ZIMBABWE

Zimbabwe's National Climate Change Response Strategy

GOVERNMENT OF ZIMBABWE
MINISTRY OF ENVIRONMENT, WATER AND CLIMATE

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Facilitated by
INSTITUTE OF ENVIRONMENTAL STUDIES
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Foreword

The impacts of global climate change and variability are becoming more evident with increased incidences of droughts, floods, hailstorms, more hot days and heat waves. Climate change is one of the biggest threats facing global development with the developing countries being more vulnerable due to their low adaptive capacity. Climate change has been widely recognized and accepted as a reality and that it poses serious problems with far reaching social, political, economic and environmental consequences, particularly in vulnerable countries.

The impacts of Climate Change in Zimbabwe are likely to stall the country's development, pose a serious risk to food security and adaptive capacity. The National Climate Change Response Strategy was among the processes that sought to establish specific provisions for dealing with climate change issues, understanding the extent of the threat and putting in place specific actions to manage potential impacts.

Science has clearly demonstrated that there is extreme urgency in taking real action to avoid irreversible damages to our planet. Reports of the Inter-governmental Panel on Climate Change (IPCC) state that Africa will suffer the most from the impacts of climate change. The serious under-development of the continent signifies high vulnerability to climate change impacts. The global nature of climate change requires the widest cooperation and participation in an effective and appropriate international response comprising mitigation and adaptation measures based on the principles of the Climate Change Convention.

However, taking note that the impacts of climate change are felt at the Local level and most felt by the poor communities due to their low adaptive capacity, the Government of Zimbabwe has developed a National Climate Change Response Strategy to guide national response measures in addressing the impacts of climate change.

The strategy further provides guidance on integration of climate change issues into national development planning processes at national, provincial, district and local levels and ensures coordinated activities.

The Government's commitment to develop a climate-resilient Zimbabwe has also been demonstrated by the elevation of the Climate Change Office into a fully fledged Climate Change Department. The country envisages developing adaptation strategies that can mitigate the diverse and complex impacts of climate change and improve community livelihoods.

The country's vulnerability to the adverse effects of climate change makes adaptation a national priority, demanding policy direction at the highest level. Therefore the development of the National Climate Change Response Strategy seeks to address the climate change issues and contribute to a climate-resilient Zimbabwe. It is my hope that the strategy will create a solid foundation for mainstreaming climate change thinking into all key socio-economic sectors in order to bring about an integrated response across all sectors.

Finally, I would like to thank UNDP, COMESA, UNICEF and Global Water Partnership for the financial and technical support, Institute of Environmental Studies (IES) and all those who made it possible to have the strategy in place.

Hon. Saviour Kasukuwere
Minister of Environment, Water and Climate

Executive Summary

INTRODUCTION

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 its meeting the country's development goals. Both climate change and policies to minimize its effects have enormous socio-economic and environmental implications. The challenge for the country is how to develop adaptation strategies that can reduce and mitigate the diverse and complex impacts of climate change. The National Climate Change Response Strategy is a response to this challenge and also aims to contribute towards achieving Zimbabwe's Agenda for Sustainable Socio-Economic Transformation (Zim Asset) 2013-2018 and beyond. The Zim Asset recognises that the country is susceptible to perennial droughts and floods caused by climate change emanating from global warming. It also notes that climate change affects the country's agro-based economy whose livelihoods largely depend on rain-fed agriculture, livestock production and natural resources. Thus the government has created a Ministry of Environment, Water and Climate in recognition of the importance of climate and climate change to the country's development.

Zimbabwe has actively participated in international negotiations on climate change from as far back as 1992. It was among the first countries to sign and ratify the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and also acceded to the Kyoto Protocol in 2009. Although Zimbabwe is constrained by its limited ability to put in place appropriate measures in order to respond to climate change because of lack of human, institutional and financial resources, it has continued through the years to support the United Nations efforts to curb the escalation of greenhouse gas (GHG) emissions.

Zimbabwe's Climate Change Response Strategy mainstreams climate change through a sectorial approach to ensure that each sector implements adaptation and mitigation actions. Each sector will therefore be able to direct its project proposals to the appropriate funding mechanism. The Response Strategy is divided into six sections. These include an introductory section which comprises a brief profile of Zimbabwe and the Vision, Mission, Goal, Strategic Objectives, Pillars and Guiding Principles of the National Climate Change Response Strategy (Section 1). This is followed by a synopsis of climate change across scales from global, regional, national to local level (Section 2); sector specific challenges, risks and impacts as well as relevant adaptation and mitigation measures (Section 3); strategy enablers such as capacity building; technology transfer; climate change education, communication and awareness (Section 4); climate change governance (Section 5); and finally a section on Action Plans, Implementation Framework and Resource Mobilization (Section 6).

The National Climate Change Response Strategy provides a framework for a comprehensive and strategic approach on aspects of adaptation, mitigation, technology, financing, public education and awareness. It will help to inform Government on how to strengthen the climate and disaster risk management policies.

The vision of Zimbabwe's Climate Change Response Strategy is ***to create a climate change resilient nation*** **while its mission is** ***to ensure sustainable development and a climate proofed economy through engaging all stakeholders recognizing the vulnerable nature of Zimbabwe's natural resources and society.***

The goal of the Response Strategy is ***to mainstream climate change adaptation and mitigation strategies in economic and social development at national and sectoral levels through multi-stakeholder engagement.***

The strategic objectives are to:

a) Mainstream climate change in all the key sectors of the economy.

b) Promote resource use efficiency and less carbon intense pathways in all economic activities and develop a climate change resilient energy infrastructure that is not carbon intense.

c) Develop climate proofed and environmentally sustainable transport systems that are less carbon intense.

d) Promote sustainable development, management and utilization of water resources under changing climatic conditions.

e) Promote sustainable land-use systems that enhance agricultural production, ensure food security and maintain ecosystem integrity.

f) Develop Nationally Appropriate Mitigation Actions (NAMAs) as a step towards low carbon development strategies.

g) Address climate change through evidence-based research, technology development and transfer.

h) Promote and protect health under a changing climate.

i) Develop an effective climate change communication information management and communication system that facilitates access by all stakeholder groups.

j) Strengthen and mainstream climate change in all education curricula.

k) Mainstream gender, children and youth, people living with HIV and AIDS and other vulnerable groups into all climate change interventions.

l) Develop and maintain an appropriate climate governance framework and institutional mechanisms aimed at coordinating climate change responses.

The Climate Change Response Strategy has seven **pillars** which include:

Pillar 1: Adaptation and Disaster Risk Management.

Pillar 2: Mitigation and low carbon development strategies (LCDS).

Pillar 3: Capacity to effect:

- Adaptation and mitigation.
- Climate change communication.
- Education and raising awareness.
- Research and development.
- Appropriate institutions to address climate change issues.

Pillar 4: Governance framework:

- Institutions.
- Networks.
- Negotiations.

Pillar 5: Finance and Investment:

- Partnerships.
- International Financing.

Pillar 6: Technology development and transfer, including infrastructure.

Pillar 7: Communication and advocacy; information management and dissemination.

Zimbabwe's Climate Change Response Strategy is guided by the following **Guiding Principles:**

a) Demand driven by national aspirations.

b) Country-driven and predicated on national development priorities.

c) Aligned with national laws, international obligations and commitments.

d) Mainstream climate change into policy and legal framework as well as development planning.

e) Mainstream sustainable development.

f) Participation and engagement of all stakeholders.

g) Response which is knowledge and evidence based that incorporates indigenous knowledge systems, culture and science.

h) Access to information.

i) Precautionary principle.

j) Mainstream the rights based approach.

SECTOR SPECIFIC STRATEGIES

The following are the strategies that will be implemented under each theme or sector:

Natural Systems

Climate Change Issues Associated with Air Pollution

a) Carry out an assessment to determine the main sources and levels of short-lived climate pollutants in Zimbabwe.

b) Introduce measures to control and capture short-lived climate pollutants.

c) Promote use of cleaner technologies.

d) Develop and implement policies and regulatory frameworks that restrict release of short-lived climate pollutants.

Climate Change Issues for the Water Sector

Water Resources Availability Issues

a) Strengthen and intensify monitoring institutions for hydro-meteorological parameters.

b) Conduct more frequent yield assessments of surface and groundwater resources.

c) Promote water use efficiency in all sectors.

Water Development Issues

a) Develop, rehabilitate, maintain and protect surface and groundwater resources.

b) Invest in management of effects of extreme events.

Water Management Issues

a) Strengthen stakeholder structures in water resources management.

b) Promote more efficient water use practices.

c) Promote catchment protection.

d) Adopt data analysis and prediction tools that incorporate climate change.

Land-use, Land-use-Change and Forestry (LULUCF)

Land-use and Land-use Change

a) Develop and enforce policies that regulate change from one land-use to another especially the clearance of forests and woodlands to other land-uses.

Climate Change and the Forestry Sector

Adaptation in the Forestry Sector

a) Promote establishment of land-use plans at district, ward, village and farm management levels that clearly identify forestry as a recognized land-use.

b) Strengthen research, planning and financial support to forestry and natural resources management, to develop cost effective adaptation options.

c) Build capacity for forest management in a changing climate.

Mitigation Options in the Forestry Sector

a) Develop national capacity to design carbon projects for accessing different carbon financing mechanisms and to implement and support the projects.

b) Maintain, account for, and expand carbon sinks.

Biodiversity and Ecosystems

a) Promote and strengthen biodiversity conservation management and the integrity of natural ecosystems by using an ecosystem based approach to adapt to climate change.

b) Promote appropriate climate smart land-use options for the drier natural regions where cattle production and wildlife ranching are the most suitable land-use options.

c) Strengthen the effectiveness of Trans-frontier Conservation Areas as a mechanism for sustainable biodiversity conservation and climate adaptation.

Economic Sectors

Agriculture and Food Security

Overarching Issues in Agriculture and Food Security

a) Develop frameworks for sustainable intensification and commercialization of agriculture at different scales across agro-ecologies.

b) Strengthen capacity to generate new forms of empirical knowledge, technologies and agricultural support services that meet emerging development challenges arising from increased climate change and variability.

c) Strengthen early warning systems on cropping season quality, rangelands conditions, droughts, floods, disease/pest outbreaks and wildlife movement in order to enhance farmer preparedness.

Thematic Issues and Proposed Strategies for the Agricultural Sector

Farming Systems

a) Develop frameworks for supporting agricultural specialization according to agro-ecological regions, including mechanisms for commodity exchange, trade and marketing.

Crop Productivity

a) Strengthen the capacity of farmers, extension agencies, and private agro-service providers to take advantage of current and emerging indigenous and scientific knowledge on stress tolerant crop types and varieties, including landraces that are adaptable to arising climatic scenarios.

b) Develop frameworks for promoting science based crop production and post harvest technologies and management practices.

Livestock Production

a) Strengthen the capacity to identify and promote adoption of indigenous and improved livestock breeds that are tolerant to climate related stresses.

b) Establish monitoring systems for greenhouse gas emissions in agricultural systems and support mechanisms for their reduction.

Agriculture and Water

a) Strengthen national research and extension capacity for development and integrated management of agricultural water resources.

Industry and Commerce

a) Introduce policies that promote the use and adoption of clean and efficient energy in industry.

b) Create a policy and regulatory framework that promotes resource use efficiency and cleaner production in industry and commerce.

c) Create an enabling policy and legal framework that encourages the setting up and operation of climate resilient industries.

Mining

a) Develop regulatory frameworks to encourage emissions reduction and invest in resource efficient technologies.

b) Enforce and monitor the implementation of mandatory and voluntary environmental management systems.

c) Adopt practices that reduce energy consumption in the mining sector.

d) Develop a framework for enhancing the capacity of small scale miners to improve their environmental performance.

Tourism

a) Mainstream climate change into policies and legislation that guide the tourism sector.

b) Promote and strengthen Zimbabwe's tourism sector's resilience to climate change.

c) Build and strengthen the capacity of the tourism and wildlife sectors to adapt to the challenges of climate change.

d) Promote mitigatory measures to ensure a low carbon footprint/emission and sustainable growth and development in Zimbabwe's tourism sector.

Physical and Social Infra-structure

Energy

a) Introduce policies and regulatory frameworks for renewable energy, energy conservation and energy efficiency.

b) Strengthen energy planning, research and development.

c) Promote low carbon energy provision and use.

Transport

a) Introduce a transport policy framework that encourages use of transport with low carbon emissions.

b) Integrate climate resilience into transport planning and infrastructural development.

Disaster Risk Management and Social Infrastructure (Human Settlements)

a) Develop an integrated and co-ordinated approach to reducing disaster risk and to address impacts of climate change through a multi-stakeholder approach.

b) Enhance early warning systems and capacity of hydro-meteorological services to advise on weather related impacts on new infrastructure as well as mitigation of potential damage to existing infrastructure.

c) Review and update policy and by-laws on building standards and codes to make them adaptive to climate change.

d) Invest in climate resilient social infrastructure.

e) Enhance community resilience to climate change.

Waste Management

a) Capacitate local authorities to deliver proper, effective and efficient waste management services in order to reduce GHG emissions from waste management.

b) Create an enabling policy environment which encourages investment into alternative energy production using waste products.

c) Develop an enabling framework to promote waste minimization through education and behavioural change of waste generators.

Health

a) Strengthen surveillance programmes for monitoring human health under a changing climate.

b) Build resilience against diseases that occur because of impacts of climate change.

Gender, People Living with HIV and AIDS and Other Vulnerable Groups

a) Mainstream climate change in policies for the vulnerable groups with their active participation at every level.

b) Strengthen the adaptive capacity of the vulnerable groups.

c) Enhance provision of early warning systems on droughts, floods and disease outbreaks to vulnerable groups and ensure a coordinated approach in providing them with emergency services.

Children and Youth

a) Understand the impacts of climate change on children and youth in Zimbabwe and create an enabling environment that prevents harm to children and youth emanating from pressures of these impacts.

b) Ensure the inclusion of children and youth in the policy formulation process for climate change, and in adaptation and mitigation activities.

STRATEGY ENABLERS

Capacity Building

Capacity Building for Climate Change

a) Build capacity to conduct comprehensive vulnerability assessments and develop appropriate response models.

b) Develop mechanisms to mainstream climate change adaptation and disaster risk management into development programmes.

The Role of the Meteorological Services in Climate Change

a) Strengthen the capacity of the National Meteorological and Hydrological Services to carry out research on climate change through improved data collection and management, and climate modelling.

b) Strengthen the documentation of and tapping into indigenous knowledge systems to complement scientific knowledge for climate change forecasting and early warning systems.

c) Establish an enabling framework for sharing and disseminating information on climate change (i.e. at provincial, district and ward levels) in the country.

Technology Transfer

a) Create a policy framework that will improve access to and promote uptake of cleaner and more efficient technologies across all economic sectors.

b) Support research and development of technologies in all relevant sectors to mitigate and adapt to climate change.

Climate Change Education, Communication and Public Awareness

Climate Change Education and Training

a) Enhance the teaching and learning of climate change at all levels of education (formal and informal).

b) Provide relevant training on climate change issues to educators and practitioners working with communities.

Public Awareness-raising and Communication

a) Implement a communication strategy for raising awareness on climate change.

b) Promote and strengthen stakeholder awareness on adaptation to and mitigation of climate change.

c) Encourage sharing of information and networking on climate change issues at local, regional and international levels.

d) Communicate climate change messages incorporating indigenous knowledge systems.

CLIMATE CHANGE GOVERNANCE

Climate Change Governance and Institutional Framework

Climate Change Governance

a) Mainstream climate change into urban and rural planning, infrastructure, investments and service delivery.

Climate Change Institutional Framework

a) Institutionalize a climate change response governance framework at national, provincial, district and ward levels.

Climate Change Policy and Legal Framework

a) Enact an enabling policy environment for climate change response.

ACTION PLAN, IMPLEMENTATION FRAMEWORK AND RESOURCE MOBILIZATION

Action Plans for these strategies that include: actions, indicative time frame, lead agency, cooperating agencies, potential sources for resource mobilization and estimated costs are given in Annex 1. A summary of the estimated costs is given in Table (i) and amounts to almost 10 billion United States dollars. The Actions will be implemented over 10 years with a review after every 5 years.

Significant financial resources will need to be allocated by the Government treasury; the private sector, green climate funds; bilateral donor and international agencies support; adaptation fund, mitigation financing including Clean Development Mechanism; international, regional and local banks.

Table (i): Summary of estimated costs to implement the Action Plans for Zimbabwe's Climate Change Response Strategy

No	Sector	Amount USD (million)
1.	Air Pollution	134
2.	Water Resources	3,158
3.	Land Use and Land Use Change	91
4.	Biodiversity	74
5.	Agriculture	2,386
6.	Industry and Commerce	528
7.	Mining	312
8.	Tourism	252
9.	Energy	262
10.	Transport	1,071
11.	Disaster Risk Management and Human Settlements	519
12.	Waste Management	231
13.	Health	52
14.	Gender; People Living With HIV and AIDS and other Vulnerable groups	25
15.	Children and Youth	32
16.	Capacity Building	45
17.	Role of Meteorological Services	23
18.	Technology Transfer	574
19.	Climate Change Education	15
20.	Public Awareness	15
21.	Climate Change Governance	88
	Overall Total	**9,887**

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Abbreviations

AfDB	African Development Bank
AGRITEX	Agricultural Extension Services
AIDS	Acquired Immunodeficiency Syndrome
APINA	Air Pollution Information Network for Africa
ARC	Agricultural Research Council
AvGas	Aviation Gasoline
AWOS	Automated Weather Observing System
AU	African Union
BCSDZ	Business Council for Sustainable Development Zimbabwe
BIOCLAM	Bioclimatic
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBD	Convention on Biological Diversity
CBOs	Community Based Organisations
CC	Climate Change
^0C	Degrees Celcius
CCAC	Climate and Clean Air Coalition
CDM	Clean Development Mechanism
CDs	Compact Disks
CH_4	Methane
CIFOR	Centre for International Forestry Research
CIMMYT	International Maize and Wheat Improvement Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMIP3	Coupled Model Inter-comparison Project Phase 3
CO	Carbon monoxide
CO_2	Carbon dioxide
COMESA	Common Market for Eastern and Southern Africa
CSAG	Climate Systems Analysis Group
CSC	Cold Storage Commission

CSOs	Civil Society Organizations
CZI	Confederation of Zimbabwe Industries
DDF	District Development Fund
DFID	Department for International Development
DNA	Designated National Authority
DR & SS	Department of Research and Specialist Services
DRR	Disaster Risk Reduction
ECZ	Engineering Council of Zimbabwe
EMA	Environmental Management Agency
EU	European Union
FAO	Food and Agriculture Organization
FC	Forestry Commission
G Wh	Gigawatt Hour
GCMs	General Circulation Models
GCOS	Global Climate Observing Systems
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GSO	Global Surface Observations
GTS	Global Telecommunication System
GUAO	Global Upper Air Observations
GWP	Global Water Partnership
HAZ	Hotel Association of Zimbabwe
HFCs	Hydrofluorocarbons
HIV	Human Immunodeficiency Virus
ICRAF	World Agroforestry Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information Communication Technology
IDRC	International Development Research Centre
IUCN	International Union for Conservation of Nature

Abbreviations

IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
Km	Kilometres
Kw	Kilowatts
LAPs	Local Area Prediction System
LCDS	Low Carbon Development Strategies
LPG	Liquified Petroleum Gas
LULUCF	Land-use, Land-use Change and Forestry
MAMID	Ministry of Agriculture, Mechanisation and Irrigation Development
MD	Ministry of Defence
MDGs	Millennium Development Goals
MEPD	Ministry of Energy and Power Development
MEWC	Ministry of Environment, Water and Climate
MFED	Ministry of Finance and Economic Development
MFA	Ministry of Foreign Affairs
MHA	Ministry of Home Affairs
MHCC	Ministry of Health and Child Care
MHTESTD	Ministry of Higher and Tertiary Education, Science and Technology Development
MIC	Ministry of Industry and Commerce
MICTPCS	Ministry of Information Communication Technology, Postal and Courier Services
MJLPA	Ministry of Justice, Legal and Parliamentary Affairs
MLGPWNH	Ministry of Local Government, Public Works and National Housing
MLRR	Ministry of Lands and Rural Resettlement
MMIBS	Ministry of Media, Information and Broadcasting Services
MMMD	Ministry of Mines and Mining Development
MPSE	Ministry of Primary and Secondary Education
MPSLSW	Ministry of Public Service, Labour and Social Welfare
MRV	Measurement Reporting and Verification
MSAC	Ministry of Sports, Arts and Culture
MSMECD	Ministry of Small and Medium Enterprises and Cooperative Development
MTHI	Ministry of Tourism and Hospitality Industry
MTID	Ministry of Transport and Infrastructural Development
MTP	Medium Term Plan

MW	Megawatts
MWAGCD	Ministry of Women Affairs, Gender and Community Development
MYIEE	Ministry of Youth, Indigenisation and Economic Empowerment
N_2O	Nitrous Oxide
NAMAs	Nationally Appropriate Mitigation Actions
NF_3	Nitrogen trifluoride
NGOs	Non-governmental Organizations
NMMZ	National Museums and Monument of Zimbabwe
NMVOCS	Non-methane Volatile Organic Compounds
NOx	Nitrogen Oxides
NSSA	National Social Security Authority
NTT	National Task Team
O_3	Ozone
OPC	Office of the President and Cabinet
OTC	Over-the-Counter
PFCs	Perfluorocarbons
PJ	Petajoule
PPCPs	Public–Private-Community Partnerships
ppm	parts per million
PPPs	Public-Private Partnerships
PSC	Public Service Commission
RCZ	Research Council of Zimbabwe
RDCs	Rural District Councils
REDD	Reduced Emissions from Deforestation and Forest Degradation
SADC	Southern African Development Community
SAZ	Standard Association of Zimbabwe
SF_6	Sulphur Hexfluoride
SIRDC	Scientific and Industrial Research and Development Centre
SLCPs	Short-lived Climate Pollutants
SNV	Stichting Nederlandse Vrijwilligers (Netherlands Development Organization)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TFCA	Trans-frontier Conservation Area
UK	United Kingdom

Abbreviations

UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNWTO	United Nations World Tourism Organization
USD	United States Dollar
VOCs	Volatile Organic Compounds
WACDEP	Water, Climate and Development Programme
WASH	Water Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organisation
WMO	World Meteorological Organization
WWF	World Wide Fund
ZCT	Zimbabwe Council for Tourism
ZCTU	Zimbabwe Congress of Trade Union
ZDF	Zimbabwe Defence Forces
ZERA	Zimbabwe Energy Regulatory Authority
ZESA	Zimbabwe Electricity Supply Authority
ZIE	Zimbabwe Institute of Engineers
ZIM ASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMPARKS	Parks and Wildlife Management Authority
ZIMSTAT	Zimbabwe National Statistical Agency
ZIMSEC	Zimbabwe Schools Examination Council
ZINWA	Zimbabwe National Water Authority
ZNCC	Zimbabwe National Chamber of Commerce
ZRP	Zimbabwe Republic Police
ZTA	Zimbabwe Tourism Authority

Glossary

Acced means assent or agree to a demand, request or treaty.

Adaptation is defined by the UNFCCC as "an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities". There are several kinds of adaptation: anticipatory, reactive, private, public, autonomous and planned. Adaptation measures include prevention, tolerance, sharing of losses, changes in activities or of location and restoration.

Adaptive capacity according to the IPCC is "the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behavior and in resources and technologies". The presence of adaptive capacity is a necessary condition for the design and implementation of effective adaptation strategies and enables sectors and institutions to take advantage of opportunities or benefits from climate change.

Anthropogenic is an effect caused or resulting from human activity.

Biofuel is a mixture of volatile, flammable hydro-carbons derived from plant material, animal waste, treated municipal and industrial waste used as fuel.

Carbon footprint is the total amount of greenhouse gases emitted into the atmosphere by activities of an individual, company, country, etc; usually expressed in equivalent tonnes of carbon dioxide.

Carbon sequestration is the process of capture and long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change.

Carbon sink is any process, activity or mechanism whether natural or artificial, that removes carbon-containing chemical compounds such as greenhouse gases, aerosols or precursors of greenhouse gases from the atmosphere and stores them for an indefinite period.

Clean Development Mechanism is a mechanism funded by developed countries to undertake emission reduction projects in developing countries. It is defined in Article 12 of the Kyoto Protocol and allows a country with emission-reduction or emission-limitation commitment under Annex B Party to implement an emission – reduction project in developing countries. Such projects can earn saleable certified emission reduction credits, each equivalent to one tonne of carbon dioxide, which can be counted towards meeting Kyoto targets.

Climate change according to the UNFCCC means "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". This differs from the IPCC usage

where climate change refers to “a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or variability of its properties and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or a result of human activity”.

Climate change mitigation according to IPCC is “an anthropogenic (human) intervention to reduce sources or enhance the sinks of greenhouse gases”.

Climate is a composite measure of the average pattern of variation in temperature, humidity, precipitation, wind, atmospheric pressure, sunshine, atmospheric particle count and other meteorological variables in a region over a long period of time (usually 30 years).

Climate risk means a risk resulting from climate change and affecting natural and human systems and regions. It is a combination of the probability of an event and its negative consequences. A societal element is said to be at risk when it is exposed to hazards and is likely to be adversely affected by the impact of those hazards when they occur.

Climate variability is the way climatic parameters fluctuate during a few years to a few decades above or below a long term average-value. Variability may be due to natural internal processes within the climate system or to variations in natural or anthropogenic external forcing.

Climatic hazard is any event or change in climate, such as a single extreme event that exceeds a critical temperature threshold or a complex combination of changes involving variables and/or resulting in multiple impacts. It is an extreme climatic/weather event causing harm and damage to people, property, infrastructure and land-uses. It includes not only the direct impacts of the climate/weather event itself by also other indirect hazards triggered by that event. A climatic hazard may be slow (like sea level rise) instead of sudden and severe or may be benign in today’s world and become hazardous in a new, different climate regime.

Coping strategies are generally short-term actions to ward off immediate risk, rather than to adjust to continuous or permanent threats or changes. In some cases they deplete assets, leading to higher risk for recurring hazards. Coping strategies can thereby undermine the possibility of long-term sustainable adaptation and so it is important to distinguish coping and adapting.

Decadal refers to the number ten, a group of ten things or a period of ten consecutive years.

Disaster risk management according to the United Nations Office for Disaster Risk Reduction is the systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disasters. It aims to avoid and lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.

Early warming systems are according to the United Nations Office for Disaster Risk Reduction the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

Energy demand management also known as **demand side management,** is the modification of consumer demand for energy through various methods such as financial incentives and education. It is usually used to encourage the consumer to use less energy during peak hours, or to move the time of energy use to off-peak times such as nighttime and weekends.

Global warming is the gradual observed century-scale rise in the earth's average atmospheric temperature generally attributed to the effect of greenhouse gases such as carbon dioxide which trap heat that would otherwise escape from the earth.

Greenhouse effect is a process whereby the presence in the atmosphere of gases such as carbon dioxide and methane (greenhouse gases) allow the incoming sunlight to pass through to the earth's surface but trap and absorb heat radiated back by the surface resulting in the elevation of the average surface temperature above what it would be in the absence of these gases. This effect makes the planet warmer, in the same way a greenhouse keeps its inside temperature warmer.

Greenhouse gases are according to the UNFCCC "those gaseous constituents of the atmosphere, both natural and anthropogenic that absorb and re-emit infrared radiation". The Kyoto Protocol addresses six anthropogenic greenhouse gases, namely, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexfluoride (SF_6) hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) Nitrogen trifluoride (NF_3) was added in the second compliance period which began in 2012 and ends in 2017 or 2020.

Renewable energy is energy that comes from any naturally occurring and replenishable source such as biomass, solar, wind, tidal, wave, flowing water (hydropower) and geothermal heat.

Resilience according to IPCC is "the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization and the capacity to adapt to stress and change". Simply, it is the ability to survive, recover from and even thrive in changing climatic conditions. It includes the ability to understand the potential impacts and to take appropriate action before, during and after a particular event, such as major flooding or prolonged drought, to minimize negative effects and maintain the ability to respond to changing conditions including unpredictable conditions.

Scenario is a sequence of events, course of events, chain of events especially when imagined. It is an account or synopsis of a possible course of action or events, a description of what could possibly happen.

Vulnerability according to IPCC is "the degree to which a system is susceptible to and unable to cope with, adverse effects of climate change including climate variability and extremes". Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity and adaptive capacity.

Section 1

Introduction

Climate change is a global issue that should concern every individual, group, organization and nation. Mitigation measures and adaptation strategies are needed for people to accommodate the anticipated changes. The Intergovernmental Panel on Climate Change (IPCC) projects that under a business-as-usual scenario, carbon dioxide (CO_2) levels, around 380 ppm in 2007, will increase to 450 ppm. Stabilization at this level will cause an increase in temperature of 2°C and any increase in temperature beyond this point will not sustain life on the planet. Thus climate change presents the biggest threat facing mankind today. Major adverse impacts of climate change include declining water resources; reduced agricultural productivity; spread of vector-borne diseases to new areas; changes in populations and distribution of biodiversity; and turbulent weather and climatic disasters.

Zimbabwe is experiencing more hot and fewer cold days than before as a result of climate change and variability. The country's annual mean surface temperature has warmed by about 0.4^0C from 1900 to 2000. The period from 1980 to date has been the warmest since Zimbabwe started recording its temperature. The timing and amount of rainfall received are becoming increasingly uncertain. The last 30 years have shown a trend towards reduced rainfall or heavy rainfall and drought occurring back to back in the same season. The frequency and length of dry spells during the rainy season have increased while the frequency of rain days has declined.

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 dependant on climate-sensitive livelihoods such as arable farming and livestock rearing among others. Thus 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 socio-economic 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.

Zimbabwe has actively participated in international negotiations on climate change from as far back as 1992. It was among the first countries to sign and ratify the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and also acceded to the Kyoto Protocol in 2009. Although Zimbabwe is constrained by its limited ability to put in place appropriate measures in order to respond to climate change requirements because of lack of human, institutional and financial resources, it has continued through the years to support the United Nations efforts to curb the escalation of greenhouse gas (GHG) emissions. Climate change issues are broadly included in Zimbabwe's National Environmental Policy and

Strategies. This has been done to demonstrate the country's willingness to contribute to the preservation of the global climate for the good of present and future generations.

Zimbabwe has no official long term development plan but had a Medium Term Plan (MTP) 2012-2015 which was operational between 2011 and mid-2013. The MTP recognized that climate change poses a significant and complex challenge to social and economic development. It acknowledged that increased frequency and intensity of extreme weather events such as droughts; reduced precipitation and gradual increases in temperatures would adversely affect key natural resource based climate sensitive sectors of the economy, particularly, agriculture, energy, forestry, water and tourism which contribute significantly to the country's Gross Domestic Product (GDP). It also highlighted that the development choices that the country would make under the MTP, particularly in the energy sector, might contribute to increased emission of GHGs thereby contributing to climate change. It therefore called for climate-smart policies that placed climate change concerns at the centre of development strategies, plans and programmes in all sectors of the economy. This would ensure the sustainability of strategies for social and economic development as well as their compatibility with international best practices on climate change adaptation and mitigation.

The MTP's policy objective was to promote climate change mitigation and adaptation strategies in social and economic development at national and sectoral level. Its three policy targets were the development of a National Climate Change Strategy; a Climate Change Policy and a National Action Plan for Adaptation and Mitigation. It also aimed to increase the integration of adaptation and mitigation strategies in economic and development activities and policies at national and sectoral level.

The Government of Zimbabwe started addressing these policy targets of the MTP through the Climate Change Office in the then Ministry of Environment and Natural Resources Management in 2012 when it initiated a process aimed at formulating a comprehensive National Climate Change Response Strategy.

The MTP has been superseded by the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim Asset) 2013 - 2018 after the 31 July 2013 harmonized elections. The Zim Asset recognizes that the country is susceptible to perennial drought and floods caused by climatic changes emanating from global warming. It also notes that the climatic changes affect the country's agro-based economy whose livelihoods largely depend on rain-fed agriculture, livestock production and natural resources.

The new government has created the Ministry of Environment, Water and Climate in recognition of the importance of climate and climate change. The Ministry of Environment, Water and Climate falls under the Food Security and Nutrition Cluster in the Zim Asset and some of the cluster outputs include strengthening and implementing the climate and disaster management policy; promoting conservation agriculture; rehabilitating irrigation; promoting drought, high yielding and heat tolerant varieties; promoting biofuels and renewable energy; all of which address climate change.

Zimbabwe's Climate Change Response Strategy mainstreams climate change through a sectorial approach to ensure that each sector implements mitigation and adaptation actions. Each sector will therefore be able to direct its project proposals to the appropriate funding mechanism. The Response Strategy is divided into six sections. These include an introductory section which comprises a brief profile of Zimbabwe and the Vision, Mission, Goal, Strategic Objectives, Pillars and Guiding Principles of the National Climate Change Response Strategy (Section 1).

This is followed by a synopsis of climate change across scales from global, regional, national to local level (Section 2); sector specific challenges, risks, opportunities and impacts as well as relevant adaptation and mitigation measures (Section 3); strategy enablers such as capacity building; technology transfer; climate change education, communication and awareness (Section 4); climate change governance (Section 5); and finally a section on Action Plans, Implementation Framework and Resource Mobilization (Section 6).

The National Climate Change Response Strategy provides a framework for a comprehensive and strategic approach on aspects of adaptation, mitigation, technology, financing, public education and awareness. It will help to inform Government on how to strengthen the climate and disaster management policies.

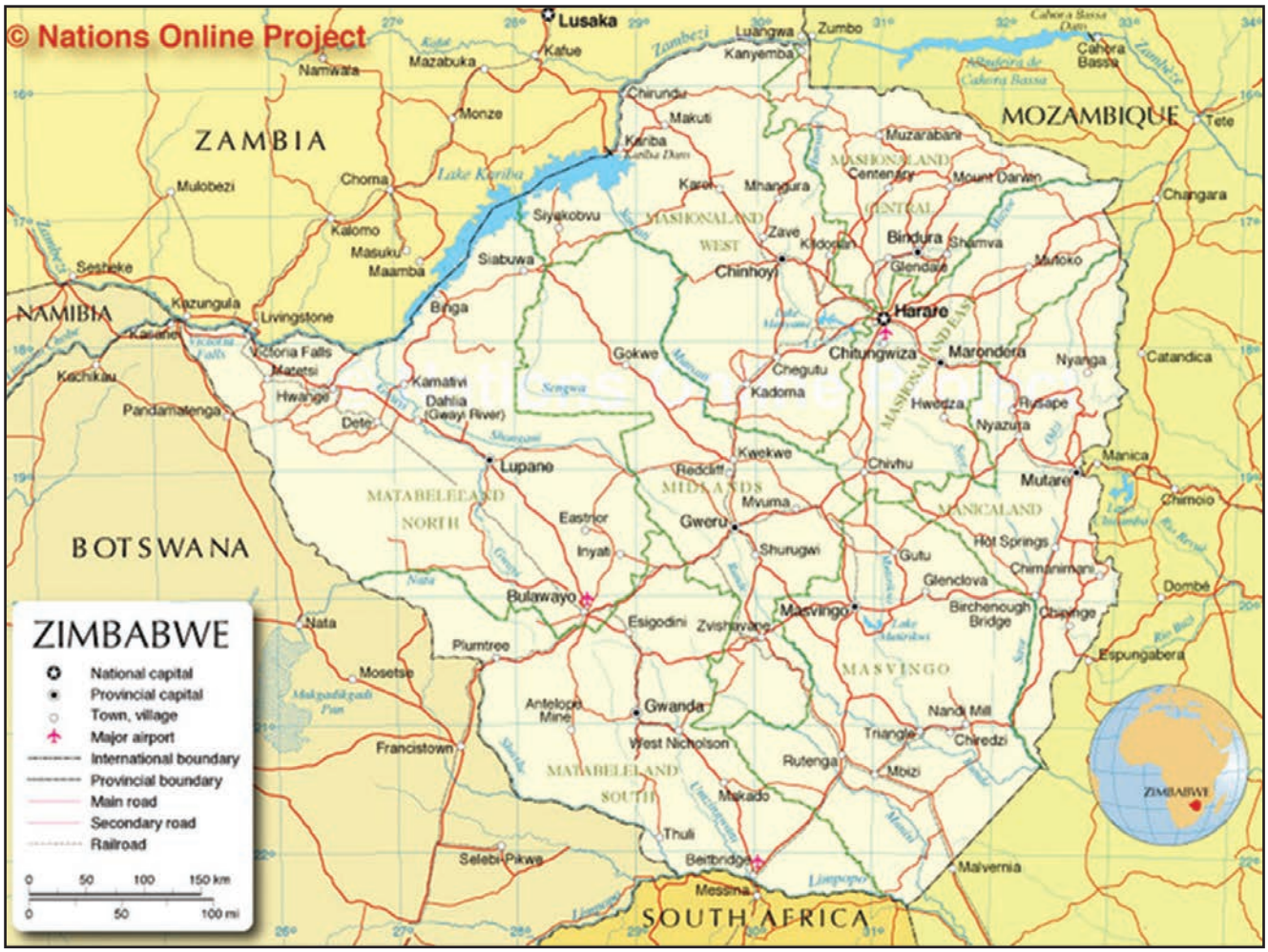
1.1 A Brief Profile of Zimbabwe

Geographical Location and Characteristics

Zimbabwe is a landlocked country in southern Africa, lying between latitudes 15° and 23° South of the Equator and longitudes 25° and 34° East of the Greenwich Meridian (See Figure 1). Its area is 390,757 square kilometres. The country is bordered by Mozambique to the East, South Africa to the South, Botswana to the West and Zambia to the North and North-west. The Zambezi River to the north and the Limpopo River to the south, form Zimbabwe's borders with Zambia and South Africa, respectively.

Most of the country is elevated in the central plateau (Highveldt) stretching from the southwest

Figure 1: Zimbabwe and its neighbours.
Source: www.nationsonline.org (accessed 12-10-2012_12:12hrs)



to the northwest at altitudes between 1,200 and 1,600 m. The watershed is 650 kilometres long and 80 kilometres wide. The country's east is mountainous with Mount Nyangani as the highest point in the country at 2,592 m. About 20 per cent of the country consists of the Lowveldt below 900 m, with the Zambezi and Limpopo river valleys found in the north and south, respectively, having the lowest altitude of around 500 m above sea level. Figure 1 shows Zimbabwe and its current administrative divisions, major towns including the capital city Harare, infrastructural development as well as its neighbours.

Zimbabwe has a sub-tropical climate with four seasons: cool dry season from mid-May to August; hot dry season from September to mid-November; the main rainy season running from mid-November to mid-March; and the post rainy season from mid-March to mid-May. The mean monthly temperature varies from 15^0C in July to 24^0C in November whereas the mean annual temperature varies from 18^0C on the Highveldt to 23^0C in the Lowveldt. The lowest minimum temperatures (7^0C) are recorded in June or July and the highest maximum temperatures (29^0C) in October, or if the rains are delayed, in November. The climate is moderated by the altitude with the Eastern Highlands enjoying cooler temperature compared to the low lying areas of the Lowveldt.

