THE AFRICAN CAPACITY BUILDING FOUNDATION | FONDATION POUR LE RENFORCEMENT DES CAPACITES EN AFRIQUE

Zimbabwe Economic Policy Analysis and Research Unit

ENHANCING NATURAL RESOURCE MANAGEMENT IN ZIMBABWE

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ZEPARU

ENHANCING NATURAL RESOURCE MANAGEMENT IN ZIMBABWE:

CASE STUDIES OF MINERAL EXPLORATION; FORESTRY MANAGEMENT; WILD LIFE MANAGEMENT AND SOLAR ENERGY

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NTS	National Transmission System
NUST	National University of Science & Technology
PARC	Pan-African Reporting Code
RCZ	Research Council of Zimbabwe
RDCs	Rural Districts Councils
REA	Rural Electrification Agency
REAZ	Renewable Energy Association of Zimbabwe
REF	Rural Electrification Fund
REFIT	Renewable Energy Feed-in Tariff
SADC	Southern African Development Community
SAZ	Standards Association of Zimbabwe
SDG	Sustainable Development Goal
SFM	Sustainable Forest Management
SIRDC	Scientific Industrial Research & Development Centre
TSP	Transitional Stabilisation Plan
UN	United Nations
UNFC	United Nations Framework Classification for Resources
UNFC-AMREC	United Nations Framework Classification – African Mineral and Energy Resource Management System
UZ	University of Zimbabwe
ZELA	Zimbabwe Environmental Law Association
ZERA	Zimbabwe Energy Regulatory Authority
ZETDC	Zimbabwe Electricity Distribution Company
ZGS	Zimbabwe Geological Society
ZIA	Zimbabwe Investment Authority
Zim ASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZMDC	Zimbabwe Mineral Development Corporation
ZSE	Zimbabwe Stock Exchange

ACRONYMS

AEMFC	African Exploration Mining and Finance Corporation
AfDB	African Development Bank
AU-AWG	African Union -AMREC Working Group
AWF	Africa Wildlife Foundation
CAMPFIRE	Communal Areas Management Programme For Indigenous Resources
CBM	Coal-Bed Methane
CBNRM	Communal Area Conservancies as part of a Community-based natural resource management
CDB	Convention on Biological Diversity
CEE	Canadian Exploration Expenses
CIDA	Canadian International Development Agency
CPUE	Catch per Unit Effort
CSOT	Community Share Ownership Trusts
CSP	Concentrated Solar Power
CUT	Chinhoyi University of Technology
EDI	Exploration Development Incentive
EMA	Environmental Management Authority
EPO	Exclusive Prospecting Order
FAO	Food and Agricultural Organisation
FDI	Foreign Direct Investment
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
HIT	Harare Institute of Technology
HWC	Human and wildlife conflict
IDBZ	Infrastructure Development Bank of Zimbabwe
IEEA	Indigenization and Economic Empowerment Act
IPP	Independent Power Producers
IPS	Interconnected Power System
JMEI	Junior Minerals Exploration Incentive
MAB	Mining Affairs Board
MECL	Mineral Exploration Corporation Limited
MEMCZ	Minerals Exploration and Marketing Corporation of Zimbabwe
MEPD	Ministry of Energy and Power Development
MET	Ministry of Environment & Tourism
METC	Mineral Exploration Tax Credit
MMCZ	Marketing Corporation of Zimbabwe
MoA	Ministry of Agriculture
MoEPD	Ministry of Energy and Power Development
MPC	Mineral Promotion Corporation
MRS	Mineral Resource Series
NERP	Non-Exclusive Reconnaissance Permit

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CHAPTER 1: WHY NATURAL RESOURCE MANAGEMENT MATTERS

1.1 Introduction

Zimbabwe is richly endowed with natural resources which include renewables (land; forest, water; wildlife; sunshine) and non-renewables (oil; gas; minerals) among others. The exploitation of these natural resources present immense opportunities to sustain high levels of income based resource rents. The country can leverage on resource revenues to support diversification into industry. Sustainable development depends on the rents from natural resources extraction being converted into other sources of income (Newman et.al. 2016). Thus natural resource rich countries have to make decisions on whether to invest or save some of the resource rents.

Furthermore, Government can use revenue from natural resources to open up fiscal space to address fundamental constraints to competitiveness; invest in new production knowledge and linking industry to the resources through value addition and beneficiation. These can include growth and competitiveness enhancing infrastructure and skills development. Key issues that concern natural resource rich countries are issues of transparency and accountability in the exploitation of the natural resources and management of the resource revenues. In this regard resource rich countries have with varying degrees of success put in place policies; institutional and legislative frameworks to manage the exploitation of natural resources as well as management of resource revenue.

Managing natural resources can be a challenge, given that the discovery or example of new mineral resource can be disruptive. This not-withstanding, a number of African countries have been able to effectively manage their natural resources to spur development. For example, Botswana's success in managing its diamond reserves demonstrates the positive impact that governments can achieve through proper management of natural resources and the revenue. Liberia has registered some achievements in the forestry sector by curbing corruption and reducing transnational illicit timber trade; Sierra Leone has put in place relatively effective institutions and realised growth drive by natural resources including iron ore; Mozambique has transformed its forestry sector; Angola and Nigeria have established sovereign wealth funds to save some of the natural resource rents[1].

Some African countries have witnessed complex-resource conflicts in the past and achieved negative results following discovery of oil and mineral resources[2]. While there are no "silver bullets" that enable countries to avoid a resource curse and make the best possible use of natural resources for development", there steps that nations can take to mitigate the curse (ACBF, 2015)Communities most affected by the growth in exploitation of natural resources are often marginalised as much of the natural resource are located in rural areas. These communities often have to deal with the political; economic and social pressures that accompany large scale investment projects or human wild life conflicts in the

[1] See https://www.acbf-pact.org/what-we-do/how-we-do-it/knowledge-learning/africa-capacity-report/africa-capacity-indicators-2013 for details.

[2] Examples include Sierra Leone; Liberia; the Niger Delta in Nigeria and the Democratic Republic of Congo among others.

case of investment in conservancies. While the overwhelming majority of the large foot print projects operating in Africa's rural areas, and despite the generation of taxes, royalties, and occasionally some social investments by companies, these areas remain poor. Many investors do not honour their corporate social responsibilities to these communities and rather collude with the political elite to further marginalise them (ACBF 2015).

There are possibilities to achieve real growth and transformation based on the exploitation of natural resources. The Africa Mining Vision (AMV) has as its primary and long term goal the creation of circumstances that support the transparent, equitable, and optimal exploitation of Africa's mineral resources to underpin broad based sustainable growth and socio-economic development. However, the challenges, opportunities and emergence of new development possibilities call for a deeper understanding of the natural resources landscape with a view to drawing lessons on good practice to support and sustain natural resource based industrialisation.

1.2. Purpose and Objectives of the Study

The purpose of this study is to provide policy makers and the broader public with information that can be used to inform the strategies designed to ensure that the country fully realises benefits of its rich natural resources endowments to drive economic growth and transformation to achieve the upper middle income status by 2030.While the country has diverse natural resource the study is not exhaustive but exploratory and only focused on a few natural resources: minerals; forestry; wildlife and solar energy.

1.2.1 Mineral Exploration

ZEPARU has carried out a number of studies on mines and minerals including policy issues; value addition and beneficiation; best practices on establishing and managing sovereign wealth funds and mineral beneficiation and value addition among others. This study focuses on one component of the minerals value chain that is mineral exploration. While the country is endowed with diverse mineral resources there is huge potential to discovery new minerals or new reserves of existing minerals. However, there has been underinvesting in mineral exploration by both the public and private sector. The economic challenges that hit the country since the late 1980s have seen systematic green-field exploration in Zimbabwe virtually stopping. This implies that modern technology used for green-field exploration has not been fully utilized for mineral exploration for which more minerals could have been discovered as is the case in other countries. Given that minerals are a finite resource, exploration becomes key in ensuring sustainable mineral extraction. Failure to conduct rigorous mining exploration imposes risk on sustainable development of later stages of the mineral value chain. Zimbabwe's mineral exploration regime is further hampered by country, economic and discovery risks.

Underinvestment in exploration makes it difficult to attract long term investment into the mining industry, as mining investment becomes more concentrated on known and

[4]See www.zeparu.co.zw, on publications for details on these studies.

abandoned mining claims. Given that mining exploration is at the top stages of the mining value chain, the sustainable developments of the later stages are at risk of not being undertaken. Evidence shows that the country remains under-explored despite the overwhelming mineral potential, which is attributed more to policy failure than geological limitations (Mugumbate, 2005). Creating a consistent and predictable policy environment can attract private investment into mineral exploration. Furthermore, a well-resourced government can also engage in exploration activities, discover the reserves and then invite private companies to exploit them.

There are two indicators that can undermine the long-term viability of the mining and minerals industry: status of key minerals and production volumes of key minerals. Under performance of these indicators can point to a twofold problem: the need to make more discoveries (to replace declining reserves)and the need for new discoveries that will be brought into production. Scaling up of geological mapping activities by the Zimbabwe geological survey and exploration activities are key to discovering of new mineral resources. Failure to undertake exploration results in a slow contraction of the mining and minerals industry over time, leading to gradual decline of the social and economic benefits induced by the exploitation of this natural resource. In this regard this case study sought to explore and document the initiatives by Government in identifying mining claims which appeared to have potential to grow them and selling to private mine developers. The objectives of the case study on Enhancing Mineral Exploration in Zimbabwe are to:

a) Understanding the historical and current status of mining exploration in Zimbabwe;
b) Understanding the policy framework governing mining exploration in Zimbabwe;
c) Identifying any loopholes in the current regime that could act as deterrent to exploration activities; and
d) Identifying possible response strategies to increase exploration based on examples from other countries.

1.2.2 Forest Management in Zimbabwe

Forests play a critical role in providing socio-economic and environmental benefits to Zimbabwe. They are vital for rural livelihoods, biodiversity, climate mitigation, energy supply, soil and water protection.Besides economic contribution, forests provide environmental benefits such as water catchment protection, climate change mitigation as well as cleaning the air (Timber Producers Federation, 2018).

However, depletion of forests in Zimbabwe is taking place at an alarming rate as the country lost 36.6% of its forest area between 1990 and 2015 (FAO, 2015). Depletion of forest is attributed to deforestation mainly attributed to illegal settlements, change of land use, mining, invasive alien species, pests, veld fires among others. Efforts towards afforestation and reforestation do not match the level of forest depletion. Institutional and legal frameworks for sustainable forest management are weak and the sector is facing serious financial and human resource capacity challenges to manage the forest resource sustainably.

Depletion of forest resources means that the ability of forests to deliver and sustain livelihoods is at risk and requires urgent attention. The consequences of unsustainable forest utilisation and malpractices have social, economic and environmental dimensions. Economic consequences of forest depletion includes limited supply of raw materials to the timber value chains, loss of foreign currency earnings and the eventual destruction of forest business and loss of investor confidence. Some of the social consequences include loss of jobs as company closers as well as loss of a source of livelihood for vulnerable groups particularly those in the rural areas. Forest depletion also leads to environmental degradation through increased soil erosion, siltation of rivers and desertification among other effects. Identification and adoption of Sustainable Forestry Management (SFM) strategies becomes a critical component for enhancing economic transformation to achieve the upper middle income status by 2030.

Thus the objectives of the case study on: Sustainable Forest Management in Zimbabwe are to:

- Provide an overview of the socio-economic importance of the forestry resources;
- Assess the Institutional and regulatory framework governing sustainable forestry resource management;
- Investigate the barriers to sustainable forest management;
- Draw lessons learnt from other countries endowed with forestry resources on sustainable forest management and
- Suggest recommendations on how Zimbabwe can achieve sustainable forest management.

1.2.3 Wild Life Management in Zimbabwe

Zimbabwe's wildlife regime suffers from institutional and regulatory gaps and lack of a comprehensive policy to sustainably manage the resource. Illegal trading in wild life is on the increase and the current wildlife governance structure marginalises the local people in decision making. Furthermore, increased human to wildlife conflict has been experienced through destruction of crops, body injuries and deaths. A number of programs are being put in place to address human and wildlife conflicts.For example, the CAMPFIRE Association have been working on a program to strengthen the capacity of rural communities in non-lethal human and elephant conflict mitigation and wildlife conservation using sustainable and affordable low cost technologies such as the Chili gun (mhiripiri bomber) and an effective problem elephant pre-warning system in Tsholotsho Zimbabwe[5]. Thus the objectives of the case study on: Sustainable Wildlife Management in Zimbabwe are to:

- Investigate how rural communities benefit more from sustainable use of wildlife, whilst at the same time coexisting peacefully with wildlife?
- Explore strategies that can be adopted by government in its conservation efforts to manage protected areas effectively and
- Explore ways in which communities affected by Human Wildlife Conflict can be fully represented in planning programmes on wildlife management.

[5]See example of one of the initiatives in the following link: http://www.campfirezimbabwe.org/article/human-and-elephant-conflict-mitigation-tsholotsho-zimbabwe

- To document and identify gaps in the interventions intended to address community needs and interests and while promoting sustainable exploitation of wildlife.

1.2.4 Solar Energy

Solar energy has enormous potential to supply energy which is clean and renewable yet it is underexploited. Therefore there is need for policies and legislative frameworks which promote the generation and consumption of solar energy which would contribute to environmental protection, security of energy supply and sustainable development.

Although solar energy is clean, the end-of-life disposal of PV panels poses serious environmental concerns. Solar PV waste contains toxic metals such as lead, chromium and cadmium which leach out into water and cause birth defects and cancer. When burnt, the waste also produces toxic fumes. Environmental Progress investigated how big the solar waste problem is and found out that solar PV technology produces 300 times more toxic waste than nuclear technology (Desai and Nelson, 2017).However, it is also important to note that the PV modules also contain valuable materials such as silicon, silver, copper, aluminium and glass (Dias et al, 2016).Therefore it is important to put in place policy and legislative frameworks that deal with end-of-life disposal of PV panels in order to limit adverse environmental effects and create value from the waste.

Adoption of solar energy technologies have been inhibited by relatively high costs when compared to alternative energy sources such as fossils. This partly explains the low uptake of such technologies. However technological advancements, competitive procurement and a large base of experienced international project developers, are expected to reduce costs for solar technologies for residential, commercial and utility scales within the ranges of US$0.05/kWh, US$0.04/kWh and US$0.03/kWh, respectively by year 2030. Fall in technology costs, should be complemented by policy, legislative, regulatory support and incentive frameworks to enable solar energy to compete with conventional energy technologies (Kaderják, 2012).

Solar energy technologies are also regarded as less efficient and this also partially explains why solar energy is underutilized globally. According to the World Energy Council (2016), commercial PV modules convert less than 20% of the solar energy incident on them to electricity, with efficiency rates ranging between 13% and 22% depending on the type of solar PV module. Monocrystalline solar panels are the most efficient commercially available modules, and have the longest life, with efficiency rates between 17% and 21%. It is therefore imperative to put in place policies and legislation that promote research and development towards development of more efficient solar energy technologies.

Solar technologies also require access to sunlight and large tracks of land in the case of solar technologies used to produce electricity for utility purposes. Access to sunlight for solar energy generation may be obstructed by trees and buildings or may interfere with third parties. Access to land may be complicated due to competing land uses and issues related to land rights. As a result, there is need for legislation (e.g. permitting rules, land use planning) to manage issues related to the access of sunlight and land for generating solar energy.

Solar energy generation is intermittent and less reliable because it depends on the availability and quality of the sunlight and atmospheric conditions. During the night there is no generation, while at noon there is maximum generation at optimal temperatures that do not damage solar PV cells. In winter generation is weak. Thus, solar energy generation is variable and therefore making it difficult to rely solely on it for energy. Intermittence also affects the solar penetration rate through grid access and connection because it is unable to follow pre-set schedule and production forecasts errors are higher than even demand forecast (Kaderják, 2012). This necessitates the need for policy frameworks (e.g. grid access rules, market balancing rules) that enable solar to be complemented by other energy generation technologies which are less intermittent in their generation of energy.

Zimbabwe is currently facing energy supply challenges. Less than a quarter of the population in the rural areas has access to clean energy. Electricity supplies cannot meet demand as the electricity grid is in a poor state due to inadequate investment in the sector, leading to erratic supplies. This has forced Zimbabwe to have to import expensive power from its neighbours, mainly South Africa and Mozambique. With an average access to electricity standing at 21% in the rural areas and 80% in urban areas, the need for alternative energy supplies to meet the energy supply deficit cannot be overemphasized. Yet the country has abundant renewable energy resources which are barely exploited. Zimbabwe's renewable energy resource base is made up of vast solar energy radiation (20 MJ /m^2 /day); hydro; municipal solid waste; municipal sewage biogas; agricultural waste; forestry waste (Mzezewa. C.T. and C.S. Murove, 2017).Thus, the objectives of the case study on leveraging on solar energy are to:

- Understand the current policy framework governing solar energy development;
- Identify any policy gaps in the current regime that could act as deterrent to development of solar energy; and
- Suggest viable policy response strategies that can be adopted to enhance solar energy development and use in Zimbabwe.

1.3 Methodology

This study used a case study approach to delve deeper into the challenges and opportunities for natural resource exploitation presented by the purposefully selected natural resources. The case studies involved extensive literature/document reviews to gain a grounded understanding of the extent of exploitation of each natural resource and factors that have facilitated or hindered exploitation. The desk review also traced the policies that have been put in place to guide exploration of each natural resource. Other countries' experiences were considered with a view to draw lessons on the policy; institutional; legislative frameworks and incentive frameworks to promote exploitation of each natural resource. Inferences were made on how the identified good practices can be replicated in Zimbabwe. Interviews were conducted with key informants drawn from the mining industry, forestry; wildlife and renewable energy sectors based on their knowledge of mineral exploration in Zimbabwe and beyond. Information gathered from literature review and key informant interviews was then used in developing the chapters in this book. Draft chapter for the case studies were subjected to independent and experienced expert reviewers to who provided further insight and information that improved the quality of the

case studies.

1.4. Outline of the Rest of the Study

The rest of the study will focus on the selected case studies: mineral exploration; forest management; wildlife management and solar energy in that order.

CHAPTER 2: ENHANCING MINERAL EXPLORATION IN ZIMBABWE: ISSUES AND CHALLENGES.

2.1. Background

The new Government of Zimbabwe, which came into office in November 2017 and got a fresh mandate in July, 2018, set out a long-term vision of transforming the country into an Upper Middle Income Society by 2030. One of the pillars to support this middle income status is the mining and minerals industry. Growth of this industry is underpinned by enhanced mineral exploration, opening of new and closed mines, increased capacity utilisation, beneficiation of mineral resources and strengthening of the linkages in the minerals value chains. Mining is currently one of the key economic sectors in the country, contributing about 8.6% to the country's Gross Domestic Product (GDP), more than 60% of exports and accounting for a significant share of foreign direct investment (FDI).

As captured by the Zimbabwe Geological Society (ZGS) Mineral Resource Series (MRS) books numbers 22, 23, 27 and 30, Zimbabwe is endowed with a diverse mineral resource base. The country has at least 133 minerals that have been extracted or confirmed at one time or another, consisting of about 75 gemstone varieties, 28 metal minerals, 27 types of industrial minerals and three energy minerals (Appendix 1). Zimbabwe's mineral resource base is diverse and rich, especially with respect to minerals such as platinum, chromium, diamonds, gold (in terms of geological prospectivity), black granite, asbestos, coal and tantalite. The wide variety of mineral resources is mainly found in the following geological formations and bodies:

- The Archaean Greenstone Belts: Gold as well as considerable resources of iron ore, nickel, copper, cobalt, podiform chromite, chrysotile asbestos, limestone and antimony;
- The Great Dyke: Chromium (chromite seams) and PGMs[6] with associated gold, copper, nickel and cobalt.
- The Proterozoic Magondi Super group: Copper and silver, gemstones, dolomite, tungsten and graphite.
- The Phanerozoic Karoo Basins: Considerable coal varieties, coal-bed methane (CBM) gas and shale gas, uranium resources;
- The Carbonatite Igneous Complexes: phosphate, vermuculite (Dorowa, Chishanya, Shawa,);
- Kimberlite pipes: diamonds (Murowa, River Ranch);
- Pegmatites: Lithium minerals, columbite-tantalite, cassiterite, gemstones.
- Mashonaland dolerite suite: black granite (dolerite).
- Recent alluvial and placer deposits: Gold and diamonds (possibly from reworked Umkondo conglomerates).

Mineral exploration and development is the first stage in the mineral supply process(Eggert, 2010). This implies that if the policy regime governing the extractive sector fails to

[6]PGMs: Platinum Group Metals (Pt-platinum, Pd-palladium, Rh-rhodium, Ru-ruthenium, Ir-iridium, Os-osmium)

adequately support this stage, it would be difficult for the subsequent stages to fully function.

Continuous mineral exploration is generally the best strategy of sustaining mining, as the minerals are finite. The life of a mine passes through five stages (Figure 1) in their order: prospecting, exploration, development, exploitation and reclamation (Hartman and Mutmansky , 2002). Although often combined, prospecting and exploration can be classified as two different stages. Prospecting refers to the search of ores using both direct and indirect prospecting techniques. Direct prospecting techniques are more relevant to surface deposits and include visual examination of the deposits or loose fragments that have weathered away from the ores. Indirect prospecting methods include the use of physical measurements, which is usually confined to measuring of gravitational, seismic, magnetic, electrical, electromagnetic, and radiometric variables of the earth (Hartman and Mutmansky , 2002).

Figure 1: Stages of a mine life cycle

Source: Hartman and Mutmansky, 2002

Exploration is, however, the second stage in the mine life cycle which comes after a prospecting activity has been able to identify possible ore locations. Exploration is the process which determines the actual size and value of the mineral deposit based on a variety of measures to result in a more positive picture of the extent and grade of the ore body. It involves samples being taken by chipping, trenching, tunnelling and drilling, which would then be subjected to chemical, metallurgical, X-ray, spectrographic or radiometric evaluation techniques (Hartman and Mutmansky , 2002).

Given the important role that exploration (including prospecting) plays, it is important for this stage to be adequately promoted. This includes adequate policies which make

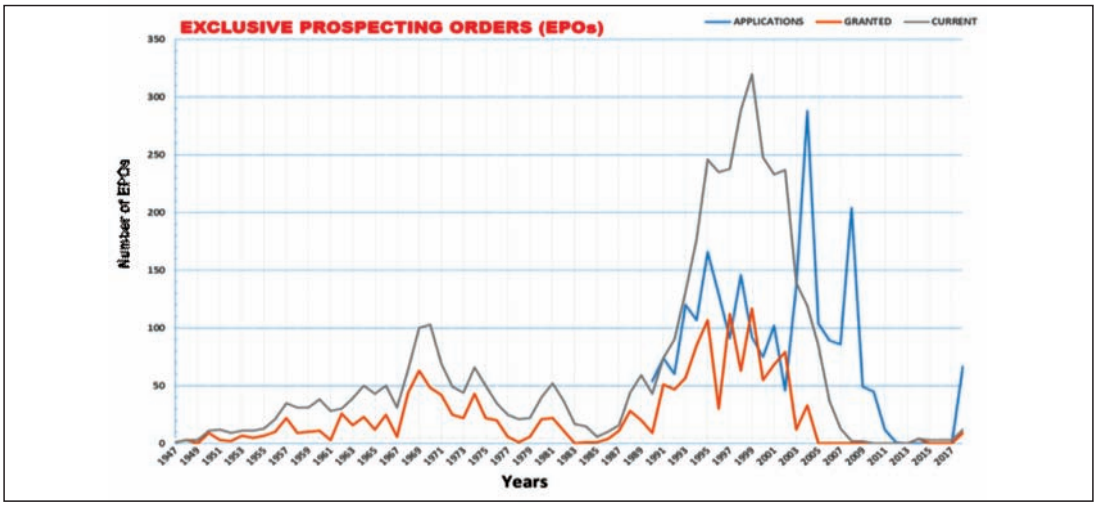
exploration transparent and predictable, as the activity is a risky initiative. Tax incentives have also been given to support mineral exploration, and empirical studies have demonstrated that the tax incentive programs were effective in increasing exploration spending by the junior mining companies in Australia and Canada (Khindanova, 2012). Although Africa is well known for possessing minerals, the share of exploration budget devoted to the continent is relatively lower. Africa managed to attract about 14% of the global exploration budget in 2017, which was focused mainly on the Democratic Republic of Congo, Burkina Faso, Tanzania and South Africa (S&P Global Market Intelligence, 2018).

2.2. Overview of mineral exploration in Zimbabwe

2.2.1 Evolution and current status of mineral exploration

History of exploration dates back to the 19th century, with over 4,000 mineral deposits known from ancient workings (Mugandani, 2017). The establishment of the Zimbabwe Geological Survey in 1910[7] resulted in a registered interest in prospecting, as its role as a mapping institution helped investors in knowing potential areas of mineral occurrences. Prospecting activity peaked in the 1960s to early 1970s in line with the world trend in increased exploration, mostly dominated by base metals (Figure 2). The nickel boom in Zimbabwe which happened over the period 1968 -75 is a good example of the outcome of increased exploration (Mugandani, 2017).

Figure 2: Evolution of exploration in Zimbabwe based on Exclusive Prospecting Orders



Source: Dr. M. T. Hawadi, Director ZGS

After independence in 1980, an initial rush was witnessed in Exclusive Prospecting Orders (EPO) applications and exploration activities over 1980 and 1981. This was because of the

[7] Where it was known as the Southern Rhodesia Geological Survey

interest to re-establish previously suspended programmes due to the liberation war. However, the socialist policies of the new government made companies adopt a wait and see attitude (Mugumbate, 2005) while the fall in base mineral prices in the mid-1980s resulted in a drop in prospecting and exploration activities (Mugandani, 2017).

Between 1983 and 1992, the Canadian International Development Agency (CIDA)/ Zimbabwe Aeromagnetic Survey project in Zimbabwe was conducted, covering 95% of the country at 305 metres ground clearance and one km line spacing. The release of the CIDA aeromagnetic survey data saw an unprecedented exploration activity in Zimbabwe (Figure 2) whereby in 1999 there were 320 current EPOs. Private companies such as Rio Tinto, Kimberlitic Searches, Reunion and Trillion embarked on intensive diamond exploration exercises. This period also saw the discovery of several kimberlites from 40 to 158, the majority of them occurring in the southern parts of the country, including Murowa, Sese, Ngulube, Triangle, Mwenezi, and Marange. The most significant kimberlite discovery made during this period was the Murowa Kimberlite Cluster. Continued exploration by Kimberlitic Searches led to the discovery of the diamond-rich placer deposits (conglomerate and alluvial) at Marange in 2001, but reported in 2006. However, the primary sources of these diamonds are yet to be identified. The sudden drop in exploration activity was due to the then macro-economic challenges that faced Zimbabwe (Hawadi M. T. and Mafara L., 2018)

Following the economic challenges that characterized Zimbabwe since the mid-2000, systematic green-field exploration in Zimbabwe virtually stopped. There were no issuance of new EPOs between 2005 and 2017 with the exception of 2014 when 4 EPOs were granted. During this period, some companies like Cannister Resources resorted to register several contiguous claims to enable them to conduct exploration on licenced ground. This implies that Zimbabwe has not been adequately subjected to the usage of modern technology used in green-field exploration that has resulted in the discovery of mineral deposits in other countries. Exploration activities were then mostly confined to expansion of current workings, with fewer efforts towards new discoveries. Whilst non-systematic exploration activities took place in claims under mining titles, the results of this exploration is meant for mine development and is normally not reported as is the case when operating under EPOs.

Following political developments in November 2017, there has been a renewed interest by government to issue out EPOs. As at December 2018 there were nine (9) EPOs that had been gazetted while three (3) of the expired EPOs were set for renewal. Thus, the 12 EPOs for 2018 are an achievement compared to the previous years. Firms that were granted EPOs include Krumlin Mining Limited in Kadoma, Geo-Associates Limited in Gweru, Mukwa Mines Limited in Midlands, Bilboes Holdings Limited with two EPOs in Matabeleland North and Laduma Investments Limited in Matabeleland South[8]. As at December 2018, there were 68 new EPOs applications and 11 new applications for special grants (Table 1). Thus, exploration activities are expected to gain momentum in 2019.

