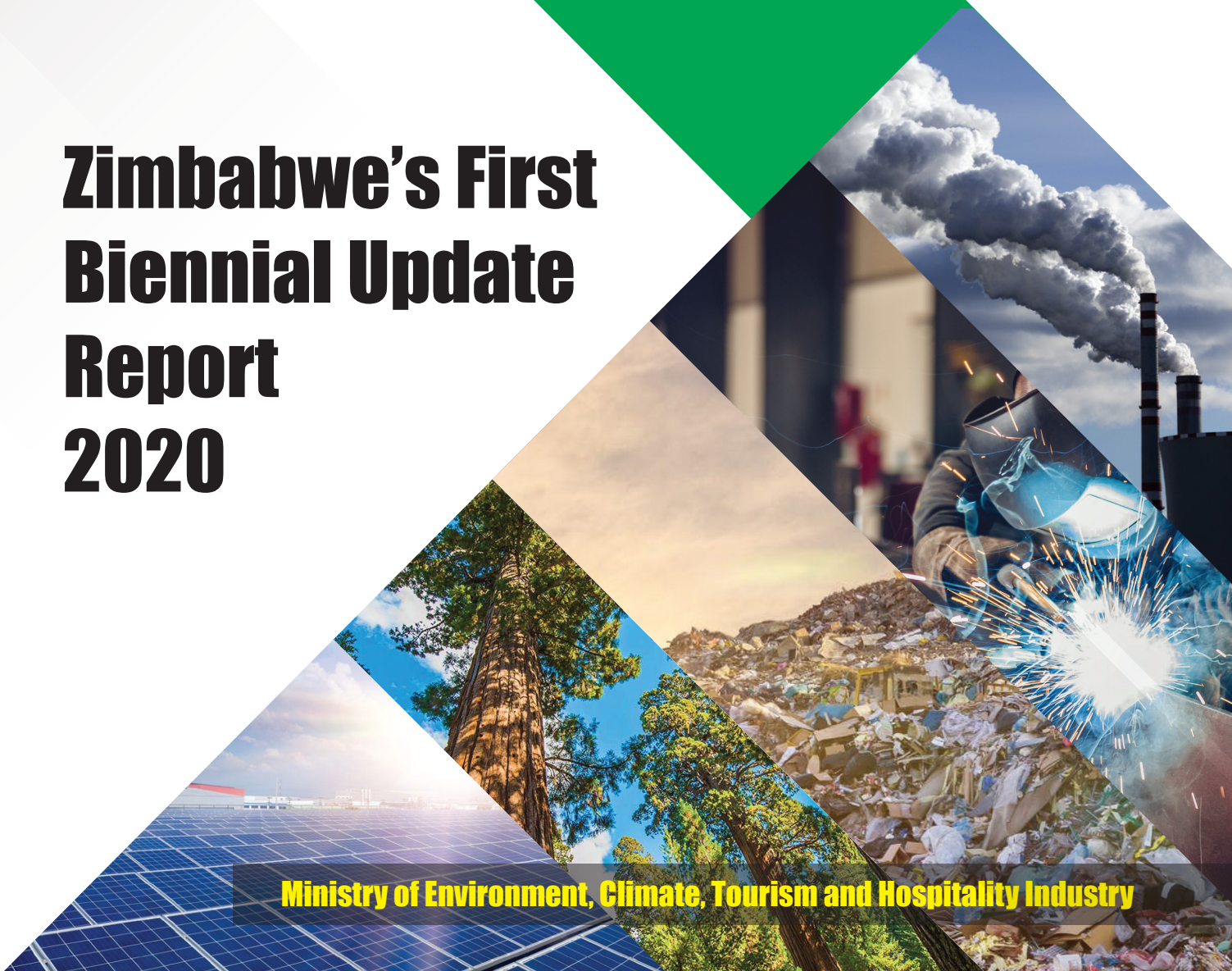
ZIMBABWE

Zimbabwe's First Biennial Update Report 2020



Ministry of Environment, Climate, Tourism and Hospitality Industry

REPUBLIC OF ZIMBABWE

Zimbabwe's First Biennial Update Report to the United Nations Framework Convention on Climate Change

2020

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Foreword

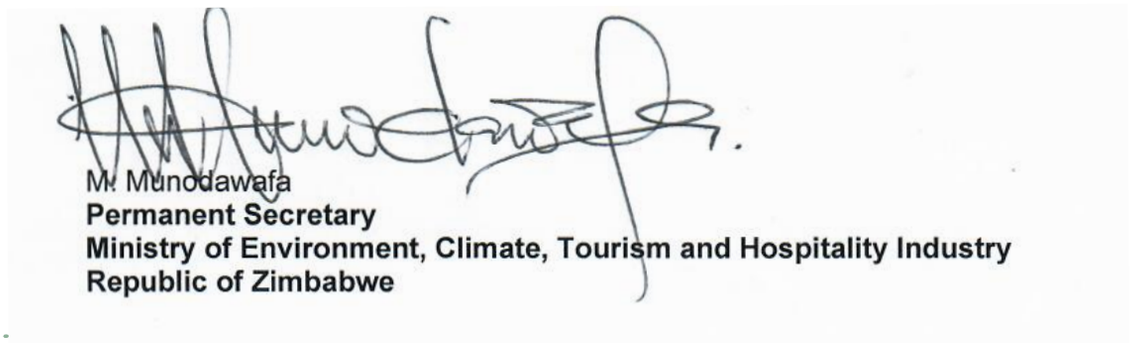
Climate change is a global development challenge which is impacting socio-economic wellbeing in all countries. Zimbabwe has seen increased frequency and magnitude of droughts, prolonged dry spells, violent storms and tropical cyclone activity over the past two decades impacting on the agriculture, energy, health and infrastructure sectors, and human settlements. By becoming a Party to the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, the Kyoto Protocol in 2009 and the Paris Agreement in 2017, Zimbabwe is an active participant in efforts to tackle the climate change challenge. To enhance the effective implementation of the international climate change regime, the Government of Zimbabwe developed the National Climate Change Response Strategy (2014) and the National Climate Policy (2017) which provide guidance on climate actions undertaken in the country.

Zimbabwe has been meeting its reporting requirements through its National Communications to the UNFCCC. The country's Third National Communication was submitted to the UNFCCC in 2016 and this First Biennial Update Report (BUR1) provides updated information on the country's national circumstances, greenhouse gas emissions profile, mitigation actions and outlines finance, technology and capacity building needs and support received to date in the country.

Guided by the country's Vision 2030 through which the country seeks to have an upper middle income society by the year 2030, economic activity and associated consumption levels are expected to increase. The Government is putting in place policies and regulatory measures to ensure that this growth is as less carbon intense as possible. Already the country also has a National Renewable Energy Policy and a Climate Smart Agriculture Policy Framework among others. Despite limited international climate finance flows, Zimbabwe is undertaking climate change mitigation actions including increasing hydroelectric power generation and ramping-up grid and off-grid solar into the energy mix. These actions will reduce the country's carbon footprint at the same time enhancing socio-economic wellbeing of the citizens.

The Government continues to strengthen the climate change institutional arrangement to ensure that implementation of the Paris Agreement is done efficiently and effectively. At the same timer monitoring, reporting and verification systems, including for climate finance, are being developed to form the foundation for the transparency required in climate action.

Zimbabwe is committed to contributing towards the transformation required to achieve low carbon and climate resilient development. Mainstreaming climate change in policy and strategic frameworks and the First National Development Strategy (2021-2025) indicates heightened political awareness and willingness to contribute towards global GHG emissions reduction and building climate resilience. It is within this progressive context that Zimbabwe presents its First Biennial Update Report to the UNFCCC.



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ES. Executive Summary

This report is Zimbabwe's first biennial update to the Third National Communication (TNC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2017. The Biennial Update Report (BUR) comprises four chapters namely, National Circumstances, National Greenhouse Gas (GHG) Inventory, Mitigation Actions, and lastly Finance, Technology and Capacity Building Needs and Support Received. Table ES1 summarises the Zimbabwe's status with respect to its commitment under the UNFCCC.

Table ES 1: Status of Zimbabwe's commitment to the UNFCCC

Aspect	Status
Name of Party	Zimbabwe
Ratification year to UNFCCC	1994
Most recent national report to UNFCCC and year of submission	Third National Communication in 2016
Reporting year of BUR	2020
Year of NDC submission	Submitted Initial NDC in 2015
Current NDC Focus	Mitigation in the Energy sector and Adaptation in the Agriculture sector
Description of Nationally Determined Contribution (NDC)	33% below the projected 2030 business as usual energy sector per capita emissions
Expected year of NDC revision	2021

ES1. National Circumstances

ES1.1 Geographic Profile

Zimbabwe's area covers 390 757 km^2. The country lies wholly within the tropics with a sub-tropical climate. The annual rainfall ranges from below 400 mm in the south to over 1000 mm in the eastern parts of the country. Notable changes in the climate include an increase in average temperatures, decrease in annual precipitation, change in spatial extent of the country's Natural Regions, change in the onset and cessation dates of the rainy season and an increase in the duration of the mid-season dry spell. Observed extreme weather events that have increased in intensity include: tropical cyclones; droughts; dry spells; floods and; heat waves.

ES1.2 Economic Profile

Zimbabwe's population was 12 973 808 according to the last census in 2012. The National Industrial Development Policy (2019-2023) is the country's blueprint for industrialization. The major industrial sectors are agriculture; manufacturing; wholesale and retail trade; and mining. Gold and platinum mainly contribute the highest income. Zimbabwe's energy sources are biofuels (mainly firewood), coal, petroleum products and electricity. Fuelwood is the country's primary energy source as 68 per cent of the population depend on wood for fuel.

Zimbabwe is predominantly serviced by road transport. Agriculture is the backbone of Zimbabwe's economy. The sector provides direct and indirect employment to approximately 60-70% of the population, supplies 60% of the industrial raw materials and contributes approximately 40% towards export earnings. Manufacturing, wholesale and retail trade; repair of motor vehicles and motorcycles, and accommodation and food service activities mainly contribute to industrial GDP. Zimbabwe's total trade has decreased from US$ 10.4billion in 2013 to US$9.1 billion in 2019. Housing projects have been dominated by residential, largely driven by the rural to urban migration which averaged 4.3 per cent.

ES1.3 Major Policies

The main policies impacting on the economy include the land reform programme implemented in the 1980s and 1990s, Economic Structural Adjustment Programme (ESAP)-1992, as well as the Fast Track Land Reform Programme which commenced in 2000. Major agricultural strategies include Zimbabwe Agriculture Investment Plan (2013–2018) (ZAIP); Comprehensive National Agricultural Policy Framework (2018 – 2030); Agricultural Policy Framework (2012-2032). The main policies in the Energy sector include the Energy Policy (2012); Renewable Energy Policy (2019); Bio-fuels Policy (2020); National Transport Master Plan; and the Zimbabwe Motor Industry Development Policy (2018-2030). In the industrial sector the main policies include the Industrial Development Policy (2019-2023).

Climate specific policies and strategies include the National Climate Policy (2017); National Climate Change Response Strategy (2014); NDC (2015) and; the Low Emission Development Strategy (2020-2050). The main barriers to implementing mitigation priorities include: lack of skilled personnel; limited financial resources; low uptake of new technologies and; weak institutional arrangements.

ES1.4 Institutional Arrangements

The High-Level Committee in the Office of the President and Cabinet (OPC) is responsible for oversight of all climate change activities at national level. The Committee comprises Permanent Secretaries for all Government ministries and is chaired by the OPC. The Ministry of Environment, Climate, Tourism and Hospitality Industry (MECTHI) is responsible for coordinating environmental issues in the country including climate change. The Climate Change Management Department is mandated with coordinating and implementing national climate change programmes.

The MRV system is not yet fully developed. The GHG Inventory System is currently under development. The elements that are already in place include the designation of a focal point to the United Nations Framework Convention on Climate Change (UNFCCC); and appointment of the coordinator of the National Communication (NC) and Biennial Update Report (BUR). The government appointed a team leader of the Greenhouse Gas (GHG) Inventory and has engaged sectoral experts. The mapping of stakeholders was also completed.

An MRV for the NDCs was developed focusing on solar water pumping systems to assist the Government of Zimbabwe in its NDC implementation framework. An MRV for support needed and support received is not yet in place. The Ministry of Finance and Economic Development as the Aid Coordination Agency is in the process of developing the Development Projects Management Information System (DevProMIS).

ES2. National GHG Inventory 2017

The summary of GHGs emitted in 2017 is shown in Table ES2.

Table ES 2: Summary of Zimbabwe's GHG inventory for the year 2017

Categories	Emissions (Gg)					
	Net CO_2	CH_4	N_2O	HFCs	NO_x	CO
Total National Emissions and Removals	**23396.84**	**531.85**	**10.39**	**NE**	**47.17**	**2625.68**
1 - Energy	**9415.46**	**149.86**	**2.34**	**NE**	**NE**	**NE**
1.A - Fuel Combustion Activities	9415.46	149.85	2.34	NA	NE	NE
1.B - Fugitive emissions from fuels	0.00	0.01	0.00	NA	NA	NA
1.C - Carbon dioxide Transport and Storage	0.00			NA	NO	NO
2 - Industrial Processes and Product Use	630.50	0.00	0.26	NE	0.00	0.00
2.A - Mineral Industry	380.92	0.00	0.00	NA	NE	NE
2.B - Chemical Industry	0.00	0.00	0.26	NA	NE	NE

Categories	Emissions (Gg)					
	Net CO_2	CH_4	N_2O	HFCs	NO_x	CO
2.C - Metal Industry	237.80	0.00	0.00	NA	NE	NE
2.D - Non-Energy Products from Fuels and Solvent Use	11.78	0.00	0.00	NA	NE	NE
2.E - Electronics Industry	0.00	0.00	0.00	NA	NE	NE
2.F - Product Uses as Substitutes for Ozone Depleting Substances				NE	NE	NE
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	NE	NE	NE
2.H - Other	0.00	0.00	0.00	NE	NE	NE
3 - Agriculture, Forestry, and Other Land Use	**13350.88**	**357.22**	**7.65**	**NE**	**47.17**	**2625.68**
3.A - Livestock		192.83	0.01	NA	NE	NE
3.B - Land	13376.34		0.00	NA	NE	NE
3.C - Aggregate sources and non-CO_2 emissions sources on land	25.08	164.39	7.64	NA	47.17	2625.68
3.D - Other	-50.53	0.00	0.00	NA	NE	NE
4 - Waste	**0.00**	**24.77**	**0.15**	**NE**	**0.00**	**0.00**
4.A - Solid Waste Disposal		24.45		NA	NE	NE
4.B - Biological Treatment of Solid Waste		0.03	0.00	NA	NE	NE
4.C - Incineration and Open Burning of Waste	0.00	0.00	0.00	NA	NE	NE
4.D - Wastewater Treatment and Discharge		0.29	0.14	NA	NE	NE
4.E - Other (please specify)	0.00	0.00	0.00	NA	NE	NE
5 - Other	0.00	0.00	0.00	NE	NE	NE
5.A - Indirect N_2O emissions from the atmospheric deposition of nitrogen in NO_x and NH_3			0.00	NA	NE	NE
5.B - Other (please specify)	0.00	0.00	0.00	NA	NE	NE
Memo Items (5)						
International Bunkers	**140.20**	**0.00**	**0.00**	**NE**	**NE**	**NE**
1.A.3.a.i - International Aviation (International Bunkers)	140.20	0.00	0.00	NA	NE	NE
1.A.3.d.i - International water-borne navigation (International bunkers)	0.00	0.00	0.00	NA	NE	NE
1.A.5.c - Multilateral Operations	NO	NO	NO	NO	NO	NO
Information Items						
CO_2 from Biomass Combustion for Energy Production	49566.87					

Total GHG emissions with FOLU were 37,786.59 CO_2eq and AFOLU accounted for 61.46% of the total GHG emissions, followed by Energy with 35.17%. Net GHG emissions and removals (with FOLU) are shown in Table ES.3 while the total GHG emissions without FOLU are presented in Table ES4.

Table ES.3: Total GHG emissions with FOLU

	Net CO_2	CH_4	N_2O	Total	% Contribution
1 Energy	9,415.46	3,147.06	725.40	13,287.92	35.17%
2 Industrial Processes and Product Use	630.50	0.00	80.60	711.10	1.88%
3 Agriculture, Forestry, and Other Land Use	13,350.89	7,501.62	2,371.50	23,224.01	61.46%
4 Waste	0.00	520.17	43.40	563.57	1.49%
Total National Emissions and Removals	23,396.84	11,168.85	3,220.90	37,786.59	100.00%

Table ES4: The total GHG emissions without FOLU

	Net CO_2	CH_4	N_2O	Total	% Contribution
1 - Energy	9415.46	3147.06	725.4	13,287.92	71.38%
2 - Industrial Processes and Product Use	630.5	0	80.6	711.1	3.82%
3 - Agriculture,	0	4049.43	3.1	4,052.53	21.77%
4 - Waste	0	520.17	43.4	563.57	3.03%
Total National Emissions and Removals	10045.96	7716.66	852.5	18,615.12	100.00%

ES3: Per capita emissions

In 2017 Zimbabwe's GHG emissions were 2.893 kgCO_2eq per capita, compared to the world average estimated at 6.329kg CO_2eq per capita.

ES4. Mitigation Actions

Zimbabwe did not prioritise mitigation actions in this report, although most of the reported mitigation actions are in the AFOLU and Energy sectors owing to the significance of these two sectors in terms of GHG contribution. In the energy sector renewable energy and energy efficiency contribute the most in terms of climate change mitigation. The summary of prioritised mitigation actions by sector is presented in Table ES5.

Table ES 5: Key mitigation action by sector

Mitigation Actions					
Sectors prioritized for mitigation actions			The mitigation actions cover all the four IPCC sectors		
Key mitigation actions					
Title of mitigation action	**Sector**	**Type of activity**	**Status)**	**Estimated GHG emissions impact**	**Estimated SD impacts**
Batoka Gorge hydropower station	Energy	Renewable energy project-Hydro	Under implementation	4,000,000tCO2eq	Improved energy access
Zimbabwe biogas programme	Energy	Renewable energy programme-biogas	Under implementation	Not estimated	Improved energy access
Harava Solar Park	Energy	Renewable energy project-Solar PV	Under implementation	72,281 tCO_2eq emission reductions per year	Improved energy access. Green jobs creation.
ZFC Limited 5Mw Solar PV Plant	Energy	Renewable energy project Solar PV	Planned	8,390.63tCO_2eq being displaced annually	Improved energy access. Green jobs creation
Electricity (Solar Water Heating) Regulations	Energy	Policy-regulation	Under implementation	Not estimated	
N_2O abatement in nitric acid production	IPPU	Project-GHG reduction	Planned	Reduce N_2O by 6.75kg/ tonne of nitric aid	
Zambezi Valley Biodiversity Project	FOLU	Project-Sustainable forest management	Under implementation	Reduction of 139136.5 tCO_2 per year	
Integrated Solid Waste Management programme	Waste	Programme	Under implementation	Not estimated	Improved air quality Revenue from waste recycling and composting

ES5. Finance, Technology and Capacity-Building Needs and Support Received

Table ES 6: Summary of finance, technology and capacity-building needs

1. Finance, Technology and Capacity-Building Needs and Support Received	
International financial resources received in the reporting period [USD]	137,050,000
Main international technology transfer, capacity-building and technical support received in the reporting period (2014 to 2019)	Upscaling energy and water efficiency in industry Development of an Electro mobility policy for Zimbabwe, Developing Circular Economy Roadmaps for abating GHG emissions from the Waste Sector
Main international support needed	US$33,671,000

Contents

List of Tables

List of Figures

Acronyms and Abbreviations

AFOLU	Agriculture, Forestry and Other Land Uses
BAU	Business-As-Usual
BUR	Biennial Update Report
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CCMD	Climate Change Management Department
CERs	Carbon Emission Reductions
CH_4	Methane
CHP	Combined Heat and Power Generation
CO_2	Carbon dioxide
CSA	Climate Smart Agriculture
DevProMIS	Development Projects Management Information System
DIDO	Drive-In-Drop-Off
EB	Executive Board
EMA	Environmental Management Agency
ESAP	Economic Structural Adjustment Programme
FOLU	Forestry and Other Land Use
FTLRP	Fast Track Land reform programme
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HACT	Harmonized Approach to Cash Transfers
ICDS	Inter-Censual Demographic Survey
IEA	International Energy Agency
IPPU	Industrial Processes and Product Use
ITMOs	Internationally transferred mitigation outcomes
LEDS	Low Emission Development Strategy
MECTHI	Ministry of Environment, Climate, Tourism and Hospitality Industry
MIC	Manufacturing Industries & Construction
MoEPD	Ministry of Energy and Power Development
MRV	Measurement, Reporting and Verification
N_2O	Nitrous Oxide
NBS	National Building Society
NCCRS	National Climate Change Response Strategy
NDCs	Nationally Determined Contributions
OEM	Original Equipment Manufacturer
RDCs	Rural District Councils
REDD+	Reducing Emissions from Deforestation and forest Degradation
solar PV	Photovoltaics
SSN	Social Safety Net
SWM	Solid Waste Management
TACCC	Transparency, Accuracy, Completeness, Comparability and Consistency
TNC	Third National Communication
UNFCCC	United Nations Framework Convention on Climate Change
ZAIP	Zimbabwe Agriculture Investment Plan
ZAPF	Zimbabwe Agricultural Policy Framework
ZAS	Zimbabwe Agricultural Society
ZESA	Zimbabwe Electricity Supply Authority
ZERA	Zimbabwe Energy Regulatory Authority
ZESCO	Zambia Electricity Supply Company
ZETDC	Zimbabwe Electricity Transmission and Distribution Company

1 National Circumstances and Institutional Arrangements

1.1 Geographic Profile

1.1.1 Location

Zimbabwe is situated in southern Africa between:

- Latitudes: 15° 30”S and 22° 30”S
- Longitudes: 25° 00”E and 33° 10”E

1.1.2 Ecosystems

Zimbabwe’s ecosystems include gazetted forests, wetlands, national parks, botanical reserves, botanical gardens, safari areas, recreational parks and sanctuaries. These provide essential goods and services that support livelihoods and increase community resilience to climate variability. However, ecosystems have come under threat due to various human activities, invasive alien species and climate change.

1.1.3 Area and Land-Use

The country covers 390 757 km^2 divided into 10 administrative provinces, namely Harare, Bulawayo, Manicaland, Masvingo, Midlands, Mashonaland East, Mashonaland Central, Mashonaland West, Matabeleland North and Matabeleland South.

1.1.4 Climate Profile

Zimbabwe lies wholly within the tropics. However, the country partly enjoys a subtropical climate because of its high altitude.

1.1.4.1 Temperature

Mean monthly temperature varies from 15ºC in July to 24°C in November. Mean annual temperature varies from 18ºC in the Highveld to 23ºC in the Lowveld. The national annual mean surface temperature warmed by about 0.9°C from 1900 to 2018, with greatest warming occurring since the 1980s.

1.1.4.2 Precipitation

- Zimbabwe experiences a unimodal rain season extending from October to March of the following year.
- During El Niño years, the country usually experiences below average rainfall whilst during La Niña, the country usually receives average to above average rainfall.
- Annual average rainfall ranges from about 400 mm in the south to over 1000 mm in the eastern parts of the country. Figure 1.1 shows the variation of seasonal rainfall from 1901 to 2010.
- The average annual rainfall declined by about 5% across the country from 1901 to 2018.
- Inter-annual rainfall variability over the country has increased since the late 1960s.

1.1.4.3 Observed trends in temperature and precipitation

Zimbabwe’s climate has been changing according to meteorological observations taken since the 1900s. Notable changes include an increase in average temperatures, decrease in annual precipitation, change in spatial extent of the country’s Agro-ecological Regions, change in the onset and cessation dates of the rainy season and an increase in the duration of the mid-season dry spell.

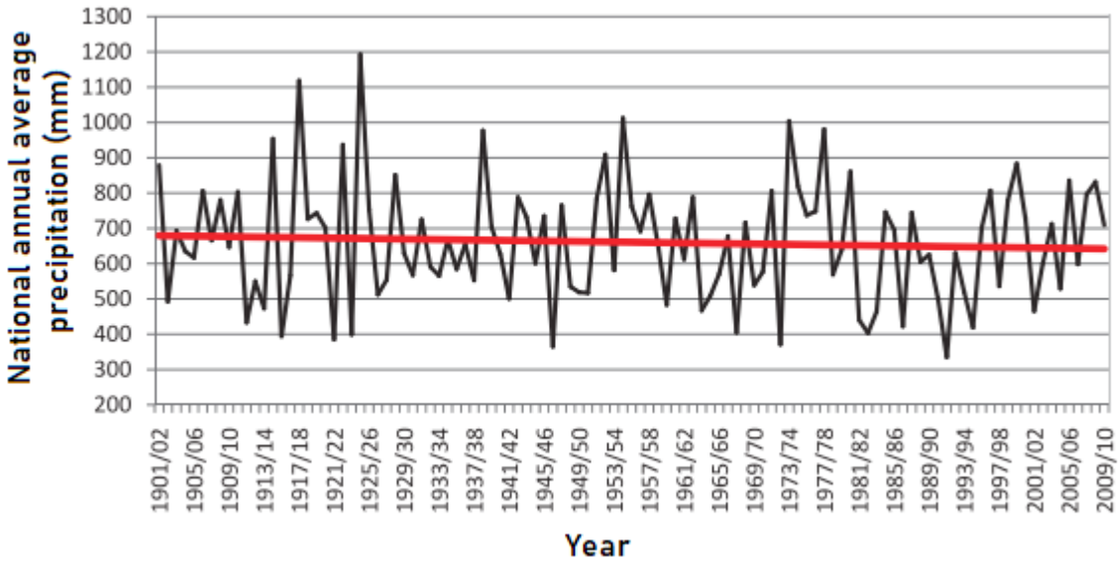

Figure 1.1: Seasonal precipitation trend (Source: Zimbabwe Meteorological Services Department)

1.1.4.4 Seasons

The country experiences four seasons namely:

- Cool season – Mid-May to mid-August
- Hot season – Mid-August to mid-November
- Main rainy season – Mid-November to mid-March
- Post rainy season – Mid-March to mid-May

1.1.4.5 Extreme weather events

The country experiences the following extreme weather events:

- *Tropical cyclones:* These occur from November to April of the following year with a peak in February. Depending on their positions in the Mozambique Channel, they can cause flooding or dry spells in Zimbabwe. Tropical cyclones that affect Zimbabwe emanate form in the South West Indian Ocean Basin and up to nine of these occur every season. Not all of the tropical cyclones that form, however, reach the country. By far the most devastating tropical cyclone in terms of human deaths and infrastructural damage to affect Zimbabwe was tropical cyclone *Idai* of March 2019. In 2000, the country experienced cyclone *Eline,* in 2003 cyclone *Japhet* and in 2017 cyclone *Dineo* which all damaged infrastructure including roads, bridges, power lines, and human settlements.