Zimbabwe is generally a semi-arid country with low annual rainfall reliability. The average annual rainfall is 650 mm but geographically it ranges from around 350 to 450 mm per year in the Southern Lowveldt to above 1,000 mm per year in the Eastern Highlands. The rainfall pattern of Zimbabwe is variable with years below and above normal rainfall.

Environment and Natural Resources

Zimbabwe has abundant natural resources that include wilderness, arable land, forests, wildlife minerals, and surface and ground water. Its forestry resources cover approximately 66 per cent of the total land area.

Almost 15 per cent of Zimbabwe is under some form of statutory protection within the Parks and Wild Life Estate or State Land. Indigenous forests and woodlands include the Miombo floristic element comprising the following woodland types: *Miombo, teak, mopane, Acacia, Terminalia* and *Combretum.* The *Afromontane* element is localized in the Eastern Highlands mainly on the windward side of the mountains with the Cape Floristic element occurring on the Nyanga Mountains.

Zimbabwe has 20 million mega litres of total annual renewable available freshwater. The water is largely replenished through rainfall and then runoff into rivers, streams, lakes and reservoirs, aquifers and freshwater aquatic systems such as wetlands. The country relies on surface water resources for 90 per cent of its requirements while groundwater supplies the remaining 10 per cent. The estimated groundwater resources available for exploitation in Zimbabwe are 8 million mega litres. There are seven river catchments in the country, namely Manyame, Mazowe, Gwayi, Runde, Sanyati, Save and Mzingwane.

Zimbabwe has the second largest number of dams in the Southern African Development Community (SADC) region after South Africa. The country has almost 40 medium to large dams and lakes including Lake Kariba as well as about 10,200 small dams. Zimbabwe is a dry country with limited wetlands.

Agriculture uses most of Zimbabwe's water, 81 per cent for irrigation, fish farming and livestock watering. The urban, industrial and institutional sector uses 15 per cent of available water, while mining accounts for 2 per cent of the water. In 2001, about 152,000 hectares of land were under formal irrigation with a total of 5,000 to

20,000 under informal irrigation. There is a further 600,000 hectares of land nationwide that can be made available for irrigation development.

Zimbabwe faces various natural hazards. These include frequent and recurrent droughts on one extreme and some flooding especially in the lower Zambezi Valley on the other extreme. Severe storms, though rare, also affect the country with devastating impacts on the population.

Current environmental problems include deforestation; soil erosion; land degradation as well as air and water pollution. Poor mining practices have led to toxic waste and heavy metal pollution especially in the more arid parts of the country. The growth of the urban populations has also led to pollution of water sources.

Zimbabwe, through the Ministry responsible for Environment launched the National Environmental Policy and Strategies in 2009 that compliments the Environmental Management Act [Chapter 20:27], and other legislation pertaining to environmental protection, monitoring and sustainable management. Zimbabwe is a signatory to the following multilateral environmental agreements, among others: the Montreal Protocol on Substances that Deplete the Ozone Layer; United Nations Convention to Combat Desertification (UNCCD); the United Nations Convention on Biological Diversity (UNCBD) and its Cartagena Protocol on Biosafety; Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the United Nations Convention on the Law of the Sea, in addition to the UNFCCC and its Kyoto Protocol.

Demographics and Human Well-being

According to the Zimbabwe National Statistical Agency (ZIMSTAT) Census Report published in 2013, Zimbabwe had a total population of 13,061,239 people as of August 2012. Of these, 41 per cent were children below the age of 15 years while four per cent were the elderly above the age of 65 years. This means that Zimbabwe's population still has the potential to grow even though its annual growth rate has declined in recent years, with a 2002-2012 inter-censal population growth rate of 1.1 per cent. With such a growth rate, the population will double in about 70 years.

The life expectancy at birth for Zimbabweans is 58 years. The total fertility rate is 3.8 children per woman which is one of the lowest in Sub-Saharan Africa. The average household size is 4.2 persons with 65 per cent of these households being male headed. Thirty three (33) per cent of the population live in urban areas and the inter-censal urbanization rate was about 2 per cent per annum.

Poverty remains high in Zimbabwe, and is estimated to be around 63 per cent for Total Consumption Poverty and 16 per cent for Food Poverty for households according to the Poverty Income Consumption and Expenditure Survey 2011/12 Report. It is more widespread in the rural areas at about 76 per cent, although small pockets (about 6 per cent) of deep poverty also occur for households in urban areas. Poverty in Zimbabwe has many causes, including weak macro-economic performance and high and rising levels of unemployment, which leave most people dependent on subsistence agriculture in climatically marginal areas.

The major health issues in Zimbabwe relate to child mortality, maternal health and the top four killer diseases, the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) epidemic, malaria, tuberculosis and diarrheal diseases. Though the adult prevalence rates for HIV and AIDS fell during the period 2000-2012 (from an estimated 34 per cent in 2000 to13.7 per cent in 2009; according to the

Demographic and Health Survey 2010-2011); 1.2 million people live with HIV. In addition, the number of orphans is estimated at about one million and vulnerable children have also increased as parents were lost.

Zimbabwe achieved near universal primary education for all in the 1980s which laid a foundation towards the fulfillment of the Millennium Development Goal 2. This was achieved through massive expansion of primary and secondary education facilities throughout the country. The Zimbabwe Demographic Health Survey 2010-2011 found that the overall literacy rate for women was 94 per cent whereas that of men was 96 per cent. By 2011 Zimbabwe had the highest literacy rate in Africa. The national census of 2012 put the national literacy rate at 96 per cent.

Economic Sectors

Economy and labour force: Zimbabwe has a fairly diversified economy based on agriculture, mining, manufacturing, commerce, forestry, and tourism, among others. Over the period 1980-1999 the GDP measured in real terms, grew at an average rate of 3.8 per cent per year. However, the economy faced severe challenges during the period 2000-2008 with the annual real GDP growth suffering declines averaging 5.3 per cent between 2003 and 2008. The country witnessed an unprecedented decline in GDP per capita to levels as low as USD300. According to the Zim-Asset, Zimbabwe's economy has been on a recovery path since 2009, registering growth, with a real GDP growth rate of 5.4 per cent in 2009, 11.4 per cent in 2010 and reaching a peak of 11.9 per cent in 2011. However, the recovery remained fragile as the growth declined from 11.9 per cent in 2011 to 10.6 per cent in 2012 and 3.4 per cent in 2013.

The Nominal GDP was estimated at USD8.9 billion in 2011 and at USD7.4 billion in real terms. Since the introduction of multi-currencies in 2009, the GDP per capita grew from US$520 per person in 2009 to US$693 per person in 2011. The introduction of the multi-currencies also brought the rate of inflation to a halt in January 2009 after it had reached an all-time high of 231 million per cent in July 2008. Inflation in Zimbabwe has been hovering between 3 and 4 per cent from January 2010 to December 2012. The year on year rate of inflation as at December 2012 stood at 2.9 per cent.

Zimbabwe has an estimated potential labour force of 7,661,295 million adults aged 15 years and above. However, the economically active population was estimated as 5,120,540 million by the national census of 2012. Of this number, 66 per cent are employed in agriculture, 24 per cent in services and about 10 per cent in industry. The unemployment rate increased from 6 per cent in 1999 to 9 per cent in 2002 and was 57 per cent for women and 31 per cent for men by 2010-2011 when the ZIMSTAT carried out the last Demographic and Health Survey. The percentage varies with the definition of employment and whether those in the informal sector are defined as being employed. The 2012 national census using the broad definition of employment put the unemployment rate at 11.1 per cent of the economically active labour force.

Agriculture: Zimbabwe has an agricultural based economy with the sector contributing about 15 per cent each year to the GDP. Agriculture provides about 60 per cent of the total employment and also supplies raw materials to industry. Zimbabwe's agricultural sector is divided into four major sub-sectors namely; large scale commercial farms, small scale commercial farms, communal and resettlement areas. The agrarian structure has changed with the recent land reform in Zimbabwe with 99 per cent of the farmers now being smallholder farmers. Of these

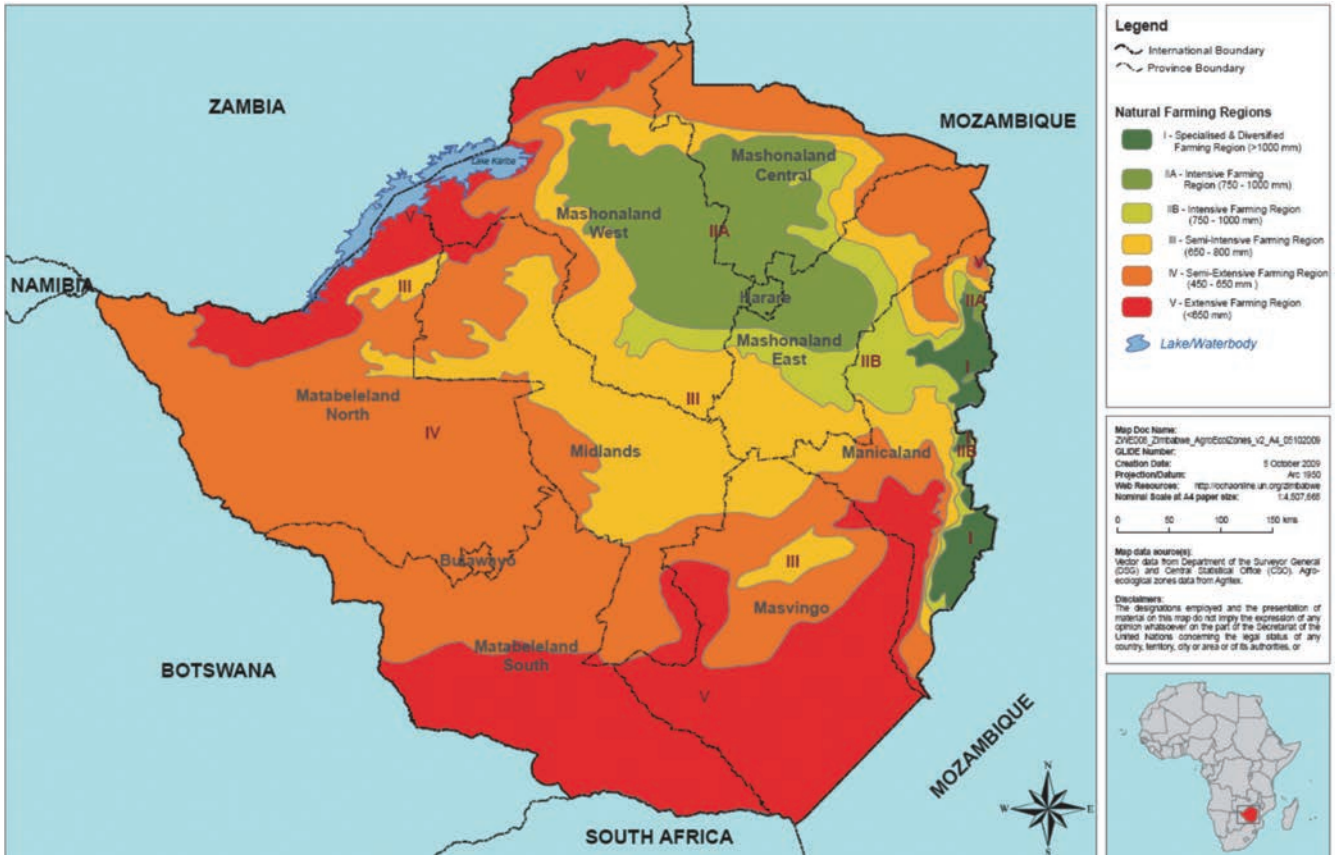
81 per cent are communal farmers, 18.7 per cent resettled farmers and 0.1 per cent large scale farmers.

The country is divided into five natural regions on the basis of soil type, rainfall, temperature and other climatic factors (Figure 2). These regions also represent the agricultural potential for the production of crops and livestock. The country produces a variety of crops in its different agro-ecological zones which include staple crops such as maize, sorghum, *mhunga* (pearl millet), *rapoko* (finger millet), oilseeds (sunflower, groundnuts and soya beans) and industrial crops which include tobacco, cotton, edible dry beans and paprika. The country rears a variety of livestock that include cattle, sheep, pigs and goats. There is also a thriving wild life industry represented by national parks and conservancies.

Industry: Industry comprising the construction, manufacturing, processing and secondary production sectors, is a key contributor to economic development in Zimbabwe. It contributes 14 per cent of GDP. The industry sector used to be mainly formal; however, the introduction of the Economic Structural Adjustment Programme in the 1990s and the resulting opening up of the economy and retrenchment of employees, induced growth of the informal sector. Indeed, according to the 2012 national census the formal sector now has about 1.5 million employees compared to 2.5 million in the informal sector.

The manufacturing sector is diversified and well integrated with the rest of the Zimbabwean economy and has strong linkages with agriculture, mining, construction and commerce. Zimbabwe's manufacturing sector is well known for the diversity of its products. The industries

Figure 2: Zimbabwe's agro-ecological regions.
Source: United Nations Office for the Coordination of Humanitarian Affairs (accessed 07-11-2012)



include food processing, metals, leather and leather products, wood and furniture, clothing and textiles, chemicals, paper and plastics, among others. Most of these manufacturing industries make use of the agricultural and mining outputs as their raw materials.

The manufacturing sector at its peak, contributed 23 per cent to GDP. However, since 2006 the sector recorded declines in output and is estimated to have declined by 73.3 per cent in 2008. According to the Zim Asset the average capacity utilization was 57 per cent in 2011 and 44 per cent in 2012. The Industrial Development Policy (2012-2016) aims to institute measures to raise capacity utilization to above 90 per cent by 2016. The services industry is also a very important sector that has contributed to the country's GDP.

Mining: The mining sector accounts for about 44 per cent of Zimbabwe's GDP, at least 30 per cent of foreign exchange earnings and 5 per cent formal employment. Zimbabwe has more than 1,000 mines producing about 35 minerals the main ones being gold, platinum, gold, nickel, chrome, iron ore, copper, coal, cobalt, tin, granite, chrysotile asbestos, lithium and more recently diamonds. The country is among the low-cost producers of minerals because of abundant shallow deposits.

Similar to other sectors, mining suffered declines during 2000-2008, but there has been resurgence in the sector with increasing production in gold, coal and platinum and the discovery of new minerals such as diamonds. Whereas the agricultural and manufacturing sectors have been the main contributors to export earnings, these have been overtaken lately by the mining sector, which now accounts for about 50 per cent of the country's total exports.

Trade: Zimbabwe's trade performance declined both in volume and value during 2008-2010 compared to the 1990s. A negative balance of trade has been experienced since 2002; however, export earnings were projected to grow by at least 10 per cent from around US$4.3 billion in 2011 to US$4.7 billion in 2012 as a result of the gradual economic recovery since 2009. This is underpinned by favourable international commodity prices and improved output of export commodities from the agriculture, mining and manufacturing sectors. The import bill was projected to marginally increase from around US$5.6 billion in 2011 to US$5.7 billion in 2012 with food imports expected to decline while non-food imports were projected to increase.

South Africa remains Zimbabwe's single largest trading partner accounting for at least 40 per cent of total exports and 60 per cent of total imports. Traditionally, the European Union (EU) used to be the major export destination for Zimbabwe accounting for two-thirds of total exports. China is the third most important market for Zimbabwe after South Africa and the EU, with around 7 per cent share of Zimbabwe's total exports.

Zimbabwe launched its National Trade Policy (2012-2016) in 2012 whose main objectives are to increase exports and promote the diversification of the country's export basket with an ultimate target of increasing the export earnings by at least 10 per cent annually from US$4.3 billion in 2011 to US$7 billion in 2016; promote enhanced value-addition of primary commodities in all sectors; consolidate and expand existing markets and explore new markets, with the main focus being to expand into regional markets; enhance trade facilitation in order to expedite trade flows by reducing and/or eliminating barriers to trade; give guidance to trade policy instruments such as tariffs, non-tariff measures and trade defense mechanisms with the aim of promoting trade,

protecting local industry from unfair trade practices, as well as improving access by consumers to a wide range of goods and services.

Energy: The main sources of energy used in Zimbabwe are electricity (from coal-fired stations, hydro-electricity and solar energy), petroleum products (including kerosene/paraffin), propane gas and fuel wood. Zimbabwe has coal reserves to meet ten times its electricity and petroleum needs for the next 100 years; hydro-power which if fully developed can meet the country's needs; abundant coal-bed methane gas deposits as well as uranium deposits. Most of the electricity is used in urban areas.

Fuel wood is the most commonly used fuel for over 90 per cent households in rural areas. Charcoal is not widely used in the country. The national fuel wood consumption is estimated at around 9.4 million tonnes per year. The African Development Bank estimated a sustainable yield of 13 million tonnes per year in 2004.

Energy demand is growing gradually, by over 2 per cent annually. Local supply does not meet demand. The shortfall is made up with imports of electricity from Zambia, Mozambique and South Africa. However, with the rising demand of electricity regionally, Zimbabwe has been working on expansion projects of the existing plants and also initiating new hydro-power generation projects particularly on the major rivers that border the country. Further development of solar power and bioenergy are also being pursued.

Transport and Communication: Zimbabwe's transport sector is dominated by road transport with 88,133 kilometres of road overall, of which 17,420 kilometres are paved. There are 2,400 km of rail track. There has been a steady increase in the registered vehicle population in the country with the number of vehicles doubling over the last 10 years. Other forms of transport are air, and boats which are used in the man-made dams of the country. The transport sector contributes about 7 per cent to GDP.

Zimbabwe has several radio stations as well as fixed and mobile telephones services. The latter is the fastest growing sector in the communication industry with more than 9 million subscribers in 2011.

Tourism: Tourism is the fourth leading foreign exchange earner in Zimbabwe contributing about 10 per cent to the country's GDP which rises to 16.3 per cent when other key supply chain activities are considered. Real growth, in terms of services has occurred in the tourism industry since 2009, with the number of arrivals rising from year to year.

The country is richly endowed with a variety of tourist attractions. It has one of the Seven Wonders of the World, the Victoria Falls, which is a World Heritage Site. The scenic eastern highlands are dominated by mountains, waterfalls and forests. The country has a variety of national parks and trans-frontier parks with over 100 large mammal species which include the big five; elephant, rhinoceros, leopard, lion and buffalo. The country is proud of both its tangible and intangible heritage; the former consisting of historic structures such as the Great Zimbabwe and Khami Ruins both of which are World Heritage Sites.

Political and Decision Making Structures: Zimbabwe is a Sovereign State with a democratically elected Executive President who is both head of State and Government. The Zimbabwe legal system is based on Roman Dutch Law. A new constitution was adopted in May 2013 to replace the Lancaster House Constitution of 1979. Harmonized elections are held every five years.

1.2 The Vision, Mission, Goal, Strategic Objectives, Pillars and Guiding Principles of Zimbabwe's Climate Change Response Strategy

1.2.1 Vision

To create a climate change resilient nation.

1.2.2 Mission

To ensure sustainable development and a climate proofed economy through engaging all stakeholders recognizing the vulnerable nature of Zimbabwe's natural resources and society.

1.2.3 Goal

To mainstream climate change adaptation and mitigation strategies in economic and social development at national and sectoral levels through multi-stakeholder engagement.

1.2.4 Strategic Objectives

a) Mainstream climate change in all the key sectors of the economy.

b) Promote resource use efficiency and less carbon intense pathways in all economic activities and develop a climate change resilient energy infrastructure that is not carbon intense.

c) Develop climate proofed and environmentally sustainable transport systems that are less carbon intense.

d) Promote sustainable development, management and utilization of water resources under changing climatic conditions.

e) Promote sustainable land-use systems that enhance agricultural production, ensure food security and maintain ecosystem integrity.

f) Develop Nationally Appropriate Mitigation Actions (NAMAs) as a step towards low carbon development strategies for Zimbabwe.

g) Address climate change through evidence-based research, technology development and transfer.

h) Promote and protect health under a changing climate.

ii) Develop an effective climate change communication information management and communication system that facilitates access by all stakeholder groups.

j) Strengthen and mainstream climate change in all education curricula.

k) Mainstream gender, children and youth, people living with HIV and AIDS and other vulnerable groups into all climate change interventions.

l) Develop and maintain an appropriate climate governance framework and institutional mechanisms aimed at coordinating climate change responses.

1.2.5 Pillars

Pillar 1:

Adaptation and Disaster Risk Management.

Pillar 2:

Mitigation and low carbon development strategies (LCDS)

Pillar 3:

Capacity to effect:

- Adaptation and mitigation.
- Climate change communication.
- Education and raising awareness.
- Research and development.
- Appropriate institutions to address climate change issues.

Pillar 4:

Governance framework:

- Institutions.
- Networks.
- Negotiations.

Pillar 5:

Finance and Investment.

- Partnerships.
- International Financing.

Pillar 6:

Technology development and transfer, including infrastructure.

Pillar 7:

Communication and advocacy:

Information management and dissemination.

1.2.6 Guiding Principles

a) Demand driven by national aspirations.

b) Country-driven and predicated on national development priorities.

c) Aligned with national laws, international obligations and commitments.

d) Mainstream climate change into policy and legal framework as well as development planning.

e) Mainstream sustainable development.

f) Participation and engagement of all stakeholders.

g) Response which is knowledge and evidence based that incorporates indigenous knowledge systems, culture and science.

h) Access to information.

i) Precautionary principle.

j) Mainstream the rights based approach.

Section 2

Climate and Climate Change

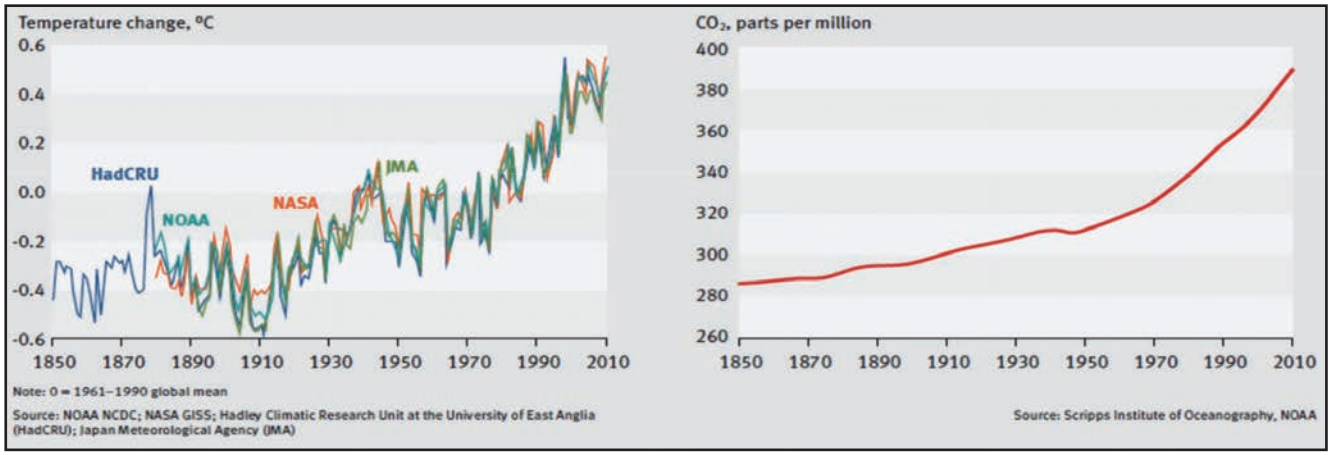
2.1 Climate Change from a Global Perspective

The earth's climate system has demonstrably changed at both global and regional scales since the pre-industrial era, with some of these changes attributable to human activities which have increased the atmospheric concentrations of greenhouse gases and aerosols. The atmospheric concentrations of key anthropogenic greenhouse gases [i.e., carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and tropospheric ozone (O_3)] reached their highest recorded levels in the 1990s, primarily due to the combustion of fossil fuels, agriculture, and land-use changes.

The increase in GHGs is a process that continues today, leading to an ever increasing atmospheric concentration of these gases. Global atmospheric concentrations of the GHGs have increased since 1750, rising by 70 per cent between 1970 and 2004. The annual emissions of carbon dioxide grew by about 80 per cent over the same period (Figure 3). Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.

Global increase in CO_2 concentrations is primarily a result of fossil fuel use, with land use-change providing another significant but smaller contribution. The observed increase in CH_4 concentration is predominantly caused by agriculture and fossil fuel use; whereas the increase in N_2O concentration comes primarily from agriculture and transport.

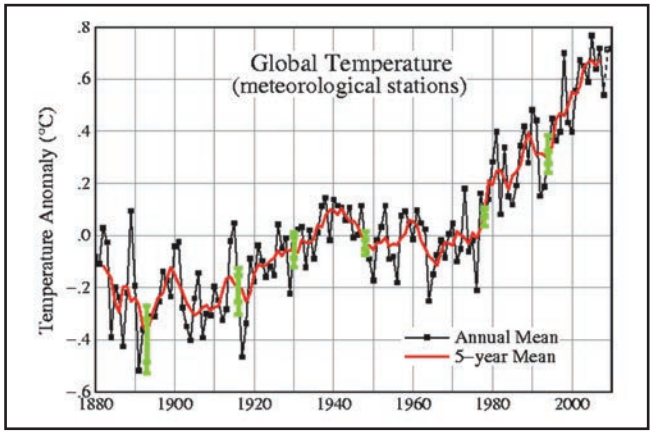
Figure 3: Trends in temperature change and atmospheric CO_2 concentrations 1850-2010.
Adopted from Global Environment Outlook, 2012.



The IPCC has published four assessment reports that progressively identify human activities as the driving force behind present and future global climate change. Its conclusion is that: "*warming of the climate system is unequivocal, as it is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level.*" There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.

According to the IPCC Fourth Assessment Report (2007), the period 1995-2006 ranks among the warmest years in the instrumental record of global surface temperature since 1850 (Figure 4), with the final decade of the twentieth century being regarded as the warmest in the past millennium.

Figure 4: Global near-surface temperatures from 1880 to 2000. *Source: IPCC 2007.*



Modelling results from research centres in Europe, America and Japan agree that the period 1997 to 2011 were the warmest years on record with 1998 and 2010 being the hottest. These findings add weight to the common conclusion that in spite of short-term spatial and temporal variability, the clear long-term trend is one of global warming.

Given that the potential consequences of a rapidly warming climate for natural and human systems are enormous, it becomes important to estimate the possible range of future climates we may experience over the next one hundred years. This is determined using computer models and scenarios. General circulation models are dynamic computer models of the atmosphere and oceans that have been used to estimate climate change attributed to a doubling of CO_2 and to transient increases in GHGs concentrations. Currently these models are the only methods that permit prediction of future climate change. Generally, these models agree on the importance of GHGs, especially CO_2, in driving global warming and climate change.

Global warming is inducing instabilities in the Earth's climate, which are already known to have many harmful effects. What is not yet known is how serious the situation could become. The possibilities range from bad and costly to fix (such as saving many valuable coastal areas from flooding and fighting new and more pervasive diseases) to the much less probable but potentially catastrophic effects of a sudden, significant climate shift that would be difficult to reverse.

Altered frequencies and intensities of extreme weather, together with sea level rise, are expected to have most adverse effects on natural and human systems. Anthropogenic warming and sea level rise would continue for centuries because of the time scales associated with climate processes and feedbacks, even if GHG concentrations were to be stabilized. Anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change. Although the exact extent of harm from global warming may be difficult to predict now, it can be said with confidence that the harmful effects of global warming on climate will significantly outweigh the possible benefits. An important consequence of climate change is that the future climate will be less familiar, more uncertain and, possibly, more extreme.

In order to deal with this phenomenon, the international community adopted the UNFCCC in 1992 that aims to stabilize concentrations of GHGs at a level that would prevent any dangerous interference with the climate system and to bring down GHGs emissions in 2000 to the 1990 emission level. The international community also adopted the Kyoto Protocol; to define legally binding targets in emission reduction for UNFCCC for developed countries listed in Annex 1 in order to halt and reverse the upward trends in GHG emissions.

The international committee recently met to review progress at the Rio+20 conference and had a declaration that emphasized adaptation to climate change as an urgent global priority that must feature high on any agenda and that the global nature of climate change requires all countries to cooperate and participate in the international action to fast-track reduction in GHG emissions.

2.2 Climate Change from a Southern African Regional Perspective

Significant progress has been made in the IPCC Fourth Assessment Report (2007) in many aspects of the knowledge required to understand climate change. However, there remain important areas where further work is required, in particular, the understanding and prediction of regional changes in climate and climate extremes; and the quantification of climate change impacts at the regional and local levels.

Modellers in the region, particularly in South Africa, are trying to address the prediction for time scales between that for weather forecasts (typically seven days ahead) and seasonal forecasts, and between seasonal forecasts and multi-decadal climate change projections. Decadal climate predictions will be highly experimental until a much better understanding of the physical mechanisms of decadal climate variability has been developed. Model development and improvement efforts and the study of the climate system with expanded ocean, land, atmosphere and ice observational networks are needed to achieve these objectives.

The warming trend observed in southern Africa over the last few decades is consistent with the global trend of temperature rise in the 1970s, 1980s and 1990s and the timing of periods of most rapid warming has also been similar. The six warmest years have occurred since 1980, with the period 1986-1995 being the warmest and driest. The temperatures in the southern African region have risen by 0.5^0C over the past 100 years and are further expected to increase at a rate of 0.05^0C per decade.

According to the 4th IPCC Assessment Report, there is already evidence that Africa is warming faster than the global average, and this is likely to continue. The warming occurs all year-round. By 2100, temperature changes will fall into ranges of about 1.4 to almost 5.8°C increase in mean surface temperature compared to 1990. This warming will be greatest over the interior of semi-arid margins of the Sahara and central southern Africa.

There is strong evidence, based on analysis of minimum and maximum temperature trends that the region is getting warmer. The trends are displayed as departures (or anomalies) from the 1961-1990 average. After the mid-1970s, these anomalies are almost all positive; approximately 0.8 °C above the 1961-1990 average over the last two decades. These anomalies are also larger in more recent years, suggesting that the rates of increase in minimum and maximum temperatures are increasing. This is consistent with detected increases in global annual surface air temperatures.

Regional scenarios for future climate change over southern Africa based on general circulation models project temperature increases of between 1 and 3° over most land areas by approximately 2060 (Figure 5).

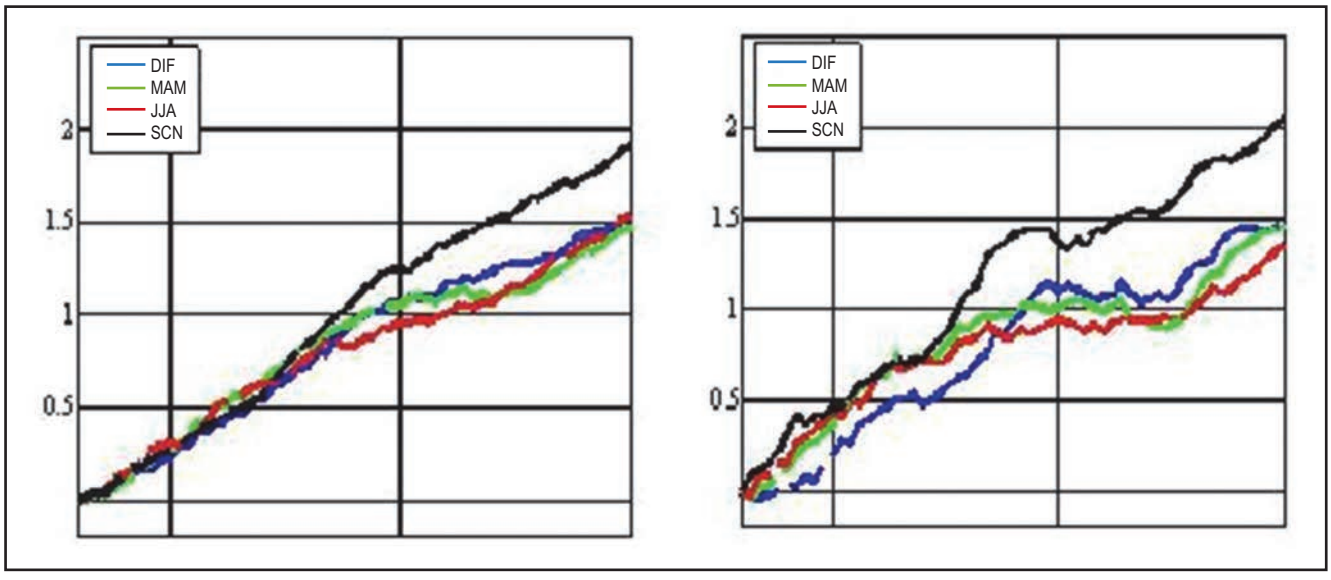
Predicted increases are greatest towards the arid regions in the southwest of the African landmass, which are also the regions which are suggested to receive the largest decreases in average rainfall in the future. Temperatures are also expected to rise more during the dry season of June to November than during the wetter December to May season.

Changes in rainfall are harder to detect because rainfall varies so much from place to place and from year to year across southern Africa. Existing evidence for rainfall trends suggests moderate decreases in annual rainfall over parts of southern Africa. There is also evidence which shows that inter-annual rainfall variability over southern Africa has increased since the late 1960s and that droughts have become more intense and widespread in the region. The pattern of anomalies demonstrates that year-to-year rainfall variability is high across the region, and has been a persistent feature of the region's climate for many years. These alternating patterns of above-normal/below-normal rainfall periods clearly illustrate the rainfall cycles prevalent in southern Africa.

Many impacts of climate change will be experienced through the changes in extreme events such as droughts, floods and storms. Already extreme wet and dry years have been recorded, which resulted in floods and droughts. In 1999-2000, for example, tropical cyclone Eline caused widespread flooding in southern and central Mozambique, south-eastern Zimbabwe and parts of South Africa and Botswana. In 1982-1983, 1986-87 and 1991-92 serious droughts were experienced that caused a decrease in crop and livestock production in many parts of the region.

Unfortunately, assessments of climate change are often limited to mean temperature and precipitation. Knowledge of changes in extremes is sparse, particularly for southern Africa. Results of analysis of extreme events using the best climate models from the IPCC Fourth Assessment Report show that different models project different trends in wet and dry extremes

Figure 5: 30-year running means of area averaged 2m-temperature in Scenario 1. Shown are the anomalies from the 1961-1990 mean. Full (dashed) lines denote 30-year Unit: ^{0}C periods that are (not) significantly different from the control period. ***Source: Katarina et al., 2006.***



in some regions. Generally the results show an increasing intensity of both floods and droughts.

Area averaged rainfall series for north-east South Africa, Zimbabwe, western Mozambique and southern Malawi and Zambia show that multi-decadal rainfall oscillations have occurred during the 20th century. The models generally show a drying trend for much of the 21st century, although decade-to-decade rainfall fluctuations in the simulations are evident early in the century. The simulated annual cycles in a warmer climate show a one month delay of the rainfall onset and no shift in rainfall cessation months, thus implying shorter rainy seasons. This delayed seasonal rainfall onset is predicted even in the northern parts of southern Africa.

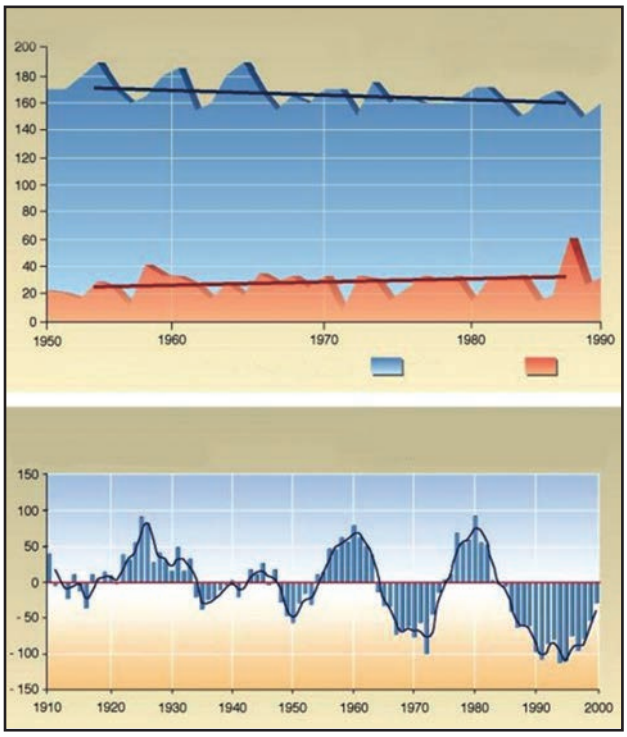
Extremely low rainfall (defined as the intensity of events occurring once every ten years) is predicted to become less extreme over central South Africa and Lesotho, increasing by about 50 per cent around 2100. Most models simulate an increase of the extreme dry events over the Kalahari by up to 30 per cent. Such conditions are favourable for a further eastward encroachment of the Kalahari Desert. The models are unable to simulate tropical cyclones/storms, which are one of the main sources of torrential rains and flooding (www.knmi.nl/africa_scenarios).

Global climate for much of the year 2011 was heavily influenced by one of the strongest La Nina events in history and was closely associated with many notable extreme regional events including drought in east Africa and flooding in southern Africa.

2.3 Evidence of Climate Change in Zimbabwe Over the Years

Zimbabwe has experienced a warming trend towards the end of the twentieth century compared to the beginning, with the annual-mean temperature increasing by about 0.4^{0}C since 1900. The 1990s decade has been the warmest during the last century. This warming has been greatest during the dry season. Day-time temperatures have warmed more than night-time temperatures during the wet season. There has been an increase in both the minimum and maximum temperatures over Zimbabwe represented by a decrease in the number of days with a minimum temperature of 12^{0}C and a maximum of 30^{0}C (Figure 6).

Figure 6: Number of days with a minimum temperature of 12^{0}C and a maximum of 30^{0}C during 1950-1990 and national rainfall deviation during 1910-2000.



Future scenarios have predicted increases in global-mean temperature of between 1.3^0 and 4.6^{0}C by 2100, representing global warming rates of between 0.1^0 and 0.4^{0}C per decade. Zimbabwe's continental interior location means that it is predicted to warm more rapidly in the future than the global average.

There has been an overall decline of nearly 5 per cent in rainfall across Zimbabwe during the 20th

century with the early 1990s witnessing probably the driest period in the past century (Figures 6, 7). There have also been substantial periods, for example, the 1920s, 1950s, 1970s that have been much wetter than average.

Model experiments suggest that annual rainfall will decrease across Zimbabwe in the future. This decrease is predicted to occur in all seasons, but is more conclusive for the early and late rains than for the main rainy season months of December to February. By the 2080s, annual rainfall averages are projected to be between 5 per cent and 18 per cent less than the 1961-1990 average. Table 1 summarizes the past and future climate trends in Zimbabwe.