[8]Zimbabwe Prospectors Association Facebook Page July 18 2018

Table 1: Status of Exploration Titles as at December 2018

Exclusive Prospecting Orders (EPOs)			New Applications	Granted	Extended	Current
			68	9	3	**12**
Special Grants (SGs) Part XX – Exploration	**2018 New Applications**	**Pending renewal**	**Granted in 2018**	**Extended in 2018**	**Current SGs**	**Total Current SGs**
	11	13 coal	3 coal	2 Coal	13 Coal	**20**
		2 CBM	1 CBM	3 CBM	6 CBM	
		1 Uranium			1 Oil/ gas/ Coal	

Source: Zimbabwe Geological Survey

2.2.2 Policy and institutional framework for mineral exploration

Exploration activities in Zimbabwe can be carried out through possession of two types of licences; a Prospecting licence and an Exclusive Prospecting Order (EPO). Energy minerals such as coal, coal bed methane gas, uranium, oil and gas are currently being explored by using a Special Grant (SG) licence under Part XX of the Mines and Minerals Act (Chapter 21:05).

Prospecting license

A firm needs to be duly registered in order to be a licensed explorer; possession of a Zimbabwe Investment Authority (Z.I.A) certificate is needed before an application for a prospecting license is made to any Ministry of Mines and Mining Development offices. The Provincial Mining Director in the Ministry of Mines and Mining Development, acting on behalf of the Permanent Secretary, has a right to refuse to issue a prospecting license, although the refusal needs to be reported to the Secretary.

There are two types of prospecting licences that can be applied for; an Ordinary Prospecting Licence and a Special Prospecting Licence**.** Both types are valid for two years. The difference between an ordinary and a special prospecting licence lies largely in terms of the area that the holder would be allowed to cover in registration of claims. For an ordinary prospecting licence, the holder can prospect and peg up to a maximum of 10 hectares (gold) or 25 hectares (base minerals), while for a special prospecting licence the holder can prospect and peg up to a maximum of 150 hectares for base minerals. A special prospecting licence is not for gold.

Once a holder of a prospecting licence identifies a mineral deposit, he/ she has to appoint an agent or an approved prospector to peg a claim on his/her behalf. After all pegging procedures are done, then the claims need to be registered through an application to the Ministry of Mines and Mining Development.

Exclusive Prospecting Order (EPO)

Companies seeking to explore can also apply for an Exclusive Prospecting Order (EPO), which enables the holder to prospect for minerals. The EPO is awarded only to large companies and these have to be thoroughly assessed prior to being granted an EPO. An exploration company that is granted an EPO can explore within a zone of up to 65,000 hectares of land. More than one EPO can be applied for at one time should there be justification presented to the Mining Affairs Board (MAB).

Once the EPO application has been submitted, the Zimbabwe Geological Survey (ZGS) checks on the areas to be prospected in terms of overlaps with other EPOs/ SGs, budget to be used, minerals being sought as well as the technical expertise of the prospecting company. The ZGS also checks if there is a time framed work programme which the EPO applicant would seek to follow in conducting exploration. If the ZGS is satisfied then the EPO application is then recommended to the MAB for noting.

Noting of the application is a confirmation that they have received the EPO which has been assessed by ZGS and found to be confirming to the requirements. The EPO would then be gazetted, which would be an opportunity for the other investors and the general public to raise any objection that they might have. The MAB then recommends to the President for approval. Once approved, the MAB Secretariat would receive six-monthly progress reports, which they evaluate. The ZGS would need to confirm that there are some activities that are indeed happening on the ground as indicated in the reports. This includes confirming the drilling that has been happening, including the number of holes, sizes and findings from the exploration. ZGS would then advise the MAB as to whether the EPO should cease or the holder should continue to explore.

Table 2 summarises the steps that need to be followed in detail for EPOs and special grants.

Table 2: Processing Steps for EPOs and PART XX Special Grants (SG),

STAGE	RESPONSIBILITY			
	MAB Secretary/ Mining Law Division	**Zimbabwe Geological Survey [ZGS]**	**MAB chaired by the Permanent Secretary**	**Minister/ President**
1. Application Submission	1. Accepts FOUR copies/ date stamps and assigns Application Number in the format: *Serial No./ Year* [eg 01/18…...60/18…] 2. Gives stamped copy back to Applicant; Retains one copy; Sends two copies to ZGS.			

STAGE	RESPONSIBILITY			
	MAB Secretary/ Mining Law Division	**Zimbabwe Geological Survey [ZGS]**	**MAB chaired by the Permanent Secretary**	**Minister/ President**
2. Application Verification		Checks on: • Area for overlaps etc., • Work programme • Budget • Company Profile • Minerals sought • Technical expertise • Expected results		
3. Application Noting		Recommends applications to be noted after above assessment.	Based on available information application is NOTED or REJECTED.	
4. Application Gazettal	• Mining Commissioner (Provincial Director) reserves area using the same Application Number. • Draft General Notice sent to Attorney General for checking		MAB chairman publishes checked notice in Government Gazette for **objections** within 21 days. Notice includes area coordinates/ description. [The Act is silent on SG gazettal at this stage]	
5. Application Consideration	Invites Company to appear before MAB for interview. Objector(s), if there, also invited.		1. Interview conducted 2. Consideration for recommendation or rejection made.	
6. Application recommendation and Approval	• Assigns EPO/ SG Number e.g. EPO 999…SG 4886 • Prepares Cabinet minute to President, supporting memo and draft General Notice of Order. • Draft Notice sent to AG's Office			General Notice sent to Minister and to the President for APPROVAL or REJECTION.
7. EPO/ SG Gazettal	• Approved General Notice sent for Gazettal. • Approved Order sent to Applicant.			
8. EPO/ SG Work Monitoring	• Receives Six - monthly progress reports • Sends copies to ZGS	• Evaluates six - monthly reports. • Visits exploration sites. • Makes recommendations to MAB. • Compiles geo - technical data from EPOs/ SGs.	Accepts or rejects continuation of exploration work.	

Source: Dr. M. T. Hawadi, ZGS Director

An EPO has a length of tenure of an initial period of 3 years and is renewable for a maximum period of three years. Renewal is done by the Minister after the holder has been proven to be abiding by the conditions of the initial EPO and there are chances that the renewal would result in more discoveries.

2.3. Key issues for mineral exploration

2.3.1 Risk factors

Exploration is risky and decisions to explore are based on evaluation of risk which can be grouped into three categories (Duke, 2010):

- Political or Country Risk, which includes the political stability as well as a stable regulatory framework governing mine title, taxation, labour and environmental protection;
- Economic Risk, which includes uncertainty about commodity prices in relation to inputs costs, physical geography, labour availability, and the cost of other factors of production in exploration, development and production.
- Discovery Risk, which is the risk that exploration might not succeed in the discovery of a mineral deposit that can be economically mined. This is considered the greatest risk and includes both the risk of finding the desired characteristics in the deposit and discovering the deposit in the first place. The discovery risk is lessened by the availability of reliable geoscience data as well as the use of appropriate exploration technologies suitable for the area being explored.

While policies that attract and protect investment are important, they will not help reduce discovery risk. This explains why regimes that are in conflict or have a poor record of protecting investment can still attract investment. For example, the discovery risk would be so low that it outweighs the political or country risk. In this regard, the availability and accessibility of quality public geoscience information is the most important factor in facilitating exploration. The quality of public geoscience information is also important in determining the exploration model that needs to be adopted. Describing the characteristics of the target deposit type, the geology of the region of interest, and an array of exploration technologies that could be needed is important in determining the exploration model (Duke, 2010).

The role of government geoscience maps thus cannot be underestimated. They facilitate companies to focus on areas of greatest potential. If regional mapping, which is expensive and time consuming were to be left to the investors, exploration would be difficult indeed (Duke, 2010). In addition to providing quality mapping, government should also provide investors with documentation of previous exploration by both public and private companies. There is need for government to require all assessment reports that companies produce when conducting exploration as a condition of retaining their exploration rights (Duke, 2010). This ensures that new investors would complement what previous investors did rather than undertaking their own parallel programme.

2.3.2. United Nations Framework Classification for Resources (UNFC)

According to Tunde (2018) Africa is a major destination by investors for the extraction of oil, gas and minerals, yet no country in Africa has a comprehensive mineral and energy

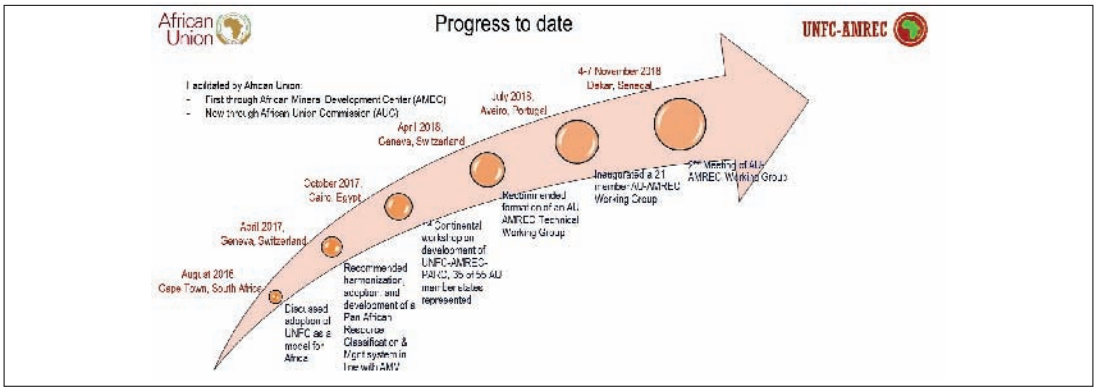
management system. More so, no country in Africa (except South Africa) has a code for reporting mineral and energy resources to stock exchanges and financial institutions. He further noted that lack of a resource management system leads to:

- Poor integration of policies, law and regulations across minerals and energy sectors
- Challenges in the strategic planning of the development of oil, gas and mineral resources
- Insufficient and inefficient capital allocation in the mineral and petroleum value chain
- Inadequate plans for developing infrastructure in resource regions
- Missed opportunities in up-, side- and down-stream value addition
- Slow introduction of innovative technologies
- Lack of clear appreciation of social and environmental issues
- Challenges in contract negotiation capacity
- Issues in full recovery of resource rents and revenues
- Reduced investor confidence
- Non-participation in African share markets and other investment instruments and
- Absence of a clear capacity building strategy and its implementation

A comprehensive system called United Nations Framework Classification – African Mineral and Energy Resources Management System (UNFC-AMREC) and aligned to African Mining Vision and Agenda 2063 is being developed. It is a unique continental system for the management of the whole mineral and energy value chain and is a first-time real application of a system anywhere in the world that includes oil, gas, minerals and renewable energy. It is also a first-time implementation of a code for transparent financial reporting, Pan-African Reporting Code (PARC). UNFC-AMREC is a system tailored for Africa to support good governance.

Both the UNFC-AMREC system draft and the PARC code draft are about 80% complete (Tunde, 2018). There is a capacity building and training strategy and roadmap being developed through a committed expert working group in partnership with professional bodies – Geological Society of Africa, Organisation of African Geological Surveys (OAGS) and others. Progress towards the UNFC-AMREC system is shown in Figure 3.

Figure 3: **Progress towards the UNFC-AMREC system**



Source: Tunde, 2018

The African Union -AMREC Working Group (AU-AWG) has been set up and domiciled with AMDC (African Minerals Development Centre) as the Secretariat. It is a fully integrated ecosystem within the overarching Africa Mining Vision to provide national mineral and energy management framework as well as an investor oriented public reporting code.

2.4. Country incentives for promoting mineral exploration

Some countries have gone an extra mile to incentivise mining exploration, as it is recognised as the most important aspect in sustaining mining activities given that resources are finite. While countries such as Nigeria and South Africa have made expenditure incurred in mining exploration tax deductible, examples from India, Canada and Australia are very revealing on some of the strategies that can make exploration attractive to investors. These examples are discussed as below.

2.4.1 India

India has significant mineral resources; it produces 10 metals, 47 industrial minerals, 23 minor minerals and three atomic minerals. The country's reserves of barite, bauxite, chromium, coal, iron ore, limestone, and manganese are among the 10 largest in the world (Kuo, 2011). In addition to a vastly experienced Geological Survey of India, established as far back as 1851, the Government also appreciated the need for a stand-alone public institution that is responsible for undertaking mineral exploration. This saw an autonomous Public Sector Company, the Mineral Exploration Corporation Limited (MECL) being established in 1972 under the Ministry of Mines. MECL was established to conduct systematic exploration of minerals in order to bridge the identified gap between the 'initial discovery of a prospect and its eventual exploitation[9]'. The exploration environment has over the years continued to be reviewed to attract exploration, especially by the private sector. In 2005, a High Level Committee was constituted to suggest methods of encouraging investment into exploration and extraction of minerals. This resulted in a revised National Mineral Policy in 2008 which made:

a) granting of all types of permits transparent with guaranteed security of tenure;
b) prospecting and mining two independent activities. Transferability of concessions were made to play a key role in mineral sector development;
c) the private sector the main source of investment in prospecting, even though government agencies continue to play their role. Government exploration activities however would be more concentrated in areas where private investment was not forthcoming.

The Mines and Mineral (Development and Regulation) Act, 1957 (MMDR Act) was amended in 2015 and made the granting of mining leases and exploration licences only through an auction system. In addition, mining leases can only be issued at least after general exploration (G2) has been completed.

[9] http://www.mecl.gov.in/Index.aspx

In 2016, the National Mineral Exploration Policy (Non-Fuel and Non-Coal Minerals) was introduced to determine a new exploration strategy for India. In order to attract the private sector, the Policy seeks to ensure:

- Free accessibility of comprehensive baseline geoscience data;
- Incentive structures that provide an appropriate risk-return scenario; and
- Ease of doing business and attractive returns from investment.

The Policy introduced two types of concessions for exploration: (i) a non-exclusive reconnaissance permit (NERP); and (ii) a composite license (Prospecting licence-cum-mining lease (PL-cum-ML)). The PL-cum-ML motivates the private sector to carry detailed exploration with the assurance of tenurial security of the mining lease. Holders of the NERP have the option to retain the reconnaissance data with themselves without mandatory sharing with the State government. NERP holders also participate in e-auctions by way of right to first refusal. Transferability of mineral concessions, which include mining leases and PL-cum-ML enable exploration agencies to enter and exit with ease if they are only interested in prospecting, exploration or mining but not interested in other segments of the value chain.

Explorers who are successful but opt not to do the mining can also retain a right to a certain share in the royalty revenue throughout the lease period, which would be paid by the successful bidder after mining. This payment can also be in the form of a lump sum payment. The Exploration Policy also provides for working out costs incurred in exploration with a view to compensating the explorer when they fail to discover meaningful reserves.

2.4.2 Canada

In Canada, the need to create incentives for exploration has seen a number of schemes being introduced, which have continued to be modified over the years. Such schemes include the following:

(i). Canadian Exploration Expenses (CEE)
This is a scheme where firms engaged in exploration can claim a deduction for tax purposes. Expenses incurred in exploration, which include costs incurred in determining the existence, location, extent and quality of minerals, are all tax deductible. This also include costs of assessing the physical and chemical characteristics of deposits to assess potential commercial value as well as costs for undertaking environmental studies and community consultations to get permits (KPMG, 2016).

(ii). Canadian Development Expenses
The scheme focuses on expenses that are tax deductible for mining development. Although it focuses on mining development, it is also relevant for exploration, given that the cost of land, exploration rights, licenses, permits and leases all qualify (KPMG, 2016).

(iii). Mineral Exploration Tax Credit (METC) scheme[10]

This scheme is designed for firms to raise exploration funds using the equities market. Mining firms that are registered on the stock exchange can pass on the costs they incur in exploration to investors by issuing special shares, known as flow-through shares. These shares are generally the same ordinary common shares of the exploration company, the investor and the company enter into a share subscription agreement for the proceeds from the share subscription to be only used to fund qualifying exploration expenses in Canada. The company renounces the tax benefits related to such exploration back to the investor. This implies that the exploration company easily raises capital for exploration which enjoys tax benefits while investors who purchase the shares are assured of those benefits, which make the shares attractive.

Similar to the Indian regime, the separation of mining from exploration has also been key to the successful exploration activities in Canada, leveraging on the tax incentives. For example, exploration is mainly dominated by "junior companies" rather than the big conglomerates as in other jurisdictions. These junior exploration firms take advantage of the exploration incentives and shoulder the biggest risk in conducting most of the 'greenfield' exploration activities. Once they discover a viable mining project, they mostly sell it to a larger company for development. The ability to profitably participate only in one segment of the mining value chain is thus critical in incentivising mining development.

2.4.3 Australia

Australia also introduced an incentive scheme to make exploration attractive in the form of the Exploration Development Incentive (EDI) which took effect from 2014 to 2017. The EDI encouraged shareholders to invest in small exploration companies that would be undertaking greenfield mineral exploration in Australia. Similar to the flow-through shares of Canada, it enabled eligible exploration companies to earn exploration credits by "giving up a portion of their tax losses from greenfields minerals expenditure, and distributing these exploration credits to equity shareholders" (Government of Australia, 2017).

For firms to benefit from the scheme they needed to demonstrate that they undertook greenfield mineral exploration in the previous year and incurred expenditure; they have not carried out any mining operations for the extraction of minerals in the previous two income years or, are not connected with, or an affiliate of, an entity that has carried on any mining operations for the previous two income years (Government of Australia, 2017). Greenfields minerals expenditure includes expenses for exploration and prospecting for minerals and the decline in value of a depreciating asset used for exploration or prospecting.

On 28 March 2018, the EDI scheme was phased out and a new scheme, the Junior Minerals Exploration Incentive (JMEI) was introduced, also aimed at encouraging greenfields mineral exploration in Australia. There were two main differences between JMEI and EDI; only shareholders who purchase newly issued shares can qualify for JMEI and it is allocated on a first come, first served basis, with a fixed amount to be allocated each year. This implies that applications made after the annual exploration cap for an income year is reached will not qualify.

[10]Found at https://www.nrcan.gc.ca/mining-materials/taxation/8874 accessed 17 August 2018

The JMEI scheme will operate from 2018-2021. Just like the EDI, entities that have commenced resources production or are connected to an entity that has commenced production do not qualify. If the shares are subsequently traded, the credit is retained by the initial investor because it attaches to the investor, not the share[11].

2.4.4 Democratic Republic of Congo (DRC)

The DRC economy is dominated by the mining sector, which has continued to be the case since 1910. Key minerals include copper, cobalt, gold and diamonds, while other minerals include tantalum, tin and tungsten. DRC has the largest known cobalt reserves, diamond deposits and gold deposits in the world, while its copper reserves are surpassed only by Chile (de Schoutheete & Hollanders, 2017).

Since the country has the largest mineral reserves in Africa, the country has also been receiving more exploration interest compared to other African countries. For example, in 2017 DRC received one quarter of the World's cobalt exploration budget (S&P Global Market Intelligence, 2018). Exploration is guided by the Congolese Mining Code of 2002 (Act No 007/2002), as well as different mining regulations that were put in place to implement the mining law. These include Decree No. 038/2003 on mining regulation, and Decree No. 068/2003 relating to the creation, organisation and functioning of the mining cadastre.

Exploration and prospecting are defined as separate activities under the DRC Mining Code, with prospecting identified as an activity prior to exploration. Prospecting is free and one needs to have a Prospecting Certificate, issued by the Mining Cadastre, which is valid for two years and cannot be renewed. The Prospecting Certificate is issued within five days from the day when someone makes a Prospecting declaration (application), and if the five days pass without any response, then it is deemed approved. Possession of a Prospecting Certificate does not confer the holder any mining right and it does also not give the holder any priority for obtaining a mining right in the areas being prospected. A holder of a prospecting certificate is not expected to carry out any exploration activities. The prospector can take samples for assaying outside DRC but has to submit a duplicate sample and a description, stating the number of samples, their volume and weight to the Geology Directorate of the Ministry of Mines or its local office.

Mineral exploration on the other hand can be done by holders of a Mineral Exploration Licence, which is standardized to all minerals and valid for five years with the opportunity for renewal for one more period. To maintain the permit, exploration works has to commence within six months after the granting of the permit, otherwise the licence would be cancelled.

The DRC has also put in place the Mining Cadastre, which keeps up to date records of all mining related activities taking place in DRC, including prospecting and exploration. The holder of a Mineral Exploration Licence is expected to submit a duplicate sample of all of the sample batches to be taken within the perimeter of his/her title to the Geology

[11] KPMG 2018 at website https://home.kpmg.com/au/en/home/insights/2018/05/junior-minerals-exploration-incentive-eligibility-07-may-2018.html accessed 16 August 2018

Directorate of the Ministry of Mines. Unlike a prospecting certificate, an exploration licence entitles the holder the right to obtain an Exploitation Licence (mining licence) under the area in which they did the exploration work. An exploration licence confines the holder to a surface area of 400 km^2, with a maximum of fifty licences for one entity and affiliated companies.

Although there are incentives for exploration, these incentives are not separated to the incentives that apply to the mining industry as a whole. This implies that there are no incentives that have been designed to attract investors into exploration which would not be enjoyed by other players who would only want to participate at mining (exploitation) stage.

2.4.5 Comparisons with Zimbabwe incentive structure

A look at the incentive structure for exploration for Zimbabwe shows that it passes the basic structure as in other countries. All capital expenditure on exploration, development, and operations incurred wholly and exclusively for exploration can be written off against tax, while exploration equipment is also imported duty free. Such expenditure include surveys, boreholes, trenches, pits and other prospecting and exploratory works undertaken for the purpose of acquiring rights to mine minerals in Zimbabwe. The taxpayer may either elect to have the expenditure allowed in the year of assessment, or to have it carried forward and allowed against income from mining operations in any subsequent year of assessment.

In addition, exploration and mining are also two separate activities, which can allow an investor to become attracted to exploration only without doing any mining operation. The only area where the Zimbabwe regime falls short compared to the METC and JMEI schemes in Canada and Australia respectively is the inability for mining firms that are registered on the Zimbabwe Stock Exchange to get incentives for raising capital for exploration through the ZSE. However, the Zimbabwean situation is comparable to other African countries (Table 3).

Table 3: Summary of incentives for mining exploration in select regimes

Country	Exploration incentive outside general mining incentives	Nature of exploration incentives
Canada	Yes	• Tax deduction on exploration expenses; • Raising of exploration capital through stock exchange • Open, transparent trading of rights
Australia	Yes	• Tax deduction on exploration expenses; • Raising of exploration capital through stock exchange • Open, transparent trading of rights
India	Yes	• Rights trading through an e-action • Explorers entitled to compensation through royalties or lump sum payment
DRC	No	• Tax incentives for mining
South Africa	Yes	• Tax deduction on exploration expenses
Nigeria	Yes	• Tax deduction on exploration expenses
Zimbabwe	Yes	• Tax deduction on exploration expenses

2.5. Assessment of Zimbabwe mineral exploration regime

A successful mineral exploration regime which attracts investors is the one that is able to manage all manner of exploration risk. Thus, the reason for low greenfield exploration activities in Zimbabwe can be understood through an assessment of the extent to which the three types of risks (country, economic and discovery) exist.

2.5.1 Country risk

Attracting junior mining companies into the exploration industry needs to be complemented by a policy environment which removes fears of reversals and possible claim disputes, as these are potential threats. Stakeholders generally believe that the political risk factors explain the slow pace of mineral exploration more than the lack of any incentives for exploration. In the past policy uncertainties undermined investor confidence. Investors were not keen to invest funds for the long term where they were possibilities of losing out due to policy reversals and inconsistencies. Lack of policy clarity particularly with the Indigenisation policy and agricultural policies resulted in investors adopting a wait and see attitude.

For example, Zimbabwe had active junior exploration operating in the country before. The discovery of Fredda Rebecca mine, is attributed to an explorer who did the exploration and later sold the claim. The political risk thus played a more pronounced role in deterring investment in the exploration industry. The threat posed by the indigenisation policy, as well as the general economic hardships, including international isolation, made it difficult for investors to be confident in investing in Zimbabwe.

Political risk can also be explained by the bureaucratic delays in mining licences approval process or mining disputes resolutions by the responsible authorities. The Ministry was just not issuing EPOs in line with the interests being registered. The coming in of the new dispensation in November 2017 has already seen a change in attitudes towards the granting of EPOs. The failure to issue out EPOs is attributed to political attitude that prevailed then, where the size of the land that is covered by EPOs was deemed too large to be entrusted to explorers. The momentum under the new government is thus encouraging.

2.5.2 Economic risk

The country has suffered greatly under hyperinflation, resulting in key economic enablers being unable to efficiently function. This has resulted in the cost of doing business in Zimbabwe being generally higher than other countries. For example, the 2018 Ease of Doing Business report by the World Bank ranks Zimbabwe 159 out of 190 countries, with its distance to the frontier[12] being 48.47 out of 100 when the regional average is at 50.43. The high cost of key economic enablers also results in higher production costs, which squeezes out profits. The incentive structure which has been put in place, however, has ensured that other costs directly related to exploration are tax deductible, which significantly cushions explorers against economic risk.

The economic risks are induced by the failure by government to finance the establishment

[12] An economy's distance to frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier

of a digitalized cadastre information management system to replace the current use of a manual system in mining allocations and records. The management of the database is manual and very difficult to resolve disputes due to overlapping of mining titles arising out of inherent inaccuracies. A computerized mining cadastre system is of vital importance in the management of the entire mining industry and would give assurances to investors that proper records are kept that cushion them against encroachment once they discover deposits. This risk still needs to be managed by expediting the implementation of the policy position stated in the Transitional Stabilisation Programme 2018-2020, that, "*mining exploration initiatives will benefit from operationalisation of the automated Mining Cadastre Information System, which will also minimise prospects of mining claim disputes, enhance revenue collection, and accountability*[13]".In the 2018 national budget government allocated US$1.7 million towards the establishment of the automated mining cadastre information system which was not utilised due to foreign currency constraints (GoZ National Budget Statement 2019).

2.5.3 Discovery risk

While incentives are important in reducing discovery risk, the availing of quality geoscience data to investors is more important. The long term development of the Zimbabwean mining sector and its provision of key mineral-based feedstocks to other sectors of the economy is fundamentally dependent on on-going investments into geo-survey and mineral exploration. A well capacitated Zimbabwe Geological Survey Department (ZGS) is desirable[14].

It is important that the ZGS be adequately capacitated to ensure that it adequately performs its functions, which include collection of geo-scientific data and production of geological maps and reports (bulletins) documenting and interpreting the country's geology. Production of mineral specific Mineral Resource Series books is also part of ZGS mandate. However, currently, ZGS is lacking experienced geoscientists and its capacity to conduct geo-chemical analysis and cartographic activities for editing and publishing of geological maps and bulletins needs improvement. In 2016, ZGS received some state of the art equipment from the African Development Bank, but with constant changes in technology, there is also need for constant investment into the necessary equipment to ensure that geological mapping is done in new areas and existing geological maps are updated. Accessibility of geological information and mineral data by both small and large scale prospective investors through a user-friendly minerals cadastre information management system (MCIMS) is also critical.

Although ZGS might lack capacity due to resource constraints, the legal system in place is enough to facilitate that all exploration data is available for other investors. Existing exploration firms who are holders of EPOs have to provide feedback every six months with all the details about their findings, which will continue to be available even if they end their exploration. This is currently being enforced by MAB. In addition, holders of prospecting/ exploration licences issued at Provincial Offices have to give their findings to ZGS and MMMD in this dual reporting system. A computerised system is therefore important for timeous sharing of information.

[13] See page.165 of the Transitional Stabilisation Programme

[14] See http://www.zeparu.co.zw/sites/default/files/2018-03/Reconfiguration%20of%20the%20Zimbabwe%20Geological%20Survey%20web.pdf for details on the reconfiguration of the Zimbabwe Geological Survey.

While the incentive system in place is generally deemed to be enough to attract exploration, it currently does not assist firms to raise exploration capital on the Stock Market. An innovative system similar to the flow-through shares in Canada or the JMEI of Australia would go a long way in reducing the discovery risk, as it reduces the level of loss that the exploration firm would shoulder in the event that no discovery is made.

2.5.4 Role of government in mining exploration

There have been attempts to ensure that there is a government institution that has a role of conducting exploration activities alongside the private sector. The Mineral Promotion Corporation (MPC) was formed as a government exploration institution. Its role was to identify mining claims which appeared to have potential to grow if developed. Successful deposits would then be promoted by the MPC, sold to private developers and the proceeds from the sale get recycled into a revolving fund. The MPC, which was subsequently transferred to the Zimbabwe Mineral Development Corporation (ZMDC), is thus currently the Government's mineral exploration company. Because of tight budgetary constraints, the MPC has not been able to carry out its functions effectively and efficiently.

