Designing gardening projects must not be in way that puts women at a disadvantage in terms of how they access land and water needed to embark on the gardening projects. Value addition activities must be such that a significant component of the value addition activities naturally inclined towards traditional activities that women do. For example, groundnuts farming intervention can come with peanut butter making project, where women form cooperatives and are provided the capacity to start processing and packaging peanut butter. Growing of vegetables can come with an additional component of drying and packaging vegetables for resale in urban centres. Designing the project interventions in this way ensures that women are included in most of the value chain activities. Irrigation development must be done on community level and the committees responsible for managing the irrigation infrastructures must be gender mainstreamed.

Annex 5: Environmental and Social Impact Assessment Report and Environmental and Social Management Plan

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List of Acronyms

ESP	Environmental and Social Policy
UNESCO	United Nations Educational, Scientific and Cultural Organisation

Introduction

UNESCO Regional Office for Southern Africa in collaboration with the Government of Zimbabwe is in the process of developing a proposal entitled '*Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe*.' The objective of this Project is to increase local communities' adaptive capacity and resilience to climate change through increased groundwater exploitation for food security and other productive uses in rural areas of Zimbabwe.

An important step before the implementation of the proposed project is the consideration of the Environmental and Social Impacts associated with the project. A study of the Environmental and Social Impacts of the proposed project was conducted. The objectives of the Environmental and Social Impact assessment study were:

1. Identification and analysis of the environmental and social impact risks associated with the implementation of the groundwater project
2. Determining the potential impact of the identified risk i.e. determining whether a risk is low, moderate or high impact
3. Recommendation of potential risk management strategies for the identified risks

1.1 The Fifteen (15) Guiding Environmental and Social Impacts Principles of the Adaption Fund

The Environmental and Social Policy (ESP) of the Adaption Fund guided the study of environmental and social risks affecting the project. The guiding principles under the ESP are:

1.1.1 Core Principles – These apply to all projects

1. Compliance with the law – Principle 1
2. Human Rights – Principle 4
3. Core Labour Rights – Principle 6

1.1.2 Other Guiding Principles

4. Access and Equity – Principle 2
5. Marginalised and Vulnerable Groups – Principle 3
6. Gender Equality and Women Empowerment – Principle 5
7. Indigenous People – Principle 7
8. Involuntary Resettlement – Principle 8
9. Protection of Natural Habitats - Principle 9
10. Conservation of Biodiversity Principle 10
11. Climate Change – Principle 11
12. Public Health – Principle 12
13. Physical and Cultural Heritage – Principle 13
14. Lands and Soil Conservation – Principle 14

15. Pollution Prevention and Resource Efficiency – Principle 12

Care was taken strike the balance between relevancy and risk. A principle might be relevant, but the risk associated with the principle may be absent from the project. The considered those principles whose risk are present in the project.

1.2 The Environmental and Social Impact Assessment Process/Procedure

The procedure adopted during the Environmental and Social Impact assessment include the following steps:

a. Risk identification,
b. Assessing the severity/levels of impacts of the identified risks
c. Formulation of proposed risk mitigation measures

The study screened all the proposed activities the project for risk.

1.3 A list of the Proposed Project Activities

The project proposes to embark on the following activities:

a. Strengthening technical, institutional and human capacity for improved and sustainable utilization of groundwater at national and local levels;
b. Conducting comprehensive assessments of groundwater resources in four poverty stricken and most vulnerable sub-catchments of Lower Gwayi and Upper Save and thus develop sample plans for sustainable groundwater utilization in improving climate resilience;
c. Strengthening the capacity of water and land management institutions in Lower Gwayi and Upper Save sub-catchments in developing integrated catchment management plans that promote and protect groundwater use;
d. Piloting and demonstrating concrete climate change adaptation measures based on sustainable groundwater exploitation for diversifying and strengthening livelihoods of the most vulnerable population in Lower Gwayi and Upper Save sub-catchments;
e. Compiling and disseminating lessons learnt to facilitate future upscaling and replication of good practices in groundwater extraction and management.

2 Risk Screening of the Project based on the 15 principles of the Adaptation Fund's Environmental and Social Policy

The methodology for risk screening of the project considered the presence or absence of the risk, and if the risk is presents, the potential impacts and the types of assessment, and management needed to make the project compliant with the guidelines of the Adaptation Fund. This document is a preliminary assessment of the risks affecting the project. The inputs of the national stakeholders are still to be captured during the national consultative meetings. The preliminary assessment plus the inputs of the national stakeholders will inform the final assessment of risks affecting the project. It is only until then that the project can be categorised.