Figure 7: Time series of the national average rainfall for Zimbabwe 1901-2009.
Courtesy of the Zimbabwe Meteorological Services.

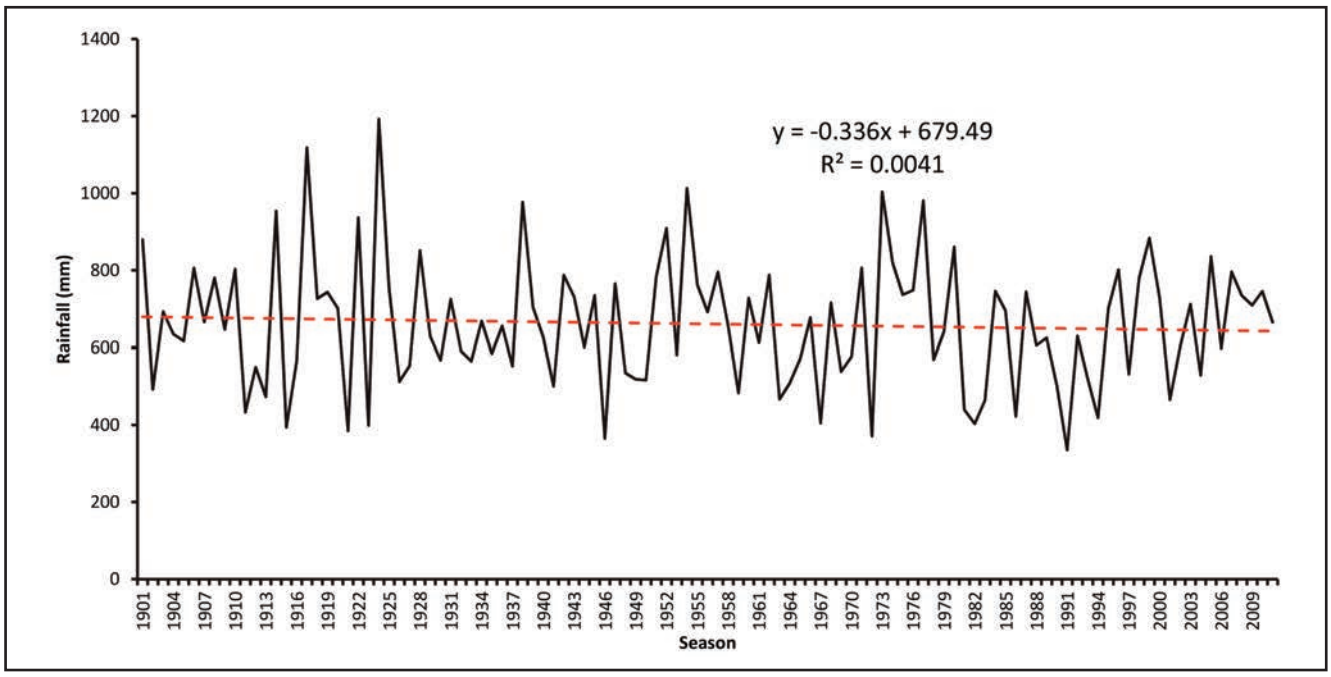


Table 2.1. A summary of past and future climate trends in Zimbabwe

Climate feature	Key messages	Source
Past climate variability	High variability, frequent drought years and occasional flood events	Historical rainfall records
Past climate trends	Increasing temperatures (~0.1°C/decade) No conclusive changes in precipitation	Historical temperature and rainfall records
Future climate trends	Increasing temperatures of around 2.5°C by 2050 Possible decrease in rainfall particularly during the rainy season onset (Sep-Nov)	World Climate Research Programme's Coupled Model Inter-comparison Project Phase 3 (CMIP3) Global Climate Model Multi-model Projections and Climate Systems Analysis Group (CSAG), University of Cape Town finer scale projections

Adapted from the Department for International Development, UK, Support to the Strategic Programme Review for Climate Change, Zimbabwe.

Section 3

Sector Specific Challenges, Risks and Impacts; Adaptation, Mitigation and Opportunities

Climate change adaptation is of great importance to Zimbabwe and other countries that are experiencing the effects of this phenomenon. Zimbabwe's contribution to GHG emissions is very insignificant, yet the country has suffered the brunt of climate change in recent years especially through the increased frequency of droughts, floods and epidemics. These make climate change adaptation a necessity for Zimbabweans.

However, while the country's focus is mainly on adaptation to climate change, this does not make mitigation irrelevant. Various activities are being implemented to reduce the amounts of GHGs emitted, and to promote a green economy. Whereas the definition of 'green economy' is widely contested, it generally implies an economy that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". The following issues are identified as pertinent for the development of Zimbabwe's Climate Change Response Strategy.

3.1 Natural Systems

3.1.1 Climate Change Issues Associated with Air Pollution

The main causes of change in atmospheric composition in Zimbabwe are urbanization; motorization; economic activity and power generation using fossil fuels; use of biomass for energy, especially for domestic cooking and heating; and open burning including vegetation fires and waste burning. These are drivers of emissions of substances into the atmosphere.

Among these emissions are short-lived climate pollutants (SLCPs), the major ones being methane, black carbon and tropospheric ozone that are responsible for a substantial fraction of climate change and have detrimental health and environmental impacts. Black carbon exists as particles in the atmosphere and is a major component of soot. It has significant human health and climate impacts. Black carbon is not a GHG but it warms the atmosphere by intercepting sunlight and absorbing it. It absorbs visible light and this absorption leads to a disturbance of the planetary radiation balance and eventually to warming. Black carbon can also influence cloud formation and precipitation patterns. It results from the incomplete combustion of fossil fuels, wood and other biomass. Black carbon is emitted from many common sources found in Zimbabwe, such as cars and trucks; biomass stoves, forest fires and some industrial facilities.

Ozone is a reactive gas that exists in two layers of the atmosphere with the stratospheric (upper layer) being considered beneficial as it protects life on Earth from the sun's harmful ultraviolet radiation. By contrast the tropospheric ozone (ground level to about 15 km) is an air pollutant harmful to human health and ecosystems, and is a major component of urban smog. In Zimbabwe

there is increasing evidence of deteriorating air quality in the main cities, particularly over the dry winter months when thermal inversions prevail, trapping particulate pollutant gases, and causing smog. Tropospheric ozone is a significant GHG and is the third most important contributor to the anthropogenic enhancement of global warming after CO_2 and CH_4.

Tropospheric ozone is formed by the action of sunlight on ozone precursors that have natural and anthropogenic sources. These are CH_4, nitrogen oxides (NO_x), volatile organic compounds (VOCs) and carbon monoxide (CO). Studies by the Air Pollution Information Network for Africa (APINA) showed that CO constituted 74 per cent of Zimbabwe's total emissions using 2000 as the base year and was mostly from savannah burning and vegetation and forest fires. The other pollutants such as NO_x contributed about five per cent. Methane emissions were not included in the emissions inventory but were reported under Zimbabwe's First and Second National Communications to the UNFCCC. Reductions in both CH_4 and CO emissions have the potential to substantially reduce ozone concentrations and reduce global warming. In contrast, reducing VOCs has a small impact on the global scale while reducing NO_x has minimal net impact on climate but reducing both substances can have a beneficial effect on peak ozone concentrations in cities and associated rural areas.

The Air Pollution Information Network for Africa has also modelled tropospheric ozone concentrations over southern Africa and showed a band of high surface ozone values extending over Botswana and Zimbabwe down into north-east of South Africa. However further modelling and ground-truthing is needed to more accurately define the geographical extent and risks of these high levels of surface ozone and to explore their possible contribution to global warming and climate change.

Short-lived climate pollutants have a relatively short atmospheric lifetime; their concentrations decline fairly quickly in the atmosphere if their precursor emissions are drawn down. Hence reducing methane and black carbon emissions can be an effective way to slow global warming over the next two to four decades. With the CO_2 measures alone it is likely that global warming will exceed 2^0C before 2050. Fast action to reduce short-lived climate pollutants especially methane and black carbon, has the potential to slow down the warming expected by 2050 by as much as 0.5 ^{0}C. The combination of CO_2, CH_4, and black carbon measures can be projected to hold the temperature increase below 2^0C until 2070 if the measures to reduce emissions of the SLCPs are fully implemented. Because they have a short atmospheric lifetime, the removal of short-lived climate pollutants also has a relatively small effect on long term global warming. Hence while reducing short-lived climate pollutants helps to slow global warming and avoiding exceeding the 2^0C target; immediate reductions of CO_2 and other long-lived GHGs are needed to meet the target over the long term.

A small number of emission reduction measures targeting black carbon and ozone precursors could begin to immediately protect the climate, protect human health and crop yields. These include the recovery of methane from coal, oil and gas extraction and transport; methane capture in waste management; use of clean-burning stoves for cooking; diesel particulate filters for vehicles and the banning of field burning of agricultural waste and veldt fires. Immediate action on priority mitigation measures to reduce short-lived climate pollutants can be implemented through existing government programmes, new national initiatives and international action programmes. Many of the measures are cost-neutral and lead to efficiency gains as well as other socio-economic benefits

and are good options for integrating with wider development goals; for example measures in the waste management sector and domestic cooking and heating.

Recognizing that mitigation of the impacts of these short-lived climate pollutants is critical in the near term, a number of countries have come together to address the issue in a coordinated manner and formed a Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) whose secretariat is UNEP Paris.

Strategies

a) Carry out an assessment to determine the main sources and levels of short-lived climate pollutants in Zimbabwe.
b) Introduce measures to control and capture short-lived climate pollutants.
c) Promote use of cleaner technologies.
d) Develop and implement policies and regulatory frameworks that restrict release of short-lived climate pollutants.

3.1.2 Climate Change Issues for the Water Sector

The hydrological cycle comprises of 1.3 x 10^9 cubic kilometres of water of which 2.8 percent is available as freshwater to satisfy all the competing uses (environment, agriculture, urban and industrial, sanitation, energy generation, etc.). Thus, water management faces challenges in trying to satisfy increasing competing uses from this little finite resource against a background of degrading water quality. This also creates potential for conflict among the different sectors and water users.

Climate change is generally viewed from the perspective of global warming associated with disturbances in global energy balances. These imbalances also affect the hydrological cycle as rain formation is a direct function of atmospheric conditions. Global warming will result in sea level rises as water held as snow and ice melts. As noted earlier, global climatic models predict that extreme events (droughts and floods) will increase as a result of climate change with sub-Saharan Africa, for instance, receiving less rainfall and experiencing higher temperature rises. This means that Zimbabwe has to prepare itself for less rainfall and, hence, less natural average runoff in rivers as a result of climate change.

3.1.2.1 Water Resources Availability Issues

Zimbabwe's long term average annual surface run-off is estimated to be 23.7 x 10^6 megalitres. The distribution of average runoff varies from 21 millimetres per year in the Gwayi Catchment to 126 millimetres per year in the Mazowe and parts of the Save Catchment. Water can be accessed from direct river abstractions or through storage works. The country also boasts of groundwater reserves which have been grouped into 10 hydro-geological units which yield approximately 1.8 x 10^6 megalitres from registered and monitored uses.

Additional water can be obtained through recycling. Most recycling takes place in urban centres where, potentially, wastewater can be treated to sufficient standards for discharge into public river systems. Assuming pre-treatment to acceptable water quality levels, recycling adds more water into the supply system.

Climate change will affect the water sector in Zimbabwe in a number of areas (e.g. domestic supplies, agriculture, industry, energy, etc.). This is because the IPCC (2007) predicts a 3.1^{0}C temperature increase in the 21st century together with a reduction in precipitation in southern Africa of about 15 per cent. It is predicted that, in general, seasons will change with hotter dry seasons and colder winters

anticipated. The traditional onset and cessation of rainfall seasons will shift with fears of shorter and more erratic rainfall seasons.

The reduction in precipitation means that the region will receive less water for runoff, infiltration and evaporation. In addition, projected temperature rises will cause an increase in evaporation which will result in reduced quantities of available water. The projected reduction in rainfall has amplified impacts on channel flow as natural runoff will reduce by large proportions.

Reduced river flows will result in less inflow into reservoirs and, hence, reduced storages. In the long term, this means that yields from reservoirs will be reduced and there will be less quantities of water available for allocation across all sectors. This will have impacts on food security, urban water supplies, industrial production and the environment. There will be less water available for self-purification processes for both surface and ground water which will negatively impact on the quality of water. This, in combination with increased threats of siltation from uncoordinated land-use practices, will severely deplete the quantity and quality of river flow and storage capacities.

Groundwater will be affected by reduced recharge resulting in the general lowering of aquifer levels. This implies larger pumping heads and increased costs for abstracting groundwater. In addition, reduced water levels affect base flows as less water becomes available to contribute towards river flows in dry seasons.

The impacts of reduced available water will include lower carry-over storage capacities in dams from year to year thus reducing reservoir yields; reduced river flow and groundwater recharge; longer walking distances to more reliable water sources; diminished water security for livestock and gardening; and increased exposure to diseases such as malaria, typhoid and cholera. This emphasizes the importance of water as a key driver to national efficiency, as any negative climatic impacts on water resources will have serious consequences across the board, as water issues are cross-cutting and multi-sectoral.

Zimbabwe, like many countries in the sub-Saharan region faces challenges of data generation as the rainfall and runoff gauging network is inadequate with the existing stations facing reliability problems. A sound monitoring network is central to understanding the extent of climate change in the country.

Strategies

a) Strengthen and intensify monitoring networks for hydro-meteorological parameters.

b) Conduct more frequent yield assessments of surface and groundwater resources.

c) Promote water use efficiency in all sectors.

3.1.2.2 Water Development Issues

About a quarter of the potential storage of water has so far been developed country-wide in Zimbabwe. Although this estimation is based on mean annual flows which are projected to decline as a result of climate change, there is still room to develop more storage within the country to supply current and future requirements.

Hydraulic infrastructure (dams, culverts, canals, etc.) will need to incorporate the anticipated increase in the occurrence of extreme events. This means that future hydraulic infrastructure designs will need to factor in the anticipated occurrence and magnitude of extreme events, particularly floods. Already increased floods have been observed in some areas such as Lower Save, Lower Manyame, Tsholotsho and Muzarabani.

Water development will need to be broadened in scope to include ground water exploitation, construction of multi-purpose storage works and promotion of rain water harvesting. Currently

inter-catchment water transfers are being mostly practiced in the south-eastern Lowveldt, other parts of the country may need to consider such transfers to move excess water from some regions to areas of scarcity.

Strategies

a) Develop, rehabilitate, maintain and protect surface and groundwater resources.

b) Invest in management of effects of extreme events.

3.1.2.3 Water Management Issues

Water management will face the biggest challenge because of variations in water availability and quality. This will be exacerbated by increased demand from competing and often conflicting uses. More efficiency in water allocation and effective monitoring processes will need to be applied.

Challenges in water supply and sanitation are also anticipated as a result of climate change. Reduction of yields against rising water demands in urban communities will compromise the quantity and quality of drinking water and the disposal of wastewater. Communities may resort to unsafe sources of water supply which might expose them to water-borne diseases. Similarly, during extreme events (floods and droughts) water quality and sanitation facilities may be highly compromised thus causing both rural and urban communities to resort to unsafe water sources and inadequate disposal facilities.

Traditionally, rivers have been polluted by many activities which discharge effluent into the water bodies. Where flows are substantial and relatively unpolluted, rivers act as natural purification agents against such pollution. However, with the anticipated reduced river flows, this self-purification mechanism may diminish resulting in more polluted water bodies.

Strategies

a) Strengthen stakeholder institutions in water resources management.

b) Promote more efficient water use practices.

c) Promote catchment protection.

d) Adopt data analysis and prediction tools that incorporate climate change.

3.1.3 Land-use, Land-use-Change and Forestry (LULUCF)

3.1.3.1 Land-use and Land-use Change

Land-use and land-cover change have a direct bearing on climate change and weather patterns in diverse and complex ways. These links include the exchange of GHGs (such as water vapour, carbon dioxide, methane, and nitrous oxide) between the land surface and the atmosphere; the radiation balance of the land surface; the exchange of heat between the land surface and the atmosphere, and the roughness of the land surface and its uptake of momentum from the atmosphere.

The main land-use categories in Zimbabwe are agricultural land, rangelands, protected areas (mainly national parks, safari areas, sanctuaries and reserved forests), conservancies and settlements (including rural, mining and urban areas). Protected areas cover about 15 per cent of the country's total land area, however, a significant proportion of these areas has been encroached into and converted to other land-uses especially agriculture and rural settlements.

Land-use change is a driver of environmental and climate change in Zimbabwe especially through the expansion of agriculture; and economic and technological development. Increasing population pressure in the communal areas has led to the fragmentation and degradation of forests as a result of their clearance for agriculture and harvesting for

firewood, poles and other forest products. An estimated 300,000 hectares are converted annually to arable land and other land-uses.

Land reform has converted the formerly large-scale commercial farms and ranches into smallholder plots and farms, which has resulted in increased clearance of land for agriculture. It is estimated that part of the 8 million hectares of land distributed in the post-2000 period, has been cleared for cropping and other forms of land-use. This has led to the reduction of forests and woodlands that act as carbon sinks.

The land reform exercise has also seen changes in tenure arrangements that govern ownership and hence management of rural land. Ownership of all rural land is now vested in the State, with beneficiaries being issued with instruments that range from "offer letters", permits, to 99-year leases. Lack of tenure was thought to be one of the major reasons why the resettled farmers did not have stewardship of their land resulting in high levels of deforestation and land degradation. However, Government has made strides in issuance of 99 year leases and launched the issuance of A1 settlement permits in 2014 to accord A1 farmers security of tenure. Farmers have to satisfy the Ministry responsible for Land and Resettlement on proper farm stewardship including setting up of woodlots for fuelwood energy and other uses as well as fireguards.

With regards to land-use policies, the current land-use policy in Zimbabwe does not incorporate climate change. Thus, although there is designation of land into land-use categories such as forests and woodlands, rangelands and agricultural land in the resettled and communal areas, there is limited implementation of the policy. This results in reduction in vegetation cover, increased emission of GHGs because of deforestation, increased land degradation as well as changes in biodiversity and ecosystem functions. These changes expose such areas to new and different effects of climate change. Government is however drafting a new National Land Policy which should ensure that climate change concerns are captured.

Zimbabwe's various land categories fall under different land administration authorities. For example resettlement land is administered by the Ministry responsible for Lands and Rural Resettlement while communal and urban land is under the Ministry responsible for Local Government and the land under protected areas such as parks and that managed as conservancies is under the Ministry responsible for Environment, Water and Climate. This scenario naturally causes a discord in the general administration and management of land resources.

The continued expansion of mining especially following the discovery of diamonds and other minerals and the expanded exploitation of granite have also resulted in major land-use changes mostly from forests and woodlands to mining areas. Even more significant land-use changes have occurred in peri-urban areas as a result of growing urban populations.

Strategies

a) Develop and enforce policies that regulate change from one land-use to another especially the clearance of forests and woodlands to other land-uses.

3.1.3.2 Climate Change and the Forestry Sector

Zimbabwe is endowed with natural vegetation that ranges from forests, woodlands, bushlands, to wooded grasslands, which all lend themselves to various degrees of exploitation. About 40 per cent (15.6 million ha) of Zimbabwe is covered by

woodlands and forests made up of indigenous moist forest and plantations of exotic commercial species. The status of these resources varies with land tenure category. Gazetted forest areas cover 2.0 per cent of Zimbabwe, and serve to protect some of the woodland and forest cover, though some of these areas are subject to periodic harvesting for timber. Just under one-quarter (24 per cent) of the area under woodland and forest is situated in National Parks, Safari Areas, Sanctuaries and Botanical Reserves, 43 per cent is found in communal areas while the remainder occurs in commercial farming and resettlement areas.

Forests are at the centre of socio-economic development and environmental protection in Zimbabwe. Forests, trees and woodlands provide the bulk of energy needs for rural communities and the urban poor; support crop and livestock agriculture, wildlife and tourism; water resources and livelihoods. Thus livelihoods, especially in rural areas, are shaped by the availability and quality of forest resources in many parts of the country.

The forestry industry is an important component of the country's economy and was estimated to contribute 3 per cent to the GDP in the 1990s. It is dominated by the exotic plantation based timber industry. According to the Timber Producers Federation exotic plantations cover about 82,000 hectares and are dominated by various pine species, followed by eucalyptus. The indigenous hardwood timber industry is smaller and is based primarily on the extraction of the Zambezi teak and mukwa which are mainly found on Kalahari sands in north western Zimbabwe. Other species used include pod mahogany, large false mopane and mountain mahogany.

The productivity of the sector has declined significantly in recent years because of past over-exploitation and degradation of the indigenous forests. The rate of clearance of woodland in both the commercial and resettlement areas has increased markedly following the changes in land tenure associated with the Land Reform Programme. The national annual rate of deforestation has accelerated from 100,000 hectares per year in the 1990s to 327,000 hectares or -1.9 per cent per annum (the highest in southern Africa) between 2000 and 2010. These figures suggest that the rate of deforestation is now three times the estimated average over the period 1985-1992.

Factors contributing to the high rate of deforestation and degradation across the country include clearance for agriculture; over-exploitation for fuel wood; expansion of urban and rural settlements; infrastructure development; inadequate land-use planning; elephant damage in some national parks and safari areas and frequent late dry-season fires. The environmental impacts associated with deforestation include loss of habitats and biodiversity; less watershed protection (leading to increased soil erosion, siltation of rivers, and the disruption of hydrological systems); reduced availability of important forest products and services; and reduction in carbon sinks.

Fuel wood accounts for over 60 per cent of the total energy supply in Zimbabwe whilst nearly 96 per cent of the rural poor rely on fuel wood for cooking and heating. The annual fuel wood consumption of the country is estimated at 8.54 million cubic metres.

The major environmental impacts from forest management and utilization arise mainly from the use of inappropriate harvesting techniques and poor post-harvest management of slush and branch wood that causes hot fires. Fire is one of the major causes of forest degradation in the country. Each year millions of hectares of forests experience hot dry-season fires that are destructive to woody vegetation and contribute to high black carbon levels in the atmosphere (a short-lived climate pollutant, See Section 3.1.1).

The relationship between forests and climate change is intricate and complex because climate affects forests whilst forests also affect climate. The potential impacts of climate change on forests include changes in species composition of forest ecosystems; shifts in forest ecosystems boundaries and species ranges; changes in species density; changes in growth rates; increased flora and fauna migration; loss of vegetation cover; loss of biodiversity; increased frequency and intensity of forest fires and increased reliance on trees and forests for survival leading to over-exploitation. On the other hand forests influence the climate through carbon sequestration, emission of water vapour and control of wind speed.

Least developed countries, especially in Africa are considered to be the most vulnerable to the impacts of climate change and bear the highest risk to their socio-economic development. Southern Africa is expected to experience heightened water stress from frequent droughts and reduced and erratic rainfall. This is expected to exacerbate existing vulnerabilities caused by floods and droughts and will require Zimbabwe to make changes to its production systems and to protect its forest and woodland resources, especially in its rural areas.

a) Adaptation in the Forestry Sector

Adaptation is *"adjustment in natural or human systems in response to actual or expected climatic changes or their effects, which moderates harm or exploits beneficial opportunities."* Uptake of adaptation measures can considerably reduce the projected socio-economic impacts of climate change. However, these measures are not costless as most involve an initial investment with benefits being realized over a longer period of time.

Some of the barriers which have been identified as affecting the uptake of adaptation opportunities in the forestry sector include limited economic resources and infrastructure; low levels of technology; inadequate funding and support for research and development into alternative technologies; limited climate data and monitoring; inefficient institutions; limited empowerment of communities to access resources; lack of cost-benefit analyses of adaptation options and for institutional, financial and policy environments that support adaptation and manage the transition to new systems; non-availability of information relating to climate change impacts and the benefits of adaptation; lack of potentially large upfront investment and for supporting communities in adaptation as well as the difficulty faced by relatively small enterprises in dealing with uncertainty and management of risk.

The knowledge base and capacity to respond to climate change through the forestry sector in Zimbabwe is currently limited. Furthermore, little is known about the potential of trees and forests to adapt to climate change especially in the dry forest zone. Understanding of the responses of individual species, especially the dominant species, is critical for the development of appropriate forest-based climate change response strategies and measures.

Both climate change response and mitigation by trees and forests need to be carefully assessed so that informed strategies that take into account socio-economic and ecological concerns are put in place. Emphasis should be placed on promoting the role of trees and forests in climate change, given their unique ability to contribute to both climate change adaptation and mitigation. Research and development need to be undertaken with stakeholders in a participatory way, recognising their key concerns and drawing on their expertise. Successful adaptation to climate change will require an active, strategic approach operating at all levels of society.

Strategies

a) Promote establishment of land-use plans at district, ward, village and farm management levels that clearly identify forestry as a recognized land-use.

b) Strengthen research, planning and financial support to forestry and natural resources management to develop cost effective adaptation options.

c) Build capacity for forest management in a changing climate.

b) Mitigation Options in the Forestry Sector

Forests have attracted attention in the global climate change debates because of their role in the carbon cycle as sinks of carbon and as sources of carbon when they are cut down. The forestry sector is a significant emitter of GHG contributing about 17 per cent of global yearly GHG emissions. Reducing emissions from deforestation and forest degradation (REDD) through sustainable forest management, forest conservation and enhancement of carbon stocks is seen as a major strategy for mitigating climate change.

Mitigation through International Carbon Finance

Payment for carbon sequestration to mitigate climate change is one of the fastest growing environmental services markets. A range of market and non-market measures have been identified at international level, to encourage mitigation in the forestry sector, including direct liability or involvement in international emissions trading schemes. International mitigation policies such as emissions trading provide opportunities for the forestry sector which could contribute to offsetting increased costs of energy and other key inputs. These include:

a) The production and supply of biomass for electricity generation or bio-fuel production.

b) The creation of tradable offsets through emissions reduction or carbon sinks especially through avoided deforestation or reduced emissions from deforestation and forest degradation ($REDD^{+}$).

Three mechanisms were created under the Kyoto Protocol, namely the Clean Development Mechanism (CDM), joint implementation and emission trading. Carbon markets comprise the mandatory or compliance markets under the Kyoto Protocol and voluntary markets. The two major mandatory markets for carbon offsets are the Kyoto Protocol's CDM and the European Union Emission Trading Scheme.

The Clean Development Mechanism (CDM)

The CDM allows developed countries to fulfil their commitment to reduce emissions through emission reduction or carbon fixation projects in developing countries. The main aim of CDM forest projects (restricted to afforestation/ reforestation projects) is the capture of CO_2 from the atmosphere by establishing forest plantations or regenerating natural vegetation. However, natural forests are not yet included in this mechanism. The CDM regulations require a very high performance level, the application of sophisticated systems to measure and monitor the carbon captured in plantations, the demonstration of additionality and control of possible leaks. These are complicated requirements and procedures that are an obstacle particularly for small producers.

The level of accessing resources through the CDM is going to remain low, if the application procedures are not simplified and if the capacity of African countries in how to make use of the mechanism is not strengthened. For instance, out of the 13 afforestation and reforestation CDM projects that have either been registered or are

in the pipeline, only two are based in Africa while all others are located in Asia or Latin America. Zimbabwe has not accessed carbon financing under the CDM to date.

Voluntary Carbon Markets

Parallel to the CDM, there is an open or voluntary carbon market, which also responds to international agreements and markets, but is not governed by the Kyoto Protocol and its regulations. In the voluntary market, forest projects are introduced that focus on carbon capture and storage by establishing planted forests; enriching and/or managing natural forests and promoting conservation of natural forests to avoid the CO_2 emissions caused by deforestation (avoided deforestation).

The voluntary over-the-counter (OTC) markets are currently the main source of carbon finance for avoided deforestation, and they have a higher proportion of forestry-based credits out of total market transactions than the CDM. However, the high cost of evaluation by certifying bodies and the relatively low price of captured carbon on international markets mean that the possible benefit of these projects remains very low.

Various carbon fixation projects, especially forest plantations, are now being implemented in the voluntary market. By using periodic direct payments, these arrangements work very similar to traditional incentives that subsidize the establishment of plantations. One difference from subsidies lies in the requirement that the plantations be permanent and in the huge body of rules concerning project formulation and monitoring.

The payment of carbon fixation certificates is made after the fifth year, and every five years from then on, on the accumulated "stock" or the equivalent of metric tonnes of CO_2. In general there are fewer forestry based carbon projects in Africa than in the other developing regions of the world. Even within Africa, the distribution of carbon sequestration projects is skewed, with east Africa receiving the most carbon investments.

Community development-oriented carbon sequestration projects can provide significant economic benefits to local communities in the form of cash incomes as well as through access to non-timber forest products. There are very few forestry based carbon projects in Zimbabwe. Thus the country has not benefited from the voluntary carbon markets largely because of poor access to information and lack of capacity especially within government to develop carbon projects.

REDD+

In the last five years international discussions under the UNFCCC have focussed on the development of a climate change mitigation regime that will succeed the Kyoto Protocol which expired at the end of 2012. One of the proposed financial mechanisms to simultaneously address forest conservation and mitigation, within the framework of sustainable development, that has emerged is the Reduced Emissions from Deforestation and Forest Degradation (REDD) Initiative.

REDD+ is an incentive based mechanism for promoting and rewarding forest ecosystem conservation. Prospects for the economic viability of sustainable forest management in natural tropical forests are expected to substantially improve through carbon revenue from this mechanism. Zimbabwe has to determine the policy, institutional and legal frameworks required to take advantage of the financial incentives from REDD+ while maintaining adequate safeguards such as rights of communities to have livelihood activities that are dependent on forests and maintenance of

ecosystem services especially biodiversity. These issues will need to be addressed even though the final architecture of the REDD+ mechanism is still evolving as negotiations continue under the UNFCCC.

Mitigation through Local Programmes

The average tree biomass in miombo woodlands, which are the dominant vegetation type in Zimbabwe, is estimated at 32 tC/ha with an additional 76 tC/ha of soil carbon. Deforestation and forest degradation are therefore, important sources of GHG emissions in the country.

Enhancing the contribution of forest resources in mitigating climate change can be achieved through such activities as afforestation and reforestation, agroforestry, and sustainable management of natural forests to improve natural regeneration. In addition, reducing deforestation could bring other environmental benefits, for example the conservation of biodiversity and maintenance of soils and water quality, as well as significant benefits for the millions of people who depend on forests for their livelihoods.

Strategies

a) Develop national capacity to design carbon projects for accessing different carbon financing mechanisms and to implement and support the projects.

b) Maintain, account for, and expand carbon sinks.

3.1.4 Biodiversity and Ecosystems

Zimbabwe has a rich biological diversity, which provides ecosystem services such as food, medicine, energy sources, building and craft materials as well as spiritual, cultural and aesthetic services. The biodiversity also regulates climate; soil fertility; outbreaks of pests and diseases; and maintains functional ecosystems. Vegetation is mainly savannah woodland interspersed with open grassed drainage lines or dambos (wetlands).

Zimbabwe has abundant and diverse tropical animals including bird species, mammals, reptiles, amphibians and fish species. The biodiversity is found in gazetted forests areas, national parks, safari areas, sanctuaries, botanical reserves, recreational parks and non-protected areas such as conservancies and farming lands. The main problem affecting biodiversity conservation and management relates to loss of biodiversity particularly in non-protected areas, such as communal and resettlement areas. The recurrent droughts affecting Zimbabwe have also resulted in loss of a number of plant and animal species.

Vulnerability assessments carried out for Zimbabwe's Second Communication to the UNFCCC (Figure 8) show that by 2080 under the worst case scenario, plant diversity is projected to decline throughout the country and the areas that currently harbour high diversity will shrink. The pressure on plant diversity will be highest in the western regions, lowest in the eastern regions and moderate for the central parts of the country. The pressure pattern for the best scenario is similar except that pressure on plant diversity is expected to be lower.

The assessments also suggested that the projected decreases in precipitation coupled with increases in temperature will cause a corresponding decrease in Net Primary Productivity in most parts of the country and that the western and southern parts of the country will be worst affected by climate change (Figure 9). The eastern highlands and the central parts of the country appear to have the greatest adaptive capacity to climate change as the vegetation in these regions is less sensitive to climate variability because of high rainfall. Net Primary

Figure 8: A comparison of plant diversity under the current (2012) and worst case scenario of the year 2080.
Source: Zimbabwe's Second Communication to the UNFCCC.

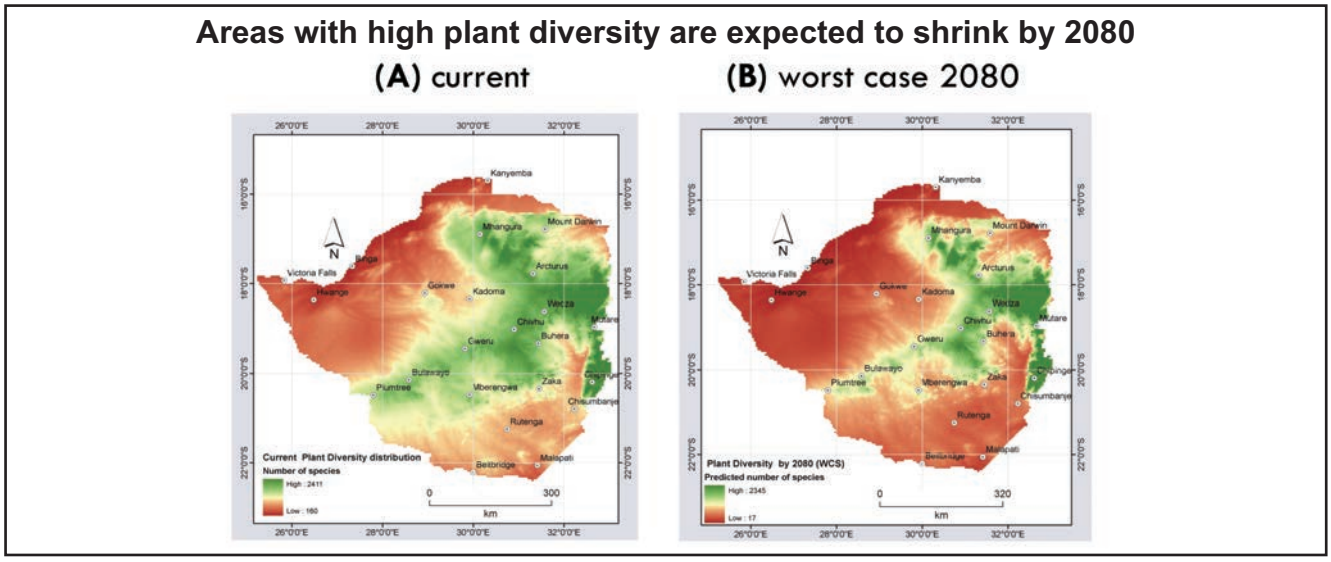
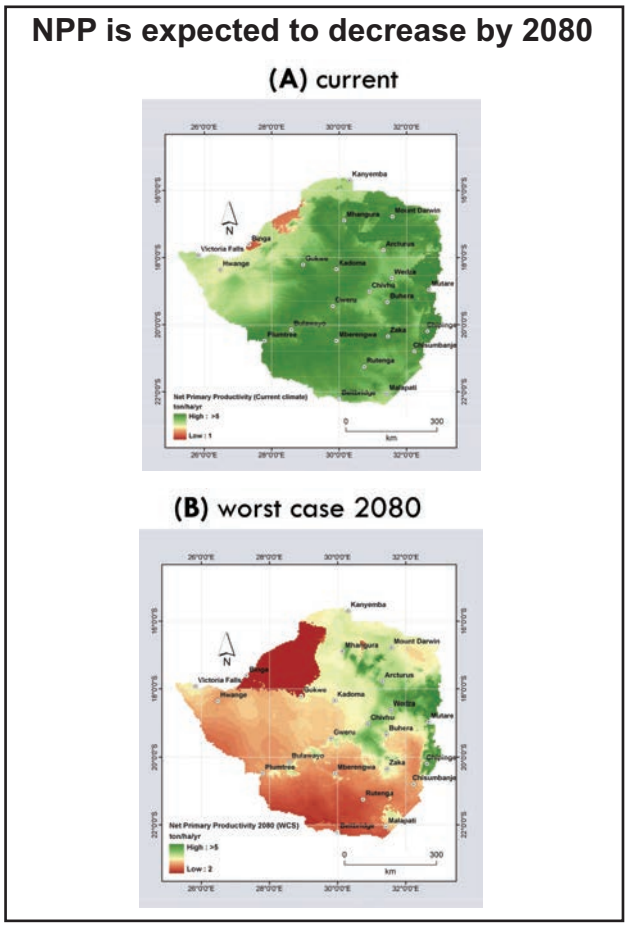


Figure 9: A comparison of net primary productivity under the current (2012) and worst case scenario of the year 2080.
Source: Zimbabwe's Second Communication to the UNFCCC.



Productivity provides an estimate of how much biomass and therefore forage is available in a rangeland. Therefore the projected reduction in Net Primary Productivity will likely reduce the carrying capacity of rangelands resulting in fewer animals being sustained within rangelands.

Zimbabwe is geographically divided into five agro-ecological regions on the basis of climatic conditions, farming potential and, to a certain extent, water resources (See Section 1.1.Figure 2). Over 80 per cent of Zimbabwe falls in Agro-ecological Regions 3, 4 and 5 which are suitable for livestock production, game ranching and wildlife, rather than rain-fed cropping. Rangelands, therefore, occupy a significant land area in Zimbabwe and are characterized by a number of habitat structures ranging from tree savannah, bush and grassland.

Rangelands provide livelihoods for a large proportion of the population, mainly livestock farmers and those individuals and communities engaged in enterprises based on wildlife. Wildlife is also at the centre of Zimbabwe's tourism industry. Rangelands are already experiencing the negative impacts of climate variability, and are vulnerable to adverse impacts of climate

change such as decreased rainfall, higher temperatures, less water availability and desertification. Desertification is land degradation caused by overgrazing and soil erosion, resulting in bush encroachment and deterioration of rangelands which will threaten livestock and wildlife. Climate change will change pasture productivity, for example, the growth of grass is inhibited by erratic rainfall, and invasive species may proliferate under extreme climatic conditions.

Loss of biodiversity and degraded landscapes will adversely affect the tourism industry. Furthermore, degraded rangelands will negatively impact on the livelihoods of farmers, particularly small-scale, resource-poor farmers living in marginal areas and is likely to increase their poverty.

Climate change can result in disruption of natural ecosystems and subsequent changes in species' ecological range; altering predator-prey interactions; decoupling animals from food sources and reducing habitat span. It is likely that livestock and wildlife will experience pressure from increased pests and diseases.

Livestock and wildlife have been previously lost in Zimbabwe, because of lack of water during major droughts. Increased occurrence of droughts will cause massive livestock and wildlife deaths and an increase in human-human and wildlife–human conflicts. There will be intensification of use of limited grazing and water points, as well as increased incidents of wildlife damage to livestock and crops.