After noting some capacity challenges with the MPC, there were attempts to merge its functions with those of the Minerals Marketing Corporation of Zimbabwe (MMCZ) to create an institution known as the Minerals Exploration and Marketing Corporation of Zimbabwe (MEMCZ). The functions of the MEMCZ with respect to exploration included undertaking prospecting and exploration for minerals in Zimbabwe as well as advising the Minister on all matters connected with the prospecting and exploration of minerals. The Bill that was to see this institution, Minerals Exploration and Marketing Corporation Bill, could however not pass through Parliament after legislators failed to find the justification for extending the functions of the MMCZ to include exploration. This therefore means that the MPC still remains the only state institution to conduct exploration.

Government involvement in exploration is not unique to Zimbabwe. In South Africa, the African Exploration Mining and Finance Corporation (AEMFC) is a government institution which applies for and undertakes prospecting, mining and reconnaissance operations in competition with other private mining companies. Namibia also established a state-owned mining company, Epangelo Mining Company, to explore for and develop new deposits (World Bank, 2011). India also has the Mineral Exploration Corporation Limited (MECL), although its exploration activities are now more concentrated in areas where private investment is not forthcoming.

Government, in the same manner can continue to undertake exploration through the MPC. In 2018, the MPC was undertaking three exploration projects in the country targeting diamonds and gold[15]. MPC could also be concentrating on exploring claims being held by government owned institutions, especially the Zimbabwe Mining Development Cooperation (ZMDC). A number of potential areas have been reserved for MPC and greenfield exploration can be conducted in these areas under Joint Venture arrangements with private companies. Small scale miners can benefit from smaller discoveries made by MPC.

[15]The gold projects include Ngondoma area as well as Fort Rixon while the diamonds projects are for the state owned Zimbabwe Consolidated Diamond Company.

2.6. Conclusion and Recommendations

The limited greenfield exploration in Zimbabwe can generally be attributed to risk fears, with all the three types of exploration risk combined playing a role. The current institutional and regulatory framework in place is generally conducive to attracting exploration, such that elimination of risks would see an increase in exploration activities. There is already a noticeable increase in exploration interest, especially following the granting of EPOs over the last six months under the new government. An increase in the rate of granting EPOs is therefore needed. It shows that the interest in exploration was already being indicated by the mining firms, with the only challenge being the reluctance of Government to issue out the EPOs to the firms. Going forward, the following can be considered important in facilitating mineral exploration in Zimbabwe:

Ensuring policy consistency
There is need to continue with the current reforms that are aimed at reducing the country risk. Policy clarity and consistency - including removing fears of policy reversals, and fears that claims can be reallocated or reclaimed - should continue to be prioritised to increase investor confidence. Investors are more likely to commit resources in undertaking greenfield exploration if they are sure that the current operating environment will remain stable during and after the tenure of their exploration licences. Government is already making strides at ensuring that the political risk is managed well and isolation from the international community ends, especially under the 'Zimbabwe is open for business' mantra.

Addressing obstacles towards doing business
Removing obstacles towards doing business would also go a long way in reducing the country risk. This includes simplifying procedures for exploration as well as reducing the time to licence. Jurisdictions such as in DRC and Mongolia put a time frame under which Government should consider an exploration licence and give a response. There is also need for the process to be time framed to avoid unnecessary delays.

Improving institutional coordination
The procedure for getting EPOs is unnecessarily long. There is need to increase the sittings of MAB meetings and to form an MAB Technical Committee that will work with ZGS to reduce processing time.

Reducing costs of doing business
The cost of doing business in Zimbabwe has generally been high due to the difficulties that the economy has been experiencing. Cost of inputs are therefore high, especially given that the transport costs to different potential exploration areas would also be high. There is need for government to prioritise infrastructure development, especially access roads and railways while ensuring that key enablers such as power and water are available at lower costs[16]. This would also make exploration attractive.

Improving the quality of geoscience data
Discovery risk to a great extent is reduced by the availability of quality geoscience data, which underlines the importance of reconfiguring the ZGS and enhancing its capacity produce quality geoscience data. There is need to ensure that ZGS has adequate

[16]See http://www.zeparu.co.zw/sites/default/files/2018-03/Cost%20Drivers%20Study%20%20of%20the%20Zimbabwean%20Economy%20Web-min.pdf on details of cost drivers in the Zimbabwean economy.

capacity to carry out the basic functions of a Geological Survey. Government should continue to support ZGS, including partnerships with development partners, to ensure that it has substantial human, material and financial resources.

ZGS geologists should be equipped with adequate field mapping experience. ZGS should also be capacitated to expand functions into non-traditional areas such as engineering geology, environmental geology, medical geology and geo-hazards mapping, among others. If ZGS could have the expertise and functions comparable to the British Geological Survey, the Geological Survey of Finland, the Geological Survey of the Netherlands and Council for Geoscience of South Africa, the quality of geoscience data produced would improve. However, services at ZGS have been negatively affected by redeployment of some trained staff to Provincial offices[17].

A computerised cadastre of mining rights and title
A lot of efforts have already gone towards the development of a computerised cadastre information management system, which will replace the current manual system. Funding for this project which has already been initiated needs prioritisation. The computerised system helps ensure fast recording of mining information as well as easy retrieval of such information for investors. This would enhance accuracy in locating exploration sites as well as helping in the elimination of exploration claim disputes, since pegs can be easily shifted illegally. The Mines and Minerals Amendment Bill, which was at the last stage of being passed into law, has already provided for the legal backing of a computerised cadastre of mining rights and title. There is need for adequate provisioning of foreign currency to finance the operationalization of the automated mining cadastre information system.

Incentivising mineral exploration
Zimbabwe already has a fiscal incentive regime for mining exploration, which stakeholders agree is a positive initiative. Making tax deductions on all expenditure incurred on mining exploration allowable in full is a strong incentive for firms to engage in Greenfield mining exploration. However, innovations for raising exploration capital should continue to be pursued, including fiscal incentives to allow players registered on the Zimbabwe Stock Exchange to issue out special shares for exploration capital.

Usage of Mineral Resource reporting Code.
Zimbabwe should insist on usage of an internationally recognised Code such as the South African Code for reporting of Exploration Results, Mineral Resources and Mineral Reserves SAMREC[18] or the Australian Joint Ore Reserves Committee (JORC) Code for reporting exploration results, Minerals Resources and Ore Reserves[19] when reporting resource or reserve quantifications for the purpose of granting mining leases and energy minerals Special Grants. It is hoped that by 2020 the UNFC-AMREC-PARC system will be complete and ready for adoption by African countries.

[17] http://www.zeparu.co.zw/sites/default/files/2018-03/Reconfiguration%20of%20the%20Zimbabwe%20Geological%20Survey%20web.pdf.
[18] https://www.samcode.co.za/codes/category/8-reporting-codes?download=120:samrec
[19] See http://www.jorc.org/docs/jorc_code2012.pdf

References

de Schoutheete, A., & Hollanders, T. (2017). Mining - Democratic Republic Of The Congo. InL. W. (ed), The Mining Law Review-6th Edition. London: Liedekerke Wolters Waelbroeck Kirkpatrick.

Duke, J. M. (2010). Government geoscience to support mineral exploration: public policy rationale and impact. Toronto: Prospectors and Developers Association of Canada.

Eggert, R. G. (2010). Mineral Exploration And Development: Risk And Reward. Prepared for the International Conference on Mining, "Staking a Claim for Cambodia," Phnom Penh, Cambodia, 26-27 May 2010.

Government of Australia. (2017). Exploration Development Incentive. Australian Taxation Office for the Commonwealth of Australia.

Government of Zimbabwe (2018) Transitional Stabilisation Programme October 2018-december 2019:"Towards a Prosperous and Empowered Upper Middle Income Society by 2030"Government of Zimbabwe (2019) National Budget Statement: "Austerity for Prosperity"

Hartman and Mutmansky . (2002). Introduction to Mining Engineering. New Jersey: John Wiley and Sons Inc.

Hawadi M. T. and Mafara L., 2018. MRS 30, Gemstone deposits of Zimbabwe

Khindanova, I. (2012). Impacts of Tax Incentive Programs on Mineral Exploration. Journal of Management Policy and Practice , 13(5), 81-87.

KPMG. (2016). A Guide to Canadian Mineral taxation. Toronto: KPMG.

Kuo, C. S. (2011). The Mineral Industry of India. In U. G. Survey, U.S. Geological Survey Minerals Yearbook. Virginia: U.S. Geological Survey.

Mugandani, E. T. (2017). Status of Mineral Exploration and Development in Zimbabwe. Harare: SAIMM Conference Proceedings, 03 August 2017.

Mugumbate, F. (2005). Overview Of ZimbabweS Mineral Resource Potential Tip Of The Iceberg? Harare: Zimbabwe Geological Survey.

S&P Global Market Intelligence. (2018). World Exploration Trends.

S&P Global Market Intelligence.

Tunde M. Arisekola. Overview of UNFC-AMREC System, incorporating PARC: The present status. Presentation at 11th OAGS AGM in Dakar, Senegal, 2018.

World Bank. (2011). Overview of State Ownership in the Global Minerals Industry. Oil, Gas, and Mining Unit Working Paper. World Bank Group.

Appendix 1: Recorded list of minerals of Zimbabwe

I. GEMSTONES	II. METAL MINERALS	III. ENERGY MINERALS	INDUSTRIAL MINERALS
1. Andalusite a. Chiastolite 2. Apatite **3. Beryl** a. Aquamarine b. Emerald c. Golden Beryl, d. Goshenite, e. Heliodor f. Morganite 4. Chrysoberyl a. Alexandrite 5. Azurite 6. Chrysocholla 7. Dioptase 8. Malachite **9. Corundum** a. Ruby b. Sapphire **10. Diamond** 11. Epidote 12. Euclase 13. Feldspar a. Amazonite b. Andesine c. Labradorite d. Peristerite **14. Fluorite** 15. Fuchsite 16. Garnet a. Almandine b. Pyrope c. Spessartine d. Andradite e. Grossular 17. Grandidierite **18. Hematite** 19. Iolite/cordierite 20. Jade a. Jadeite b. Nephrite 21. Jaspilite 22. Kyanite 23. Lepidolite 24. Lazulite 25. Phenakite 26. Pyrite **27. Quartz** a. Amethyst b. Aventurine	1. Arsenic a. Arsenopyrite 2. Tin a. Cassiterite b. Stannite 3. Chromite 4. Cinnabar 5. Cobalt (by product of nickel or copper) **6. Copper** a. Bornite b. Chalcocite c. Cuprite d. Chalcopyrite e. Malachite (gemstone) f. Azurite (gemstone) g. Chrysocholla (gemstone) 7. Galena 8. Gold 9. Iron a. Magnetite b. Hematite (gemstone) c. Limonite 10. Ilmenite 11. Manganese a. Pyrolusite b. Manganite 12. Molybdenum a. Powellite b. Molybdenite 13. Nickel a. Pentlandite b. Millerite 14. Pollusite 15. Pyrite 16. Silver (by product) 17. Stibnite 18. Tantalum and Niobium a. Tantalite b. Columbite c. Pyrochlore	1. Coal a. Coking coal b. Sub-bituminous c. Bituminous d. Anthracite 2. Coal bed methane gas 3. Uranium a. Uranophane b. Autunite c. Pitchblende 4. Oil (prospective) 5. Shell Gas (prospective) **Total energy minerals = 3**	1. Clays a. Kaolin b. Ball clay c. Fireclay d. Brick earths e. Montmorillonite 2. Aggregates a. Sand b. Gravel c. Granitic aggregates 3. Aluminium a. Andalusite (gemstone) b. Kyanite c. Sillimanite d. Bauxite e. Corundum (gemstone) 4. Graphite 5. Asbestos a. Chrysotile 6. Dimension stones a. Black granite (dolerite) b. Granites c. Glitterstone d. Green quartzite e. Marble f. Sandstone g. Slate 7. Carbonate minerals a. Calcite b. Limestone c. Dolomite d. Marble e. Dolomitic marble f. Calcitic dolomarble g. Dolomarble h. Calcrete i. Tufa j. Magnesite k. Carbonatite (RREs) 8. Mica a. Muscovite 9. Lithium minerals a. Spodumene b. Lepidolite c. Petalite d. Bikitaite e. Eucryptite f. Amblygonite

CHAPTER 3: SUSTAINABLE FOREST MANAGEMENT IN ZIMBABWE: WHAT IS AT STAKE?

3.1. Background

Forests are vital for rural livelihoods, biodiversity, climate mitigation, energy supply, soil and water protection. For example, they act as a source of food, medicine and fuel for more than a billion people; are instrumental in responding to climate change , protect soils and water; hold more than three-quarters of the world's terrestrial biodiversity; provide many products and services that contribute to socio-economic development (Food and Agricultural Organisation (FAO), 2018). In Africa, 80% of wood harvested from forests is used for household energy[20].

Despite all these socio-economic and environmental roles forests play, some 13 million ha of forest area is lost annually although this is somewhat offset by 5.7 million ha of new forest growth[21]. Overall, global forest area has declined by 129 million hectares (3.1 percent) between 1990 to 2015 and is now just under 4 billion hectares (FAO, 2016). Underlying factors affecting forest conversion include population growth, agricultural development, land tenure, and the governance of land-use change (FAO, 2016). Evidence has shown that tropical ecosystems in poor countries are facing greatest threats of deforestation and this is mainly attributed to weak institutions and limited financial resources[22]. Pressure on global forests is expected to increase with increasing world population that is projected to rise from the current 7.6 billion to around 10 billion in 2050 in addition to a corresponding rise in global demand for food estimated to grow by 50 percent over that period. Nations of the world acknowledge that one of the global challenges will be on how to increase agricultural production and improve food security without reducing forest area (FAO, 2018).

There is renewed international recognition of Sustainable Forest Management (SFM) as an important component of sustainable development[23]. For example, in 1992, countries of the world adopted the forest principles in Rio De Janeiro which provided an international understanding of sustainable forest management. In addition, international Conventions such as the Convention on Biological Diversity (CDB) Aichi Targets, and Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme in the Paris Agreement, are also driving a new focus on sustainable forest management (Chazdon*et al*., 2016). Furthermore, in 2007 the United Nations (UN) General Assembly emphasized the need for more effective implementation of sustainable forest management at all levels to address challenges of continued deforestation and forest degradation, the slow rate of afforestation and forest cover recovery and reforestation (UN 2008, Resolution 62/98). The need for sustainable management of forests has been placed high on the world's Agenda 2030 for Sustainable Development. For example, Sustainable Development Goal (SDG) number 15, speaks of the need for countries to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

[20] http://www.fao.org/docrep/011/aj982e/aj982e10.pdf
[21] http://www.fao.org/docrep/011/aj982e/aj982e10.pdf
[22] http://www.fao.org/docrep/011/aj982e/aj982e10.pdf
[23] http://www.fao.org/forestry/41212-08b8c14ee8da05299b12b6d77548f6d5d.pdf

Countries have since developed criteria and indicators for assessing progress in implementation and monitoring sustainable forest management at global, regional and national levels. These were crafted based on a reference framework outlining the seven globally agreed elements of sustainable forest management. Furthermore, some countries have put in place certification processes such as the Forest Stewardship Council while others have crafted best practice guidelines in order to manage forest units at the local levels.

Slow progress has generally been noted in implementation of sustainable forest management worldwide particularly in developing countries[24] and this has been caused by limited capacity and lack of enabling conditions to implement SFM particularly in developing countries. Other reasons have been cited as limited capacity and a lack of enabling conditions in addition to limited accessibility to a considerable body of existing knowledge on, and experiences in, the implementation of SFM[25].

3.2. The Conceptual Framework

Sustainable Forest Management can be defined as a dynamic and evolving concept which aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations (UN 2008, Resolution 62/98). This approach is about forest management based on the principles of sustainable development and is premised on three pillars of the economic, social and environmental values. It aims to ensure that the society's ever increasing demands for forest products and benefits are met simultaneously with the need to preserve forest health and diversity. This balance is imperative for forest survival and prosperity of forest dependent communities. It safeguards local livelihoods by protecting the biodiversity and ecosystems provided by forests, reducing rural poverty and mitigating some of the effects of climate change[26]. If forests are managed well, this guarantees livelihoods sources, income generation and employment to the society. Sustainably managed forests provide essential goods and services and thus play a vital part in sustainable development (FAO, 2015).

The thematic elements that form the bedrock of contemporary forest management practices are outlined in Box 1.

Box 1: Summary of seven globally agreed thematic elements of sustainable forest management

1. *Extent of forest resources*
   The theme expresses an overall desire to have adequate forest cover and stocking, including trees outside forests, to support the social, economic and environmental dimensions of forestry. For example, the existence and extent of specific forest types are important as a basis for conservation efforts. The theme encompasses ambitions to reduce deforestation and to restore and rehabilitate degraded forest landscapes. It

[24] http://www.fao.org/forestry/41212-08b8c14ee8da05299b12b6d77548f6d5d.pdf
[25] http://www.fao.org/forestry/sfm/85086/en/
[26] https://www.revolvy.com/page/Sustainable-forest-management

also includes the important function of forests and trees outside forests to store carbon and thereby contribute to moderating the global climate.

2. *Biological diversity*
   The theme concerns the conservation and management of biological diversity at ecosystem (landscape), species and genetic levels. Such conservation, including the protection of areas with fragile ecosystems, ensures that diversity of life is maintained, and provides opportunities to develop new products in the future, including medicines. Genetic improvement is also a means of increasing forest productivity, for example to ensure high wood production levels in intensively managed forests.

3. *Forest health and vitality*
   Forests need to be managed so that the risks and impacts of unwanted disturbances are minimized, including wildfires, airborne pollution, storm felling, invasive species, pests, diseases and insects. Such disturbances may impact social and economic as well as environmental dimensions of forestry.

4. *Productive functions of forest resources*
   Forests and trees outside forests provide a wide range of wood and non-wood forest products. This theme expresses the ambition to maintain an ample and valuable supply of primary forest products, while at the same time ensuring that production and harvesting are sustainable and do not compromise the management options of future generations.

5. *Protective functions of forest resources*
   The theme addresses the role of forests and trees outside forests in moderating soil, hydrological and aquatic systems, maintaining clean water (including healthy fish populations) and reducing the risks and impacts of floods, avalanches, erosion and drought. Protective functions of forest resources also contribute to ecosystem conservation efforts and have strong cross-sectoral aspects, because the benefits to agriculture and rural livelihoods are high.

6. *Socio-economic functions*
   The theme covers the contributions of forest resources to the overall economy, for example through employment, values generated through processing and marketing of forest products, and energy, trade and investment in the forest sector. It also addresses the important forest function of hosting and protecting sites and landscapes of high cultural, spiritual or recreational value, and thus includes aspects of land tenure, indigenous and community management systems, and traditional knowledge.

7. *Legal, policy and institutional framework*
   The theme includes the legal, policy and institutional arrangements necessary to support the above six themes, including participatory decision-making, governance and law enforcement, and monitoring and assessment of progress. It also involves broader societal aspects, including fair and equitable use of forest resources, scientific research and education, infrastructure arrangements to support the forest sector, transfer of technology, capacity-building, and public information and communication.

Source: https://www.greenfacts.org/en/forests/toolboxes/box-1.htm

3.3.Extent to which Zimbabwe has achieved sustainable forest management

The extent to which Zimbabwe has achieved sustainable forest management in this chapter was measured using how the country is fairing on the seven globally agreed elements of sustainable forest management summarised in Box 1 above. The UN, 2008 Resolution 62/98 encouraged Member States to consider these seven thematic elements of sustainable forest management. The position of Zimbabwe with regards to each thematic element is briefly discussed below.

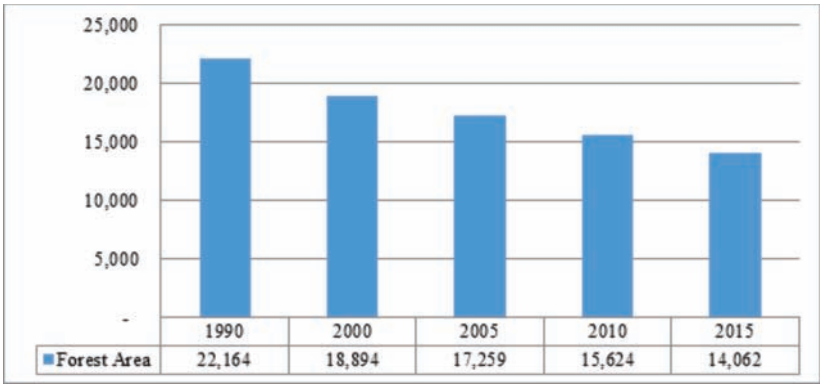
3.3.1. Extent of forest resources

FAO defines a forest generally as land of more than 0.5 hectares, with a tree canopy cover of more than 10%, which are not primarily under agricultural or urban land use (Chazdon *et. al*., 2016). Zimbabwe's total forest and woodland area is 17,547,000 ha found in communal lands, on private land and in national parks and protected areas constituting about 45% of the country's total land area. About 66% of the forests and woodlands are on farms, communal and resettlement areas and their surroundings; 28.5% in parks; about 5% lies within gazetted forests; and 1% constitutes the commercial exotic plantations (Government of Zimbabwe, undated) largely in Eastern Highlands and a few in Midlands. There are 24 gazetted indigenous forests in Zimbabwe and these are found mainly in the north-western region (Forestry Commission, 2018).

3.3.2. Deforestation in Zimbabwe

Evidence shows that by 2015, Zimbabwe's forest cover had declined by 36.6% from 22,164,000ha in 1990 (FAO, 2015) (Figure 4). Zimbabwe's planted forest fell from 154,000ha in 1990 to only 87,000 in 2015 while other naturally regenerated forest fell from 21,209,000ha to 13,174,000ha over the same period (FAO, 2015). Timber Producers Federation (TPF) (2018a) revealed that the commercial forests further declined from 120,000ha to the current 69 066 ha.

Figure 4: Extent of forest in Zimbabwe between 1990 and 2015 (000 Ha)



Source: Food and Agriculture Organisation (2015) Global Forest Resources Assessment 2015

[27] https://rainforests.mongabay.com/deforestation/archive/Zimbabwe.htm

Forest area designated for production fell from 2,216,000 ha in 1990 to 1,406,000 ha in 2015 (FAO, 2015). Living forest biomass fell from 1483 million tonnes in 1990 to 941 million tonnes in 2015 and both public and private ownership of forests has been declining over time between 1990 and 2015 (FAO, 2015).

The Zimbabwe Fourth National Report (2010) to the Convention on Biological Diversity attests to increased forest degradation and destruction due to several factors, chief being human activities such as population pressure in communal areas, effects of fires, collection of non-timber forest products for medicinal purposes, commercial timber and tobacco curing. Consultations with the stakeholders revealed that forest diversity has been declining at an average annual rate of 330,000 ha due to expansion of agriculture, unsustainable exploitation of fuel-wood (domestic, industrial and commercial use), infrastructural developments (dams, power lines, urban expansion, irrigation), uncontrolled fires, mining, invasive alien species and climate change. The depletion rate translates to over 60 million trees a year against the current planned planting rate of only 15 million trees[28].

Tobacco curing alone has contributed to 15% of deforestation due to dependence on fuel-wood for curing by 90% of tobacco farmers. Some of the consulted stakeholders were of the view that this statistic could be an understatement considering the state of deforestation in tobacco growing areas like Hurungwe and the fact that more and more farmers are increasingly growing tobacco on an annual basis.

Increased mining activities following recent discoveries of gold, diamonds, chrome and coal have resulted massive clearance of bio-mass as new mines were developed and old mines expanded. More than a million people are panning gold illegally along rivers, clearing trees and digging in river beds, which result in soil erosion, landslides and siltation of water bodies (Government of Zimbabwe, undated). Furthermore, an increase in the population of newly resettled areas has resulted in accelerated clearance of forests and woodlands for cultivation (see Annex 1). Land area under cultivation increased by 14% between 1992 and 2008 with close to 70,000 ha being converted to agriculture use annually (FAO 2012). In 2017, Zimbabwe's population was estimated to be 16.5 million with an annual growth rate of 2.3%[29]. This coupled with the prolonged economic hardships that have been hitting the country for nearly two decades now, increase pressure on the forest resource as people desperately turn to it for alternative livelihood source.

3.3.3. Afforestation Initiatives in Zimbabwe

In response to the alarming forest depletion rate, the government has initiated a number of programmes in order to promote sustainable management of the forest resources. These are outlined here under:

[28] https://www.facebook.com/forestrycommission.zw/posts/press-statement-by-the-minister-of-environment-water-and-climate-hon-o-c-z-muchi/1267220476629224/

[29] http://databank.worldbank.org/data/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=ZWE

i. Afforestation and Reforestation Programmes

The Forestry Commission has been on a massive tree planting programme nation-wide since 1992. As from 2005 an average of 8.1 million trees were planted with a survival rate of about 65 to 70% (Nhekairo and Gumbie, 2013). This has been achieved through initiatives such as the national tree planting day, schools tree growing and tree care competitions and also at special commemoration such as International Forest Day, World Environment Day among others. In order to consolidate these efforts, the Ministry of Environment embarked on a five year National Tree Planting Programme in the year 2015 with a view to increasing the country's forest cover and reduce deforestation. This programme involved the planting of 75 million trees nationwide covering a total area of 45 740 hectares over five years (Government of Zimbabwe, 2016). This translates to an annual tree planting rate of 15 million trees covering 9 148 hectares[30] yet falling short of the 60 million trees that are lost annually through deforestation. FAO (2015) statistics revealed that planted forest also declined from by 43.5% from 154,000 ha in 1990 to 87, 000 ha in 2015.

There is also multiple stakeholder participation in afforestation and reforestation in Zimbabwe to compliment government effort. These include the private sector and other cooperating partners that include non-governmental organizations/agencies, development partners such as UNDP and FAO as well as local community groups. Stakeholder efforts have seen the creation of NGO based working groups on woodlands such as Environment Africa, Southern Alliance for Indigenous Resources, Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) Association, Africa 2000, ENDA, Biomass User's Network, and ZERO among others. These groups interact to exchange ideas on woodland management and work in collaboration with relevant environmental government institutions such as Agritex; Environmental Management Agency (EMA); Forestry Commission as well Parks and Wild Life Authority.

The Forestry Commission and EMA are mandated by their statutes to conduct environmental education awareness to promote conservation and protection of forests, management and their sustainable utilization. The Forestry Commission runs a research and development programme that seeks to develop exotic trees that are drought and pest resistant. Further, the parastatal runs many research trials throughout the country to develop and provide suitable genotypes that adapt well to local environments.

ii. REDD+ Ecosystem Conservation Programme

Zimbabwe is tapping from the Global Environment Facility (GEF), an international funding mechanism that presents a tremendous opportunity to address some of the most urgent environmental problems threatening human prosperity and survival, including: global biodiversity loss, climate change, ozone depletion, and the degradation of the world's oceans and other international waters[32]. So far the country has received US$148.94 million

[30] Government of Zimbabwe (2016)

[31] https://www.herald.co.zw/sustainable-biodiversity-management/

[32] https://www.cbd.int/doc/nbsap/finance/BurgielCohen-GEF-RiotoNewDelhi-AGuidefNGOs_topics-212-00.pdf

towards implementation of 42 projects in the area of climate change, bio diversity, and land degradation among others[33]. For example, the Government is implementing a five-year Global Environment Facility funded programme to support conservation initiatives in North Western Zimbabwe. The programme is known as the Hwange-Sanyati Biological Corridor and focuses on three key environmental components; Forestry, Wildlife and Landscape Management. The Forestry component supports improved forest management activities in two gazetted forests (Ngamo and Sikumi) in Hwange as well as a piloted sub project on Reducing Emissions from Deforestation and Forest Degradation (REDD+)[34] activities as a tool for good forest stewardship in Zimbabwe.

This is an initiative that focuses on the role of conservation, sustainable forest management and enhancement of carbon stocks in developing countries. Some of the positive developments recorded so far include improvement in delivery on the implementation of forest management operational plans by the Forestry Commission.

iii. Community Based Natural Resources Management

The NGO community runs community programmes such as recycling, tree nurseries, natural product enterprises, herb and nutrition gardens and training, capacity building, as well as environmental education and awareness to schools and colleges (Chimhou *et al*, 2010). The major finding from stakeholder consultations is the limited awareness among the communities on the real value forests can bring to their livelihoods. This is exacerbated by the little value addition that is done to non-timber forestry resources. Most of the consulted stakeholders were of the view that communities will be able to guard forests jealously if value addition of non-timber products was fully fledged in Zimbabwe.

iv. Tobacco Wood Energy Programme

In view of the high level of deforestation caused by tobacco curing, the Government of Zimbabwe introduced an afforestation levy on all tobacco farmers in January of 2015. This was pegged at a rate of 1,5 percent in the first year and 0,75 percent in subsequent years. Funds raised from this levy are earmarked for woodlot development in tobacco farms to provide energy for tobacco curing. Solar, coal and biogas are however, alternative sources of energy that farmers are being encourage to explore with the requisite support from government.

