



The Impacts of Green Credit Financing on Climate Change in Zimbabwe

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Abstract

Zimbabwe is highly vulnerable to climate change due to its heavy economic dependence on rain-fed agriculture and also high climate-sensitive resources. It is well known that just like elsewhere in the global village, the country has experienced quite a number of recurrent droughts, mid-season dry spells, flooding, hailstorms and cyclones that have reduced crop yields and livestock productivity and increased food insecurity and poverty. According to research, climate change is projected to worsen the situation by increasing the frequency and intensity of extreme weather events and also by reducing the length and reliability of the rainy season. Such changes will have huge negative impacts on the suitability and availability of land and water for agricultural activities and also distribution of pests and diseases. This paper therefore seeks to explore the effects of climate change on agriculture in Zimbabwe. Moreover, it serves as a foundation for why the government of Zimbabwe came up with the green credit finance as a strategy to counter effects of climate change.

Subject Areas

Green Finance and Environmental Development

Keywords

Climate Change on Agriculture, Green Credit Financing, Impacts of Climate Change, Zimbabwe

1. Introduction

It must be articulated from the onset of this paper that climate change is a global phenomenon that affects the environment and human activities, especial-

ly agriculture. Crucial to note is that the detrimental effects of climate change have influenced the government of Zimbabwe and other nations to implement green credit finance and other policies as a mitigation strategy. Climate change, agriculture and green credit finance are interrelated and all have important implications for the environment, food security and development.

Agriculture is one of major sectors of the economy that encompasses all activities related to the production, processing and distribution of agricultural products and services in Zimbabwe. According to Craig *et al.* (2016) [1], agriculture is the cultivation of plants and animals for food, fiber, fuel and other purposes. Agriculture is the mainstay of Zimbabwe's economy, yet recurrent droughts and the impacts of climate change through temperature increases and reduced rainfall are already negatively affecting Zimbabwe's agricultural sector particularly due to the high reliance on rain-fed crop production (Imran *et al.*, 2018) [2]. It is also crucial to highlight that in Zimbabwe, agriculture is a major driver of the country's economy as it contributes to food security, employment, income and exports (Emana *et al.*, 2017) [3]. Agriculture underpins the country's economic growth, food security and poverty reduction with approximately 70% of the population depending directly or indirectly on agriculture as a livelihood (Hussain *et al.*, 2020) [4]. The agricultural sector contributes an average of 11.3% (2012-2016 average) to annual GDP and 16% of the country's export earnings (Government of Zimbabwe and World Bank, 2017) [5]. Zimbabwe's main agricultural products are maize, sorghum, millet, wheat, cassava, cotton, tobacco, coffee, sugarcane, peanuts and livestock (cattle, goats, sheep, pigs, chickens, fish and others). Whilst, tobacco, sugarcane, maize and cotton are the main agricultural exports with tobacco and cotton contributing 25% and 12.5% respectively to GDP (Government of Zimbabwe, 2024) [6]. Agriculture contributes to climate change by emitting greenhouse gases, such as carbon dioxide, methane and nitrous oxide, from land use change, fertilizer use, livestock and rice production. However, climate change is defined by FAO (2024) [7] as the long-term shift in the climate's average temperatures and weather patterns caused by both natural and human contributions. It poses a very serious threat to agriculture in Zimbabwe as it can cause a number of effects such as changes in temperature and rainfall patterns, which can affect the suitability and productivity of crops and livestock, increased frequency and intensity of droughts, floods, storms and pests, which can damage crops and infrastructure, reduce yields, reduced availability and quality of water and soil resources amongst many detrimental effects. It is against this background that this paper seeks to assess the effects of climate change on agriculture in Zimbabwe.

Study Aims

This paper seeks to assess the effects of climate change on agriculture in Zimbabwe and lay a foundation as to why the government of Zimbabwe implemented the green credit finance as a strategy to counter climate change impacts.

2. Research Methodology

The study utilized qualitative research method, this approach according to De-Franzo (2024) [8] is used to gain an understanding of underlying reasons, opinions and motivations by providing insights into problem or helping to develop ideas and hypotheses for potential quantitative research. In other simpler methods, it is a method of observation that is gathered through non-numerical data.