- *Droughts and dry spells:* The frequency of droughts increased from 10% between 1902 and 1979 to 25% between 1980 and 2018. Major drought seasons that have occurred include 1911/12; 1913/14; 1915/16; 1921/22; 1923/24; 1946/47; 1959/60; 1967/68; 1972/73; 1981/82; 1982/83; 1986/87; 1991/92; 1994/95; 1997/98; 2001/02; 2006/07; 2011/12; 2012/13; 2015/16 (CEDRISA, 2009; Gandure, 2005; Illiffe, 1990; Unganai, 1994; Raftopolous et al., 2000, USAID, 2019). The worst drought to affect the country occurred in the 1991/2 season, with the country receiving a seasonal rainfall total average of only 335mm, a deficit of 327mm when compared with the seasonal normal of 662mm. The main dry spell during the cropping season occurs from the end of December extending to the first or second week of January and is known as the mid-season dry spell. Duration of the dry spell has been increasing.

- *Floods:* Despite the frequency of occurrence of extreme wet events declining from ±20% (1902 to 1979) to ±13% (1980 to 2011) floods occur every year and are usually as a result of intense precipitation, tropical cyclones or dam failure. They are usually confined to low lying areas to the extreme north and south of the country. The areas are shown in Figure 1.2.

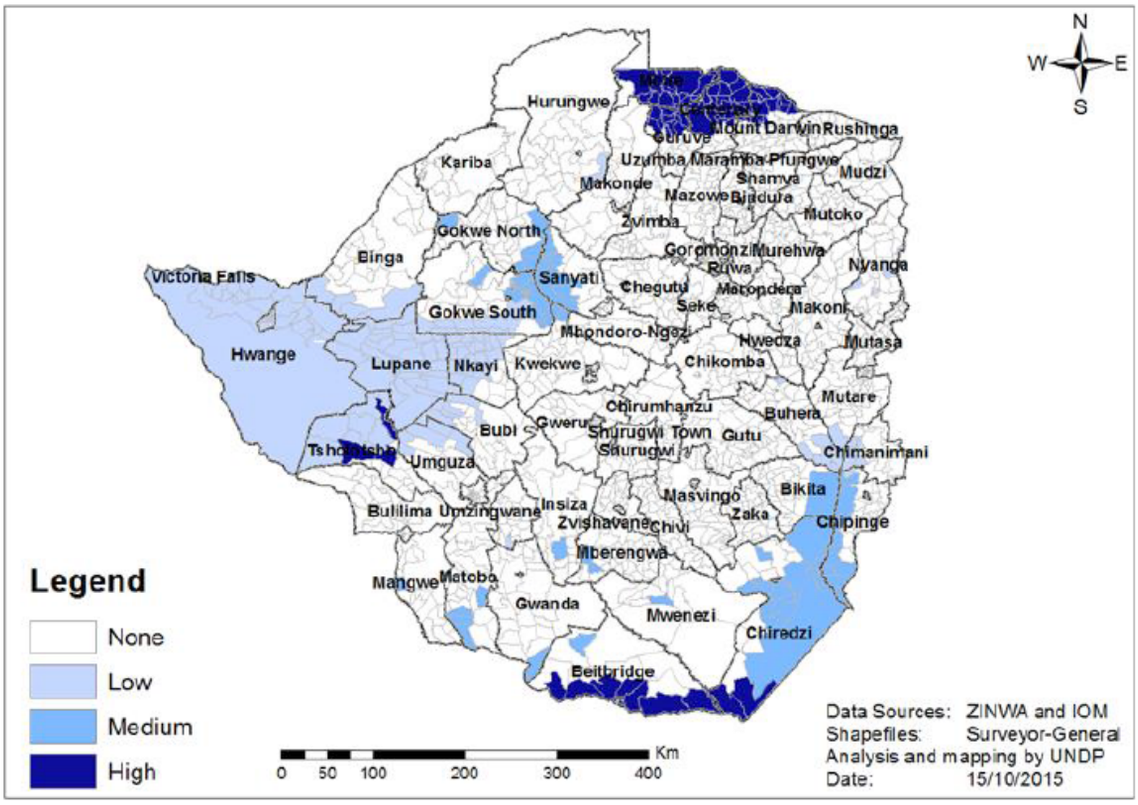

Figure 1.2: Areas prone to flooding in Zimbabwe (Source, ZINWA and IOM)

- *Heat waves:* The highest number of heat wave days (about 3 on average per annum) occurs over the southern areas of the country, notably in the Limpopo basin.

1.1.4.6 Future climate projections

The following projections have been made with respect to Zimbabwe's future climate and extreme weather events:

- *Temperature:* National mean/median annual temperature is projected to warm by 1 to 1.5°C (2020-2040), 1.5 to 2.0°C (2041-2060) and by more than 2°C (2061-2080) for the RCP4.5 scenario. For the RCP8.5 scenario, future warming is projected to be 1 to 1.5°C (2020-2040), 2.0 to 2.5°C (2041 to 2060) and 2.0 to 3.5°C (2061 to 2080).

- *Precipitation:* Future projections of mean national annual precipitation show a decline of up to 10% compared to the 1986-2005 baseline for both RCP4.5 and RCP8.5 scenarios across all three future periods.

- *Droughts and dry spells:* Using an ensemble of hydrological and climate models and the RCP8.5 scenario, droughts over southern Africa are projected to increase in frequency and severity during the 2070 to 2099 period when compared to the 1976 to 2005 reference period.

- *Floods*: Using the RCP4.5 emission scenario, southern Africa is projected to experience future increases in intense extreme precipitation events and more frequent flooding for the periods, 2016–2035, 2046–2065 and 2080 to 2099 when compared to the 1986 to 2005 reference period.

- *Tropical cyclones*: Future projections point to fewer tropical cyclones and an increase in the occurrence of the most intense tropical cyclones by 2100 in the South West Indian Ocean basin as a result of climate change.

1.2 Population Profile

1.2.1 Population size and structure

Zimbabwe's population, according to the 2012 census, was 12 973 808 with males constituting 48 % while females constituted 52%. Zimbabwe's population is fairly young with 40% of the population being below 15 years and those aged 65 years and above constituting 6%.

1.2.2 Population distribution

It is estimated that about 68% of Zimbabwe's population lives in rural areas while urban population constitutes 32%. Harare Metropolitan Province has the largest population of 2 098 199 people which is 16% of the total population while Bulawayo Metropolitan Province has the lowest population of 655 675 people of all the country's 10 provinces.

Other provinces' contribution to the total population is shown in Figure 1.3. The country's population density is 33 persons per square kilometre. Harare has the highest population density of 2 406 per square kilometre, while Matabeleland North has the lowest population density of 10 people per square kilometre.

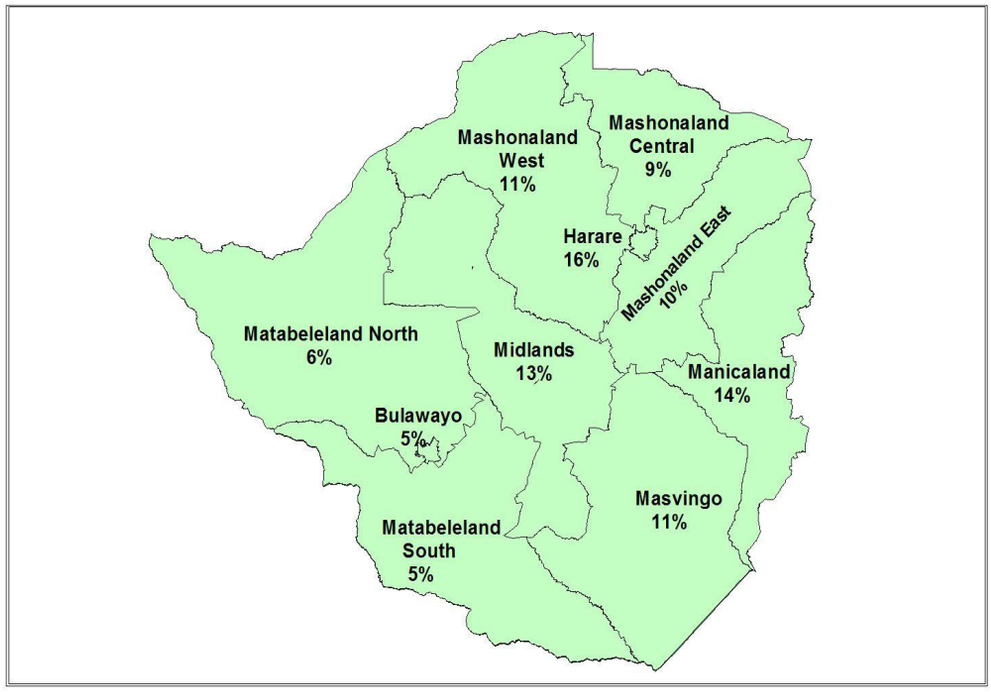

Figure 1.3: **Distribution of the Population by Province, 2012 Census**

1.2.3 Zimbabwe population trends

In 2002 Zimbabwe's population was 11 631 657 while in 2012 it was 12 973 808. This gives a population growth rate of 1.1% between 2002 and 2012.

1.2.4 Development indicators

Table 1.1 shows that between 1990 and 2018, Zimbabwe's Human Development Index (HDI) value increased from 0.498 to 0.563, an increase of 13.2 per cent. Each of the HDI indicators namely life expectancy at birth, mean years of schooling, expected years of schooling also increased in same period. However, Gross National Income (GNI) per capita decreased by about 1.2 per cent between 1990 and 2018.

Table 1.1: Zimbabwe's HDI trends from 1990 to 2018

Year	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2011 PPP$)	HDI
1990	58.1	9.8	4.5	2,693	0.498
1995	50.5	9.8	5.5	2,574	0.472
2000	44.6	9.8	6.5	2,747	0.452
2005	43.2	9.5	6.8	1,853	0.425
2010	50.6	10.1	7.3	1,689	0.472
2015	59.5	10.3	8.3	2,226	0.543
2016	60.3	10.4	8.3	2,246	0.549
2017	60.8	10.5	8.3	2,318	0.553
2018	61.2	10.5	8.3	2,661	0.563

1.3 Economic Profile

Zimbabwe has developed the National Industrial Development Policy (2019-2023) as its blueprint for industrialisation. The policy is aimed at creating a conducive business environment, modernise, industrialize and promote investment. However, the industrial sector has been negatively affected by both external and internal factors. Effects of the 2008 hyperinflation period are still visible in some industries that include the iron and steel, fertilizer and cement. The country's economic recovery is, therefore, underpinned by structural transformation towards industrialisation which is critical for sustained economic growth and development. Table 1.2 shows the GDP trends by industry at constant 2012 prices for the period 2009 to 2018.

Table 1.2: Trend in GDP by industry at constant 2012 prices

Industry	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Agriculture, hunting and fishing and forestry	1174	1259	1277	1377	1341	1650	1564	1503	1654	1957
Mining and quarrying	560	792	985	1064	1188	1148	1153	1200	1242	1350
Manufacturing	1157	2004	2282	2404	2389	2267	2272	2285	2314	2344
Electricity, gas, steam and air conditioning supply	352	420	447	448	471	496	468	460	478	473
Water supply; sewerage, waste management and remediation activities	40	45	43	44	37	36	40	39	41	43
Construction	213	184	305	376	391	418	435	441	458	467
Wholesale and retail trade; repair of motor vehicles and motorcycles	2054	2264	2362	2463	2560	2624	2724	2903	3138	3305
Transportation and storage	559	577	578	615	658	666	698	706	730	748
Accommodation and food service activities	484	534	557	581	603	618	642	692	730	738
Information and communication	657	687	687	733	784	793	832	841	895	920
Financial and insurance activities	899	666	639	1 137	1 088	924	974	1 020	1 052	1 120
Real estate activities	120	128	190	303	305	319	354	400	404	417
Professional, scientific and technical activities	108	242	280	351	362	359	365	398	399	389
Administrative and support service activities	92	133	138	131	137	135	137	144	149	148

Industry	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Public administration and defence; compulsory social security	345	498	910	1 272	1 280	1 396	1 414	1 507	1 524	1 448
Education	359	684	997	1 326	1 509	1 588	1 499	1 335	1 416	1 350
Human health and social work activities	70	132	209	279	305	339	379	401	437	438
Arts, entertainment and recreation	2	3	5	7	7	8	10	12	12	14
Other service activities	102	191	212	189	180	174	166	167	172	195
Domestic Services	22	42	42	41	43	44	45	46	50	49
GDP at Market Prices	**10735**	**12847**	**14670**	**17115**	**17455**	**17870**	**18188**	**18326**	**19188**	**20115**
Population (millions)	12	12	13	13	13	14	14	14	15	15
GDP per capita in US$	**878**	**1041**	**1177**	**1310**	**1306**	**1309**	**1304**	**1285**	**1315**	**1348**

During the period under review the major contributors to GDP were Agriculture, Mining; Hunting and Fishing and Forestry; Manufacturing; and Wholesale and retail trade and repair of motor vehicles and motorcycles. The annual contributions were about 10 per cent for each of the sectors. The population has been growing at a decreasing rate while the GDP per capita has been steadily increasing.

The country's major exports are minerals, which are gold, platinum group metals, chrome, and diamonds. The imports are dominated by mineral fuels, mineral oils and products of their distillation; bituminous substances; and mineral waxes. The country also imports significant volumes of food products; electrical machinery and equipment and parts thereof; and vehicle parts and accessories thereof. Zimbabwe imports all controlled ozone depleting substances (ODS) and ODS substitutes for use.

Government's thrust is to develop and implement policies, strategies and interventions which are conducive for industrial development so as to set the sector on a sustained growth trajectory. The Zimbabwe National Industrial Development Policy is aligned to the Transitional Stabilisation Programme (TSP) (October 2018 – December 2020), which prioritises the stimulation of economic growth and creation of employment.

1.3.1 Mining

There are 13 major minerals which contribute significant income to the fiscus of Zimbabwe (Table 1.3).Overall, mining and quarrying contribution to GDP rose significantly from US$560 million in 2009 to US$1,350 million in 2018. This is attributed to a wide range of emerging mineral resources that include Diamond.

Table 1.3: Contribution of major minerals to national income between 2009 and 2014

Mineral	***Average national income contribution (US$ in '000s)***
Gold	3,213,820
Platinum	2,700,320
Palladium	902,645
Nickel	821,952
Chrome	273,460
Rhodium	226,427
Copper	218,271
Iridium	34,307
Graphite	17,187
Cobalt	16,317
Phosphate	12,396``

Mineral	*Average national income contribution (US$ in '000s)*
Rhuthenium	10,650
Asbestos	3,213
Others	2,967

1.3.2 Energy

Zimbabwe's primary energy sources are biofuels (mainly firewood 61%), coal and petroleum products (36%) and electricity (13%). Fuelwood is the country's major energy source as 68 per cent of the population depend on wood for fuel. The Zimbabwe Electricity Supply Authority (ZESA) is the utility responsible for the generation, transmission and distribution of electricity. Zimbabwe's total energy supply as at 2017 was estimated at 473 689TJ and the respective final consumption was 415 657TJ. The difference is accounted by transformational loses and energy industry own use. ZESA has both hydro and thermal power stations. Kariba is the major hydro power station and is jointly owned by ZESA and Zambia Electricity Supply Company (ZESCO). About 50 per cent of coal produced in the country is used for generation of electricity at the four-utility owned thermal power stations in the country which are Hwange, Munyati, Bulawayo and Harare. The other 50 per cent of the coal produced is used in the other sectors of the economy which are manufacturing, mining, agriculture and commercial and transport sectors. There has been recent increase in solar power uptake. As at 2020 there are two grid tied solar plants in Nyabira (2.25MW Centragrid Power
Station) and Mutoko (2.5MW Riverside Power Station).

To meet the total electricity demand for the nation, ZESA imports some of the electricity from neighbouring countries namely Mozambique, Zambia and South Africa. It also buys electricity from Independent Power Producers (IPPs) in the country. However, the country continues to experience constrained energy supplies, a factor that has adversely affected business and public transport operations. The Government has adopted coping strategies by blending fuel and liberalising the fuel market in order to alleviate the energy shortages.

Most of the energy supplied is mainly for the domestic market, with little exports in the form of coke and electricity. Almost all petroleum products (diesel, gasoline, jet kerosene, other kerosene, LPG, etc.) are imported. Zimbabwe requires 1470 MW of electricity while it generates about 1100 MW, with deficit met by imports as well as load shedding. Independent power producers' contribution is increasing. The prices of petroleum products have a high transport component considering the country is landlocked. Prices of electricity are agreed upon by the utility and IPPs with Zimbabwe Energy Regulatory Authority regulating the market.

Taxes are levied on electricity sold at 6% and the money is channelled to the Rural Energy Fund for increased clean energy access. Carbon taxes are charged on gasoline and diesel. Solar products are exempted from duty as a way of promoting the use of renewable energy technologies. Currently there are no direct subsidies for all energy products. The trade pattern for 2017 energy commodities is shown in Table 1.4. As Zimbabwe aspires to become a middle-income economy by 2030, key development priorities in the energy sector are required. The priorities include renewable energy development (as enunciated in the Renewable Energy Policy) and promoting energy efficiency (Zimbabwe is currently developing the National Energy Efficiency Policy). Zimbabwe is now implementing net metering regulations which will go a long way in promoting solar energy projects development.

Table 1.4: Trade pattern for 2017 energy commodities

Transactions	Commodity (TJ)					
	Primary Coal and Peat	Coal and Peat Products	Oil Products	Biofuels and Waste	Electricity	Total Energy
Primary production	79,071	0	0	333,442	14,288	426,802
Imports	675	0	50,167	0	9,248	60,090
Exports	0	-5,602	0	0	-1,264	-6,866

1.3.3 Transportation

Zimbabwe is predominantly serviced by road transport. Other forms of transport are air, rail and water transport in the inland water bodies such as the Kariba dam and the Zambezi river. Most of the international road routes radiate from Harare, the country's capital city, to neighbouring countries.

The main form of public transport is commuter omnibuses which operate within and between the cities/towns, rural communities as well as linking Zimbabwe to neighbouring states. Zimbabwe is a landlocked country and accesses the sea either by road or rail transport through ports in South Africa, Namibia or Mozambique. Air Zimbabwe has a very limited fleet of aircraft that services domestic and regional routes. It is, however, complemented by foreign airlines.

The country has four road authorities which are Department of Roads, Urban Councils, Rural District Councils and District Development Fund. In the year 2012 the total road network was approximately 81,601 km. The state roads lengths were as follows:

- Department of Roads - 18,000 km
- Urban Councils - 7,975 km
- Rural District Councils - 30,626 km
- District Development Fund - 25,000 km

The Rural District Councils roads and District Development Fund roads are predominantly gravel roads. The country is also connected to a pipeline from Beira in Mozambique to Harare for transportation of petroleum products. The import capacity of the pipeline is 120 million litres per month.

Key developments in the transport sector are the dualization of major roads linking the country with neighbouring countries, revamping of the national railway system, leasing in the aviation sector and promotion of biodiesel and ethanol production. Planned actions include the development of a transport policy.

1.3.4 Industry

Table 1.5 shows the distribution of establishments by industry and province. Most establishments are in the major contributors to GDP industries, which are manufacturing, wholesale and retail trade; repair of motor vehicles and motorcycles, and accommodation and food service activities. Most establishments are found in Harare province and the least number is in Mashonaland Central.

Table 1.5: Distribution of Establishments by Industry and Province

Industrial Classification	Bulawayo	Man	Mash Central	Mash East	Mash West	Mat North	Mat South	Midlands	Masvingo	Harare	Total
Mining and quarrying	8	7	10	0	28	2	14	28	4	21	122
Manufacturing	411	833	338	682	474	279	228	666	739	1,660	6,310
Electricity, gas, steam and air conditioning supply	15	14	7	7	15	7	8	17	10	20	120

Industrial Classification	Bulawayo	Man	Mash Central	Mash East	Mash West	Mat North	Mat South	Midlands	Masvingo	Harare	Total
Water supply; sewerage, waste management and remediation activities	4	2	0	1	0	0	1	0	2	117	127
Construction	76	23	3	6	17	2	1	21	14	91	254
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,832	5,211	2,639	3,973	3,896	2,013	2,809	4,337	4,333	3,226	34,269
Transportation and storage	81	58	2	10	35	21	76	44	21	152	500
Accommodation and food service activities	318	300	171	222	347	184	260	352	245	450	2,849
Information and communication	67	52	17	26	39	19	19	32	29	129	429
Financial and insurance activities	109	152	48	66	114	26	50	105	124	426	1,220
Real estate activities	95	39	6	20	10	32	_	14	23	90	329
Professional, scientific and technical activities	190	69	22	31	83	14	11	77	47	435	979
Administrative and support service activities	116	56	24	44	94	37	23	79	65	199	737
Public administration and defence; compulsory social security	5	13	3	10	22	1	12	16	10	85	177
Education	206	770	554	553	560	580	337	764	590	365	5,279
Human health and social work activities	124	167	107	94	104	62	54	156	84	207	1,159
Arts, entertainment and recreation	34	14	2	7	8	9	3	11	3	50	141
Other service activities	378	248	98	288	433	90	226	307	277	760	3,105
Activity Not Stated	11	7	1	4	1	5	4	0	34	4	71
National	4,080	8,035	4,052	6,044	6,280	3,383	4,136	7,026	6,654	8,487	58,177

Source: ZimStat, 2020

1.3.5 Trade

Zimbabwe's major trading partner is South Africa. Zimbabwe's total imports have decreased from US$ 6.0 billion in 2015 to US$4.8 billion in 2019. There was an increase of total exports from US$3.3 billion in 2015 to about US$4.3billion in 2019. Trade balance was US$2.7 billion in 2013 though by 2019 it had reduced to US$0.5 billion. Table 1.6 shows the summary of external trade for the country.

Table 1.6: Summary of External Trade, US$

Period	Total Imports	Domestic Exports	Re-Exports	Total Exports
2015	6,029,726,909	3,321,399,024	22,991,005	3,344,390,029
2016	5,270,412,573	3,324,341,095	10,338,555	3,334,679,650
2017	5,063,876,441	3,446,056,499	34,495,643	3,480,552,142
2018	6,390,573,528	4,036,758,709	20,596,784	4,057,355,493
2019	4,817,222,159	4,252,090,438	16,922,451	4,269 012,889

1.3.6 Building Stock and Urban Structure

Estimates of housing demand in Zimbabwe range from 1.3 million to 1.5 million housing units. Demand for housing in Zimbabwe is largely driven by rural-urban migration which averages 4.3 per cent per annum. Low cost housing developments have historically been undertaken by municipalities. In recent years, most municipalities in Zimbabwe have not been able to provide new low-cost housing stock due to financial constraints. The government has since opened up housing development to private developers, and as from 2006 there has been an increase in urban housing projects.

Zimbabwe's urbanization increased from about 13 per cent in the 1960s to about 31 per cent in 1992 and to 32 per cent in 2019. This slow growth in urbanisation from the 1990s can be attributed to the poor performance of the industry coupled with the 2000 land reform programme. In addition, new suburbs are developing in peri-urban areas, particularly around cities, exerting pressure on the social service delivery system.

1.3.7 Agriculture

Agriculture is the backbone of Zimbabwe's economy. The sector provides direct and indirect employment to approximately 60-70% of the population, supplies 60% of the industrial raw materials and contributes approximately 40% towards export earnings. The sector also contributes about 15-18% to GDP. Agriculture in Zimbabwe is however mainly rain fed and as such is vulnerable to erratic rainfall, recurrent droughts and flooding. Agriculture uses about 42.1% of total land area, and of this area approximately 365,000 hectares are suitable for irrigated agriculture. However only about 123,000 ha are currently irrigated, mostly by commercial farmers, government and smallholder irrigation projects (CIAT; World Bank. 2017).

In the late 1980s', government took measures to stimulate production through export incentives, introducing the Export Retention Scheme and the Export Revolving Fund and foreign exchange allocations in favour of exporters. In addition, government policy indirectly stimulated export production through the relatively low government-set producer price for maize, which made many commercial farmers diversify into cash crops destined for the more lucrative export markets.

In the early 1990s government embarked on market-oriented reforms aimed at market deregulation, liberalization and export promotion. Controls on domestic prices were removed except for a few commodities. The devaluation of the Zimbabwean dollar also continued to stimulate exports. In the mid-1990s government adopted a comprehensive agricultural policy for the period 1995-2020.

Since independence Zimbabwean government embarked on a series of land reform programmes that sought to reallocate land more equitably. More than 14 million hectares of land were transferred to more than 230,000 households on small-scale (A1) and medium scale (A2) farms (Table 1.7). Zimbabwean agriculture is divided into four major sectors namely; Large Scale Commercial Farms, Small Scale Commercial Farms, Communal Areas and Resettlement Schemes which comprise of the Old Resettlement Schemes, A1 and A2.