3.3.4. Biological diversity

FAO (2015) reported that 422,000 ha were being managed for protection of soil and water in 2015 having declined from 665,000 ha in 1990. However, no area was reported to be protected for ecosystem services, cultural or spiritual values. In terms of the extent of forest protected areas, only 801,000 ha have been protected and designated for conservation of biodiversity and this forest area did not change between 1990 and 2015 (FAO, 2015).

[33] See https://www.thegef.org/country/zimbabwe
[34] http://www.fao.org/redd/overview/en/

Only six percent (909,000 ha) of the total forest area falls under management plan of which 801, 000ha is conservation forest whilst 108,000ha is production (FAO, 2015). Only 2% of the forest management plan was reported to be monitored annually unlike in countries like Swaziland, Senegal and Mauritius among other countries that reported to be monitoring 100% of the forest management plan (FAO, 2015).

Zimbabwe participates in several transboundary conservation initiatives with other Southern African countries such as Angola, Botswana, Namibia, South Africa, Mozambique and Zambia. For example, it is involved in the Lower Zambezi Mana Pools Transfrontier Conservation Area (TFCA) with Zambia; Great Limpopo Trans frontier Park with South Africa and Mozambique; Limpopo-Shashe –TFCA with Botswana and South Africa; Kavango –Zambezi TFCA with Angola, Botswana, Namibia and Zambia; as well as the Chimanimani TFCA with Mozambique[35]. The Great Limpopo Trans frontier park management priorities for example, are focused on biodiversity conservation and tourism. The park is exploring a number of intervention strategies, including rehabilitation of the land (Kruger), reforestation through tree planting (Limpopo), reducing the number of cattle and introducing rotational grazing while restoring soil-eroded areas (Gonarezhou), and a planned introduction of alternate fuel sources to counter charcoal use among communities[36].

3.3.5. Forest health and vitality

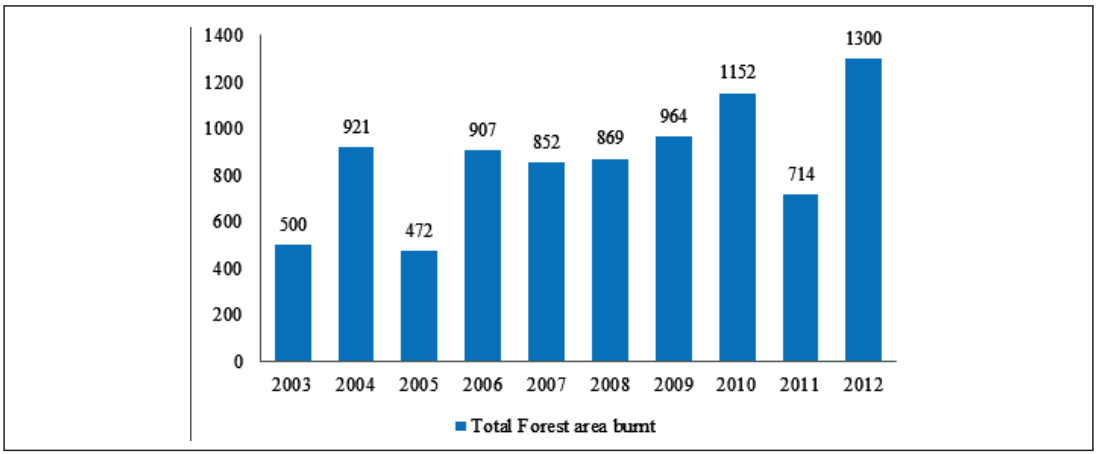
Veld fires

Veld fires are a major threat to biodiversity (Nyamadzawo *et al* 2013). Each year, Zimbabwe loses an average of 900,000 ha to veld fires, most of them in resettlement areas. In 2010, the Forestry Commission reported that 79,000 ha of protected indigenous forests were burnt. Figure 5 illustrates the extent of fire damage to the forest resource between 2003 and 2012. TPF (2018b) highlighted some of the causes of such veld fires in commercial plantation and these include smoking, honey harvesting, clearing of land for agriculture using fire with such fires getting out of control and burning timber plantations, poachers who use fire to trap animals and most of all deliberate burning of the forests as a way of settling disputes.

The major challenge that emerged from consultations with stakeholders is the resource constrained Forestry Commission to put in place fire guards. Further, despite the fact that there is an elaborate national fire policy, elaborate protocol on lighting fire as well as construction of fire guards, enforcement of these is a big issue. Some of the consulted stakeholder further raised the issue that besides lack of enforcement, community awareness programmes to control fires no longer receives priority in terms of funding as was in the past.

[35] http://en.wikipedia.org/wiki/Transboundary_Protected_Area
[36] https://www.giz.de/en/downloads/giz2015-en-tfca-great-limpopo.pdf

Figure 5: Total land area burnt between 2003 and 2012 in 000 ha



Source :Food and Agriculture Organisation (2015) Global Forest Resources Assessment 2015; www.fao.org/3/a-i4808e.pdf

Invasive alien species

Forests are not only susceptible to insect pests and diseases but to some extent, to invasive alien species as well. Fast-growing exotic tree species ,such as pine (Pinuspatula), wattle (Acacia mearnsii), Lantana camara, strawberry guava (Psidiumcattleianum), guava (Psidiumguajava), gumtrees (Eucalyptus), Jacaranda mimosifolia, white cedar (Meliaazedarach) and cypress, are slowly becoming invasive in the Afromontane forests, grasslands, miombo woodlands and stream banks ((Government of Zimbabwe, undated). Further, the invasive weed commonly known as Mupesepese and mostly prevalent in Chimanimani suppresses all other plant life wherever it is growing and is very difficult to eradicate (TPF, 2018b). Thus, it is threatening the establishment of not only plantation tree crops but also agricultural crops thereby reducing the food security of the country.

Despite the widespread occurrence of invasive alien species in Zimbabwe, there is no comprehensive data on plant and animal invasive species available but experts concur these species cause damage to forests.

Pests

Baboons and to a lesser extent monkeys, have wreaked havoc to the forest growth particularly in timber plantations. The former destroy trees through bark stripping, ring barking, uprooting planted seedlings and damaging tree tips (TPF, 2018b). Bark stripping often leads to growth retardation; mortality and tree deformation leading to yield reduction and if left without control this damage can to a great extent negatively impact on the viability of commercial timber (TPF, 2018b). Consultations with stakeholders concurred with this observation and noted that trees such as baobabs are at the threat of extinction as the roots of small baobab trees are a favourite to these baboons.

In the plantations, emerging pests affecting eucalyptus trees include the bronze bug (Thaumastocorisperigrinus), Blue gum chalcid (Leptocubeinvasa) and Red gum lerp (Glycospisbrimblecombey) (TPF, 2018b). Their threat might be huge in future if not contained now.

3.3.6. Productive functions of forest resources

The commercial timber industry is largely dominated by the exotic plantations that mainly grow pine followed by eucalyptus trees. 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 (Government of Zimbabwe, 2014).

Major wood products produced in Zimbabwe include sawn and processed timber; treated poles; veneer and plywood; particle and fibre board; wattle extracts and charcoal. The country used to produce paper and paper products as well as match sticks but has since stopped owing to economic challenges.

Zimbabwe practices planned exploitation of indigenous hard wood through concessions entered into between the timber consumers and the Forestry Commission. In the case of forests that are governed by Rural Districts Councils (RDCs) or those located in private farms, the Forestry Commission is charged with the duty of administering concessions entered into between timber players and RDCs or private farm owners. The concession specifies what is to be harvested, periodic limits either monthly or annually as well as how to remove the timber in order to protect the soil and other plants surrounding the harvested trees. The land use must remain the same whilst only exploiting exploitable sizes of trees. Each concession is allowed to exploit 200 m^3/ month. Currently the Commissions have 10 concessions in Tsholotsho, Lupane, Nkai, Umguza and Chemagora in the Midlands area.

The productivity of the timber sector has declined significantly in recent years because of past overexploitation and degradation of the indigenous forests (Government of Zimbabwe, 2014). The use of inappropriate harvesting techniques and poor post crop harvest management of slush and burn that causes veld fires have also been documented (Government of Zimbabwe, 2014). Furthermore, non-timber forest products, such as honey and wild fruits, that provide safety nets for rural communities during drought years, are being increasingly commercialized resulting in unsustainable harvesting of forest products. Medicinal plant species have been unsustainably harvested with a few of the 500 known species now on the brink of extinction (Madzara 2013).

Protective functions of forest resources

Forests have protective functions to the environment such as water catchment protection; climate change mitigation through carbon sequestration; generating clean air; reduction of soil erosion and the risk of landslides, floods and droughts, and prevent desertification and salinization (TPF, 2018b and FAO, 2018). Their unsustainable exploitation however jeopardizes them of delivering on this protective role. This leads to negative environmental impacts such as 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 (Government of Zimbabwe, 2014).

Sentiments from some of the consulted stakeholders were that some of the country's threatened forests are water catchments hence their depletion threaten socio economic livelihoods of many people. Mafungautsi forest for example, forms part of the watershed for the four Sengwa-Mbumbusi, Lutope, and Ngomadoma rivers with a link to the Zambezi River. The Zambezi River houses the Kariba Dam, an important tourist destination and source of hydroelectric power for both Zimbabwe and Zambia. The Forestry Commission however, revealed that this catchment is now under threat from human settlement as 11 000 illegal settlers invaded the reserved forest. Chief Njelele who resides near the forest has been on record to have been illegally settling local people in there at a cost[37].

Socio-economic functions

Forests and trees have important multiple functions and provide a wide range of forest goods and products that include fodder, medicines, timber, construction materials, foods and firewood for energy. In Zimbabwe, 65 percent of households use wood as a main source of energy for cooking (Labour Force Survey, 2014). At its peak, in Zimbabwe the forestry sector directly employed 14 445 people and over 40 000 indirectly in the downstream industries and contributed 3% to the Gross Domestic Product (GDP) (FAO, 1999).

Forest products are not only earmarked for the local market but are exported to the region and generate the much needed foreign currency in view of the liquidity crunch the country is going through. In 2016 wood and articles of wood, wood charcoal exported by Zimbabwe (Harmonised Systems Code 44) raked in $23. 64 million in export revenue with Zambia, Botswana, South Africa and Mozambique constituting 99.5% of the market share[38]. The country has however, recorded increasing imports in recent years.

Owing to the prolonged economic challenges and changes in the land-use of some forests through the land reform programme, the forest sector currently contributes less than 1.5% to the GDP and employs a mere 3,084 permanent employees and about 1,737 fixed contract workers in 2017 (see Table 4) up from a total employment of 14,445 in 2000 (TPF, 2018c). The private sector through corporate social responsibility contributes to the health and education status of forest employees and surrounding communities.

Table4: Annual Employment Trends 2009- 2013

Description	2009	2010	2011	2012	2013	2014	2015	2016	2017
Permanent	6,314	4,741	5,238	5,589	3,553	2,921	3,103	2,673	3,084
Contract	2,613	2,501	2,774	2,580	1,465	912	1,565	1,267	1,737
Total	8,927	7,242	8,012	8,169	5,018	3,833	4,668	3,940	4,821

Source: TPF (2018c) Employment Statistics

[37] https://www.chronicle.co.zw/settlers-destroy-mapfungautsi-forest/
[38] https://www.trademap.org/Product_SelCountry_TS.aspx?nvpm=1|716|||44|||2|1|1|2|2|1|1|1|1

The harsh economic conditions have not spared the forestry industry just like any other sectors of the economy. As a result, the timber industry is facing low export competitiveness; declining sales due to liquidity challenges; low product demand; high cost of doing business; antiquated equipment; loss in forest area due to bad environmental practices, fire and illegal settlers (Kanyekanye, 2015). This has consequently seen a lot of companies closing their operations and laying off employees. Major casualties include Mutare Board and Paper Mills, Karina Textiles, Cairns Foods (under judiciary management), Zimbabwe Coffee, and Border Timbers International. The few remaining firms are operating at precariously low capacity utilization ranging between 5 and 40% (TPF, undated). A fall in the performance of the forest sector has further resulted in declining revenue and rates contributions to local authorities (TPF, undated).

Experts view from the timber industry revealed that Zimbabwe's forest industry is shrinking with limited scope to improve productivity through mechanization. While the industry has a potential of producing 1,800,000m^3 of round wood, per annum, it is currently producing less than half. Further the value chain is getting shorter every year and there is little investment in tree improvement with resultant drop in mean annual increment (Kanyekanye, 2015).

Rural communities have adopted alternative livelihood and income generating activities through the sale of forest and non-forest products such as firewood trade, wild fruits to middlemen who resell them in the urban areas; honey production and caterpillar (i.e. Mopani worms) harvesting (Human Development Report, 2017). Another benefit Zimbabwe is enjoying from its forests is nature based tourism. The sector is currently on a growth path and is expected to boost the tourism induced economic growth.

3.3.7. Legal, policy and institutional framework

There are various policies and regulatory frameworks that are aiding Zimbabwe towards the achievement of the SFM. These include the international, regional, national and provincial frameworks both affecting the public and private sectors.

International and regional frameworks governing sustainable forest management in Zimbabwe

Zimbabwe is a signatory to various international and regional agreements and protocols on the environment. Key among them are the Convention on Biological Diversity; United Nations Framework Convention on Climate Change; United Nations Convention to Combat Desertification; the Non-Legally Binding Authoritative Statement of Principles for Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests (Forest Instrument); the Sustainable Development Goals; African Union Convention Article VIII on Vegetation Cover and the Southern African Development Community Protocol on Forestry. All these agreements have provisions that parties have committed on sustainable forest management.

According to Government of Zimbabwe (2016), regarding the implementation of the country's obligations to some of these conventions, the following has been done:

A National Biodiversity Strategy and Action Plan document has been produced in line with the requirements of the Convention on Biological Diversity.

A National Action Plan on the Desertification Convention is now in place.

3.3.8. National framework of sustainable forest management

At the national level the Forest Act and the Communal Lands Forest Produce Act of 1987 are the laws that directly influence the management and utilisation of forest resource in Zimbabwe. The other ones such as National Parks and Wildlife Act of 1975, amended 1982; Communal Land Act of 1982, amended 1985; Rural District Councils Act of 1988; Land Acquisition Act of 1993; Mines and Minerals Act of 1996; and the Environmental Management Act of 2002 indirectly influence the management and utilisation of the forest resource.

Forest Act Chapter 19:05

The Forest Act is the principal act that deals with forest issues in Zimbabwe. This act mandates the Forestry Commission with the duties of administration, control, and management of state forests. Further, the Act provides for the setting aside of state forests, protection of private forests, trees and forest produce, control of tree cutting for mining purposes, conservation of timber resources and the compulsory afforestation of private land.

Parks and Wildlife Act of 1975 Chapter 20:14 of 1975 revised 1996

The Parks and wildlife Act regulates the wildlife resources including the forest within the wildlife game parks. It is the Parks and Wild Life Department under the Ministry of Environment that is responsible for the management of forests within the national parks.

Communal Lands Forest Produce Act of 1987

The Act empowers the Rural District Councils with commercial utilisation of forest products on communal areas and constricts local people and communities' access to the forest resource to subsistence utilisation.

Rural District Councils Act chapter 29:13

This Act empowers the rural district councils to enact by-laws to regulate natural resource use in the district communal areas and to issue licences for commercial exploitation of wood products in these areas. The Rural District Councils have the right to grant concessions to outsiders to utilise forest products for commercial gain.

The Communal Lands Act of 1982, amended 1985

This Act vests the control of land under the President through the Rural District Councils rather than through the Chiefs.

Environmental Management Act Chapter 20:27

The Environmental Management Act oversees the management of all natural resources; water, soils, air, mineral, forestry and wildlife resources. It provides for regulations to promote the sustainable use of the environment through environmental impact assessment, environmental audits and penalties to environmental polluters.

The National Constitution

Section 73 (1) of the Constitution of Zimbabwe (2013) gives every person environmental rights that include the right:

a) to an environment that is not harmful to their health or well-being; and
b) to have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that—
    i. prevent pollution and ecological degradation;
    ii. promote conservation; and
    iii. secure ecologically sustainable development and use of natural resources while promoting economic and social development.

In section 72 (2), the State must take reasonable legislative and other measures, within the limits of the resources available to it, to achieve the progressive realisation of the rights set out in this section.

Statutory Instrument 116 of 2012: Forest (Control of Firewood, Timber and Forest Produce) Regulations 2012.

Statutory Instrument 116 of 2012 controls both wood and timber movement and trade in Zimbabwe and has special emphasis on encouraging the production of flue-cured tobacco on a sustainable basis.

3.3.8.1. Legislative gaps

Sentiments from the consulted stakeholders were that Zimbabwe has a relatively sound legal framework that lacks enforcement. TPF (2018b) cited a number of conflicts in the national legislation that the forest plantations are grappling with. These include the Mines & Minerals Act vs. Forest Act where the former confers lands rights to the miner over the forester. Linked to this is where the Ministry of Mines is offering Mining Special Grants in Gazetted Forests or gold panning activities being conducted in gazetted forests like Tarka and Maswera Forests.

The other area of conflict is between the Land Resettlement Act vs. Forest Act where forest land is being converted into agricultural land. Mabonda forest in Penhalonga has new settlements with offer letters from Ministry of Lands. Stray cattle and goats from these settlers are destroying young trees. Mineral exploration in protected areas such as Hwange and Mana Pools national parks for coal and coal-bed methane has led to land use conflicts with conservancies (Government of Zimbabwe, undated).

In addition, traditional and local leadership is allowing settlements in gazetted and Commercial Forest Plantations as in the cases of Martin Forest in Chikukwa; Tarka Forest in Ngorima; Gwendingwe Forest in Muusha and Cashel Estates in Mutambara (TPF,2018b). Further, there are law overlaps and duplications for example the management of fire under the Statutory Instrument 7 of 2007 is under EMA but this instrument is derived from the Forest Act being managed by Forestry Commission.

Moreso, the principal forest Act is old and does not capture some of the emerging issues of sustainable forest management. For example, the current Forest Act does not adequately cover issues with regards to conservation of indigenous trees. Kenya, in its Forest Conservation and Management Act No. 34 of 2016 clearly and broadly covered the issues of sustainable management of indigenous forests. Its Section 42 (1) provides that:

All indigenous forests and woodlands shall be managed on a sustainable basis for purposes of—

- conservation of water, soil and biodiversity;
- cultural use and heritage;
- · recreation and tourism;
- sustainable production of wood and non-wood products;
- carbon sequestration and other environmental services;
- education and research purposes;
- habitat for wildlife in terrestrial forests and fisheries in mangrove forests.

Furthermore, the current forest laws are silent on management of forestry plantations. The reasoning behind this was that these are organized players who follow systematic forest plans from plantations right through to harvesting. Weaknesses that crept in however resulted in increasing timber product shortages and importation of timber into the country. The government is now in the process of drafting a statutory instrument to control commercial plantations so as to avert the importation of timber which is currently taking place.

The other gap in the legislation is the lack of promotion of commercialization of the forest products and the creation of an enabling environment for sustainable trade in forest produce as espoused in the Draft National Forest Policy (Zimbabwe Environmental Law Association (ZELA), 2017). As alluded to above, the Rural District Councils Act gives the RDCs the right to grant concessions to outsiders to utilise forest products for commercial gain. This arrangement does not give local communities incentives to sustainably manage their forest resources and gives rise to commercial timber poaching (Shumba, 2011).

The law further promotes individual rights to the exploitation of forest resources but prohibits communities neighbouring or within the forests to derive any benefits from them. This is not in line with conventional approaches to community rights in sustainable forest management. This state of affairs has rather promoted timber poaching by the deprived communities. FAO (2016) emphasises that some of the prerequisites for sustainable land management are land-tenure security, the formal recognition of customary rights to the use of land and forest goods, and the strengthening of the rights of vulnerable groups, such as poor, forest dependent people.

Zimbabwe's Communal forest law does not allocate forest revenue accrued from forest resources to the communities residing near the forests yet they are the custodians of those forests. Section 13(4) of the National Constitutions obliges the State to ensure that local communities benefit from the resources in their areas. This implies that the current forest laws are not yet aligned to the National Constitution to deliver on this to ensure the local communities are included in the country's national development. The issue of equitable benefit sharing is also emphasised in various international conventions to which Zimbabwe is a signatory such as the Nagoya Protocol of the Convention on Biological Diversity. Devolving forest management rights to local communities and smallholders can improve access to, and recognition of, forest benefits through collaborative forest management (FAO, 2016).

Forest pathways to sustainable development will be fundamentally strengthened by legal frameworks that recognize and secure the rights of local communities and smallholders to access forests and trees (FAO, 2018).

3.3.8.2. Forest Policy

The Government of Zimbabwe has recently drafted a Forest Policy that is pending Cabinet approval. The objectives of this policy fully support the thematic elements of sustainable forest management as presented in Box 1 above. The following section shows the alignment of thematic elements and extracts of the proposed policy objectives intended to promote sustainable forest management.

Forest biological diversity

Promote the conservation and sustainable management of forests in all categories of forest tenure systems to enhance the forest resource base, ensure ecosystem stability and basic environmental services.

Protective functions of forest resources

Build the resilience of communities to climate change impacts through participation in improved forest resource management and payment for ecosystem services.

Socioeconomic functions of forests.

Valuate the contribution of forest resources to food security; livelihoods; energy as well as ecosystem, social, economic and cultural services to enable their true value to be reflected in the national accounting system. Promote investment in forestry through sustainable forest-based industrial development, trade and commercial tree growing for income generation, poverty reduction, employment creation and improvement of livelihoods. Encourage Public Private Community Partnerships in the forestry sector to enhance beneficiation of non-timber forest products and the contribution of forests to community livelihoods as well as public and private sector growth.

Legal, policy and institutional framework

Set the norms and standards of performance, regulatory controls, management practices, auditing and reporting requirements to promote and improve best practice in the forestry sector.

Support forestry research; knowledge management and dissemination; technology transfer as well as education and training and adequately finance training and research institutions to ensure a vibrant forestry sector.

Establish an effective legislative and institutional framework committed to the development of the forestry sector in line with current global trends in sustainable forest management.

- Promote national interests by participating in the drawing up, domestication and implementation of international and regional agreements on forest resources to increase environmental and socio-economic benefits that accrue from sustainable management of forests.
- Promote Public Private and Community participation in the forestry sector and create a sense of collective responsibility for all forest types and ecosystems
- Ensure gender equity and active participation of women, youths and vulnerable groups (which include children, people with disabilities, the elderly, orphans and marginalized communities) in forest resources management, forest industries and livelihood interventions.

As can be noted above the proposed policy framework is aligned to the thematic elements that form the bedrock of contemporary forest management practices. Thus, the approval by Cabinet, launch and implementation of the Forest Policy is expected to go a long way in enhancing SFM in the country. The adoption of this policy also needs to be complemented by enhancement of capacities of implementing agencies to ensure that they are fit for purpose.

Policy gaps

The forest policy needs to be supported by other government policies like the agriculture, land use, rural development and national development policies in an integrated manner. The draft Agricultural Policy recognizes the need to maintain friendship with the environment and cites household energy and tobacco curing as major reasons for forestry resource depletion. Government therefore commits to:

(i) Promote the planting of timber plantations for construction and firewood for domestic use and tobacco curing;
(ii) Encourage use of more efficient tobacco curing facilities;
(iii) Assist in enforcing regulations within the rural areas to reduce veld fires and maintain ecosystem diversity; and
(iv) Promote agro-forestry.

The major challenge is delays in implementation of this policy which has been a draft since 2012. There is little investment towards alternatives to rural household energy particularly

solar in order to ease pressure on forests. Furthermore power outages in urban areas have also contributed to unsustainable exploitation of the forest resource.

3.3.9. Institutional set up and capacity challenges

The UN (2008) Resolution 62/98 emphasized that implementation of sustainable forest management is also critically dependent upon good governance at all levels. The approach on regulation of forestry however, has been sectoral with standalone regulatory and monitoring institutions leading to overlaps and conflicts in some instances. Chimhou *et al*, (2010) highlights that the Ministry of Environment's mandate is also executed by government institutions such as the Environmental Management Agency, the Parks and Wildlife Management Authority, the Forestry Commission, and the Zimbabwe Tourism Authority but there is in practice little collaboration among them.

Ministry of Environment, Tourism and Hospitality Industry

The policy-making and coordinating unit for the Ministry of Environment, Tourism and hospitality Industry, lead ministry for environmental policy is relatively small, usually under-staffed with a myriad of environmental issues to deal with, including international obligations (Chimhou*et al*, 2010).

Forestry Commission

The Forestry Commission is constrained by limited human resource skills owing to brain drain emanating from prolonged period of economic crisis since the early 2000s. Some of the consulted stakeholders cited skills shortages in forestry mapping as current staff are overstretched, vegetation cover mapping, Geographic Information System skills to monitor vegetation change. In addition there are skills shortages in monitoring forestry pest and diseases. Consultations with the Forestry Commission revealed that the government lost the only entomologist who needs replacement. Further forestry research needs support. Whilst forestry extension skills are adequate, the numbers of those with skills are few.

Zimbabwe falls short of international best practice methods when it comes to measuring and reporting progress towards SFM. Forest inventory is one of the tools employed to do so. However, this was last conducted in 1998 and has not been done on a continuous basis but rather periodically. The country relies on ground plot inventories and there is no use of areal or remote sensing either for sample or full coverage (FAO, 2015). This tends to deprive the institution of creating a sound database containing such information. Forestry inventory in Zimbabwe lags behind fellow African countries like Tanzania and Zambia due to limited resources.

Environmental Management Agency

Challenges that have been noted in literature about Environmental Management Agency (EMA) include the weak implementation of the EMA Act and almost non-existent monitoring coupled with sporadic and unsustained environmental protection efforts (Chimhou et al, 2010). Like any other government institution, EMA has not been spared from

human resource shortages as it succumbed to loss of experienced and competent staff leading to widening skill gaps and loss in institutional memory. The EMA has offices at provincial and district levels, but representation by one or two officers in each district is deemed inadequate (Chimhou et al, 2010). Sentiments from the stakeholder consultations pointed to the lack of adequate transport fleet to conduct environmental monitoring and field visits. This tends to compromise the Agency's ability to deliver on its mandate of environmental management and protection.

Rural District Councils and Traditional Leaders

Limited enforcement of forestry by laws by Rural District Councils and traditional leaders was cited by stakeholders as a factor militating against modern day forestry management practices. The Rural District Councils lack financial resources to execute their mandates and this encourages predatory tendencies whereby revenue from local resources are captured by the councils rather than benefiting local communities (Chimhou et al, 2010).

Limited financial and human resources

Limited institutional capacity highlighted above is largely explained by limited financial resources from the government fiscus and development partners. Given the fiscal constraints, the government is facing, inadequate resources are being channelled towards sustainable forest management. It emerged from stakeholder consultation that in the past, Zimbabwe experienced substantial donor funding to community management of forestry resource. However, with the gradual withdrawal of donor funding since the early 2000s, this ceased. Another challenge cited by stakeholders includes the government institutions' limited capacity in proposal writing soliciting for international funding for forestry management. Global funds exist such as the Green Climate Fund, the GEF, and Redd+. However, tapping from this international financing is not necessarily easy but can be achieved with a bit of aggression on the part of government institutions.

UN (2008) Resolution 62/98 emphasizes that effective implementation of sustainable forest management is critically dependent upon adequate resources, including financing, capacity development and the transfer of environmentally sound technologies, and recognizing in particular the need to mobilize increased financial resources, including from innovative sources. Forest training in Zimbabwe is hampered by the aging equipment and lack of financial resources for refurbishment; as well as distressed computer laboratory and inventory equipment in state owned forest colleges (TPF, 2018).