Reduced rainfall, river flows and storages will present challenges to environmental management. Ecosystems will be affected by increased frequencies of dry spells and extreme events. The Zimbabwe Water Act acknowledges the environment as a legitimate user which is entitled to water allocations. However, with reduced water availability, the "silent" user may experience the biggest cuts with less water being allocated to environmental flows from existing dams.

Water bodies are likely to be affected by recurrent droughts, rising temperatures buttressed by high evaporation rates, and conditions that starve the water bodies of inflowing water (See Section 3.1.2). This will have consequences on fish stocks and reduce opportunities for fishing. The hydrological regimes of wetlands, some of which form nursery grounds for fishery resources and which are used for arable agricultural activities during the dry season, will also be adversely affected by climate change.

One of the most serious environmental challenges affecting rangelands is that of veldt fires resulting in massive losses of grasslands and the lowering of the ability of ecosystems to provide goods and services to society and the environment. Table 2 shows the trends of area affected by fires over the period 2001 to 2013. With the predicted drier climate under climate change, fires are expected to increase in intensity. Therefore adaptation strategies should include reduction of non-climatic stresses such as over-exploitation of biodiversity and fires.

Table 3.1. National area affected by veldt fire 2001-2013
Source: Environmental Management Agency (2010, 2013)

Year	2001	2002	2003	2004	2005	2006	2007
(ha)	407,950	444,037	500,312	921193	471,893	906,802	238,945

Year	2008	2009	2010	2011	2012	2013
(ha)	443,809	950,905	1,152,413	713,770	1,132,325	1,179,274

Currently, Zimbabwe is pursuing six Trans-frontier Conversation Area (TFCA) initiatives with its neighbours. Trans-boundary natural resource management is a process of cooperation across national boundaries that aims to enhance the management of shared or adjacent natural resources for the benefit of all parties in the area. These initiatives are important for opening up wildlife corridors, an important climate change adaptation mechanism.

Strategies

a) Promote and strengthen biodiversity conservation management and the integrity of natural ecosystems by using an ecosystem based approach to adapt to climate change.

b) Promote appropriate climate smart land-use options for the drier natural regions where cattle production and wildlife ranching are the most suitable land-use options.

c) Strengthen the effectiveness of Trans-frontier Conservation Areas as a mechanism for sustainable biodiversity conservation and climate adaptation.

3.2 Economic Sectors

3.2.1 Agriculture and Food Security

3.2.1.1. Overarching Issues in Agriculture and Food Security

Critical Role of Agriculture in Sustainable Development

Sustainable development for Zimbabwe will hinge on a robust agricultural sector that supports household and national food self-sufficiency, providing inputs for industry, and reducing negative pressure on the environment. Over 70 per cent of Zimbabwe's employment is directly or indirectly accounted for by agriculture. However, the national agricultural production largely relies on rain-fed agriculture, which is one of the most vulnerable sectors to climate change and variability. The pending negative impacts of climate change and variability call for transformational changes in the country's agricultural systems. Zimbabwe has not sufficiently harnessed available scientific and indigenous knowledge and technologies to increase productivity; stimulate industrial growth and participate in regional and global markets and to support diversified livelihood options for the different categories of its people.

The anticipated increase in erratic rainfall seasons, characterized by unpredictable lengths of seasons; high temperatures; alternating floods and dry spells; and variable rainfall amounts, will present new challenges to the majority of farmers in the absence of appropriate response measures. Integrated response strategies are therefore required across the different development sectors if the current and future climate threats are to be addressed. Overall, the emphasis for response to climate change in agriculture should be on adaptation but clearly embracing mitigation, recognising that sound options for adaptation will translate to better mitigation measures.

Emerging Evidence on Challenges and Opportunities for Adaptation

Research in Zimbabwe has revealed that the majority of rural Zimbabweans live in semi-arid zones, and will suffer disproportionately from the emerging impacts of climate change and variability including disasters associated with extreme weather events such as droughts, periodic flooding, disease outbreaks for both

human and livestock and loss of crop lands. In their efforts to cope with negative climatic impacts, farming communities have moved deeper into marginal lands, unsustainably extracting natural resources and using unsuitable agricultural practices. The studies have thus revealed evidence of a degrading natural resource base and a narrowing of options for communities to adapt to future climate change.

There are also currently strong links between a declining natural resource base and the weakening of local institutions that have been traditionally the pillars for protection of natural resources and vulnerable social groups within communities. Unless appropriate interventions are made, the negative impacts of climate change and variability on agricultural productivity will heavily stress current institutional structures, particularly at the grassroots levels.

Formal institutional mechanisms are failing to build on known traditional social safety nets in ways that ensure increased agricultural productivity, management of strategic food reserves, and the efficient use and conservation of natural resources. Efforts to revitalize the *Zunde raMambo*[1] concept to enhance food security under changing climatic conditions have revealed opportunities to build the adaptive capacity of communities by focusing on improving their timely access to climate information, sufficient quantities and diversity of agricultural inputs, production technologies and technical know-how; strengthening of local institutions; and empowering farmers to co-learn and self-organize for effective participation in markets. This should be complemented by building capacity of the national extension system to rise to new challenges associated with climate change and variability. However, the current state and nature of vulnerabilities for the different socio-economic sectors and sections of communities are still poorly understood to inform decision-making.

There is therefore need, to support research on how indigenous knowledge can be integrated into evidence-based planning frameworks, informed by good science, in order to enhance decision making by communities, local authorities and higher level policy makers. Flexible and highly responsive adaptation measures will be necessary for the agricultural sector as climatic effects will vary significantly with the ecological and socio-economic circumstances of communities. No single adaptation approach will fit all current and future scenarios.

Food Security

Zimbabwe faces a dilemma on how to balance the short-term food needs and long term production goals of the different farmer communities because of climate-induced crop failures. Food insecurity is a major source of vulnerability for individual households and communities in the country. Food shortages have become a perennial feature resulting in a high prevalence of undernourishment estimated at 30 to 54 per cent between 2006 and 2012. As a result there is an exceptionally high dependence on food handouts/aid particularly for the rural

FOOTNOTE

[1] *Zunde raMambo* is a Zimbabwean traditional concept where the chief designates common land for growing food crops as protection against food insecurity; members of the community take turns to participate in the entire production process; and the harvest is stored in the chief's granary as food reserves for distribution to the chief's subjects in the event of critical food shortages.

population, often undermining efforts to build internal mechanisms towards food self-sufficiency and better livelihoods by communities in the medium to long-term.

These trends imply that communities have very limited choices to satisfy their food preferences, neither do they have a say about the quality of food they eat, raising critical concerns about food safety. During periods of climate-induced disasters (e.g. droughts and floods), the basic systems that ensure access, proper handling, preparation and storage of food are often severely compromised, leading to frequent outbreaks of food borne illnesses.

Increasing climate pressures will also inevitably lead to rising food prices weighing heavily on household and national budgets. Disadvantaged social groups will therefore be condemned deeper into hunger and malnutrition. Currently, it is estimated that food costs account for approximately 60 per cent of household income expenditures in Zimbabwe.

Zimbabwe's recently concluded land reform programme has produced a new, and inevitably heterogeneous generation of farmers who ought to understand their production circumstances in terms of agro-ecological zones, technical know-how and markets. This opens new opportunities for farmers to employ new technologies to increase productivity and effectively participate in market-oriented production systems. However, their sensitivity to risk and capacity to adapt is likely to be tested under the increasing climate variability and change.

With adequate support for sustainable access to production resources, there is scope to maximize production in the country's high potential agro-ecological zones while creating appropriate market links with farmers in low potential zones. However, there is currently lack of infrastructural and logistical mechanisms for ready procurement and transportation/transfer of agricultural input supplies and food to needy areas within and across major agro-ecological zones.

The country therefore needs to initiate a livelihoods debate beyond aid/handouts and subsistence. There is need to focus more on community empowerment processes that enable farmers to self-mobilize and self-organize for collective action towards increased production, risk management and enhanced market participation to improve their adaptation to climate change. There is also need to re-design the national social safety net systems at different levels in relation to agricultural production, development of markets and management of food security to enhance adaptation and reduce risks associated with poor rainfall distribution. One of the adaptation options is to enhance the capacity of the farming communities to maximize production during favourable cropping seasons in order to fall back on such harvests during poor years. Advances in post-harvest processing and storage technologies are also required so that harvests from good years can be stored for longer periods to cater for the drought years.

Finally, Zimbabwe will need to take full advantage of its locally generated knowledge products and technologies to adapt to climate change. For example, there are opportunities to promote use of knowledge on integrated soil fertility management technologies, conservation agriculture approaches, as well as employ available technological capabilities for conventional crop/livestock breeding, biotechnology and mechanization, to increase productivity without compromising diverse ecosystems services that support livelihoods.

This will help to generate locally relevant and contextualised 'climate smart agricultural solutions'.

Overarching Strategies in Agriculture and Food Security

a) Develop frameworks for sustainable intensification and commercialization of agriculture at different scales across agro-ecologies.

b) Strengthen capacity to generate new forms of empirical knowledge, technologies and agricultural support services that meet emerging development challenges arising from increased climate change and variability.

c) Strengthen early warning systems on cropping season quality, rangelands conditions, droughts, floods, disease/pest outbreaks and wildlife movement in order to enhance farmer preparedness.

3.2.1.2 Thematic Issues and Proposed Strategies for the Agricultural Sector

Climate change is a global phenomenon, but adaptation is a local phenomenon. This calls for strengthening of information and knowledge systems to enhance the capacity of communities to make timely decisions about appropriate action(s) to take, and what tools and approaches to employ. Successful agricultural countries are characterized by the presence of vibrant and dynamic agricultural and environmental research systems.

Farming Systems

Zimbabwe is currently divided into five Agro-ecological Regions, based primarily on rainfall and type of soils (See Section 1.1). These two factors also largely dictate the observed geographical distribution of major vegetation types. The uneven distribution of the projected impacts of climate change and variability will inevitably result in differential access patterns to agricultural services and bio-resources by households across different social gradients and agro-ecological zones.

There is increasing evidence that the boundaries of these agro-ecological zones are now changing and will require re-characterization and re-demarcation. There are currently no monitoring frameworks in Zimbabwe to benchmark these changes in agro-ecological zones with specific reference to existing and potential changes in farming systems, including shifts in prioritization of crop and livestock types.

There are also no readily available forms of national statistics about the most vulnerable social groups within communities and across different farming sectors. It is therefore difficult to project the desired population structure and dynamics that can be potentially supported on the nation's resource base, and how these will be affected by the changing circumstances as a result of climate change.

Further, with soil fertility declining and yields falling, farmers are reverting to extensive production practices, especially in the smallholder sector. This is resulting in mutually self-reinforcing mechanisms of increasing land degradation and, in turn, accelerating poverty and food insecurity. Climate variability, poor soil fertility and market volatility are major sources of vulnerability under these circumstances. Mechanisms are required to halt and/or reverse these trends and support transformative processes into more competitiveness and diversified farming systems.

Strategies

a) Develop frameworks for supporting agricultural specialization according to agro-ecological regions, including mechanisms for commodity exchange, trade and marketing.

Crop Productivity

Projections indicate increasing agricultural water scarcity and declining productivity of crops because of climate change and variability. Reports of the IPCC forecast a 20-50 per cent reduction in yields of staple cereals for southern Africa which include maize, the staple crop for the majority of Zimbabweans. Most Zimbabwean farmers, particularly in the smallholder sector, practice maize mono-cropping. However, despite achievements in crop breeding of high yielding varieties (e.g. greater than 10 tonnes per hectare for maize) in the country, average yields have remained at less than 0.8 tonnes per hectare on smallholder farms and approximately 1.5 tonnes per hectare on commercial farms.

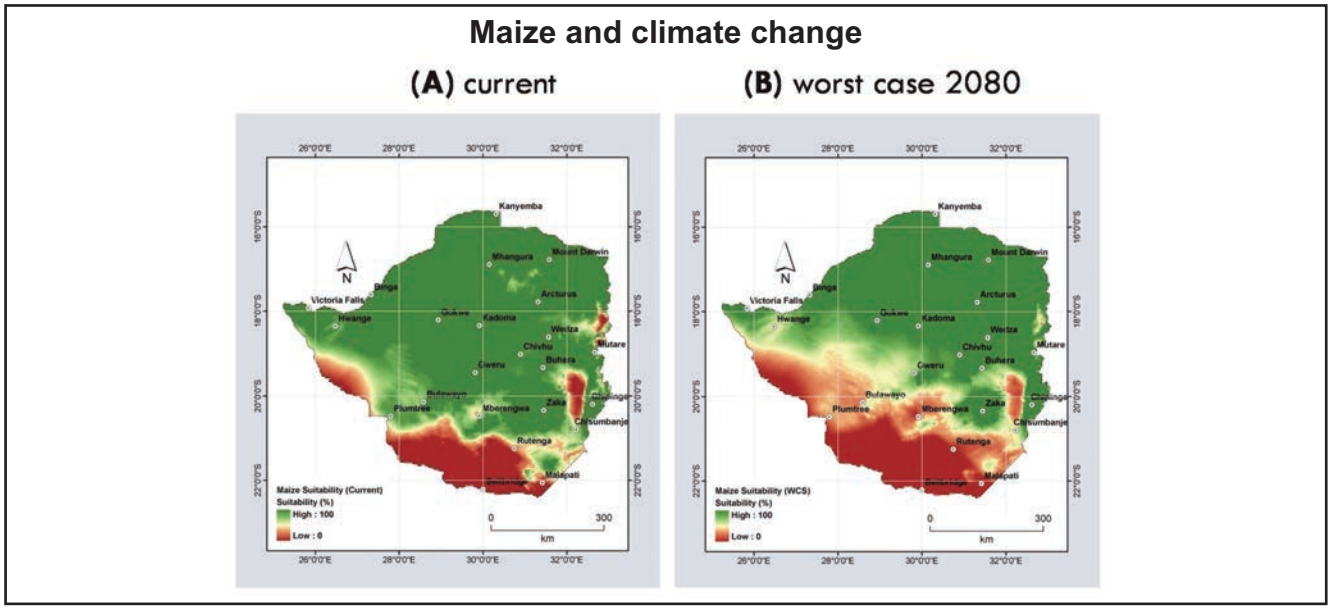
Vulnerability assessments carried out for Zimbabwe's Second Communication to the UNFCCC (Figure 10) show that areas regarded 'excellent' for maize will decrease from the current 75 per cent to 55 per cent by 2080 under the worst case scenario.

Zimbabwe has over the years done very little to diversify its cropping systems beyond maize grown under rain-fed systems. Farmers have failed to diversify into alternative crops, even when they experience recurrent failure of maize. A major challenge is therefore to get most communities out of this 'maize-poverty trap'.

Drought tolerant crop types such as millets and sorghum (small gains) and high protein leguminous crops that include cowpea, groundnut and Bambara nut have over the years been largely ignored. Processing and marketing opportunities for these crops have not been given due attention at the research level, and the wealth of related indigenous knowledge within communities has not been harnessed. Even the international research and development initiatives have, in recent years, come under scrutiny for failing to support a systematic development of these and other indigenous crops. Zimbabwe will therefore need to put in place frameworks for developing such known stress tolerant and under-utilised crops. Farmers also need to timely access climate information in order to make decisions about crop types, varieties to plant and timing of operations.

Figure 10: A comparison of the maize production zones under the current and worst case scenario for the year 2080.

Source: Zimbabwe's Second Communication to the UNFCCC.



The emerging changes in climate will force farmers to adopt new crop types and varieties and forms of agricultural production technologies that can respond to the new and changing stress factors. For example, there could be changes in crop pests and diseases; however, there is currently insufficient knowledge about the expected changes in their distribution and potential ecological responses to emerging temperatures and weather scenarios, as well as their impacts. Without such knowledge, the country has limited scope to develop appropriate response measures. There is also overwhelming evidence that alternative (off-farm) livelihood opportunities will remain limited and unsustainable in the absence of a robust agricultural base in the country.

Globally, agriculture has been identified as a significant source of GHGs particularly carbon dioxide, nitrous oxide and methane. However, amounts measured from African farming systems are insignificantly low, and this has been attributed to low use of both organic and mineral fertilizer inputs. There is, however, need to put monitoring mechanisms in place in response to the inevitable increase in fertilizer usage as farming systems are intensified. Use of mineral fertilizer in Africa has been considered as 'a must' if current levels of production have to take the much needed quantum leap. This has implications on the emission trends.

Strategies

a) Strengthen the capacity of farmers, extension agencies, and private agro-service providers to take advantage of current and emerging indigenous and scientific knowledge on stress tolerant crop types and varieties, including landraces that are adaptable to arising climatic scenarios.

b) Develop frameworks for promoting science based crop production and post harvest technologies and management practices.

Livestock Production

Livestock have traditionally provided a major source of insurance against seasonal crop failures for farmers as they can be sold to purchase food and other requirements during drought years. However, with increasing intensities of droughts this traditional coping strategy may no longer suffice in future without major interventions.

One of the major threats to livestock production is the continued expansion of cropping activities into areas previously set aside for livestock grazing. Lack of livestock feed resources during the dry season has been a traditional and perennial challenge for farmers in Zimbabwe. Recent studies in farming systems have also demonstrated increasing conflicts among livestock, wildlife and cropping systems, and that overally livestock are increasingly being squeezed out of the farming systems.

Informed actions are required to re-define the futuristic role of livestock in supporting the livelihoods of rural people as well as revitalizing and maintaining the commercial beef and dairy industries. There are challenges associated with diminishing annual yields in surface water and increased periodic outbreaks of diseases. This will most likely give rise to demands for alternative stress tolerant breeds or types, alternative feeding regimes and new disease control approaches.

Zimbabwe's Second Communication to the UNFCCC carried out vulnerability studies in the livestock sector. The assessments suggested that the projected decreases in precipitation coupled with increases in temperature will cause a corresponding decrease in Net Primary Productivity in most parts of the country (See Section 3.1.4, Figure 9). Net Primary Productivity provides an estimate of how much biomass and therefore forage is available in a rangeland.

Currently there is a high dependency on ranching in livestock production, rendering the sector vulnerable to any climatic changes that are likely to reduce biomass productivity in the rangelands. The high costs of supplementary feed resources also present a major challenge for the industry to reduce the current dependency on natural grazing.

A few assessments of possible future changes in animal health arising from climate variability and change have been undertaken. The demographic impacts on trypanosomiasis, for example, can rise through modification of the habitats suitable for tsetse-flies exacerbated by climate change and variability. Climate change may also affect the spatial extent of other livestock disease outbreaks such as anthrax. Generally changes in disease distribution, range, prevalence, incidence and seasonality can all be expected. It is therefore important to improve disease surveillance in ranching regions to control outbreaks. Heat stress and drought are likely to have further negative impacts on animal health and milk production of dairy cows.

Livestock manure is a significant source of GHGs, particularly methane, and is influenced by the chemical quality of feed resources. Methane emissions from livestock can be controlled through on-farm anaerobic digestion of manure as a mitigation measure (See Section 3.1.1).

Strategies

a) Strengthen the capacity to identify and promote adoption of indigenous and improved livestock breeds that are tolerant to climate related stresses.

b) Establish monitoring systems for greenhouse gas emissions in agricultural systems and support mechanisms for their reduction.

Agriculture and Water

The largest proportion of Zimbabwe's agricultural land is located in marginal rainfall areas. As a result farmers, particularly smallholders, have for decades been struggling to develop coping mechanisms. The worsening rainfall distribution patterns, and in some cases the reduction in total rainfall amounts, call for a re-thinking of water management in the agricultural sector as well as re-designing of the cropping and livestock systems.

Key challenges in water availability for agriculture under the changing climatic scenarios are related to three major elements; firstly, the development of irrigation systems and associated technical capacity. Secondly the development of drought escaping, drought tolerant, high yield, high nutrient, water efficient crops and heat and drought tolerant breeds of livestock. Thirdly managing episodic floods and excess rainfall using infrastructure designed to adapt to frequent droughts and decreasing rainfall.

Only 3.5 per cent of arable land in the SADC region is under irrigation, and in Zimbabwe this accounts for less than 200,000 hectares. However, the major issues to consider in irrigation development are potential failures in filling up the water reservoirs because of droughts and low rainfall on one extreme and the washing away of dam walls during extreme events such as flooding on the other. Declining water tables and abandonment of dams have been common in arid and semi-arid zones. Globally there has been increasingly worry about the future impacts of ground water pumping for mega-scale irrigated systems as the impacts of global warming continue to set in.

There are projections that net water requirements for some of the current crop cultivars may increase due to rising temperatures, with potential negative implications on profitability of

irrigation systems. Designing of highly efficient irrigation systems is therefore a major requirement. Serious considerations should be given to crop improvement programmes over the long term. There could also be opportunities for harnessing more efficient carbon sinks in agricultural systems if crops that are more adaptable to high CO_2 intensities are developed and promoted.

Strategies

a) Strengthen national research and extension capacity for development and integrated management of agricultural water resources.

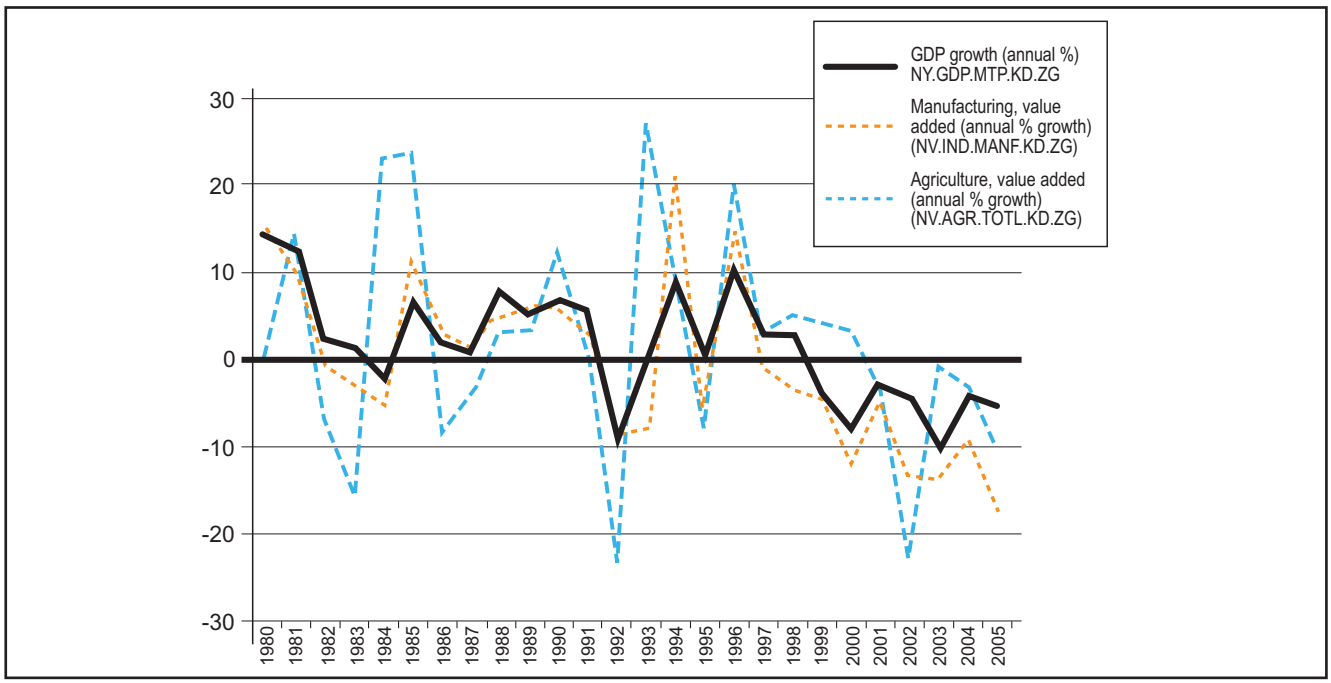
3.2.2 Industry and Commerce

Zimbabwe's industrial sector consists of a formal sector and a growing informal sector. It is highly diversified comprising manufacturing, processing and the secondary production sector with strong backward linkages. Manufacturing has strong linkages with agriculture, mining, construction and commerce.

The performance of agriculture, mining and manufacturing are the main drivers of GDP growth contributing over 40 per cent of the GDP in any given year. Each time a drought occurs, the performance of the agriculture and manufacturing sectors under-perform and drag the GDP growth down (Figure 11). Thus any reduction in agricultural production caused by frequent droughts and more extreme events such as floods resulting from climate change will have a huge impact on Zimbabwe's economy.

The industrial sector's share of the GDP fell from 25 per cent in the 1980s to around 15 per cent from 2006-2008. The sector has been recovering since 2009 and is projected to grow if credit and better energy supply are availed. According to the Zim Asset 2013-2015 mid-term plan the average capacity utilization was 57 per cent in 2011and 44 per cent in 2012.

Figure 11: Key economic trends for Zimbabwe 1980-2005.
Source: Chimhowu et al, 2010.



Industrial activities have a number of adverse impacts on the environment, that include the consumption of both renewable and non-renewable resources and production of pollutants such as emissions, effluents and solid wastes. The industries that produce GHGs are energy production and manufacturing (including but not limited to cement production; fertilizer production; and processes in mining such as iron and steel manufacture and ferroalloy production). Industries' main contribution to GHGs is through energy consumption. According to Zimbabwe's Second National Communication to the UNFCCC, industry accounts for the largest consumption of both electricity and coal thereby contributing (directly and indirectly) to at least 80 per cent of the country's GHG emissions.

The major challenge for Zimbabwe's industry has been low investment in more resource efficient machinery and equipment resulting in negative environmental impacts especially with regards to emissions. There is potential for industry to reduce their contribution to global climate change through investment in cleaner energy as well as resource efficient production processes.

There is need for industry to look at alternative sources of energy like use of natural gas (the cleanest of all fossil fuels), solar lighting and other forms of renewable energy such as mini-hydro-electricity. There is general need to move from end of pipe technologies to technologies that enhance the efficiency and environmental performance of the full production process from raw material to marketing of products. Industries should be encouraged to promote source separation of waste and to apply the "cradle to grave" principle in their manufacturing practice (See Section 3.3.4).

The industrial sector is complimented by a large commercial sector which ranges from provision of services to retailing. Although the direct contribution of the commercial sector is limited, it has a large indirect impact on climate because of its energy consumption and waste production. Commerce is the third largest consumer of electrical power in Zimbabwe. The retail sector is also dependant on imported products and hence it also contributes to climate change through transportation.

Strategies

a) Introduce policies that promote the use and adoption of clean and efficient energy in industry.

b) Create a policy and regulatory framework that promotes resource use efficiency and cleaner production in industry and commerce.

c) Create an enabling policy and legal framework that encourages the setting up and operation of climate resilient industries.

3.2.3. Mining

Zimbabwe is well endowed with minerals, with mining activities contributing significantly to the economy. The main minerals include gold, platinum, diamonds, coal, iron, chrome, nickel, phosphates, limestone, gypsum and graphite.

The mining sector accounts for about 44 per cent of Zimbabwe's GDP, at least 30 per cent of foreign exchange earnings and 5 per cent formal employment. The country is among the low-cost producers of minerals because of abundant shallow deposits. Mining continues to play a pivotal contribution to the economic wellbeing of the country despite the variability of the commodity markets. During the period January to November 2012 the mining sector produced

minerals worth US$1.6 billion, buoyed up by high levels of gold and platinum production. Whereas the agricultural and manufacturing sectors have been the main contributors to export earnings, these have been over-taken lately by the mining sector which now accounts for about 50 per cent of the country's total exports.

These mining activities, conducted in over 1, 000 mines, have however, inherent destructive elements to the environment and to climate in particular. For instance open cast mining leads to clearing of forests and woodlands which are carbon sinks, whilst blasting leads to emission of dust and gases which pollute the atmosphere. The health effects of emissions from mining activities on workers and local residents are often underplayed to the detriment of the communities, thus the reduction of emissions will have co-benefits.

Mining contributes to climate change through GHG emissions and energy consumption. The major source of energy in the mining sector is coal. Coal is converted to coke and used to smelt minerals inevitably leaving a negative carbon footprint in terms of emissions. Electricity is also used in mines and mining is the fourth largest consumer of electrical power. In Zimbabwe, electricity is generated from coal, a fossil fuel, and from Kariba dam (hydro-electricity).

The coal mines have stockpiles of high-sulphur coal, which industry cannot use, that generate methane and occasionally burn spontaneously when the temperatures are high releasing GHGs. Projections of increased hot and dry climate accompanying climate change will increase the frequency of dump fires which will result in increased emission of GHGs.

Climate change offers new opportunities for the mining sector to reduce emissions and trade carbon credits on the international carbon market. Mines can install clean technology such as those for capturing and storing carbon and can trade this on the international market under the Clean Development Mechanism.

Climate change can affect mining operations through extreme events such as excessive rains and floods that may cause landslides.

There has recently been an upsurge of legal and illegal small-scale mining. The main challenges in the small scale/informal mining sector include lack of organizational capacity, capital equipment and technical know-how to mine sustainably. These miners often cause veldt fires as a result of methods used to detect minerals, resulting in GHG emissions and destruction of carbon sinks.

The recently promulgated Community Share Ownership Trusts whereby the proceeds of mineral exploitation by mining houses will include dividends to nearby and affected communities gives an opportunity for utilizing these resources for climate change adaptation and mitigation activities at the local level.

Strategies

a) Develop regulatory frameworks to encourage emissions reduction and invest in resource efficient technologies.

b) Enforce and monitor the implementation of mandatory and voluntary environmental management systems.

c) Adopt practices that reduce energy consumption in the mining sector.

d) Develop a framework for enhancing the capacity of small scale miners to improve their environmental performance.

3.2.4 Tourism

The Government of Zimbabwe has earmarked tourism as one of the country's strategic sectors for economic growth and development, because

of its links with other industries and its positive contribution to GDP, employment, foreign currency earnings and investment. The main thrust is to have a sustainable tourism sector that promotes economic growth and improves livelihoods.

Tourism in Zimbabwe is based on the environment, with the main attractions being wildlife, wilderness areas, water bodies and landscapes. Therefore, the quality of the environment and the experiences that people have will be a major factor in the potential for the tourist market in Zimbabwe and its rate of growth.

Vulnerability studies for the Second Communication to the UNFCCC predict a decrease in biodiversity in most parts of the country as a result of climate change, especially the western and southern regions where most national parks are located (See Section 3.1.4). This will have a negative effect on the tourism sector as most tourists visit the country to view the variety of game species and the unique landscapes the biodiversity offers. Thus, adaptation strategies for tourism may include protecting biodiversity both in and outside the park estates.

Zimbabwe has a long tradition of progressive wildlife management and spearheaded the sustainable use of wildlife in the southern African region. Wildlife-based tourism consists of both consumptive, mainly hunting, and non-consumptive, including photographic safari tourism. Zimbabwe is also in the forefront of community based natural resource management, such as the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) which is implemented in 59 of the 64 rural districts of Zimbabwe. CAMPFIRE provides opportunities in the tourism industry for communities to generate income through sustainable use of natural resources. In addition, Zimbabwe has pursued trans-boundary initiatives that promote regional tourism development.

There are two major threats to tourism that Zimbabwe may experience in the face of climate change. One is that the changing climate will have a detrimental impact on the quality of Zimbabwe's tourism products, such as reducing biodiversity and degrading the landscapes. For example: Mana Pools, a major tourist attraction and biodiversity hotspot, is prone to flooding; and trout fishing, a niche tourist attraction in the cool streams and dams of the Eastern Highlands, will be adversely affected.

The second is the external threat from the international processes such as the introduction of mitigating measures in the aviation industry that could result in potential tourists being reluctant or desisting from travelling by plane because of the carbon emissions associated with air travel. A fully 'green' tourism industry using sustainable energy sources and other environment-friendly practices would help to counteract this perception and compensate for the tourists' carbon footprints.

Strategies

a) Mainstream climate change into policies and legislation that guide the tourism sector.

b) Promote and strengthen Zimbabwe's tourism sector's resilience to climate change.

c) Build and strengthen the capacity of the tourism and wildlife sectors to adapt to the challenges of climate change.

d) Promote mitigatory measures to ensure a low carbon footprint/emission and sustainable growth and development in Zimbabwe's tourism sector.

3.3 Physical and Social Infra-Structure

3.3.1. Energy

The energy sector stands at the centre of the climate change discourse in Zimbabwe, because it is the major contributor of GHG emissions. It contributes the biggest share (60.7 per cent) of the country's total GHG emissions, followed by agriculture 20.7 per cent, industrial processes 16.6 per cent and waste 1.9 per cent. Although Zimbabwe contributes a mere 1.7 per cent to the total GHG emissions of the African continent, it is still important for future development planning to take cognisance of this low carbon footprint and to preserve it.

The relevance of energy in economic development is highlighted in key development policies, in particular, the Zim Asset. One of the development pillars of Zim Asset is Infrastructure and Utilities and this is the section that recognizes the need for sustainable and adequate available energy as an enabler to the green growth of the economy that the country is pursuing.

Greenhouse gas emissions from the energy sector emanate from combustion of carbon-based fuels as well as fugitive emissions during coal mining and handling processes. Carbon dioxide (CO_2) and methane (CH_4) are the two most important GHGs emitted by the energy sector. Nitrogen oxides (NO_X) and carbon monoxide (CO) are also emitted from combustion of carbon-based fuels, especially from vehicles and stationary fuel powered engines.

Zimbabwe's commercial energy mix is dominated by conventional energy sources coal, hydropower, petroleum, ethanol and liquid gas. The energy resources of commercial significance are coal, with total reserves of 10.6 billion tonnes of which half a billion are proven; petroleum, of which about 40 petajoule (PJ) of finished distillates are imported every year; and hydroelectric power with a total potential of 4,200 MW generated on the regionally shared Zambezi watercourse. Fuel wood provides the bulk (60 per cent) of the total energy supply.

There is heavy reliance on coal for electricity generation with over 46.4 per cent coming from four thermal power stations, namely Hwange, Munyati, Harare and Bulawayo. The other 53 per cent energy is derived from non-carbon resources in the form of hydro-power from Lake Kariba power station (Table 3). The balance is derived from renewable energy sources such as solar power.

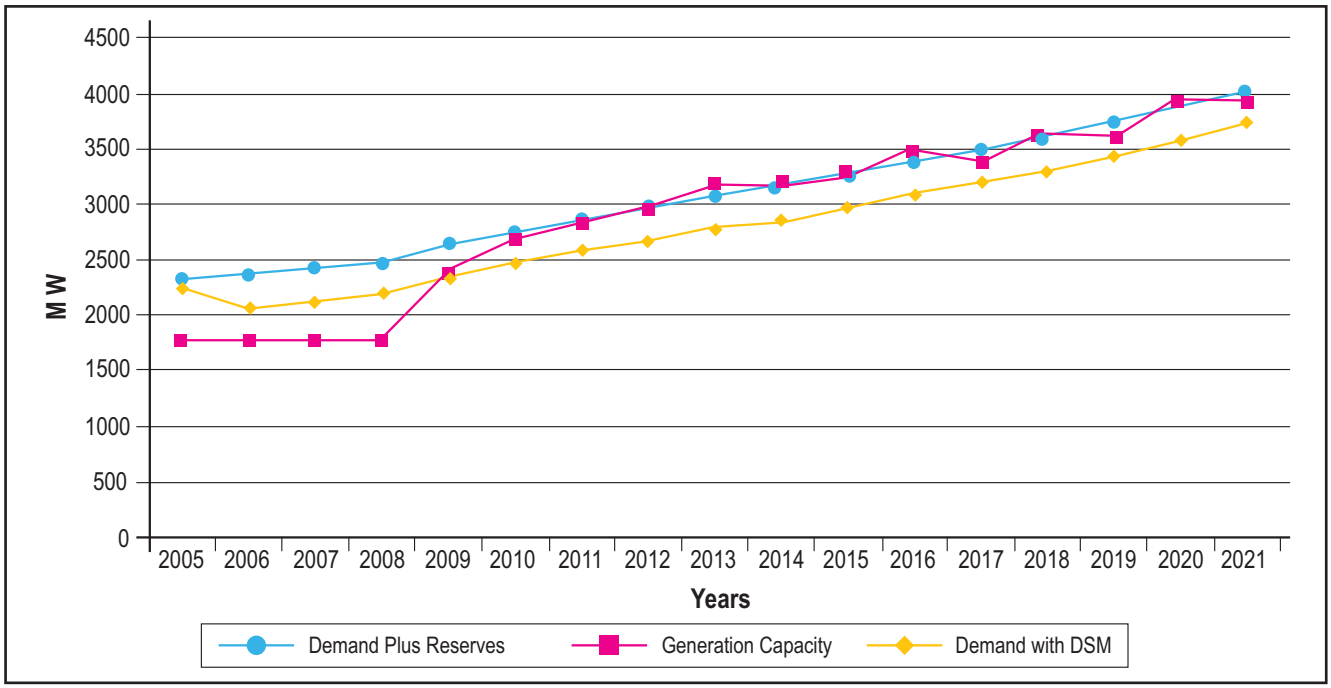
Table 3.2. Production of electricity in Zimbabwe in GWh.
Source: Source: Zimbabwe Electricity Supply Authority.

Power Station	Generated Energy (GWh)		
	2010	2011	2012
Hydro generators (Kariba)	5,798.78	5,091.42	5,372.00
Coal generators (Hwange, Munyati, Bulawayo, Harare)	2,711.78	3,811.60	3,575.00
Other renewable generators (Border Timbers, Hippo Valley, Triangle)			167.23
Other generators (not included above)			2.60
Total Energy Generated	**8,510.56**	**8,903.02**	**9,116.83**

The power stations are currently performing at 66 per cent of the generation design capacity because of lack of adequate financing for operations; high transmission losses; old age and poor maintenance of equipment; and issues of climate change related water availability in Lake Kariba. The electricity energy supply and demand scenario including its future projection is given in Figure 12.

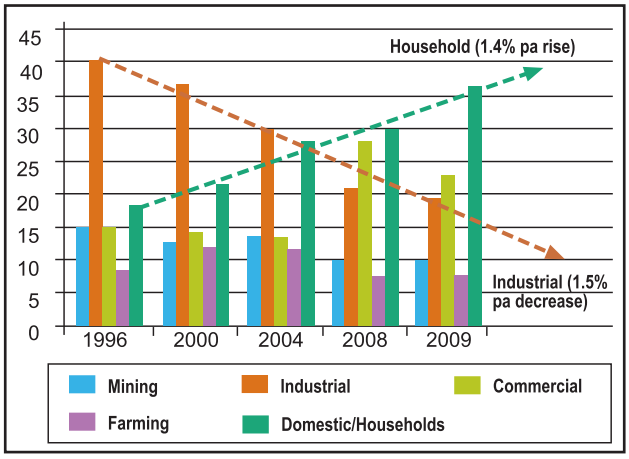
The long term scenario predicts that the electricity demand of the country will have doubled by 2020 and to meet this demand energy generation capacity should increase by more than twice the current capacity. The immediate option at the disposal of Government to address the current power generation shortfall gap of between 600–1,600 MW at peak hours is coal which is locally available in abundance. However, thermal power production is a major source of GHGs. Therefore government should consider an integrated resource plan with a rich share of renewable energy to curb further GHG emissions in the long term.