2.1 Environmental and Social Risk Assessment Checklist

		Concern	Y/N	Comments
1	**Compliance with the Law**			
1.1	Are the project activities in compliance with all applicable national laws and by laws?	Low Risk	Yes	During the National Stakeholder consultations and meetings, it was revealed that Zimbabwe has a number of laws, regulations, policies and strategies governing the different components of the proposed project. It was revealed that the proposed project is already complying with the laws governing its current activities. Stakeholders emphasised that for the project to continue complying, it should be aligned with the following national laws, strategies, and policies: a. National Water Policy – Maps out the road map for sustainable utilisation of water resources in Zimbabwe. b. Policy was crafted August 2012 c. Water Act [Chapter 20:24] – provides for development and utilisation of water in Zimbabwe. Law was enacted in 1998 and came into force in January 2000 d. Zimbabwe's National Climate Change Response Strategy – document gives the road map for mainstreaming the integration of climate change issues into national development planning processes at national, provincial, e. district and local levels and ensure coordinated activities f. Zimbabwe Climate Policy 2016 g. Manpower Development and Training Act of 1995 – sets out the legal requirements for setting training institutions, and human capital development amongst many others h. Indigenisation and Economic Empowerment Act – provides for support measures for the economic empowerment of indigenous Zimbabweans

				i. The National Gender Policy [2013 – 2017] – which provides the roadmap for eliminating gender j. discrimination and inequalities in all spheres of life and development k. Comprehensive Agricultural Policy Framework (2012 – 2032) – gives the strategic roadmap for agricultural development in Zimbabwe l. Access to Information and Protection of Privacy Act [Chapter 10:27]
1.2	Are there any statutory requirements for social impact assessments in the host country (including provisions for disclosure and consultation) the project needs to adhere to?	No Risk	No	Stakeholders during the National Consultative meetings indicated that all the relevant clearance for each stage of project should be obtained from the relevant authorities before implementation, and information disclosed according to: The Access to Information and Protection of Privacy Act [Chapter 10:27]
1.3	Is there a risk that the project might conflict with existing legal social frameworks including traditional frameworks and norms?	No Risk	No	Traditional leaders were consulted during environmental and social impact assessments stakeholder consultations. Stakeholders during the National Consultative meetings recommended that the project implementers continue consulting traditional and local leadership during project implementation stage
2	**Access and Equity**			
2.1	Will the project provide fair and equitable access to benefits in a manner that is inclusive and does not impede access to basic health services, clean water and sanitation, energy, education, housing, safe and decent working conditions, and land rights?	Low Risk	Yes	During the national consultative meetings, women and child headed families indicated that they are currently disadvantaged by traditional practices in how they access land and productive resources. Stakeholders recommended that the implementers of the project must ensure equitable distribution of project benefits to marginalized groups
2.2	Is there a risk that the project creates or aggravates inequalities between women and men or adversely impacts the situation or livelihood conditions of women or girls?	Low Risk	No	During the field visits women [accounting for 70.3% of households visited], and other marginalised groups were consulted. The environmental and social impacts assessment study captured the differentiated effects of climate change on women, and other marginalised groups.

2.3	Explain whether the project use opportunities to secure and, when appropriate, enhance the economic, social and environmental benefits to women?	Low Risk	Yes	Project to implement empowerment activities (gardening, livestock rearing, and value addition) targeted at women.
2.4	Explain whether the project provide, when appropriate and consistent with national policy, for measures that strengthen women's rights and access to land and resources?	Low Risk	Yes	Stakeholders made the following recommendations during consultative meetings: a. Empowering women, and the vulnerable groups to make decisions on which adaptation strategies to adopt. b. Including women in the decision-making structures of the project both at village level up to national level. c. Educating village heads and chiefs who are responsible for allocation of communal land on the national policies that address the issue of women's rights and access to land and economic resources. d. setting up a grievance committee that deals with issues of access to resources provided for under the project. The membership of the grievance committee must have proportionate representation of women and vulnerable groups
3	**Marginalised and Vulnerable Group**			
3.1	Will the project be imposing any disproportionate adverse impacts on marginalized and vulnerable groups including children, women and girls, the elderly, indigenous people, tribal groups, displaced people, refugees, people living with disabilities, and people living with HIV/AIDS? In screening any proposed project/programme, the implementing entities shall assess and consider particular impacts on marginalized and vulnerable groups	Low Risk	No	The disabled, elderly, youths, and community leaders were consulted during the field visits. The proportions of each of the interest groups above are as follows: 19.09% disabled, 37.4% youths (below 36 years of age), and 20.1% elderly (above 60 years of age). Additionally, the traditional leaders, village heads, and other leadership structures within the wards visited were consulted and their inputs on the project captured. The input of chiefs, as both the custodians of land, and culture is important in ensuring that the beliefs and rights of the vulnerable members of society

3.2	Is there a risk that the project might negatively affect vulnerable groups in terms of material or non-material livelihood conditions or contribute to their discrimination or marginalisation (only issues not captured in any of the sections above)?	No Risk	No	See Access and Equity
4	**Human Rights**			

4.1	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? If the answer to the screening question 15.1 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.	No Risk	No	National Stakeholder consultations and literature review revealed that there are no elements within all the components of the project that negatively affect human rights.
4.2	Is there a risk that the project negatively affects human rights (e.g., right to selfdetermination, to education, to health, or cultural rights) – other than issues related to indigenous peoples which are dealt with in the respective standard? Differentiate between women and men, where applicable.	No Risk	No	National Stakeholder consultations and literature review revealed that there are no elements within all the components of the project that negatively affect human rights.