Deficiencies in knowledge and application

The other challenge inadequate information and knowledge about improved forest management. FAO (2015) however, advises that reliable and up-to-date information on the state of forest resources is crucial to support decision-making for investment and policy making in forestry and sustainable development. There is misevaluation of the forest resource. This is because the country lacks forestry economists to quantify the real contribution made by forests to socio-economic development. This tends to create information gap requisite to inform government policy decision making. This is with regards

to their contribution to rural livelihood, carbon sequestration, and ecosystem protection. All these variables are not quantified to build an argument why forests are that important. The government can only be convinced of the need to allocate requisite resources to spur the country in attaining sustainable forest management when given requisite information.

Zimbabwe's progress towards achieving SFM on other indicators under the seventh element: Legal, policy and institutional framework

Except for the period between 2002 and 2009, Zimbabwe had no area of forest under an independently verified forest certification scheme such as the Forest Stewardship Council (FSC). In 2002 for example, a total of 123,000ha of forest area was under FSC but this drastically fell to only 55,000ha in 2009 and to zero thereafter (FAO, 2015). Plantation owners lost their certificates due to use of lethal chemicals for baboon control; cost of acquiring FSC certification; unsustainable forest management – too many and frequent fires; and land disputes/illegal settlers (TPF, 2018). The only form of standardization in place is affiliation by major timber producers to Standards Association of Zimbabwe which inspects and certifies the quality of timber particularly structural grades (TPF, 2018). This presents a non-trade barrier to Zimbabwe as accessing the western countries markets may be a challenge as they demand for timber that comes from sustainably managed forests (TPF, 2018).

There is dominance in public control in forestry in Zimbabwe and private sector participation is limited by pricing, marketing and regulatory framework. Publicly owned forest area declined from 13,852,000 ha in 1990 to 9,868,000ha in 2015. A similar trend was recorded over the same period for the privately owned forest area that declined from 8, 312,000 ha in 1990 to 5,756, 000ha in 2015 (FAO, 2015).

3.4. Lessons learnt from other countries

Consulted stakeholders revealed that Zimbabwe did well in the past. The country used to export commercial tree seed to countries like Australia including many African countries. Its efforts however, are being militated by the prolonged economic hardships; the spatial spread of settlements owing to land reform; weakened institutional forestry management due to limited financial and human resources.

Good practices from other African countries that Zimbabwe can draw lessons from are found in Rwanda, Tanzania, Kenya and to some extent Ethiopia. For example some of the consulted stakeholders were of the view that Zimbabwe can pick lessons from Tanzania on participatory forestry management. That country has joint forest management programmes that empower communities to manage the forests. Communities are given title deeds to manage the forests. Kenya and Ethiopia to some extent have made strides in this regard. Similarly, the transfer of forest ownership to communities for sustainable management, and increased recognition of the importance of participatory forest management have helped reduce pressure on forest resources and increase the benefits of forests accruing to local communities (FAO, 2016).

The CAMPFIRE model, a Zimbabwean brand which is used in wildlife, has been adopted by several African countries. Some of the consulted stakeholders noted that the initiative has

its own weaknesses but can be reconsidered in the forestry sector. Rwanda has a forestry policy that has been applauded by many countries and development partners including FAO. Malawi lost large tracks of its forests due to tobacco curing and Zimbabwe is fast heading in that direction if no aggressive remedial interventions are implemented.

Chile's forestry plantations form a strong basis for a huge export industry. More than 1 million hectares of plantations have been established since 1990, mainly on land that previously had been under extensive agricultural use or was threatened by erosion (FAO, 2016). According to FAO (2016), some of the key factors that contributed to the positive trend in forest cover in Chile include forest plantations to produce timber for industrial processing and to deliver environmental benefits such as soil protection have been encouraged by subsidies for afforestation, a legal requirement to replant after harvesting, and a positive response to such opportunities in the private sector. Policy recognition of the potential of agriculture and forestry, based on the suitability of the land for different uses, has led to strong and effective support for both sectors.

Moreso, the National Institute for Agricultural Development of Chile has supported small and medium-sized producers through: the co-financing of agroforestry and agricultural investment projects; a programme to strengthen agriculture, forestry and related activities in indigenous communities to improve incomes and quality of life while respecting the world views of those communities; skills development and capacity building in smallholder organizations; and credit for irrigation and the management of native forests (FAO, 2016). It also offers technical assistance and training through extension officers throughout the country. FAO (2018) highlights the lessons learnt in the forest sector from a number of countries which are summarized below:

i. **Harnessing value chains and taking advantage of private sector capacity can increase productivity and local incomes**. In Arkhangelsk (the Russian Federation) value added more than doubled although timber harvest remained more or less the same. This increase was attributed to innovation, vertical integration and cluster approaches to forest industries. Employment creation did not necessarily expand in timber harvesting but the value chain approach increased opportunities up the value addition.
ii. **Scientific and technical support is key to sustained success.** In Burkina Faso, careful forest seed selection and breeding as well as support for village nurseries have helped ensure that planted trees are adapted to local ecosystems, and that survival rates are high.
iii. **Lack of solid data collection or management systems impede valuation of forest and woodlands to economic development and this is a barrier to change.** Developed countries like Italy have gone furthest in establishing sound data collection and monitoring systems and this has been applied in other countries. In addition countries like Republic of Korea's methodology of estimating the regulatory and cultural value of forests could be more broadly applied. This however relies on good data collection systems.
iv. **Strong enabling environment is key.** A mix of regulatory approaches, economic incentives and social marketing programmes (aimed at behaviour change) work best. Each of these factors is necessary but not sufficient. Integrated landscape approaches

are embedded in the Italian Constitution, as well as in enabling regulations and in data and information management. In Burkina Faso, Nepal and the Republic of Korea, sustained financial and political support for broad-based approaches to forest and woodland restoration have helped enhance quality of life and improve (in the case of the Republic of Korea) tree landscapes or reduce (in Burkina Faso and Nepal) degradation of forest.

v. **Multi stakeholder, decentralized approaches to woodland regeneration and landscape management have themselves improved governance. T**his has been recorded in Burkina Faso, Guatemala, Nepal and the United Republic of Tanzania. In Arkhangelsk (the Russian Federation) a multi stakeholder approach to governance also enabled the revival of and added value to the timber industry.

3.5. Conclusion

Zimbabwe's forests are depleting at an alarming rate of 330,000 ha per annum. Major drivers include agricultural expansion, unsustainable exploitation of fuel-wood, infrastructural developments, uncontrolled fires, mining, invasive alien species and climate change. Population rise and prolonged economic hardships will continue to exert pressure on the forestry resources as people desperately turn to it for alternative sources of livelihood.

In response to this level of forestry depletion, the country is implementing a number of initiatives such as the national tree planting day, schools tree growing and tree care competitions and also at special commemoration such as International Forest Day, World Environment Day and so on. However, these efforts are not matching the forest resource loss as evidenced by a loss of 60 million trees per annum against a planned planting programme of 15,000 trees per year. This points to gaps in the country's efforts to achieving sustainable forest management. Evidence shows that the land area that was managed for soil and water protection declined from 665,000ha in 1990 to 422,000ha. More so, only 6% of the total forest area falls under a management plan unlike in other African countries like Swaziland, Senegal and Mauritius among others that are reported to be monitoring 100% of the forest management plan. This implies that Zimbabwe's biological diversity is under threat.

The country's forest health and vitality is to some extent threatened by veld fires and invasive alien species that are wide spread around the country. Fast-growing exotic tree species are slowly becoming invasive in the Afromontane forests, grasslands, miombo woodlands and stream banks. Although there is no adequate data on plant and animal invasive species available, experts concur that these species cause damage to forests.

Some of the wood products produced in Zimbabwe include sawn and processed timber; treated poles; veneer and plywood; particle and fibre board wattle extracts and charcoal. In the past, the country used to produce paper and paper products as well as match sticks but has since stopped owing to economic challenges. The productivity of the timber sector has declined significantly in recent years because of past overexploitation and degradation of the indigenous forests. Regulatory framework to facilitate sustainable timber harvesting is in place but is facing implementation challenges leading to

unsustainable harvesting. Furthermore, non-timber forest products such as honey, wild fruits, and medicinal plants are unsustainably harvested.

While forests have protective functions to the environment, some of the reserved forests are at risk of depletion owing to illegal settlements. The forests' socio- economic function is not spared either. The country has recorded decline in employment in the forestry sector, contribution to GDP and increased imports forestry products. For example, the timber industry is facing low export competitiveness; declining sales due to liquidity challenges; low product demand; high cost of doing business; antiquated equipment; company closures and the timber value chain is shortening. There is however scope for increased contribution to economic growth by the forest sector through increased forest based tourism activities.

Zimbabwe has a relatively sound legal framework that lacks full enforcement. There are a number of conflicts in the national legislation that the forest plantations are grappling with. More so, the principal forest act is old and does not capture some of the emerging issues of sustainable forest management. Furthermore, the current forest laws promote individual rights to the exploitation of the forest resource but prohibit communal rights to these resources. This is contributing to commercial timber poaching. Whilst there is a forest institutional framework in place, gaps have been noted that undermine sustainable forest management in Zimbabwe. These include lack of coordination, and inadequate financial and human resources among the institutions mandated with the responsibility of sustainable forest management in Zimbabwe. It further includes lack of sound databases on sustainable management much needed to conduct research that will inform policy on the critical importance of the forest resource to Zimbabwe.

3.6. Recommendations

- There is need for Zimbabwe to step up its efforts to counter deforestation whilst increasing the tree planting efforts if the goal of sustainable forest management is to be achieved.
- Biodiversity is at the centre of Zimbabwe's national development agenda hence the need for the country to increase land under forest management plans given the high level of biological diversity threat. Furthermore there is need to contain pests and alien species threatening sustainability of forestry in Zimbabwe.
- There is need for increased investment in the forest sector in order to increase its socio-economic contribution to the country. This can be achieved through increased budgetary allocation to the sector particularly towards research, training and forest infrastructure development. Further, resources can also be tapped from international funding on sustainable forest management such as the Green Climate Fund, the Global Environment Facility, and REDD+. There is further need to take a value chain approach in reviving the forest sector of Zimbabwe.
- Institutions mandated for forest management require strengthening through adequate financial and requisite human skills if the country is to sustainably manage forestry resources. Such institutions include the Ministry of Environment; EMA, Forestry Commission, RDCs as well as forest training colleges.
- Zimbabwe needs to build scientific knowledge, including a credible database for

monitoring the forest resource and biodiversity.

- There is need to for law enforcement in forest management and Zimbabwe needs to re-align the forest legislation to the new and emerging issues and concepts on sustainable management of forests that are espoused in the three Rio environmental conventions. In addition, Zimbabwe's forest laws need to embrace the conventional methods of forest management by conferring communities with the rights to exploiting the resources in order to ensure responsibility on forest resource use.
- Going forward, Zimbabwe should increase its participation in climate change mitigation frameworks such as the Reducing Emissions from Deforestation and Forest Degradation (REDD+) programmes. These would allow the country to participate in the global carbon markets and generate revenue for conservation and communities.
- There is need for increased coordination among policies on forests, agriculture, land use, rural development and national development. Furthermore, the linkages between the Forestry Commission and other Ministries and government institutions responsible for environmental management such as Ministries of Agriculture, Environment and Energy, EMA, Parks and Wild life among others requires strengthening if forests are to be free from illegal logging and trade.

References

Chazdon, R. L., Brancalion, P. H. S., Laestadius, L., Bennett-Curry, A., Buckingham, K., Kumar, C., … Wilson, S. J. (2016). When is a forest a forest? Forest concepts and definitions in the era of forest and landscape restoration.*Ambio*, *45*(5), 538–550. Accessed at: https://doi.org/10.1007/s13280-016-0772-y

Chimhowu, A. O., Manjengwa, J., & Feresu, S. (2010). Moving Forward in Zimbabwe: Reducing poverty and promoting growth. *(*2nd ed.) (Volume 1 of Moving Forward in Zimbabwe, Admos Chimhowu).Institute of Environmental Studies.

Food and Agriculture Organisation (2013). Sustainable Forest Management Toolbox. http://www.fao.org/forestry/41212-08b8c14ee8da05299b12b6d77548f6d5d.pdf

Food and Agriculture Organisation (2015) Global Forest Resources Assessment 2015www.fao.org/3/a-i4808e.pdf

Food and Agriculture Organisation (2017). Natural Resource Management: SMF Toolbox. http://www.fao.org/forestry/sfm/85086/en/

Food and Agriculture Organisation (FAO) 2016. State of the World's Forests 2016. Forests and agriculture: land-use challenges and opportunities. Rome. Accessed at: http://www.fao.org/3/a-i5588e.pdf

Forestry Commission (2018) State of forest resource in Zimbabwe

Global Environment Facility (2011) Focal Area and Cross Cutting Strategies – multilateral REDD-plus financing program

Government of Kenya (2016) Forest Conservation and Management Act No. 34 of 2016

Government of Zimbabwe (2016)Press Statement By the Minister of Environment, Water and Climate Hon. O. C. Z. Muchinguri (MP) to mark World Environment Day 2016

GoZ (undated) Zimbabwe's Fifth National Report to the Convention on Biodiversity. Accessed at: https://www.cbd.int/doc/world/zw/zw-nr-05-en.pdf

Great Limpopo Transfonteir Park https://www.giz.de/en/downloads/giz2015-en-tfca-great-limpopo.pdf

https://www.facebook.com/forestrycommission.zw/posts/press-statement-by-the-minister-of-environment-water-and-climate-hon-o-c-z-muchi/1267220476629224/ (Accessed on 15 September 2018)

https://www.greenfacts.org/en/forests/toolboxes/box-1.htm.

International Trade Centre: Trade Map https://www.trademap.org/Product_SelCountry_TS.aspx?nvpm=1|716|||||44|||2|1|1|2|2|1|1|1|1

Miller, D. M. and Gwaze, D. (2012) Zimbabwe Biodiversity and Tropical Forest Assessment (118/119). Accessed at: http://www.usaidgems.org/Documents/FAA&Regs/FAA118119/Zimbabwe2012.pdf

Muralikrishna I.V., and Manickam V. (2017) Natural Resource Management and Biodiversity Conservation, Environmental Management *Science and Engineering for Industry2017, Pages 23-35*

Nhekairo F.R. and Gumbie. C. M. (2013) Forests, Rangelands And Climate Change Adaptation In Zimbabwe*(Prepared for Forests and Rangelands Workshop, Johannesburg, 17 – 19 June, 2013)*. Accessed at: www.fao.org/forestry/38075-0c1dedc315bad89891acd82bd11f38fa0.pdf

Secretariat of the Convention on Biological Diversity. 2009. Sustainable Forest Management, Biodiversity and Livelihoods: A Good Practice Guide.Montreal, 47 + iii pages. Accessed at: https://www.cbd.int/development/doc/cbd-good-practice-guide-forestry-booklet-web-en.pdf

Sustainable biodiversity management https://www.herald.co.zw/sustainable-biodiversity-management/ 12 March 2019.

Sustainable Forest Management https://www.revolvy.com/page/Sustainable-forest-management
Timber Producers Federation (TPF) (2018a) Zimbabwe Forestry Management Regime (unpublished), Timber Producers Federation, Mutare

Timber Producers Federation (TPF)(2018b) Presentation at the National Dialogue Workshop on Land Tenure and Land Policy in Zimbabwe . Accessed at: https://www.icaz.org.zw/imisdocs/TPF%20PRESENTATION_LAND%20POLICY%20WORKSHOP.pptx.pdf

United Nations. (2008). Resolution adopted by the General Assembly 62/98: Non-legally binding instruments on all types of forests. Accessed at: http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/62/98 on 23 October 2018

World Bank. Zimbabwe Country Profile https://databank.worldbank.org/data/views/reports/reportwidget.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=ZWE

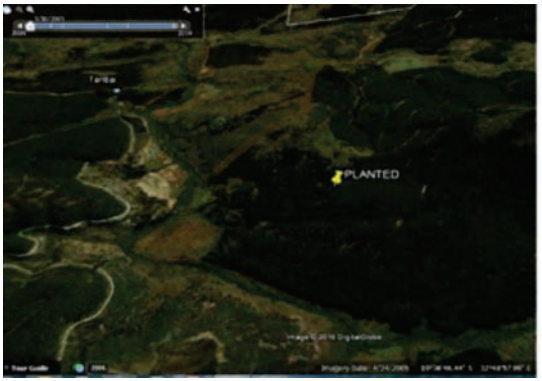
Zimbabwe Environmental Profile https://rainforests.mongabay.com/deforestation/archive/Zimbabwe.htm

http://en.wikipedia.org/wiki/Transboundary_Protected_Area
http://www.fao.org/docrep/011/aj982e/aj982e10.pdf

Annex I: Destruction of forest Estates in Zimbabwe between 2005 and 2014 (Timber Producers Federation, 2018)

CASHEL-TANDAI ESTATE

PLANTED FOREST IN 2005 SETTLED & DEGRADED IN 2014



CHALLENGES- *MARTIN CHIMANIMANI*

FOREST PLANTATION IN 2006 SETTLEMENTS & CULTIVATION 2014

CHAPTER 4: WILDLIFE MANAGEMENT IN ZIMBABWE

4.1 Why Manage Wildlife?

Wildlife management is defined as the sound management of wildlife species to sustain their populations and habitat over time, taking into account the socioeconomic needs of human populations. The definitions of wildlife management takes into account three common elements that includes: efforts directed toward wild animal populations; the relationship of habitat to those wild animal populations, and the manipulations of habitats or populations that are done to meet some specified human goals. Thus, the sustainable management of wildlife can result in the provision of continuous income and contribute considerably to the alleviation of poverty as well as to safeguarding human and environmental health.

There are both tangible and intangible benefits that can be derived from managing wildlife. Tangible benefits may accrue from leasing rights for hunting and other forms of outdoor recreation involving wildlife. Fees collected from these activities can provide income to pay property taxes and other management costs. Whilst on the other hand intangible benefits from wildlife management can include the excitement derived from observing wildlife, the satisfaction and pride from conservation efforts, economic and social benefits of wildlife that will accrue to present and future generations.

In most countries conservation efforts have stemmed from concern over the severe depletion of wildlife.As the populations of many wildlife species decline, their conservation importance has increased. However, there seems to be a divergence between the needs of local communities and conservation objectives. Threat to food security and livelihoods has often been the main source of conflict with regards to wildlife management. .Crops are subject to damage caused by wildlife which have a negative impact on economies and livelihoods. Food security is typically most vulnerable in communities that depend on rain fed agriculture. At the same time, conservation efforts are being hindered by an upsurge in wildlife trafficking and poaching. The response by many governments has been the introduction of stringent and indiscriminate laws and regulations designed to prevent all exploitation of wildlife within designated protected areas..Furthermore governments have introduced regulated sport hunting in order to convert wildlife into assets for the benefit of local people and the country as a whole. Thus, wildlife can be valuable assets and in turn empower local communities and provide basic necessities. This can lead to habitat preservation instead of habitat destruction. The presence of regulated wildlife utilization activities have helped reduce illegal activities as it is a lawful activity designed by government wildlife authorities and experts to ensure sustainable utilization of wildlife resources.

In recognition of the need to conserve, protect and sustainably utilize natural resources, the international community through the United Nations family has come up with strategies and options to manage natural resources. One such option is the Sustainable Development Goal (SDG) number 15.This SDG seeks to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and

reverse land degradation and halt biodiversity loss[41].

Box 2: SDG 15 targets related to wildlife management.

a. Target 15.4: By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.
b. Target 15.5: Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
c. Target 15.6: Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.
d. Target 15.7: Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.
e. Target 15.8: By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.
f. Target 15.9: By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.
g. Target 15.A: Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.
h. Target 15.B: Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation.
i. Target 15.C: Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities.

4.2 Situational analysis

In Zimbabwe, most wildlife is managed by the Parks and Wildlife management authority in national parks, safari areas, recreational parks and sanctuaries collectively called the Wildlife Estate and these cover an estimated 12.5 percent of the total land area of Zimbabwe. Most of these Wildlife Estates are located in remote or rugged terrain; in hot and dry areas with infertile soils of low agricultural potential. Most of Zimbabwe's wildlife occurs within these Parks Estates, which are made up of different categories; National Parks, Safari Areas, Botanical Reserves and Botanical Gardens, Sanctuaries and Recreational Parks as outlined in the Parks and Wildlife Act. Table 5 provide details of these different categories.

[41]Sustainable Development Goals; https://sustainabledevelopment.un.org/sdg15

Table 5: List of National Parks, Botanical Gardens and Reserves in Zimbabwe

	Name of Park	District	Area (Hectares)
National Parks	Chizarira	Binga	191,000
	Gonarezhou	Chiredzi	505,000
	Matusadonha	Nyaminyami	140,700
	Chimanimani	Chimanimani	17,110
	Mana Pools	Hurungwe	219,600
	Kauma Pan	Hwange	31,300
	Hwange	Hwange	1,465,100
	Victoria Falls	Hwange	2,340
	Zambezi	Hwange	56,010
	Rhode Nyanga	Nyanga	47,150
	Rhodes Matopos	Matobo	42,400
	Total A rea of National Parks		**2,717,710**
Botanical Gardens and Reserves	Pioneer Reserve	Beitbridge	38
	Tolo River Reserve	Beitbridge	44
	South Camp Reserve	Beitbridge	26
	Chisekera Hot Springs	Chiredzi	95
	MawariRaphia Palm	Mt Darwin	34
	TingwaRaphia Pan	Mt Darwin	290
	Haroni Forest	Chimanimani	20
	Rusitu Forest	Chimanimani	150
	Sebakwe Acacia Karoo	Kwekwe	60
	Sabakwe Great Dyke	Kwekwe	165
	Sebakwe Mountain Acacia	Kwekwe	53
	Mazowe	Harare	46
	Bunga Forest	Mutare	495
	National Botanic garden	Harare	67
	Vumba Botanic Garden	Mutare	200
	Ewanrigg Botanic Garden	Goromonzi	286
	Total Area of Botanical Gardens and Reserves		**2,069**

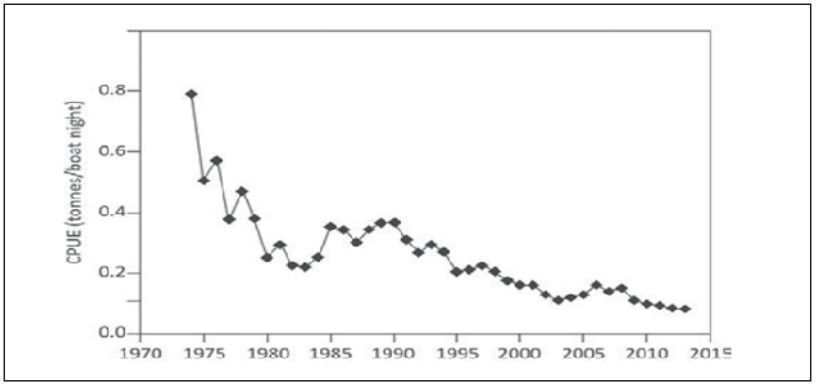
Source: Parks and Wildlife Management[42]

The Parks and Wildlife Management Authority's mandate involves protecting wildlife and preserving protected areas. The authority has been vested with the authority to exploit and conserve wildlife. However, alienation of wildlife resources and reduced access to land have changed the cultural perspectives of the rural communities in which wildlife resources were utilised on a sustainable basis, except when hunted illegally for meat, wildlife has become a liability and nuisance[43]. Wildlife contributes an estimated over US$ 250 million annually to the country's economy (one-quarter of the total contribution made by agriculture) through safari hunting, game cropping, tourism and live animal sales. Safari hunting generates substantial foreign exchange and provides direct employment for local

[42] http://zimparks.org/wp-content/uploads/2015/11/Zimbabwe-Prospectus-Parks-Website.pdf
[43] http://www.fao.org/docrep/u5200e/u5200e06.htm

populations. According to the Africa Wildlife Foundation (AWF), due major droughts, poverty, a growing population, and a lack of fuel have resulted in massive deforestation and destruction of wildlife and wildlife habitat in Zimbabwe[44]. Wildlife is considered a "*public good*" and therefore it is subject to the "*tragedy of the commons*": As more people try to consume the free resource, moral hazard takes precedence as people compete to harvest much resources as they can and focus less on conservation efforts. This have resulted in overuse, lack of sustainability and finally extinction, for example failure to observe and adhere to restrictions governing fishing in exclusion zones have led to overfishing of kapenta in Lake Kariba[45].This has resulted in decline in catch per unit effort ((CPUE) in tonnes per boat night) an indication of diminished supply.

Figure 6: Trend in catch per unit effort (CPUE) of Kapenta obtained from Zimbabwean waters of Lake Kariba.



Source: Parks and Wildlife Management Authority of Zimbabwe[46]

Underfunding of wildlife management programmes in Africa has been highlighted as one of the major reason for the wanton destruction of wildlife and wildlife habitat. It has been noted that wildlife management agencies have high financial requirements that are not being adequately being met by the State. Thus, because of inadequate funding these sanctuaries become "paper parks", i.e. protected areas that exist only on paper with no conservation efforts being carried out to manage and protect wildlife. As a result wildlife ultimately pays for the gap in funding through poaching and destruction of wildlife habitat[47].Despite co babwe has managed to maintain a successful wildlife management system[48]. In response wildlife population have been increasing , putting pressure on existing parks and wildlife sanctuaries. Figure 7 highlights the trend in population for selected animal species in selected animal sanctuaries in Zimbabwe.

[44]Zimbabwe Country Profile ; https://www.awf.org/country/zimbabwe

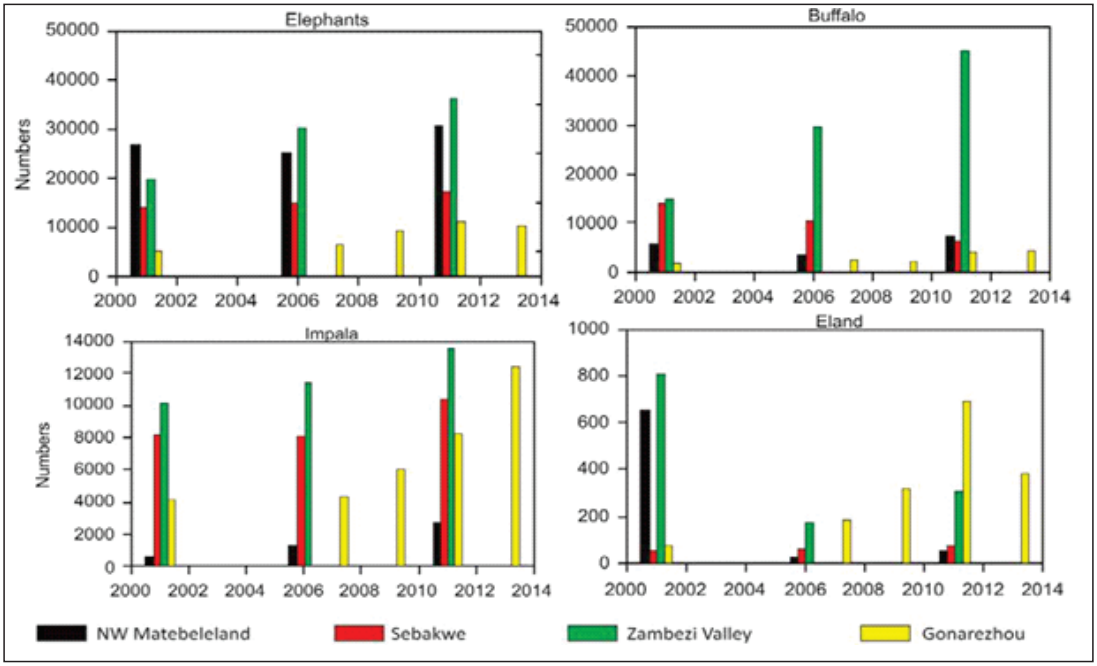
[45]Kapenta fish war turns ugly; Bulawayo 24; 17 Aug 2014, https://bulawayo24.com/index-id-news-sc-africa-byo-52337-article-Kapenta+fish+war+turns+ugly.html

[46]Fifth National Report to the Convention on Biodiversity report; https://www.cbd.int/doc/world/zw/zw-nr-05-en.pdf

[47]http://www.africanindaba.com/2014/04/poaching-in-africa-facts-causes-and-solutions-april-2014-volume-12-3/

[48]Fourth National Report to the Convention on Biodiversity report; https://www.cbd.int/doc/world/zw/zw-nr-04-en.pdf

Figure 7: Trend in animal population in selected National parks in Zimbabwe (2000-2014)

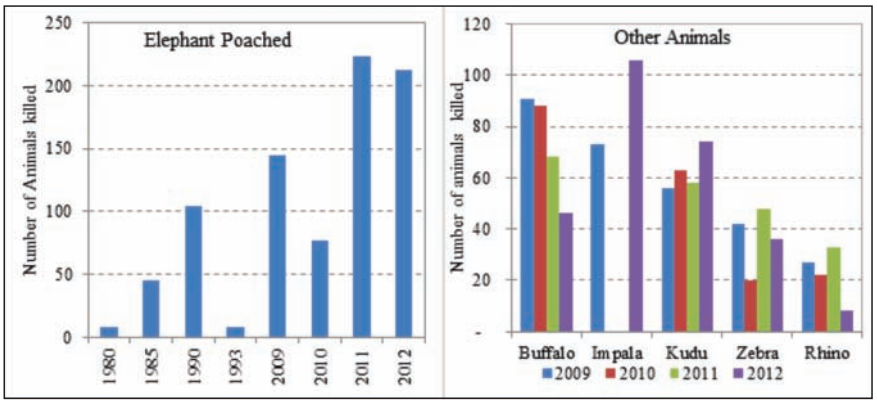


Source: Zimbabwe's Fifth National Report to the Convention on Biodiversity[49]

These increases in wildlife population have also been accompanied with increased poaching incidents as the increase has not been commensurate with incentives and benefits accruing to communities adjacent to the wildlife sanctuaries. Thus, as Zimbabwe's human population grows and wildlife being restricted to smaller areas and their population also expand; they increasingly move out of their designated habitat and raid crops and sometimes threaten human lives. However, the search for food sources have resulted in increased human wildlife conflicts and this has created substantial negative attitudes towards animal conservation. Unresolved conflicts stimulate poaching or retaliation. Poachers or retaliators can be seen as "local heroes" because they provide meat to the communities and resolve the conflict with wild animals. Figure 8 highlights the trend in the reported cases of poaching in Zimbabwe in selected game animals.