Figure 12: The long term energy supply and demand projection.
Source: Zimbabwe Electricity Supply Authority.



Access to electricity in Zimbabwe remains low with a national average of 40 per cent and of only 19 per cent in rural areas. The energy consumption pattern was transformed by the economic meltdown the country experienced between 2006 and 2008. Since then there has been a significant drop in the share of energy consumption by industry, while on the other hand the increase in population and construction of new houses has seen a rise in domestic energy consumption. The historical subsector energy consumption is shown in Figure 13.

Figure 13: Trends in sectoral electricity consumption.
Source: Zimbabwe Electricity Supply Authority.



Agriculture accounts for the next largest source of demand for coal after generation of electricity. A limited amount of this coal, probably no more than several thousands of tonnes per year, is utilized on large farms for tobacco curing and domestic use. Use of coal in households is very limited.

Zimbabwe is also endowed with coal-bed methane deposits that are estimated to be more than 600 billion cubic metres that could also generate electricity. These are found in the Lupane-Hwange area as well as Beitbridge and Chiredzi. Use of cleaner coal-bed methane to generate electricity would be a good substitute for highly polluting coal. Resource constraints have limited independent verification and extraction of the resource.

Biomass constitutes a major source of energy, for heating and cooking especially for the rural and low-income urban population. Since 2007, there has been an increase in the number of the urban households using fuel-wood because of the intermittent availability of electricity. Zimbabwe's forest cover diminished from 20.9 million hectares in 1990 to 15.6 million hectares in 2010 with the main drivers being the continued dependence on biomass for heating and cooking; the opening up of land for agriculture; poor management of forests; and use of firewood for curing tobacco. With a forest regeneration rate as low as 0.94 tonnes/ha/year in the communal areas, this has not matched the rate of extraction. Biomass extraction and use have two fold negative impacts on climate change. The extraction of biomass removes GHG sinks and the burning of firewood for cooking and heating adds to carbon emissions.

Biomass utilisation at domestic level is unsustainable as the open fire mostly used is highly inefficient and the smoke emitted is polluting to the environment and has negative health impacts. Indoor air pollution is a major cause of concern as it affects mostly women and children who are responsible for collecting and using firewood.

The agricultural sector uses fuel wood for agro-processing of tobacco. Small-holder farmers have limited capital. This has led them to resort to 'low cost' fuel wood for curing tobacco resulting in heavy depletion of forests. There are more than 66,000 tobacco growers producing more than 132 million kg of tobacco of which 62 per cent is cured by fuel wood. A tonne of tobacco consumes almost three times the wood a person requires per year. It is estimated that over 46,000 hectares of forests were destroyed while 1.38 million cubic metres of fuel wood were burnt to cure part of the 127 million kilogrammes of tobacco delivered to the auction floors in 2011. Thus about 47 per cent of deforestation rates have been attributed to biomass energy consumption for curing tobacco. The management of fuel wood resources and demand are therefore a major issue in the energy planning processes and GHG mitigation in Zimbabwe.

Zimbabwe imports all its liquid fuel requirements and the estimated monthly demand when the economy was at its peak for diesel, petrol and jet fuel were 105; 90 and 15 million litres, respectively. The transport and agricultural sectors consume 60 per cent and 13 per cent of the fuels, respectively. Other liquid fuels are consumed by aircraft and households mainly paraffin (<1 per cent). Diesel contributes 54, petrol 29 and paraffin 8 per cent of the total liquid fuel supply. The remainder is shared between liquefied petroleum gas (LPG), aviation gasoline (Avgas) and Jet A1.

The use of renewable energy is low (less than 1 per cent). The major renewable energy resource currently used is hydropower from Kariba. There are other known sites where electricity could be produced on the Zambezi River Basin such as

the Batoka, Devil's, Mupata and Katambora gorges as well as on perennial rivers in the eastern highlands and the large to medium scale irrigation dams across the country. Independent power producers are tapping on the relatively high hydro potential in the Eastern Highlands. These systems are generating 6.75 MW using a combination of mini-hydro and micro-hydro power stations that are feeding mostly the Honde Valley. The absence of an enabling policy and regulatory environment has been cited as a key factor in limited investment in renewable energy.

Zimbabwe has a long history of ethanol production for fuel blending at Triangle Sugar Estates starting in the 1970's. The use of biofuels such as ethanol offers an opportunity for climate change mitigation because they are carbon neutral as they sequestrate carbon dioxide during plant growth.

More recently, a national biofuels programme was launched in 2005 to partially substitute imported fossil fuels with locally produced biofuels. Two approaches have been used and involve the use of the *Jatropha curcas* plant and the processing of its seed into biodiesel and the expanding of sugarcane growing and the resuscitation of blending of petrol with ethanol based on the involvement of Triangle Sugar Estates and new entries that include Hippo Valley, Chiredzi and Chisumbanje Sugar Estates. A new plant was commissioned at Chisumbanje and produces 200,000 litres of ethanol per day. All the sugar cane processing plants have cogeneration equipment that is generating electricity from bagasse helping to augment local power production within the Chiredzi area. With regards to Jatropha, this has not spread as much as was initially projected, however communities are pressing the seeds for oil to use in household lighting.

The government through the Zimbabwe Energy Regulatory Authority introduced mandatory blending of petrol with ethanol starting with 10 per cent (E10) in 2013 and expected to rise to 20 per cent in 2014. The mandatory blending will help to mitigate GHG emissions from combustion fuels.

Solar power is available in abundance with the solar radiation peaking 6 kW/m^2/day in most areas. Applications of solar technology have focussed on solar photovoltaic (production of electricity) for pumping of water, refrigeration, lighting in households and institutions, powering of radios and televisions as well as solar thermal (heat production) for cooking, water heating and crop drying. Over 100,000 solar energy systems have been installed country-wide; however, their use is limited mostly to rural schools and homesteads. Mimosa mine has the country's largest installed domestic water heaters with 360 units. The estimated installed capacity for solar water heaters is equivalent to 1.5 MW. This example can be replicated across the country's urban households and institutions to bring significant environmental benefits and reduce pressure on power generation.

Wind speeds over Zimbabwe are generally low, averaging 3.0 m/s. Wind energy has been used for the pumping of water. A project to determine wind profiles in various parts of the country was conducted in the mid-1990s. It, however, did not generate sufficient data to produce a wind map but enabled the design and production of a wind electric machine able to operate on low wind speeds. These machines could be used to enhance irrigation particularly in the newly resettled areas.

Biogas offers an additional source of household energy and its production should be used to mitigate emissions from farm and municipal waste. There are more than 400 biogas digesters which range in capacity from 3-16 cubic metres in Zimbabwe. Unfortunately only two have been known to be functional. The Rural Electrification Agency and SNV a Dutch non-governmental

organization have resuscitated the National Biogas Programme aimed at promoting biogas utilisation at household and institutional levels to help address energy supply for cooking.

The National Energy Policy of 2012 strongly advocates for the promotion of renewable energy to address the energy supply gap. The availability of reliable, adequate and sustainable energy will be a necessary condition for the attainment of the projected GDP growth rates. Zimbabwe should develop an Integrated Energy Resources Plan that will give an optimal mix of energy resources that will address the country's energy needs at the lowest possible cost. Greening the Integrated Energy Resources Plan using as much renewable energy as can economically be viable, will in the long term achieve national development goals while using low carbon pathways and attaining a national low GHG footprint.

Other measures to green the energy sector include reducing energy demand and increasing the efficiency of energy production and use which, when combined should lower Zimbabwe's GHG emissions. There are opportunities to increasing energy efficiency both on the supply and demand side through improving equipment for power generation, transmission and distribution on the supply side; and improving the energy performance of cook-stoves, lamps, appliances, boilers, buildings, vehicles and processes in the energy-intensive industries such as iron and steel, cement and fertilizer manufacturing on the demand-side.

With regards to fuels there are opportunities to switch to less carbon-intensive fuels including use of ethanol in vehicles and for electricity generation, developing bagasse/biomass cogeneration/bioenergy systems and using micro-hydropower, wind and off-grid solar photovoltaics among other renewable sources.

Mitigation measures should in the short term focus on thermal energy which is expected to provide the bulk of energy in the short-term. There are opportunities through the use of cleaner coal technologies and reduction of transmission losses. Growth in hydropower, biofuels and solar energy should provide opportunities for climate mitigation in the long-term. This will however require the creation of an enabling environment for investment in the renewable energy sector and an enhanced understanding of the importance of renewable energy. The measures should start with the piloting of the technologies followed by the up-scaling of successful technologies throughout the country. The recently launched National Energy Policy (2012) has strategies which if implemented within the stipulated timeframes should be able to complement the strategies identified in this strategy document.

Strategies

a) Introduce policies and regulatory frameworks for renewable energy, energy conservation and energy efficiency.

b) Strengthen energy planning, research and development.

c) Promote low carbon energy provision and use.

3.3.2. Transport

The transport sector is a vital part of Zimbabwe's development as it impacts on trade, commerce, business and participation of the labour force in these sectors. The transport sector consists of road, rail, air networks and a small ferry service. Zimbabwe occupies a strategic position within the Common Market for Eastern and Southern Africa (COMESA) and SADC and therefore needs an efficient transport system as any traffic bottlenecks on the regional trunk road network have a detrimental effect on these two regional groupings.

Zimbabwe's road infrastructure consists of a diversified network of roads totalling 88,133 km. Over two thousand (2,307 km) of Zimbabwe's road infrastructure forms part of the Regional Trunk Road Network linking SADC and COMESA member states. There has been a boom in trade of between 10 and 90 per cent within the region, resulting in an upsurge of traffic volumes traversing Zimbabwe's roads.

The National Railways of Zimbabwe operates 2,400 km of rail. However, there has been a near collapse of the railway infrastructure in recent years that has resulted in more abnormal loads having to be transported by road.

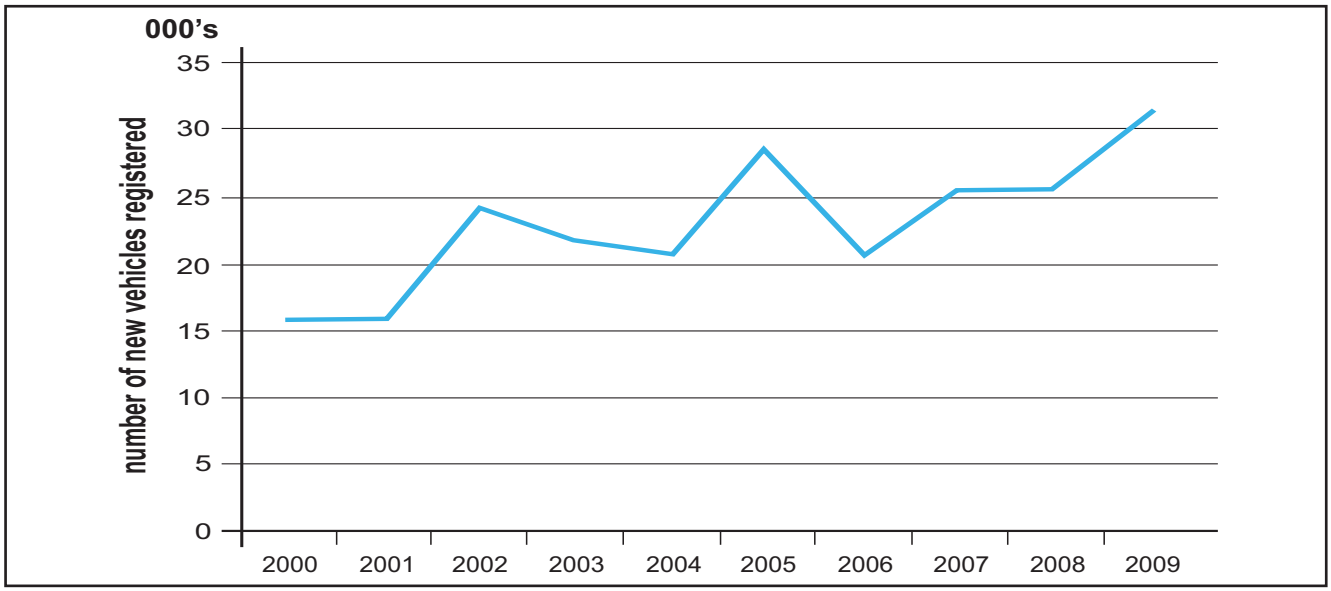
There are over 200 airports and aerodromes spread across the country. The original design capacity of the various terminals was sufficient for up to 3.8 million passengers a year with Harare International Airport as the main hub.

The major challenges for the road transport sector that relate to climate change in Zimbabwe are the rate of motorization and the quality of fuel. The traffic sector is increasing rapidly with the vehicle fleet doubling every 10 years. The central vehicle registry registered 15,723 new vehicles in 2000 and 31,440 in 2009 as shown in Figure 14. The total number of vehicles in Zimbabwe was estimated by the Zimbabwe National Road Authority at 896,012 in 2012 of which 828,395 were small motor vehicles, 30,514 heavy vehicles, 9,399 convectional buses and 8,907 registered public buses, among others.

The majority of these vehicles are generally reconditioned cars imported from industrialized countries where they would have been discarded after they reach their full economic life. There is need to enforce emission standards for vehicles and to use them to assess the emissions of imported vehicles before they are allowed into the country.

The current and projected growth in the transport sector will increase GHG emissions. Already the transport sector is one of the major contributors of GHG emissions as it is responsible for about 12 per cent of Zimbabwe's GHG emissions. Nearly 97 per cent of transportation GHG emissions come through direct combustion of fossil fuels, with the remainder being carbon dioxide (CO_2) from hydro-fluorocarbons emitted from vehicle air conditioners and refrigerated transport. A move towards the use of blended fuels will reduce the GHG emissions from vehicle fuel combustion.

Figure 14: Number of new vehicle registrations per annum between 2000 and 2009.



Current estimates suggest that Zimbabwe needs over 1 billion litres of diesel; over 730 million litres of petrol; and 180 million litres of jet fuel per year for transport (See Section 3.3.1). This equates to 744,000 tonnes and 543,120 tonnes per year CO_2 emissions from diesel and petrol consumption, respectively. In addition, vehicles release nitrous oxide, methane and other organic pollutants, with the amounts emitted determined by average speed and vehicle technology.

Introduction of an integrated transport system in Zimbabwe would reduce the carbon footprint caused by the road transport sector. Zimbabwe needs to develop an efficient public and mass transport system by introducing larger buses and trains on urban commuter routes. This will reduce the number of people using private cars and reduce GHG emissions. There is also need for promotion of use of non-motorized transport such as bicycles and walking to reduce carbon emissions. Such transportation has co-benefits of improving health.

Climate change is expected to affect transport infrastructure which is vulnerable to floods, storms, and extreme high temperatures. For example, bridge foundations are eroded by increased run-off, and roads and small bridges are often washed away by floods. Tarred roads are also susceptible to extreme temperatures, which melt or soften the tar; while excessive rains cause the development of pot-holes and increased erosion alongside the roads. There is therefore need to incorporate climate change in road designs and transport related infrastructure.

The air, rail and ferry transport sector is relatively small but also contributes to GHG emissions. Coal is the main fuel used in rail traction. Zimbabwe's air traffic currently consists mainly of regional and domestic flights with a few international flights. Of concern is that the carbon footprint related to air travel is much higher than any other mode of transport. It is estimated that the emissions in grams of carbon dioxide/per kilometre/per person transported by an aeroplane is about 322.8 g if the plane is completely full while that of a car is 204.2 g. A train is estimated to emit 60.2 g per passenger if the train is 70 per cent full and a public bus 81.8 g per passenger.

Given this scenario, the carbon footprint of visitors and tourists that come to Zimbabwe is increased as a result of current international travel arrangements where the majority of visitors have to fly to South Africa before they can fly to Zimbabwe, increasing their travel distance. Introducing direct international flights to Zimbabwe will impact positively on the carbon footprint of Zimbabwe's air transport sector. There is also need to promote the use of alternative modes of transport for visitors coming to Zimbabwe particularly regional tourists.

Strategies

a) Introduce a transport policy framework that encourages use of transport with low carbon emissions.

b) Integrate climate resilience into transport planning and infrastructural development.

3.3.3. Disaster Risk Management and Social Infrastructure (Human Settlements)

Zimbabwe has experienced an increasing number of weather-related hazards that include floods, storms and droughts, among others. Climate change is predicted to further increase and intensify these extreme events. These climate induced disasters indiscriminately affect the poor and marginalized people's livelihoods and health, and undermine the country's economic development.

The most affected people in Zimbabwe are rural communities who are likely to have low adaptive capacity to deal or cope with such disasters. That is why it is important to mainstream climate change into disaster risk management. Disaster risk management can be used to reduce the impacts and losses from climate change and is central to adaptation. Therefore it should become a central component in all of Zimbabwe's climate change adaptation strategies.

Zimbabwe has endorsed the Hyogo Framework for Action 2005-2015 which was adopted by the World Conference on Disaster Reduction on Building the Resilience of Nations and Communities to Disasters held in Hyogo, Japan in 2005. The Framework aims to reduce the risks of natural disasters and the effect they have on the lives and livelihoods of the poor. The implementation of this framework requires the building of climate and disaster resistant housing and implementing disaster preparedness through early warning systems. The Department of Civil Protection has developed a Draft Disaster Risk Management Policy, Bill and a Draft Disaster Risk Management Strategy aligned to international agreements and the Hyogo Framework.

Local authorities are best placed to deal with disasters but they lack adequate financial resources and capacity and are unable to maintain sewers and drains meant to reduce risks associated with water-borne diseases; safe disposal of wastewater and to reduce flooding risks and avoid blockages as part of disaster preparedness. They are not able to deliver adequate healthcare systems in response to injuries and illnesses which may arise from climate induced hazards. In addition, they are not effectively enforcing building by-laws and land-use controls.

The laws, policies and by-laws on location of settlements, design, standards and quality of buildings are also fragmented. These should be revised to mainstream climate change and to include disaster risk management. They should also be aligned with the Environmental Management Act that requires mandatory environmental impact assessments of projects such as housing developments and settlements.

Lack of enforcement of policy and by-laws has resulted in some communities settling in endangered areas such as riverbanks, wetlands, gullies, sloppy areas, marginal lands as well as disaster and flood prone areas which are not suitable for human settlements. The vulnerability of communities is further increased by lack of co-ordination among infrastructure sectors; low level of participation by the population in climate change initiatives; lack of a culture of safety among the general population and of financial resources to construct flood and fire protected infrastructure.

In addition, the current infrastructure was designed using historical climatic conditions and yet the climate is changing. The outdated infrastructure is not able to withstand extreme weather events. An effective and reliable infrastructure is an important adaptation response to climate change. Therefore, one of the top priorities for climate change adaptation should be the provision of a robust national infrastructure. The design of climate proofed settlements is an important imperative.

The generation and provision of reliable and appropriate information on present and future climate risks is a key component of disaster risk management. Improved data sources and capacity to model are required to create data on which adaptive strategies could be based. Understanding of climate change at local levels in Zimbabwe is limited by the lack of data of sufficiently high resolution and continuity. Low-resolution data has insufficient temporal and spatial coverage to detect crucial local climate change trends or to validate projections from regional climate models.

Zimbabwe needs to create a database for the management of disasters at all levels in the country. Lack of readily available national disaster information and institutional memory leads to poor planning, monitoring and evaluation of trend analysis and forecasts. There is also need for technical assistance to support disaster risk management education and training through formal education and public awareness programmes.

The development of flood and drought early warning systems is also important for settlements in drought and flood prone areas. The strengthening of Zimbabwe's national institutions such as the Departments of Meteorological and Hydrological Services should be a top priority for climate change adaptation. These should be effective and reliable institutions with capacities to monitor, detect, forecast and give early warnings about disasters such as floods, droughts and emerging threats.

They should also have capacity to carry out climatological analyses of atmospheric hazards, as well as forensic analyses and assessments of vulnerabilities of critical infrastructure. For example, forensic analyses would reveal the structural failures of infrastructure such as houses, electrical power distribution infrastructure, communication structures and dams as a result of extreme weather conditions. When infrastructure is destroyed, the costs of rebuilding and rehabilitation must be borne by insurance companies. Zimbabwe is, however recovering from an economic melt-down; this means most of the infrastructure is either not insured or underinsured.

The Department of Civil Protection has incorporated decentralized arrangements for the co-ordination of national, provincial, district and community-level disaster risk management initiatives in the Disaster Risk Management Bill and Policy. Some of the structures that have been created include the National Emergency Services Subcommittee; National Food and Water Subcommittee; National Epidemics and Zoonoses Crisis Subcommittee and National Resource Mobilization Subcommittee. These structural arrangements could be more beneficial to all stakeholders if they were also used for climate change governance. Currently, there are different organizations that promote disaster risk management and climate change adaptation in Zimbabwe, but the interventions are not coordinated.

Strategies

a) Develop an integrated and co-ordinated approach to reducing disaster risk and to address impacts of climate change through a multi-stakeholder approach.

b) Enhance early warning systems and capacity of hydro-meteorological services to advise on weather related impacts on new infrastructure as well as mitigation of potential damage to existing infrastructure.

c) Review and update policy and by-laws on building standards and codes to make them adaptive to climate change.

d) Invest in climate resilient social infrastructure.

e) Enhance community resilience to climate change.

3.3.4. Waste Management

Solid waste management poses a major challenge for the majority of urban local authorities in Zimbabwe. This is because they are practicing the traditional solid waste management system which involves generation, storage, collection, transportation and disposal of solid waste at dumpsites. The traditional system focuses on the disposal of solid waste without controlling its generation and promoting waste re-use and recycling. It is estimated that about 48 per cent of solid waste generated in Zimbabwe is not collected and is either being

illegally dumped in open spaces and on roadsides or disposed of by open burning. The limited quantity of solid waste that is collected by local authorities is deposited at dumpsites which do not qualify as landfills because of their design.

The contribution of solid wastes to climate change is through methane gas which is produced by anaerobic respiration of microorganisms when they decompose biodegradable waste. This is a major issue as biodegradable waste constitutes at least 50 per cent of the overall waste generated in Zimbabwe's urban areas. In addition there are often spontaneous or human caused fires at most dumpsites fueled by the emitted methane, further releasing CO_2.

When open burning of waste is practiced it contributes to short-lived climate pollutants such as black carbon (See Section 3.1.1). Incineration is mostly practiced as a way of disposing medical hazardous solid waste and emits CO_2, carbon monoxide (CO), nitrous oxide (NO_x) and non-methane volatile organic compounds (NMVOCs). Further, combustion of fuel used during collection, transportation and processing of wastes also contributes to CO_2 emissions. It is however, difficult to determine the magnitude of solid waste management emissions because of limited data on waste generation, composition and management in Zimbabwe, as well as inaccuracies in emissions models.

Proper waste management practices can result in climate benefits. These benefits can be achieved through adoption of the integrated solid waste management system which prioritizes waste minimization, re-use, recycling and waste-to-energy recovery. A larger stakeholder involvement in waste management that includes the informal waste sector is needed as it has potential to make a significant contribution to resource recovery. There is need to increase the level of recycling in Zimbabwe. Some industries have formed clusters where they are exchanging waste materials for use as raw materials thus reducing solid waste that would end up at the dumpsites.

According to global IPCC inventories, wastewater management is the second largest source of GHG emissions from the waste sector as a whole. In Zimbabwean urban centres, liquid waste is either collected in septic tanks or is directed to the municipal sewage treatment works where it is separated into liquid wastewater and sludge. Sludge digestion emits methane. Most urban authorities in Zimbabwe do not capture methane at their treatment works with only the City of Harare flaring it at two of its sewage treatment works. A net benefit to climate can be achieved through capturing methane gas produced at landfills as well as by incinerators and wastewater treatment plants. Use of the energy recovered from waste management processes also avoids the use of fossil fuels elsewhere in the energy system.

Zimbabwe has policies, legislation and statutory instruments that should help in reducing the amount of solid waste generated and the management of both solid and liquid waste. However, these are not fully implemented because of lack of resources for building the requisite infrastructure and for enforcing legislation.

Strategies

a) Capacitate local authorities to deliver proper, effective and efficient waste management services in order to reduce GHG emissions from waste management.

b) Create an enabling policy environment which encourages investment into alternative energy production using waste.

c) Develop an enabling framework to promote waste minimization through education and behavioural change of waste generators.

3.3.5. Health

Climate change is likely to alter the ecology of some disease vectors in Africa. Consequently the spatial and temporal transmission of such diseases will also be altered. Most assessments on health have concentrated on malaria and there are still debates on the attribution of malaria resurgence in some African areas. An estimated 700,000 to 2.7 million people die of malaria in sub-Saharan Africa each year and 75 per cent of these are children. The economic burden of malaria is estimated as an average reduction in economic growth of 1.3 per cent for those African countries with the highest burden. The social and economic costs of malaria are huge and include considerable costs to individuals and households as well as high costs at community and national levels.

Results from the "Mapping Malaria Risk in Africa" project show a possible expansion and contraction, depending on location of climatically suitable areas for malaria by 2020, 2050 and 2080. Assessments using 16 climate change scenarios show that by 2100, changes in temperature and precipitation could alter the geographical distribution of malaria in Zimbabwe with previous unsuitable areas of dense human population becoming suitable for transmission.

At a more local level, vulnerability assessments carried out for Zimbabwe's Second Communication to the UNFCCC also used malaria as an indicator to assess the potential impact of climate change on the health sector as its distribution and seasonal transmission correlates significantly with temperature and rainfall in the country. Further, understanding the changes in malaria occurrence in a changing climate is important since 75 per cent of the country is prone to malaria. A strong link was demonstrated among recorded malaria incidences, temperature and rainfall using bioclimatic (BIOCLAM) GIS models. Results indicated that malaria incidences were lower in drought years and exceptionally wet years but higher in average years. This indicates that excessive rainfall coupled with high temperatures may negatively affect the breeding pattern of malaria carrying mosquitoes found in Zimbabwe.

Other weather sensitive diseases are also likely to spread faster with global warming. Intensified flooding will increase incidences of water borne or related diseases such as cholera, typhoid and bilharzia, while warmer temperatures will enhance the spread of meningitis. Reduced availability of safe water because of climate change may also increase the prevalence of diseases such as diarrhoea, cholera, typhoid, guinea worms and dysentery through use of unsafe water. In some areas, warming is likely to translate into reduced crop yields and livestock productivity and water scarcity, which will concomitantly negatively affect human health and nutrition. During periods of climate-induced disasters (e.g. droughts and floods), the basic systems that ensure proper handling, preparation and storage of food are severely compromised, leading to frequent outbreaks of food borne illnesses.

Climate variability may also interact with other background stresses and additional vulnerabilities such as immuno-compromised populations affected by HIV and AIDS resulting in increased susceptibility and risk to other infectious diseases e.g. cholera. The potential of climate change to intensify or alter flood patterns may become a major additional driver of future health risks from flooding.

Another potential impact of increasing average temperatures and changing weather patterns is the loss of biodiversity which might include medicinal plants, making them less available to communities that depend on them for treatment. Effective early warning and disease surveillance systems that alert populations to anticipated disease outbreaks would reduce vulnerability to a number of climate-induced epidemics and facilitate timely and decisive responses.

Strategies

a) Strengthen surveillance programmes for monitoring human health under a changing climate.

b) Build resilience against diseases that occur because of impacts of climate change.

3.3.6. Gender, People Living with HIV and AIDS and Other Vulnerable Groups

Zimbabwe's demographic data published by ZIMSTAT show that more women than men are poor and live in the rural areas where livelihoods are intimately linked with the exploitation of natural resources which are vulnerable to climate change. They are further disadvantaged by old age, disability and HIV status, among other variables, which make them disproportionately vulnerable to the effects of climate change. They experience the greatest impacts of climate change because they are already vulnerable and marginalized, while at the same time, they have the least capacity or opportunity to prepare for its negative effects.

Moreover, because of gender differences in property rights, access to information, and cultural, social and economic roles, the effects of climate change are likely to affect men and women differently. For example, recurring droughts and low rainfall patterns have impacts on accessible water supplies and fuel wood, especially in the rural areas. This increases the distances that women and girls have to walk to secure these resources. Thus climate change exacerbates existing inequalities in key dimensions that not only are the building blocks of livelihoods, but are also crucial for coping with change.

Gender, HIV and AIDS, and other vulnerabilities coincide. Women are more vulnerable not only to climate change, but also to social problems including poverty, unemployment and HIV and AIDS. Although Zimbabwe has made significant strides towards the reduction of HIV prevalence, the levels remain significantly high at 15 per cent in 2010/11, and the epidemic still bears a woman's face, in terms of prevalence (women 18 per cent and men 12 per cent prevalence). Furthermore, women care for the sick and the orphans, therefore their role as primary caregivers in the HIV and AIDS pandemic places severe strain on their resources, and this will be exacerbated by the increase in climate change-related diseases.

Unequal access, control and ownership of natural resources by women and men, youth, the elderly and other vulnerable groups extends the exclusion of the vulnerable groups from important decision and policy-making institutions that govern the natural resources. Governance and decision making structures at all levels are still dominated by men. The impacts of climate change will further widen the gaps and amplify the inequities between women and men and other vulnerable groups.

Gender disaggregated data on climate change, its impacts and adaptation strategies are still limited in Zimbabwe. Anecdotal evidence shows that climate change, as evidenced by frequent droughts, floods, and erratic rainfall and high temperatures, is negatively affecting smallholder farmers who are mainly women, with little or no adaptation strategies. A study in the rural district of Chiredzi, southeast of Zimbabwe, found that the most vulnerable households to climate change included female-headed and child-headed households, those lacking access to irrigation and poor households.

According to the Disability Scoping Study carried out by DFID in 2007 People Living With Disability (1.4 million) constitute approximately 10 per cent of Zimbabwe's total population. The study showed that households with disabled members had lower mean income and fewer mean expenses regardless of seasonal fluctuations than households without disabled members. People Living With Disability have also been excluded from the land reform programme with less than one per cent having benefited from both the land reform programme and the provision of agricultural inputs because they are not regarded as very productive members of society. This makes them more vulnerable to the impacts of climate change.

The 2012 National Census carried out by ZIMSTAT revealed that elderly people (65 years and above) comprise about four per cent of the total population. Elderly people find it difficult to participate in development initiatives because of their advanced age and home confinement. Aged men and women, however, have indigenous knowledge important for adapting to climate change owing to their experience in natural resources management and agriculture. This knowledge includes rainfall predictions using behaviours of certain animals, birds, tree and plant species as well as coping strategies.

Various strategies are being used to address the effects of climate change in Zimbabwe. These include afforestation projects, conservation agriculture, and the expansion of small grain production as well as rearing of small livestock. Conservation agriculture has been criticized for being too labour intensive for vulnerable groups especially women, the sick, the elderly and the disabled. Small grain and small livestock production as well as afforestation projects have all targeted women, but without the necessary supporting technology. This has increased the burden on women.

Strategies

a) Mainstream climate change in policies for the vulnerable groups with their active participation at every level.

b) Strengthen the adaptive capacity of the vulnerable groups.

c) Enhance provision of early warning systems on droughts, floods and disease outbreaks to vulnerable groups and ensure a coordinated approach in providing them with emergency services.

3.3.7. Children and Youth

Zimbabwe has a young growing population. According to the 2011 Child Labour Survey Report, there are about 5.8 million children below 18 years representing 48.8 per cent of the total population. Youth are defined as persons between 15 and 35 years of age and according to the 2012 National Census there are about 4.7 million youth in Zimbabwe. Children and youth are at increased risk from disease, under-nutrition, water scarcity, disasters and the collapse of public services and infrastructure that will be exacerbated by climate change.

Most children in Zimbabwe, 73.5 per cent, live in rural areas, and are directly affected by low food crop production and food insecurity which are exacerbated by more frequent droughts, flooding and unreliable rainfall patterns.

Children are often most vulnerable to adverse health effects from environmental hazards because they are not fully developed physically and psychologically. Preventable and treatable diseases such as diarrhoea and malaria are predicted to worsen with climate change. Water availability is predicted to reduce with climate change. Access to clean safe water is crucial for good health and development of children.

Unsafe drinking water exposes them to the risk of contracting water borne diseases. Another adverse effect of water shortages is that as streams and water sources dry up, children will have to travel further to collect water.

Children may also face other growing difficulties such as lapses in education and insecurity caused by climate-induced behavioural changes and livelihood choices of parents and other family members, which may result in displacement, conflict, neglect and abandonment. Children may have to cope with higher levels of pressures which keep them out of school and force them into work too soon.

The effects of climate change will be particularly hard on young people because they lack supportive financial and natural capital to fall back on. Their condition has been worsened by the effects of HIV and AIDS which has created child-headed households which are vulnerable to all shocks including climate change.

Zimbabwe has sound policy frameworks that provide for the protection and rights of children and youth. However, these existing policies do not sufficiently recognize or address children and youth's issues and unique vulnerabilities in relation to the impacts of climate change. There is need to mainstream children's issues and the various risks that climate change poses for children and to put children at the forefront of national climate change adaptation policies and programmes. Similarly, the policies and plans fail to draw on the practical knowledge, insights and capacity for meaningful change that children can and do offer, most notably at sub-national and community levels. The views of young people are particularly important to ensure that adaptation approaches take account of the needs of different children and different stages of child development.

Children exhibit relatively high levels of awareness and concern about climate change which affects their visions of and anxieties about the future. Children have a major stake in the future and have the right and responsibility to participate in decisions that affect them, and to take adaptive action on climate change. Therefore, children and youth should be actors in the climate change agenda, rather than being treated as passive observers or victims. Children should learn about climate change issues in a way that does not make them feel threatened, but rather, that addressing it is something they can be part of.

Inclusion of children and youth in climate change adaptations and mitigations is not just about consulting them or asking their views. It means giving them access to information that they need to comprehensively understand the dynamics of climate change and its impact on their rights, opportunities and responsibilities. It means encouraging them to use that knowledge in creative and innovative ways to safe guard their future, to design and implement their own actions with the support they need, and to take part in interventions initiated by adults.

Children and young people have the energy and enthusiasm which climate change response strategies can capitalize on. Through fostering the spirit of voluntarism embraced by the National Youth Policy and building on their enthusiasm, young people and children can be a resource in climate change mitigation and adaptation activities.

Strategies

a) Understand the impacts of climate change on children and youth in Zimbabwe and create an enabling environment that prevents harm to them emanating from pressures of these impacts.

b) Ensure the inclusion of children and youth in the policy formulation process for climate change, and in adaptation and mitigation activities.

Section 4

Strategy Enablers

4.1 Capacity Building

4.1.1. Capacity Building for Climate Change

Capacity development and technology transfer are some of the most important requirements to the overall response to climate change impacts. Capacity development is required at community, district, provincial, national and regional levels and across all sectors. However, inadequate resources are often devoted to capacity development initiatives in Zimbabwe limiting the country's adaptive and mitigative capacity. There is therefore need to develop capacity to appropriately respond to climate change.

Capacity-building should focus on long term planning of adaptation and mitigation actions. Its implementation requires cooperation across all scales from national, regional to international levels. There is need for capacity building in forecasting and in development and use of climate models. There is also need for training in different disciplines including climate related research and development of sustainable spatial decision support systems. Linkages among research institutions nationally, regionally and internationally are required to tap into technologies and to increase their uptake. Exchange programmes should be encouraged to allow transfer of best practices and adoption of best methodologies.

It is important to establish public-private-community-partnerships with a special focus on facilitating capacity development in climate change, disaster risk management and socio-economic development.

Strategies

a) Build capacity to conduct comprehensive vulnerability assessments and develop appropriate response models.

b) Develop mechanisms to mainstream climate change adaptation and disaster risk management into development programmes.

4.1.2. The Role of the Meteorological Services in Climate Change

The Meteorological Services Department is mandated to provide up-to-date information on climate change issues in Zimbabwe. The responsibility also covers providing information on Zimbabwe's emissions of greenhouse gases (GHGs) and information on interventions required to react to the adverse impacts of climate change.

Zimbabwe is taking part in the Global Climate Observing Systems (GCOS) activities of the World Meteorology Organization (WMO) and is monitoring climate by maintaining a

systematic observation network. Meteorological and atmospheric observations in Zimbabwe cover two aspects of the GCOS; the Global Surface Observations (GSO) and the Global Upper Air Observations (GUAO). The Meteorological Service Department Observation Network comprises of 64 stations operating as a basic synoptic network. All stations provide surface data while 14 of the stations have been equipped to provide surface and upper air data and participate in GCOS activities. Dissemination of data, products and services to regional and international data centres for WMO is done through the Global Telecommunication System (GTS). The Department heavily relies on Global Circulation Models for weather prediction and forecast verification.

The Meteorological Services Department hosts data from 1890 which is relevant for detecting climatic trends and risks. It is also a source of downscaled future climatic data. However, most of the equipment at the Meteorological Service Department is old and now costly to maintain. The shortage of and lack of spare parts to repair faulty equipment gravely affects operations of the Department. The constant breakdown of equipment often results in research being carried out using a course resolution and creates gaps in datasets. The department has also suffered a major brain drain.

The role of the Meteorological Services Department in disaster risk management and climate change response should not be underestimated. Its strengthening should therefore be a top priority for climate change adaptation. The Department should be an effective and reliable institution with capacities to monitor, detect, forecast and give early warnings about disasters such as floods, droughts and emerging threats. It should also have capacity to carry out climatological analyses of atmospheric hazards, forensic analyses and assessments of vulnerabilities of critical infrastructure.

Strategies

a) Strengthen the capacity of the National Meteorological and Hydrological Services to carry out research on climate change through improved data collection and management, and climate modelling.

b) Strengthen the documentation of and tapping into indigenous knowledge systems to complement scientific knowledge for climate change forecasting and early warning systems.

c) Establish an enabling framework for sharing and disseminating information on climate change (i.e. at provincial, district and ward levels) in the country.

4.1.3. Technology transfer

The increased emmision of GHGs by human activity has significantly distabilized energy balances resulting in the general shift in global climatic conditions. Technological processes in industry are responsible for these emmisions as these have focused mainly on boosting economic development with very little consideration of the long term negative impacts on the climate. Technological advancements in some parts of the world have resulted in the development of more efficient technologies with reduced impacts to the climate. Therefore efforts towards adoption of more efficient technologies are required as without technology transfers, “it may be difficult to achieve emission reduction at a significant scale” (IPCC, 2007).

Technology transfer is a key component in climate change response strategies as there is need for a serious shift in technological processes currently being applied. It requires a serious policy shift on the part of governments; education and awareness of communities and significant financial investments. Zimbabwe is a signatory of the Climate Change Convention and, hence, is bound to "take steps to promote, facilitate, and finance environmentally sound technologies and know-how". Such efforts should not be restricted to high technological applications only, as local communities will also need to shift to more climate change resilient techniques.