Table 1.7: Changes in land holdings over time in Zimbabwe

Land Category	**Area by year (million hectares)**		
	1980	**2000**	**2009**
Communal area	16.4	16.4	16.4
Old Resettlement	0.0	3,5	3.5
New Resettlement A1	0.0	0,0	4.1
New Resettlement A2	0.0	0.0	3.5
Small-scale commercial farms	1.4	1.4	1.4
Large-scale commercial farms	15.5	11.7	3.4
State farms	0.5	0.7	0.7
Urban Land	0.2	0.3	0.3

National Parks and Forest land	5.1	5.1	5.1
Unallocated land	0.0	0.0	0.7

Note: "Old resettlement" refers to areas where land was redistributed in the 1980s
(Source: Kasiyano, 2017)

1.3.7.1 Crop and animal production

Zimbabwe has a diversified agricultural sector, producing food crops, cash crops, and livestock. Over 23 types of food and cash crops are grown. The major food crops produced include maize, small grains, wheat, groundnuts and beans. Tobacco, cotton, tea, coffee, sugarcane, soya beans and horticulture crops are the main cash crops. Tobacco is the major agricultural export commodity. The other agricultural products exported are sugar, coffee, tea and cotton, and in years of surplus, maize. Zimbabwe also exports flowers and other horticultural products. Table 1.8 shows the top five exported agricultural produce from 2001 to 2018. Imports of agricultural products are limited mainly to wheat and maize in drought years. The area with suitable climatic conditions for maize, which is the staple food crop, has decreased and may continue to decrease in future due to climate change.

Table 1.8: Exports of 5 agricultural produce from 2001 to 2018

Crop	**Value exported (USD)**
Tobacco	8,959,851
Cotton	1,848,042
Live trees and cut flowers	1,573,686
Sugar	1,050,452
Vegetables and tubers	684,350

Zimbabwe's agricultural performance has over the years generally declined resulting in the country relying on imports to supplement domestic production. Total maize production is highly variable and follows the performance of the rain season. The historical patterns of maize production are shown in Figure 1.4 and Figure 1.5 shows production trends for 13 crops between 1990 and 2017. Zimbabwe's production of major cash crops has also been declining.

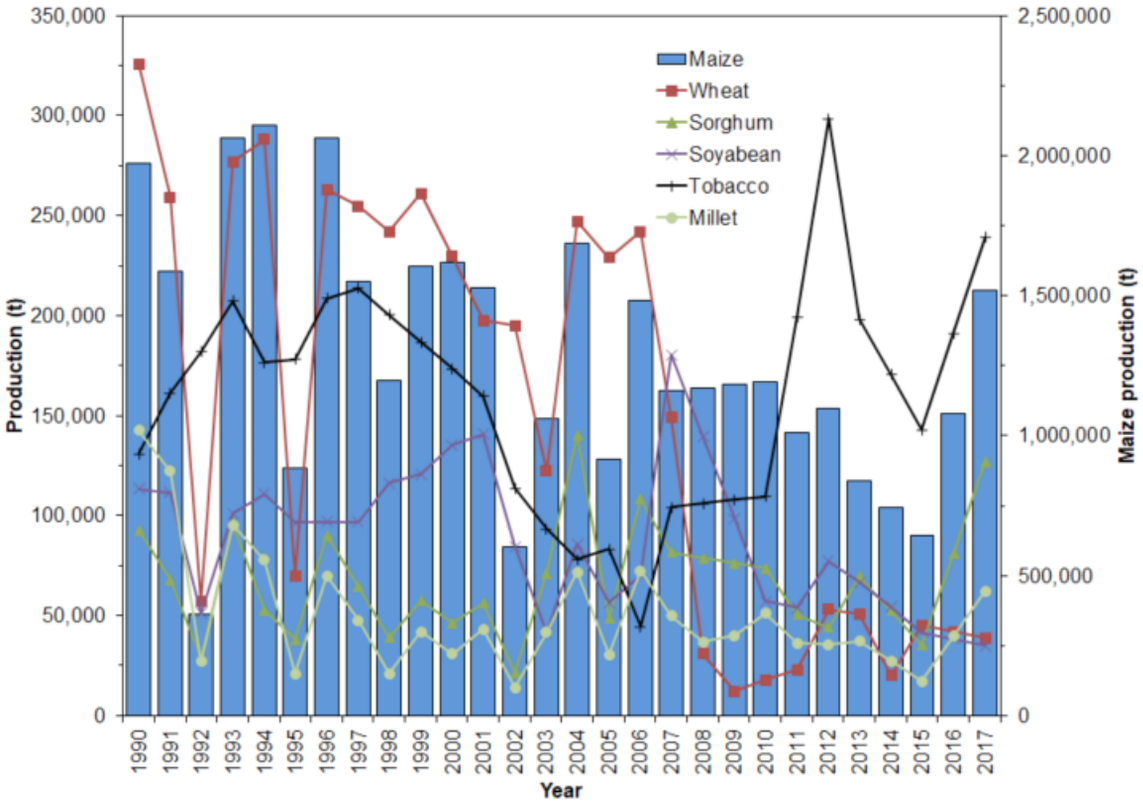

Figure 1.4: **Production levels for maize and other crops in Zimbabwe (Source: ZIMSTAT)**

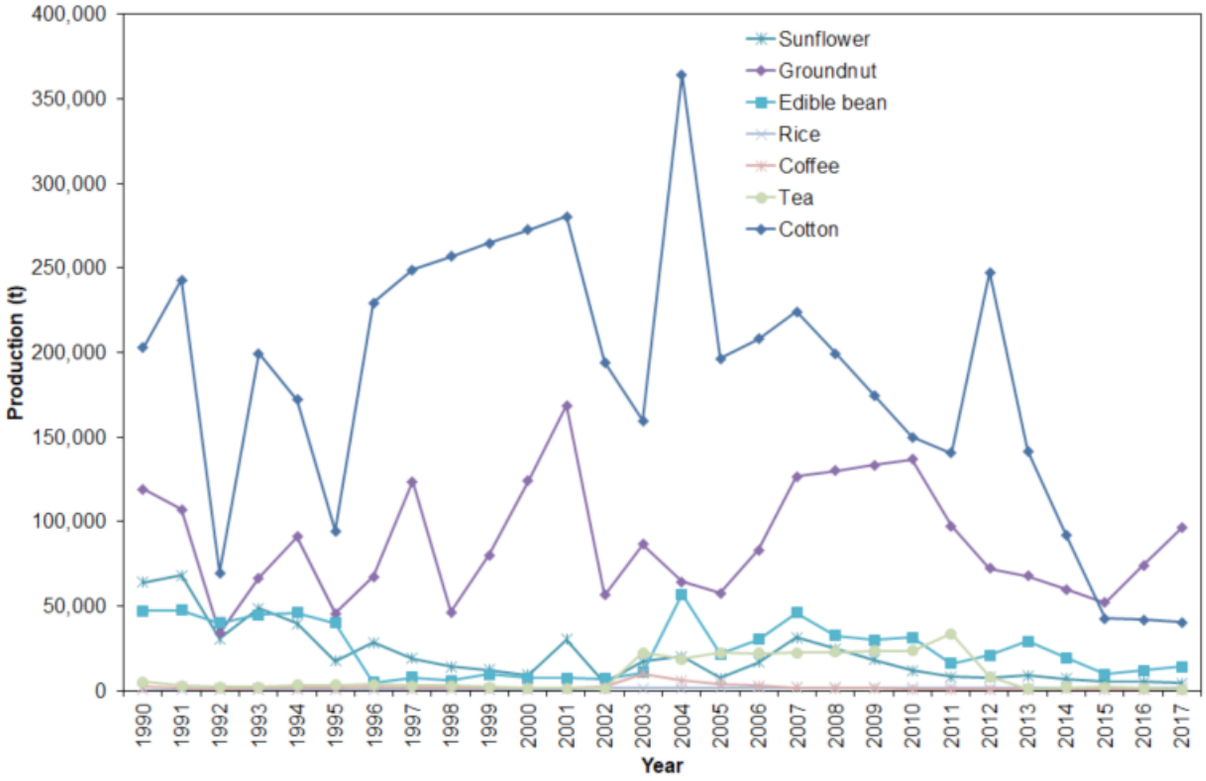

Figure 1.5: Production levels for other crops in Zimbabwe (Source: ZIMSTAT)

The livestock sector mainly consists of beef and dairy cattle, goats, sheep, pigs and poultry**.** The importance of livestock in rural livelihoods and food security lies in the provision of meat, milk, eggs, hides, draught power and manure. They also act as strategic household investment.

Table 1.9: Livestock Production statistics 2001 – 2011

Sector	Year						
	2001	2003	2005	2006	2009	2010	2011
Cattle	6,418,116	5,296,865	5,187,613	4,986,318	5,221,720	5,156,753	5,241,192
Dairy	57,488	42,609	44,000	29,920	25,000	22,000	12,392
Sheep	340,000	515,306	415,901	332,721	470,000	502,205	532,337
Pigs	270,000	183,241	167,775	218,108	280,000	259,091	-
Poultry*	25,400,000	28,200,000	33,400,000	29,079,117	12,883,344	37,523,124	51,600,000

*Day old chicks
(Source: World Bank, 2012)

In Zimbabwe, cattle are the most important of all the livestock species and are owned by 88% of households among smallholder farmers. About 89% of smallholding farmers own poultry, up to 73% of households own goats while up to 11% own sheep. Pigs are owned by less than 10% of households while less than 5% of smallholder households own rabbits. Natural Regions IV and V, which together account for 73.9% of smallholder settlements hold 50-80% of all livestock since these areas are characterised by poor crop performance. Drier, semi-arid areas are the location for goats and sheep while cattle are spread more evenly. Most small ruminants (70%-75%) are found in natural regions IV and V. Matabeleland North, Matabeleland South, Midlands and Masvingo Provinces are the areas most suited for livestock production.

1.3.7.2 Agro-ecological Zones

The country is divided into five Agro-ecological zones, also called Natural Regions on the basis of soil type, rainfall, temperature and vegetation. These zones are shown in Figure 1.6. Regions I and II are suitable for intensive crop and animal production while extensive livestock production and irrigated crops are suitable in regions IV and V (CIAT; World Bank, 2017). Rainfall ranges from 650 mm to above 1 050 mm per annum in regions I to III while in regions IV and V it is below 650 mm per annum (Figure 1.6).

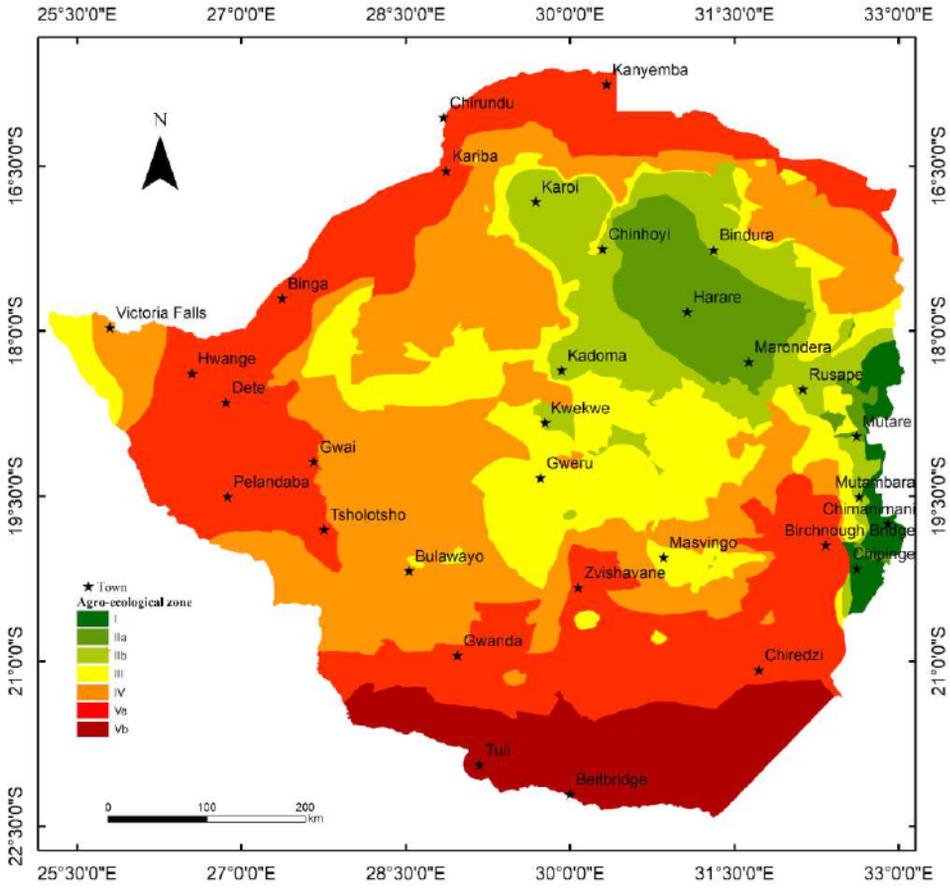

Figure 1.6: Revised Agro-Ecological Zones of Zimbabwe (ZINGSA AEZ, 2020)

1.3.7.3 Agricultural strategies

The country has a number of agricultural strategies, policies and development strategies with the aim of boosting agricultural productivity, improving competitiveness, promoting investment in agriculture and ensuring food and nutrition security. The following is a list of some of the strategies:

- Comprehensive Agricultural Policy Framework (2012- 2032)
- Food and Nutrition Security Policy
- National Agricultural Policy Framework (2018 – 2030)
- National Policy and Programme on Drought Mitigation
- National Drought Plan
- National Nutrition Strategy
- Zimbabwe Agriculture Investment Plan (ZAIP) (2013 – 2018)

1.3.8 Forestry

As of 2017, Zimbabwe's forestry resources covered approximately 45% of the total land area (Table 1.10). Forests generate a wide range of both timber and non-timber products and services. Most of the country is covered by mopane and miombo woodland and savanna. The biggest area of commercial plantations (~108 000ha), mainly eucalypti and pines, is found in Manicaland. Commercial timber harvested from indigenous woodlands in communal lands is mainly teak and mukwa species.

Table 1.10: Zimbabwe land use statistics

Land use	Area(ha) 1992	% of land	Area(ha) 2017	% of land
Natural Forest	20788106,41	53,2	17401762,85	44,6
Wooded grassland	6175828,49	15,8	7965520,5	20,4
Wetland	295172,43	0,8	416615,49	1,1
Settlement	139349,43	0,4	247877,42	0,6
Other land	78520,1	0,2	133643,1	0,3
Grassland	689104,79	1,8	1474990,41	3,8
Forest plantation	155117,49	0,4	179832,26	0,5
Cropland	10737372,16	27,5	11238329,27	28,8
Total	39058571,3		39058571,3	

Source: Forestry Commission

1.3.8.1 Forest cover changes

Between 1990 and 2010, Zimbabwe lost an average of 327,000 hectares of forest per year (Table 1.11). Major drivers of this deforestation include; agricultural expansion, fuelwood gathering, excessive livestock numbers in some places, commercial logging, veld fires, harvesting construction timber, illegal settlements, mining, tobacco curing and charcoal making.

Table 1.11: Trends in Total (Net) Forest cover, 1990 – 2010 for Zimbabwe

Total forest cover				
Year	1990	2000	2005	2010
Area (1000 ha)	22164	18894	17259	15624
Annual change rate (1000 ha) Negative numbers represent deforestation				
Period		1990 - 2000	2000 - 2005	2005 - 2010
Area change (1000 ha)[1]		-327	-327	-327

Notes 1: The area change was averaged since data for other years was not available

1.3.8.2 Export of forest and forest products

The forestry industry contributes between 3 and 5 per cent to the country's GDP. The country mainly exports transmission poles and other forest products to neighbouring countries. In an effort to promote exports, in 2017 the Forestry Commission of Zimbabwe de-centralised issuance of timber movement and export permits to district offices and reduced the cost of export documentation by 50%. The Forestry Commission has also stepped up enforcement of a ban on the exportation of unprocessed and semi-processed indigenous hardwoods, in preference for finished wood products to enhance the country's foreign currency earnings.

1.3.8.3 Forestry management in Zimbabwe

Forestry management is governed by government policies and community level initiatives. The Forestry Commission is the forestry authority in Zimbabwe in terms of the Forest Act. Sustainably managed forests provide essential goods and services and ensure sustenance of livelihoods. Its functions include regulation of the forestry sector, management of gazetted forests, forest research, forestry training and development and implementation of the forest policies. The following are pieces of legislation that influence the management of forest resources in Zimbabwe, and each has provisions pertaining to forests:

- Land Apportionment Act
- Native Land Husbandry Act 1952
- Forest Act (Chapter 19: 05 as amended in 1999)

- Communal Lands Forest Produce Act (No. 20 of 1987)
- Communal Lands Act (1985)
- Rural District Councils Act 1988
- Land Acquisition Act 1993
- National Parks and Wildlife Management Act (1975 and amended 1982)
- Environmental Management Act Cap 20:27
- Traditional Leaders Act, 2000

In communal areas, management practices include:

- Afforestation and reforestation by communities, CSOs, schools and government departments and agencies.
- The sharing of benefits between Government and local communities to ensure conservation of existing forests. Examples are the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) and Reducing Emissions from Deforestation and Forest Degradation (REDD+) programmes.
- Cultural practices which include rules, beliefs and taboos regarding the general use and harvesting of trees and other natural resources.

1.3.9 Waste

Zimbabwe produces an average of 2.5 million tonnes per year of solid waste. The per capita waste generation rate tends to be higher in high income areas than in low income areas. Significant population increases have led to large increases in solid waste generation over the years. The amount of waste generated per person per year is increasing. In 2005, generation rates were 0.5kg per capita per day and by 2025 the country is expected to generate 0.7kg per capita per day.

Major solid waste types in Zimbabwe include food waste, paper and card board, plastics, glass, ceramics, metals, textiles, rubber and leather. The bulk of solid waste generated in residential areas comprises organic matter.

Zimbabwe urban local authorities are experiencing major challenges in managing solid waste due to population growth, urbanization, industrialisation and increased use of non-biodegradable plastics and bottles. Waste disposal methods often employed include open dumping, burning and landfilling with open dumping being the most common in Zimbabwe urban environments.

1.4 Development Priorities and Objectives

The Transitional Stabilisation Programme (TSP) was a government blue print that drew its policy thrust from Vision 2030. The TSP focused on:

- Stabilising the macro-economy, and the financial sector.
- Introducing necessary policy, and institutional reforms, to transform to a private sector led economy.
- Addressing infrastructure gaps.
- Launching quick-wins to stimulate growth.

The Programme sought to prioritise quick-wins, and provide the necessary prelude to the two Five Year Development Strategies that will run from 2021-2030.

The country has committed itself to implementing the SDGs guided by national development priorities. The SDGs were mainstreamed and integrated into national development plans. In response to SDG 9, major infrastructure projects have been launched in the areas of utilities, transportation, telecommunication connectivity, and industrial zones. Some of the key initiatives included rehabilitation of water and sewerage infrastructure in urban centres, expansion of the Kariba South power station, the Emergency Power Infrastructure Rehabilitation Project to rehabilitate power transmission and distribution systems, as well as the rehabilitation of the Ash plant at Hwange thermal power station.

1.4.1 Priorities Related to Mitigation of Climate Change

Zimbabwe's GHG emissions are very low (< 0.05% of global total) and the country has high carbon sequestration potential given its vast forestry resources. According to Zimbabwe's TNC, the energy and agriculture sectors are the major sources of GHG emissions. The Industrial Processes and Waste sectors contributed the remaining 8%.

Although all sectors are important for Zimbabwe's development, the energy, agriculture and manufacturing industry are key sectors. Priority policies and regulations for these sectors are as follows:

1. Energy:
    - Renewable Energy Policy launched in March (2019)
    - Low Emission Development Strategy (LEDS) (2020)
    - Introduction of duty on kerosene
    - Banning of incandescent lights
    - Removal of duty on solar equipment
    - Regulations to installations of solar geysers on new buildings
    - Prepaid meters for demand side electricity management
    - National Energy Efficiency Policy (draft)
    - Biofuels Policy (2019)

2. Industry
    - National Industrial Development Policy (2019-2023)
    - Zimbabwe Motor Industry Development Policy (ZMIDP) (2018-2030)

3. Agriculture
    - Climate Smart Agriculture Policy Framework
    - National Agriculture Policy Framework

1.4.2 Mitigation legislation

A number of policies and other legislation support mitigation actions particularly in the energy sector and these include:

- Renewable Energy Policy (2019)
- National Climate Policy (2017)
- National Climate Change Response Strategy (2014)
- Low Emission Development Strategy (2020-2050)
- Bio-fuels Policy (2019)
- Environmental Policy and Strategies (2009)
- Energy Policy (2012)
- National Transport Master Plan (2017)
- Forest Policy (under development)

1.4.3 Zimbabwe's Nationally Determined Contributions (NDCs)

Since the energy sector produces more emissions in comparison with other sectors, the mitigation focus of Zimbabwe's NDCs is largely on this sector. The emission reduction target for Zimbabwe is 33 per cent per capita below the projected Business as Usual energy emissions by 2030. Emission reduction targets are envisaged to be achieved through renewable energy development and energy efficiency improvement.

1.4.4 Low Emission Development Strategy (LEDS) (2020-2050)

The Government of Zimbabwe has adopted a LEDS to promote low carbon development pathways in all sectors of the economy.

1.4.5 Constraints and barriers to implementing mitigation priorities

Barriers are generally sector specific. In all sectors the following are some identified barriers:

- Inadequate skilled personnel
- Limited financial resources
- Low uptake of new technologies
- Weak institutional arrangements
- COVID-19

1.5 Institutional Arrangements for Climate Change Management in Zimbabwe

1.5.1 Government structure relevant to MRV

The High-Level Committee in the Office of the President and Cabinet (OPC) is responsible for oversight of all climate change activities at national level. The committee comprises permanent secretaries for all government ministries and is chaired by the OPC. The Ministry of Environment, Climate, Tourism and Hospitality Industry, through the CCMD, is mandated with coordinating and implementing national climate change programmes. The Department is responsible for the development of the National Communications and BURs and is supported by a multi-sectoral National Climate Change Committee for sector-specific and cross-sector implementation, coordination, advice and guidance. Figure 1.7 illustrates the institutional arrangement relevant to National Communications and Biennial Update Reporting in Zimbabwe.

1.5.2 Overall description of MRV

There is no integrated MRV system in operation as yet.

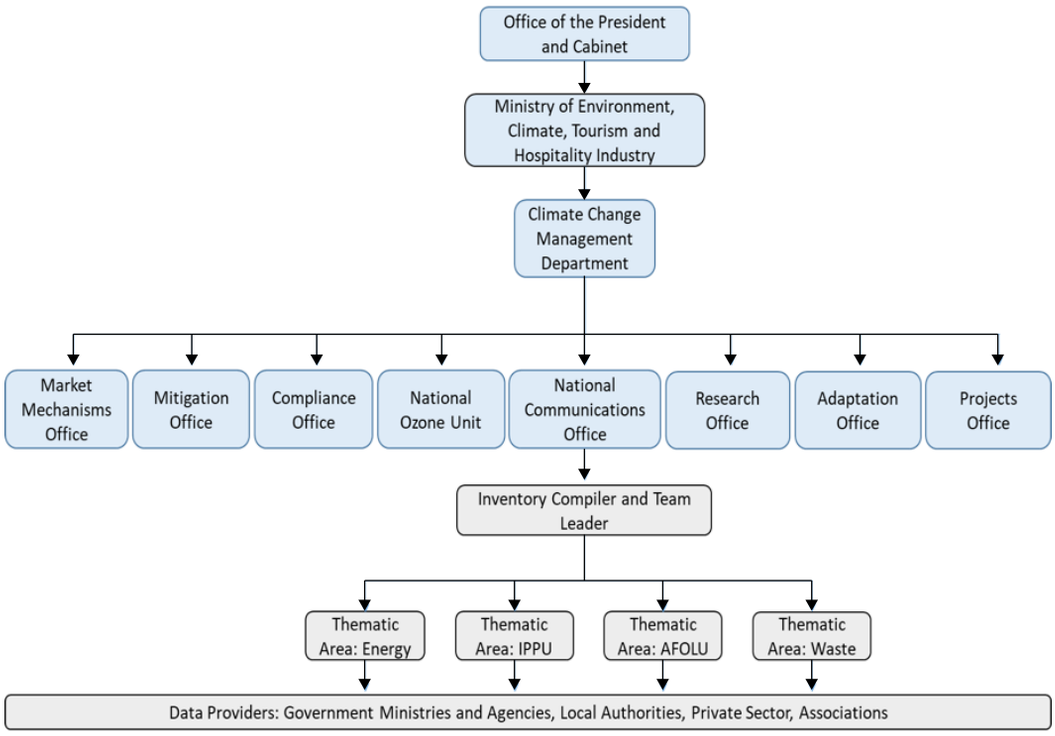

Figure 1.7: **Institutional arrangements for Zimbabwe NC and BUR**

1.5.3 GHG Inventory System

The GHG Inventory System is currently under development. The elements that are already in place include:

- The designation of a focal point to the UNFCCC.
- Appointment of the coordinator of the NC and BUR.
- Team leader of the GHG Inventory appointed. Sectoral experts engaged.

- Stakeholder mapping has been done; Focal points in government and the private sector have been identified – formalization of working arrangements is still pending.
- A Greenhouse gas emissions database has been designed.

1.5.4 MRV of Mitigation Actions

The coordination of the MRV for mitigation is linked to the coordination of the MRV of the GHG Inventory. An MRV for the NDCs was developed focusing on solar water pumping systems. The Solar Irrigation method is established to assist the Government of Zimbabwe in its NDC implementation framework including its monitoring, towards preparing and building a robust measurement, reporting and verification (MRV) framework. Table 1.12 indicates institutions, their roles and level of formalization in place.

Table 1.12: Status of key institutions involved in MRV for solar water pumping systems for irrigation

Institution	Role	Legal status
Climate Change Management Department	NDC and LEDS MRV coordination	Mandated by Government to coordinate climate change issues
Ministry of Lands, Agriculture, Water and Rural Resettlement	Implementing agency	MoU not yet in place
Ministry of Energy and Power Development - Zimbabwe Energy Regulatory Authority	Data Collection	MoU not yet in place

In the LEDS, a draft framework for MRV of the mitigation actions identified in the LEDS was developed including tables and protocols by sector.