[49] Fifth National Report to the Convention on Biodiversity report; https://www.cbd.int/doc/world/zw/zw-nr-05-en.pdf

Figure 8: Reported levels of animal poaching in Zimbabwe



Source: ZPWMA[50]

According to the CAMPFIRE Association, human wildlife conflict falls under two categories: crop damage and livestock deaths. They estimated that between the periods 2010 – 2015 an estimated 7,000 ha of crops were destroyed by elephants. The impact of crop destruction was noted to be high in drought prone areas (e.g. Beit-Bridge, Binga, and Tsholotsho) as being more acute than in areas where crop production may be higher. Lion and crocodiles were also responsible for most cattle deaths, whilst Hyenas equally destroy cattle and small livestock's such as goats, and sheep.

These communities also paid the ultimate price with the loss of life for an estimated 96 people with others countlessly injured after encountering dangerous animals (see Table 6). Crocodile and hippo are responsible for most human deaths and injuries whilst there are also a number of incidents where elephants have killed and maimed people who were tending their fields or traversing wildlife areas.

Table 6: Human and wildlife conflict (HWC) (2010 – 2015) in 9 CAMPFIRE Districts.

	Crop Damage (estimated Ha)			Livestock killed (cattle, goats, sheep)				Human deaths
District	**Elephant**	**Hippo**	**Buffalo**	**Lion**	**Leopard**	**Crocodile**	**Hyena**	
Beit-Bridge	268	-	1	3	-	-	30	4
Binga	26	35	-	1	-	32	29	7
Bulilima	522	-	-	5	-	-	231	-
Chiredzi	18	9	-	122	-	21	-	2
Chipinge	22	10	-	5	-	7	-	7
Hwange	461	-	-	71	2	15	-	2
Mbire	3,878	475	1,146	426	52	416	1,870	53
NyamiNyami	1,216	49	102	59	6	9	-	13
Tsholotsho	1,085	-	20	175	19	-	211	8
Total	**7,495**	**578**	**1,269**	**867**	**79**	**500**	**2,371**	**96**
	9342 Ha			**3817**				

Source: CAMPFIRE Association Zimbabwe[51]

[50] As cited in the Zimbabwe's Fifth National Report to the Convention on Biodiversity report; https://www.cbd.int/doc/world/zw/zw-nr-05-en.pdf

[51] http://campfirezimbabwe.org/index.php/downloads/finish/1-downloads/1-role-of-trophy-hunting-of-elephant-in-support-of-the-zimbabwe-campfire-programme/0

Whilst short term and medium terms solutions have been proffered and adopted in an effort to reduce the human wildlife conflict, long-term solutions are also required in creating harmony between local communities and wildlife habitat, through ensuring communities benefit from co-existing with wildlife. Tolerance of wildlife among local communities is likely to increase if communities can see the tangible benefits that accrue to them from the sustainable use of wildlife[52].

Thus, the key question that needs to be addressed is; under what conditions coexistence between humans and wildlife is still possible in the twenty-first century, as population and resource pressures, economic growth and globalization become ever more intense. The study sought to answer the following underlying questions:

- How can local rural communities benefit more from sustainable use of wildlife, whilst at the same time coexisting peacefully with wildlife?
- What strategies can the Zimbabwean government adopt in their conservation efforts to manage protected areas effectively?
- How can communities affected by Human Wildlife Conflict be fully represented to ensure timely interventions that address their needs and interests and promote wildlife as an asset rather than costs?[53]

4.3 Legal and institutional framework

4.3.1 Legal and Regulatory Policy Framework

In order to achieve the set wildlife management goals a number of tools are used in wildlife management and these includes Wildlife laws which are necessary to protect the safety of people, to protect wildlife and to ensure a fair share for future generations.

Zimbabwe is a signatory to the CITES Convention. CITES regulates the worldwide commercial trade in wild animal and plant species. The goal of CITES is to ensure that international trade does not threaten the survival of any species, and Zimbabwe is bound by the conventions resolutions. In 1989, CITES banned the international trade in elephant ivory to protect the elephant population, however Zimbabwe's elephant population was placed on Appendix II lists of CITES were species that are not necessarily threatened with extinction but that may become so unless trade is closely controlled. The international trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate[54]. The CITES Convention requires that parties to the agreement take the following measures among others that include enforcing the provisions of the Convention and to prohibit trade in specimens in violation thereof; designate for the purposes of the Convention, one or more Management Authorities competent to grant permits or certificates on behalf of that Party[55].

[52] https://conservationaction.co.za/resources/reports/zimbabwe-national-elephant-management-plan-2015-2020/
[53] http://www.fao.org/3/a-i4893e.pdf
[54] https://www.cites.org/eng/disc/parties/chronolo.php
[55] Ibid

The country is also a signatory to the Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement (1999).The Protocol on Wildlife Conservation and Law Enforcement seek to establish a common framework for conservation and sustainable use of wildlife in the region.

The Protocol advocates for Member States to harmonise their legal instruments for wildlife, establish management programmes for wildlife, and create a regional database of wildlife status and management. The primary objective of the protocol is to promote sustainable use of wildlife, facilitate the exchange of information concerning wildlife management, utilisation and the enforcement of wildlife laws. Signatories to the protocol have to harmonise and align their laws and policies in line with promoting the objective of the Protocol.

The Parks and Wildlife Act [Chapter 20:14] 1975 is the principal Act with respect to wildlife management in Zimbabwe. There are other several Acts of Parliament that govern the conservation and sustainable utilization of the wildlife resources in Zimbabwe.

- Parks and Wild Life (General) Regulations. 1981
- Trapping of Animals (Control) Acts 34/1973
- Protection of Wild Life (Indemnity) Act 21/1989
- Parks and Wild Life (General) (Amendment) Regulations 1986 (No. 1)
- Control of Goods (Import and Export) (Wildlife Regulations, 1982)
  Parks and Wild Life (Payment for Hunting of Animals and Fish) Notice. 1987[56]

These Acts are supported by various subsidiary pieces of legislation such as Statutory Instruments which include the Rural Districts Council Act (Chapter 29:13) and the Environmental Management Act (Chapter 20:27) of 2002 as amended by Act 5/2004 among others.

The Rural District Councils Act (Chapter [29:13]) of 2002
The Rural District Councils Act is important in the wildlife sector as it provides for a legal entity (in Communal Lands) responsible for wildlife resources. Since the land in Communal areas is not privately owned by the communities and given that most of the communities do not constitute a legal entity, the Appropriate Authority status is conferred to the Rural District Councils (RDCs). Thus, the RDCs act as custodians of the wildlife resources on behalf of the communities. Efforts are now underway in some areas to form Community Development Trusts. There is scope for these Community Development Trusts to be used as vehicles to further devolve authority from the District level to the sub-district level, which will provide more income at a community level and therefore increase conservation support from the community as they will have a true vested interest.

4.3.2 Institutional and social framework

Without policy and institutional support to drive wildlife management all efforts to manage, control and ensure sustainable utilization of wildlife are bound to fail. Policies should clearly

[56] https://conservationaction.co.za/wp-content/uploads/2013/11/Wildlife-Legislation-in-SS-Africa-Nov-13.pdf

articulate issues with regard to the responsibilities and benefits of wildlife management between wildlife management authorities and the local communities[57].

4.3.2.1 Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) and Government Policy[58]

The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) of Zimbabwe has been widely regarded as one of Africa's most successful contemporary conservation initiatives. The Zimbabwean government recognizes that the survival of wild animals depends entirely on those among whom they live. Unless local people want to save them, wildlife will be poached to extinction thus the CAMPFIRE program is meant to avoid this occurrence. The future of wildlife in communal areas rests on the sustainability of this programme. The CAMPFIRE conceptually includes all natural resources, but its implementation presently focuses on communal wildlife management in about a quarter of the country's 56 districts. It is most active where substantial wildlife populations, or the prospect of achieving them, exist. The CAMPFIRE program is an attempt to make a social link with the economic and ecological objectives of the Parks and Wildlife management Act. The theory behind CAMPFIRE is that communities will invest in environmental conservation if they can exploit these resources on a sustainable basis for their own benefit. The programme is based on creating appropriate institutions under which resources can be legitimately managed and exploited by the resident communities. Profits from the enterprise may be used for communal benefits or distributed to individual households at the discretion of the community adjacent to national parks[59].

The Parks and Wildlife Act of 1975 allowed commercial farmers and ranchers to have proprietorship of wildlife resources on their land. However, no such provisions existed for wildlife in Communal Lands; thus, in 1982, the Act was amended to allow the communal farmers to also have proprietorship over the wildlife just like the commercial farmers and ranchers. This amendment paved the way for the implementation of CAMPFIRE. However, because the communal farmers did not constitute a legal entity, the Rural District Councils were then tasked with being the legal entity that would represent the Communal farmers. In this regard the Rural District Councils would act on behalf of the communities on matters relating to wildlife utilization on Communal Land. Communities are represented in RDCs through Councillors whom they elect as prescribed in statutes. Authority for the management of wildlife on communal land is therefore granted to RDCs as the lowest accountable level of government, on behalf of communities. The authorized authority (AA status) of RDCs can be reviewed and/or revoked if producer communities do not benefit directly.

The amendment of the Rural District Councils Act [Chapter 29:13], was necessitated by the Environmental Management Act [Chapter 20:27] of 2006, which provided for the establishment of an Environment Committee responsible for the management and protection of the environment in a Council area. This replaced the Natural Resources and

[57] http://www.fao.org/docrep/v1500e/v1500e0a.htm
[58] http://campfirezimbabwe.org/index.php/management-t/6-policy
[59] http://www.fao.org/docrep/u5200e/u5200e06.htm

Agriculture/Conservation Committee in RDCs. The Environment Committee is assisted by Environment Subcommittees in the exercise of functions relating to the environment and natural resources within one or more wards or one or more villages in the council area. Environment Subcommittees provide for greater involvement of Traditional Leaders in community level CAMPFIRE activities. Rural District Councils (RDCs), through the Communal Land Act [Chapter 20:04], are the planning and land allocating authorities within their respective areas of jurisdiction, with traditional leaders being custodians.

The CAMPFIRE program permits the residents of communal lands to share in the benefits/revenue generated from wildlife exploitation in these communities. The Government of Zimbabwe through the Parks and Wildlife management authority recognizes that the conservation of wildlife and habitats outside the Parks and Wildlife estate requires the cooperation of rural communities in communal and resettlement areas, and that these must be the primary beneficiaries. According to the country's statues, wildlife belongs to the state, and wildlife is res nullius. This means that a wild animal is entitled to natural freedom of movement from one place to another and does not belong to an individual. Therefore government grants landholders custodianship and privileges regarding use of wildlife that is on one's land, and such rights are automatically lost when the wildlife moves to another area. The main objectives of CAMPFIRE program are:

- To obtain voluntary participation of communities in a flexible programme which offers long-term solutions to problems of resources,
- To introduce a system of group ownership with defines the rights of access to natural resources for communities residing in the target areas,
- To provide the institutions needed by resident communities to manage and exploit resources legitimately for their own direct benefit;
- To provide technical and financial assistance to communities, which join the programme to enable them to realize these objectives[60].

The CAMPFIRE, programs cover an estimated 3,754 million Hectares in 104 rural words and benefits and estimated 85,847 households (see Table 7).

Table 7: Coverage of CAMPFIRE program

	Total Area (Ha)	CAMPFIRE Area (Ha)	Number of Wards	Number of Campfire Wards	Number of Villages	Number of Households
Beit Bridge	1,269,700	310,300	15	8	15	5,070
Binga	1,230,800	364,000	25	21	51	19,474
Bulilima	203,300	203,300	22	13	51	7,767
Chipinge	522,300	40,800	33	2	15	951
Chiredzi	1,710,239	481,004	32	9	52	9,461
Hurungwe	1,967,834	529,800	26	7	N/A	N/A
Hwange	376,963	376,963	20	18	93	13,980
Mbire	781,000	898,000	17	9	328	12,302
NyamiNyami	369,931	140,000	12	6	62	5,875
Tsholotsho	833,600	410,000	22	11	70	10,967
Total	**9,265,667**	**3,754,167**	**224**	**104**	**737**	**85,847**

[60] http://www.abcg.org/action/document/show?document_id=688

CAMPFIRE's success over the years is the result of collaborative efforts by CAMPFIRE Service Providers, which include the Zimbabwean government ministries and departments, dealing with natural resources and in particular wildlife and environmental issues; NGOs and development partners[61]. The CAMPFIRE programme has been able to demonstrate that it is a practical and scalable form of biodiversity conservation. Through flexible guidelines and principles for conservation developed over time, CAMPFIRE has to date established effective conservation communities at district, ward and village level managing wildlife, controlling grass burning and tree cutting, and other community based activities whose operations are not supported by donor funding. In major wildlife districts, the functionality of these local level institutions has been enhanced by direct payments of income from private sector partners since 2007.

CAMPFIRE, being a programme that helps rural communities manage natural resources for their own local development, is guided by one main objective: to enhance voluntary participation of communities in a flexible programme of natural resources management through a system of group ownership/decision making, with defined rights of access for communities residing in natural resource rich areas. The other strategic objectives that guide the CAMPFIRE Association activities include the following:

- Facilitating community-based natural resource management activities in rural areas;
- Setting and maintaining standards for both community and RDC performance under CAMPFIRE principles;
- Creating opportunities for the participation and involvement of both public and private sector actors in the implementation of CAMPFIRE.
- Advocating for natural resources conservation and utilization locally and internationally.

According to the CAMPFIRE Association the community wildlife management model is based on three main criteria which are as follows:

- Voluntary interest in participation by defined communities and their RDCs (communal wildlife areas exist at the pleasure of specific communities; they are not mandatory or gazetted by any law)
- Presence of wildlife populations capable of producing sustainable and economically significant income. Communities survive on subsistence farming and have the right to determine diversity and levels of wildlife which are acceptable to them on their land.
- Income sharing between communities and their RDC, based on the number of animals harvested within an area each hunting season.

Management of other natural resources that are not wildlife equally requires the voluntary participation of defined communities. It has been legally possible for some communities to establish special purpose vehicles such as Community Trusts to drive business ventures for these resources, usually in partnership with the private sector and the RDCs.

4.4. Sources of CAMPFIRE revenue

Under the 2002 Guidelines CAMPFIRE revenue is defined as, "the gross revenue that accrues directly or indirectly out of a community-managed, natural resource". Resource

[61] http://campfirezimbabwe.org/index.php/management-t/5-implementation-of-campfire

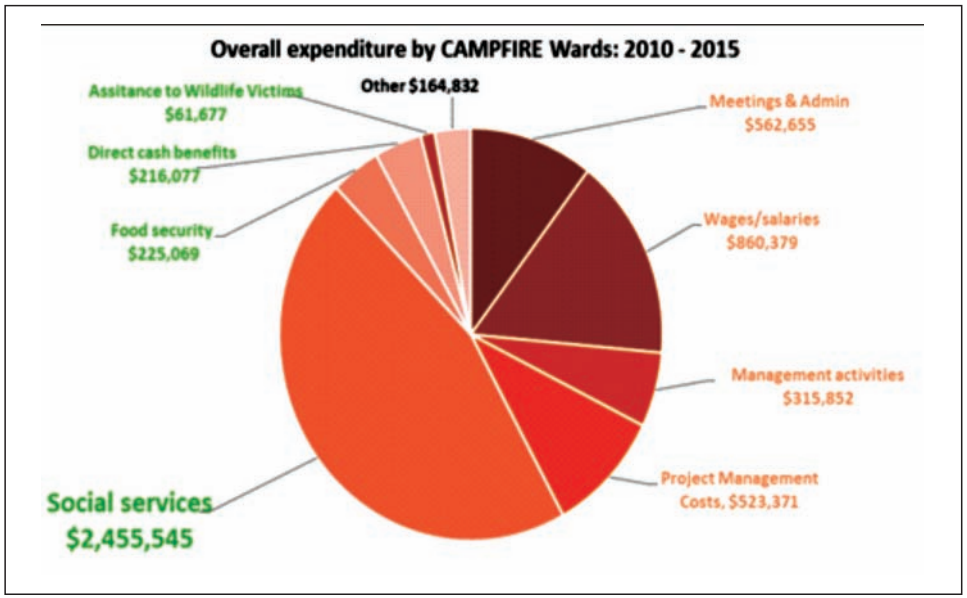
activities for revenue generation includes the following[62]

- Wildlife Tourism - trophy hunting Lease fees, etc;
- Tourism – photographic Lease fees, Daily rates, Percentage of gross revenue;
- Other - Hide sales, Meat sales Crocodile egg collection;
- Forestry Commercial logging Lease fees, Logging fees;
- Non-timber forest products, Bee-keeping, Mopane worms, Fruit sales;
- Fisheries, Sport fishing, Lease fees, Daily rates;
- Grass Grazing Grazing fees and
- Other Sand extraction User fees.

Of the wildlife-based activities, over 90% of the revenue is from trophy or sport hunting leases with commercial safari operators. The balance of the revenue is from leases for other forms of tourism, the sale of hides, ivory and other animal products. The sharing of Revenue based on predefined guidelines by the CAMPFIRE Association which requires that 55% of income is allocated to communities, 26% to the RDC to support costs attributable to CAMPFIRE activities, 15% for general RDC administration, and 4% as a levy to the Association. 55% of income to communities is the minimum limit.

Figure 9 highlights the distribution of revenue generated from CAMPFIRE activities between the period 2010 and 2015. The figure shows that a large portion of the revenue generated was allocated towards social services.

Figure 9: Distribution of Expenditure CAMPFIRE Wards; 2010-2015



Source; CAMPFIRE Association of Zimbabwe

[62] http://campfirezimbabwe.org/index.php/management-t/9-sources-of-revenue

Despite its achievements CAMPFIRE still faces fundamental challenges. In particular, the development strategies of households in CAMPFIRE areas focus on land uses that are incompatible with wildlife such as human immigration to rural areas, the extension of basic agricultural schemes and increased livestock numbers.

Box 3: Summary of CAMPFIRE program

- CAMPFIRE protects about 12.7% of land in Zimbabwe and benefits from wildlife and other incomes
- Between 1994 and 2012, CAMPFIRE generated US$39 million of which US$21.5 million was allocated to communities and used for resource management (22%), household benefits (26%), and community projects (52%).
- About 90% of CAMPFIRE revenue comes from hunting with elephant hunting contributing up to 70% of annual revenue.
- Based on Constitution of the CAMPFIRE Association as amended in 2007, all major RDCs use CAMPFIRE revenue sharing guidelines, and in these districts revenue is paid directly into community controlled bank accounts by safari operators using the following guideline: , RDC fees (41%), CAMPFIRE Association Levy (4%), and CAMPFIRE community (55%)[63].

1. Threats and loopholes in the current wildlife management regime in Zimbabwe

Wildlife management in Zimbabwe like in other developing countries suffers from a variety of problems including: limited support from government including policy and legal frameworks that respond to the changing trends in the sector; insufficient financial resources and incentives; inadequate conservation education; weak or non-existent regulatory structures and institutional governance that has not integrated various stakeholders in the wildlife conservation and management.

Increasing illegal trade in wild life products

The trade in live animals and the parts of dead animals globally, is estimated to be around $5 billion annually, and nearly a third of this trade is through illicit means. Each year hundreds of millions of animals are caught from the wild and then sold as food, pets, accessories, souvenirs and medicine. According to the World Wide Fund for Animals, the Illegal trade in wildlife is the 4th most profitable illegal business behind drugs, human trafficking and counterfeits. The illegal trade in wildlife is mainly driven by high profit margins especially from high prices paid for rare species and animal parts perceived to be of great value and significance in communities.

The most lucrative product in illegal wildlife trade is elephant ivory. Trading in elephant ivory has gained more visibility than issues involving other wild animals due to the brutal means used by poachers in obtaining ivory[64]. Zimbabwe, together with other States in Southern Africa is home to more than 85% of the known African Elephant population, hence the escalating incidences of poaching of elephants in the country.

[63] Ibid

[64] 13 jumbos die in 'cyanide poisoning', The Chronicle October 13, 2017; https://www.chronicle.co.zw/13-jumbos-die-in-cyanide-poisoning/

Exclusion of Local People from wildlife decision making
A postcolonial critique is also used to argue that Western models of tourism development and wildlife conservation are embedded in a colonial legacy which is centred on exclusion of indigenous communities from the land as well as from decision-making related to tourism development and wildlife conservation. Few local people who live at or near these tourist attractions and facilities benefit from related jobs, even relatively lowly (menial) ones. State tourism programs and wildlife conservation policies were oriented towards protecting park wildlife for foreign tourists, and tended to eschew local involvement. Understanding the political economy of wildlife safari tourism offers a valuable theoretical lens to examine such issues and to ascertain the value of managing them[65].

Legislative frameworks,
The state was unwilling to devolve wildlife management to local communities through legislation. The national government had retained management of wildlife resources. No devolution of management of wildlife resources is provided for even to lower levels of government as protection of wildlife remains a national government function. The Act consolidates wildlife management in one government entity the Parks and wildlife management authority..

The Parks and Wildlife management Act (Chapter 20:14); Section (5), subsection (2) and (3) of the Parks and Wild Life Act stipulates the procedure for appointment and composition of members to the Parks and Wild Life Management Authority Board. Thus the Board shall consist of not fewer than six members and not more than twelve members appointed by the Minister, after consultation with the President and of these members five shall be chosen for their experience or professional qualifications in the following fields or areas of competence; wild life conservation; Environmental conservation; Tourism; Financial and business management; Human resources management and one shall be a legal practitioner. However the Act does not make it mandatory for the inclusion of community representatives especially from areas were human shares land with wildlife habitat.

A wildlife policy can take various forms: it may be an explicit national policy, or part component of a national development plan. However Zimbabwe does not have an explicit wildlife management policy and most of its management policies are embedded in the country's laws and regulations or derived from the national economic policies and international obligations of which the majority of them don't put much emphasis on reconciling conflicts between humans and wildlife.

4.5. Best Practices in Wildlife management

In Namibia, the government established Communal Area Conservancies as part of a Community-based natural resource management programme (CBNRM). They stressed that the sustainable use of soils and water, wild animals and plants is at the heart of the Community-based natural resource management programme through integrating the use of the resources by rural communities thus enabling them to diversify their livelihoods and improve their socio-economic status while ensuring biodiversity conservation.

[65] https://pdfs.semanticscholar.org/fe1d/d449e88309735e031e412baaa9528fa448a1.pdf

The establishment of Communal Area Conservancies gave rural Namibians living on communal land the legal right and responsibility to manage their natural resources themselves, but also enhanced the quality of their lives, while at the same time improving the biodiversity of these long-neglected areas.

Through amendment of the Nature Conservation Ordinance of 1975 through Nature Conservation Amendment Act of 1996 gave residents of communal areas the same rights over wildlife and tourism as commercial farmers. The 1996 amendment Act conferred on a conservancy committee in communal areas the same rights, privileges, duties and obligations that the Nature Conservation Ordinance (4. of 1975) confers on a commercial farmer. The rights over wildlife conferred on a conservancy committee are for the ownership (and therefore use for own purposes) of huntable game (Oryx, springbok, kudu, warthog, buffalo and bush pig), and the right to apply for permits for the capture and sale of game, trophy hunting, other forms of hunting, and the right to apply for permits for the use of protected and specially protected game.

Thus, instead of fencing the farm being the conditions for gaining ownership over huntable game and the right to use other species, the Nature Conservation Amendment Act sets the formation of a conservancy as the condition upon which ownership and use rights over game are given to communal area residents. According to the Act any group of persons residing on communal land may apply to the Minister of Environment and Tourism to have the area they inhabit or part of that area declared a conservancy. The Minister will declare a communal area a conservancy if:

- the community applying has elected a representative committee and supplied the names of the committee members;
- the community has agreed upon a legal constitution, which provides for the sustainable management and utilization of game in the conservancy;
- the conservancy committee has the ability to manage funds;
- the conservancy committee has an approved method for the equitable distribution to members of the community of benefits derived from the consumptive and non-consumptive use of game in the conservancy;
- the community has defined the boundaries of the geographic area of the conservancy;
- the area concerned is not subject to any lease or is not a proclaimed game reserve or nature reserve.

Once a conservancy has been declared in the Government Gazette the Act gives the conservancy committee, on behalf of the community in the conservancy, "rights and duties" with regard to the consumptive and non-consumptive use and sustainable management of game "in order to enable the members of such a community to derive benefits from such use and management .

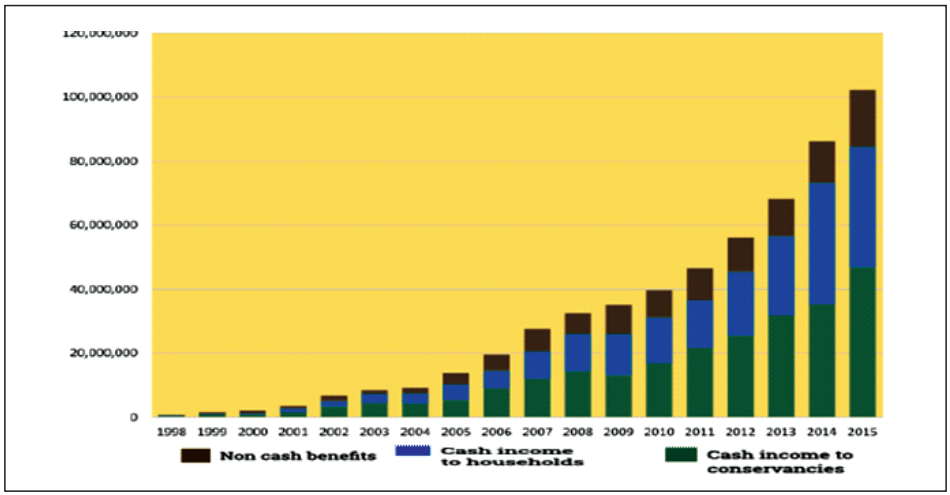
Thus, the Nature Conservation Amendment Act, 1996 (Act 5 of 1996) paved the way for the establishment of Communal Area Conservancies in rural communities. As legal entities, established according to the provisions of national legislation, registered conservancies are mechanisms for control and management at the local level. Thus, the Community-based natural resource management programme approach implemented through conservancies and community forests is based on well-established economic and

management principles of:

a. devolution of rights and responsibilities to the lowest appropriate level,
b. proprietorship and tenure over the resources in defined
c. geographic areas, and
d. the creation of appropriate incentives through empowerment, economic opportunities and the reinstatement of traditional, cultural and heritage values.