It is necessary to first identify critical sectors whose activities contribute most to emissions at local, national and regional scales. Appropriate interventions would then be identified together with implementation mechanisms. It is also important to identify alternative technological approaches that can be adopted at various levels of society to enable communities to cope with the challenge of climate change and to assess the cost benefits of adopting such technologies. These activities would require attention as part of Zimbabwe's contribution towards mitigating global climate change.

Zimbabwe carried out a technological transfer needs assessment in 2008 to identify and prioritize the climate change initiatives it should undertake including areas of focus; capacity needs; technology transfer needs; barriers to accessing technologies and opportunities of accessing funds to undertake mitigation and adaptation activities.

The energy sector contributes most to climate change (See Section 3.3.1.) as energy drives the economy through industrial and commercial activities. Use of fuel wood for domestic energy provision in rural areas and poor urban areas has also caused depletion of forest cover. Technological improvement in the energy sector will result in significant benefits in addressing climate change. Other sectors of the national economy such as agriculture, rural and urban development and mining also need to adopt more efficient technologies to enable the nation to cope with climate change.

Strategies

a) Create a policy framework that will improve access to and promote uptake of cleaner and more efficient technologies across all economic sectors.

b) Support research and development of technologies in all relevant sectors to mitigate and adapt to climate change.

4.2 Climate Change Education, Communication and Public Awareness

The countries that are parties to the UNFCCC have accepted certain responsibilities contained in Article 6 of the Convention which include implementing education, awareness and training on climate change at the national and sub-national levels. At the international level, each member of the Conference of Parties is supposed to cooperate and promote the development and exchange of educational and public awareness materials on climate change and its effects. It is also tasked with the development and implementation of educational and training programmes including the strengthening of national institutions and the exchange or secondment of personnel to train experts in climate change.

Zimbabwe has started participating in UNFCCC Article 6 activities. This is seen by its inclusion of a chapter on climate change education, training and public awareness in its National Second Communication to the UNFCCC. Several workshops were organized, especially between 2009 and 2012, aimed at addressing the issue of education, awareness and training. To further, these activities, Government has tasked the Ministry of Environment, Water and Climate with overseeing most of the activities related to climate change including the coordination of education, awareness and training. This National Response Strategy is therefore an important step in fulfilling the aims and objectives of Article 6 of the UNFCCC.

4.2.1. Climate Change Education and Training

Education is a powerful vehicle for imparting new ideas, especially to young people. The aim of using education to carry the climate change messages is to create a new generation of youth whose behaviour will be climate change compliant. As stated in Section 1.2, Zimbabwe has almost achieved universal primary education in line with Millennium Development Goal 2. Its network of schools is so extensive that most young persons can be reached through the formal education system. Thus, all school going children at primary level could receive climate change education to create the sustainable behavioural change needed to adapt to and to mitigate climate change.

There has been a general view that the content of the curricula used in both primary and secondary schools does not adequately address climate change. This is because climate change has been taught as a small component of the curriculum in such subjects as Social Studies, Environmental Studies and Agriculture at Primary Level; and Geography, Agriculture and Civic Education at Secondary Level.

In response to this deficiency the Ministry of Environment, Water and Climate has engaged the Ministry of Primary and Secondary Education to develop new curricula and materials for primary and secondary schools that strengthen existing teaching materials on climate change. It is expected that when fully developed, the materials in the new curricula can be used from the early childhood development level up to 'A'-Level.

So far a new Early Childhood Development syllabus has been developed and started to be implemented in 2014. Climate change issues, such as weather are included under the mathematics and science and social sciences sections. At Primary Level a new Agriculture syllabus taught from Grade 4 to 7 has been developed that includes climate change issues. The syllabus began being implemented in 2014. The Environmental Science syllabus that is taught at Grades 6 and 7 also includes some climate change issues.

Syllabi at secondary level still need to be reviewed and revised to make climate change issues more explicit. Even in those syllabi where climate change has been incorporated there is still more to be done especially on adaptation issues and local impacts of climate change. Once all the new curricula are in place, they should be consistently monitored, evaluated and updated to keep up with global trends.

The tertiary education sector is made up of teacher training colleges, agricultural training colleges, polytechnic colleges and universities. Currently, the teacher training colleges cover

climate change issues as part of the carrier subjects which their graduates then teach at primary and secondary schools. As a result, the same weaknesses pointed out under primary and secondary school curricula also apply to the teacher training colleges in that the course content on climate change is not broad enough and will need enhancement. The colleges will need to review the content of the carrier subjects such as Geography, Environmental Science, Physics and Civil Education and integrate climate change. The syllabus for agricultural colleges will also need to be reviewed.

There will be need for in-service training for those teachers already produced by these colleges so that their foundation on climate change issues can be strengthened. This also applies to national extension officers (e.g. Agricultural Extension, Environmental Management Agency), agro-service providers, and Civil Society Organizations personnel to enable them to implement action plans for climate change adaptation with communities.

Regarding universities, each university has its own policy on what subjects to offer. Climate change is taught as part of Geography and Environmental Studies or of Atmospheric Studies that include Meteorology and Climatology or is mainstreamed into other courses in the disciplines of Crop, Animal, Soil Sciences and Agricultural Economics at most Zimbabwean universities. Thus a situational analysis of what aspects of climate change are included in these curricula should be carried out as a starting point.

Currently there are no fora for informal teaching of climate change issues. The out-of-school youths and vulnerable groups such as women, children and the disabled are not being reached by the formal climate change education. There is need to develop educational materials and to create fora where the material is delivered to these groups. The materials should be based on indigenous knowledge infused with technical information and should be translated into as many local languages as possible. They should be delivered using different modes of communication including drama, road shows and mass media.

Strategies

a) Enhance the teaching and learning of climate change at all levels of education (formal and informal).

b) Provide relevant training on climate change issues for educators and practitioners working with communities.

4.2.2. Public Awareness-raising and Communication

The Zimbabwean public is aware of climate change and the need to adapt to it. There is need to turn this awareness and to translate it into action. The central pillar of raising public awareness should be measured by behavioural change.

There is a need to develop climate change communication strategies based on or around the following themes: the public's understanding of and knowledge about climate change and its perceived causes; access to climate change information; the ability to develop and use local indicators to predict climate change as well as current and projected coping strategies and adaptation measures to climate change.

Several communication strategies need to be used to raise public awareness on climate change. These include use of posters and

pamphlets written in simple language that the public can understand and relate to. Use of drama on both radio and television as well as in road shows should be encouraged.

Prominent public figures in both government and the private sector should also be used at every opportunity to address the climate change issues. This should include role models for the youth as well as musicians. This way the climate change messages will reach a wide and varied audience. Traditional and community opinion leaders should be used in promoting climate change messages especially on issues of mitigation and adaptation. Churches should be brought on board as part of the communication strategy for raising public awareness on climate change.

Programmes targeted at out-of-school youths also need to be developed. Other vulnerable groups such as people with disabilities need to be engaged through their representative associations. In all these actions sight must not be lost of existing indigenous knowledge systems. These should be incorporated as much as possible when raising public awareness.

Strategies

a) Implement a communication strategy for raising awareness on climate change.

b) Promote and strengthen stakeholder awareness on adaptation to and mitigation of climate change.

c) Encourage sharing of information and networking on climate change issues at local, regional and international levels.

d) Communicate climate change messages incorporating indigenous knowledge systems.

Section 5

Climate Change Governance

5.1 Climate Change Governance and Institutional Framework

Climate change is an issue that has impacts at global, regional, national and local levels (see Section 2). Therefore its governance should be considered and mainstreamed at national, provincial, district and community levels in both urban and rural settings. There are several institutions that have different mandates that may directly or indirectly impact on climate governance. In addition, there are sectoral laws and policies that inform the climate change governance but they are not coordinated and at times are in conflict.

5.1.1. Climate Change Governance

Climate change has created urgency in the promotion of good governance at national level especially in the context of adaptation and development. Its governance is informed by the principles of decentralization and autonomy; accountability and transparency; responsiveness and flexibility; and participation and inclusion. It is important to include communities in decision making as they are most vulnerable to climate shocks and extreme weather events and should be involved in monitoring and evaluation of both climate change and any interventions to mitigate or adapt to climate change.

At the heart of climate change governance are also issues of equity, human rights, gender and poverty reduction. Effective climate change governance takes into account risks and opportunities that are offered by climate change. There is however, need for a shift in approach when dealing with climate change because although it is addressed in international and regional agreements it is both an environmental and development issue. Parties to the UNFCCC are required to promote and cooperate in scientific, technological, technical and socio-economic research on climate change.

Climate change issues should generally be mainstreamed into all sectors; however, in Zimbabwe, they have not yet been mainstreamed into sectors that include land-use planning, agriculture, natural resource management, industry, energy and transport. Thus, there is generally a limited supportive environment to respond to climate change issues at national level.

Climate change issues provide an opportunity for the Government, local authorities, UN agencies and development partners, civil society organizations and communities to work together. Currently there is limited coordination among these stakeholders.

Local authorities (urban and rural) are best positioned to implement disaster risk management and to mainstream climate change adaptation. This includes increasing the abilities of communities to cope with consequences of extreme weather conditions such as flooding, storms, droughts, heat waves and cold spells. Local authorities are also supposed to enforce by-laws on siting, design, quality and building standards which are climate proofed (See Section 3.3.3).

Urban local authorities with the support of relevant institutions should collect data on GHG emissions and the ambient concentration of air pollutants in areas under their jurisdiction. However, they do not have infrastructure and equipment to monitor the level of these pollutants. This means the required data is not being captured. Additionally, urban local authorities do not have the capacity to provide infrastructure and services; for land-use management and for enforcing building by-laws and approved standards, and in land subdivisions. This results in poor delivery of services such as sanitation and drainage systems; adequate clean and safe water and solid waste collection. There is also limited access to health, education and emergency services.

Rural District Councils have limited capacity to reduce exposure and to cope with consequences of extreme weather conditions such as flooding, storms, droughts, heat waves and cold spells and their impacts on local communities.

Strategies

a) Mainstream climate change into urban and rural planning, infrastructure, investments and service delivery.

5.1.2. Climate Change Institutional Framework

Climate change adaptation is intricately linked with disaster risk management. Currently Disaster Risk Management and Rural and Urban Councils fall under the Ministry responsible for Local Government, Public Works and National Housing, while climate change is the mandate of the Ministry of Environment, Water and Climate. However, they could both use the same platforms and coordination mechanisms. For example, the Department of Civil Protection (Disaster Risk Management) has decentralized arrangements for coordinating National, Provincial, and Community-Level Disaster Risk Management Initiatives. These structural arrangements could be more beneficial to all stakeholders if they were also used by the climate change governance institutions.

The Office of the President and Cabinet is promoting the mainstreaming of climate change through the implementation of the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim Asset) economic blueprint while the Ministry of Finance is responsible for national budgets.

There is need to instutionalize climate change into strategies, actions and budgets of climate sensitive sectors such as agriculture, forestry, water, environmental management, fisheries, settlements, infrastructure, health and food security.

Strategies

a) Institutionalize the climate change response governance framework at national, provincial, district and ward levels.

5.2 Climate Change Policy and Legal Framework

Zimbabwe ratified the UNFCCC but has no standalone climate change policy and legislation. It has also ratified multilateral environmental agreements such as the Convention on the Conservation of Biological Diversity and United Nations Convention to Combat Desertification (UNCCD) in Africa. At the regional level, the SADC has developed the Climate Change Adaptation Strategy for the Water Sector. An addendum to the SADC Protocol on Gender and Development is being negotiated to take into consideration climate change and its gendered impacts. The legal instruments are supposed to be aligned with national laws and policies.

Climate change issues are covered by various uncoordinated sectoral policies, strategies and action plans. These policies include the National Policy and Programme on Drought Mitigation; the Draft Disaster Risk Management Policy and Strategy; the Second Science, Technology and Innovation Policy 2012; the Water Policy, the Agriculture Marketing and Pricing Policy and the Small, Micro and Medium Enterprises Policy.

The ZIM Asset 2013-2018 recognises that the agro-economy in Zimbabwe is being affected by climate change and has identified a Climate Change Policy as a cluster output for the key result areas on policy and legislation and environmental management. There is need for Zimbabwe to be prepared for climate change through adopting a policy framework that is aligned to international and regional agreements and informed by local scenarios.

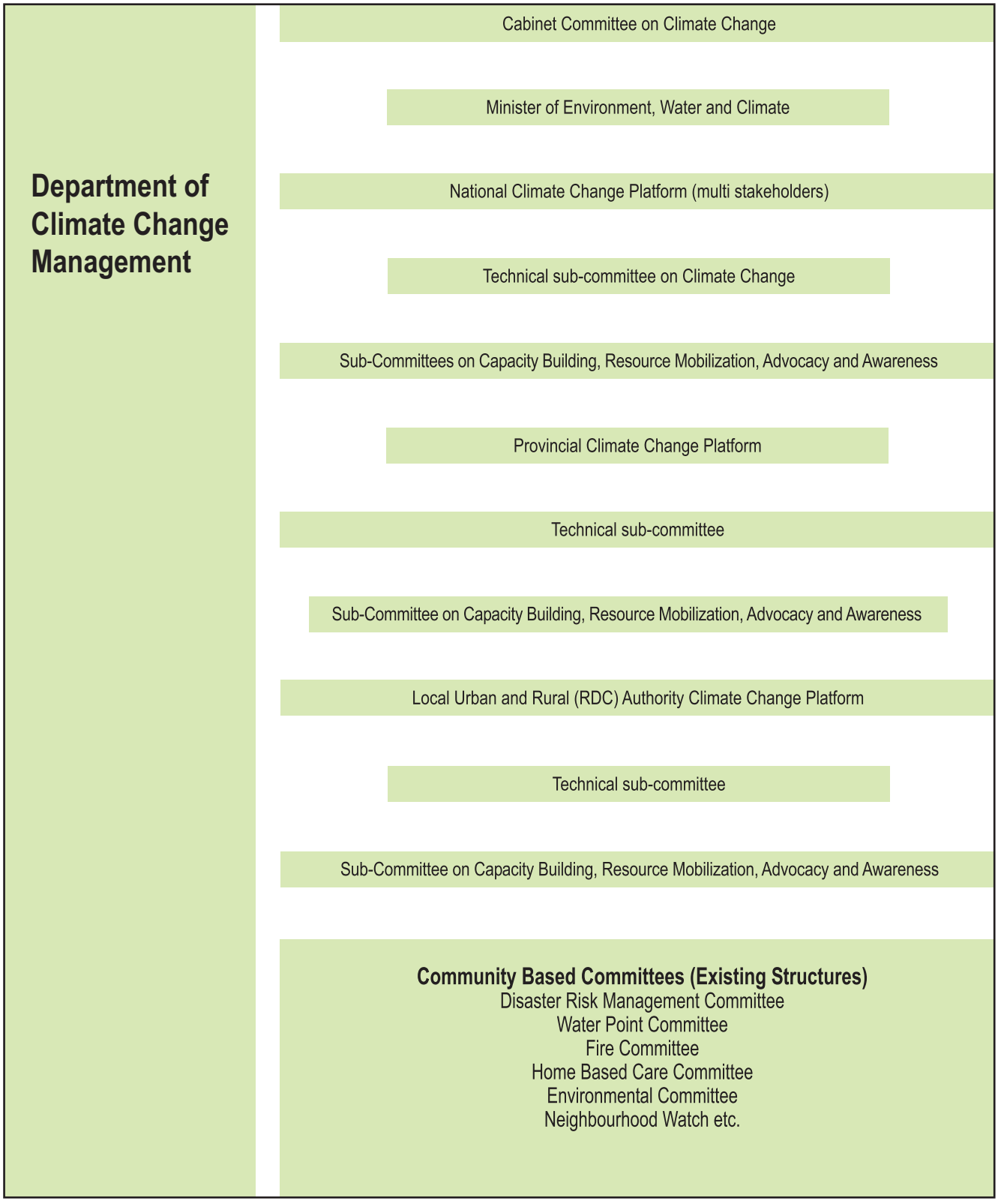
Strategies

a) Enact an enabling policy environment for climate change response.

5.3 Framework for Climate Governance

The Framework for climate change governance is given in Figure 15.

Figure 15: Proposed Climate Change Governance Framework



Section 6

Action Plan, Implementation Framework and Resource Mobilization

6.1 Action Plan

Action Plans for the strategies that include: actions, indicative time frame, lead agency, cooperating agencies, potential sources for resource mobilization and estimated costs are given in Annex 1. These were generated by stakeholders during several consultative workshops with representatives of government ministries; private sector; academia; research institutions; vulnerable groups and civil society. A summary of the estimated costs is given in Table 6.1 and amounts to almost 10 billion United States dollars. The Actions will be implemented over 10 years.

6.2 Resource Mobilization

Climate finance has been a key topic in international climate negotiations especially under the UNFCCC, resulting in a significant commitment by developed countries to increase the flow of climate finance to developing countries to US$100 billion per year by 2020. The major aim of climate financing is to advance action on low-carbon, climate-resilient development.

Significant financial resources will need to be allocated by the Zimbabwe Government treasury and contributed by the private sector as well as be mobilized from international climate funds; bilateral donor and international agencies; carbon markets; foreign direct investment and loans from international, regional and local banks to implement the Action Plans proposed in this National Climate Change Response Strategy.

The most important multilateral sources of climate financing at the international level are the World Bank's carbon funds, the Global Environment Facility (GEF), the African Development Bank (AfDB), African Sustainable Forestry Fund, the UNFCCC's Adaptation Fund, and the Kyoto Protocol's Clean Development Mechanism. The Green Climate Fund, which is a financial mechanism of the UNFCCC, is expected to be a major source of climate finance as it will support projects, programmes, policies and other activities in developing country Parties.

Unfortunately, Zimbabwe has not been able to take full advantage of these funds in the past, due to several reasons that include lack of capacity and lack of accredited financial institutions. For example by June 2013, 10 SADC countries had in total received US$964.19 million from these climate funds but Zimbabwe's share of the funds was only 0.7 per cent. It has received modest funding from, for example, multilateral organizations (such as UNDP, UNICEF, UNEP; GEF; GEF Small Grants Programme and FAO); international organizations (such as the Global Water Partnership); regional organizations (e.g.

Table 6.1. Summary of estimated costs to implement the Action Plans for Zimbabwe's Climate Change Response Strategy.

No	Sector	Amount USD (million)
1.	Air Pollution	134
2.	Water Resources	3,158
3.	Land Use and Land Use Change	91
4.	Biodiversity	74
5.	Agriculture	2,386
6.	Industry and Commerce	528
7.	Mining	312
8.	Tourism	252
9.	Energy	262
10.	Transport	1,071
11.	Disaster Risk Management and Human Settlements	519
12.	Waste Management	231
13.	Health	52
14.	Gender; People Living With HIV and AIDS and other Vulnerable groups	25
15.	Children and Youth	32
16.	Capacity Building	45
17.	Role of Meteorological Services	23
18.	Technology Transfer	574
19.	Climate Change Education	15
20.	Public Awareness	15
21.	Climate Change Governance	88
	Overall Total	**9,887**

COMESA); private organizations (such as the Evangelischer Entwicklungsdienst); and research funding organizations (e.g. IDRC and DFID). However, most of the climate finance has come from the Government Treasury through the public sector investment programme.

Another international funding programme that can provide significant climate financing is the UN Sustainable Energy for All that aims to attain universal access to energy for all by 2030. This is a window which Zimbabwe can utilize since the government has already endorsed the process.

Private sector carbon funding is also potentially a major source of climate financing which has not been fully developed in Zimbabwe. There is need for government to put in place polices and incentive mechanisms for attracting private sector participation in carbon financing.

The recent advances in the development of the reduced emissions from deforestation and forest degradation (REDD+) mechanism provides opportunities for Zimbabwe to mobilize financial resources for sustainable forest management and conservation of its tree and forest resources. The country has the potential to set aside over 14 million hectares of forests for REDD+. The pilot Kariba REDD project currently covers over 700,000 hectares with more than 50 million Certified Emission Reduction units. The country needs to develop the appropriate institutional framework to be able to take advantage of these opportunities.

Foundations such as the World Wildlife Fund, Peace Parks Foundation, IUCN, Kellogg Foundation, Ford Foundation, Frankfurt Zoological Society, Bill and Melinda Gates Foundation are the larger among many foundations that support Sustainable Forest Management in the region.

Thus there are sectors that are likely to be affected by climate change and some where opportunities for low carbon development may present themselves. Each sector will therefore have specific and particular needs and will need to develop climate change related projects. There will be need for capacity building and establishment of sector-by- sector guidance to enable them to develop viable projects that can attract finance from a diversity of sources. There will also be need to build capacity to consider Zimbabwe's options for raising the climate finance necessary for realizing proposed actions to respond to climate change and to turn ideas into actions on the ground.

There are CDM mitigation opportunities in energy, manufacturing, mining, agriculture, waste management and transport which Zimbabwe has not yet taken up. Zimbabwe needs to establish a designated national authority (DNA), an organization granted responsibility by a UNFCCC Party to authorize and approve participation in CDM projects. This could be assigned to the Department of Climate Change Management. The main task of the DNA is to assess potential CDM projects to determine whether they will assist Zimbabwe in achieving its sustainable development goals and to provide a letter of approval to project participants in CDM projects. Zimbabwe will need to develop a practical CDM Implementation Strategy including human and technical requirements.

The government has provided for the establishment of an Environment Fund under the Environmental Management Act [Chapter 20:27] that is supposed to be capitalized through budgetary allocations, environmental levies, carbon tax and donations. The fund is expected to provide support through grants and loans to local authorities; climate change adaptation and mitigation activities; environmental extension;

research, training and technology transfer; rehabilitation of degraded areas and environmental awareness programmes. Although the fund is not yet fully operational, it provides a legal institutional framework for mobilizing climate finance for the country.

The Ministry of Environment, Water and Climate will need to be accredited to be able to access the global Adaptation Fund. Such accreditation requires the Ministry to meet fiduciary standards for accurate and regular recording of transaction and balances; efficient management and disbursement of funds in a timely manner and forward looking plans and budgets. Thus there will be need to strengthen the fiduciary management capacity for climate finance more broadly at sub-national level, including budgeting, accounting, internal controls, fund flow, financial reporting and external audits.

In addition the country also has other funds that contribute to climate financing. These include the Water Fund, the Rural Electrification Fund and the Zimbabwe Energy Fund, a multi donor trust fund set up initially to support development of energy infrastructure in Zimbabwe, but is being expanded to include energy access for the poor.

6.3 Monitoring and Evaluation

Monitoring and evaluation of the Climate Change Response Strategy is essential to:

- check if the implementation is proceeding as planned;
- assess the impacts of implementing the Response Strategy in the short, medium and long term and to determine whether the actions are contributing to the objectives of the Strategy;
- if necessary to redirect actions to new situations that have arisen during implementation;
- ensure visibility of technical and financial contributions to climate change;
- ensure that when tackling adaptation and climate risk management priority actions are implemented; and
- take account of emerging issues, challenges and trends as well as results of global negotiations under the UNFCCC.

Monitoring will need to be done through periodic reports by the Department of Climate Change Management in the Ministry responsible for Environment, Water and Climate. Each line Ministry could also put in place a monitoring and evaluation system that tracks climate change projects. These could input into the Department of Climate Change Management's report. ZIMSTAT could also play a role as a source of information contributing to socio-economic analysis and as a potential central repository of climate information in Zimbabwe.

There will be need to establish a Technical Monitoring Committee to follow up the implementation of the Strategy. Zimbabwe's Climate Change Response Strategy's progress should be reviewed after every 5 years.

There will be need for research to inform policy and action. The Technical Monitoring Committee could set the research agenda and ensure that the research findings inform decision making and reach extension agents including civil society organizations.

Annex 1

Action Plans for the Climate Change Response Strategies

1. NATURAL SYSTEMS

1.1 Climate Change Issues Associated with Air Pollution

ASPECT	CLIMATE CHANGE ISSUES ASSOCIATED WITH AIR POLLUTION					
THEME	Air Pollution					
STRATEGY	a) Carry out an assessment to determine the main sources and levels of short-lived climate pollutants in Zimbabwe.					
ACTIONS	Action	[2]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Carry out an assessment to determine the main sources and levels of short-lived climate pollutants in Zimbabwe and determine measures that could be successfully implemented.	Short term	MEWC	MIC, MHTESTD; Academic Institutions; MMMD; Private Sector; Local Authorities	Government Treasury; UNEP; Development Partners	USD 1 million

[2] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.1 Climate Change Issues Associated with Air Pollution

ASPECT	CLIMATE CHANGE ISSUES ASSOCIATED WITH AIR POLLUTION					
THEME	Air Pollution					
STRATEGY	b) Introduce measures to control and capture short-lived climate pollutants.					
ACTIONS	Action	[3]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Formulate nationally appropriate greenhouse gas emission reduction targets.	Short term	MEWC	MEPD; MIC; Local Authorities	Government Treasury; Global Climate Funds	USD 100,000
B2	Introduce extended pre-mine degasification, recovery and oxidation of methane from ventilation air from coal mines.	Short to medium term	MMMD	MEPD; Chamber of Mines; MEWC; EMA	Carbon off setting projects; GEF; Global Climate Funds; CCAC; Corporate Social Responsibility Programmes	USD10 million
B3	Capture and generate energy from methane associated with waste management.	Short term to long term	Local Authorities; EMA	MEPD; Urban Residents; Private Sector; CBOs; CSOs	Tax on waste; Carbon off setting projects; GEF; Global Climate Funds; CCAC; Corporate Social Responsibility Programmes; CSOs	USD100 million
B4	Control methane emissions from livestock mainly through on-farm anaerobic digestion of manure from cattle and pigs.	Medium term	MEPD; MAMID	MEWC	Farmers; GEF; CCAC; UNDP	USD 2.5 million

[3] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.1 Climate Change Issues Associated with Air Pollution

ASPECT	CLIMATE CHANGE ISSUES ASSOCIATED WITH AIR POLLUTION					
THEME	Air Pollution					
STRATEGY	c) Promote use of cleaner technologies.					
ACTIONS	Action	[4]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Scale up use of efficient-burning biomass stoves that use modern fuels such as liquefied petroleum gas for residential cooking and domestic heating.	Short to medium term	Private Sector	MEPD; EMA; MLGPWNH	Social Corporate Responsibility; UN Development Partners; CCAC; CSOs	USD 5 million
C2	Introduce diesel particulate filters for vehicles and eliminate high-emitting vehicles from roads.	Short to long term	MTID	MLGPWNH, Private Sector, Transport Associations, EMA	Vehicle Owners; Private Sector	USD 2 million
C3	Replace traditional brick kilns with vertical shaft kilns to reduce black carbon emissions.	Medium term	EMA	MLGPWNH, Traditional Leaders	Private Sector; Communities; CCAC	USD 10 million (revolving fund)

[4] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.1 Climate Change Issues Associated with Air Pollution

ASPECT	CLIMATE CHANGE ISSUES ASSOCIATED WITH AIR POLLUTION					
THEME	**Air Pollution**					
STRATEGY	**d) Develop and implement policies and regulatory frameworks that restrict release of short-lived climate pollutants.**					
ACTIONS	**Action**	**[5]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
D1	Ban open-burning of municipal solid waste and field burning of agricultural waste.	Short to medium term	Local Authorities and EMA	MLGPWNH; MHCC	Government Treasury	USD 1 million
D2	Strengthen the enforcement of the Fire Management Strategy.	Short term	EMA	Zimparks; Forestry Commission; Local Authorities; Traditional leaders; AGRITEX; CSOs; ZRP; farmers	Government Treasury	USD 2 million
D3	Consider joining organizations that aim to reduce short-lived climate pollutants such as the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants.	Short to long term	MEWC	MFA	UNEP	USD 100 000

[5] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

Water Resources Availability Issues

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	Water Resources Availability					
STRATEGY	a) Strengthen and intensify monitoring networks for hydro-meteorological parameters.					
ACTIONS	Action	[6]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Establish and maintain hydro- meteorological stations consistent with World Meteorological Organization recommendations.	Medium-long term	MEWC (ZINWA and Meteorological Services Department)	Catchment Councils; Sub-catchment Councils; Transboundary River Basin Organizations; SADC	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 5 million
A2	Rehabilitate and maintain dysfunctional hydro-meteorology stations.	Short to medium term	MEWC (ZINWA and Meteorological Services Department)	Catchment Councils; Sub-catchment Councils; Transboundary River Basin Organizations; SADC	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 7.5 million
A3	Rehabilitate and maintain groundwater monitoring stations.	Short to medium term	MEWC (ZINWA)	DDF; Catchment Councils; Sub-catchment Councils; EMA	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 10 million

[6] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	**Water Resources Availability**					
STRATEGY	**b) Conduct more frequent yield assessments of surface and groundwater resources.**					
ACTIONS	**Action**	**[7]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Build capacity (equipment, human resources and information) for carrying out yield assessments of water resources.	Short to long term	MEWC (ZINWA)	DDF; Catchment Councils; Sub-catchment Councils; Local Authorities; EMA	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 1 million
B2	Conduct silt surveys of dams and sediment investigations.	Short to long term	MEWC (ZINWA)	DDF; Catchment Councils; Sub-catchment Councils; Local Authorities; EMA	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 5 million
B3	Conduct comprehensive yield assessments of surface and groundwater sources.	Medium to long term	MEWC (ZINWA)	DDF; Catchment Councils; Sub-catchment Councils; Local Authorities; EMA	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds	USD 5 million

[7] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	**Water Resources Availability**					
STRATEGY	**c) Promote water use efficiency in all sectors.**					
ACTIONS	**Action**	**[8]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
C1	Invest in modern and efficient water use and distribution technologies.	Medium to long term	MEWC (ZINWA)	MAMID, Local Authorities; MIC; MF; Sector representatives; EMA; Catchment Councils and Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions	USD 50 million
C2	Conduct education and awareness campaigns on benefits of more efficient approaches to water use, including reusing water.	Short term	MEWC (ZINWA, EMA)	MAMID; MPSE, MHCC, MF; MIC; MYIEE; MWAGCD; Catchment Councils; Sub-catchment Councils; Local Authorities; Sector representatives	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions	USD 2.5 million

[8] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

Water Development Issues

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	Water Development Issues					
STRATEGY	a) Develop, rehabilitate, maintain and protect surface and groundwater resources.					
ACTIONS	**Action**	**[9]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
A1	Rehabilitate existing storage and distribution infrastructure.	Short term to long term	MEWC (ZINWA)	Local Authorities; DDF; MF; Developmental Partners; Catchment Councils; Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions	USD 1 billion
A2	Complete dams under construction and develop groundwater sources.	Short to long term	MEWC (ZINWA)	Local Authorities; DDF; MF; Developmental Partners; Catchment Councils; Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions; Private Sector; PPPs	**Surface water** USD 1 billion **Ground water** USD 250 million
A3	Construct inter-catchment transfer infrastructure.	Medium to long term	MEWC (ZINWA)	Local Authorities; DDF; MF; Developmental Partners; Catchment Councils; Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions; Private Sector; PPPs	USD 500 million
A4	Revive the policy of one medium dam per Province per year.	Short-term	MEWC (ZINWA)	Local Authorities; MF; Developmental Partners; Catchment Councils and Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions; Private Sector; PPPs	USD 5 million

[9] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	Water Development Issues					
STRATEGY	b) Invest in management of effects of extreme events.					
ACTIONS	Action	[10]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Revisit engineering guidelines on optimum designs in light of anticipated increase in extreme events.	Short to medium term	MEWC (ZINWA)	Meteorological Services Department; Zimbabwe Institution of Engineers; Engineering Council of Zimbabwe; MIC; MF; SADC; Catchment Councils and Sub-catchment Councils	Government Treasury	USD 250,000
B2	Construct flood control structures such as dams, dykes, culverts etc.	Medium to long term	MEWC (ZINWA)	Meteorological Services Department; Zimbabwe Institution of Engineers, Engineering Council of Zimbabwe; MF; MTID; DDF SADC; Catchment Councils and Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions; Private Sector; PPPs	USD 250 million
B3	Raise awareness on extreme events.	Short term	MLGPWNH (Department of Civil Protection)	MEWC; MF; MTID; MHA; MD; Catchment Councils and Sub-catchment Councils; SADC	Government Treasury; International Cooperating Agencies; UN Agencies; SADC; Multi-Donor Funds; Local Financial Institutions	USD 2.5 million

[10] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

Water Management Issues

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	Water Management Issues					
STRATEGY	a) Strengthen stakeholder institutions in water resources management.					
ACTIONS	Action	[11]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Strengthen the Water National Action Committee and its subcommittees.	Short term	MEWC	Local authorities; MAMID; MF; MMMD; MEPD; MWAGCD; MHCC; MIC; SADC; WACDEP	Government Treasury; Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 1 million
A2	Strengthen Catchment and Sub-catchment Councils.	Short term	MEWC	WACDEP; Global Water Partnership Southern Africa; Zimbabwe Water Partnership	Government Treasury; Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 5 million

[11] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	**Water Management Issues**					
STRATEGY	**b) Promote more efficient water use practices.**					
ACTIONS	**Action**	**[12]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Promote water demand management.	Short to medium term	MEWC (ZINWA)	Catchment Councils; Sub-catchment Councils; Local Authorities; DDF; MAMID	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local financial Institutions	USD 1 million
B2	Promote rainwater harvesting.	Short to medium term	MEWC	ZINWA; Catchment Councils; Sub-catchment Councils; Local Authorities; MAMID	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 500,000
B3	Identify and support demonstration projects.	Short to medium term	MEWC (ZINWA)	Catchment Councils; Sub-catchment Councils; UNICEF; UNDP; WACDEP; Water and Power Cooperation	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 7 million

[12] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	**Water Management Issues**					
STRATEGY	**c) Promote catchment protection.**					
ACTIONS	**Action**	**[13]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
C1	Enforce existing legislation.	Ongoing	MEWC (EMA)	ZINWA; Catchment Councils; Sub-catchment Councils; Local Authorities; MAMID; MMMD; MHA	Government Treasury; International Cooperating Agencies,; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 100,000
C2	Implement catchment protection measures (e.g. silt traps, vertiver grass, contour ridges, sustainable tillage techniques).	Ongoing	MEWC (EMA)	Catchment Councils; Sub-catchment Councils; MAMID	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 20 million
C3	Discourage uncontrolled alluvial mining along rivers.	Ongoing	MEWC (EMA)	Local Authorities; MMMD; MHA, Catchment Councils; Sub-catchment Councils; ZINWA	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 3.5 million
C4	Control discharge of wastes and sediments into surface and groundwater systems.	Ongoing	MEWC (EMA)	Local Authorities; ZINWA; Catchment Councils; Sub-catchment Councils; MAMID; Private Sector; MIC	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 5 million

[13] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.2 Climate Change Issues for the Water Sector

ASPECT	CLIMATE CHANGE ISSUES FOR THE WATER SECTOR					
THEME	Water Management Issues					
STRATEGY	d) Adopt data analysis and prediction tools that incorporate climate change.					
ACTIONS	Action	[14]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
D1	Promote research on the impacts of climate change in the water sector.	Short to long term	MEWC (ZINWA, Meteorological Services Department)	Catchment Councils; Sub-catchment Councils; Research Institutions; River Basin Organisations; WACDEP; SADC; EMA;RCZ	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 10 million
D2	Promote research and advancement of appropriate tools to facilitate efficient water management.	Short to long term	MEWC (ZINWA, Meteorological Services Department)	Catchment Councils; Sub-catchment Councils; Research Institutions; River Basin Organisations; WACDEP; SADC; EMA; RCZ	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 10 million
D3	Set up mechanisms to incorporate Indigenous Knowledge Systems in prediction of climate change impacts.	Short to long term	MEWC (Meteorological Services Department)	Catchment Councils; Sub-catchment Councils; Research Institutions; River Basin Organisations; WACDEP; SADC; EMA	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 500,000
D4	Develop data sharing and information exchange strategies at all levels.	Short to long term	MEWC	ZINWA; Meteorological Services Department; EMA; Catchment Councils and Sub-catchment Councils	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; Local Financial Institutions	USD 500,000

[14] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Land-use and Land-use-change					
STRATEGY	a) Develop and enforce policies that regulate change from one land-use to another, especially clearance of forests and woodlands to other land-uses.					
ACTIONS	Action	[15]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Review and harmonise the existing laws and regulations on land-use.	Short term	MEWC	MLRR; MLGPWNH; MAMID; MJLPA; EMA; FC; Timber Producers Federation	Government Treasury; UNDP; FAO	USD 250,000
A2	Review national land-use categories to take in to account forestry as a viable land-use.	Short term	MLGPWNH	MAMID; MEWC; Universities	Government Treasury; UNDP; FAO	USD 150,000
A3	Develop and implement a land and land-use information management system to capture and monitor land-use changes.	Short term	MLGPWNH (Department of Surveyor General)	MAMID ; MEWC (Forestry Commission, EMA) Timber Producers Federation; MICTPCS, Universities	Government Treasury; World Bank; FAO; UNEP; World Bank; AfDB	USD 13 million
A4	Revise the Forest-based Land Reform Policy to incorporate climate change adaptation and mitigation strategies.	Short term	MEWC (EMA and FC)	MLRR; MLGPWNH (Rural District Councils); MJLPA; Timber Producers Federation	Government Treasury; UNDP; FAO	USD 150,000

[15] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

Adaptation Options in the Forestry Sector

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Adaptation Options in the Forestry Sector					
STRATEGY	a) Promote establishment of land-use plans at district, ward, village and farm management levels that clearly identify forestry as a recognized land-use.					
ACTIONS	Action	[16]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Design land-use plans that incorporate forestry.	Short term	MLRR	MLGPWNH; MAMID; Forestry Commission; EMA	Government Treasury; FAO; World Bank; AfDB; SADC	USD 2 million
A2	Create awareness among the stakeholders on the role of forests and woodlands in climate change adaptation and mitigation.	Short term	MEWC (Forestry Commission, Timber Producers Federation)	MAMID; MPSE; MICTPCS; MMIBS; EMA;CSOs	Government Treasury; UNICEF; Carbon off setting projects; GEF; Global Climate Funds	USD 500,000
A3	Promote livelihood enhancement activities that reduce rural people's reliance on forests and forest products.	Medium term	FC; MAMID	MWAGCD; MYIEE; MLGPWNH (RDCs); MSMECD; CSOs; UN Agencies	Government Treasury; Private Sector; PPPs; World Bank; AfDB; Carbon off setting projects; GEF; Global Climate Funds	USD 10 million