1.5.5 MRV for support needed and support received

An MRV for support needed and support received is not yet in place. The Ministry of Finance and Economic Development as the Aid Coordination Agency is in the process of developing the Development Projects Management Information System (DevProMIS) in which information on and tracking of support received will be imbedded.

2 The National GHG Inventory

2.1 Inventory overview

The GHG inventory for Zimbabwe covers all the four IPCC sectors, namely: Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land-Use (AFOLU) and Waste. The inventory was compiled using the methods provided in the 2006 IPCC Guidelines.

Zimbabwe's GHG inventory reported in BUR1 is for the calendar year 2017 and this was the most recent year in which data is available. The emissions trend covers the period 2000 to 2017, which is the period with data available for all the sectors. Zimbabwe's last GHG inventory, reported in the Third National Communication (TNC), was submitted to the UNFCCC in 2016 and covered the period 2000 to 2012, with 2006 being the reporting year. The main gases covered are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Total GHG emissions with FOLU were 37,786.59 CO_2eq and AFOLU accounted for 61.46% of the total GHG emissions, followed by Energy with 35.17%.

2.2 Methodology and data sources

The GHG emissions by sources and removals by sinks were compiled using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The details of source/sink categories covered and methodologies are presented in Table 2.1. Processed data and information were entered into the IPCC Greenhouse Gas Inventory Software (Version 2.691 of January 2020) for both computation of the inventory and archiving data. From the Initial National Communication (1998) to the TNC (2016), Zimbabwe reported its GHG inventory largely using the Revised 1996 IPCC Guidelines. For the first time, the country has reported its GHG inventory in all sectors using the 2006 IPCC Guidelines.

With the exception of the category, Cement Production (2.A.1), Tier 1 methodological approach was used in the computation of the entire inventory largely due lack of disaggregation of available data and lack of country specific emission factors. The activity data and their uncertainty levels were provided by government agencies, respective government departments under each sector, local authorities, individual private companies and other sources indicated in Table 2.1. Default IPCC Emission Factors were obtained from the 2006 IPCC Guidelines and the online IPCC Emission Factor Database. For computation of carbon dioxide equivalents, Global Warming Potential (GWP) of CO_2, CH_4 and N_2O were obtained from the IPCC Second Assessment Report (SAR). The TNC used the AR4 GWPs.

To improve on the Transparency, Accuracy, Completeness, Comparability and Consistency (TACCC) Principles, all procedures on selection of activity data and emission factors were peer reviewed and documented. The IPCC approved methodologies for data gap filling, including interpolation and extrapolation were used. Comparison of the inventory software output with other computations from international sources such as FAOSTAT and IEA, was done and in the case where the differences were significant investigations were carried out and documented. Capacity building workshops for both inventory compilers and data providers were held to improve the inventory. Workshops were also held to go through the data and methods used. The BUR1 compilation process also benefited from international review of the Third National Communication by experts from the UNFCCC/IPCC. Recommendations from the review were used to improve on the quality of the inventory.

Table 2.1: Summary of methods and data sources used in compiling the national GHG inventory.

Source and Sink Category		*Carbon dioxide (CO_2)*				*Methane (CH_4)*				*Nitrous oxide (N_2O)*			
M		*AD*	*CF*	*EF*	*M*	*AD*	*CF*	*EF*	*M*	*AD*	*CF*	*EF*	
1	ENERGY												
1.A	Fuel Combustion Activities												

Source and Sink Category M		Carbon dioxide (CO_2)				Methane (CH_4)				Nitrous oxide (N_2O)			
		AD	CF	EF	M	AD	CF	EF	M	AD	CF	EF	
1.A.1	Energy Industries	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC
1.A.2	Manufacturing Industries and Construction	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC
1.A.3	Transport	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC
1.A.4	Other Sectors	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC
1.A.5	Non-Specified	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC	T1	MoEPD	IPCC	IPCC
1.B	**Fugitive emissions from fuels**												
1.B.1	Solid Fuels	NE	NE	NE	NE	T1	MoEPD	IPCC	IPCC	NO	NO	NO	NO
1.B.2	Oil and Natural Gas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1.B.3	Other emissions from Energy Production	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
1.C	**Carbon dioxide Transport and Storage**	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1.C.1	Transport of CO_2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1.C.2	Injection and Storage	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1.C.3	Other												
2	**Industrial Processes and Product Use**												
2.A	**Mineral Industry**												
2.A.1	Cement production	T2	CP		IPCC								
2.A.2	Lime production	NE	NE		NE								
2.A.3	Glass Production	T1	GP		IPCC								
2.A.4	Other Process Uses of Carbonates	T1	ZIMSTAT		IPCC								
2.A.5	Other (please specify)												
2.B	**Chemical Industry**												
2.B.1	Ammonia Production					NO	NO		NO				
2.B.2	Nitric Acid Production									T1	NAPr		IPCC
2.B.3	Adipic Acid Production									NO	NO		NO
2.B.4	Caprolactam, Glyoxal and Glyoxylic Acid Production									NO	NO		NO
2.B.5	Carbide Production	NO	NO		NO	NO	NO		NO				
2.B.6	Titanium Dioxide Production	NO	NO		NO								
2.B.7	Soda Ash Production	NO	NO		NO								
2.B.8	Petrochemical and Carbon Black Production	NO	NO		NO								
2.B.9	Fluorochemical Production												
2.B.10	Other (Please specify)												
2.C	**Metal Industry**												
2.C.1	Iron and Steel Production	T1	ISP		IPCC	T1	ISP		IPCC				
2.C.2	Ferroalloys Production	T1	Chamber Mines, USGS, MMCZ		IPCC								
2.C.3	Aluminium production	NO	NO		NO	NO **(PFCs)**	NO		NO				
2.C.4	Magnesium production	NO	NO		NO								

Source and Sink Category M		Carbon dioxide (CO_2)				Methane (CH_4)				Nitrous oxide (N_2O)			
		AD	CF	EF	M	AD	CF	EF	M	AD	CF	EF	
2.C.5	Lead Production	T1	Lead Producers		IPCC								
2.C.6	Zinc Production	NO	NO		NO								
2.C.7	Other (please specify)												
2.D	**Non-Energy Products from Fuels and Solvent Use**												
2.D.1	Lubricant Use	T1	ZIMSTAT		IPCC								
2.D.2	Paraffin Wax Use	T1	ZIMSTAT		IPCC								
2.D.3	Solvent Use	NE	NE		NE								
2.D.4	Other (please specify)												
2.E	**Electronics Industry**												
2.E.1	Integrated Circuit or Semiconductor												
2.E.2	TFT Flat Panel Display												
2.E.3	Photovoltaics												
2.E.4	Heat Transfer Fluid												
2.E.5	Other (please specify)												
2.F	**Product Uses as Substitutes for Ozone Depleting Substances**	**HFCs**				**PFC**				**SF_6**			
2.F.1	Refrigeration and Air Conditioning	NE	NE		NE								
2.F.2	Foam Blowing Agents	NE	NE		NE								
2.F.3	Fire Protection	NE	NE		NE	NE	NE		NE				
2.F.4	Aerosols	NE	NE		NE	NE	NE		NE				
2.F.5	Solvents	NE	NE		NE	NE	NE		NE				
2.F.6	Other Applications (please specify)												
2.G	**Other Product Manufacture and Use**												
2.G.1	Electrical Equipment												
2.G.2	SF6 and PFCs from Other Product Uses					NE **(PFCs)**	NE		NE	NE **(SF_6)**	NE		NE
2.G.3	N2O from Product Uses									NE **(N_2O)**	NE		NE
2.G.4	Other (Please specify)												
2.H	**Other**												
2.H.1	Pulp and Paper Industry												
2.H.2	Food and Beverages Industry												
2.H.3	Other (please specify)												
3	**Agriculture, Forestry, and Other Land Use**												
3.A	**Livestock**												
3.A.1	Enteric Fermentation					T1	ZIMSTAT	CS	IPCC				
3.A.2	Manure Management					T1	ZIMSTAT	CS IPCC	IPCC	T1	ZIMSTAT	CS	IPCC
3.B	**Land**												

Source and Sink Category M		Carbon dioxide (CO_2)				Methane (CH_4)				Nitrous oxide (N_2O)			
		AD	CF	EF	M	AD	CF	EF	M	AD	CF	EF	
3.B.1	Forest land	T1	F.COM	CS	IPCC								
3.B.2	Cropland	T1	F.COM ZIMSTAT	CS	IPCC								
3.B.3	Grassland	T1	F.COM	CS	IPCC								
3.B.4	Wetlands	T1	F.COM	CS	IPCC								
3.B.5	Settlements	T1	F.COM	CS	IPCC								
3.B.6	Other Land	T1	F.COM	CS	IPCC								
3.C	**Aggregate sources and non-CO2 emissions sources on land**												
3.C.1	Emissions from biomass burning	T1	EMA ZIMSTAT	CS	IPCC								
3.C.2	Liming	T1	ZIMSTAT	CS	IPCC								
3.C.3	Urea application	T1	ZIMSTAT	CS	IPCC								
3.C.4	Direct N2O Emissions from managed soils									T1	ZIMSTAT	CS	IPCC
3.C.5	Indirect N2O Emissions from managed soils									T1	ZIMSTAT	CS	IPCC
3.C.6	Indirect N2O Emissions from manure management									T1	ZIMSTAT	CS	IPCC
3.C.7	Rice cultivation					T1	FAO	IPCC	IPCC				
3.C.8	Other (please specify)												
3.D	**Other**												
3.D.1	Harvested Wood Products	T1	FAO	CS	IPCC								
3.D.2	Other (please specify)												
4	**Waste**												
	4.A Solid Waste Disposal					T1	ZIMSTAT, EMA, UNEP, FAO, WB,LA						
4.B	**Biological Treatment of Solid Waste**					T1	ZIMSTAT		D	T1	ZIM-STATZIM-STAT		D
4.C	**Incineration and Open Burning of Waste**	T1	ZIMSTAT		D	T1	ZIMSTAT		D	T1	ZIM-STATZIM-STAT		D
4.D	**Wastewater Treatment and Discharge**					T1	LA		D	T1	LA,FAO		D
4.E	**Other (please specify)**												
5	**Other**												
5.A	**Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3**												
5.B	**Other (please specify)**												
	Memo Items (5)												
	International Bunkers												
1.A.3.a.i	International Aviation (International Bunkers)	T1	IEA	IEA	D	T1	IEA	IEA	D	T1	IEA	IEA	D

Source and Sink Category M		Carbon dioxide (CO_2)				Methane (CH_4)				Nitrous oxide (N_2O)			
		AD	CF	EF	M	AD	CF	EF	M	AD	CF	EF	
1.A.3.d.i	International water-borne navigation (International bunkers)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
1.A.5.c	**Multilateral Operations**												

T1 *= IPCC Tier 1 methodological approach;* ***AD*** *= Activity Data;* ***CF*** *= Conversion Factor;* ***EF*** *= Emission Factor;* ***F. COM*** *= Forestry Commission;* ***USGS****=United States Geological Survey;* ***MMCZ*** *= Minerals Marketing Corporation of Zimbabwe;* ZIMSTAT***ZIMSTAT*** *= Zimbabwe National Statistics Agency;* ***EMA*** *= Environmental Management Agency;* ***MoEPD*** *= Ministry of Energy and Power Development;* ***CP*** *= Cement Producers;* ***GP*** *= Glass Producers;* ***NAPr*** *= Nitric Acid Producers;* ***ISP*** *= Iron and Steel Producers;* ***CS*** *= Country Specific;* ***D*** *= IPCC Default;* ***LA*** *= Local Authority;* ***IEA*** *= International Energy Agency;* ***FAO*** *= Food and Agriculture Organisation of the United Nations, WB = World-Bank;* ***NE*** *= Not estimated;* ***NO*** *= Not occurring;* ***NA****: Not Applicable*

2.3 GHG emissions/removals and trends

Table 2.2 shows the national GHG inventory for Zimbabwe by gas for the calendar year 2017, while Figures 2.1 and 2.2 show emission trends by gas and by sector, respectively for the period 2000 to 2017.

Table 2.2: National GHG Inventory 2017

Categories	Emissions (Gg)					
	Net CO_2	CH_4	N_2O	HFCs	NO_x	CO
Total National Emissions and Removals	**23,396.84**	**531.85**	**10.39**	**NE**	**47.17**	**2,625.68**
1 - Energy	**9,415.46**	**149.86**	**2.34**	**NE**	**NE**	**NE**
1.A - Fuel Combustion Activities	9415.46	149.85	2.34		NE	NE
1.B - Fugitive emissions from fuels	0.00	0.01	0.00		NA	NA
1.C - Carbon dioxide Transport and Storage	0.00				NO	NO
2 - Industrial Processes and Product Use	**630.50**	**0.00**	**0.26**	**NE**	**0.00**	**0.00**
2.A - Mineral Industry	380.92	0.00	0.00		NE	NE
2.B - Chemical Industry	0.00	0.00	0.26		NE	NE
2.C - Metal Industry	237.80	0.00	0.00		NE	NE
2.D - Non-Energy Products from Fuels and Solvent Use	11.78	0.00	0.00		NE	NE
2.E - Electronics Industry	0.00	0.00	0.00		NE	NE
2.F - Product Uses as Substitutes for Ozone Depleting Substances					NE	NE
2.G - Other Product Manufacture and Use	0.00	0.00	0.00		NE	NE
2.H - Other	0.00	0.00	0.00		NE	NE
3 - Agriculture, Forestry, and Other Land Use	**13,350.88**	**357.22**	**7.65**	**NE**	**47.17**	**2,625.68**
3.A - Livestock		192.83	0.01		NE	NE
3.B - Land	13,376.34		0.00		NE	NE
3.C - Aggregate sources and non-CO_2 emissions sources on land	25.08	164.39	7.64		47.17	2,625.68
3.D - Other	-50.53	0.00	0.00		NE	NE
4 - Waste	0.00	24.77	0.15	NE	0.00	0.00
4.A - Solid Waste Disposal		24.45			NE	NE
4.B - Biological Treatment of Solid Waste		0.03	0.00		NE	NE
4.C - Incineration and Open Burning of Waste	0.00	0.00	0.00		NE	NE

Categories	Emissions (Gg)					
	Net CO_2	CH_4	N_2O	HFCs	NO_x	CO
4.D - Wastewater Treatment and Discharge		0.29	0.14		NE	NE
4.E - Other (please specify)	0.00	0.00	0.00		NE	NE
5 - Other	0.00	0.00	0.00	NE	NE	NE
5.A - Indirect N_2O emissions from the atmospheric deposition of nitrogen in NO_x and NH_3			0.00		NE	NE
5.B - Other (please specify)	0.00	0.00	0.00		NE	NE
Memo Items (5)						
International Bunkers	140.20	0.00	0.00	NE	NE	NE
1.A.3.a.i - International Aviation (International Bunkers)	140.20	0.00	0.00		NE	NE
1.A.3.d.i - International water-borne navigation (International bunkers)	0.00	0.00	0.00		NE	NE
1.A.5.c - Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Information Items						
CO_2 from Biomass Combustion for Energy Production	49566.87					

Key
***NO**: Not occurring; **NE**: Not estimated*;

The total GHG emission in 2017 including FOLU were 37,786.59CO_2eq as shown in Table 2.3 while total GHG emissions without AFOLU are shown in Table 2.4

Table 2.3: Total GHG emissions and removals with FOLU

	Net CO_2	CH_4	N_2O	Total	% Contribution
1 - Energy	9,415.46	3,147.06	725.40	13,287.92	35.17%
1.A - Fuel Combustion Activities	9,415.46	3,146.85	725.40	13,287.71	35.17%
1.B - Fugitive emissions from fuels	0.00	0.21	0.00	0.21	0.00%
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00	0.00%
2 - Industrial Processes and Product Use	630.50	0.00	80.60	711.10	1.88%
2.A - Mineral Industry	380.92	0.00	0.00	380.92	1.01%
2.B - Chemical Industry	0.00	0.00	80.60	80.60	0.21%
2.C - Metal Industry	237.80	0.00	0.00	237.80	0.63%
2.D - Non-Energy Products from Fuels and Solvent Use	11.78	0.00	0.00	11.78	0.03%
2.E - Electronics Industry	0.00	0.00	0.00	0.00	0.00%
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	0.00	0.00%
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00	0.00%
2.H - Other	0.00	0.00	0.00	0.00	0.00%
3 - Agriculture, Forestry, and Other Land Use	13,350.89	7,501.62	2,371.50	23,224.01	61.46%
3.A - Livestock	0.00	4,049.43	3.10	4,052.53	10.72%
3.B - Land	13,376.34	0.00	0.00	13,376.34	35.40%
3.C - Aggregate sources and non-CO2 emissions sources on land	25.08	3,452.19	2,368.40	5,845.67	15.47%
3.D - Other	-50.53	0.00	0.00	-50.53	-0.13%

	Net CO_2	CH_4	N_2O	Total	% Contribution
4 - Waste	0.00	520.17	43.40	563.57	1.49%
4.A - Solid Waste Disposal	0.00	513.45	0.00	513.45	1.36%
4.B - Biological Treatment of Solid Waste	0.00	0.63	0.00	0.63	0.00%
4.C - Incineration and Open Burning of Waste	0.00	0.00	0.00	0.00	0.00%
4.D - Wastewater Treatment and Discharge	0.00	6.09	43.40	49.49	0.13%
4.E - Other (please specify)	0.00	0.00	0.00	0.00	0.00%
Total National Emissions and Removals	23,396.84	11,168.85	3,220.90	37,786.59	100.00%

Table 2.4: Total GHG emissions in CO_2eq

	Net CO_2	CH_4	N_2O	Total	% Contribution
1 - Energy	9,415.46	3,147.06	725.4	13,287.92	71.38%
1.A - Fuel Combustion Activities	9,415.46	3,146.85	725.4	13,287.71	71.38%
1.B - Fugitive emissions from fuels	0	0.21	0	0.21	0.00%
1.C - Carbon dioxide Transport and Storage	0	0	0	0	0.00%
2 - Industrial Processes and Product Use	630.5	0	80.6	711.1	3.82%
2.A - Mineral Industry	380.92	0	0	380.92	2.05%
2.B - Chemical Industry	0	0	80.6	80.6	0.43%
2.C - Metal Industry	237.8	0	0	237.8	1.28%
2.D - Non-Energy Products from Fuels and Solvent Use	11.78	0	0	11.78	0.06%
2.E - Electronics Industry	0	0	0	0	0.00%
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0	0	0	0	0.00%
2.G - Other Product Manufacture and Use	0	0	0	0	0.00%
2.H - Other	0	0	0	0	0.00%
3 - Agriculture,	0	4,049.43	3.1	4,052.53	21.77%
3.A - Livestock	0	4,049.43	3.1	4,052.53	21.77%
4 - Waste	0	520.17	43.4	563.57	3.03%
4.A - Solid Waste Disposal	0	513.45	0	513.45	2.76%
4.B - Biological Treatment of Solid Waste	0	0.63	0	0.63	0.00%
4.C - Incineration and Open Burning of Waste	0	0	0	0	0.00%
4.D - Wastewater Treatment and Discharge	0	6.09	43.4	49.49	0.27%
4.E - Other (please specify)	0	0	0	0	0.00%
5 - Other	0	0	0	0	0.00%
Total National Emissions and Removals	10,045.96	7,716.66	852.5	18,615.12	100.00%

During the period 2000 – 2009, GHG emissions marginally increased from 17,000 Gg CO_2eq in 2000 to around 22,000 Gg CO_2eq in 2002, and declined steadily to around 12,000 Gg CO_2eq in 2009. After 2009 the emissions increased rapidly to year 2015 (45,000 Gg CO_2eq) largely due to significant increase in the emissions of CO_2 (Figure 2.8).

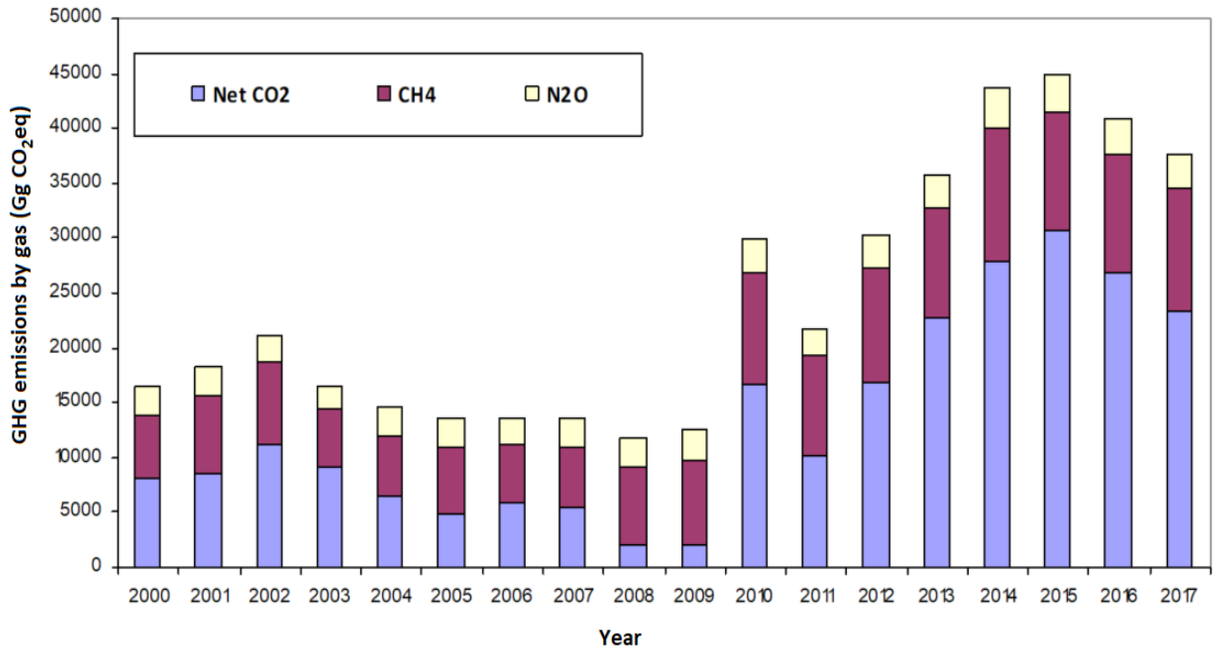

Figure 2.8: GHG emission trend by gas for the period 2000 to 2017

The AFOLU Sector contributed significantly to the spikes in GHG emissions from the year 2010, and this was largely due to emissions from biomass burning on forestland (Figure 2.9).

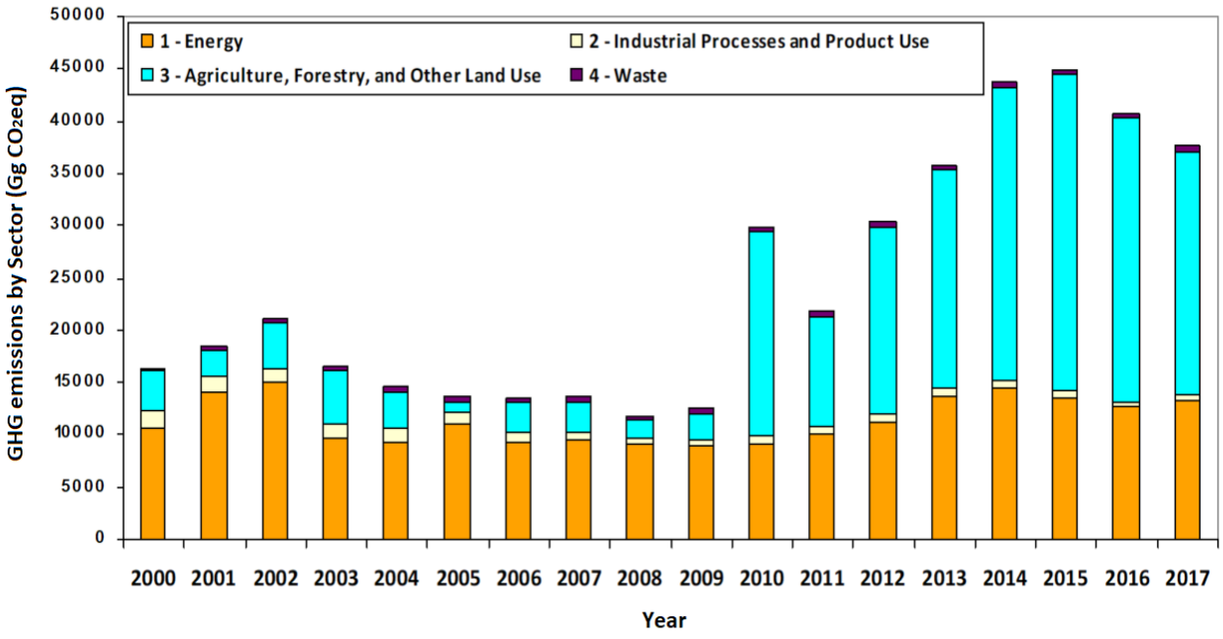

Figure 2.9: GHG emission trend by Sector for the period 2000 to 2017

2.4 Key category analysis

Key category analysis was carried out using both approaches 1 (level analysis) and 2 (trend analysis) and the results are shown in Table 2.5 and Table 2.6, respectively. Key categories by level were largely dominated by CO_2 emissions from AFOLU. Over 60 per cent of the GHG emissions in the key category came from Forestry and Other Land Use (FOLU). Energy contributed around 11 per cent to the key categories and the emissions came from power generation, transport and combustion of biomass in agriculture and commercial (1A4), and Agriculture around 7 per cent.