As part of this approach, conservancies are self-defined social units or communities of people that choose to work together and become registered with the Ministry of Environment & Tourism (MET).Conservancies are becoming important drivers of the rural economy in Namibia through the distribution of funds generated from natural resource management to communities. Prior to the establishment of conservancies, the revenue generated by tourism and other sectors was significantly less, and a small portion of the revenue found its way to the local communities as the majority was drawn out of the area by large businesses based in urban centres. However, this has changed as an increasing proportion of economic benefits generated by conservancies. Incomes earned by conservancies from game meat, joint-venture tourism and trophy hunting have been increasing substantially between 1998 and 2015[66]. Furthermore, the Communal Area Conservancies approach has been creating jobs and providing an increasing range of business opportunities to rural communities in Namibia. The growth of various sectors shows how conservancies are beginning to unlock the economic benefits of natural resources (Figure 10).

Figure 10: Economic benefits from conservancies (1998 - 2015).



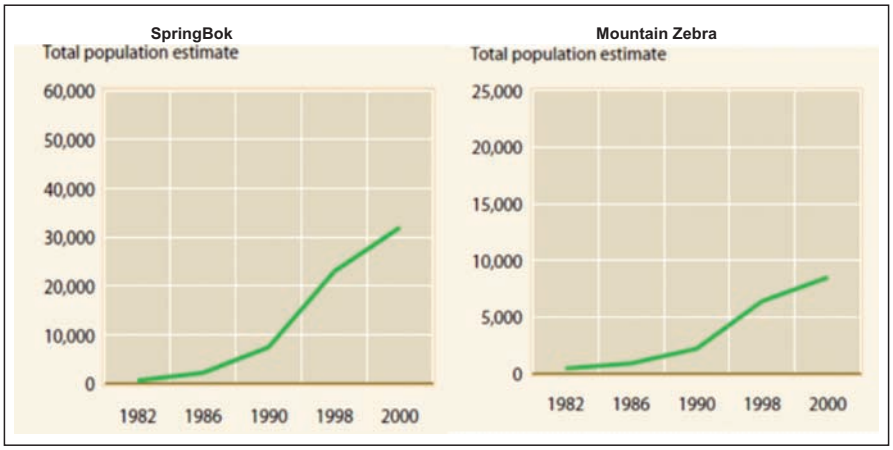
Source: Namibian Association of CBNRM Support Organisations[67]

[66]NACSO (2010); Namibia's communal conservancies: a review of progress and challenges in 2009. NACSO, Windhoek. http://www.nacso.org.na/sites/default/files/SOC_2009.pdf

[67]NACSO_Strategic_Plan.pdf

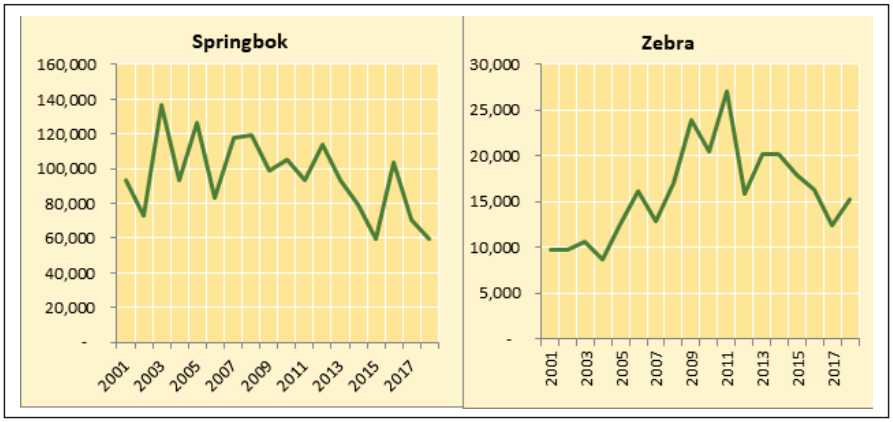
In response to conservation efforts Wildlife population in the north-western Namibia have increased significantly over the past 25 years. Wildlife population estimates during the 1980's and 1990's have been increasing dramatically (see Figure 11). The increasing wildlife population also creates further opportunities to intensify and diversity wildlife-based enterprises, and to capture greater benefits from the wildlife sector.

Figure 11 a: Population estimates for Spring Boks and Mountain Zebras in North Western Namibia (1982-2000)



Source: Namibian Association of CBNRM Support Organizations[68]

Figure 11b: Population estimates for Spring Boks and Mountain Zebras in North Western Namibia (2001-2018)



Source: Namibian Association of CBNRM Support Organizations[69]*;*

[68] Ibid

[69] http://www.nacso.org.na/resources/game-count-data

4.6. Lessons for Zimbabwe

The devolution of rights and responsibilities over wildlife and other natural resources to appropriate local community organisations will lead to increased proportion of generated revenue uplifting and driving the rural communities through incomes earned by conservancies from game meat, joint-venture tourism and trophy hunting, furthermore the provides for increasing business opportunities to rural communities .In return conservationist are guaranteed protection of natural resources as the local communities directly benefit from the resources.

Possible response strategies to improve Wildlife management practices in Zimbabwe
There are various approaches that may be taken in order to enhance wildlife management practices in Zimbabwe. This includes approaches that reduce human wildlife conflicts and the costs imposed by wildlife on human activities. In wildlife management it is crucial to address both the relationship between wildlife and humans and the underlying conflicts over wildlife among people with different values, objectives and experiences. Reducing impacts may not reduce conflict if the underlying causes are not addressed. The conflicts between people over wildlife often reflect real or perceived injustices around who bears the cost of co-existing with wildlife and who benefits/revenue arising from sale of wildlife. Where local communities who experience cost induced by wildlife are not involved in wildlife management decisions, they tend to resent wildlife management and conservation authorities. Thus, wildlife management process must be developed jointly with local communities affected by wildlife. The process should include all aspects such as identifying and engaging key stakeholders throughout the process, mapping out sources of conflict and testing and adapting strategies, ensuring effective communication, building trust and working closely with the affected local communities.

There is need for decentralization and devolution of wildlife management practices to the lowest level possible this involves communities in wildlife management and process should not be restricted to Rural District Council level but should be devolved to ward levels. Community ownership, partnership with stakeholders, tangible benefits to community and goodwill/ support from government are the biggest drivers of success for community based wildlife management projects. Tangible benefits to community mean that the community must feel the benefits of the project for them to support it.

Co-management Approach
The failure of both the state-based and community-based models of managing wildlife to fulfill conservation goals and the socioeconomic needs of the local communities has resulted in the evolution of collaborative wildlife management approaches. The co-management approach also known as the as the participatory management, joint management and shared management approach seeks to create negotiated agreements among interest groups. The approach seeks to address weaknesses and shortcomings of both the traditional or community-based natural resource management systems and the centralized nature of government wildlife management decision.

Co-management approach emerges when the state retains substantial role in resource management, while the role of the local resource users or landowners is expanded. Thus, it is different from community-based approach, which is characterized by more or less

complete control of the natural resources by the local community. While the community-based approach is people-centred and community focused, the co-management strategy focuses more on a partnership arrangement between the government, local communities and other key stakeholders and has broader scope and scale[70].

The co-management approach positively contributes towards the achievement of both conservation and socio-economic development goals. The devolution of rights and responsibilities over wildlife and other natural resources to appropriate local community organisations needs to include not just the responsibility for managing and benefiting from resources, but also the legal means to prevent the exploitation of resources by other sectors. However, co-management arrangements cannot succeed without an enabling political framework and favourable government policies. An enabling policy environment creates incentives for local communities to participate fully in wildlife management decision making process. Thus, there is need for legislation in Zimbabwe that supports the creation and establishment of community based wildlife management entities following the format of Community Share Ownership Trusts (CSOT) as used to be provided for in the Indigenization and Economic Empowerment Act for the mining sector. The operations of these entities should be divorced from the operations of the Rural District Councils but should be independent decision making entities[71].

Box 4: Community share ownership trusts in Zimbabwe

Zimbabwe is endowed with about 60 known minerals, however after the realization that the Zimbabwean people are not fully benefiting from the exploitation of these natural resources and the need to empower marginalized communities in resource rich areas resulted in the Zimbabwean government coming up with the Indigenization and Economic Empowerment Act (Chapter 14:33) of 2007 which specified that at least 51% of shares of public companies and any other business shall be owned by indigenous Zimbabweans. In order to achieve these, the government had amongst other strategies, the establishment of Community Share Ownership Schemes/Trusts so as to empower the local indigenous communities through holding of a minimum 10% shareholding in the related mining entities that operates in their localities.

The establishment of CSOT was guided by the Indigenization and Economic Empowerment Act (IEEA) and the starting point was the mining sector. According to this Act, all mining companies were to cede at least 10% ownership of their companies' shareholding to local communities. The CSOTs are legally recognized entities established under Companies and Associations Trustees Act (Chapter 24:04) through Deeds of Trustees. The main objectives of the trusts were to ensure that communities fully benefited from the natural resources extracted from their areas through provision of social amenities such as schools, hospitals, health care services; development projects such as building of dams, drilling of boreholes and construction of roads.

Examples of community share ownership trusts include; the Mhondoro/Ngezi/Zvimba Community Share Ownership Trust, Tongogara Community Share Ownership Trust , Mimosa-Zvishavane Community Share Ownership Trust, Gwanda Community Share Ownership Trust , Marange Community Share Ownership Scheme and the Masvingo Community Share Ownership Trust .These Share ownership schemes allowed broad-based ownership and participation of local communities in the management and distribution of economic benefits arising from the exploitation of local natural resource to the local communities[72]

[70] Wildlife Conservation and Management in Kenya: Towards a Co-Management Approach, FEEM Working Papers No. 47.04; 26 Apr 2004;John Mburu ; https://papers.ssrn.com/sol3/papers.cfm?abstract_id=524543

[71] http://www.swradioafrica.com/Documents/Re-framing%20the%20Wildlife%20Based%20Land%20Reform%20Programmes%20in%20Zim.pdf

[72] Share ownership trust 'best scheme since independence'TheChronicle;April 18, 2015,; http://www.chronicle.co.zw/share-ownership-trust-best-scheme-since-independence/
The community share ownership trust initiative as a rural development solution in Zimbabwe: the Tongogara experience in Shurugwi district; http://ir.msu.ac.zw:8080/xmlui/handle/11408/1051

To ensure that communities living adjacent wildlife areas are fully represented there is need for legislative reforms of the Parks and Wildlife Management Act, so that the principal Act explicitly provides for more representation from the community on the Board of the Parks and Wildlife Management Authority.

Wildlife Management Policy

In 2012 Kenya came up with National Wildlife Conservation and Management Policy that sought to make provision for an overarching framework for the prudent and sustainable conservation, protection and management of wildlife and wildlife resources in Kenya, with incidental provision on access and the fair and equitable distribution of benefits accruing to them thus Zimbabwe needs to develop an explicit and comprehensive policy modelled along the Kenyan Wildlife management Policy[73].

References

Akama John S, Maingi Shem and Camargo Blanca A. (2011); Wildlife Conservation, Safari Tourism and the Role of Tourism Certification in Kenya: A Postcolonial Critique; Tourism Recreation Research Vol. 36(3), 2011: 281-291; https://pdfs.semanticscholar.org/fe1d/d449e88309735e031e412baaa9528fa448a1.pdf

E.O.A. Asibey E.O.A. and G.S. Child G.S., Wildlife management for rural development in sub-Saharan Africa, http://www.fao.org/docrep/t8850e/t8850e03.htm

CAMPFIRE Association of Zimbabwe; http://campfirezimbabwe.org/index.php/management-t/6-policy

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) website; https://www.cites.org/eng/disc/parties/chronolo.php

Fifth National Report to the Convention on Biodiversity report; Government of Zimbabwe; https://www.cbd.int/doc/world/zw/zw-nr-05-en.pdf

Fourth National Report to the Convention on Biodiversity report; Government of Zimbabwe; https://www.cbd.int/doc/world/zw/zw-nr-04-en.pdf

Kapenta fish war turns ugly; Bulawayo 24; 17 Aug 2014, https://bulawayo24.com/index-id-news-sc-africa-byo-52337-article-Kapenta+fish+war+turns+ugly.html

Gareth Mauck Gareth (2013); Wildlife Legislation in Sub-Saharan Africa: Criminal Offences; https://conservationaction.co.za/wp-content/uploads/2013/11/Wildlife-Legislation-in-SS-Africa-Nov-13.pdf

Thomas J.P. McHenry Thomas J.P.; Policy and legal tools for the management of wildlife resources; http://www.fao.org/docrep/v1500e/v1500e0a.htm

[73] http://www.forestpeoples.org/sites/fpp/files/publication/2013/07/draftnationalwildlifeconservation-and-management-policy-2012.pdf

NACSO (2010); Namibia's communal conservancies: a review of progress and challenges in 2009. Namibian Association of Community Based Natural Resource Management (NACSO), Windhoek. http://www.nacso.org.na/sites/default/files/SOC_2009.pdf

Parks and Wildlife Management; http://zimparks.org/wp-content/uploads/2015/11/Zimbabwe-Prospectus-Parks-Website.pdf

Poaching in Africa: Facts, Causes and Solutions April 2014, Volume 12-3 ; African Indaba ; http://www.africanindaba.com/2014/04/poaching-in-africa-facts-causes-and-solutions-april-2014-volume-12-3/

Re-framing the Wildlife Based Land Reform Programmes in Zimbabwe; Sokwanele: 3 October 2012; http://www.swradioafrica.com/Documents/Re-framing%20the%20Wildlife%20Based%20Land%20Reform%20Programmes%20in%20Zim.pdf

Role of trophy hunting of elephant in support of the Zimbabwe CAMPFIRE programme , Campfire Association of Zimbabwe; http://campfirezimbabwe.org/index.php/downloads/finish/1-downloads/1-role-of-trophy-hunting-of-elephant-in-support-of-the-zimbabwe-campfire-programme/0

Sustainable Development Goals; https://sustainabledevelopment.un.org/sdg15
Sustainable Wildlife Management and Human−Wildlife Conflict; Collaborative Partnership on Sustainable Wildlife Management; http://www.fao.org/3/a-i4893e.pdf

The community share ownership trust initiative as a rural development solution in Zimbabwe: the Tongogara experience in Shurugwi district; http://ir.msu.ac.zw:8080/xmlui/handle/11408/1051

The National Wildlife Conservation and Management policy, 2012, Ministry Of Forestry And Wildlife; Republic Of Kenya;http://www.forestpeoples.org/sites/fpp/files/publication/2013/07/draftnationalwildlifeconservation-and-management-policy-2012.pdf

Wildlife Conservation In Zimbabwe: A Review Of Relevant Statutes And An Assessment Of Protected Areas, Conservancies And Implications Of The Indegenisation Policy; ABCG/BATS Task on Land Tenure FY2011; African Wildlife Foundation; Kenya; http://www.abcg.org/action/document/show?document_id=688

Wildlife management in Zimbabwe: The CAMPFIRE programme;http://www.fao.org/docrep/u5200e/u5200e06.htm

Zimbabwe Country Profile, Africa Wildlife Foundation; https://www.awf.org/country/zimbabwe

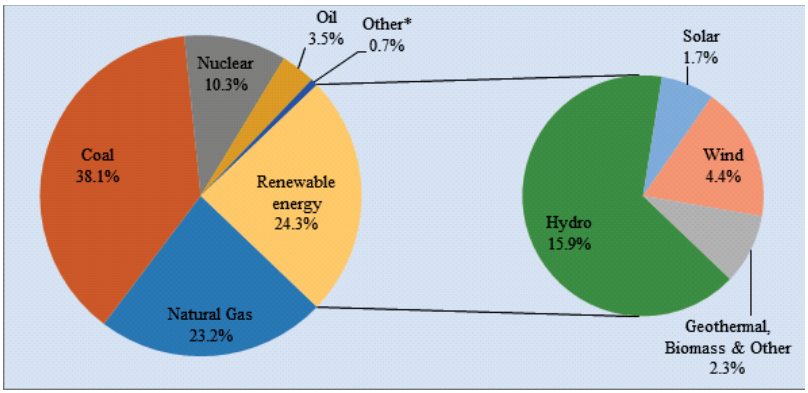
Zimbabwe national elephant management plan (2015-2020) https://conservationaction.co.za/resources/reports/zimbabwe-national-elephant-management-plan-2015-2020/

CHAPTER 5: LEVERAGING ON ABUNDANT SOLAR ENERGY

5.1. Background

Solar energy is derived from the sun and it is extremely clean, renewable and most abundant source of energy. Ironically, it is one of the most underutilized energy resource on earth. The sun produces more power in a single hour than humanity would use in a single year[74]. However, in 2017, the world produced a total 25,551.3 TWh (i.e. Terawatt-hours) of electricity of which only a mere 1.7% came from solar (Figure 12). About 76.7% of electricity comes from non-renewable fuels such as natural gas, coal, nuclear, oil and waste which are depletable and some cause environmental pollution and drive climate change through increasing the carbon footprint in the atmosphere. Therefore, the use of renewable energy such as solar which is highly underexploited would improve the security of energy supply, promote environmental protection and support sustainable development.

Figure 12: Electricity production by fuel type, 2017



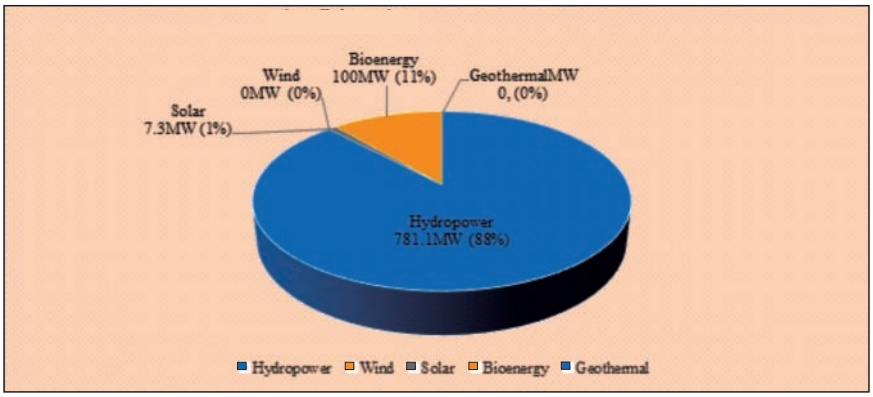
* Includes sources not specified elsewhere e.g. pumped hydro, non renewable waste and statistical discrepancies.

Source: BP Statistical Review of World Energy, June 2018

Zimbabwe has strong potential for electricity generation from hydro, solar and biomass resources while its potential for wind and geothermal is weak (Africa-EU Renewable Energy Programme, 2018)[75]. However, hydro is the dominant source of electricity while solar and biomass resources are largely underexploited (Draft Renewable Energy Policy, 2016).

[74] https://www.businessinsider.com/map-shows-solar-panels-to-power-the-earth-2015-9
[75] https://www.africa-eu-renewables.org/market-information/zimbabwe/renewable-energy-potential/

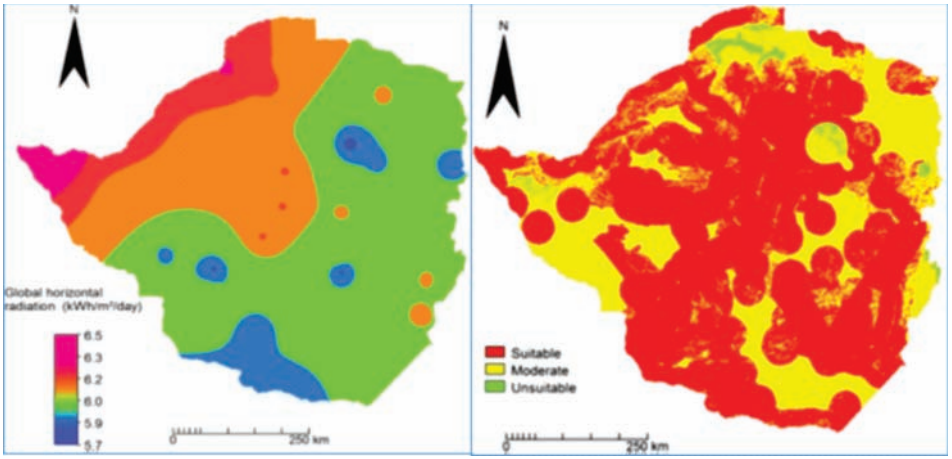
Figure 13: Zimbabwe's total installed and potential renewable energy capacity



Source: IRENA (2018 and 2015)

Zimbabwe's average solar irradiation is 5.7 kWh/m^2/day, with technical potential of producing over 300MW.(Africa-EU Renewable Energy Programme, 2018). However, Zimbabwe's 2017 installed capacity for solar PV electricity generation was only 7.3MW which is way below its capacity. The potential for concentrated solar power (CSP) for commercial purposes is estimated at 71.4GW, which is more than 30 times Zimbabwe's current demand for electricity (Ziuku et al, 2014).

Figure 14: Solar irradiation for Zimbabwe and area suitability for CSP technology



Source: Ziuku et al, 2014

Despite the potential for solar energy, Zimbabwe suffers from a serious electricity deficit. The country produces about 1200MW of electricity against a demand of 2029MW (Mzezewa and Murove, 2017). The shortfall is met by imports from Hydro Cabora Basa (50MW) and

ESKOM which provides between 50MW and 320MW (Mudzingwa, 2016). Lower national electrification rate (40%) skewed against the rural areas where only 21% of the population has access to electricity compared 80% in urban areas, implies that the potential demand for electricity is way above the 2029MW (Draft Renewable Energy Policy, 2016).

There are a number of obstacles hindering the development of solar energy in the country.The demand for solar energy technologies in Zimbabwe has been damaged by poor quality products and installations in the market which has destroyed consumer trust in solar technologies (Power for All, 2017). Some of the products that have been distributed in the market do not meet global standards such as the Lighting Africa standards for solar lights and home systems, and IEC standards for mini-grid components. There are no standards around the provision of warranties and after-sales service, as well as installation and maintenance for solar products. In addition, demand is low because there is lack of information among potential customers about recent advances in technology, reductions in cost, availability of financing solutions, and other benefits derived from solar energy technologies (Power for All, 2017).

On the supply side, the companies that sell, distribute and develop solar technologies face challenges in recruiting and retaining qualified personnel (Power for All, 2017). In addition, potential investors and policy makers find it difficult to make informed decisions where there is limited information about the performance, potential, challenges, opportunities and social impact of solar energy. Such lack of information creates high risk perception among investors and unwillingness among policy makers to support efforts on solar market development. Zimbabwe used to have companies that assembled Standards Association of Zimbabwe (SAZ) certified solar photovoltaic panels from imported cells and making solar water heaters but these companies have folded due to competition from imports (Mzezewa and Murove, 2017).

Access to finance is also a challenge. The local companies that are operating in the solar energy sector are fairly new, thus posing challenges in accessing finance as they lack the track record or history with which to borrow at competitive interest rates, and to attract international investors to partner with (Power for All, 2017). They also lack assets to pledge as collateral to secure credit. Credit guarantees could help but there are fewer financial institutions that are offering credit guarantees to make credit accessible at affordable rates for solar companies. International solar investors have less interest in Zimbabwe because of difficulties associated with profit repatriation.

The main objective of this case study was to explore the possible policy options for facilitating and promoting the development of solar energy. The specific objectives of the study were to:

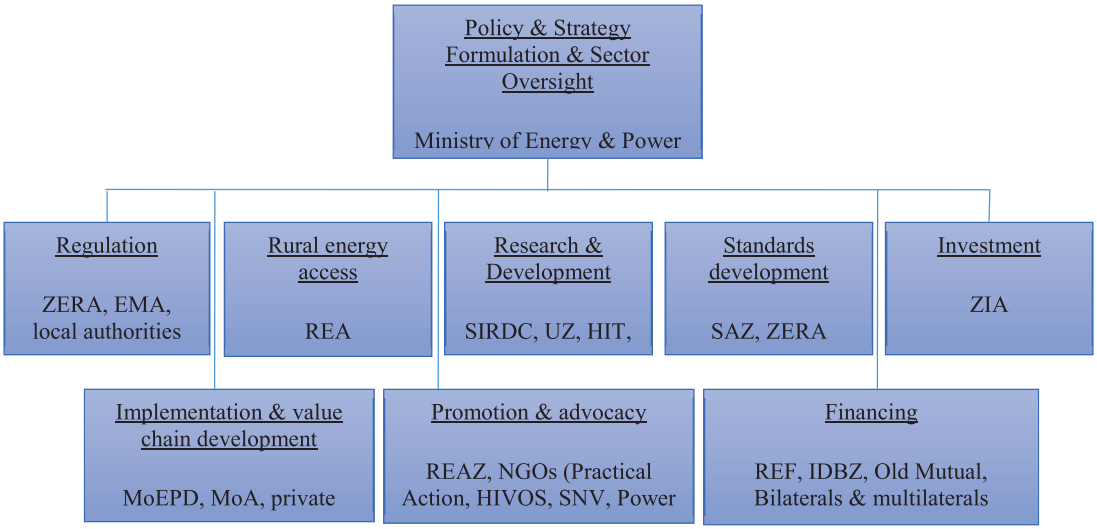
a) Understand the current policy framework governing solar energy development;
b) Identify any policy gaps in the current regime that could act as deterrent to development of solar energy; and
c) Suggest viable policy response strategies that can be adopted to enhance solar energy development in Zimbabwe.

5.2. Policy framework for Zimbabwe

5.2.1. Institutional framework

The Ministry of Energy and Power Development (MoEPD) formulates policies and strategies and plays an oversight role over the entire energy sector (Figure 15). The Zimbabwe Energy Regulatory Authority (ZERA) is responsible for the regulation of the energy sector while the Rural Electrification Agency (REA) is the main institution responsible for ensuring rural access to electricity. The Scientific Industrial Research & Development Centre (SIRDC), University of Zimbabwe (UZ), National University of Science & Technology (NUST), Chinhoyi University of Technology (CUT) and Harare Institute of Technology (HIT) as well as the Research Council of Zimbabwe (RCZ) are responsible for research.

Figure 15: Institutional framework



The SAZ is the main institution for standards setting in Zimbabwe. Investment facilitation and promotion is the main responsibility of the Zimbabwe Investment Authority (ZIA). The implementation and development of the energy sector value chain is the responsibility of all the stakeholders in the energy sector including the Ministry of Energy and Power Development; the Zimbabwe Electricity Supply Authority other government ministries; parastatals; independent power producers; manufacturing and mining firms among other private sector players with interest in the energy sector. The promotion and advocacy for all the renewable energy sources development is spearheaded by the Renewable Energy Association of Zimbabwe (REAZ) together with NGOs such as HIVOS, SNV, Power for All, ZERO and Practical Action. Several players are involved in the financing of the sector spearheaded by the Rural Electrification Fund (REF) in collaboration with bilateral and multilateral institutions such as UNDP, EU, African Development Bank (AfDB), among others. Institutions like Infrastructure Development Bank of Zimbabwe (IDBZ) and Old Mutual also play a key role in providing local finance for renewable energy projects.

5.2.2. Legislative framework

Zimbabwe has a number of legislative instruments for governing the development of solar energy development (Figure 16).The Zimbabwe Energy Regulatory Authority (ZERA) Act of 2011 empowers ZERA to promote, identify and encourage the employment and development of renewable energy sources, as well as providing for the overall regulation and licensing of the energy sector and the setting of tariffs and energy prices. The Electricity Act (2002) guides operations of the electricity subsector and provides for the licensing of independent power producers (IPP). The Rural Electrification Fund Act (2002) provides for the establishment of the Rural Electrification Fund and Rural Electrification Fund Board to accelerate access to electricity and clean energy in rural areas. The Electricity Licensing Regulations give guidelines on electricity license applications. The Environmental Management (EMA) Act provides for environmental protection and the requirements for environmental impact assessments for new projects. Electricity Licensing Guidelines & Requirements (2017) provide simple guidelines on the license application process and documentation required for generators with capacity above 100kW.