[16] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Adaptation Options in the Forestry Sector					
STRATEGY	b) Strengthen research, planning and financial support to forestry and natural resources management, to develop cost effective adaptation options.					
ACTIONS	**Action**	**[17]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Establish ecological monitoring sites to provide information for adaptive tree and forest management.	Medium term	Forestry Commission	MEWC; MAMID (DR&SS); MLGPWNH (RDCs); EMA; Timber Producers Federation; Universities; CSOs; UN Agencies	Government Treasury; UNEP; CIFOR; Carbon off setting projects; GEF; Global Climate Funds	USD 2.5 million
B2	Promote breeding of trees that are adapted to the changed climate.	Long term	Forestry Commission	MAMID (DR&SS); ICRAF; Universities; Timber Producers Federation; CIFOR	Government Treasury; CIFOR; Carbon off setting projects; GEF; Global Climate Funds	USD 10 million
B3	Provide guidelines for site-species matching especially for plantation species in relation to ground water use.	Short term	Forestry Commission	MAMID (DR&SS); Universities; EMA; Timber Producers Federation	Government Treasury	USD 250,000
B4	Promote changes in forest and management/ silvicultural practices such as the time and pattern of planting, watering and the application of fertilizer in response to the changed climate.	Medium term	Forestry Commission	MAMID (AGRITEX); Universities; Timber Producers Federation	Government Treasury	USD 1 million

[17] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Adaptation Options in the Forestry Sector					
STRATEGY	c) Build capacity for forest management in a changing climate.					
ACTIONS	Action	[18]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Strengthen education, training and extension in forestry and climate change adaptation and mitigation.	Short term	Forestry Commission	EMA, MLGPWNH; Timber Industry; Zimparks; Farmers; MPSE and MHTESTD	Government Treasury; COMESA; FAO; UNESCO	USD 10 million
C2	Build the capacity of extension agencies to promote trees and forest management for climate change adaptation and mitigation.	Short term	Forestry Commission	MAMID, Universities; ICRAF; Agricultural Colleges	Government Treasury; CIFOR; GIZ; FAO	USD 3 million
C3	Promote use of indigenous knowledge in forestry management.	Short term	Forestry Commission	RDCs; MAMID; Traditional Leaders	Government Treasury; CSOs	USD 500,000
C4	Improve fire management through landscape change and prescribed burning.	Medium term	EMA	FC; Timber Producers Federation; RDCs; MAMID; Zimparks	Government Treasury; UN Agencies; CSOs	USD 5 million

[18] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

Mitigation Options in the Forestry Sector

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Mitigation through International Carbon Enhance					
STRATEGY	a) Develop national capacity to design, carbon projects for accessing different carbon financing mechanisms and to implement and support the projects.					
ACTIONS	**Action**	**[19]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
A1	Identify, map and set aside forest areas and other lands that can be managed for carbon mitigation under different schemes.	Short term	Forestry Commission	WWF; CIFOR; Timber Producers Federation; MLRR (Department of Surveyor General); MLGPWNH; MAMID	Government Treasury; Carbon Offsetting Projects; GEF; Global Climate Funds	USD 800,000
A2	Develop capacities for measurement, reporting and verification of (MRV) of carbon stocks in forests and other tree landscapes.	Medium term	Forestry Commission	Research Institutions-CIFOR, ICRAF; WWF; Universities; MAMID (DR&SS); Timber Producers Federation	Government Treasury; UNEP; UNDP; Carbon Offsetting Projects; GEF; Global Climate Funds	USD 5 million
A3	Train local communities and other forest owners and users in measurement, reporting and verification of carbon stocks.	Short term	Forestry Commission	Timber Producers Federation; WWF; EMA; MLGPWNH; MAMID; CSOs	Government Treasury; UN Agencies; Carbon Offsetting Projects; GEF; Global Climate Funds; CSOs	USD 2 million
A4	Build the capacity of local financial institutions to support and manage carbon finance transactions.	Short term	MF	MEWC (Forestry Commission)	Government Treasury; AfDB-Climate Investment Fund	USD 200,000
A5	Develop capacity to formulate and manage projects that can take advantage of International Carbon Finance.	Short term	MEWC	Forest Commission; EMA; MAMID; CSOs	Government Treasury; UNEP; Global Environment Fund; FAO; UNDP	USD 5 million

[19] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.3 Land-use and Land-use-change and Forestry (LULUCF)

ASPECT	LAND-USE AND LAND-USE-CHANGE AND FORESTRY					
THEME	Mitigation in Forestry through Local Programmes					
STRATEGY	b) Maintain, account for, and expand carbon sinks.					
ACTIONS	Action	[20]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Protect forests and practice afforestation, agroforestry and other practices that increase tree and forest cover.	Long term	Forestry Commission	EMA; MAMID; MLGPWNH; Timber Producers Federation; Private Sector; ICRAF; WWF; Communities	Government Treasury; FAO; Carbon Offsetting Projects; GEF; Global Climate Funds	USD 10 million
B2	Promote restoration and rehabilitation of degraded forest lands to address impacts of climate change and desertification.	Long term	Forestry Commission	EMA; Timber Producers Federation; MAMID; MLGPWNH; Research Institutions; FAO; CSOs; Communities	Government Treasury; Carbon Offsetting Projects; GEF; Global Climate Funds; Payment for Environmental Services; UN Agencies	USD 10 million

[20] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.4 Biodiversity and Ecosystems

ASPECT	BIODIVERSITY AND ECOSYSTEMS					
THEME	Biodiversity and Ecosystems					
STRATEGY	a) Promote and strengthen biodiversity conservation management and the integrity of natural ecosystems by using an ecosystem based approach to adapt to climate change.					
ACTIONS	Action	[21]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Provide an enabling environment for implementation of international multilateral environmental agreements, such as the Convention on Biological Diversity to which Zimbabwe is a signatory, by strengthening the legal and institutional framework for conserving biodiversity and protecting ecosystems.	Medium term	MEWC (Department of Environment and Natural Resources)	Zimparks; FC; EMA; MLGPWNH; ZINWA; Attorney General Office; MMMD; MAMID; MFA; MTID; MEPD; CSOs	Government Treasury; UN Agencies; Other International Donors	USD 500,000
A2	Develop comprehensive biodiversity inventory, and monitoring and evaluation programmes to determine the status of biodiversity and to assess the adaptive carrying capacity of landscapes.	Long term	MEWC (Zimparks, FC and EMA)	ZINWA; MLGPWNH; MAMID; Research institutions; CSOs	Government Treasury; UN Agencies; Other International Donors	USD 5 million
A3	Promote the sustainable use of wetlands to preserve their ecological integrity.	Medium term	Medium term MEWC (EMA)	Catchment Councils; Sub-catchment Councils; MJLPA; MLGPWNH; MAMID; ZRP; CSOs	Government Treasury; UN Agencies; Multi-Donor Funds; Other International Donors	USD 5 million

[21] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.4 Biodiversity and Ecosystems

ASPECT	BIODIVERSITY AND ECOSYSTEMS					
THEME	Biodiversity and Ecosystems					
STRATEGY	b) Promote appropriate climate smart land-use options for the drier natural regions where cattle production and wildlife ranching are the most suitable land-use options					
ACTIONS	Action	[22]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Promote wildlife management in communal, resettlement and commercial farms.	Medium term	MEWC (Zimparks)	FC; EMA; MLRR; MLGPWNH; MAMID; Private sector; Research institutions; Farmers; Communities	Government Treasury; UN Agencies; Other Donors	USD 2 million
B2	Improve the adaptive carrying capacity of rangelands.	Medium term	MAMID	MEWC, Zimparks; EMA; Communities; CSOs; Other relevant authorities	Government Treasury; UN Agencies; Carbon Offsetting Projects; GEF; Global Climate Funds; Other International Donors	USD 30 million
B3	Strengthen the capacity of communities whose livelihoods depend on biodiversity in various adaptation techniques.	Long term	MEWC (Department of Climate Change Management)	MAMID; Department of Meteorological Services; EMA; MLGPWNH; CSOs	Government Treasury; UN Agencies; Other International Donors	USD 10 million

[22] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

1. NATURAL SYSTEMS

1.4 Biodiversity and Ecosystems

ASPECT	BIODIVERSITY AND ECOSYSTEMS					
THEME	Biodiversity and Ecosystems					
STRATEGY	c) Strengthen the effectiveness of Trans-frontier Conservation Areas as a mechanism for sustainable biodiversity conservation and climate adaptation.					
ACTIONS	Action	[23]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Develop and implement a monitoring and evaluation system to assess the role and effectiveness of Trans-frontier Conservation Areas.	Short term	MEWC (Zimparks)	FC; EMA; Private Sector; Research institutions; CSOs	Government Treasury; UN Agencies; Other Donors	USD 500,000
C2	Promote large scale management of biodiversity as an adaptation measure to mitigate the impacts of climate change.	Medium to long term	MEWC, (Zimparks-Transfrontier Management Areas Management Unit)	FC; EMA; Private Sector; Research institutions; CAMPFIRE	Government Treasury; UN Agencies; GEF; Global Climate Funds; Other Donors	USD 1 million
C3	Promote enterprise and other opportunities that enhance the capacity of TFCAs as a mechanism for climate adaptation.	Long term	MEWC (Zimparks - Transfrontier Management Areas Management Unit	MTHI; MHA (Immigration); MLGPWNH; Security Sectors; CAMPFIRE; Private Sector	Government Treasury; Carbon offsetting Projects; GEF; Global Climate Funds; UN Agencies; SADC	USD 20 million

[23] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

Overarching Issues in Agriculture and Food Security

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Overarching Issues in Agriculture and Food Security					
STRATEGY	a) Develop frameworks for sustainable intensification and commercialization of agriculture at different scales across agro-ecologies.					
ACTIONS	Action	[24]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Mechanize agriculture across all farming systems and production scales to enable assimilation of improved production and processing technologies (e.g. appropriate forms of Conservation Agriculture and Integrated Soil Fertility Management) for sustainable intensification of farming systems.	Medium to long term	MAMID	MEWC; Universities; Private Seed and Fertilizer Companies; Farmer Organizations; CSOs; Banks/Financial Institutions; Regional Organizations; Development Partners	Government Treasury; FAO; EU; Other Development Partners; Local, regional and International Financial Institutions; COMESA	USD 1.2 billion (revolving fund)
A2	Strengthen capacity of local, provincial and national institutions to work with communities in developing mechanisms for enhancing local social safety nets around food security and natural resources management in response to changes in major climatic factors.	Short to medium term	MAMID	MEWC; CSOs; Private Agro-Companies; Insurance and Financial Institutions; Local Authorities; Farmers' Unions and Associations; Universities; International Research Organizations; SADC; COMESA	Government Treasury; FAO; EU; Other donor agencies; Local Financial Institutions; Regional and International Development Organizations	USD 5 million
A3	Develop mechanisms for redirecting and coordinating humanitarian assistance towards developing medium to long term adaptive capacity and strengthening self-reliance of communities.	Short to medium term	MAMID	CSOs; Private companies; Farmer Organizations; MEWC; MSMECD; MWAGCD; MYIEE; MLGPWNH; MPSLSW	Government Treasury; WFP; Other Relevant United Nations Agencies; Other Donor Agencies; Financial Institutions	USD 2 million

[24] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Overarching Issues in Agriculture and Food Security					
STRATEGY	b) Strengthen capacity to generate new forms of empirical knowledge, technologies and agricultural support services that meet emerging development challenges arising from increased climate change and variability.					
ACTIONS	Action	[25]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Develop frameworks for promoting long-term research and development initiatives on diversification and improvement of stress tolerance against climatic and environmental factors in crops and livestock.	Short to long term	MAMID	Private seed and fertilizer companies; Farmer Organizations, CSOs; ARC; RCZ; Research Institutions; MHTESTD; SIRDC; Regional Research Organizations; CIMMYT; ICRISAT	Government Treasury; FAO; Banks/Financial Institutions; Private Sector; RCZ	USD 10 million
B2	Identify and promote farmer prioritized crop types and varieties and livestock breeds known to be tolerant to climatic stress based on indigenous knowledge systems and/or scientific research.	Short term	MAMID	Universities; CSOs; CBOs; Private Agro-Companies; Insurance and Financial Institutions; MSMECD; MWAGCD; MYIEE; Local Authorities; Farmers' Unions and Associations; International Research Organizations	Government Treasury; Private Sector; International Foundations: FAO; Donor Agencies; International and Local Financial Institutions	USD 10 million
B3	Introduce competitive national research funding schemes and strengthen research capacity to stimulate innovative solutions and generation of empirical evidence in climate change adaptation and mitigation in agriculture.	Short to medium term	MHTESTD; Agricultural Research Council	Universities; CSOs; CBOs; Private Agro-Companies; Insurance and Financial Institutions; MF; MEWC; MYIEE; Farmers' Unions and Associations; RCZ; International Research Organizations; SADC; COMESA	Government Treasury; Private Sector; International Foundations; FAO; EU; Other Donor Agencies; International Financial Institutions	USD 15 million
B4	Promote climate smart agriculture.	Short to medium term	MAMID	MEWC; ZINWA; Local Authorities; Traditional Leadership	Government Treasury; International Cooperating Agencies; UN Agencies; Multi-Donor Funds; COMESA; Local financial institutions	USD 1 million

[25] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Overarching Issues in Agriculture and Food Security					
STRATEGY	c) Strengthen early warning systems on cropping season quality, rangelands conditions, droughts, floods, disease/pest outbreaks and wildlife movement in order to enhance farmer preparedness.					
ACTIONS	Action	[26]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Conduct assessments of vulnerability and adaptive capacity of communities, and their relative dynamics across the rural-urban divide, agro-ecological zones and social groups.	Short term	MAMID	MEWC; Universities; MPSE; MHCC; MLGPWNH (Department of Civil Protection); Regional and International Research Organizations; Private Sector; FAO	Government Treasury; GEF; UNDP; UNEP; UNICEF; Other UN Agencies; Other Donor Agencies	USD 2 million
C2	Establish surveillance systems for intra- and inter-seasonal vulnerabilities of communities, agricultural input supply patterns and movement of surpluses.	Medium term	MAMID	Universities; Food and Nutrition Council of Zimbabwe; SIRDC; MPSE; MHCC; Regional and International Research Organizations; Private Sector; Relevant UN agencies	Government Treasury; GEF; UNDP; UNEP; UNICEF; Other UN Agencies; Other Donor Agencies	USD 2.5 million
C3	Develop frameworks for integration of indigenous knowledge into science-based early warning systems to enhance decision making on agricultural management and disaster risk management.	Short term	MAMID	Universities; MPSE; MEWC; Regional and International Research Organization; Private Sector; Relevant UN agencies	Government Treasury; GEF; UNDP; UNEP; UNICEF; FAO; Other UN Agencies; Other Donor Agencies	USD 500,000
C4	Review and establish effective communication pathways for climate information flows and knowledge dissemination.	Short to medium term	MAMID; MEWC	Universities; MPSE; MMIBS; MICTPCS; Farmers' Unions and Associations; Private Sector	Government Treasury; GEF; UNDP; UNEP; UNICEF; FAO; Other UN Agencies; Other Donor Agencies	USD 2 million

[26] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

Thematic Issues and Proposed Strategies for the Agricultural Sector

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Farming Systems					
STRATEGY	a) Develop frameworks for supporting agricultural specialization according to agro-ecological regions, including mechanisms for commodity exchange, trade and marketing.					
ACTIONS	Action	[27]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Strengthen capacity to review the delineation of Zimbabwe's agro-ecological zones and the matching farming systems to enhance dynamic responses to emerging climatic scenarios.	On going	MAMID, MEWC	Universities; Private Sector; Relevant UN Agencies	Government Treasury; UNDP; FAO; Other UN Agencies; EU; Other Donor Agencies; Financial Institutions	USD 2.5 million
A2	Establish surveillance schemes on how production and marketing systems respond to climatic pressures within and across agro-ecological zones.	Short to medium term	MAMID	MPSLSW; MIC; MSMECD; Research Institutions; Farmers' Unions and Associations	Government Treasury; UNDP; FAO; Other UN Agencies; Other Donor Agencies; Financial Institutions	USD 2 million
A3	Strengthen institutional mechanisms for market-oriented agricultural production and diversified livelihood opportunities for farming communities to enhance their adaptive capacity and foster socio-ecological resilience.	Medium to long term	MAMID	Private Seed and Fertilizer Companies; Farmers' Organizations; Marketing Boards; CSOs; Banks/Financial Institutions; MPSLSW; MSMECD; MYIEE; MWAGCD	Government Treasury; UNDP; FAO; GEF; Other UN Agencies; Other Donor Agencies; Financial Institutions; Private Sector	USD 20 million

[27] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	**Crop Productivity**					
STRATEGY	**a) Strengthen the capacity of farmers, extension agencies, and private agro-service providers to take advantage of current and emerging indigenous and scientific knowledge on stress tolerant crop types and varieties, including landraces, that are adaptable to arising climatic scenarios.**					
ACTIONS	**Action**	**[28]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
A1	Establish incentive structures for production of stress tolerant crop types and varieties by communities in marginal agro-regions.	Short to long term	MAMID	MF; Private Sector; Farmers' Organizations; CSOs; MHTESTD; Universities; MWAGCD; MYIEE; Relevant United Nations Agencies	Government Treasury; Private Sector; Donor Agencies and Financial Institutions	USD200 million (Revolving Fund)
A2	Promote community seed production schemes that harness crop diversity.	Short term	MAMID	CSOs; Farmers' Organizations; Traditional Leaders; Private Sector; Research Institutions; MHTESTD	Government Treasury; FAO; GEF; EU; Other Donor Agencies; Private Sector	USD 5 million
A3	Develop training programmes for promoting processing and consumption of neglected but stress tolerant and nutritious crops.	Short to medium term	MAMID	Universities; CSOs; Private Sector; Farmers' Organizations; MSMECD; MWAGCD; MYIEE	Government Treasury; Private Sector; Donor Agencies; Financial Institutions	USD 2.5 million
A4	Strengthen capacity for development of new food recipes and industrial products using stress tolerant and traditional crops.	Short to medium term	MAMID; MHTESTD	Research Institutions; MTHI; MSMECD; MWAGCD; MYIEE CSOs; Food and Nutrition Council; Farmers' Organization; Universities, Technical Colleges, Hospitality and Food Industries	Government Treasury; Private Sector; Donor Agencies; Financial Institutions	USD 5 million

[28] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	**Crop Productivity**					
STRATEGY	**b) Develop frameworks for promoting science-based crop production and post harvest technologies and management practices.**					
ACTIONS	**Action**	**[29]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Strengthen research capacity towards development of solutions and innovations in crop improvement and fertilizer development to increase productivity with minimal GHGs emissions.	Medium term	MAMID	ARC; RCZ; Research Institutions; Private Seed and Fertilizer Companies; Farmers' Organizations; CSOs; Insurance Companies; Regional Organizations	Government Treasury; GEF; FAO; EU; Other Donors; Private Sector	USD 5 million
B2	Design and evaluate alternative cropping systems that perform under different agronomic regimes and climatic scenarios and transfer to farmers.	Long term	MAMID	Research Institutions; MHTESTD; CSOs; CBOs; Private Sector; Farmers' Organizations; MWAGCD; MYIEE	Government Treasury; FAO; EU; Donor Agencies; Private Sector; Financial Institutions	USD 50 million

[29] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 Agriculture and Food Security

Livestock Production

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Livestock Production					
STRATEGY	a) Strengthen the capacity to identify and promote adoption of indigenous and improved livestock breeds that are tolerant to climate related stresses.					
ACTIONS	Action	[30]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Strengthen surveillance systems for livestock diseases and production performance indicators against changing climatic and ecological variables.	Short term	MAMID	Research Institutions; Private Sector; Farmers' Organizations; MEWC; CSOs; Banks/Financial Institutions; Insurance Companies; Regional Organizations	Government Treasury; FAO; EU; Donor Agencies; Private Sector; Financial Institutions	USD 2 million
A2	Develop frameworks for promoting effective rangeland management systems to enhance sustainable production and storage of livestock feed resources.	Short term	MAMID	ARC; CSC; Research Institutions; Private Sector; Farmers' Organizations; MEWC; CSO; Banks/Financial Institutions; Insurance Companies; Regional Organizations.	Government Treasury; FAO; EU; Donor Agencies; Private Sector; Financial Institutions	USD 500,000
A3	Strengthen national research and extension capacity for livestock improvement and production in response to farmers' medium to long-term demands for adaptation.	Medium-long term	MAMID	ARC; CSC; RCZ; Research Institutions; Private Sector; Farmers' Organizations; MEWC; CSOs; Banks/Financial Institutions; Insurance Companies; Regional Organizations	Government Treasury; FAO; EU; Donor Agencies; Private Sector; Financial Institutions	USD 500 million

[30] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	**Livestock Production**					
STRATEGY	**b) Establish monitoring systems for greenhouse gas emissions in agricultural systems and support mechanisms for their reduction.**					
ACTIONS	**Action**	**[31]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Review and document current levels of gaseous emissions under different livestock management systems in the country.	Short term	MAMID	Research Institutions; Private Sector; Farmers' Organizations; MEWC; CSOs; Banks/Financial Institutions; Insurance Companies; Regional Organizations	Government Treasury; FAO; GEF; Donor Agencies; Private Sector; Financial Institutions	USD 1 million
B2	Equip extension and research institutions with technologies and skills for monitoring and analysis of greenhouse gaseous emissions.	Medium term	MAMID	MHTESTD; MEWC; Private Sector; Regional Research Organizations	Government Treasury; FAO; GEF; UNEP; Donor Agencies; Private Sector; Financial Institutions	USD 10 million
B3	Promote linkages for coordination of information and knowledge sharing on climate change mitigation in agriculture.	Short term	MAMID	Research Institutions; Private Sector; Farmers' Organizations; MEWC; CSOs; Banks/Financial Institutions; Insurance Companies; Regional Organizations	Government Treasury; FAO; GEF; Donor Agencies; Private Sector; Financial Institutions	USD 1 million

[31] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.1 *Agriculture and Food Security*

ASPECT	AGRICULTURE AND FOOD SECURITY					
THEME	Agriculture and Water					
STRATEGY	a) Strengthen national research and extension capacity for development and integrated management of agricultural water resources.					
ACTIONS	Action	[32]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Strengthen capacity for surveillance and predictive analysis of agricultural water use patterns across temporal and spatial scales.	Short to medium term	MAMID; MEWC	ZINWA; EMA; Catchment Councils; Sub-Catchment Councils; MLGPWNH (DDF; Rural and Urban Councils); Research Institutions; Private Sector; Farmers' Organizations; RCZ	Government Treasury; FAO; World Bank; Other Donor Agencies; Private Sector	USD 2 million
A2	Develop infrastructure and associated technologies for irrigation, but integrating mechanisms for handling excess water and flooding.	Long term	MEWC; MAMID	ZINWA; EMA; Catchment Councils; Sub-Catchment Councils; MLGPWNH (DDF; Rural and Urban Councils); Research Institutions; Private Sector; Farmers' Organizations; RCZ	Government Treasury; FAO; World Bank; Other Donor Agencies; Private Sector	USD 500 million
A3	Establish early warning systems at local levels to facilitate informed decision-making processes at farm and community scales in response to climatic risks.	Short to long term	MEWC; MAMID	ZINWA; EMA; Catchment Councils; Sub-Catchment Councils; MLGPWNH (DDF; Rural and Urban Councils); Research Institutions; Private Sector; Farmers' Organizations; RCZ	Government Treasury; FAO; World Bank; Other Donor Agencies; Private Sector	USD 2.5 million
A4	Develop research and development frameworks to generate and promote technical and institutional innovations for water harvesting and management in crop and livestock production systems.	Short to medium term	MAMID	MEWC; MLGPWNH (DDF; Rural and Urban Councils); Research Institutions; Private Sector; Farmers' Organizations; RCZ	Government Treasury; FAO; World Bank; Other Donor Agencies; Private Sector	USD 5 million

[32] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.2 *Industry and Commerce*

ASPECT	INDUSTRY AND COMMERCE					
THEME	Industry and Commerce					
STRATEGY	a) Introduce policies that promote the use and adoption of clean and efficient energy in industry.					
ACTIONS	Action	[33]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Review, implement and monitor emissions and effluent standards for industries.	Short term	MEWC (EMA)	MIC; Local Authorities; SAZ; Private Sector; BCSDZ; Academic Institutions; CSOs	Government Treasury; Environment Fund	USD 1 million
A2	Establish Associations/sub committees to review and implement the regulations on emissions and to monitor through conducting audits.	Short term	MEWC (EMA)	MIC; CZI; ZNCC; MSMECD; SAZ; Private Sector; Development partners	Government Treasury; Environment Fund	USD 250 000
A3	Continue to introduce pre-paid meters for electricity supply in industry.	Short term	ZESA	MIC; MEPD; ZESA; MEWC; EMA; SIRDC; Universities; NSSA	ZESA; PPPs	USD 2 million
A4	Provide incentives such as tax relief and financing for companies that invest in technologies that reduce GHG emissions from their production processes.	Short to medium term	MF	MIC; MSMECD; MHTESTD; MMMD; MEWC; EMA; Research Institutions	Government Treasury; Global Climate Funds; CDM; Banks; Private Sector	USD 100 million
A5	Establish a revolving fund to acquire modern technologies that use cleaner energy such as solar and natural gas to reduce emissions.	On-going	MIC	MF; MEPD; Private Sector	Government Treasury; Private Sector; Global Climate Funds; CDM	USD 50 million

[33] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.2 *Industry and Commerce*

ASPECT	INDUSTRY AND COMMERCE					
THEME	Industry and Commerce					
STRATEGY	b) Create a policy and regulatory framework that promotes resource use efficiency and cleaner production in industry and commerce.					
ACTIONS	Action	[34]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Provide incentives for industries that adopt resource use efficiency especially of water and energy and cleaner production.	Short to medium term	MIC	MF; MSMECD; MEWC; Cleaner Production Centre	Government Treasury; Private Sector; Industrial Organizations; UNIDO	USD 100 million (revolving fund)
B2	Encourage companies to apply for certification for voluntary environmental management systems which require them to continuously improve their environmental performance.	Short to medium term	MIC	MEWC; MSMECD; Private Sector; BCSDZ; SAZ	Government Treasury; Banks; CDM	USD 20 million
B3	Promote the concepts of recycle, reduce and re-use of resources.	On-going	EMA; MIC	BCSDZ; CZI; ZNCC	Government Treasury; Private Sector	USD 5 million

[34] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.2 *Industry and Commerce*

ASPECT	INDUSTRY AND COMMERCE					
THEME	Industry and Commerce					
STRATEGY	c) Create an enabling policy and legal framework that encourages the setting up and operations of climate resilient industries.					
ACTIONS	Action	[35]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Develop and implement policies that encourage investment in climate resilient industries.	Short to medium term	MIC	MEWC; MF; Local Authorities; Private Sector; CZI; BCSDZ; ZNCC	Government Treasury; Private Sector	USD 250 million

[35] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.3 Mining

ASPECT	MINING					
THEME	Mining					
STRATEGY	a) Develop regulatory frameworks to encourage emissions reduction and invest in resource efficient technologies.					
ACTIONS	Action	[36]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Develop regulatory frameworks to steer the mining sector towards low-carbon production and processing.	Short to long term	MMMD	Chamber of Mines; Mining Companies; EMA; MF; MHTESTD	Government Treasury; CDM; Mining Companies	USD 500,000
A2	Enforce mandatory low carbon mining regulations.	On-going	MMMD	EMA; BCSDZ; Chamber of Mines; Mining Companies	Government Treasury; Mining Companies	USD 1 million
A3	Encourage companies to move towards low carbon production and processing through provision of meaningful incentives.	Short to medium term	MMMD	MF; EMA; CZI; Chamber of Mines	Government Treasury; Mining Companies; AfDB; Local Banks; CDM	USD 200 million

[36] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.3 Mining

ASPECT	MINING					
THEME	Mining					
STRATEGY	b) Enforce and monitor the implementation of mandatory and voluntary environmental management systems.					
ACTIONS	Action	[37]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Enforce compliance with all mining and related environmental legislation such as Environmental Impact Assessments, Mine Closure Plans, Disaster Risk Management.	Short term	MMMD; EMA	Chamber of Mines; Local Authorities; MLGPWNH	EMA; Mining Companies	USD 2.5 million
B2	Promote the implementation of voluntary environmental management systems which assist in reducing the environmental impacts of mining on environmental resources.	Short to medium term	MMMD	SAZ; EMA; MF; Chamber of Mines; Academic Institutions; Cleaner Production Centre	Mining Companies	USD 50 million (revolving fund)

[37] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.3 Mining

ASPECT	MINING					
THEME	Mining					
STRATEGY	c) Adopt practices that reduce energy consumption in the mining sector.					
ACTIONS	Action	[38]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Invest in cleaner energy and resource efficient technologies.	Short to long term	MMMD; MEPD	MF; Chamber of Mines; Mining Sector	Government Treasury; CDM; Private Sector	USD 100 million
C2	Strengthen research and build skills to develop mining technologies with a low carbon foot print.	On-going	MMMD	School of Mines; MHTESTD; Academic Institutions; SIRDC; Private Sector	Mining Companies; Government Treasury; Banks; CDM; UNIDO	USD 5 million
C3	Build capacity in the mining sector to exploit opportunities for accessing international climate change mitigation finance.	On-going	MMMD	MEWC; Academic Institutions; Mining Sector; Chamber of Mines	CDM; Private Sector; UNDP; UNIDO	USD 500 000

[38] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.3 Mining

ASPECT	MINING					
THEME	Mining					
STRATEGY	d) Develop a framework for enhancing the capacity of small-scale miners to improve their environmental performance.					
ACTIONS	Action	[39]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
D1	Enforce legislation for small-scale miners to practice more environmentally friendly mining methods.	Short to medium term	MMMD	EMA; Chamber of Mines; Mining Companies; MF; MJLPA; MHTESTD	Government Treasury; CDM; Mining Companies	USD 2 million
D2	Build capacity of small-scale miners in cleaner technologies with lower carbon footprints and reduced contamination of water resources.	Short to medium term	MMMD	MHTESTD; Universities; School of Mines; SIRDC; EMA; Private Sector	Government Treasury; Mining Companies; Banks; CDM; UNIDO; World Bank	USD 20 million
D3	Provide incentives for small-scale miners to invest in cleaner technologies.	On-going	MMMD; MF	MEPD; MIC; Chamber of Mines; Mining Sector	Government Treasury; UNIDO; CDM	USD 20 million

[39] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.4 Tourism

ASPECT	TOURISM					
THEME	**Tourism**					
STRATEGY	**a) Mainstream climate change into policies and legislation that guide the tourism sector.**					
ACTIONS	**Action**	**[40]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
A1	Review policies and legislation that are relevant to tourism and mainstream/integrate climate change.	Short term	MTHI	Private Sector; ZTA; ZCT; Zimparks; HAZ; MJLPA	Government Treasury; UNWTO	USD 300,000
A2	Incorporate climate change in the Tourism Policy and Tourism Master Plan which guide the growth of the tourism sector.	Short term	MTHI	Private Sector; ZTA; ZCT; Zimparks; HAZ	Government Treasury; GEF	USD 200,000

[40] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.4 Tourism

ASPECT	TOURISM					
THEME	**Tourism**					
STRATEGY	**b) Promote and strengthen Zimbabwe's tourism sector's resilience to climate change.**					
ACTIONS	**Action**	**[41]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Carry out research and documentation on extreme events such as floods and droughts that threaten tourism products, including wildlife, especially the large charismatic mammals; water bodies for fishing and other aquatic recreations; and major tourist attractions for example, the Eastern Highlands and the Victoria Falls.	Short term	MEWC	MTHI; Zimparks; ZINWA; EMA; Private Sector; Research institutions; NMMZ; RCZ	Government Treasury; UN Agencies	USD 500,000
B2	Continue to promote ecotourism through creating community wildlife conservancies and by strengthening the tourism and wildlife projects in the CAMPFIRE areas and ensure that vulnerable community-based tourism enterprises are robust enough to cope with the adverse effects of climate change.	Short to long term	MTHI	MEWC; Zimparks; CAMPFIRE; ZTA; Private Sector; MLGPWNH; Research institutions; CSOs; CBOs	Government Treasury; UN Agencies; Other international donors; Private Sector	USD 100 million
B3	Diversify Zimbabwe's tourism products through launching new activities, and enhance those that are there, to make the tourism experience in Zimbabwe more enjoyable, including sports, business, adventure, agricultural, cultural tourism, eco-tourism and hosting of mega-events.	Medium term	MTHI	ZTA; ZCT; Zimparks; MSAC; MIC; MAMID; MMIBS; Private Sector; Research institutions	Government Treasury; SADC; UN Agencies; Private Sector; PPPs	USD 100 million

[41] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.4 Tourism

ASPECT	TOURISM					
THEME	**Tourism**					
STRATEGY	**c) Build and strengthen the capacity of the tourism and wildlife sectors to adapt to the challenges of climate change.**					
ACTIONS	**Action**	**[42]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
C1	Strengthen the capacity of the Zimbabwe Parks and Wildlife Management Authority to improve wildlife management and conservation in a changing climate.	Short to medium term	MEWC (Zimparks)	MTHI; Research institutions; Private Sector; PSC	Government Treasury; Zimparks; GEF; UN Agencies; Private Sector	USD 30 million
C2	Invest in tourism research and development on futuristic tourism products such as virtual tourism as an adaptation to climate change.	Medium to long term	MTHI	MICTPCS; ZTA; MHTESTD; Private Sector; RCZ	Government Treasury; UN Agencies; Global Climate Funds; Private Sector	USD 5 million

[42] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

2. ECONOMIC SECTORS

2.4 Tourism

ASPECT	TOURISM					
THEME	**Tourism**					
STRATEGY	**d) Promote mitigatory measures to ensure a low carbon footprint/emission and sustainable growth and development in Zimbabwe's tourism sector.**					
ACTIONS	**Action**	**[43]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
D1	Carry out strategic research on GHG emissions associated with tourism activities (e.g. in transport and accommodation).	Short to medium term	MEWC, (Departments of Climate Change Management and Meteorological Services)	MTHI; MTID; MEPD; EMA; Research institutions; RCZ; Private Sector; UNEP	Government Treasury; Global Climate Funds; UN Agencies	USD 2 million
D2	Develop appropriate strategies against the spill-over effects of possible mitigation measures in the international aviation industry by promoting domestic and regional tourism.	Short to medium term	MTHI (ZTA)	ZCT; MFA; MIC; Private Sector	Government Treasury; Global Climate Funds; UN Agencies; Private Sector	USD 3.6 million
D3	Engage in 'Green Tourism' and create incentives that will encourage stakeholders in the tourism industry to adopt clean energy sources and to maximize recycling and reuse of waste and promote Zimbabwe as a green destination.	Medium to long term	MTHI (ZTA)	MEPD; MEWC; EMA; Local Authorities; ZCT; Zimparks; CSOs	Government Treasury; Global Climate Funds; UN Agencies; Private Sector	USD 10 million

[43] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.1 Energy

ASPECT	PHYSICAL AND SOCIAL INFRA-STRUCTURE					
THEME	Energy					
STRATEGY	a) Introduce policies and regulatory frameworks for renewable energy, energy conservation and energy efficiency.					
ACTIONS	Action	[44]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Introduce a Renewable Energy, Energy Conservation and Energy Efficiency Policy with time-defined targets for renewable energy mix and carbon intensities for the energy sector.	Short term	MEPD	ZESA; MLGPWNH; MF; MAMID; MEWC; MHTESTD; MTID; CSOs	EU; DFID; Hivos; Electricity Levy	USD 20 million
A2	Develop and implement incentives aimed at promoting and reducing costs of Renewable Energy such as renewable energy feed-in tariffs, net metering, subsidies and tax redemptions to make renewable energy technologies affordable.	Short term	MEPD	ZESA; Independent Power Producers; Private Sector; MLGPWNH; MF; CSOs	ZERA; World Bank; GEF; Rural Electrification Fund	USD 50 million
A3	Enact the Rural and Renewable Energy Act as prescribed by the Energy Policy of 2012.	Short term	MEPD	ZESA; MLGPWNH; MF; MAMID; MEWC; MJLPA	Rural Electrification Fund; COMESA; UNIDO; UNDP	USD 200 000
A4	Introduce regulations that enforce the use of solar water geysers and use of passive heating on all new housing developments.	Short to medium term	MEPD	MLGPWNH; Local Authorities; MF; MAMID; MEWC; MHTESTD; MJLPA	UNIDO; UNDP; UN Habitat; GEF; DFID; EU; World Bank; AfDB	USD 10 million

[44] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.1 Energy

ASPECT	PHYSICAL AND SOCIAL INFRA-STRUCTURE					
THEME	Energy					
STRATEGY	b) Strengthen energy planning, research and development.					
ACTIONS	Action	[45]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Establish a National Integrated Resource Plan that shows the renewable energy and conventional energy mix to meet the country's energy needs.	Short term	MEPD	MLGPWNH; MF; MAMID; MEWC; MHTESTD; CSOs	UNIDO; UNDP; COMESA; EU; DFID	USD 500,000
B2	Establish an information system within the Ministry of Energy and Power Development that is a strategic tool for investment decision making and optimal energy resource mix at least cost.	Short to medium term	MEPD and ZIMSTAT	ZESA; MLGPWNH; MF; MAMID; MEWC; MICTPCS; CSOs	UNIDO; Other UN Agencies; COMESA; EU, DFID	USD 1 million
B3	Promote research and development in the renewable energy sector.	On-going	MEPD; MHTESTD	MLGPWNH; MF; MAMID; MEWC; CSOs; RCZ	UNIDO; Other UN Agencies; COMESA; EU; DFID	USD 10 million
B4	Establish an Energy Research Council and an Energy Research Fund.	Short term	MHTESTD	MEPD; RCZ	Government Treasury; Rural Electrification Fund	USD 20 million

[45] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.1 Energy

ASPECT	PHYSICAL AND SOCIAL INFRA-STRUCTURE					
THEME	**Energy**					
STRATEGY	**c) Promote low carbon energy provision and use.**					
ACTIONS	**Action**	**[46]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
C1	Reduce transmission line losses and promote demand side management and energy saving technologies at power stations.	Short to medium term	MEPD	ZESA; MF; MEWC; Research Institutions; MHTESTD; SIRDC	World Bank; GEF; UNIDO; UNDP; AfDB	USD 20 million
C2	Encourage the use of biofuels for household domestic use to address energy for cooking needs.	Short to medium term	MEPD; MHTESTD	CSO; Private Sector; MLGPWNH; MF; MAMID; MEWC	EU; World Bank; UNDP; GEF; UN Habitat; GIZ; Other Development Partners	USD 5 million
C3	Raise awareness through demonstration of appropriate technology for household cooking.	Short term	MEPD	Private Sector; Local Authorities; MF; MAMID; MEWC; MHTESTD; Media; Parliament; CSOs	GEF, UNIDO; UNDP; Private Investors	USD 5 million
C4	Promote and implement energy conservation, energy efficient technologies, including improved cook stoves for household use and efficient tobacco curing barns.	Short to medium term	MEPD	FC; EMA; MAMID; MHCC; CSOs; GIZ; UNICEF	CDM; UNEP; GIZ; UNICEF	USD 10 million
C5	Reduce greenhouse gas emissions in industry, and at household level through demand side management and energy saving techniques.	Medium term	MEPD	FC; EMA; Local Authorities; BCSDZ; CZI; ZNCC; MSMECD; Tobacco Industries and Marketing Board; Farmers Unions; CSOs	EU; DFID; UNIDO; UN Habitat; UNEP; World Bank; Tobacco Industry and Marketing Board	USD 30 million
C6	Promote production of renewable energy equipment that uses bio-fuel, solar and biogas	Short term	MEPD	ZESA; CZI; ZNCC; MSMECD; MYIEE; MWAGCD; BCSDZ; Private Sector; CSOs; Research Institutions	EU; DFID; Private Sector; GEF; GIZ; SNV	USD 80 million