Table 2.5: Key categories -Level assessment 2017

PCC Category code	IPCC Category	GHG	2017 Ex, t ($Gg\ CO_2\ Eq$)	Ex,t| ($Gg\ CO_2\ Eq$)	Lx,t (%	Cumulative Total of Column F (%)
3.B.3.b	Land Converted to Grassland	CO_2	19987.42	19987.42	28.71	28.71
3.B.1.b	Land Converted to Forest land	CO_2	-15733.73	15733.73	22.60	51.31
3.B.2.b	Land Converted to Cropland	CO_2	7763.26	7763.26	11.15	62.46
1.A.1	Energy Industries - Solid Fuels	CO_2	5247.52	5247.52	7.54	69.99
3.A.1	Enteric Fermentation	CH_4	3900.10	3900.10	5.60	75.60
3.C.1	Emissions from biomass burning	CH_4	3432.41	3432.41	4.93	80.53
1.A.4	Other Sectors - Biomass	CH_4	3120.65	3120.65	4.48	85.01
1.A.3.b	Road Transportation	CO_2	2013.68	2013.68	2.89	87.90
3.C.1	Emissions from biomass burning	N_2O	1565.66	1565.66	2.25	90.15
1.A.2	Manufacturing Industries and Construction - Solid Fuels	CO_2	965.45	965.45	1.39	91.54
3.B.1.a	Forest land Remaining Forest land	CO_2	822.87	822.87	1.18	92.72
3.C.5	Indirect N_2O Emissions from managed soils	N_2O	799.50	799.50	1.15	93.87
1.A.4	Other Sectors - Biomass	N_2O	614.22	614.22	0.88	94.75
1.A.4	Other Sectors - Liquid Fuels	CO_2	592.01	592.01	0.85	95.60

The key categories in terms of trend analysis were dominated by land conversions between forestland, grassland and cropland, contributing over 70%. The other sectors that were significant in terms of trend include emissions from:

- Biomass burning
- Energy Industries - Solid Fuels
- Other Sectors - Biomass
- Enteric Fermentation
- Road Transportation
- Manufacturing Industries and Construction - Solid Fuels
- Other Sectors - Solid Fuels

Table 2.6: Key category due to trend analysis -2000 to 2017

IPCC Category code	IPCC Category	GHG	2000 Year Estimate Ex0 ($Gg\ CO2\ Eq$)	2017 Year Estimate Ext ($Gg\ CO2\ Eq$)	Trend Assessment (%)	% Contribution	Cumulative Total (%)
3.B.3.b	Land Converted to Grassland	CO_2	19987.42	19987.42	32.60	27.91	27.91
3.B.1.b	Land Converted to Forest land	CO_2	-15733.73	-15733.73	25.66	21.97	49.87
3.B.2.b	Land Converted to Cropland	CO_2	7763.26	7763.26	12.66	10.84	60.71
1.A.1	Energy Industries - Solid Fuels	CO_2	5217.56	5247.52	8.47	7.25	67.96
3.A.1	Enteric Fermentation	CH_4	4170.83	3900.10	7.14	6.11	74.08
1.A.4	Other Sectors - Solid Fuels	CO_2	2223.44	65.90	6.34	5.42	79.50

IPCC Category code	IPCC Category	GHG	2000 Year Estimate Ex0 (Gg CO2 Eq)	2017 Year Estimate Ext (Gg CO2 Eq)	Trend Assessment (%)	% Contribution	Cumulative Total (%)
3.B.1.a	Forest land Remaining Forest land	CO_2	-15792.65	822.87	4.89	4.18	83.69
1.A.4	Other Sectors – Biomass	CH_4	211.53	3120.65	3.31	2.83	86.52
3.C.1	Emissions from biomass burning	CH_4	726.44	3432.41	2.21	1.90	88.41
1.A.3.b	Road Transportation	CO_2	1577.00	2013.68	2.02	1.73	90.15
3.C.5	Indirect N_2O Emissions from managed soils	N_2O	845.64	799.50	1.44	1.23	91.38
2.B.2	Nitric Acid Production	N_2O	464.57	79.80	1.24	1.06	92.44
2.C.1	Iron and Steel Production	CO_2	427.75	0.00	1.23	1.06	93.50
1.A.2	Manufacturing Industries and Construction - Solid Fuels	CO_2	0.00	965.45	1.21	1.04	94.54
2.A.1	Cement production	CO_2	447.89	380.05	0.82	0.70	95.23

2.5 Uncertainty analysis

Uncertainties related to activity data were largely not available from the data providers; hence uncertainty analysis was not performed.

2.6 QA/QC and planned improvements

USA EPA QA/QC Template was used. The draft report was peer reviewed before it was presented for validation. The identified constraints, gaps and planned improvements for each sector are shown later in Table 2.8.

2.7 Changes in GHG emissions over time

An analysis of the time series emissions indicates a general increase in GHG emissions over time (Table 2.7 and Table 2.8). The trend generally followed the performance of the Zimbabwean economy. Data for 1994 was not available; hence the GHG emissions for 1994 were obtained from the Initial National Communication (INC). GHG emissions for the period 2000 to 2017 were based on the estimations performed using current data and the 2006 IPCC Guidelines.

Table 2.7: Total aggregate GHG emissions and removals by year and gas (Gg)

Gas	Year				Change: 1994-2017 (%)	Change: 2000 -2017 (%)
	1994	2000	2006	2017		
CO_2	*18469.90*	*9987.80*	*8689.54*	*9415.46*	*49.02%*	5.73%
CH_4	*71.83*	*15.72*	*15.50*	*149.86*	*-108.63%*	-853.31%
N_2O	*0.74*	*1.26*	*1.28*	*2.34*	*-216.22%*	-85.71%

Table 2.8: GHG emissions by sector in CO_2eq

Sectors	Year			
	1994	2000	2006	2017
Energy	21643.56	10692.58	13532.74	13259.5
Industrial Processes and Product Use	4372.5	1698.806	880.7207	707.2121
Agriculture,	13389	1652.03	2773.937	23130.79
Land Use Land Use Change and Forestry	-62171.90			
Waste	25.1	344.1525	481.3176	563.8044

2.8 Sectoral Emissions

2.8.1 Energy Sector

2.8.1.1 Overview

Zimbabwe's energy portfolio is dominated by biofuels. The total energy consumption for the country is shown in Figure 2.10. Energy consumption increased by 15% but the energy consumption per capita decreased by 4%. This is because the population increased much faster (i.e. 20%) than the rate at which energy was supplied. The contribution in the energy mix of the renewables and waste rose from 65% to 80% while coal contribution dropped from 14% to 3%, and oil remained at 11%.

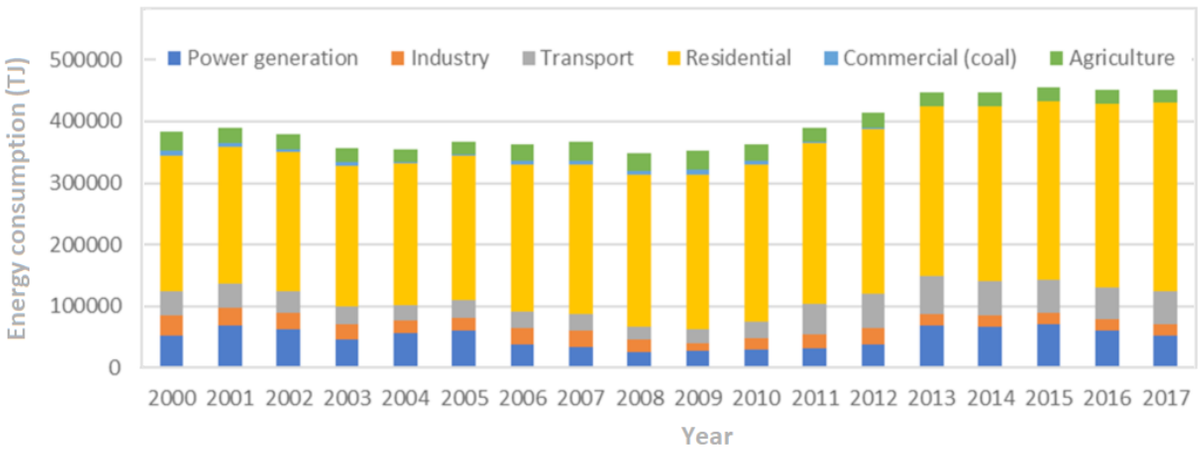

Figure 2.10: National energy consumption for the period 2000-2017 (MoEPD, 2019)

Electricity contribution dropped from 10% in 2000 to 7% in 2017. Zimbabwe has been experiencing energy shortages as indicated by the low energy consumption per capita figures for both total energy and commercial energy.

The decreasing emission trends shown in Figure 2.11 are attributable to, a greater extent, decreasing energy supply and consumption. While the total emissions decreased by 24 per cent, the Energy industries, Transport and Non-specified categories increased by 1%, 16% and 11%, respectively, during the period 2000-2017. The emissions from the Manufacturing Industries and Construction (MIC), Other sectors (including Commercial, Residential and Agriculture) and Fugitive categories decreased by 60%, 78% and 35% respectively, during the same period.

Total GHG emissions from the Energy sector were highest in 2000 reaching 17,366.07Gg CO_2eq and lowest in 2008 at 8,973.45 Gg CO_2eq, closely reflecting the general performance of the economy. In 2010 the total GHG emissions were 9,500 Gg CO_2eq.

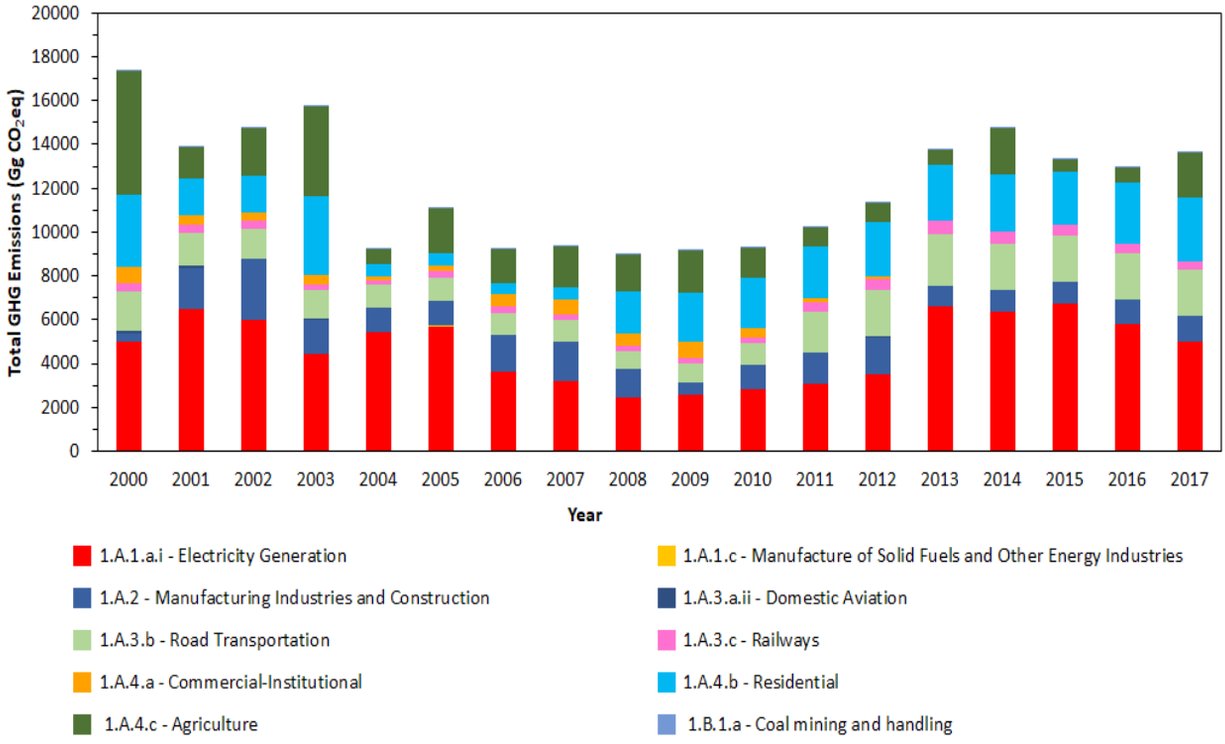

Figure 2.11: Emissions trends by category

2.8.1.2 Comparison between the sectoral and reference approach

Comparison was conducted between the sectoral and reference approaches (Table 2.9). Data for the sectoral approach was obtained from the Ministry of Energy and Power Development (MoEPD) while that for the reference approach was obtained from the energy balances compiled by the International Energy Agency (IEA). Significant differences were obtained for all fuels. Figures for coking coal were much higher in the reference approach (IEA data) than those in the sectoral approach (MoEPD data). The sectoral approach reported higher motor gasoline figure than the reference approach while the diesel figures were lower in the sectoral approach as compared to the reference approach.

Table 2.9: Comparison between sectoral and reference approaches, 2017

	Reference Approach				Sectoral Approach		Difference	
Fuel	Apparent Consumption (TJ)	Excluded consumption (TJ)	Apparent Consumption (excluding non-energy use and feedstocks) (TJ)	CO_2 Emissions (Gg)	Energy Consumption (TJ)	CO_2 Emissions (Gg)	Energy Consumption (%)	CO_2 Emissions (%)
Motor Gasoline	14,043.10		14,043.10	973.19	19,137.60	1,326.24	-26.62	-26.62
Aviation Gasoline	0.00		0.00	0.00			0.00	0.00
Jet Gasoline	0.00		0.00	0.00	722.98	51.69	-100.00	-100.00
Jet Kerosene	0.00		0.00	0.00			0.00	0.00

Fuel	Reference Approach				Sectoral Approach		Difference	
	Apparent Consumption (TJ)	Excluded consumption (TJ)	Apparent Consumption (excluding non-energy use and feedstocks) (TJ)	CO_2 Emissions (Gg)	Energy Consumption (TJ)	CO_2 Emissions (Gg)	Energy Consumption (%)	CO_2 Emissions (%)
Other Kerosene	3,022.20	0.00	3,022.20	217.20	2,365.20	170.06	27.78	27.72
Gas/Diesel Oil	27,606.00	0.00	27,606.00	20,44.68	19,995.00	1,481.63	38.06	38.00
Residual Fuel Oil	0.00		0.00	0.00			0.00	0.00
Liquefied Petroleum Gases	1,229.80	0.00	1,229.80	77.56	1,513.60	95.51	-18.75	-18.79
Other Petroleum Products	1,085.40		1,085.40	79.60			100.00	100.00
Anthracite	0.00		0.00	0.00			0.00	0.00
Coking Coal	1,3021.07		1,3021.07	1,231.79	6,321.00	597.97	106.00	106.00
Other Bituminous Coal	62,384.40		62,384.40	5,901.56	5,6001.80	52,94.60	11.40	11.46
Coke Oven Coke / Lignite Coke	-6,288.60	0.00	-6,288.60	-6,73.30	3,702.40	397.78	-269.85	-269.27

2.8.1.3 Category specific recalculations

TNC data was obtained from the IEA. In the FNC, data was obtained from the MoEPD. Moreover, the 2006 IPCC Guidelines were used to estimate GHG emissions from the energy sector. The 2006 IPCC guidelines were also used in the TNC. The TNC used the Forth Assessment Report for the Global Warming Potential of CO_2, CH_4 and N_2O, while the BUR1 has used the GWP from the Second Assessment Report. Therefore, recalculations were performed for the reporting years 2000 (SNC) and 2006 (TNC) as shown in Table 2.10.

Table 2.10: Energy Recalculated GHG Emissions

Year	*Reported*	*Recalculated*
2000 (SNC)	13,240.00	10,692.58
2006 (TNC)	10,664.00	9,396.77
2017 (FNC)	13,259.50	13,259.50

2.8.1.4 Category specific QA/QC activities

Energy activity data was obtained from the MoEPD, while data from international sources (IEA and UNSD) was used for QC and verification. The uncertainties were calculated using the IPCC inventory software. However, the quality of the output was low since most data was supplied without specifying the uncertainties. Uncertainties analysis is a major area needing capacity building in the country.

2.8.2 Industrial processes and product use (IPPU)

2.8.2.1 IPPU Overview

GHG emissions from IPPU largely came from three source categories: Mineral (2A) Chemical (2B) and Metal (2C) industries. Zimbabwe uses several ODS substitutes such as HFC-134a and blends which contain constituents of substitutes to ODS. However, emissions of HFCs, PFCs, SF_6, were not estimated since the activity data was

not disaggregated as required by the 2006 IPCC methodologies.

2.8.2.2 Emissions by sector

Figure 2.12 shows a steady decrease in GHG emissions from year 2000 to 2009 followed by a slight increase in emissions in the year 2010 and 2011. However, between 2012 and 2017 an inconsistent trend in emissions was experienced. The GHG emissions were largely influenced by economic performance. A significant dip in GHG emissions was experienced in 2016 when a major monetary policy shift occurred causing shocks in the economy. This resulted in depressed economic activity because of foreign currency challenges arising from the monetary policy change.

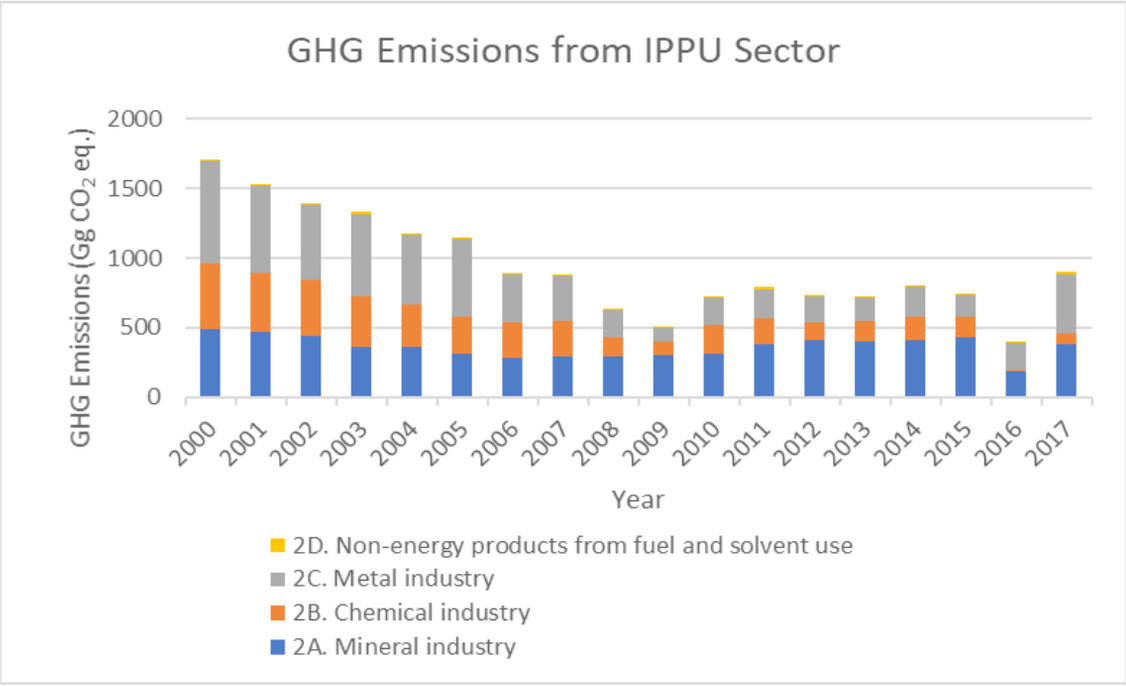

Figure 2.12: GHG emissions in the IPPU-2000 to 2017

2.8.2.3 Emissions by Gas

Table 2.11 shows the direct GHG emissions from the IPPU sector by gas from the period 2000 to 2017. The emissions of CO_2 decreased by 31 per cent between 2000 and 2017. With respect to N_2O, there was a decrease by 83 per cent between 2000 and 2017. The decrease in emissions of both gases is mainly attributed to the reduction in industrial activities experienced by the country. Furthermore, the fertilizer industry has been experiencing stiff competition from cheap imports. The emissions of HFCs, PFCs, SF_6, were not estimated.

Table 2.11: Direct GHG Emissions from IPPU sector from 2000-2017, Gg CO_2eq

Gas	*2000*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*
CO_2	1197.8	882.1	633.8	622.8	495.2	410.0	528.8	609.9	603.0	587.8	639.7	595.9	390.8	820.5
CH_4	0.28	0.37	0.14	0.14	*0.00	NE	NE	NE	NE	NE	NE	NE	NE	NE
N_2O	464.6	264.6	257.9	254.9	141.3	103.9	200.9	181.7	132.1	142.4	167.2	151.7	9.94	79.80
HFC	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
PFC	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
SF_6	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total	1663	1147	892	878	637	514	730	792	735	730	807	748	401	900
Numbers may not sum exactly due to rounding off														
** Values too small and when rounded off become 0*														

2.8.2.4 Category specific recalculations

Recalculations were done in the cement sector due to use of a higher tier methodology. Recalculations were done for the source category other uses of soda ash by subtracting the soda ash used in glass production from total soda ash used in the country. This was not considered in the TNC.

For nitric acid production, recalculations were done for the entire time series since the SAR GWP was used in this inventory compared to the 4AR GWP used in the TNC. Similar recalculations were done for CH_4 emissions in the iron and steel industry for the period 2000 to 2008. Recalculations were done for Non-energy products from fuels and product use (2D) since in the TNC, only imports were considered without accounting for exports.

2.8.2.5 Category specific QA/QC activities

General inventory QC procedures were conducted in accordance with the 2006 IPCC Guidelines Volume 1, Chapter 6. The general inventory QC involved checking the activity data, emission factors, analysis of emission trends and archiving of reference materials. Specific QC activities included checking with the energy sector to ensure that emissions were not double counted especially for coke production in the iron and steel industry and non-energy products and use. QA activities involved independent peer review with experts in the industry.

The IPPU sector benefited from international review of the Third National Communication by experts from the UNFCCC/IPCC in February 2020. Recommendations from the review were used to improve on the quality of the inventory.

2.8.3 Agriculture, Forestry and Other Land Use (AFOLU)

2.8.3.1 AFOLU Overview

For the first time, Zimbabwe has reported its GHG inventory in livestock farming, croplands, forests, grasslands, wetlands and settlements in a single chapter, Agriculture Forestry and Other Land Use. The categories considered in the inventory compilation were: Enteric fermentation (3.A.1), Manure Management (3.A.2), Forest land (3.B.1), Croplands (3.B.2), Grasslands (3.B.3), Wetlands (3.B.4), Settlements (3.B.5), Other lands (3.B.6), Emissions from Biomass Burning (3.C.1), Liming (3.C.2), Urea Application (3.C.3), Direct N_2O Emissions from Managed Soils (3.C.4), Indirect N_2O Emissions from Managed Soils (3.C.5), Indirect N_2O Emissions from Manure Management (3.C.6), Rice Cultivation (3.C.7) and Harvested Wood Products (3.D.1).

Figure 2.13 shows the GHG emissions and removals from the AFOLU sector for the periods 1990 to 2017. Over the period of 27 years the Forest land has between 310 and 55,087 Gg (mean: 30,210 ± 11,129 Gg) of CO_2 and the removal capacity has been decreasing rapidly to the lowest capacity in 2015. Concurrently, GHG emissions in the AFOLU sector have been increasing largely due to deforestation and biomass burning. Land Use Change has been a major contributor to GHG emissions in the AFOLU sector, particularly the conversion of Forest Land to Cropland and Grassland, and to a lesser extent, conversion of Forest Land to Settlement.

In the year 2017, GHG emissions from the AFOLU sector were estimated at 42,029 Gg CO_2eq, while removals were estimated at 14, 911 Gg CO_2, giving a net positive flux of 27,118 Gg CO_2eq (Figure 2.14). Conversion of Forest Land to Grassland had the highest emission contribution of 17,342 Gg CO_2, that being 41% of the total emissions. This was followed by emissions from conversion of Forest Land to Cropland (18%), emissions from Biomass Burning (12%), Enteric Fermentation (10%), and Direct N_2O Emissions from Managed Soils (9%). The computation of emissions from Biomass Burning using local data was only possible from 2010 to 2017 due to lack of data in the earlier years. Despite the availability of international data on area burnt for the whole time series, its use was not possible because of incomparability with local datasets for the period 2010 to 2017.