2.1. Sources of Data

The study utilized online available secondary sources of information from across SADC countries, international and humanitarian institutions like the World Bank (climate smart agriculture, The World Bank has significantly scaled up its engagement and investment in climate-smart agriculture (CSA) [2] [4] [9]. In its Climate Change Action Plan (2021-2025) [9], the World Bank has identified Agriculture, Food, Water and Land as one of the five key transitions needed to tackle the Paris Agreement. The data from the UN (Food and Agriculture Organization to the United Nations (Thomas, 2020) [10], online related articles and journals as well for example environmental and planetary sciences articles of 2019-2022 in the Nature Communications journal such as the greenhouse gas impacts of converting food production in England and Wales to organic methods (Smith *et al.*, 2019) [11], fertilizer use by crop in Zimbabwe [12], and the impact of green credit policy on corporate risk taking [13]. Some of the reasons why the researcher used this methodology include that they are easily accessible and less expensive financially, they also save time and resources. They provide a large and diverse amount of data and information. Also, they enhance the validity and reliability of the research.

2.2. Findings

Globally, there is on one universally agreed definition of the term but according to FAO (2024) [7]. Climate is the long-term shift in the Earth's average temperatures and weather patterns caused by both natural and human activities, principally due to the burning of fossil fuels (Aron, 2019) [14]. Climate change refers to changes beyond the average atmospheric condition that are caused both by natural factors such as the orbit of Earth's revolution, volcanic activities and crustal movements and by artificial factors such as the increase in the concentration of greenhouse gases and aerosol (IPCC, 2019) [15]. Climate change is a very complex and also multifaceted phenomenon that affects the Earth's climate system in various ways (FAO, 2024) [7]. It is not just about global warming, which is the increase in the average temperature of the planet, but also about the shift changes in weather patterns, precipitation, sea level, ice cover, ecosystems and human activities that result from or contribute to the warming. Climate change can be a natural process where temperature, rainfall, wind and other elements vary over decades or more (IPCC, 2019) [15]. Global warming, others known as climate change has been increasingly recognized as the greatest threat of the

century (Bowe *et al.*, 2010) [16]. Consequently the world faces the most pronounced question over how our planet can sustain and feed this population due to climate change with its implications on food insecurity, access to clean water and sanitation, population migration and the threat of an increased number of both natural and man-made disasters (Crowley, 2000 [17], Klaus Paehler, 2007 [18]). The FAO (2024) [7] explains the causes, effects, solutions and actions to address the climate crisis such as cutting emissions, adapting to impacts and financing adjustments.

Table 1 outlines the causes of climate change, below is an explanation as in to how each factor contributes to climate change.

3. Causes of Climate Change

The causes of climate change can be categorized into two main causes that are natural and man-made causes. According to Klaus Paehler (2007) [18], the natural causes are many including Earth's orbital changes, solar variations, volcanic eruptions and ocean currents, the human causes include burning of fossil fuels, land-use and deforestation.

3.1. Natural Causes

1) Ocean current

The oceans have been shown to be the crucial and major component of the climate system. It is said that ocean currents move vast amounts of heat across the entire global community. Wind push horizontally against the sea surface and drive ocean current patterns. Interactions between the ocean and atmosphere can also produce phenomenon called El-Nino which occurs every 2 to 6 years. It has shown that deep ocean circulation of cold water move from the poles towards the equator and warm water from the equator back towards the poles. Without this movement the poles would be colder and the equator warmer. The

Table 1. Causes of climate change.

Causes of climate change	Natural	Man-made
Current ocean	Natural cause	
Volcanic activities	Natural cause	
Earth's orbital changes	Natural cause	
Cloud's contribution	Natural cause	
Solar variation	Natural cause	
Green house gas emissions		Human cause
Farming		Human cause
Deforestation		Human cause
Industrial pollutions		Human cause
Land use		Human cause

oceans play an important role in determining the atmospheric concentration of CO₂. Changes in ocean circulation may affect the climate through the movement of CO₂ into or out of the atmosphere (Brown *et al.*, 2012 [19], Hoffman *et al.*, 2010 [20], Barley, 2010 [21]).