[46] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.2 Transport

ASPECT	TRANSPORT					
THEME	Transport					
STRATEGY	a) Introduce a transport policy framework that encourages use of transport with low carbon emissions.					
ACTIONS	Action	[47]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Develop a policy framework that promotes use of cleaner fuels in the transport sector.	Short term	MEPD and MTID	SAZ; EMA; MF; BCSDZ; CZI; ZNCC; Research Institutions; ZESA; CSOs	Government Treasury; Industry; GEF; UNEP; UNIDO; World Bank; DFID; EU	USD 500,000
A2	Develop legal provisions that use economic instruments to promote use of transport with low carbon emissions.	Short to medium term	MTID	MF; MEWC; MJLPA; MEPD	Government Treasury; Banks; Private Sector	USD 250,000
A3	Strengthen capacity to measure and monitor vehicle emissions and enforce emissions standards.	Short term	MTID; MEWC	MHA; Motor Industry (Manufacturers, Assemblers, Traders, Retailers); SAZ; MHTESTD; CSOs; Private Sector; Fuel Companies; Transport Operators Associations	Carbon Tax; Tollgate Fees; Fines and Penalties; Corporate Social Responsibility; Motor Industry	USD 5 million
A4	Introduce regulations that promote use of non-motorized transport to reduce carbon emissions and make provisions for non-motorized transport on existing and new road networks.	Short term	MTID	MF; MHA; MLGPWNH; MJLPA; CSOs; Media; Local Authorities; Zimbabwe Safety Council	Government Treasury; Banks; Private Sector; Cooperate Social Responsibility	USD 50 million
A5	Introduce an effective mass public transport system that includes use of big buses and rail transport.	Medium term	MTID	MF; MEWC; MHA; MLGPWNH; MJLPA; CSOs; Media	Government Treasury; GEF; UNEP; EU; DFID; UNIDO; AfDB; World Bank; Local Banks; Private Sector	USD 500 million

[47] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.2 Transport

ASPECT	TRANSPORT					
THEME	**Transport**					
STRATEGY	**b) Integrate climate resilience into transport planning and infrastructural development.**					
ACTIONS	**Action**	**[48]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Conduct baseline assessments and use results to develop climate resilient transport infrastructure.	Short term	MTID	MEWC; MF; BCSDZ; Private Sector; MHTESTD	Government Treasury; World Bank; AfDB; Banks; GEF; Global Climate Funds; Private Sector	USD 5 million (Assessment) USD 500 million (Infrastructure)
B2	Build capacity on climate resilient transport planning and infrastructure development in institutions responsible for transport planning.	Short term	MTID and MLGPWNH	MEWC; MF; BCSDZ; MHTESTD; MICTPCS Private Sector; CSOs	Government Treasury; Global Environment Fund; EU; DFID; UN Habitat; Development Partners	USD 500,000
B3	Promote research and development of appropriate technology (including technology transfer) for climate resilience in the transport sector.	Short to medium term	MTID	Private Sector; Research Institutions; MHTESTD; MF; RCZ	UNIDO; UNEP; UNDP; Global Environment Fund; European Union; DFID	USD 10 million

[48] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.3 Disaster Risk Management and Social Infrastructure (Human Settlements)

ASPECT	DISASTER RISK MANAGEMENT AND SOCIAL INFRASTRUCTURE (HUMAN SETTLEMENTS)					
THEME	Disaster Risk Management and Social Infrastructure (Human Settlements)					
STRATEGY	a) Develop an integrated and co-ordinated approach to reducing disaster risk and to address impacts of climate change through a multi-stakeholder approach.					
ACTIONS	Action	[49]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Establish an inclusive platform on climate change.	Short term	MEWC	MLGPWNH; MHA; MD; MHCC; MPSLSW; All Other Relevant Ministries; CSOs; Private Sector; Communities; UN Development Agencies; Other Development Partners	Government Treasury; GEF; UNEP; World Bank; PPPs; Other Development Partners	USD 100,000
A2	Develop mechanism for sectoral mainstreaming of disaster risk management and climate change.	Short term	MEWC	MLGPWNH; MHA; MD; MHCC; MPSLSW; All Other Relevant Ministries; CSO; Private Sector; Communities; UN Development Agencies; Other Development Partners	Government Treasury; GEF; UNEP; World Bank; PPPs; Other Development Partners	USD 1 million

[49] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.3 Disaster Risk Management and Social Infrastructure (Human Settlements)

ASPECT	DISASTER RISK MANAGEMENT AND SOCIAL INFRASTRUCTURE (HUMAN SETTLEMENTS)					
THEME	Disaster Risk Management and Social Infrastructure (Human Settlements)					
STRATEGY	b) Enhance early warning systems and capacity of hydro- meteorological services to advise on weather related impacts on new social infrastructure as well as mitigation of potential damage to existing infrastructure.					
ACTIONS	Action	[50]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Capacitate hydro-meteorological early warning systems at national, provincial and district levels.	Short term	MEWC	MLGPWNH (Department of Civil Protection); MPSE; MTID; MF; Traditional Leaders; CSOs; Catchment Councils; Sub-catchment Councils	Government Treasury; GEF; UNEP; PPPs; Multi-Donor funds; World Bank; WMO; Other Development Partners	USD 5 million
B2	Enhance and promote indigenous knowledge systems at community levels for early warning systems.	Short term	MEWC	MLGPWNH (Department of Civil Protection); MPSE; Other Relevant Ministries; Traditional Leaders; CSOs	Government Treasury; GEF; UNEP; PPPs; Other Development Partners.	USD 1 million
B3	Promote research on impacts of climate change on human settlements	Short to medium term	MLGPWNH	MEWC; MHTESTD; Other Relevant Ministries; Research Institutions; CSOs; RCZ; ZIE; ECZ	Government Treasury; GEF; UNEP; UN Habitat; UNICEF; World Bank; AfDB; PPPs; Other Development Partners	USD 10 million

[50] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.3 Disaster Risk Management and Social Infrastructure (Human Settlements)

ASPECT	DISASTER RISK MANAGEMENT AND SOCIAL INFRASTRUCTURE (HUMAN SETTLEMENTS)					
THEME	Disaster Risk Management and Social Infrastructure (Human Settlements)					
STRATEGY	c) Review and update policy and by-laws on building standards and codes to make them adaptive to climate change.					
ACTIONS	Action	[51]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Review and update national building policy; model building by-laws and development plans.	Short term	MLGPWNH	ZIE; ECZ; Institute of Architects of Zimbabwe; Architect's Council of Zimbabwe; Construction Industry Federation of Zimbabwe; MHTESTD	Government Treasury; GEF; UNDP; UNEP; World Bank; AfDB; PPPs; Other Development Partners	USD 350,000
C2	Raise public awareness on building standards, policies and by-laws.	Short term	MLGPWNH	ZIE; ECZ; Institute of Architects of Zimbabwe; Architect's Council of Zimbabwe; Construction Industry Federation of Zimbabwe; CSOs	Government Treasury; PPPs; Development Partners	USD 500,000
C3	Strengthen capacity to enforce by-laws and policies on building standards, and put in place stiffer penalties for offenders.	Short term	MLGPWNH	MHA; MJLPA; ZIE; ECZ	Government Treasury; PPPs; Fines from Offenders	USD 500,000

[51] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.3 Disaster Risk Management and Social Infrastructure (Human Settlements)

ASPECT	DISASTER RISK MANAGEMENT AND SOCIAL INFRASTRUCTURE (HUMAN SETTLEMENTS)					
THEME	Disaster Risk Management and Social Infrastructure (Human Settlements)					
STRATEGY	d) Invest in climate resilient social infrastructure.					
ACTIONS	Action	[52]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
D1	Climate proof and retrofit existing and future social infrastructure in both rural and urban areas.	Short term	MLGPWNH	ZIE; ECZ; Institute of Architects of Zimbabwe; Architect's Council of Zimbabwe; Construction Industry Federation of Zimbabwe; MHTESTD; Development Partners	Government Treasury; GEF; UNDP; UN Habitat; UNICEF; Other UN Agencies; World Bank; AfDB; PPPs; Other Development Partners	USD 500 million

[52] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.3 Disaster Risk Management and Social Infrastructure (Human Settlements)

ASPECT	DISASTER RISK MANAGEMENT AND SOCIAL INFRASTRUCTURE (HUMAN SETTLEMENTS)					
THEME	Disaster Risk Management and Social Infrastructure (Human Settlements)					
STRATEGY	e) Enhance community resilience to climate change.					
ACTIONS	Action	[53]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
E1	Raise public awareness of at risk communities.	Short term	MEWC	MLGPWNH; MPSE; Other relevant Ministries; Local Authorities; Traditional Leaders; CSOs	Government Treasury; GEF; UNDP; UNICEF; Other UN Agencies; Private Sector; Development Partners	USD 1 million

[53] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.4 Waste Management

ASPECT	WASTE MANAGEMENT					
THEME	Waste Management					
STRATEGY	a) Capacitate local authorities to deliver proper, effective and efficient waste management services in order to reduce GHG emissions from waste management.					
ACTIONS	Action	[54]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Promote the adoption of an integrated approach to liquid and solid waste management by all local authorities and waste generators in order to minimise quantities of waste disposed.	Short term	MLGPWNH; MEWC	Local Authorities; Private Sector; MIC; MPSE; MHTESTD; MSMECD; MWAGCD; MYIEE; CSOs; Research Institutions; Private Sector; BCSDZ	Government Treasury; UNEP; Other UN Agencies; Development Partners; Private Sector; Banks	USD 8 million
A2	Improve the resource base of local authorities to enhance their capacity to practise efficient and effective waste management methods in order to reduce the open burning of waste and the resultant carbon emissions.	Long term	MLGPWNH (Local Authorities)	MF; EMA; MPSE; MHTESTD; MIC; BCSDZ; MHCC; CSOs	Government Treasury; Development Partners; World Bank; AfDB; Private Sector; Local Banks	USD 100 million
A3	Continue to train local authorities to develop local environmental action plans and to construct proper landfills and sewage works that capture methane.	On-going	MEWC (EMA)	MLGPWNH (Local Authorities); MF; MEPD	Government Treasury; CDM; Private Sector; Local Banks; Development Partners	USD 100 million

[54] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.4 Waste Management

ASPECT	WASTE MANAGEMENT					
THEME	Waste Management					
STRATEGY	b) Create an enabling policy environment which encourages investment into alternative energy production using waste.					
ACTIONS	Action	[55]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Promote research and development into use of solid waste for energy recovery/electricity generation.	Short term	MEWC; MHTESTD	MEPD; MLGPWNH (Local Authorities); CSOs; RCZ; Research Institutions	Government Treasury; UNDP; UNIDO; Other UN agencies; Multinational Institutions	USD 1 million (Research) USD $20 million (Implementation)

[55] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.4 Waste Management

ASPECT	WASTE MANAGEMENT					
THEME	Waste Management					
STRATEGY	c) Develop an enabling framework to promote waste minimization through education and behavioural change of waste generators.					
ACTIONS	Action	[56]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Incorporate principles of environmentally sound waste management into the curricula of informal and formal education systems.	Short term	EMA	MPSE; MHTESTD; CSOs; MHCC; Local Authorities	EMA; Local Authorities; Private Sector	USD 500,000
C2	Strengthen capacity to enforce polluter pays principles and provide incentives to encourage waste minimization.	Short term	Local Authorities; EMA	MEWC; MHA; CSOs	Government Treasury; Environment Fund; Private Sector; Development Partners	USD 1 million
C3	Introduce prohibitive fines and reinvest funds raised through waste fines into the sector to enhance waste management.	Short term	Local Authorities; MEWC	MHA	Government Treasury; Environment Fund	USD 500,000

[56] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.5 Health

ASPECT	HEALTH					
THEME	Health					
STRATEGY	a) Strengthen surveillance programmes for monitoring human health under a changing climate.					
ACTIONS	Action	[57]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Enhance monitoring programmes and training of health officers on the distribution and progress of epidemics associated with climate change.	Short term	MHCC	MLGPWNH; MEWC; MAMID (Livestock and Veterinary Department); MHTESTD; CSOs, EMA	Government Treasury; WHO; Other UN agencies; Other Development Partners; Private Sector	USD 5 million

[57] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.5 Health

ASPECT	HEALTH					
THEME	Health					
STRATEGY	b) Build resilience against diseases that occur because of impacts of climate change.					
ACTIONS	Action	[58]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Build capacity for both curative and preventive measures for diseases that might occur during climate induced disasters or as a consequence of increased temperatures.	Long term	MHCC	MLGPWNH; MAMID (Livestock and Veterinary Department); CSOs; Private Sector; Communities.	Government Treasury; UN Agencies (UNICEF, WHO, UN Habitat); Other Development Partners; Private Sector; CSOs	USD 5 million
B2	Expand health facilities and networks to remote areas by building more clinics and disaster reduction centres in areas prone to climate induced disasters.	Medium term	MHCC	MTID; MLGPWNH; DDF; CSOs; Private Sector; Communities	Government Treasury; UN agencies (UNICEF, WHO, UN Habitat); Other Development Partners; Private Sector; CSOs	USD 20 million
B3	Enhance institutional capacities for early warning systems, preparedness and response on possible disease risks caused by extreme weather events at all levels of society.	Medium term	Department of Civil Protection; MHCC	ZDF; MHA; Department of Meteorological Services; MAMID (Livestock and Veterinary Department); Private Sector; Traditional Leaders	Government Treasury; Global Climate Funds	USD 10 million
B4	Harness Information and Communication Technology (ICT) in public awareness campaigns on epidemics associated with climate change.	Short term and on going	MHCC	MICTPCS; MAMID (Livestock and Veterinary Department); MPSE; Research Institutions; CSOs	Government Treasury; WHO; Other Development Partners	USD 2 million
B5	Promote climate proofing investments for health and create a conducive environment for the use of weather-indexed insurance.	Medium to long term	MF; NSSA	MHCC; MAMID; (Livestock and Veterinary Department); MLGPWNH (Department of Civil Protection); MEWC; Private Sector; Communities; CSOs	Private Sector	USD 10 million

[58] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.6 Gender, People Living with HIV and AIDS and Other Vulnerable Groups

ASPECT	GENDER, PEOPLE LIVING WITH HIV AND AIDS AND OTHER VULNERABLE GROUPS					
THEME	Gender, People Living with HIV and AIDS and Other Vulnerable Groups					
STRATEGY	a) Mainstream climate change in policies for the vulnerable groups with their active participation at every level.					
ACTIONS	Action	[59]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Review cross-sectoral policies and mainstream adaptation of vulnerable groups to climate change.	Short term	MEWC	MWAGCD; MPSE; MYIEE; MHCC; MHTESTD; MF; MLGPWNH; MPSLSW; CSOs	Government Treasury; UN Women; Other UN Agencies; CSOs; Private Sector	USD 250,000

[59] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.6 Gender, People Living with HIV and AIDS and Other Vulnerable Groups

ASPECT	GENDER, PEOPLE LIVING WITH HIV AND AIDS AND OTHER VULNERABLE GROUPS					
THEME	Gender, People Living with HIV and AIDS and Other Vulnerable Groups					
STRATEGY	b) Strengthen the adaptive capacity of the vulnerable groups.					
ACTIONS	Action	[60]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Build adaptive capacity in vulnerable groups and mainstream these groups in all responses.	Long term, On-going	MEWC	MWAGCD; MPSE; MHTESTD; MYIEE; MHCC; MF; MLGPWNH; MPSLSW; CSOs	Government Treasury; UN Women; UNICEF; CSOs; Private Sector	USD 10 million
B2	Ensure equitable access and ownership of resources for climate change adaptation by vulnerable groups.	Long term	MYIEE; MWAGCD	MPSLSW; MLRR; MLGPWNH; MEWC; MAMID; MYIEE	Government Treasury; UN Agencies; Local and International Development Partners; Private Sector	USD 500,000
B3	Develop culturally appropriate and gender sensitive labour saving green technologies.	Medium term	MEWC	MWAGCD; MHTESTD; MAMID; MYIEE; MSMECD; MIC; Research Institutions; CSOs	Government Treasury; Global Climate Funds; UN Agencies; CSOs; Private Sector	USD 10 million
B4	Use integrated adaptation responses that combine indigenous knowledge from the elderly with expert insights.	Short term	MEWC	MWAGCD; MPSE; MHTESTD; MLGPWNH; Research Institutions	UN Women; UNICEF; Other UN Agencies; CSOs; Private Sector	USD 500,000

[60] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.6 Gender, People Living with HIV and AIDS and Other Vulnerable Groups

ASPECT	GENDER, PEOPLE LIVING WITH HIV AND AIDS AND OTHER VULNERABLE GROUPS					
THEME	Gender, People Living with HIV and AIDS and Other Vulnerable Groups					
STRATEGY	c) Enhance provision of early warning systems on droughts, floods and disease outbreaks to vulnerable groups and ensure a coordinated approach in providing them with emergency services.					
ACTIONS	Action	[61]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Create a multi-stakeholder forum with representatives of vulnerable groups for emergency services provision.	Short term	Department of Civil Protection	MWAGCD; MPSE; MHTESTD; MYIEE; MHCC; MF; MLGPWNH; MPSLSW; CSOs	Government Treasury; UNDP; UN Women; UNICEF; Other UN agencies; CSOs; Private Sector	USD 250,000
C2	Disseminate updated information on climate change and raise awareness of vulnerable groups on disaster preparedness.	Short term	Department of Civil Protection	MWAGCD; MPSE; MLGPWNH; MPSLSW; CSOs	Government Treasury; UN agencies; CSOs; Private Sector	USD 1 million
C3	Train vulnerable groups on how to respond to disaster.	Short term	Department of Civil Protection	MWAGCD; MPSE; MYIEE; MHCC; MLGPWNH; MPSLSW; CSOs	Government Treasury; UN agencies; CSOs; Private Sector	USD 2 million

[61] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.7 Children and Youth

ASPECT	CHILDREN AND YOUTH					
THEME	Children and Youth					
STRATEGY	a) Understand the impacts of climate change on children and youth in Zimbabwe and create an enabling environment that prevents harm to them emanating from pressures of these impacts.					
ACTIONS	Action	[62]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Determine the vulnerabilities of children and youth and how these vulnerabilities will be magnified by the impacts of climate change.	Short term	MEWC	MPSE; MHTESTD; MHCC; Research Institutions	Government Treasury; UNICEF; Other UN Agencies	USD 1 million
A2	Identify and implement interventions that protect and empower children in the face of adverse impacts of climate change.	Short to long term	MEWC	MPSE; MHTESTD; MHCC; Local Authorities; Local leaders; Research Institutions; Development Partners; CSOs	Government Treasury; UNICEF, Other UN Agencies; Other Development Partners	USD 5 million
A3	Provide support to ensure that all children in Zimbabwe are food secure and able to attend and complete school in a changing climate; and reduce the incidence of diseases in children, especially those associated with climate change.	Long term	MEWC	MPSE; MHTESTD; MHCC; Local Authorities; Local Leaders; Research Institutions; Development Partners; CSOs	Government Treasury; UNICEF; Other UN Agencies; Other Development Partners	USD 20 million

[62] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

3. PHYSICAL AND SOCIAL INFRA-STRUCTURE

3.7 Children and Youth

ASPECT	CHILDREN AND YOUTH					
THEME	Children and Youth					
STRATEGY	b) Ensure the inclusion of children and youth in the policy formulation process for climate change, and in adaptation and mitigation activities.					
ACTIONS	Action	[63]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Incorporate children and youth in the climate change governance framework.	Short term	MEWC	MPSE; MHTESTD; MHCC; MYIEE; Research Institutions; Development Partners; National Youth Council	Government Treasury; UNICEF; Other UN Agencies; Other Development Partners	USD 170,000
B2	Promote the participation of children and youth in climate change policy issues.	Long term	MEWC	MPSE; MHTESTD; MHCC; MYIEE; National Youth Council; Research Institutions; Development Partners	Government Treasury; UNICEF; Other UN Agencies; Other Development Partners	USD 500,000
B3	Build capacity of children and youth for adaptation and provide resources for them to participate in climate change adaptation and mitigation activities.	Long term	MEWC	MPSE; MHTESTD; MHCC; MYIEE; Local Authorities; Local Leaders; National Youth Council; Research Institutions; CSOs.	Government Treasury; UNICEF; Other UN Agencies; Other Development Partners	USD 5 million

[63] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

4.1.1 Capacity Building for Climate Change

ASPECT	STRATEGY ENABLERS					
THEME	Capacity Building					
STRATEGY	a) Build capacity to conduct comprehensive vulnerability assessments and develop appropriate response models.					
ACTIONS	Action	[64]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Develop a detailed understanding of local hazards; social, climatic vulnerabilities and risks; and possible responses.	Short term	MLGPWNH	MEWC; MTID; MPSLSW; Research Institutions; CSOs; Extension Departments; Local Authorities; Traditional Leaders	Government Treasury; Climate Finance; Global Environment Fund; GEF; Other Development Partners	USD 2 million
A2	Build capacity to identify population groups or settlements that are at risk and to assess whether the infrastructure and buildings will be able to withstand extreme events.	Short to medium term	MLGPWNH	MEWC; MTID; MPSLSW; Research Institutions; CSOs; Extension Departments; Local Authorities; ZIE; ECZ; Institute of Architects of Zimbabwe; Architect's Council of Zimbabwe; Construction Industry Federation of Zimbabwe; Traditional Leaders	Government Treasury; Climate Finance; Global Environment Fund; GEF; Other Development Partners	USD 3 million

[64] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

ASPECT	STRATEGY ENABLERS					
THEME	**Capacity Building**					
STRATEGY	**b) Develop mechanisms to mainstream climate change adaptation and disaster risk management into development programmes.**					
ACTIONS	**Action**	**[65]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Enhance capacity to respond to climate change within climate sensitive sectors.	On going	MEWC; MLGPWNH	All Climate Sensitive Government Ministries; Private Sector; CSOs; Development Agencies	Government Treasury; Climate Finance; Global Environment Fund; GEF; Other Development Partners	USD 10 million
B2	Develop the capacity of communities for adaptation, mitigation and disaster preparedness and response.	On going	MEWC; MLGPWNH	MPSLSW; MWAGCD; MAMID; MHCC; CSOs	Government Treasury; Climate Finance; Global Environment Fund; GEF; Other Development Partners	USD 10 million
B3	Introduce social assistance programmes and develop national risk-sharing arrangements that support the most vulnerable.	On going	MPSLSW	MLGPWNH; MF; CSOs; Development Agencies	Government Treasury; UN Agencies; Other Development Partners	USD 20 million

[65] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

4.1.2. The Role of the Meteorological Services in Climate Change

ASPECT	STRATEGY ENABLERS					
THEME	Role of Meteorological Services					
STRATEGY	a) Strengthen the capacity of the National Meteorological and Hydrological Services to carry out research on climate change through improved data collection and management, and climate modelling.					
ACTIONS	Action	[66]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Build capacity (human and material) of the Meteorological Services to carry out research on climate change in order to understand its causes, and its potential impacts on various sectors through improved and expanded data collection and management, as well as climate modelling.	Short to long term	MEWC	MEPD; MAMID; MPSE; MHTESTD; Research Institutions	Government Treasury; WMO; Other UN Agencies; World Bank; AfDB; Other Development Partners	USD 10 million
A2	Build an integrated data collection system and database incorporating international best practice.	Short term	Department of Meteorological Services	MHTESTD; Research Institutions; ZIMSTAT; WMO	Government Treasury; WMO; Other UN Agencies; World Bank; AfDB; Other Development Partners	USD 10 million

[66] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

ASPECT	STRATEGY ENABLERS					
THEME	Role of Meteorological Services					
STRATEGY	b) Strengthen the documentation of and tapping into indigenous knowledge systems to complement scientific knowledge for climate change forecasting and early warning systems.					
ACTIONS	Action	[67]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Document indigenous knowledge on climate forecasting to complement scientific knowledge for climate change adaptation at community level.	Short to medium term	Department Meteorological Services	MHTESTD; Research Institutions; Local Authorities; CSOs; Traditional Leaders; Communities	Government Treasury; UN Agencies	USD 1 million

[67] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

ASPECT	STRATEGY ENABLERS					
THEME	**Role of Meteorological Services**					
STRATEGY	**c) Establish an enabling framework for sharing and disseminating information on climate change (i.e. at provincial, district and ward levels) in the country.**					
ACTIONS	**Action**	**[68]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
C1	Create platforms for disseminating and sharing of information on climate change issues at all levels including grassroots level.	Short to medium term	MEWC	Local Authorities; MAMID; MPSE; MHTESTD; MMIBS; MICTPCS; CSOs; CBOs; Traditional Leaders	UN Agencies; Government	USD 2 million

[68] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

4.1.3. Technology transfer

ASPECT	STRATEGY ENABLERS					
THEME	Technology Transfer					
STRATEGY	a) Create a policy framework that will improve access to and promote uptake of cleaner and more efficient technologies across all economic sectors.					
ACTIONS	Action	[69]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Identify inefficient technologies to be substituted with innovative low carbon technologies across all economic sectors.	Medium term	MIC	MEWC; MHTESTD; MMMD; MAMID; MTID; MF; MSMECD; MYIEE; CSOs; Development Partners	Government Treasury; Private Sector; Environment Fund; CDM; UNIDO	USD 1 million
A2	Provide incentives for technology transfer which promote the uptake of resource use efficiency and cleaner production technologies across the economic sectors.	Short to long term	MIC	MF; Private Sector; MEWC; MMMD; MAMID; MTID; MSMECD; MYIEE; Development Partners	Government Treasury; Private Sector; Environment Fund; CDM; UNIDO	USD 500 million (revolving fund)
A3	Enforce air emissions and effluent regulations and standards which will push companies to invest in more efficient and cleaner technologies.	Short term	MEWC (EMA)	SAZ; Private Sector; MHA; MJLPA; BCSDZ; CZI; ZNCC	Government Treasury	USD 500,000
A4	Promote the uptake of more climate resilient technologies in agriculture, mining, industry, energy, etc.	Short to long term	MEWC	MIC; MMMD; MAMID; MTID; MSMECD; MEPD; MYIEE; Private Sector; Research Institutions; CSOs; Development Partners	Government Treasury; Private Sector; Environment Fund; CDM	USD 20 million (revolving fund)

[69] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.1 Capacity Building

ASPECT	STRATEGY ENABLERS					
THEME	Technology Transfer					
STRATEGY	b) Support research and development of technologies in all relevant sectors to mitigate and adapt to climate change.					
ACTIONS	Action	[70]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Improve funding for private and public sector research and development into more efficient technologies.	Short to long term	MIC	MHTESTD; MF; MEWC; MMMD; MAMID; MTID; MSMECD; MEPD; RCZ; Research Institutions; Private Sector; CSOs; Development Partners	Government Treasury; Private Sector; Environment Fund; CDM	USD 50 million
B2	Enhance capacity of local research institutions to test, adopt and adapt new and more efficient technologies used in other parts of the world.	Short to long term	MHTESTD	Research Institutions; RCZ; MEWC; MF; Private Sector; CSOs; Development Partners	Government Treasury; Private Sector; Environment Fund; CDM	USD 2 million
B3	Raise awareness on the economic and climate change benefits of adopting cleaner technologies for sustainable development.	Short to long term	MEWC	CSOs; BCSDZ; MMIBS; CZI; ZNCC; MSMECD; MYIEE; MWAGCD	Government Treasury; Private Sector; UN Agencies and Other Development Partners	USD 500,000

[70] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	Climate Change Education and Training					
STRATEGY	a) Enhance the teaching and learning of climate change at all levels of education (formal and informal).					
ACTIONS	Action	[71]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Review the content of the education curricula at all levels to incorporate climate change and produce literature in all relevant languages.	Short to medium term	MPSE; MHTESTD	MEWC; MAMID; Universities; Agricultural and Teacher Training Colleges; ZIMSEC	Government Treasury; UNESCO; UNICEF	USD 3 million
A2	Continuously monitor, evaluate and upgrade the curricula to keep up with global trends and good practice.	Short to medium term	MPSE; MHTESTD	MEWC; MAMID; Agricultural and Teacher Training Colleges; Research Institutions	Government Treasury; UNESCO; UNICEF; Other Development Partners	USD 1 million
A3	Create platforms for competitions on climate change issues through establishment of climate change clubs at all schools and training centres.	Short term	MPSE; MHTESTD	MYIEE; EMA; MAMID; Universities; Agricultural and Teacher Training Colleges; Schools	GEF, Local and International Companies; EMA; UNICEF; Private Sector	USD 500,000
A4	Create opportunities for all people to learn more about climate change as it relates to the management of the environment.	Short to medium term	MEWC	EMA ; ZINWA; Catchment Councils; FC; Zimparks; MYIEE; MWAGCD; Research Institutions; Local Authorities; Traditional Leaders	Government Treasury; GWP; UNEP; UNDP; Private Sector	USD 1 million

[71] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	Climate Change Education and Training					
STRATEGY	b) Provide relevant training on climate change issues to educators and practitioners working with communities.					
ACTIONS	Action	[72]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
B1	Conduct in-service training of current educators and extension workers until saturation levels are reached or a critical mass of teachers with climate change skills is produced.	Short to medium term	MPSE; MHTESTD	MEWC; PSC; MAMID; Universities; Agricultural and Teacher Training Colleges; EMA; CSOs	Government Treasury; GEF, UNEP, UNDP, UNICEF, UNESCO; Private Sector	USD 2 million
B2	Enhance the climate change knowledge of media and other professionals through the use of various platforms in order to achieve change in perceptions, attitudes and behaviour towards climate change mitigation and adaptation.	Short to medium term	MEWC	MMIBS; MICTPCS; MAMID; MHTESTD; MPSLSW; MLGPWNH; ZCTU; Zimbabwe Federation of Trade Union; Chamber of Mines	Government Treasury; UNEP; UNDP; UNESCO; GWP; Private Sector	USD 1 million
B3	Train traditional leadership on their roles and responsibilities and use the traditional institutions as a vehicle for educating communities on climate change issues.	Medium term	MEWC	Traditional Leaders; MLGPWNH; RDCs	Government Treasury; GEF; UNDP; UNICEF; Zimbabwe Cultural Fund	USD 5 million
B4	Actively engage youth and their representative organizations in climate change education and training.	Short to medium term	MEWC	MYIEE; MHTESTD; MPSE; MAMID	Government Treasury; UNESCO; UNICEF; Private Sector	USD 1 million

[72] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

4.2.2 Public Awareness-raising and Communication

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	Public Awareness-raising and Communication					
STRATEGY	a) Implement a communication strategy for raising awareness on climate change.					
ACTIONS	Action	[73]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Implement a communication strategy to raise awareness on climate change that recognises use of media such as newspapers, radio, television and social media.	Short to long term	MEWC	MMIBS; MICTPCS; Local Media Houses; Wireless Networks; CSOs	UN Agencies; Media Houses; Wireless Network Providers	USD 2.5 million
A2	Develop awareness, communication and advocacy materials (such as posters, pamphlets, videos, compact discs (CDs) in both English and local languages) and fundraising strategies.	Short term	MEWC	MMIBS; MICTPCS; Artists Organizations; Media Organizations	UN Agencies ; Other Development Partners; Private Sector	USD 5 million
A3	Conduct out-reach programmes on awareness and information exchange on climate change adaptation and mitigation across various stakeholders including grassroots-communities.	Short term	MEWC	MMIBS; MICTPCS; Media Houses; MPSE; MLGPWNH; Traditional Leaders; CSOs; Church Organizations	Government Treasury; UNDP; GEF; Private sector	USD 2 million
A4	Employ leaders, educators, mentors and community popular opinion leaders to share their knowledge, values and experience with different target audiences to ensure an increase in behavioural change towards climate change adaptive behaviours.	Short to long term	MEWC	MPSE; MYIEE; MLGPWNH; MWAGCD; MAMID; ZINWA; EMA; FC; Traditional and Political Leaders	Government Treasury; GEF; UNEP	USD 500,000

[73] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	**Public Awareness-raising and Communication**					
STRATEGY	**b) Promote and strengthen stakeholder awareness on adaptation to and mitigation of climate change.**					
ACTIONS	**Action**	**[74]Indicative Time Frame**	**Lead Agency**	**Co-operating Agencies**	**Potential Source for Resources Mobilisation**	**Estimated Costs**
B1	Sensitize policy makers on the importance of addressing climate change issues especially in the areas of adaptation and mitigation.	Short term	MEWC	Clerk of Parliament; Parliament; Heads of Ministries; MMIBS; MICTPCS	Government Treasury; UN Agencies	USD 100,000
B2	Engage the Junior Parliamentarians to act as champions for creating awareness on climate change issues.	Short to medium term	MYIEE (Youth Council of Zimbabwe); MEWC	Clerk of Parliament; MMIBS; MICTPCS; Media houses; CSOs	Government Treasury; Private Sector; UNICEF; UNESCO	USD 500,000
B3	Promote awareness through participatory information exchange and empowerment of local communities for adaptation and mitigation to climate change.	Short to medium term	MEWC	MMIBS; MICTPCS; MAMID; Media Houses; CSOs; Traditional and Political Leaders	Government Treasury; GEF; UN Agencies; Private Sector	USD 1 million

[74] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	Public Awareness-raising and Communication					
STRATEGY	c) Encourage sharing of information and networking on climate change issues at local, regional, and international levels.					
ACTIONS	Action	[75]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
C1	Develop an information data base on climate change adaptation and mitigation issues.	Short term	MEWC	Local Authorities, ZIMSTAT; Research Institutions; CSOs; Extension Departments; Traditional Leaders	Government Treasury; UNDP; UNICEF; Other Development Partners	USD 1 million
C2	Develop mechanisms of employing ICTs to disseminate information and to enable formation of social networks on climate change adaptation and mitigation issues.	Short term	MEWC	MICTPCS; MHTESTD; MAMID; Local Media Houses; Wireless Networks; Youth Council of Zimbabwe	UN Agencies; Media Houses	USD 1 million
C3	Form community based climate change clubs including introduction of climate change shows (village, ward, district and provincial levels) as a platform for changing towards climate change adaptive behaviour.	Short term	MEWC	MAMID; MPSE; Research Institutions; Traditional and Political Leaders	Government Treasury; GEF; UNEP	USD 500,000
C4	Establish local and regional forums that provide a platform for sharing climate change information and adaptation practices.	Short term	MEWC	MICTPCS; MLGPWNH; MMIBS; Research Institutions; Media Houses; Universities; CSOs	Government Treasury; UNDP; Private Sector; COMESA; SADC; AU	USD 500,000

[75] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

4. STRATEGY ENABLERS

4.2. Climate Change Education, Communication and Public Awareness

ASPECT	CLIMATE CHANGE EDUCATION, COMMUNICATION AND PUBLIC AWARENESS					
THEME	Communication and awareness raising					
STRATEGY	d) Communicate climate change messages incorporating indigenous knowledge systems.					
ACTIONS	Action	[76]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
D1	Document and mainstream indigenous knowledge systems on climate change into communication and awareness raising systems.	Medium term	MEWC	MHTESTD; MICTPCS; MMIBS; MPSE; MLGPWNH; Research Institutions; Media Houses	Government Treasury; UNDP; UNESCO; Other UN Agencies; Private Sector	USD 500,000

[76] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

5. CLIMATE CHANGE GOVERNANCE

5.1 Climate Change Governance and Institutional Framework

5.1.1 Climate Change Governance

ASPECT	CLIMATE CHANGE GOVERNANCE					
THEME	Climate Change Governance					
STRATEGY	a) Mainstream climate change into urban and rural development planning, infrastructure, investments and service delivery.					
ACTIONS	Action	[77]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Promote a multi-stakeholder approach in urban and rural development planning, infrastructure, investments and service delivery.	Short term	MLGPWNH	MEPD; MEWC; MHCC; MPSLSW; MWAGCD; MTID; MAMID; Private Sector; Communities; CSOs; UN Agencies and Development Partners	Government Treasury; Development Partners	USD 800,000
A2	Build the institutional, financial and adaptive capacity of local authorities to address climate hazards and to adopt budgets and plans that are responsive to climate change.	Medium to long term	MLGPWNH	MEWC; MF; Local Authorities; Communities; CSOs; UN Agencies and Development Partners	Government Treasury; World Bank; African Development Bank; Private Sector; Development Partners	USD 15 million
A3	Promote Public-Private-Community Partnerships (PPCPs) in the delivery of services such as improved water and sanitation for low-income households and development of urban infrastructure and housing as an adaptation strategy.	Long term	MLGPWNH	MEWC; MTID; Private Sector; CSOs; Urban WASH; UN Agencies; Development Partners	Government Treasury; World Bank; AfDB; Private Sector; UNICEF; Development Partners	USD 70 million

[77] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

5. CLIMATE CHANGE GOVERNANCE

5.1 Climate Change Governance and Institutional Framework

5.1.2 Climate Change Institutional Framework

ASPECT	CLIMATE CHANGE GOVERNANCE					
THEME	Climate Change Institutional Framework					
STRATEGY	a) Institutionalize the climate change response governance framework at national, provincial and community levels.					
ACTIONS	Action	[78]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Strengthen existing governance structures at national, provincial and community levels to incorporate climate change.	Short term	MEWC	OPC; MLGPWNH; Line Ministries; Local Authorities; Communities; CSOs	Government Treasury; UN Agencies; Private Sector; Other Development Partners	USD 1 million

[78] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years

5. CLIMATE CHANGE GOVERNANCE

5.2 Climate Change Policy and Legal Framework

ASPECT	CLIMATE CHANGE GOVERNANCE					
THEME	Climate Change Policy and Legal framework					
STRATEGY	a) Enact an enabling policy environment for climate change response.					
ACTIONS	Action	[79]Indicative Time Frame	Lead Agency	Co-operating Agencies	Potential Source for Resources Mobilisation	Estimated Costs
A1	Review laws and policies governing climate change.	Short term	MEWC	MJLPA; Line Ministries; CSOs; Communities; UN Agencies; Development Partners	Government Treasury; UN Agencies; Private Sector; Other Development Partners; COMESA	USD 250,000
A2	Develop a climate change policy.	Short term	MEWC	MJLPA; Line Ministries; CSOs; Communities	Government Treasury; UNDP; UNICEF; Other UN Agencies; Private Sector; Other Development Partners; COMESA	USD 750,000

[79] Short term =1-5 years; medium term= 6-10 years; long term = more than 10 years