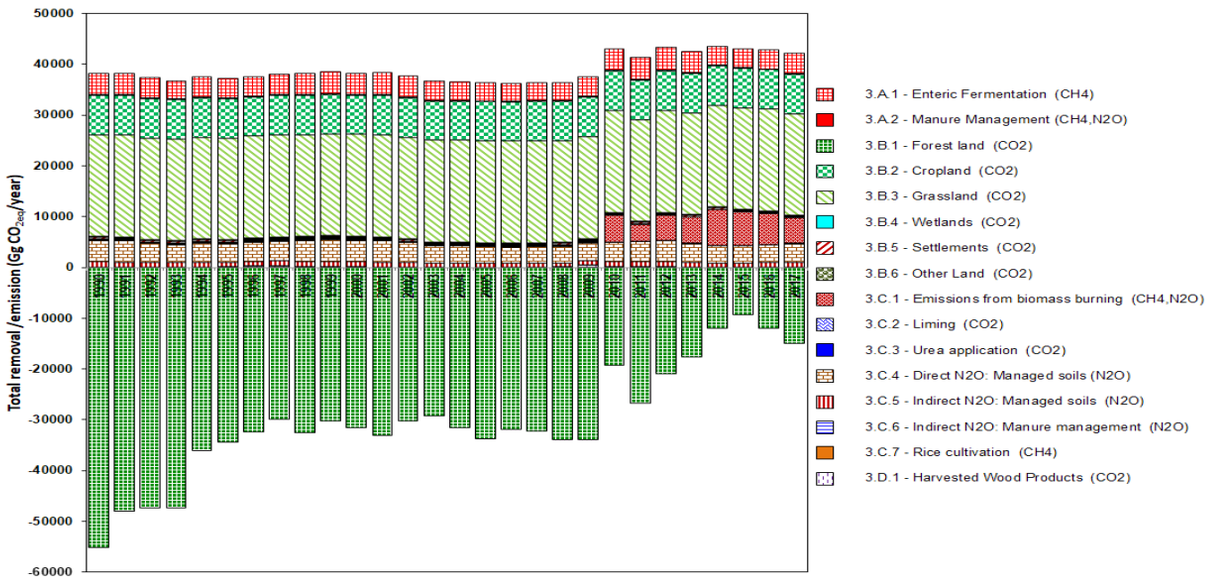

Figure 2.13: Total GHG emissions and removal in the AFOLU Sector

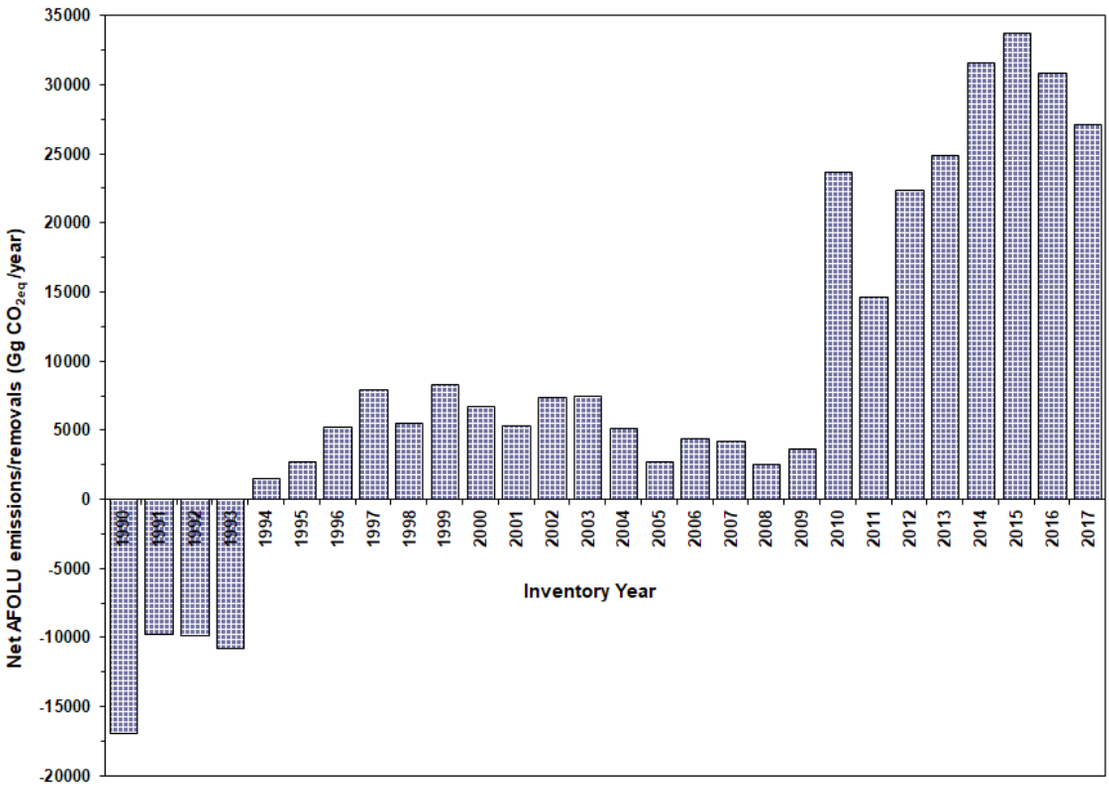

Figure 2.14: Net GHG emissions and removal in the AFOLU Sector

2.8.3.2 Emissions by gas

Methane emissions from livestock enteric fermentation ranged from 171 to 223 Gg (mean: 194 ±14), with the lowest emissions occurring in 1993 while the highest emissions were in 2014 (Figure 2.15). The trend generally reflected the relative proportions of the livestock and the effects of the drought years (1991/1992 and 2001/2002). The category, Other Cattle, contributed to the highest amount of CH_4 emissions, while swine contributed the least emissions.

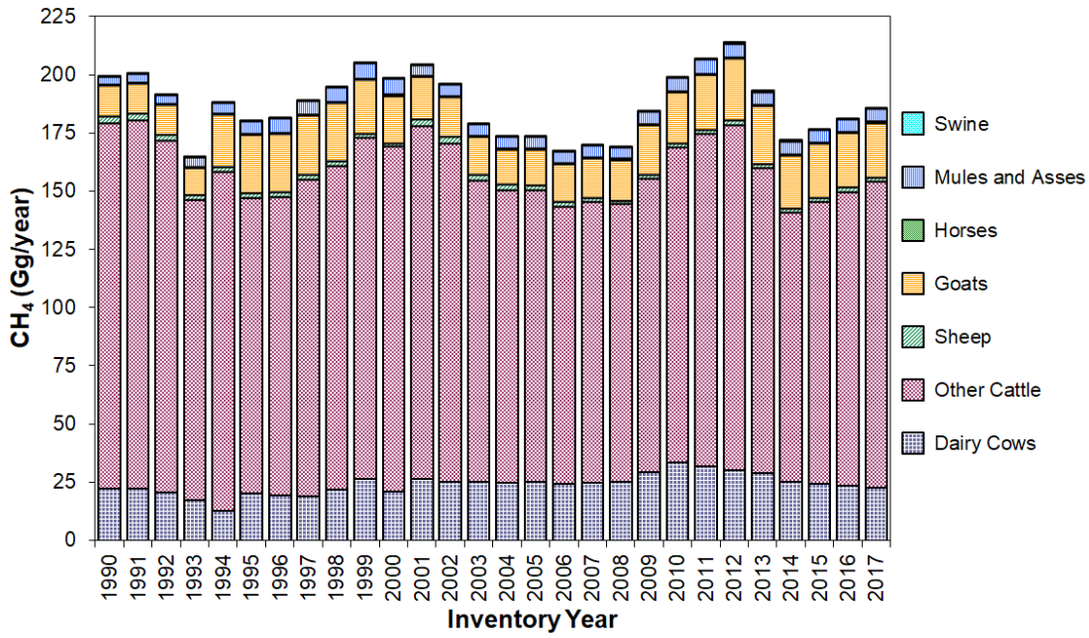

Figure 2.15: Methane emissions from enteric fermentation between 1990 and 2017

Emissions of CH_4 from Manure Management during the years 1990 to 2017 (range: 6.3 – 8.5; mean: 7.2 ± 0.5 Gg/year; **Figure 2.9**) followed similar trend as enteric fermentation. Similar trend was also noted for both direct and indirect N_2O emissions from Manure Management (Figure 2.17)

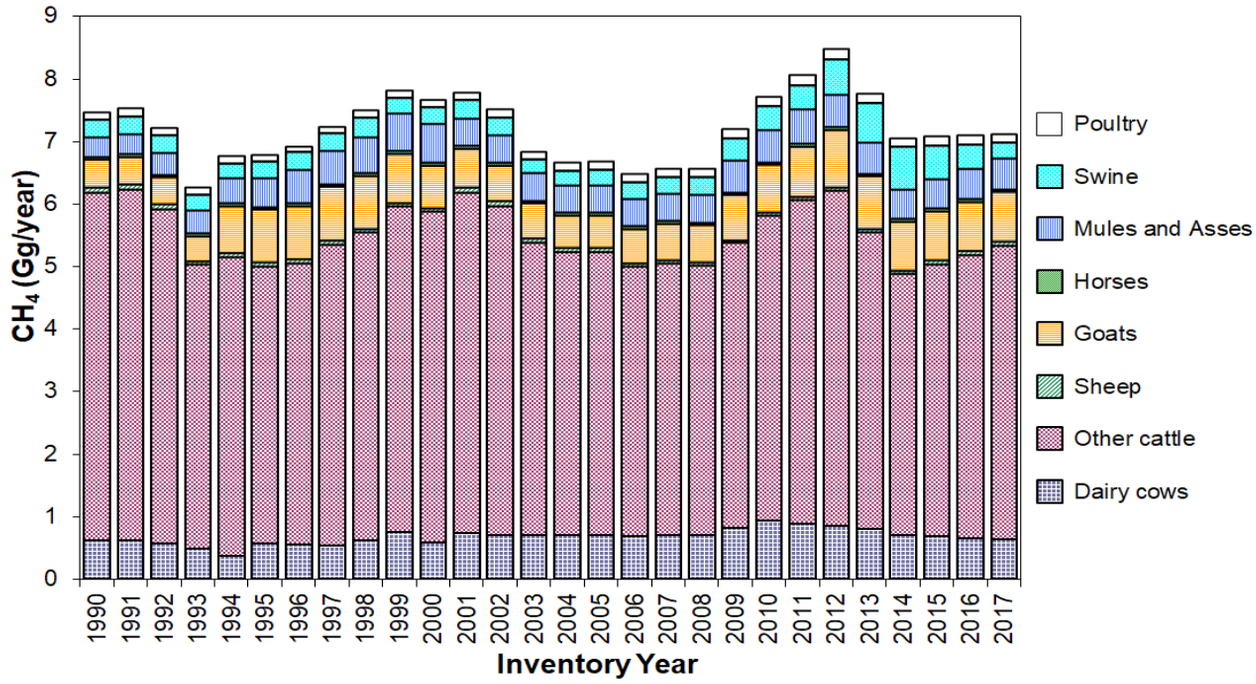

Figure 2.16: Methane emissions from manure management between 1990 and 2017

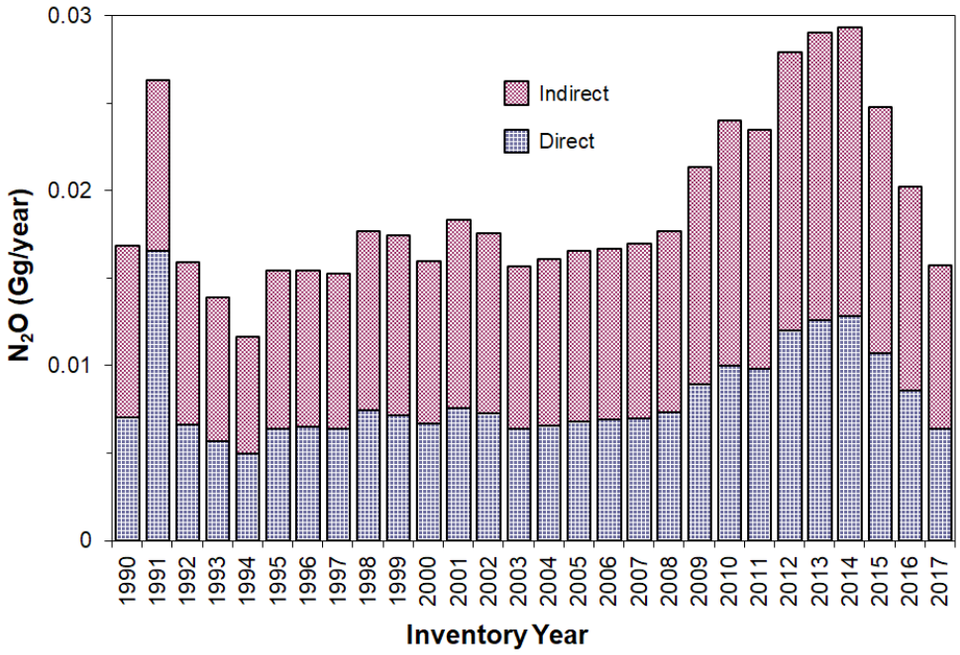

Figure 2.17: Direct and indirect N_2O emissions from manure management between 1990 and 2017

Forest Land comprised emissions and removals from the above and below ground carbon pools for both forest land remaining forest land and land converted to forest land subcategories, while soil carbon pool emissions and removals were estimated in the land converted to forest land subcategory. The Forest Land includes Natural Forests and Plantations. The Forest Land category was estimated to be a net sink for CO_2 for the whole time series from 1990 to 2017 varying between 55,087 Gg and 9, 210 Gg CO_2 (Figure 2.18). The forest land remaining forest land subcategory significantly influenced the trend of removals in the land category over the time series. It declined from being a net sink contributing 71% of the removals in 1990, to a net emitter in 2015 contributing 70% of the emissions. Land converted to forest land sub-category maintains a net sink scenario over the time series contributing between 28.6% and 170.8% of the removals in Forest land category.

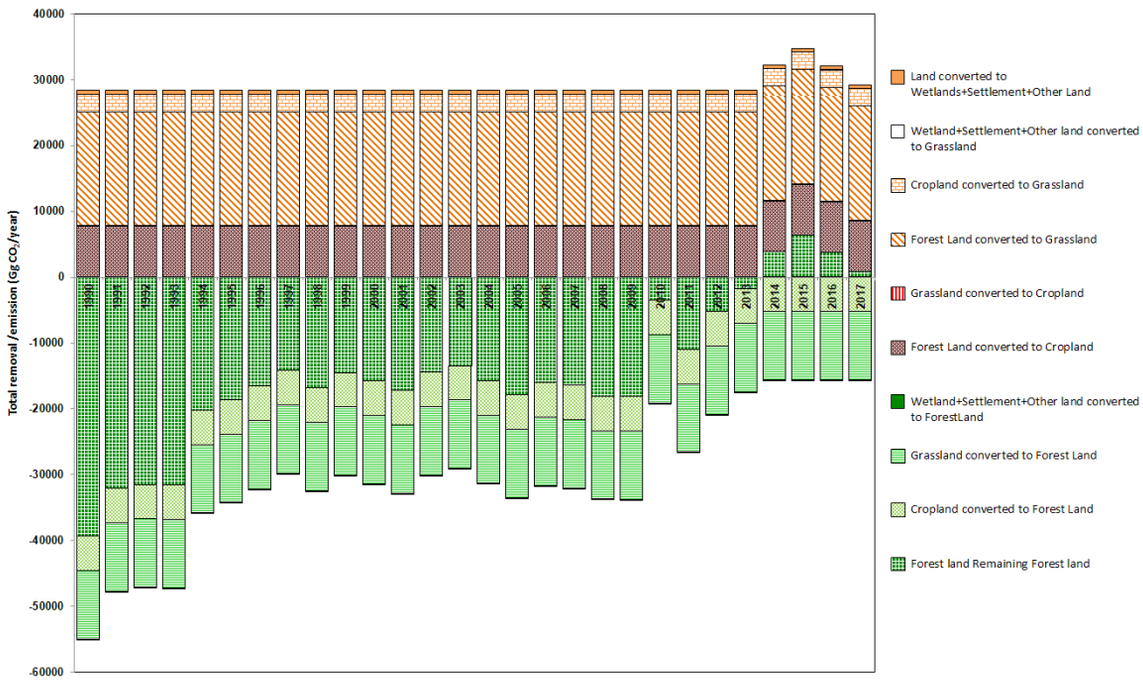

Figure 2.18: Total emissions/removals from Land between 1990 and 2017

Croplands comprised emissions and removals from the biomass carbon pool in the land converted to cropland subcategory and soil and dead organic matter carbon pools in both cropland remaining cropland and land converted to cropland subcategories. Cropland includes land under annual crops and fallow agricultural land. Throughout the time series cropland was a net emitter, constantly emitting 7,768 Gg CO_2 from 1990 to 2017, which is driven 100% by land converted to cropland, especially conversion of forest land to cropland (7,723 Gg CO_2).

Grasslands comprised emissions and removals from soil carbon pool for both grassland remaining grassland and land converted to grassland subcategories, while emissions and removals from biomass and dead organic matter were estimated from the land converted to grasslands.

The Grassland category comprises grassland (herbaceous) and wooded grasslands. The Grassland category was a net emitter throughout the time series, constantly emitting 19,993 Gg CO_2, driven by land converted to Grasslands, mostly forest land converted to Grasslands (17,342 Gg CO_2).

Wetlands comprised flooded land, which represent man made water bodies in the country. No emissions were estimated from flooded land remaining flooded land. However, CO_2 emissions were estimated from land converted to flooded land which amounted to 164.3 Gg CO_2 annually for the whole time series.

Settlements category comprised settlements remaining settlements and land converted to settlements. Settlements remaining settlements do not have any emissions or removals, however the land converted to settlements emitted 224.7 Gg CO_2 annually.

Other Land category comprised rock out crops, mine dumps and other land which could not be classified into the other five categories. No emissions or removals were estimated in the other land remaining other land subcategory; however, emission were estimated for the land converted to other land subcategory which emitted 174.8 Gg CO_2 annually from 1990 to 2017.

Emissions from biomass burning, 2.7 – 232 (mean: 55 ± 82) Gg CH_4;0.07 - 7.1 (mean: 1.6 ± 2.5) Gg N_2O (Figure 2.19 and Figure 2.20) have not followed a definite trend for biomass burning in cropland, but between 2010 and 2017 there was a marked increase in biomass burning in Forest Land and Grassland.

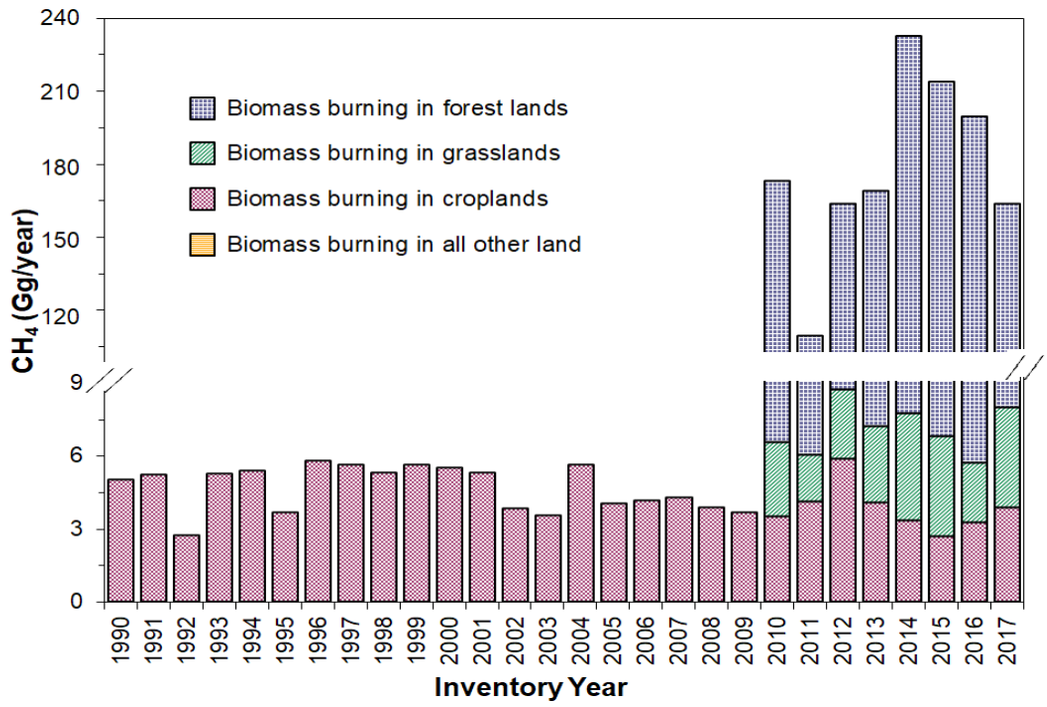

Figure 2.19: Total methane emissions from biomass burning

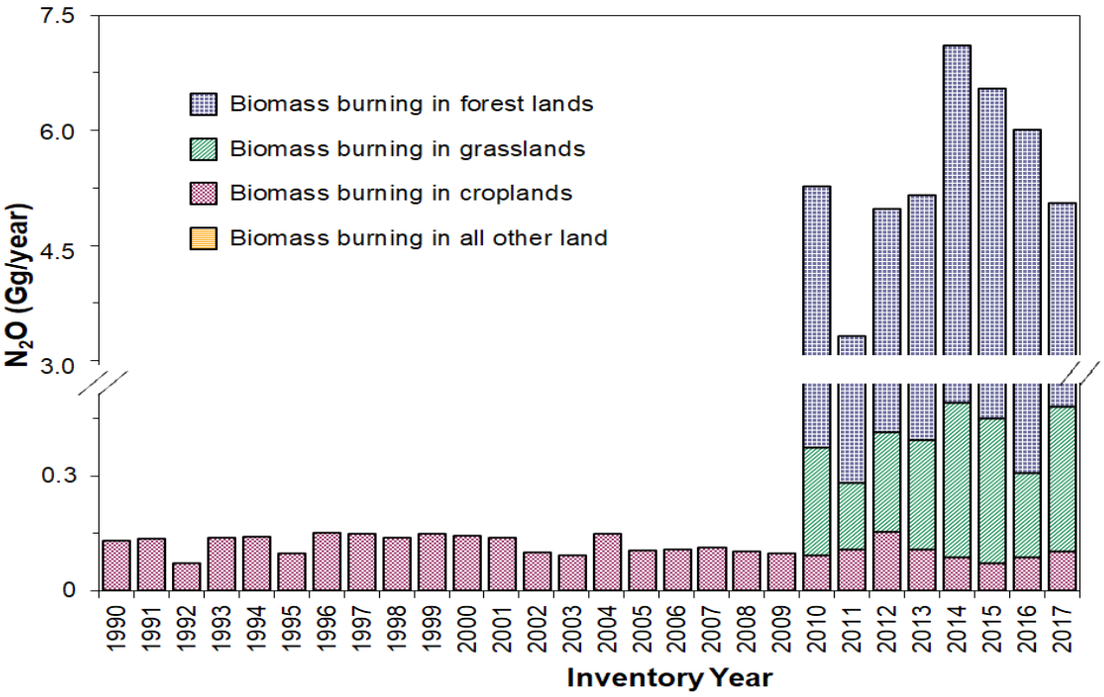

Figure 2.20: Total nitrous oxide emissions from biomass burning

Managed soils contribute about 9% of the AFOLU GHG emissions magnitude with Direct N_2O Emissions ranging from 10.5 to 13.8 (mean: 12.2 ± 1.1) Gg N_2O between 1990 and 2017 (Figure 2.21).

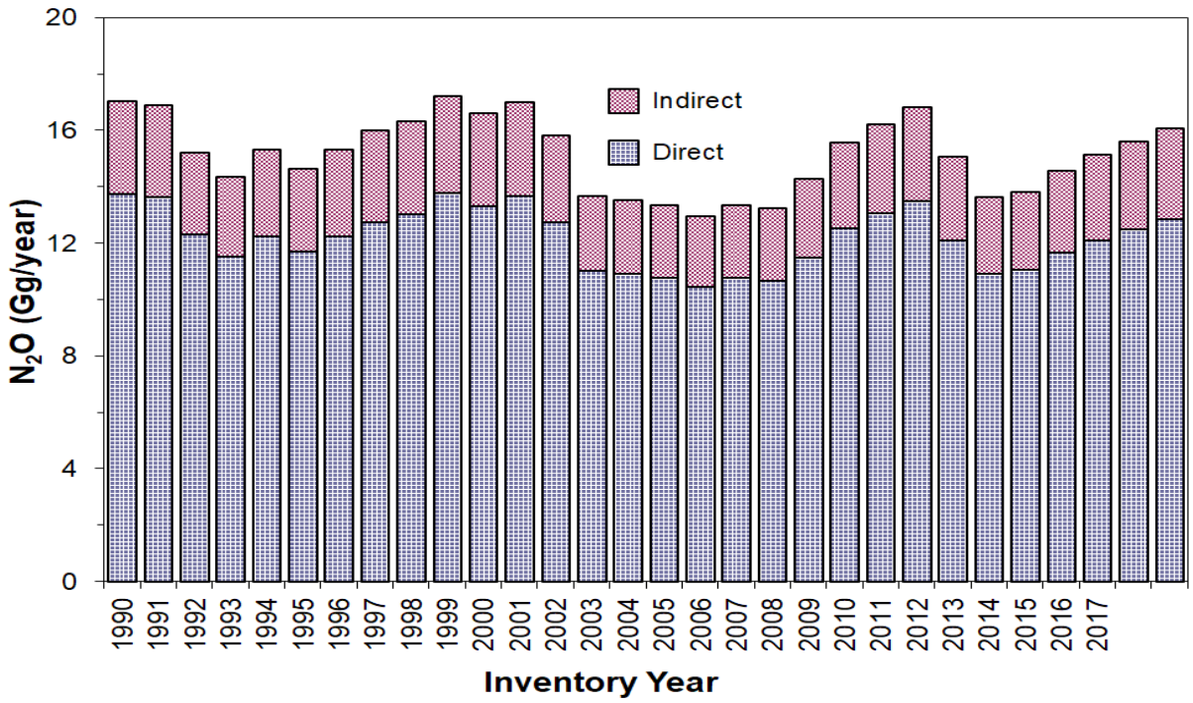

Figure 2.21: Direct N_2O emissions from managed soils

2.8.3.3 Category specific recalculations

This, being the first time the AFOLU inventory was compiled using the 2006 IPCC Guidelines as well as the Global Warming Potentials from the SAR, recalculations were done for all categories. The previous inventories were conducted using the Revised 1996 IPCC Guidelines and by averaging activity data from multiple sources. In the current inventory the primary data providers were mainly ZimStat, EMA, Forestry Commission and FAOSTAT.

2.8.3.4 Category specific QA/QC activities

The following procedures were followed to improve on the Transparency, Accuracy, Completeness, Comparability and Consistency (TACCC) Principles:

- All procedures on selection of activity data and emission factors were peer reviewed and documented. The review ensured gap filling on unspecified procedures and inclusion of justification for all methods selection
- While one primary source of activity data was selected, comparison of the computations with FAOSTAT computed emissions were done. In the case where the differences in emissions were considerable, explanation was given and documented.
- A capacity building workshop was undertaken involving participatory exchange of knowledge and information with data providers. The workshop provided background information to the activity data.
- Working workshops were held to go through the data and methods used in the AFOLU Sector. The workshops improved the quality of the data as it was an opportunity to identify omissions and correct anomalies in the inventory.
- The AFOLU sector benefited from international review of the Third National Communication by experts from the UNFCCC/IPCC. Recommendations from the review were used to improve on the quality of the inventory.

2.8.4 Waste

2.8.4.1 Overview

GHG emissions reported from the waste sector are mainly from source categories Solid Waste Disposal 4A, Biological Treatment of Solid Waste 4B, Incineration and Open Burning of Waste 4C and Wastewater Treatment and Discharge 4D. The main source categories for the GHG emissions are Solid Waste disposal in landfill sites and Wastewater Treatment and Discharge. Solid waste disposal is the key category, by level and trend analysis,

contributing 88.6% of the total emissions in 2017, followed by Wastewater Treatment and Discharge at 8.7%, Open burning and Incineration 2.4% and lastly 0.2% from Biological Treatment of Solid Waste.