4.3	Will the project influence land tenure arrangements or community-based property rights to land or resources and is there a risk that this might adversely affect peoples' rights and livelihoods? Consider in particular impacts on transhumant pastoralist, vulnerable groups, different gender etc.?	No Risk	No	National Stakeholder consultations and literature review revealed that there are no elements within all the components of the project that negatively affect human rights.
5	**Gender Equity and Women's Empowerment**			
5.1	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	Low Risk	No	During the National Stakeholders consultations it was recommended that project interventions be designed such that there be no adverse impacts on women and girls.
5.2	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	Low Risk	No	The national consultative process indicated that current traditional and cultural practices in the project targeted areas normally exclude women from participating in decision-making structures. It was recommended that women be involved during the design and implementation of the project.
5.3	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No Risk	No	Women groups/leaders (both at local and national level) did not indicate any particular concerns during the stakeholder consultations that might lead to gender equality concerns.
5.4	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services?	Low Risk	No	National consultative meetings and field visits revealed that culturally, women have limited access compared to men on access to natural resources (land, and water). Additionally, big livestock (cattle) and major livelihood projects are viewed as the right of men as opposed to women. Stakeholders recommended that the design of the project must avoid the pitfall of distributing project benefits or implementing livelihood activities that disadvantage women based on the traditional roles and responsibilities of women.

5.8	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No Risk	No	The was no evidence from the national consultative meetings and field assessments that components of the project will commercialize or use the traditional knowledge and practices of the local people
6	**Core Labour Rights**			
6.1	Will the proposed Project meet the core labour standards as identified by the International Labor Organization	No Risk	Yes	The project meets all the core labour standards identified by the International Labour Organisation.
6.2	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labour standards (i.e. principles and standards of ILO fundamental conventions)?	No Risk	No	The project does involve any components that fail to comply with national and international labour practices
6.3	Might the project be directly or indirectly involved in forced labour and/or child labour?	No Risk	No	The project activities do not involve aspects where forced labour and/or child labour will be used
7	**Indigenous Peoples**			
7.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No Risk	No	There are no indigenous people in the areas targeted by the project
7.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No Risk	No	There are no indigenous people in the areas targeted by the project

7.3	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No Risk	No	There are no indigenous people in the areas targeted by the project

7.4	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No Risk	No	There are no indigenous people in the areas targeted by the project
7.6	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No Risk	No	There are no indigenous people in the areas targeted by the project
7.7	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	No Risk	No	There are no indigenous people in the areas targeted by the project
8	**Involuntary Resettlement**			
8.1	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No Risk	No	The project components do not involve activities potentially leading to involuntary resettlement of any people settled in the areas targeted by the project
8.2	When limited involuntary resettlement is unavoidable, will due be observed so that displaced persons shall be informed of their rights, consulted on their options, and offered technically, economically, and socially feasible resettlement alternatives or fair and adequate compensation.	No Risk	No	The project components do not involve activities potentially leading to involuntary resettlement of any people settled in the areas targeted by the project
9	**Protection of Natural Habitat**			
9.1	Could the Project potentially cause adverse impacts to habitats, endangered species and local ecosystems services	Low Risk	Yes	There are no endangered species in the areas targeted by the project. However, there was evidence of deforestation as villagers looked for firewood for fuel and also from activities related to villagers opening and establishing new fields for cultivation

9.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature	No Risk	No	

	reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?			
9.4	Could the Project lead to loss (eradication or removal from local area) of one or more animal, insect, or plant species?	Medium Risk	Yes	There was evidence of deforestation from deforestation as villagers looked for firewood for fuel and also from activities related to villagers opening and establishing new fields for cultivation
10	**Conservation of Biological Diversity**			
10.1	Is the project located in or near areas legally protected or officially proposed for protection including reserves according to UNESCO Natural World Heritage Sites, UNESCO Biosphere Reserves, Ramsar Convention on Wetlands?	No Risk	No	There are no legally protected sites in the areas targeted by the project.
10.2	Could the Project lead to degradation or fragmentation of local forest areas, wetlands, farming or grazing land, or other landscape elements of ecological or economic importance	Medium Risk	Yes	There was evidence of deforestation, land degradation, destruction of wetlands, depletion of farming and grazing land due to activities of the villagers. Villagers do not follow good land husbandry practices when doing communal farming and livestock rearing. The project activities involve farming and livestock rearing, and hence implementers of the project must train villagers good land husbandry practices.
10.3	Could the Project lead to significant increase in consumption of locally sourced fuel-wood?	Low Risk	No	Part of the project activities involve construction of bio digesters which process waste farm products (animal droppings, and crop residue) for fuel and organic fertilizer

10.4	Could the activity lead to introduction of invasive alien varieties or species which potentially could eradicate, change, or significantly reduce local naturally occurring varieties or species?	No Risk	No	There are no components of the project that can lead to the inclusion of invasive species or alien varieties which could potentially eradicate, change or significantly reduce local naturally occurring varieties
10.5	Could the activity introduce genetically altered organisms and/or involve the transfer, handling or use of genetically modified organisms/living modified organisms that result from modern biotechnology and that may have an adverse effect on biodiversity?	No Risk	No	

10.6	Does the Project involve agricultural production or harvesting of natural forests, plantation development, or reforestation?	No Risk	No	Stakeholders during the national consultative process advocated to activities leading to reforestation and reclaiming of wetlands.
10.7	Could the activity lead to increase in unregulated or unlicensed collecting, hunting, or fishing?	No Risk	No	There are no components of the project that can lead to unregulated or unlicensed hunting.
11	**Climate Change Mitigation and Adaptation**			
11.1	Will the proposed Project result in significant 19 greenhouse gas emissions or may it aggravate climate change?	No Risk	No	
11.2	Is the project area prone to specific climate hazards (e.g., floods, droughts, wildfires, landslides, cyclones, storm surges, etc.)?	No Risk	No	Stakeholders selected project sites in areas that are not prone to climate hazards.
11.3	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	Low Risk	Yes	Project involves farming and livestock rearing activities. These activities require access to water, and if water resources are not managed properly, it can lead to failure of some of the project components.