2) Volcanic activities

Volcanic eruptions are known to throw out large volumes of sulphur dioxide, water vapour, dust and ash into the atmosphere. It is known that large volumes of gases and ash can influence climate patterns for years by increasing planetary reflectivity causing atmospheric cooling. Tiny particles called aerosols are produced by volcanoes. Because these reflect solar energy back into space, they have a cooling effect on the Earth's surface (Ammann *et al.*, 2010) [22].

3) Earth's orbital changes

The Earth makes one revolution around the sun once a year tilted at an angle of 23.5° to the perpendicular plane of its orbital path (Crowley, 2000) [17]. The changes in the tilt of the Earth can lead to small but climatically important changes in the strength of the seasons, more tilt means warmer summers and colder winters; less tilt means cooler summers and milder winters (Crowley, 2000) [17]. Slow changes in the Earth's orbit lead to small but climatically important changes in strength of the seasons over tens of thousands of years. Climate feedbacks have been shown to amplify these small changes, thereby producing ice ages (Perkins, 2010) [23].

4) Cloudy's contribution

Perkins (2010) [23] reported that global satellite analysis supported by climate models have revealed that could cover accentuate warming because as Earth's average temperature rises, clouds will accelerate global warming by trapping more heat. Dessler (2010) [24] analyzed satellite data gathered between 2000 and 2010 to estimate the short-term variations in the amount of visible and infrared radiation emitted to space. He made allowance by subtracting other influencing factors such as Earth's surface reflectivity and the heat-trapping effects of atmospheric water vapour as well as how clouds affected the planet's radiation balance as a function of temperature over the decade. The results showed that clouds enhance warming by trapping on average an extra 0.54 watts per square meter for every 1°C rise in global average temperature.

5) Solar variation

The sun is known to be the source of energy for planet's climate system. Although the sun's energy output appears constant from an everyday point of view, small changes over an extended period of time can lead to climate changes (Klaus Paehler, 2007) [18]. According to Perkins (2010) [23], it has been speculated that a portion of the warming in the first half of the 20th century was due to an increase in the output of solar energy. As the sun is the fundamental source of energy that is instrumental in the climate system (Crowley, 2000) [17], it would be reasonable to assume that changes in the sun's energy output would cause climate to change. Studies by Crowley (2000) [17] and Klaus Paehler (2007) [18] have shown that if this were so it would be expected to see warmer temperatures

in all layers of the atmosphere. However, contrary, the cooling was observed in the upper atmosphere, a warming at the surface and in the lower parts of the atmosphere. Accordingly this was shown to be due to greenhouse gases capturing heat in the lower atmosphere. In addition climate models that included solar irradiance changes could not reproduce the last century's observed temperature trend without including a rise in greenhouse gases suggesting that GHGs are the main cause of climate change (Klaus Paehler, 2007) [18].

3.2. Man-Made Causes

It has been shown (Klaus Paehler, 2007) [18] that climate is changing due to man-made greenhouse gases from burning fossil fuels for electricity, cars, trains, aircrafts, homes, flaring of gas at oil fields like in Nigeria etcetera. Furthermore, land-use and deforestation add pressure to greenhouse gases.

According to UN Climate Action report (2010) [25], increasing greenhouse gas emissions from human activity act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures. Examples of greenhouse gas emissions that are causing climate change include carbon dioxide and methane. These come from burning fossil fuels such as gasoline for driving a car or coal for heating a building. Clearing land and forest can also release carbon dioxide (Allen *et al.*, 2010) [26]. Landfills for garbage are another source and according to IPCC (2019) [15], energy, industry, agriculture and waste disposal are among the major emitters. According to UN (2010) [25], the main cause of climate change is the human emission of greenhouse gases, such as carbon dioxide and methane, that trap heat in the atmosphere and enhance the natural greenhouse effect. In addition these emissions come from burning fossil fuels, deforestation, agriculture and other activities, other factors that influence climate change include natural variability, such as El Nino and La Nina cycles, volcanic eruptions, changes in the sun's activity and variations in the Earth's orbit.