2.8.4.2 Emissions by sub-sector

Since 1990, emissions from the waste sector gradually increased, peaking at 480.75Gg CO_2eq in 2005 before decreasing to a minimum of 448.80Gg CO_2eq in 2010 (Figure 2.22). The increase is due to increased waste generation and collection rates while the dip from 2006-2011 is attributed to the economic decline with low collection rates for MSW and malfunctioning of digesters at wastewater treatment plants. Compared to 1990, emissions in 2017 increased by 195% due to increase in volumes of MSW received at the landfill.

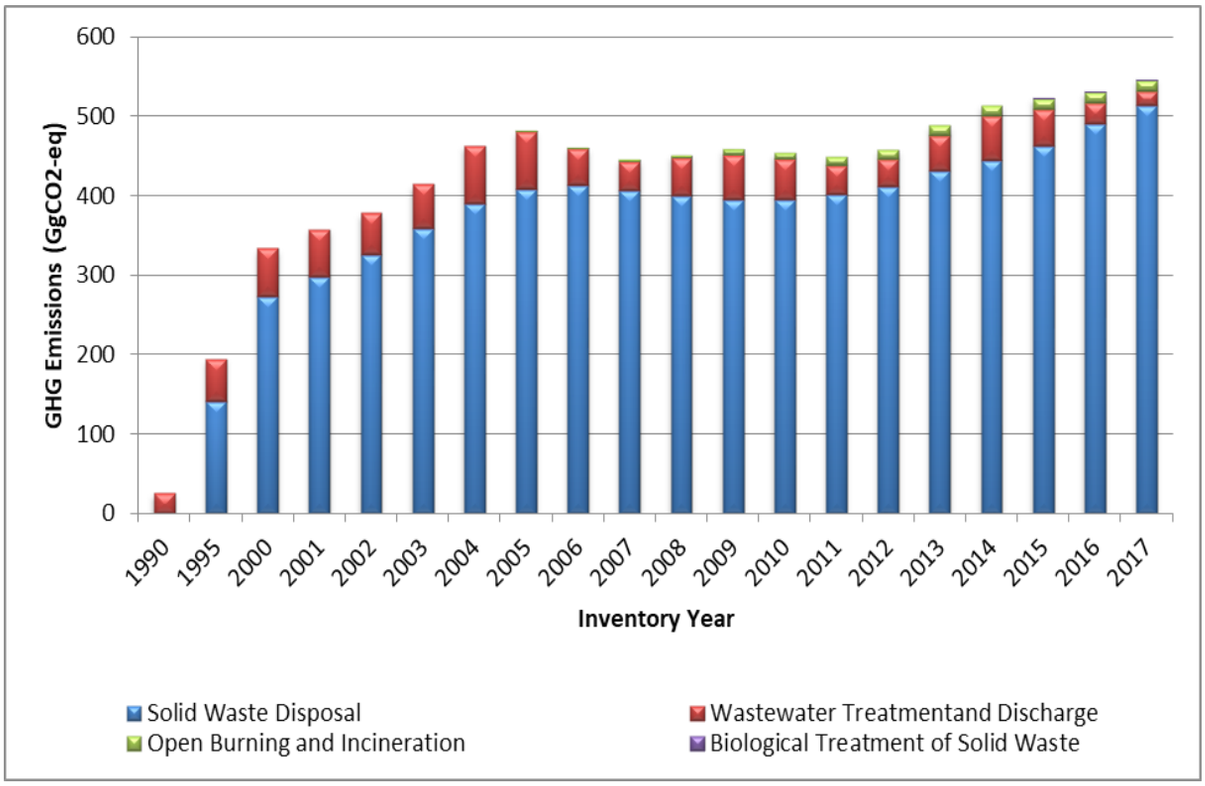

Figure 2.22: **Waste sector emissions by sub category 1990-2017**

2.8.4.3 Category specific recalculations

The solid waste disposal category had recalculations carried out due to methodological changes with the use of the 2006 IPCC Guidelines. Accompanying changes are noted in emissions factors, namely degradable organic matter (DOC), fraction of DOC (DOC) and weighted Methane Correction Factor (MCF). The recalculated 2006 CH_4 emissions are 19.7Gg from 25.5 Gg in 2006 giving a difference of –22%.

The CH_4 and N_2O emissions from wastewater treatment and discharge were recalculated for the previous national communications. The adjustment of Boilogical Oxygen Demand (BOD_5) to factor in additional BOD_5 from industrial wastewater for the whole time series and methodological change from the Revised 1996 IPCC, to 2006 IPCC Guidelines necessitated the need for recalculations. The recalculated 2006 CH_4 emissions are 9.05 Gg from 4.63 Gg giving a difference of +54.6%.

2.8.4.4 Category specific QA/QC activities

Methane emissions from solid waste disposal and wastewater treatment and discharge are key categories and the following QA/QC procedures were applied;

- Comparison of activity data from primary and secondary sources
- Analysis of activity data trends along with emission trends along the time series
- Peer review of the activity data, emission factors and emission estimation results
- The Waste sector benefited from international review of the Third National Communication by

experts from the UNFCCC/IPCC. Recommendations from the review were used to improve on the quality of the inventory.

A capacity building workshop was undertaken involving participatory exchange of knowledge and information with data providers. The workshop provided background information to the activity data.

3 Mitigation Actions

3.1 Overview

Mitigation actions were identified in all IPCC sectors. The mitigation actions in the energy sector were focused on renewable energy and energy efficiency. In IPPU N2O abatement at a nitrogenous fertiliser manufacturing plant is reported. In the AFOLU sector mitigation actions are in the forestry sub-sector and focus at reducing CO2 emissions from conservation areas. Two mitigation projects were identified under the Waste sector, both focusing on Integrated Solid Waste Management (ISWM) programmes.

3.2 Summary of mitigation action progress

Table 3.1 provides a summary of the mitigation actions and their status. The total GHG emission reduction was estimated at 4,219,807.5 Gg CO_2eq per year.

Table 3.1: Summary of mitigation action progress

No. of mitigation actions (Total)	**Nine (9)**	
GHG emission reduction in total of all listed mitigation actions over	4,219,807.5 Gg CO_2eq	
Mitigation actions by sector		
Short description of mitigation actions	**Status [idea, planning phase, under implementation]**	**Impact [estimated GHG emission reduction, quantified in tCO_2eq] over a given time**
Energy		
Batoka Gorge hydropower station	Planning	4000,000tCO_2eq
Zimbabwe biogas programme	Implementation	Not estimated
ZFC Limited 5MW CDM solar PV project	Planning	8,390 tCO_2eq
Electricity (Solar Water Heating) Regulations, SI 235 of 2019	Implementation	Not estimated
Harava Solar Park	Implementation	72,281tCO_2eq
IPPU		
Nitrous Oxide (N_2O) Abatement in Nitric Acid Production	Planning	6.75kg N_2O per tonne of nitric acid produced
AFOLU		
Zambezi Valley Biodiversity Project	Implementation	Reduction of 139136.5 tCO_2 per year
Waste		
Integrated Solid Waste Management	Implementation	Not estimated
Regional Waste to Energy Plant	Idea	Not estimated

3.3 Mitigation actions by sector

3.3.1 Energy sector mitigation actions

The mitigation actions in the energy sector are focused on renewable energy and energy efficiency. The renewable energy projects reported include the Batoka Gorge large hydro power project, private sector solar PV projects and the National Biogas Digester Programme. Table 3.2 to Table 3.6 summarise these mitigation actions in the Energy Sector.

Table 3.2: Batoka Hydro Project (Mitigation Action E1)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration (Years)	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Batoka Gorge hydropower station	*Planning*	*Zambezi River Authority*	*Construction: 7 Operation: 25*	*Energy*	*Bi-national*	*4MtCO$_2$eq /year*	*CO$_2$, CH$_4$, N$_2$O*
	Objective of the mitigation action						
	To generate 1,200 MW of electricity						
	Brief description and activities planned under the mitigation action						
	The Batoka hydropower plant is a prominent 2x1,200 MW hydropower plant to be constructed on the Zambezi River on the border between Zimbabwe and Zambia. In February 2012, the two countries signed a memorandum of understanding (MoU) to develop the project that will be expected to produce 10,215GWh of electricity a year, which will be shared between Zambia and Zimbabwe. The project duration is 25 years.						
	Estimated outcomes and estimated emission reductions						
	The project will be expected to avoid around 4 MtCO$_2$eq *per annum,*						
	Methodologies and assumptions						
	It is assumed that the Governments of Zambia and Zimbabwe will agree to implement the project in time for the power plant to be commissioned well before 2030. Commissioning of the project will be expected to be 7 years after commencement of construction work. The commissioning of the plant will complement coal-powered power plants which are currently producing 3000 to 4000 GWh of electricity, thus off-setting coal and diesel-based emissions. Estimation of reduced emissions will be done using the Tier 1 method and the 2006 IPCC guidelines.						
	Progress of implementation / steps taken/ envisaged						
	Feasibility studies and EIAs were done and the Governments of Zimbabwe and Zambia are expected to continue discussing and agree to implement the project.						
	General description of the monitoring and reporting system						
	The amount of electricity generated from the power plant will be recorded and emissions reduction will be equivalent to the emissions from the generation of the same amount of electricity by coal plants.						
	Key indicators used						

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Contribution of RE electricity in the power mix	%	*54*	*Not set*	*2017*	*N/A*	*N/A*	*ZERA 2018 Annual Report*
	Indicators related to GHG impacts						
GHG reduction	*Not estimated*	*Not set*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

	Indicators related to sustainable development (SDGs)						
Improved access to electricity	*Not calculated*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*

Table 3.3: Zimbabwe Biogas Digester Programme (Mitigation Action E2)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Zimbabwe Biogas Digester Programme	*Implementation*	*Rural electrification Fund*	*2014-2030*	*Waste, Energy and Agriculture*	*National*	Train 4000 builders to construct biogas digesters •Construct 8000 Domestic biogas digesters with a size of 6 -20 cubic meters •Construct 283 Institutional biogas digester with a size above 20 cubic metres	*CH4,*
	Objective of the mitigation action						
	To produce biogas from organic waste for heating and cooking						
	Brief description and activities planned under the mitigation action						
	The activities involve the upscale of the Zimbabwe Biogas Digester Programme by increasing the capacity to construct biogas digesters and measure the amount of biogas/methane produced by the systems. **Construction of Biogas digesters**: Construction of digesters will aid in capturing methane form organic matter from waste streams (animal waste and sewer systems) for use as energy thereby reducing the amount of methane emitted into the atmosphere from organic waste sources. **GHG MRV**: Capacity building on measuring, reporting and verification of the GHG emission reduction from the biogas programme and their contribution of the national target.						
	Estimated outcomes and estimated emission reductions						
	There is no capacity to quantify biogas produced and estimate emissions avoided						
	Methodologies and assumptions						
	• Biogas will be used as a replacement of the current energy source i.e. fuel wood for domestic biogas digesters and electricity for institutional biogas digesters • Emissions will be estimated using the IPCC 2006 Guidelines						
	Progress of implementation / steps taken/ envisaged						
	Seven pilot projects have been implemented with capacities of 50-400 m^3 , and technical assistance has been provided on 68 biogas digester plants since 2014.						
	General description of the monitoring and reporting system						
	• The activities will include metering units for biogas digesters that can be used to quantify the amount of biogas produced. • Portable Gas analysers will be used to determine the amount of methane and other constituents in the biogas						
	Key indicators used						

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Increased energy access	*MJ/capita*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*
Trained builders	*people*		*4000*	*2014*	*N/A*	*2019*	*MoEPD*
Domestic biogas digesters	*Number/ capacity*		*8000*	*2014*	*N/A*	*2019*	*MoEPD*
Institutional biogas digester	*Number/ capacity*		*283*	*2014*	*N/A*	*2019*	*MoEPD*
Contribution of renewable energy in the energy mix	*%*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*
Avoided emissions	*$GgCO_2eq$*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*
	Indicators related to GHG impacts						
Amount of CH_4 reduced	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*
M^3 of biogas produced	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*
	Indicators related to sustainable development (SDGs)						
Improved access to modern energy services	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*	*Not calculated due to lack of capacity*

Harava Solar Park (Mitigation Action E3)

Harava Solar Park is a 20MW AC ground-mounted solar PV project to be eventually scaled-up to 40MW, located in Seke Rural, Zimbabwe (Table 3.4).The power plant will evacuate power into the national grid feeding into the Dema substation, through a Power Purchase Agreement with the Zimbabwe Electricity Transmission and Distribution Company (ZETDC).

Table 3.4: Harava Solar Park (Mitigation Action E3)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration (Years)	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Harava Solar Park	*Implementation*	*Harava Solar Park (Pvt) Ltd*	*Construction: 2 Operation: 7*	*Energy*	*National*	*20MW power, 73 GWh of electricity per annum, 73MtCO2eq saving per annum*	*CO_2, CH_4, N_2O*

	Objective of the mitigation action
	To generate 20 MW of electricity and feed it into the grid
	Brief description and activities planned under the mitigation action
	Harava Solar Park is a 20MW AC ground-mounted solar PV project located in Seke Rural, Zimbabwe. The power plant will evacuate power into the National Grid feeding into the Dema substation, through a Power Purchase Agreement with the Zimbabwe Electricity Transmission and Distribution Company (ZETDC).
	Estimated outcomes and estimated emission reductions
	Average power generation for the next 7 years is estimated at 73.2 GWh per year, resulting in emissions reductions of up 72,281 tCO_2eq emission reductions per year and 505,970 tCO_2eq of emission reductions over the 7 years crediting period.
	Methodologies and assumptions
	Large-scale Methodology: ACM0002 – "Grid-connected electricity generation from renewable sources" Version 20.0 Standardized Baseline ASB0040 – "Emission Factor of the Electricity System of Southern Africa" version 01.0 2006 IPCC Methodologies and UNFCCC tool for large solar PV projects
	Progress of implementation / steps taken/ envisaged
	Construction is nearing completion and a 132kV transmission line spanning 10km from the solar park to Dema substation is in the process of being set up.
	General description of the monitoring and reporting system
	The amount of electricity in GWh generated and fed into the grid will be monitored by the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) and avoided coal-based emissions from coal power plants estimated.
	Key indicators used

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Amount of electricity fed into the grid	GWh	*0*	73.2	*2020*	*N/A*	*2021*	*ZETDC and ZERA*
	Indicators related to GHG impacts						
GHG emissions reduction	tCO_2eq	0	72,281	*2020*	*N/A*	*2021*	*ZETDC and ZERA*
	Indicators related to sustainable development (SDGs)						
-Employment creation	*No. of green jobs created*	*Not calculated*	*Not given*	*Not given*	*Not given*	*Not given*	*Harava Solar Park*

- Increased business opportunities for various business sectors	Increase in the number of enterprises in the value chain	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided

ZFC limited 5MW solar PV (Mitigation Action E4)

The Zimbabwe Fertiliser Company (ZFC) envisages constructing a 5MW solar Photovoltaics (PV) system. The company will sell the power to the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) under net metering arrangements. The project is expected to increase the share of renewables in the generation mix and will contribute to the reduction in electricity imports. The generation of clean energy also contributes to Zimbabwe's Nationally Determined Contribution under the Paris Agreement. Table 3.5 gives a description of the solar plant project.

Table 3.5: ZFC limited 5MW solar PV (Mitigation Action E4)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration (Years)	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Construction of a 5MW solar PV plant	*Planned*	*ZFC limited (Pvt sector initiative)*	*Operation: 20*	*Energy, Energy Industries*	*Organisational*	*5MVA, 8,561 GWh p.a. and 1678.797 tCO_2eq p.a.*	*CO_2, CH_4, N_2O*
	Objective of the mitigation action						
	Generate 8.561GWh of electricity and feed into the grid						
	Brief description and activities planned under the mitigation action						
	The project will consist of a 5MW solar Photovoltaics (PV) system on 5 hectares of land. The company will sell the power to the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) under net metering arrangements. The generation of clean energy also contributes to Zimbabwe's Nationally Determined Contribution under the Paris Agreement. Activities for the project: a) Social and environmental impact assessment. b) Project initiation, including stakeholder mapping and consultations. c) Site Preparation-Land preparation including environmental and social impacts control. d) Determining the grid connection point- Engaging the Zimbabwe Electricity Transmission and Distribution Company (ZETDC) to establish the availability, location, and capacity of the grid connection. e) Construction- Procurement and installation by a technical partner, either an authorized. vendor or Original Equipment Manufacturer (OEM) under a fix and supply arrangement f) Commissioning- Commissioning will be done in two stages: cold (off the grid optimizing parameters) and hot commissioning (feeding into plant and grid). User training, development, and implementation of standard procedures for operations and maintenance. g) Post Construction and Monitoring Stage- Implementation of the solar energy supply contract monitoring reporting and verification systems with the ZETDC. Signing of maintenance contracts with a technical partner. The registration process under emissions trading: a) Project design b) National approval c) Validation d) Registration e) Registration of project by the Executive Board (EB) of a validated project as a CDM project activity or chosen standard. f) Monitoring:- ZFC Limited monitors actual emissions according to approved methodology. g) Verification h) Certified Emission Reduction (CER) issuance by EB.						
	Estimated outcomes and estimated emission reductions						
	Generation of 8,561 GWh annually resulting in 1,678,797 tCO_2eq being abated annually.						
	Methodologies and Assumptions						
	2006 IPCC Methodologies and UNFCCC tool for large solar PV projects						

	General description of the monitoring and reporting system						
	Amount of power (GWh) generated and fed into the grid annually will be recorded Emissions trading and CER verification report produced						
	Key indicators used						
Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Electricity generated annually	*GWh*	*0*	*8,560 GWh*	*2022*	*N/A*	2022	*ZFC, ZETDC and ZERA*
	Indicators related to GHG impacts						
GHG emissions displaced	CO_2eq	0	*8000*	*2022*	*N/A*	*2022*	*ZFC, National Communications Project Management*
	Indicators related to sustainable development (SDGs)						
Jobs created	*Number of people*	*0*	*Not calculated due to lack of capacity*	*Not estimated*	*Not estimated*	*Not estimated*	*Not estimated*

Solar Water Heating Programme

This mitigation action is in the form of regulations that promote solar water heating for household and commercial use. The details of the solar water heating programme are given in Table 3.6

Table 3.6: Electricity (Solar Water Heating) Regulations of 2019 (Mitigation Action E5)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration (Years)	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Electricity (Solar Water Heating) Regulations, 2019	*Implementation*	*Ministry of Energy and Power development*	*continuous*	*Energy, Energy Industries (1A1)*	*National*	*Energy saving, Electrical Demand reduction, GHG emissions reduction*	*CO_2, CH_4, N_2O*
	Objective of the Mitigation Action						
	To promote use of solar thermal energy in water heating and save electricity from the grid						
	Brief description and activities planned under the mitigation action						
	Regulation of the installation, licensing, operation, repair, maintenance, retrofit and upgrade of solar water heating systems for the production of sanitary hot water to save electricity.						
	Estimated Outcomes and Estimated Emission Reductions						
	The electricity consumption and emissions reductions were not estimated since projections of the electric geysers to be retrofitted and new Solar Water Heathers (SWHs) that will be installed were not estimated.						
	Progress of Implementation / Steps Taken/ Envisaged						
	The regulations (SI 235 of 2019) were enacted						

	Methodologies and assumptions						
	All new geysers will be powered by solar Full compliance with the Zimbabwean Standards specified in the Second Schedule of SI 235 of 2019.						
	General description of the monitoring and reporting system						
	The number and type of geysers will be recorded annually and the grid electricity consumed tracked by means of surveys by the Ministry of Energy and Power Development in consultation with ZETDC and ZERA.						
	Key Indicators Used						
Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Number of solar geysers installed	*Units*	*Not estimated*	*Not yet set*	*Not yet set*	*N/A*	*2020*	*ZERA, ZETDC, ZimStat*
	Indicators related to GHG impacts						
GHG avoided	*CO_2eq*	*Not estimated*	*Not yet set*	*Not yet set*	*N/A*	*2020*	*National Communications (CCMD)*
	Indicators related to sustainable development (SDGs)						
Electricity generated from the virtual power station	*GWh*	*Not yet estimated*	*Not yet set*	*Not yet set*	*N/A*	*2020*	*ZERA, ZETDC, ZimStat*
Number of jobs created	Qty	Not yet estimated	*Not yet set*	*Not yet set*	*N/A*	*2020*	*ZERA, ZIMSTAT*

3.3.2 IPPU Mitigation actions

The mitigation action reported in the IPPU pertains to N_2O abatement at a nitrogenous fertiliser manufacturing plant (Table 3.7). This involves re-engineering the Nitric acid plant by retrofitting an N_2O abatement reactor catalyst into the system to decompose the nitrous oxide into harmless constituent elements of nitrogen and oxygen.

Table 3.7: N_2O abatement in nitric acid production (Mitigation Action I1)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration	Sector[1] and subsector	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Nitrous Oxide (N_2O) Abatement in Nitric Acid Production	Planning	Sable Chemicals	Operation, 2021-2024	IPPU Chemical/ Nitric acid production	Company level	Reduce N_2O emissions by at least 6.75kg/ tonne of HNO_3 Jobs created during construction	N_2O
	Objective of the mitigation action						
	To reduce N_2O emissions by at least 6.75kg per tonne of nitric acid produced						
	Brief description and activities planned under the mitigation action						

	This involves re-engineering the nitric acid plant by retrofitting an N_2O abatement reactor catalyst into the system to decompose the nitrous oxide into harmless constituent elements of nitrogen and oxygen. The steps already taken include: • The Government of Zimbabwe joined the NACAG group in 2018 • Signing of Declaration and Statement of Undertaking by Government of Zimbabwe in March 2019 • Grant Application by Sable in 2019 • Due Diligence and technical assessments in 2019 • Selection of the technology in 2020 Steps envisaged to be undertaken • Signing of project implementation agreement (GoZ/GIZ/ Sable Chemicals) (In progress) • Closing of grant agreement between Sable and GIZ • Tender for abatement technology, installation of N_2O catalyst and commissioning • Setting up a regulatory system for reducing N_2O emissions from nitric acid sector
	Estimated outcomes and estimated emission reductions
	Reduction in N_2O emissions by at least 6.75kg/ tonne of nitric acid produced
	Methodologies and assumptions
	• N_2O emissions are calculated based on the IPCC tier 1 methodology. • The BAU scenario, since there are no policies or measures to abate N_2O emissions, it is assumed that 9kg of N_2O (ref: IPCC Tier1) are released per tonne of nitric acid produced throughout the forecast period (2021 – 2030). • With measures scenario includes mitigation with N_2O abatement technology • With additional measures scenarios, includes mitigation with N_2O abatement technology and a regulatory framework for long term N_2O emission reduction. • Direct N_2O emission measurements will be taken for “with measures” and “with additional measures” scenarios. • The N_2O emissions abatement is the difference between the BAU and with policies and measures scenarios.
	General description of the monitoring and reporting system
	The N_2O concentrations will be measured and monitored throughout the lifespan of the technology and the result provided in the company’s annual reports.
	Participation in market mechanisms
	• The sale of Carbon Emission Reductions (CERs) is generally excluded by the NACAG project. • Zimbabwe will account for the N_2O emissions reductions generated from this mitigation action in its NDC and these emissions will not be made part of an international transfer in accordance with Article 6 or any other provision of the Paris Agreement.
	Key indicators used

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year (2022)	Most relevant data sources for indicator value
	Progress indicators						
	Indicators related to GHG impacts						
Amount of N_2O reduced per tonne	Kg/ tonne of nitric acid produced	9kg N_2O per tonne of nitric acid produced	6.75kg N_2O per tonne of nitric acid produced	2021		Annually beginning 2022	Implementing company
	Indicators related to sustainable development						
Jobs created disaggregated by sex	Number of female employees and Number of male employees			2021		Annually beginning 2022	Implementing company

3.3.3. AFOLU Mitigation Actions

The AFOLU sub-sectors contribute significantly to national GHG emissions by up to 80%. The huge share of AFOLU-related emissions highlights the importance of the sector as a driver of GHG emissions and its potential in achieving the national GHG emission reduction target. The current mitigation action is in the forestry sub-sector and is aimed at reducing CO_2 emissions from conservation areas. Table 3.8 summarises the mitigation action for the Zambezi Valley Biodiversity Project.