11.4	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)?	No Risk	No	Extensive stakeholder consultations ensured that none of the proposed interventions directly or indirectly increase social and environmental vulnerabilities to climate change
11.5	Could project activities potentially increase the vulnerability of the local ecosystem to current or future climate variability and changes?	No Risk	No	Project interventions recommended by stakeholders improve the resilience of local ecosystems to current and future climate variability and changes
11.6	Explain whether the project seek opportunities to enhance the adaptive capacity of communities and ecosystem to climate change?	No Risk	Yes	Stakeholders recommended that the project advocates for reclaiming of forests and wetlands currently damaged by the activities of villagers in the selected project sites.
11.7	Are changes in biophysical conditions in the project area triggered by climate change expected to impact people's livelihoods? Are some groups more susceptible than others (e.g., women or vulnerable groups)?	No Risk	No	
12	**Pollution Prevention and Resource Efficiency**			

12.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local impacts?	No Risk	No	No project components lead to pollution of the environment
12.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	Low Risk	Yes	Farming and livestock production will result in the production of farm and animal waste.

12.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	No Risk	No	There are no components of the project involving manufacturing of any form
12.4	Does the project intend to use pesticides, fungicides or herbicides (biocides)? If yes, provide details and answer questions a-b	Low Risk	Yes	Gardening Activities and Rearing of Livestock will involve minimum use of pesticides, and fungicides to control pests and diseases. These chemicals are to be used as a last resort.
a	Have alternatives to the use of biocides been rigorously considered or tested?		Yes	The primary method of controlling pests and diseases is through organic means. For instance planting of certain herbs close to fowl runs for chickens and letting the birds eat those herbs helps to control diseases. Intercropping and crop rotation is also important in controlling pests and diseases in gardening activities
b	Has a pest management plan been established?		Yes	Adequate bio security measures should be enacted around places where livestock are kept Crop rotation must be practices in order to control plant pests and diseases Proper disposal of plant residues after harvest, must be practices in order to kill soil pests
12.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	Low Risk	Yes	Irrigation activities can possibly result in increased consumption/usage of water
13	**Public Health**			

13.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No Risk	No	No components of the project pose safety risks to the local communities
13.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No Risk	No	The project does not use any hazardous materials
13.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No Risk	No	No components of the project involve large scale infrastructure construction
13.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No Risk	No	No components of the project involve large scale infrastructure construction
13.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No Risk	No	No components of the project involve large scale infrastructure construction
13.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	Low Risk	Yes	Water harvesting activities can potentially increase the risk of water borne (like typhoid) and vector-borne diseases (like malaria) if not properly managed.
13.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	No Risk	No	Not applicable to the project

13.8	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No Risk	No	Not applicable to the project
14	**Physical and Cultural Heritage**			
14.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations?	No Risk	No	Evidence gathered during the national consultative meetings and field visit assessments shows that there are no physical or cultural heritage sites in the pilot areas targeted by the project.

	practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)			
14.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage?	No Risk	No	The project interventions proposed do not utilize tangible or intangible forms of cultural heritage.
14.3	Is the project located in or near a site officially designated or proposed as a cultural heritage site (e.g., UNESCO World Cultural or Mixed Heritage Sites, or Cultural Landscapes) or a nationally designated site for cultural heritage protection?	No Risk	No	Stakeholder indicated that the pilot areas of the project interventions are not located in or near sites officially designated or proposed as cultural heritage sites.
14.4	Does the project site include important cultural resources such as burial sites, buildings or monuments of archaeological, historical, artistic, religious, spiritual or symbolic value?	No Risk	No	Project activities will not impact any cultural resources. Community members and traditional leadership within targeted areas must be engaged to ensure that the project implementation does not affect cultural resources like burial sites
15	**Lands, water and Soil Conservation**			

15.1	Does the Project involve significant extraction, diversion or containment of surface or ground water?	Medium Risk	Yes	Stakeholders indicated that Farming activities, (irrigation of gardens), can lead to over-extraction of surface or groundwater if proper water management policies and strategies are not implemented. It was recommended that sustainable groundwater strategies be implemented throughout the project life cycle.
15.2	Could there be significant impacts on quality or quantity of surface- or groundwater?	Medium Risk	Yes	Stakeholders indicated that livestock production and gardening activities could lead to reduction in surface water quality through the use of inorganic fertilizers. It was recommended that organic farming methods be implemented.
15.3	Could the activity lead to increased soil erosion, run-off, or significant changes to soil characteristics and/or lead to major detriments to soil quality over a large or locally important area?	Medium Risk	Yes	Stakeholders indicated that there are challenges of severe soil erosion, siltation, and gullying as a result of the current poor farming activities of villagers in the targeted. Farming activities and livestock rearing during project implementation can lead to continued soil erosion, siltation and gullying. The stakeholders indicated that farmers/villagers be trained in conservation farming, and also be encouraged to stock livestock in a sustainable manner
15.4	Could the activity lead to major changes in flow regimes of local waterways, conditions of water bodies?	No Risk	No	There was no evidence from the stakeholder consultations and field assessments that proposed project activities might possibly affect the flow regimes of local waterways, and conditions of water bodies.
15.5	Would the Project generate potential adverse regional sustainability concerns?	No Risk	No	There were no indications from national stakeholder consultations that the project could generate adverse regional sustainability concerns.