3.3. Challenges for the Agricultural Sector

Projections indicate that current trends in population growth will continue, with population more than doubling from 13.1 million in 2012 to 29.6 million in 2050 and further increasing to 40.2 million in 2100 (FAO, 2024) [7]. The rapid population growth of 2.8 percent per year (UN, 2010) [25] and will likely exacerbate the competition for and degradation of the natural resource base, contribute to an increase in GHG emissions, and intensify vulnerability to climate-related hazards. Already the country is experiencing food insecurity and has struggled to meet its strategic grain reserves (targeted at 500,000 tonnes in physical stock), especially in light of recurrent weather extremes such as droughts and prolonged dry periods. Drought is a major challenge for agriculture, affecting both crops and livestock. The country encountered 7 droughts, one in 1980, 1998, 2001, 2007, 2010, 2013 and in 2017 (World Bank, 2021) [27]. In 2015, agricultural output fell by 5 percent and in 2016 by a further 3.6 percent (FAO, 2024) [7].

Both these years were associated with drought conditions, with the recent 2015/16 El Nino-induced drought, which left 2.8 million people food insecure in the country (World Bank, 2017) [9]. Currently, Zimbabwe is facing a severe drought due to El Nino weather phenomenon, which has influenced to below-average rainfall and left millions in need of food assistance. Already the president of Zimbabwe has declared a state of disaster and called for international aid and stating that the country needs \$2 billion to address the crisis (Binswange *et al.*, 2012) [28]. The drought has affected over 80% of the country, with significant impacts on agriculture, food security and electricity production due to reliance on hydroelectric power (GoZ, 2016) [29]. According to GoZ (2016) [29], this situation is part of a larger pattern of extreme weather events in Southern Africa which are becoming more frequent and severe. Land degradation is a serious challenge in the country. Deforestation is a key risk factor to the natural environment and contributes to soil erosion. Most soils in the country are already acidic and highly leached (Acrisols) requiring proper soil fertility management to maintain and enhance production through practices such as integrated soil fertility management, erosion management, livestock management and irrigation water management from integrated soil management for sustainable agriculture and food security in Southern and East Africa, soil and water conservation, soil moisture management and conservation tillage in Zimbabwe [30] [31]. Government's investment has continued to decline in critical sectors such as agricultural extension, disease control, irrigation, livestock and mechanization. National budget allocations for agriculture have consistently gone down, and the country's allocation of 6 percent is below the recommendation in the Maputo Agreement (Nelson *et al.*, 2024) [32]. Critically, farmers lack access to finance from banks and Microfinance institutes. The lack of land tenure security for smallholder farmers who acquired land under the FTLRP constrains access to finance, as this land cannot be used for collateral. The lack of title is a limiting factor for agrarian investment in A1 and A2 farms across the country (World Bank, 2017) [9]. The presence of crop and livestock pests and diseases is also a challenge, particularly given that climate change may cause changes in their range and occurrence. For example, 2016 saw the emergence of the fall army-worm which was not previously known in the country but can cause up to 70 percent maize crop losses if not managed.

4. Effects of Climate Change on Agriculture in Zimbabwe

It is undeniable fact that climate change has both positive and negative effects on agriculture in Zimbabwe but all depending on the type, location and management of the farming system. Zimbabwe is endowed with abundant human and natural resources and these resources are interdependent, for instance since the economy is heavily reliant on agriculture and electricity, its strength and stability are linked to the climate and particularly the state of the country's water resources. The effects of climate change are diverse and also widespread, affecting

both natural and human systems. Some of the effects are shown in **Table 2** and **Figure 1**.

4.1. Negative Effects of Climate Change in Table 2

Reduced crop yields and livestock productivity

This is one of the most critical negative impacts of climate change on agriculture in Zimbabwe. Climate change reduce crop yields and livestock productivity due to a number of factors but not limited to droughts, floods, heat stress, pests and diseases (Amare *et al.*, 2018) [33].

Food Insecurity and poverty

Climate change just like elsewhere in the SADC and African continent has been a major driving force of food insecurity, malnutrition and poverty (Hachigonta *et al.*, 2013) [34]. Climate change increases food insecurity, malnutrition and poverty especially among rural households because they depend on agriculture for their livelihoods in Zimbabwe.

Loss of biodiversity and ecosystem services

Climate change has negatively impacted biodiversity and ecosystem services in Zimbabwe. Loss of biodiversity and ecosystem services is due to land degradation, deforestation, desertification and other human activities like urbanization.