Figure 16: Legislative framework

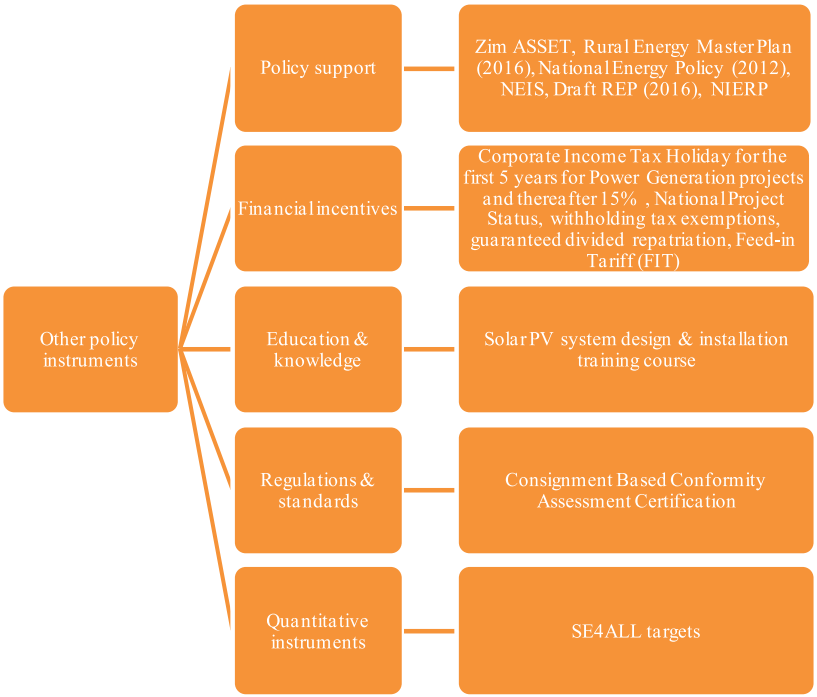
The Electricity (Grid Code) Regulations (2017) establishes the reciprocal obligations of industry participants around the use of the National Transmission System (NTS) and operation of the Interconnected Power System (IPS). The Electricity (Distribution Code) Regulations SI 47 of 2017 seek to ensure the efficient, safe, reliable, coordinated development, operation and maintenance of the electricity distribution system through laying out the requisite rules, procedures, standards and requirements. The draft Solar Water Heating Regulations (2017) outlaw the use of electricity water heaters and compel

new housing projects to install solar water heaters. The regulations also seek to regulate the installation and standards for solar water heaters. Solar Photovoltaic Standards set the quality performance requirements for solar PV panels and related equipment to protect consumers from substandard products. The draft Solar PV Regulations seek to enforce the Solar Photovoltaic Standards. The Electricity (Net Metering) Regulations (SI 86 of 2018) aim to promote small scale renewable power generation such as rooftop solar PV systems to export excess power to the national grid, and to increase the viability of mini-grids. The Customs and Excise Suspension and Amendment Regulations of 2010 (SI 147 of 2010) exempt from paying excise duty solar equipment such as solar panels, inverters, and solar lights, except batteries for which Zimbabwe has local capacity to manufacture.

5.2.3. Other Policy Instruments

Other policy instruments that can be used in the management of solar energy development include policy support, financial incentives, education and knowledge, regulation and standards and quantitative instruments (Figure 17).

Figure 17: Other policy instruments



5.2.3.1. Policy Support

National development plans

The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim ASSET) 2013 - 2018, a 5-year blue print for economic development, commits Zimbabwe to increase the

use of renewable energy by 300MW by 2018. The Zim Asset envisages initiating and installing a 100MW solar plant and acquiring and installing solar powered equipment as a strategy to mechanize agriculture sector. It also encourages the use of solar energy for lighting and heating and calls for the development of policy and regulatory measures for solar water heaters.

The Transitional Stabilisation Programme (TSP, 2018-2020), a successor of the Zim Asset blue print, considers solar as a clean and environmentally friendly alternative source of power, especially for rural households in off-grid areas and for augmenting grid efforts to improve on access to energy supply. The TSP encourages installation of solar street lights along all rehabilitated roads across towns. The TSP also notes that the requirement by local authorities for all new housing development plans to embrace solar geysers would promote demand for solar energy technology. The TSP also highlights that resources worth US$50 million will be mobilized for solar mini grid systems for targeted communities and rural based business ventures, through leveraging the Rural Electrification Fund.

Rural Energy Master Plan (2016)
Zimbabwe has an integrated network plan called the Rural Energy Master Plan (2016) which includes both off-grid and on-grid components, and outlines how Zimbabwe's rural areas are to be provided with modern energy services over a 20-year timeframe. This is in line with good practice which requires integrated network, generation and resource planning in order to identify valuable energy resources, set priorities for network expansion that support cost effective and efficient renewable energy utilization (Kaderják, 2012). The current Rural Energy Master Plan (REMP) 2016 seeks to: provide a strategic roadmap for universal access to energy; guide the selection and ranking of grid and off grid solutions for different geographical locations; define, select and rank different types of energy solutions; develop least cost grid extension plan and complimentary off grid plan; inform ZERA when licensing new energy projects (Economic Consulting Associates and Practical Action - Southern Africa (2013).

National Energy Policy (2012)
The National Energy Policy (NEP, 2012) outlines the policy objectives, measures and strategies for promoting renewable energy sources. The policy calls for: (i) the introduction of mandatory regulations for solar geyser installation in new homes; (ii) provision of incentives for retrofitting existing geysers with solar collectors; (iii) awareness raising on the benefits of solar water heaters; (iv) promotion of proven solar technologies; (v) promotion of local manufacturing of solar equipment; (vi) training of artisans to assemble and install solar technologies; and (vii) establishment of cost-effective fit-in tariffs with appropriate subsidy mechanisms.

Draft Renewable Energy Policy 2016
Zimbabwe has a draft Renewable Energy Policy (REP) which seeks to promote the development of renewable energy. The draft addresses critical issues associated with renewable energy developments which were left out in the NEP (2012). These issues include: identifying a nodal agency for renewable energy development; procurement models for renewable energy such as competitive bidding, Feed-in-Tariff, third party access; renewable energy portfolio standards / Targets for different technologies;

incentive and financing mechanism; integration with national grid; and decentralized generation (see Box 1).

Box 5: Initiatives for renewable energy envisaged in the draft REP, 2016

The draft policy aims at addressing barriers to the uptake of renewable energy in the country through different provisions and programs as follows.

- It sets overall targets for renewable energy. The draft policy aims to achieve an installed renewable energy capacity of 1,000 MW (excluding large hydro) by 2025 with a generation mix of nearly 17% of the total electricity demand coming from renewable energy sources.
- It provides specific incentives for renewable energy development such as: conferment of National Project Status; income tax exemptions; capital subsidy for community projects; incentives for third party sale of power; reduction in licensing fees; relaxations of licensing.
- It stipulates the procurement mechanisms for renewable energy to ensure higher investment, timely implementation and appropriate returns to the investor. The procurement mechanism for solar PV and CSP is competitive bidding. For rooftop solar, procurement will be under the FiT and net metering regulations of ZERA.
- Addresses development risks associated with the promotion of the uptake of renewable energy through: outlining well-defined approval timelines for the administrative processes; setting up of a nodal agency to facilitate the entire process of obtaining approvals; simplifying, streamlining and time binding the complex and time consuming processes such as land acquisition.
- Enhances off-grid applications as a viable option for rural electrification through providing the necessary guidelines, incentives and provisions related to standards, procurement, financing mechanisms, among others.
- Provides for the promotion of domestic manufacturing of renewable energy equipment through: domestic content requirement; approved standards and specifications; financial and tax incentives; capacity building initiatives.
- Establishes a separate fund called the Green Fund of Zimbabwe for promoting, developing and extending financial assistance for setting up of projects relating to new and renewable sources of energy and off-grid sources.

Source: Draft Renewable Energy Policy, 2016

5.2.3.2. Financial incentives

Solar energy developers can benefit from a five-year corporate income tax holiday offered to investors within the energy, water and sanitation and transport sectors with payable tax as follows: 0% for the first 5 years, 15% for the second 5 years and 30% after 10 years (IRENA, 2016). Other energy investors may also qualify for a tax holiday, National Project Status, withholding tax exemptions, guaranteed divided payments and repatriation (RECP, 2014).The Renewable Energy Feed-in Tariff (REFIT) mandates power utilities operating the national grid to purchase electricity from renewable energy sources at a pre determined

price so as to stimulate investment in the renewable sector. The REFIT is meant to promote renewable energy projects up to a maximum capacity of 10MW. It would be implemented through an annual call for proposals. The REFIT is differentiated by technology type and by size of the generation plant. Differentiating REFIT by technology type is a good policy for solar energy development because this allows the development of relatively expensive technologies such as solar, which are underexploited. However, this is not cost effective and may result in higher tariffs to the end consumer.

5.2.3.3. Education and knowledge

ZERA runs a solar PV system design and installation training course aimed at improving local capacity in solar PV installations. Furthermore, ZERA developed a register of renewable energy companies who were assessed for technical competence to ensure that consumers are provided with quality solar energy products and services (ZERA, 2015).

5.2.3.4. Research and Development Intervention Projects

There are some research and development initiatives that are in place to expand the scope of solar energy use in the country. The Chinhoyi University of Technology (CUT) is designing a Tobacco Curing System using Solar Energy and a Biomass Back-up Heat Exchanger Unit which would reduce deforestation and promote clean energy use (Table 8). However, there is need for policy measures to promote research and development into other uses of solar energy such as space heating, solar thermal cooling, water and pool heating.

Table 8: Research & development intervention projects for solar technologies in Zimbabwe

Title	Institution	Remarks	Progress
Solar Water Heaters for Zimbabwe: DSM, GHG emission abatement, Consumer Economics and Rolling out	University of Zimbabwe	Surveys were completed for 5 provinces and the University is to assess the efficacy and effectiveness of solar water heaters currently available on the local market.	60%
Development of a Solar PV testing Laboratory at SAZ	Standards Association of Zimbabwe	The laboratory is expected to provide a testing platform for solar products to ensure standards adhere to stipulated standards. Procurement of the laboratory is in progress.	65%
Designing of a Tobacco Curing System using Solar Energy and a Biomass Back-up Heat Exchanger Unit	Chinhoyi University of Technology	The majority of farmers are using firewood for curing tobacco and this is decimating forests. The project is therefore expected to reduce firewood use and promote cleaner methods. Conceptual design was completed and the prototype is being constructed.	45%

Source: ZERA, 2015

[76]See https://verigates.bureauveritas.com/wps/wcm/connect/6dfc8e5c-d4ae-4136-aaf2-7952e72d7a0f/GSIT+-+Zimbabwe++%28CBCA%29+Datasheet+Rev+5.pdf?MOD=AJPERES for details.

5.2.3.5. Regulations and standards

In order to deal with issues associated with poor quality imports into the country, the Consignment Based Conformity Assessment Certification was adopted by government in 2015, whereby Bureau Veritas conducts pre-shipment inspection and certification of goods to ensure and confirm that the client receives what they ordered, ensures that quality solar products enter the country (Mzezewa and Murove, 2017). This initiative ensures that the import of poor solar energy technologies is minimized. However, the initiative also increases the cost of importing solar products into the country.

5.2.3.6. Quantitative instruments

The government has adopted the objectives of Sustainable Energy for All (SE4ALL) of having 100% access by 2030. SE4ALL catalyses faster and bolder action to realise Sustainable Development Goal number seven (SDG 7)-the goal on universal energy access[77]. This commitment needs to be translated into action starting with the development of National System Development and a Rural Energy Master Plan (Economic Consulting Associates and Practical Action - Southern Africa, 2013).

5.3. Gaps in the policy framework

The government is still developing important policy and regulatory frameworks for promoting renewable energy sources. A number of policy instruments that will catalyze the development of renewable energy sources are still work in progress e.g. Renewable Energy Policy, IPP policy framework, National Energy Integrated Resource Plan, Power Procurement Regulations, among others. The finalisation of these policy instruments will address most of the problems that are currently hindering the development renewable energy resources. Some of the policy gaps noted in this study are noted as follows.

5.3.1. Net metering regulations

The Electricity (Net Metering) Regulations (SI 86 of 2018) are silent on renewable energy credits. It is standard practice that the regulations indicate that the renewable energy credits belong to the net metering participant, even though there is no market for the certificates (Navigant Consulting Ltd, 2014). There is no tool which has been developed by ZERA or REA to help prospective net metering participants to assess the commercial viability of net metering as is the case in Sri Lanka (Economic Consulting Associates and Carbon Africa, 2014). If the objective is to promote renewable energy generation through net metering, then it makes sense to assist potential participants in assessing commercial viability through such a tool.

[77] See https://www.seforall.org/ for details

5.3.2. Information for decision making

Zimbabwe has no tools for assessing energy market needs and demand. The Ministry of Energy and Power Development (MEPD) no longer produces yearly statistical energy bulletins. National Census collects household energy statistics but they are not analysed, partly because of the Zimbabwe National Statistics Agency is bound by legal confidentiality requirements to release such data for analysis by stakeholders. However, the government has since gazetted regulations that allow access to household data collected by Zimstat. The lack of information makes projects more risky and place undue cost burden on the project developer. Another challenge relating to information is the lack of a standard template that defines valuation parameters (e.g. market beta, credit ratings, risk premium, etc.) that are used to determine and negotiate tariffs with ZEDTC. As a result it is difficult to reach an agreement with ZETDC on the agreed tariff because ZETDC insists on using conservative parameters that are contrary to the reality on the ground.

5.3.3. Absence of technical planning guidelines for mini-grids

There are no locally defined technical standards for renewable energy technology mini-grids. There are no technical planning guidelines for mini-grids in the country. The Electricity Licensing Guidelines & Requirements (2017) developed by ZERA provide process guidelines for IPPs wishing to get licenses for systems above 100kW. However, the planning process guidelines for mini-grids of capacity less than 100KW are not available. As a result, most mini-grid developers with capacity below 100kW are not aware of and have not fully complied with ZERA's regulatory requirements that include informing ZERA of the presence of the project, reporting requirements and its technical specifications for the energy sector regulatory requirements. In addition, the absence of these guidelines lengthens the time of developing a fully operational power generation project. Thus the guidelines would cut the learning curve.

5.3.4. EMA regulatory costs

Although ZERA does not have any charges for the very small projects below the regulatory threshold, the Environmental Management Agency (EMA) imposes charges that are relatively high for renewable energy projects, without making due consideration of project size and potential positive environmental impacts. The charges adversely affect the viability of renewable energy projects. In the spirit of improving the ease of doing business environment, EMA reviewed its environmental impact fees from 1.5% of project cost to a sliding scale whereby the smallest project pays US$210, larger projects 0.8% and 1% for high impact projects. As a result, a very high impact project would pay between 1% and 2% of total project cost (Table 9). However, this is still very high compared to the general guideline that fees and other development costs should not exceed 1% to 2% of total project cost (SADC RERA, 2013). However, the Draft REP envisages waiving off the EIA process and approval for projects with installed capacity of less than 5MW. For projects with 5MW and above, the Draft REP envisages tacit approval whereby if approval is not granted within 30 days after submission of EIA report, the application is deemed approved by the MoEPD.

Table 9: Environmental impact assessment costs

Project category	Old EIA fees	New sliding scale fees	Level of environmental and social impact and example of project
A	1.5% of project cost	US$210.00	Small scale projects with minimum impact: e.g. small scale mining, small scale infrastructure projects, SMEs, etc.
B	1.5% of project cost	0.8% of project cost	Moderate impact: e.g. Tourism infrastructure, commercial brick moulding, housing development, etc.
C	1.5% of project cost	1% of project cost	High negative impacts: e.g. commercial entities, manmade lakes, etc.
D	1.5% of project cost	1.2% of project cost	Extremely high negative impacts: e.g. mining, ore processing, chemical plants, tanneries, oil and gas exploration. Impact can continue after decommissioning e.g. acid mine drainage.

Source: Environmental Management Agency

5.3.5. Single window facility for renewable energy

There is no single window facility that renewable energy developers can approach to facilitate speedy acquisition of all the relevant licenses and permits. The Draft REP provides for the conversion of existing institutions into a nodal agency. The role of that agency, as envisaged in the draft policy, will be to facilitate the acquisition of clearances, approvals and permissions required for project development through developing an investment toolkit, information provision, consultation with relevant stakeholders, resource estimation, pre-feasibility studies and monitoring and evaluation of renewable energy projects.

5.3.6. Planning and policy support instruments

There are no specific long-term targets, clear action plans, timelines, and implementation strategies for renewable energy. More importantly, there is no reporting, monitoring, and evaluation frameworks to guide progress. (Mukeridzi, 2016). The government is still developing many of the critical policies that will catalyse renewable energy use. The Renewable Energy Policy is still in draft form. An Independent Power Producers (IPP) Policy framework is work in progress. The necessary legislation for the promotion and development of IPPs is still to be developed (Mzezewa and Murove, 2017).

5.3.7. No requisite infrastructure to support achievement of specific solar targets

The Draft Renewable Energy Policy (2017) sets overall target of developing 1000MW of renewable energy, and specifies targets for individual renewable energy sources. The 2030

target stated in the Draft Renewable Energy Policy (2017) for grid solar is 1575MW. This target is an upward revision of the target stated in the SE4All Action Plan wherein grid solar power generation is targeted at 300MW, 400MW and 600MW by 2020, 2025 and 2030 respectively. However, there is no requisite infrastructure to support the enforcement of the renewable energy targets. In other jurisdictions they use Green Certificates to track and monitor generation and compliance with the targets.

5.3.8. No solar access policy instruments for roof-top solar

There are no solar access policy instruments that ensure adequate access to sunlight to the users of solar gadgets. Such policy instruments would encourage the uptake of solar technologies by consumers. For instance, there is no policy position on what happens when a solar system is obstructed from sunlight by a neighbour's tree or property which is built after the system has been installed. Hence there is need for solar access policy instruments that clear such uncertainties. California's solar access laws appear in the state's Civil, Government, Health and Safety, and Public Resources Codes. California's Civil Code (801.5) ensures that neighbours may voluntarily sign solar easements to ensure that proper sunlight is available to those who operate solar energy systems. California's Government Code (65850.5) provides that subdivisions may include solar easements applicable to all plots within the subdivision in their plans. California's Public Resources Code (25980) contains the Solar Shade Control Act, which encourages the use of trees and other natural shading except in cases where the shading may interfere with the use of active and passive solar systems on adjacent properties. Specifically, the law provides that a tree or shrub cannot cast a shadow which covers more than 10 percent of a solar collector's absorption area at any one time between the hours of 10 a.m. and 2 p.m. if the tree or shrub is planted after the installation of the solar collector.SB 1399of 2008 amended the Public Resources Code to exempt trees and shrubs planted prior to the installation of a solar system. Also exempted are trees and shrubs that are subject to a local ordinance, or the replacement of trees or shrubs that had been growing prior to the installation of the solar device[78].

5.3.9. End-of-life PV management

There are no policy instruments that deal with end-of-live solar PV waste management. Solar PV produces a lot of waste that is toxic to the environment and people living in it. The draft REP does not address this issue either. A well designed policy strategy for the management of solar PV waste does not only address the environmental and human side-effects of solar waste, but also ensures viability of solar energy technologies through recovery of costs via local recycling and reuse.

[78] http://programs.dsireusa.org/system/program/detail/294

5.4. Conclusion and Recommendations

5.4.1. Conclusion

The policy framework for managing renewable energy in general and solar energy in specific is incomplete. A number of policy instruments are still work in progress. For instance, the Renewable Energy Policy is in draft form, while the National Energy Integrated Resource Plan, Independent Power Producers Policy and the Power Procurement Regulations are in the pipeline. There are gaps in the policy tool box, e.g.: information and knowledge policy tools which are vital for decision making by investors and customers are inadequate, making information and knowledge unavailable or less accessible. There are no technical/process guidelines for mini-grids that would guide the development of projects below the regulatory threshold of 100KW. However, ZERA has developed the draft Mini grid framework which yet to be approved. There are no renewable energy credits or Green Certificates which are vital instruments that help to track, verify, monitor the production of renewable energy and ease compliance with renewable energy targets. The regulatory costs imposed by EMA are too high above generally agreed standards that fees and all development costs should be below 1% to 2% of total project costs. A single-window facility that facilitates speedy development of renewable energy technologies is missing, making investments lengthy and costly. In addition, there are no policy provisions for the end-of-life PV management, hence risking the long-term adverse environmental and human effects from solar PV toxic waste. Furthermore, there are no solar access policy instruments to provide guidance on accessing sunlight for solar gadgets.

5.4.2. Recommendations

Expediting the completion of policy instruments that are still work in progress
Most of the policy instruments have been in draft form for a long time. There is need to speed up the process of developing, approving and launching of policies in the country. In this regard, it is important to build capacity along the policy development value chain so as to reduce the bottlenecks associated with the delays and shorten the lead time between inception of policy development and launching of the policy. These delays in finalising policies slow down the development of solar energy and other renewable energy resource projects which depend to these policies. For example, the draft REP will deal with a number of institutional and policy gaps, as well as with regulatory obstacles currently undermining the development of renewable energy technologies. The policy deals with the single-window facility, regulatory costs, funding, skills, and quality assurance of renewable energy technologies, among others.

However, the draft REP needs to address the gaps in it before it can be launched. Although the draft REP has set clear targets for individual renewable energy technologies, it has not provided for the supporting infrastructure to track, monitor and incentivize the achievement of the targets. Therefore the draft REP should consider the introduction of Green Certificates which are an important policy instrument used in other jurisdictions to track, verify, monitor and enhance viability in the generation of renewable energy and facilitate efficient compliance with the renewable energy targets through trading of Green Certificates.

The draft REP also needs to have a proper reporting, implementation, monitoring and evaluation framework which spells out the short-term, medium term and long-term targets, clear action plans, timelines, and implementation strategies for renewable energy to guide progress.

In addition, the draft REP should also consider putting in place solar access policy instruments that ensure adequate access to sunlight to the users of solar harvesting gadgets. Such policy instruments would encourage the uptake of solar technologies by consumers by clearing uncertainties associated with accessing sunlight especially in residential areas. In California, for example there are solar access laws that permit neighbours to voluntarily sign solar easements to ensure that proper sunlight is available to those who operate solar energy systems. They also have Solar Shade Control Act, which encourages the use of trees and other natural shading except in cases where the shading may interfere with the use of active and passive solar systems on adjacent properties. Specifically, the law provides that a tree or shrub cannot cast a shadow which covers more than 10 percent of a solar collector's absorption area at any one time between the hours of 10 a.m. and 2 p.m. if the tree or shrub is planted after the installation of the solar collector. However, trees and shrubs planted prior to the installation of a solar system are exempted[79].

The draft REP policy should also consider the long-term need of addressing end-of-life PV management. Solar PV waste produces toxic waste that affects the environment and people living in it and therefore there is need for the policy to outline policy strategies on how solar PV waste will be managed to reduce adverse impact to the environment and people. A well designed solar waste management strategy will not only reduce hazards to the environment and people but will also increase viability of solar technologies through cost recovery by locally recycling, repairing and reusing the solar PVs. Some of the strategies that have been used in other jurisdictions include adoption of PV-specific waste regulations or mainstreaming PV waste management into existing frameworks of waste management; establishing dedicated PV recycling plants or adapting general recycling plants for PV recycling; and promoting innovation in the design of PV systems to create value in end-of-life PV components, and reduce amount of materials in PV panels.

Developing an information and knowledge toolkit

Information and knowledge is critical in enlightening decision making by investors, consumers and policy makers for the development of solar energy. In this regard, the MoEPD may establish an information and knowledge toolkit which will provide such information and knowledge that would catalyse investors to develop solar energy technologies and consumers to increase uptake of such technologies. This may take the form of an online information portal with comprehensive information meeting the needs of investors, consumers and policy makers. For investors, information should includesolar resource mapping, grid and grid expansion plans, population densities, income profiles of potential customers, licensing requirements, financing, GIS maps, library of laws and policies, reports, forms, tariff standards, and technical guidelines. For customers, the information should include available solar energy technologies, their benefits, financing options. The MoEPD may also produce and make public on the information portal annual

[79] http://programs.dsireusa.org/system/program/detail/294

energy balance reports, national energy outlook reports, by taking advantages of household data from Zimstat on population census and demographic health survey reports.

Developing a standardized template for market parameters used for tariff determination and negotiation

Lack of agreement between ZETDC and project developers on the appropriate tariff rates has delayed the takeoff of some projects because of different views on market parameters (e.g. market beta, credit ratings, risk premium, etc.) used to calculate the tariffs. Therefore it is recommended that ZETDC establishes a template, in consultation with stakeholders, that transparently defines these parameters in order to reach speedy agreement on applicable tariffs.

Reducing EMA regulatory costs

The regulatory costs imposed by EMA need to be reduced. This can be done through waivering the requirements for environmental impact assessment, as suggested in the draft REP, for renewable energy sources such as solar which are largely environmentally friendly. The costs can also be reduced through aligning the fees to the actual costs that EMA incurs in assessing the environmental impact assessment report rather than tying the fees sorely to a percentum of the project total cost.

Developing technical planning guidelines for mini-grids covering solar

The Electricity Licensing Guidelines and Requirements (2017) provide technical planning guidelines and a framework for the licensing power producers above the regulatory threshold of 100KW. Thus, there are no licensing requirements for generation capacity below 100KW, and ZERA does not regulate the tariffs that are charged. While this practice is consistent with SADC mini-grid guidelines, there is still need for mandatory registration of mini-grids for purposes of data gathering and enforcement of technical inspections for safety. In some countries the regulators use simplified registration for systems under a specific capacity. Registration, unlike licensing, is solely for information purposes (Tenenbaum *et al.*, 2014). The process is meant to give the private sector a degree of assurance from the government side, while helping create a central database of mini-grids.

References

Desai J. and Nelson M. (2017).Are we headed for a solar waste crisis?http://environmentalprogress.org/big-news/2017/6/21/are-we-headed-for-a-solar-waste-crisis.

Accessed 10 August 2018.
Dias, P.; Javimczik, S.; Benevit, M.; Viet, H.; Bernardes, M. (2016).“Recycling WEEE: Extraction and concentration of silver from waste crystalline silicon photovoltaic modules.”Waste Management 57, 220-225.Online at https://doi.org/10.1016/j.wasman.2016.03.016.

Economic Consulting Associates and Carbon Africa (2014). EUEI-PDF Kenya 2013 Project Renewable Energy Regulatory Capacity Development Assessment of a net metering programme in Kenya Volume 1: Main report. https://renewableenergy.go.ke/asset_uplds/files/Net%20Metering%20Assessment%20Report%20Volume%201.pdf. Accessed 28 August 2018.

Economic Consulting Associates and Practical Action - Southern Africa (2013).Supportive framework conditions for mini-grids employing renewable and hybrid generation in the SADC Region: Zimbabwe Case Study – Gap analysis and National Action Plan. Regional Electricity Regulators' Association of Southern Africa (RERA).

How To Profit From Solar Energy | Investopediahttps://www.investopedia.com/articles/personal-finance/042315/how-profit-solar-energy.asp#ixzz5N0pfF7i2

IRENA, Renewable Energy Zones for Africa Clean Energy Corridor Report, October 2015. https://mapre.lbl.gov/download/859/

Mudzingwa T. (2016). Capacity Building Workshop On Development Of CDM Activities And Nama For Public And Private Sector In Zimbabwe, 24 Aug 2016 – Montclair Nyanga. ZERA.https://unfccc.int/files/na/application/pdf/module_1_5.energy_regulation_in_zimbabwe.pdf. Accessed 16 August 2018.

Mukeridzi T. (2016). What's holding back off-grid renewable energy in Zimbabwe?http://news.trust.org/item/20160909070629-5ka1m/. Accessed 16 August 2018.

Mzezewa C. T. and Murove C. S. (2017).Renewable energy market entry study report – Zimbabwe. Ministry of Foreign Affairs Netherlands. https://www.rvo.nl/sites/default/files/2017/11/renewable-energy-market-study-zimbabwe-2017.pdf

Navigant Consulting Ltd. (2014).Net Metering Standard Industry Practices Study.https://www.nr.gov.nl.ca/nr/energy/electricity/net_metering_study.pdf. Accessed 28 August 2018.

Power for All (2017).Zimbabwe Call to Action.https://static1.squarespace.com/static/532f79fae4b07e365baf1c64/t/58dbd2512e69cf36033f6f1f/1490801306308/Zimbabwe.+27+March.+Current+Version.+header.pdf. Accessed 7 August 2018.

Practical Action Consulting Southern Africa (2016). Metering and Payment Technologies for Mini-grids: An Analysis of the Market in Zimbabwe. https://sun-connect-news.org/fileadmin/DATEIEN/Dateien/New/Market_Analysis_Zimbabwe.pdf. Accessed 16 August 2018.

US Department of Energy (2017). The SunShot Initiative's 2030 Goal: 3¢ per Kilowatt Hour for Solar Electricity. https://www.energy.gov/sites/prod/files/2016/11/f34/SunShot%202030%20Fact%20Sheet-1.pdf. Accessed 9 August 2018.

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