2.2 Additional details, and pictures related to the Moderate Risks affecting the project

This section of the report provided further details on the assessment done of the risks affecting the proposed project. Images/pictures and detailed descriptions of the current challenges (this related to what villagers are currently practicing) which might be carried over into the project implementation if they are not managed. The risk posing the greatest challenge to the implementation of the project is lands and soil conservation. There is evidence of serious land degradation in the Wards visited during the stakeholder consultations.

2.2.1 Principle 15: Lands and Soil Conservation – Moderate Risk

There is moderate risk of land and soil degradation in Binga and Buhera during project implementation. Currently, villagers in the targeted ward practice stream bank cultivation, overstocking and poor cultivation practices. Failure to address these factors during project implementation, can lead to continued land and soil degradation.

a. Stream Bank Cultivation – Location of Vegetable Gardens

Which district do you come from?: Buhera						
		If your answer is yes, where is it located?				
		not applicable	Near the river banks	Close to my homestead	Close to borehole	Other
		Count	Count	Count	Count	Count
If your answer is yes, where is it located?	not applicable	15%	0	0	0	0
	Near the river banks	0	41%	0	0	0
	Close to my homestead	0	0	36%	0	0
	Close to borehole	0	0	0	8%	0
	Other	0	0	0	0	0

Table 1: Location of gardens in Buhera

Which district do you come from?: Binga						
		If your answer is yes, where is it located?				
		not applicable	Near the river banks	Close to my homestead	Close to borehole	Other
		Count	Count	Count	Count	Count
	not applicable	52%	0	0	0	0

If your answer is yes, where is it located?	Near the river banks	0	12%	0	0	0
	Close to my homestead	0	0	17%	0	0
	Close to borehole	0	0	0	19%	0
	Other	0	0	0	0	0

Table 2: Location of gardens in Binga

Table 1 and 2 above show the location of vegetables in Binga and Buhera. The majority of villagers in Binga (52%) compared to Buhera (15%) do not have vegetable gardens because of lack of access to water. A bigger proportion of vegetable gardens in Buhera (41%) are located close to riverbanks. In Binga 12% of vegetable gardens in Binga are located close to riverbanks. Gardens tend to be located near a reliable water source. Introduction of boreholes will effectively stop villagers from gardening near rivers.

Figure 1: Binga Ward 25 - Image of Cattle drinking water from a natural dam

Figure 1 shows a picture of cattle drinking from an open water source in Binga Ward 25. Cattle trembling on natural dams is a major course of siltation and drying up of water sources in Binga and Buhera. Lack of access to sources of water for livestock and overstocking forces villagers to strain the few open water sources in both Binga and Buhera. Provision of borehole water and training the villagers on good animal watering practices will remove the current strain put on open water sources by livestock. Access to water will improve the bio diversity in the area.

Figure 2: Binga Ward 25 - Picture of a heavily silted riverbed

Figure 2 shows a picture of a heavily silted river in Binga, and figure 3 below shows a picture of a field that is prone to erosion in Buhera. The main silt covering the riverbeds comes from soils eroded in fields located upstream. Overgrazing of pieces of land close to the riverbeds exposes the soils increases the rate of soil erosion leading to siltation of riverbeds.

Figure 3: Picture of a field in Buhera revealing the land preparation practices within the ward

2.2.2 Principle 10: Conservation of Biological Biodiversity – Moderate Risk

Figure4: Picture showing trees cut down for firewood in Buhera.

Figure5: Picture of a newly opened field Binga

Figure 4 and 5 above show pictures of trees cut down for firewood in Buhera and trees cleared for establishment of a new field in Binga Ward 25.

Villagers in Binga Ward 25 are continuously resettling in search of places close to water sources where they can locate their fields and establish their homesteads. Increasing access to water for these villagers will stop the need of villagers to continue cutting down trees for

the establishment of new fields. This will have a positive impact on the bio diversity in the area, which is under threat from resettling activities of the villagers.

Figure 6: Drying wetlands

Figure 6 is a picture of a wetland drying up because of trembling from cattle and other livestock. Overstocking and lack of access to drinking points for livestock leads to straining of wetlands, dams and other open water sources in the two districts. Increasing access to groundwater will improve the health condition of wetlands in the targeted wards and positively affect biodiversity in the targeted area.