Table 3.8: Zambezi Valley Biodiversity Project (Mitigation Action A1)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (GHG- & non-GHG related impacts,)	GHGs covered
Zambezi Valley Biodiversity Project	Implementation	Ministry of Environment Climate, Tourism and Hospitality Industry	2018-2024	Forestry	Sub-national	6000 ha woodland restored 245 597 ha Sustainable forest management; Reduction of 139136.5 tCO_2 per year	CO_2
	Objective of the mitigation action						
	To promote an integrated landscape approach to managing wildlife resources, carbon and ecosystem services in the face of climate change in the protected areas and community lands of the mid to lower Zambezi regions of Zimbabwe						
	Brief description and activities planned under the mitigation action						
	This 6-year GEF project focuses on reducing key threats for wildlife, habitat, and livelihoods of local communities (poaching, illegal wildlife trade, deforestation, and impact of climate change) in one of the key biodiversity country's hotspots – Lower Zambezi Valley. The project strategy aims to strengthen protected areas and Community Wildlife Conservancy (CWC) management for wildlife and woodlands.						
	Estimated outcomes and estimated emission reductions						
	Estimated outcomes 1. Increased national capacity for illegal wildlife trade control, and integrated wildlife and woodland management. 2. Improved capacity of protected areasnetwork and CAMPFIRE Wildlife Conservancies to protect globally significant biodiversity of the mid-lower Zambezi region over a total area of 1,616,900 ha. 3. Increased area under sustainable management and increased benefits for local communities from CBWM, SFM and SLM in established CWCs. Estimated emission reductions 1. Restoration of 6000 and 245597 ha of woodland and SFM area, respectively. 2. Emission reduction of 139136.5 tCO_2 per year						
	Methodologies and assumptions						
	FAO ExACT tool was used to estimate emissions mitigated by the project. Assumptions: Local people will remain attracted to the options introduced by the project and actively use opportunities provided by the project to develop sustainable livelihoods.						
	General description of the monitoring and reporting system						
	The table below illustrate the key indicators monitored in the project:						
	Key indicators used						

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year (20xx)	Most relevant data sources for indicator value
	Progress indicators						
Total area under improved CBWM in the project area, ha	Area (ha) under CBWM	0	334, 500	2018	334, 500	2024	MECTHI / ZPWMA
	Indicators related to GHG impacts						
Total woodland area restored	Area restored (ha)	0	6,000	2018	6, 000	2024	MECTHI /Forestry commission
CO_2 Emission mitigated	tCO_2eq	0	834,819	2018	834, 819	2024	MECTHI / Forestry commission
	Indicators related to sustainable development						
Number of people benefiting in the project area from CBWM, SFM, and SLM (f/m)	Number of people	3,438 (~f 50%/ m 50%)	14,000 (f 7000/ m 7000)	2016	14,000 (F 7000/ M 7000)	2024	MECTHI / Project office / Forestry commission
Average annual revenue from CBWM, SFM and SLM per target CWC, $US	%, USD	450,000	CWC revenue increase by at least 20% for the CBWM area	2016	CWC revenue increase by at least 20%	2024	MECTHI / ZPWA

3.3.4 Waste sector mitigation actions

Two mitigation projects were identified under the Waste sector, both focusing on Integrated Solid Waste Management (ISWM) programmes. The ISWM approach is a deliberate initiative that aims to reduce the impact of improper waste management and open dumping practices in Zimbabwe. Table 3.9 and 3.11 summarises the mitigation projects under the waste sector

Table 3.9: Sunshine Group Integrated Solid Waste Management Project (Mitigation Action W1)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration	Sector[1] and subsector (if applicable)	Scope [e.g. national, regional, city-wide]	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Sunshine Group Integrated Solid Waste Management (ISWM)	Implementation	Zimbabwe Sunshine Group	(2018-Ongoing	Waste-Solid Waste	City -wide	Composting 100 000 tonnes biodegradable waste/year	CH_4 N_2O
	Objective of the mitigation action						
	To reduce GHG emissions from solid waste disposal and treatment through composting						

	Brief description and activities planned under the mitigation action
	The private sector project focuses on waste recycling and composting. By separating waste at source waste is diverted from the landfill to waste transfer centres. Valuable material is also retrieved before it is contaminated and rendered unusable. At the waste transfer centres the waste is further sorted and processed to value add and thus fetch a higher price for the waste. The end products of the bio-waste value extraction process aid in suppressing GHG emissions as well the ultimate goal of ISWM. The interventions focus on the household level and institutional level building on already existing interventions and past experiences in household waste management and institutional waste collection centres respectively. The organisation has implemented pilot waste management projects in three distinct communities. The project activities include: a. Characterisation of waste and development of the most suitable interventions for diverting that waste from the dumpsites. b. Construction of waste handling facilities in Harare & establish a city-wide collection system. c. Establishing a waste composting facility. d. Raising awareness and encourage behavioural change in ISWM at the community and institutional levels through continuous community engagement, trainings, education and awareness campaigns e. Building a waste to energy plant f. Establishment of more waste composting facilities
	Estimated outcomes and estimated emission reductions
	• 100 000 tonnes of biodegradable material composted per year. • Reduction in GHG emissions (quantitative figures not available). • Decentralised community waste collection points.
	Methodologies and assumptions
	• 2006 IPCC guidelines for waste emissions estimation. **Assumptions** • People will cooperate in supplying waste for the composting project • Continued support from local authorities
	General description of the monitoring and reporting system
	Result monitoring will primarily employ survey-based information gathering while implementation progress monitoring will make use of implementing partner's monitoring system. An external evaluator will be engaged at the end each year to conduct an additional evaluation.
	Key indicators used

Name of the indicator	Unit	Indicator baseline value	Indicator target value	Year baseline and target value relate to	Indicator value in the last reporting year	Reporting year	Data sources for indicator value
	Progress indicators						
Amount of waste received at the collection centres.	tonnes	0 tonnes	1500 tonnes diverted for recycling	3000 tonnes of waste diverted for recycling	NA	2020	ISWM system statistics. recycling feed stock sheets
Schools Waste Transfer Stations (SWTS)	Number	0	50	60	NA	2020	Project commissioning Reports
Drive in and Drop Off (DIDOs) constructed and operational.	Number	0	2		NA	2020	Project commissioning Reports
	Indicators related to GHG impacts						
CH_4	*Not Calculated due to lack of capacity*	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity
N_2O		Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity	Not Calculated due to lack of capacity

	Indicators related to sustainable development (SDGs)						
Youth employed in ISWM operations	Number	1042	0	≥ 60% of 511 Jobs Created employ youth	≥ 60% of 531 jobs created employ youth	2020	ZimSunshine Employment database and system development report

Regional waste to energy plant in Bulawayo

The second mitigation action in the Waste sector is the regional waste to energy plant in Bulawayo and is summarised in Table 3.10.

Table 3.10: Regional waste to energy plant in Bulawayo (Mitigation action W2)

Name of the mitigation action	Status [idea, planning phase, under implementation]	Implementing institution	Duration	Sector[1] and subsector	Scope regional	Quantitative targets (both GHG-related and non-GHG impacts, as applicable)	GHGs covered
Regional Waste to Energy Plant in Bulawayo	*Planning*	*BCC & Private Company*	*Start date – 2021 Commissioning date – 2022*	*Waste and Energy*	*City-wide*	*90% CH_4 emission reduction from BAU,*	*CO_2, CH_4, N_2O*
	Objective of the mitigation action						
	• To generate electricity through waste conversion • To reduce GHG emissions from waste disposal sites • To create employment through direct and indirect activities • To integrate solid waste management system in each of the partner urban centres						
	Brief description and activities planned under the mitigation action						
	The project involves the construction of a waste to energy plant in Bulawayo. The Waste-to-Energy plant is expected to reduce the waste that is landfilled by about 90%. This project will involve improving waste collection from the current 92% to about 97,5%, and will also involve recyclates harvesting as a pre-incineration step. The electricity from the plant will be sold to industries that need assurance of constant power supply and any excess will be fed into the grid The project will involve a dual process of incinerating dry waste materials as well as using part of the biodegradable waste that goes to the landfill to generate electricity which will be fed into the grid at an agreed price. The project will result in reduction of emissions in the waste and energy sectors. CoB will improve waste collection and separation at source. Currently, about 100 000 tons of waste finds its way to the landfill per year, and 45-55% of that waste is biodegradable waste.						
	Estimated outcomes and estimated emission reductions						
	Energy produced, increased recycling rates, reduced landfilled waste hence increasing landfill lifespan, reduced methane emissions from the landfill (around 90% reduction) *Some of the outcomes are not estimated, due to limited capacity.*						
	Methodologies and assumptions						
	The CH_4 emissions at the landfill will be reduced with diversion of biodegradable waste to the electricity-generation plant, while the substitution of firewood and kerosene, which are the two major alternative energy sources whenever there is load-shedding, with the biogas-generated electricity will result in significant emissions reductions. The CoB would require capacity building in estimation of GHG emissions and the use of 2006 IPCC guidelines *Waste diverted to electricity generation and waste volumes landfilled will be monitored, so will the electricity generated and firewood, charcoal and kerosene usage. Ambient air quality at the landfill will also be monitored.*						

	General description of the monitoring and reporting system						
	Progress indicators						
Quantities of degradable waste separated from total waste collected	*tons*	*0*	*Not yet set*	*Not set*	*N/A*	*N/A*	*The CoB Annual Reports would include waste collected, waste sent to biogas digesters, waste sent for recycling and incineration*
	Indicators related to GHG impacts						
Landfill CH4 emissions	*tCO_2eq*	*Not yet set*	*Not yet set*	*Not set*	*N/A*	*N/A*	*N/A*
Waste sector CH4 emissions	*tCO_2eq*	*Not yet set*	*Not yet set*	*Not set*	*N/A*	*N/A*	*N/A*
	Indicators related to sustainable development (SDGs)						
Energy consumption per capita	*GJ/ person*	*29*	*Not set*	*2017*	*N/A*	*N/A*	*NC4*
Number of people employed	*number*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Steps taken							
• CoB placed the project in the investment prospectus • The project was awarded to a private company • An application for a National Project status with the relevant ministry was made and granted							
Envisaged steps							
• CoB intends to have detailed discussions with the private sector on issues such as technical and financial feasibility studies, project life span, start and commissioning dates, etc.							

4 Finance, Technology and Capacity Building Needs and Support Received

This Chapter presents the finance, technology and capacity building needs and support received for Zimbabwe's climate action.

4.1 Constraints and gaps, and related financial, technical and capacity-building needs

This section provides information on Zimbabwe's constraints and gaps, and related financial, technical and capacity-building needs. A number of gaps were identified and the related improvement actions are presented in Table 4.1

Table 4.1: Identified constraints, gaps and planned improvements

Sector	Constraints and gaps	Improvement actions	Lead responsibility	Priority	Criteria	Timing	Key success factors
Energy	Inadequate data on charcoal and firewood	Capacitate the Forestry Commission and ZimStat to be able to collect data on all charcoal and firewood produced in the country	CCMD	High	Growing sector Mitigation potential	Short-medium	Funding
	Lack of disaggregated data on energy consumed in industry	Capacitate the MoEPD, ZERA and ZimStat to be able to collect and record energy consumed in industry by fuel and by year, disaggregating by industry category using standardised classifications.	MOEPD CCMD	High	TACCC	Short	Funding
	Weak institutional arrangements to regularly provide relevant data on energy minerals and fuels.	Strengthen the institutional arrangements in the Energy Minerals and Value Addition departments in the Ministry of Mines to regularly provide relevant data on energy minerals and fuels.	Ministry of Mines and Mining Development	High	TACCC	Short term	Engagement Funding Inventory System
	Weak institutional arrangements to capture aviation data covering fuel and Landing and Take Off (LTOS)	Build capacity for CAAZ, ZERA and MoTID and ZimStat to capture aviation data covering fuel and LTOS by each aeroplane for both public and private run airlines.	Ministry of Transport	High	TACCC Mitigation potential	Short term	Engagement
	Lack of disaggregated data on fuel sales or use by major consumers	Capacitate ZERA to collect and avail data on fuel sales or use by major consumers.	CCMD	High	TACCC Mitigation potential	Short	Funding Engagement

Sector	Constraints and gaps	Improvement actions	Lead responsibility	Priority	Criteria	Timing	Key success factors
IPPU							
	Emissions of HFCs, PFCs and SF6 are currently not reported in National Communications.	Capacitate data providers to supply disaggregated activity data for estimating emissions of HFCs, PFCs and SF6	CCMD	High	TACCC	Short	Funding Expertise
	Weak institutional arrangements and legislation to provide required data	Set the institutional arrangements and legislation to ensure companies provide required data at scheduled times to meet the national inventory requirements.	CCMD	High	Sustainability	Short term	Climate Act
AFOLU	Absence of standardised templates and approaches for collecting livestock population. Inadequate financial resources to collect fire and land use data.	Standardisation of templates and approaches for collecting livestock population, fire and land use data	Experts CCMD ZIMSTAT Data Providers	High	TACCC	Short-term	Funding
	Lack of disaggregated activity data and country-specific factors	Conduct a livestock census. Characterise feed and nutrition factors across the revised agro ecological regions. Survey for manure management systems across livestock sub-categories	Experts CCMD ZIMSTAT Data Providers	High	TACCC Mitigation potential	Short-medium	Funding
WASTE	Lack of disaggregated data on waste streams and a systematic data collection system	Capacitate local authorities to characterise waste streams and develop a systematic data collection system.	Local Authorities	High	TACCC	Short term	Funding
	Inadequate capacity to conduct uncertainty analysis	Capacitate on uncertainty estimation associated with activity data, emission factors	CCMD	High	TACCC	Short term	Funding Expertise
	Emissions from medical waste incineration are currently not reported in National Communications.	Capacitate data providers to supply activity data for estimating emissions from medical waste incineration	CCMD	Medium	TACCC	Medium term	Funding Expertise
Cross-cutting issues	Absence of a national MRV system for mitigation	Develop a national MRV system for mitigation actions for all IPCC sectors	CCMD	High	TACCC	Short	Funding and Technical Support
	Lack of a MRV system for tracking finance, technology transfer and capacity building	Develop a tracking system for finance, technology transfer and capacity building	Ministry of Finance and Economic Development	High	TACCC	Short	Funding and Technical Support
	Inadequate capacity to conduct uncertainty analysis	Capacitate on uncertainty estimation associated with activity data, emission factors	CCMD	High	TACCC	Short term	Funding Expertise

4.2 Financial resources, technology transfer, capacity-building and technical support received

This section provides updated information on financial resources, technology transfer, capacity-building and technical support received from the Global Environment Facility, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including the preparation of the current Biennial Update Report.

4.2.1 Financial resources received

Table 4.2: highlights financial resources received by Zimbabwe mostly through the ministries responsible for climate change, environment and agriculture. Due to the absence of a climate finance tracking system, some resources flowing through other channels could not be captured.

Table 4.2:Specific financial support received by origin

Reporting period (2015-2020)						
Finance mobilised	Climate-specific amount		Status	Financial instrument	Project	Focus of support
	ZW$	US$ equivalent				
Global Environmental Facility		832,000	Disbursed	Grant	Fourth National Communication and First Biennial Update Report	Multi-Sector National Reporting
		10,000,000	Disbursed	Grant	GEF 6 - Strengthening Biodiversity and Ecosystems Management and Climate-Smart Landscapes in the Mid to Lower Zambezi Region of Zimbabwe	Environment and Climate Change
Green Climate Fund		300,000	Ongoing	Grant	Green Climate Fund National Designated Authority Readiness	NDA-Institutional capacity strengthening
		3,000,000	Ongoing	Grant	Green Climate Fund National Adaptation Planning	Adaptation
		35,722	Project completed	Grant	Support to IDBZ through PWC	Finance
		10,000,000	Committed, implementation commencing in 2021	Grant	Integrated Climate Risk Management for Food Security and Livelihoods in Zimbabwe focusing on Masvingo and Rushinga Districts – WFP	Agriculture, Early Warnings and Weather Indexed Insurance
		26,600,000	Ongoing	Grant	Building Climate Resilience of Vulnerable Agricultural Livelihoods in Southern Zimbabwe	Agriculture, Early Warning and Disaster Risk Management

Reporting period (2015-2020)						
Finance mobilised	Climate-specific amount		Status	Financial instrument	Project	Focus of support
	ZW$	US$ equivalent				
Climate Technology Centre and Network		200,000	Completed	Grant	Piloting rapid uptake of industrial energy efficiency and efficient water utilisation in selected sectors in Zimbabwe	Mitigation
		150,000	Completed	Grant	Developing a Climate-Smart Agriculture Manual for Agriculture Education in Zimbabwe	Agriculture
		200,000	Completed	Grant	Development of a Regional Efficient Appliance and Equipment Strategy in Southern Africa	Mitigation
		400,000	Ongoing	Grant	Leapfrogging Zimbabwe's market to energy-efficient refrigerators and distribution transformers	Mitigation
United Nations Development Programme – Russia Trust Fund		900,000	Ongoing	Grant	Support Towards Implementation of Zimbabwe's NDCs to the Paris Agreement on Climate Change	Mitigation
United Nations Development Programme		2,700,000	Ongoing	Grant	Supporting Enhanced Climate Action for Low Carbon and Climate Resilient Development Pathway	Mitigation, Adaptation;
		200,000	Ongoing	Grant	Climate Promise – Update of Zimbabwe's NDC	Mitigation
Nitric Acid Climate Action Group		2,250,000	Committed	Grant	Reducing nitrous oxide emissions from Sable Chemical Industries	Mitigation
World Bank		1,500,000	Disbursed	Grant	Zimbabwe Reconstruction Fund Climate Change Technical Assistance	Mitigation and Adaptation
Multi-donor Support		75,000,000	Ongoing	Grant	Zimbabwe Resilience Building Fund	Agriculture, Early Warning and Disaster Risk Management
TOTAL		137,050,000				

4.2.2 Technology Transfer

In 2014, the Government of Zimbabwe received Air Quality Monitoring Equipment support from the International Atomic Energy Agency (IAEA) worth Euro 20, 000 under the project titled, "Establishing and Improving Air Pollution Monitoring in Africa". The Air Quality Monitoring Equipment has been placed under the custody of the Environmental Management Agency, a parastatal of the MECTHI responsible for air quality monitoring and assessments. The equipment donation was complemented by a training workshop on the operation and maintenance of the equipment.

In 2019, the Government of Zimbabwe received 17 recovery machines and 100 recovery cylinders for use in capturing of HFCs and HCFCs from refrigeration and air conditioning appliances, through the Montreal Protocol HCFC phase-out project.

The Government of Zimbabwe further received support from the UNDP Russia Trust Fund through the project titled, Support Towards Implementation of Zimbabwe's NDC under the Paris Agreement on Climate Change, 2018 – 2020, in the form of:

- Forestry inventory equipment worth about US$25,000 for the Forestry Commission. The equipment will assist in data collection, processing and storage under the national forestry monitoring system.

- GIS equipment for Renewable Energy Database development by the Ministry of Energy and Power Development worth approximately US$25,000. The equipment is for Information, Communication Technology for data collection, mapping energy projects and feeding into the geo-database server.

4.2.3 Capacity Building and Technical Support

The National Inventory compilers, GHG data providers and technical officials from the Government received GHG data Quality Assurance and Quality Control (QA/QC) training from the UNFCCC in February 2020 to enhance the quality of activity data shared with national inventory compilers.

A number of capacity building initiatives were conducted to mobilize climate finances through the development of bankable project proposals by the Climate Technology Centre and Network (CTCN) through UNEP Denmark Technical University Partnership, World Bank under the Zimbabwe Reconstruction Fund's (ZIMREF) Climate Change Technical Assistance. Furthermore, the Ministry of Finance and Economic Development were trained on Climate Finance and Climate Finance tracking under the Green Climate Fund's Nationally Designated Authority Readiness Project.

4.3 Technology needs

Zimbabwe last conducted its Technology Needs Assessment in 2004. Most of the technology used in the country is imported and some of the technologies may have outlived their economic life and rendered obsolete. Therefore, there is need to conduct an updated Technology Needs Assessment and Capacity Needs Self-Assessment to inform its technology needs for enhanced climate change mitigation and adaptation actions.The Government of Zimbabwe developed its Low Emissions Development Strategy (LEDS) for the period 2020 to 2050, to guide the country towards a low emissions development pathway covering all the four IPCC sectors. Implementation of the LEDS requires technological, capacity building and financial support (Table 4.3).

Table 4.3: Support needed

Need identified	Specific type of support needed	When and for how long is support needed?	Indicative Financial support needed (mil US$)
NDC	MITIGATION:		
	Ethanol blending	2020-2030	100
	Solar water heaters		1,230
	Energy efficiency improvement		60
	Increasing hydro in our energy mix		5,000
	Refurbishment & electrification of the rail system		1,106
Sub-total			7,496
	ADAPTATION:		
	Adaptation in the agricultural sector		26,175
Total			33,671

The support pledged for climate action by origin is presented in Table 4.4.

Table 4.4: Support pledged for climate actions by origin

Programme	Source of pledge	Activities to be supported	Period	Financial support pledged (US$)
NDC Partnership	COMESA	Development of climate change legislation.	2020-2021	18, 920
		Targeted consultations with key data providers to feed into the definition of the baseline and the targets for the NDC.		18, 100
		Alignment of the sectoral plans and strategies with the Low Emission Development Strategy.		18, 920
		Detailed costing of proposed measures in the updated NDC including a cost-benefit analysis and the impact on the SDGs.		9, 700
	UNDP	Supporting NDC enhancement and revision in the country	2020-2021	430, 000
	UNEP	Expansion of the Sectoral coverage of the NDC to be economy wide	2020-2021	70, 851
		Prioritization, quantification of GHG emission reduction potential, and costing for identified measures for the updated NDC		66, 331
	FAO	Creating of a national MRV system and database for both mitigation and adaptation	2020-2021	29, 666
		National Forest Inventory Finalisation		20, 666
		Mapping of CSA Practices in the country		10, 666
	World Bank	Draft the revised NDC Report ahead of the 2020 Stock-take	2020-2021	300, 000
		Harmonization and integration of Public Investment Management (PIM) Guidelines and the Public Private Partnership (PPP) framework		75.000
		Mainstreaming climate change in project appraisal manuals for targeted sectors		75.000

Programme	Source of pledge	Activities to be supported	Period	Financial support pledged (US$)
	KAS	Consultations on the Legal instrument to guide climate change actions in Zimbabwe	2020-2021	30, 000
	GEF-UNEP	Supporting Zimbabwe's compliance with the requirements of the Enhanced Transparency Framework under the Paris Agreement on Climate Change	2020-2023	1, 324, 950
	ICAT	Supporting Zimbabwe in enhancing its capacity for mitigation and adaptation action transparency.	2020-2021	600, 000
	ADRiFi	Design of a Disaster Risk Financing Strategy	2020-2022	182, 790
		Strengthening of Data Collection Systems to Support Risk Profiling and Modelling		133, 877
		Strengthening Disaster Response Operational Modalities		98, 966
		Development of Climate Risk Profiles and Use of AFRICA RISK VIEW as Early Warning Tool		390, 987
	UNESCO	Climate Change Impact Assessment; Tool development for Disaster Risk Reduction (DRR); Education for Sustainable Development and Citizen Science and strengthen the role of BRs in Southern Africa.	2020-	700, 000
	CTCN	Development of an Electro mobility policy for Zimbabwe, incorporating implementation and market frameworks for the deployment and scale-up of Electric Vehicles	2020-2021	226, 417
		Developing Circular Economy Roadmaps for abating GHG emissions from the Waste Sector	2020-2021	TBA

Programme	Source of pledge	Activities to be supported	Period	Financial support pledged (US$)
	WFP	Distribution of Automated Weather Stations and Manual Rain gauges to be carried out in close collaboration with MSD.	2018-2023	100, 000
	UNDP	Economy wide Low Emissions Development strategy and MRV implementation across all sectors.	2021-2025	150,000
Total				5,354,807.00

5 ANNEXES

Annex 1: National legislation related to climate change

Zimbabwe's two key national instruments that drive its commitment to addressing climate variability and change are the National Climate Policy (2017) and the National Climate Change Response Strategy (2014). Other relevant policy, strategies and legislation that incorporate a climate change dimension include:

Zimbabwe's 2012–2015 Medium Term Plan (MTP)
National Environmental Policy and Strategies (2009)
Environmental Management Act (2003)
National Water Act (1998)
Meteorological Services Act (1990)
Civil Protection (against disaster risks) Act (1989)
The Environmental Impact Assessment Policy (1997)
The National Environmental Policy and Strategies (2009)
The National Fire Strategy and Implementation Plan (2006)
The National Energy Policy (2009)
The National Agricultural Policy Framework (NAPF)
The Water Policy (2012)

A number of socio-economic development policies have been developed in Zimbabwe in recent years, with various impacts on the economy. The current ones include Vision 2030 and the TSP. The country developed a number of policies that have climate change as their primary or secondary goals. These include the National Climate Policy (GoZ, 2017), NCCRS (GoZ, 2014), NDCs (2015) and Low Greenhouse gas Emission Strategy (LEDS) (2020-2050). Related environmental management instruments include National Environmental Policy and Strategies (2009) and the Environmental Management Act (Chapter 20:27, 2002). Table 1.8 shows summary of the country's policies and other instruments related to climate change.

Table A 1: **National climate change and related policies**

Instrument	Policy goal and strategies
National Climate Policy (GoZ, 2017)	Vision: A climate resilient and low carbon Zimbabwe Purpose of the Policy To guide climate change management in the country, enhance the national adaptive captive, scale up mitigation actions, facilitate domestication of global policies and ensure compliance to the global mechanisms. Primary Goals Develop and strengthen capacity in Weather, Climate Research and Modelling. Promote technology transfer, capacity building and information sharing. Reduce vulnerability to climate variability and climate related disasters by strengthening adaptive capacity. Accelerating mitigation measures by adopting and developing low carbon development pathways. Strengthen education and awareness to climate variability and change. Search for solutions to financial resource allocation, mobilization and management. Foster collaboration among national and international institutions in climate related issues. Strengthen governance structures for the climate policy to increase Zimbabwe's resilience to climate change and climate variability.

Instrument	Policy goal and strategies
NCCRS (GoZ, 2014)	Strategic objectives Mainstream climate change in all the key sectors of the economy. Promote resource use efficiency and less carbon intense pathways in all economic activities and develop a climate change resilient energy infrastructure that is not carbon intense. Develop climate proofed and environmentally sustainable transport systems that are less carbon intense. Promote sustainable development, management and utilization of water resources under changing climatic conditions. Promote sustainable land-use systems that enhance agricultural production, ensure food security and maintain ecosystem integrity. Address climate change through evidence-based research, technology development and transfer. Promote and protect health under a changing climate. Develop an effective climate change communication information management and communication system that facilitates access by all stakeholder groups. Strengthen and mainstream climate change in all education curricula. Develop and maintain an appropriate climate governance framework and institutional mechanisms aimed at coordinating climate change responses.
NDCs (2015)	The Mitigation Contribution for Zimbabwe is given as 33% below the projected Business as Usual energy emissions per capita by 2030. The adaptation component includes gender as a cross cutting issue. E. Mainstreaming gender responsive climate policies and emphasise special efforts to support vulnerable groups (women, youth and children) in climate change adaptation efforts within all sectors of the economy.
Constitution of Zimbabwe	Section 73 - environmental rights. Every person has the right to: An environment that is not harmful to their health and wellbeing; and To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and Secure ecologically sustainable development and use of natural resources while promoting social and economic development.
Low Greenhouse gas Emission Strategy (LEDS)	GDP) is projected to increase from USD 19,600million in 2020 to USD 119,100million by 2050 producing Business-As-Usual (BAU) greenhouse gas emissions (GHG) of 36.6 $MtCO_2eq$ in 2020 and 65.3 $MtCO_2eq$ in 2050. The 38 sector specific mitigation measures identified are largely economically viable at a Social Discount Rate (SDR) of 6%.
Environmental Management Act (Chapter 20:27, 2002)	To provide for the sustainable management of natural resources and protection of the Environment; prevention of pollution and environmental degradation;

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