3 Mitigation Measures for general risks identified and related monitoring arrangements

ES Principle	Risk Identified	Possible Impact	Level of Risk	Mitigation Measures	Responsible	Monitoring arrangements and/or indicators
Access and Equity	Culture and traditional practices limit women and child headed families access to resources Men and women affected differently by the negative impacts of climate change	Women and child headed families left out in the distribution of project benefits Project interventions not specifically addressing the differentiated impacts of climate change on women i.e. one sided interventions	Low Risk	Inclusion of women in the design and project implementation structures Initiating project intervention activities specifically targeted at women and child headed families Design intervention strategies that address the negative impacts of climate change on women. For example putting interventions that reducing the vulnerability of women walking long distances in search of water.	Gender Specialists Gender Specialists Gender Specialists	Additional focus groups and household interview will be organised during the project implementation to ensure that there is equitable distribution of the project benefits

Marginalised and Vulnerable Groups	The elderly, youths, the disabled, and other vulnerable groups left out or not receiving proportionate benefits	Intervention strategies not meeting the needs of the vulnerable, and marginalised groups	Low Risk	Design intervention strategies aimed at empowering the youths, the disabled and other vulnerable members of society Engage chiefs, and local leadership to help in ensuring that the project benefits	Gender Specialists Monitoring and Evaluation Specialists Project Officers	

				reaches out to the vulnerable members of society		

Gender Equity and Women's empowerment	Disparities on livestock ownership. Traditionally men own cattle and larges fields, whilst women owned small livestock like chickens and goats and small vegetable gardens Women not adequately represented in community decision making structures	Women disadvantaged if interventions involve cattle ranging or require access to large tracks of land Project interventions not specifically suitable to adequately address the negative impacts of climate change on women	Low Risk	Employment of gender experts to ensure that consultations were responsive to various gender needs and roles such that project activities effectively respond to the unique needs of women and girls, men and boys, and promote equal opportunities to participate, and receive comparable social and economic benefits. Project activities have been designed to be gender sensitive and to empower women. Training all project staff on gender-sensitive approaches. Mechanisms for selection of beneficiaries will be gendersensitive in order to ensure equal participation of men and women taking into consideration different needs	Gender Specialists Project Officers Monitoring and Evaluation Officers	
Protection of Natural Habitats	There are high levels of deforestation in the areas targeted by the project	Low of habitats to animals and insects. Low of plants	Low Risk	The project activities do not involve activities leading to deforestation. The following mitigation strategies must be implemented to reduce deforestation in the areas targeted by the project:	Project Officers	

				- Promotion of alternative sources of fuel, like bio gas.		
				Trees (firewood) are a major source of fuel for cooking. Adoption of alternative sources of fuel will reduce deforestation. - Promotion of conservation agriculture and use of organic methods to increase soil fertility. Villagers currently destroy large tracts of forest to open up new fields in the even of soils from their old fields having been exhausted.		
Conservation of Bio diversity	See protection of natural habitats	See protection of natural habitats	See protection of natural habitats	See protection of natural habitats	See protection of natural habitats	See protection of natural habitats

Climate Change, Mitigation and Adaption	Vegetable gardening is water intensive	Depletion of water resources leading to failure of gardens and livelihood initiatives dependent on water	Low Risk	The following measures must be implemented: - Adoption of conservation farming - Proper management of water resources - Use of drip irrigation - Using prolific boreholes that produce commercial water to irrigate vegetable gardens - Reducing the sizes of gardens	Project Officers Monitoring and Evaluation Specialists	

				- Growing indigenous vegetables and drought tolerant but high value vegetables like onions		

Pollution Prevention and Resource Efficiency	Farming activities and gardening projects will require chemicals (pesticides, and fungicides) to control pests	Pesticides and fungicides pollute the environment	Low Risk	Putting up bio – security measures around livestock projects to reduce the incidence and spread of diseases Use of natural pest and disease control mechanisms for crops e.g. crop rotation, proper termination and disposal of crop residue after harvest Growing indigenous crops that are tolerant to diseases and local pests	Project Officers Agriculture Extension officers Monitoring and Evaluation Specialists	
Public Health	Contamination of water harvested to support project activities	Potential increase in water borne diseases, and vector borne diseases like malaria	Low Risk	Training project staff on how to manage harvested water sources to reduce the chances of contamination of water sources	Project Officers Monitoring and Evaluation Officers	
Lands, soils, and Water Conservation	Farming activities, (irrigation of gardens), can lead to over-extraction of surface or groundwater if proper water management policies and	Over extraction of surface and groundwater resources	Medium Risk	Using climate smart agriculture Proper management of water resources (see Pollution and Resource Efficiency above)	Project officers Monitoring and Evaluation Specialists Agriculuture Extension Officers	

	strategies are not implemented There was evidence of severe soil erosion, siltation, and gullying from the current farming activities of villagers in the targeted. Farming activities and livestock rearing during project implementation can lead to continued soil erosion, siltation and gullying	soil land and Continued erosion, degradation, gullying	Medium Risk	Training villagers on good soils husbandry practices Adoption of indigenous knowledge systems on the protection of wetlands Adoption of conservation agriculture		

4 The Environmental and Social Impacts institutional structures and monitoring mechanisms

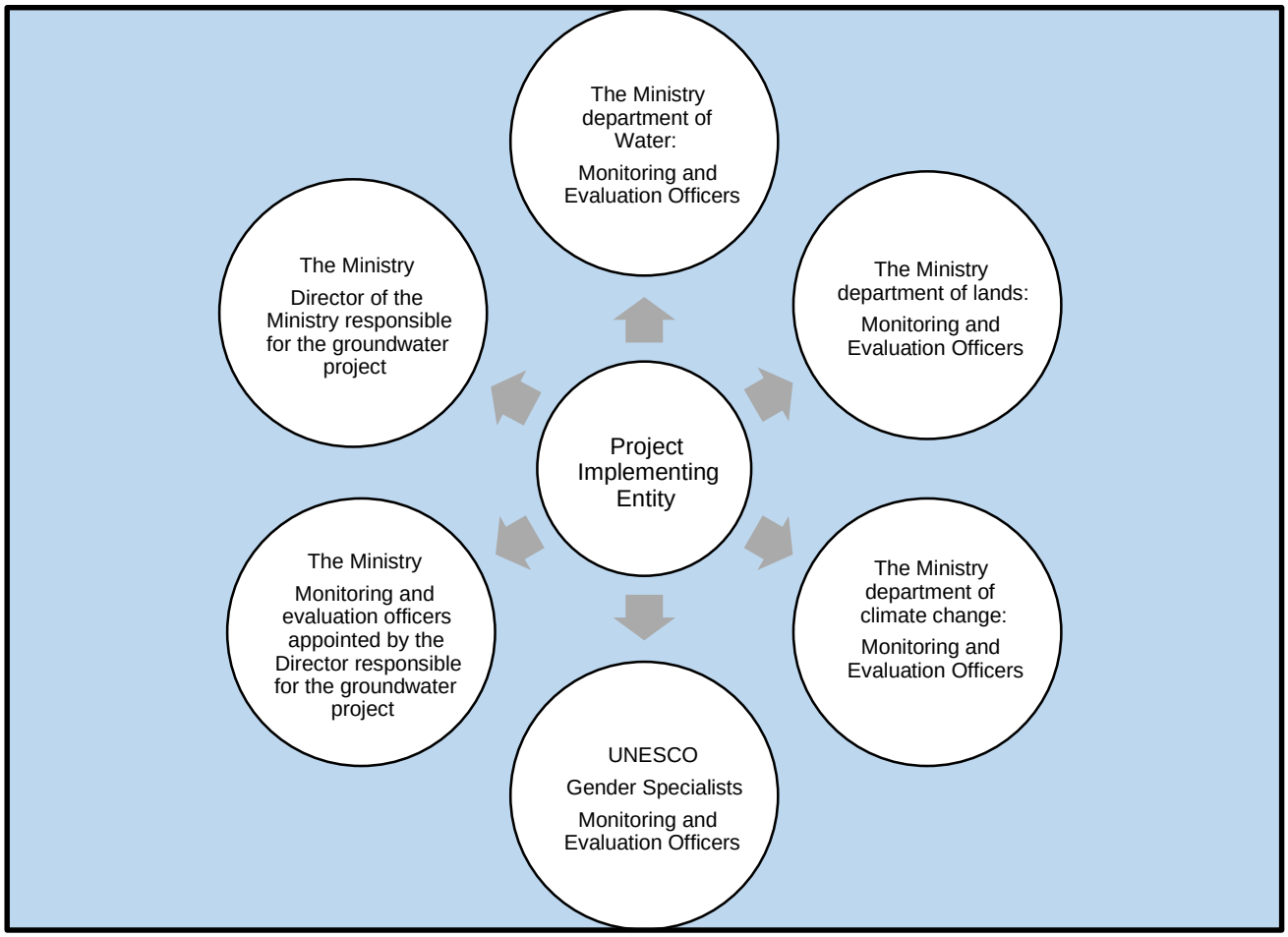
4.1 Introduction

This section of the document addresses the institution structures that needs to be in place to implement and monitor the environmental and social impact mitigation measures for the groundwater project. Additionally, efficient risk management requires definition of proper risk ownership for each and every risk identified for the project. The proposed organogram structure addresses issues of risk ownership.

4.2 Broad Allocation of Risk Responsibilities

The project is owned by the Ministry of Agriculture, Water, Lands and resettlement and Climate change (hereafter referred to as the Ministry) and funded by UNESCO. The Ministry and UNESCO therefore assumes the overall responsibility of maintaining oversight on risk management of the project during the funding period of the project, which is the first five (5) years of the project. Thereafter, the Ministry will assume overall oversight of risk management of the project. The implementing entity of the project, defined as the organization that shall be appointed to implement the project on behalf of the Ministry will be responsible for the actual implementation and monitoring of the project risk management strategies.

The structure to the proposed risk mitigation and monitoring strategies is given in the diagram below:



4.3 Institutional Strengthening needed for effective risk mitigation and monitoring

a. Ministry of Agriculture, Water, and Climate Change (The Ministry)

The Ministry needs to appoint monitoring and evaluation officers from the following departments to ensure that there is proper implementation of the risk mitigation strategies proposed for the adverse risks identified for the groundwater project:

i. Department of Water;
ii. Department of Lands;
iii. Department of Climate Change;
and
iv. The Director of the Ministry to appoint other monitoring and evaluation officers responsible for risks that do not fall squarely with the departments identified in bullet point (i) to (iii).

The Ministry is the owner of the project and hence it maintains oversight of monitoring and updating the risk mitigation strategies after the project piloting stage (which is the first five years). Additionally, the Ministry must train Agricultural Extension Officers (Agritex officers) within the wards in which the project pilots will be implemented. Agritex officers will take over the day to day risk management activities from the entity/organization appointed to implement the project during the project piloting stage.

b. UNESCO

UNESCO together with the Ministry will have overall oversight of monitoring and evaluating the implementation of the risk mitigation during the project piloting stage (the first five years of the project). UNESCO therefore needs to provide risk monitoring and evaluation officers as well as gender specialist to assist the Ministry in monitoring and evaluation of the groundwater project. The objective of UNESCO during this stage is to train and capacitate the monitoring and evaluation officers from the Ministry to ensure continuity of effective monitoring and evaluation of risk mitigation activities of the groundwater project.

4.4. Allocation of Responsibilities for risks with potential adverse impacts

Allocation of risk monitoring and evaluation responsibilities for the groundwater project is divided into two parts: duties and responsibilities during project piloting stage (the first five (5) years, and duties and responsibilities after the project piloting stage (after the first five years). **a. Duties and Responsibilities during the project piloting stage**

The following risks, if not properly managed and mitigated, were identified as having potential adverse impacts on the project.

Environmental and Social Risk		**Primary Responsibility**	**Institution with oversight of monitoring and evaluation of risks**	
Risk Particulars	**Risk Classification**	**Primary Risk Management Responsibility**	**The Ministry department to maintain oversight of the risk**	**UNESCO arm maintaining oversight over the risk**
Access and Equity	Low Risk	Gender Specialist Project Manager	Director of the Ministry to appoint Monitoring and Evaluation Officers	Monitoring and Evaluation Officers
Marginalised and Vulnerable Risks	Low Risk	Gender Specialist Project Manager	Director of the Ministry to appoint Monitoring and Evaluation Officers	Monitoring and Evaluation Officers
Gender, Equity and Women's Empowerment	Low Risk	Gender Specialist Project Manager	Director of the Ministry to appoint Monitoring and Evaluation Officers	Monitoring and Evaluation Officers
Protection of Natural habitants – ecosystems	Low risk	Project Officers Project Manager	Department of lands Department of Water	Monitoring and Evaluation Officers
Conservation of Biodiversity	Low Risk	Project Officers Project Manager	Department of Lands Department of Water	Monitoring and Evaluation Officers
Climate Change, Mitigation and Adaptation	Low Risk	Project Officers Project Managers	Department of Climate Change	Monitoring and Evaluation Officers
Pollution Prevention, and Resource Efficiency	Low Risk	Project Officers Project Managers	Department of Lands Department of Water	Monitoring and Evaluation Officers
Public Health	Low Risk	Project Officers Project Managers	Director of the Ministry to appoint Monitoring and Evaluation Officers	Monitoring and Evaluation Officers

Land, Soils, and Water Conservation	Medium Risk	Project Officers Project Mangers	Department of Lands Department of Water	Monitoring and Evaluation Officers

b. Duties and responsibilities after the project piloting stage

Environmental and Social Risk		**Primary Responsibility**	**Institution responsible for monitoring and evaluation of the risk**
Risk Particulars	**Risk Classification**	**Primary Risk Management Responsibility**	**The Ministry department to maintain oversight of the risk**
Access and Equity	Low Risk	Agritex Officers for the respective wards	Director of the Ministry to appoint Monitoring and Evaluation Officers
Marginalised and Vulnerable Risks	Low Risk	Agritex Officers for the respective wards	Director of the Ministry to appoint Monitoring and Evaluation Officers
Gender, Equity and Women's Empowerment	Low Risk	Agritex Officers for the respective wards	Director of the Ministry to appoint Monitoring and Evaluation Officers
Protection of Natural habitants – ecosystems	Low risk	Agritex Officers for the respective wards	Department of lands Department of Water
Conservation of Biodiversity	Low Risk	Agritex Officers for the respective wards	Department of Lands Department of Water
Climate Change, Mitigation and Adaptation	Low Risk	Agritex Officers for the respective wards	Department of Climate Change
Pollution Prevention, and Resource Efficiency	Low Risk	Agritex Officers for the respective wards	Department of Lands Department of Water
Public Health	Low Risk	Agritex Officers for the respective wards	Director of the Ministry to appoint Monitoring and Evaluation Officers
Land, Soils, and Water Conservation	Medium Risk	Agritex Officers for the respective wards	Department of Lands Department of Water

The entire responsibility of implementing, monitoring and evaluation of risk mitigation measures rests with the Ministry after the first five years of rolling out the project.

Annex 6: List of stakeholders consulted and attendance registers for consultative meetings

United Nations Educational, Scientific and Cultural Organization | International Hydrological Programme

Registration Form

Inception Meeting for the Development of the Adaptation Fund Project Proposal

10 July 2019, UNESCO ROSA

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United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

Registration Form

Inception Meeting for the Development of the Adaptation Fund Project Proposal

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Strengthening local communities' adaptive capacity and resilience to climate change through sustainable groundwater exploitation in Zimbabwe

30 August 2018, UNESCO Regional Office for Southern Africa, 8 Kenilworth Road, Newlands, Harare, Zimbabwe

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United Nations Educational, Scientific and Cultural Organization

PROPOSAL DEVELOPMENT CONSULTATIVE PROCESS FOR UNESCO/GOVERNMENT OF ZIMBABWE ADAPTATION FUND PROPOSAL
23 October 2019, Monomotapa Hotel, Harare
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