Increased greenhouse gas emissions

Climate change has influenced certain agricultural practices that are increasing the green house gas emissions. There is an increased on greenhouse gas emissions from agricultural activities such as burning of savanna and sugarcane fields, enteric fermentation and manure management.

4.2. Positive Impacts of Climate Change on Agriculture in Table 2

Increased crop diversification and intensification

Climate change has catered for agricultural opportunities by enhancing crop diversification and intensification through utilization of drought tolerant, early maturing and high yielding varieties. These have somehow improved the crop yields against the concurrent climate change rainfall patterns that are constantly changing one season after another (Seed Co Group, 2024) [35].

Table 2. Effects of climate change on agriculture in Zimbabwe.

Negative effects of climate change on agriculture	Positive effects of climate change on agriculture
Reduced crop yields and livestock productivity	Increased opportunities for crop diversification and intensification
Increased food security and poverty	Enhances soil fertility and carbon sequestration
Loss of biodiversity and ecosystem services	Improves water availability
Increased greenhouse gas emissions	Enhances farming technologies like irrigation

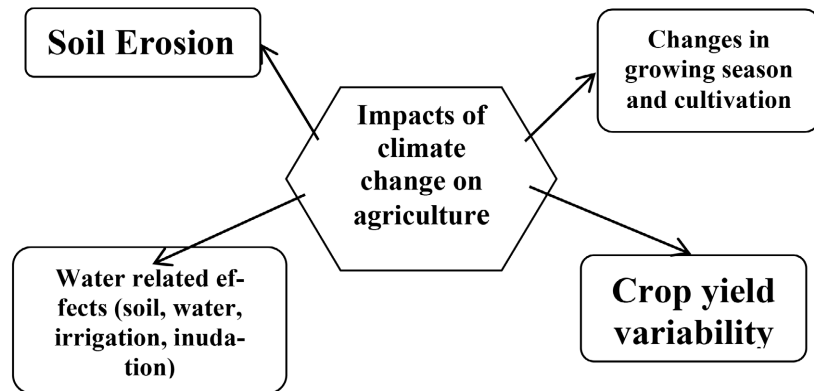


Figure 1. Climate change impacts on agriculture in Zimbabwe.

Improved water availability

It crucial to highlight that prolonged exposure to droughts and dry seasons has influenced the agricultural landscape of Zimbabwe by improving water utilization, management and sustainable mechanisms. Improved water availability and quality due to water harvesting, and conservation techniques has been one of positive impact of climate change on agriculture in Zimbabwe.

Enhancing soil fertility and carbon sequestration

Climate change has enhanced soil fertility and carbon sequestration due to conservation agriculture, agroforestry and manure management practices as well.

Enhanced agricultural-technologies and mechanisms

Climate change has impacted the landscape of agriculture in Zimbabwe by enhancing new farming technologies and mechanisms such as irrigation. Climate change has also revolutionized the agriculture in Zimbabwe (Seed Co Group, 2024) [35]. It has created new initiatives in agriculture that utilize limited resources and are sustainable. Such an example is irrigation farming mechanisms that have resurfaced the agricultural landscape of Zimbabwe. Another example of commercial fish farming has resurfaced in the agri-business of Zimbabwe.

- **Soil erosion**

Soil erosion is the process of soil particles being detached and transported by water, wind or gravity (Abay *et al.*, 2020) [36]. It can influence climate change in several ways including, reducing the amount of organic carbon stored in the soil, which can increase the amount of carbon dioxide released into the atmosphere. Also, soil erosion can also affect the albedo or reflectivity of the land surface. Eroded soils tend to have lower albedo than intact soils, which means they absorb more solar radiation and heat up the surface, this can create a positive feedback loop that enhances warming.

- **Changes in growing and cultivation seasons**

Climate change influences changes in growing and cultivation seasons by altering temperature, precipitation, and frost patterns in different regions. This

can have both positive and negative impacts on crop production and food security. Climate change may lengthen the growing season in some regions by advancing the onset of spring and delaying the onset of autumn. This can allow for more crop diversity, higher yields and multiple harvests. However, it can also expose crops to more heat, stress, water scarcity, pests, diseases and weeds. Climate change can make conditions better or worse for growing crops in different regions, depending on the type of crop, degree of change and the ability to adapt. Farmers and ranchers can use various strategies to cope with the changing growing and cultivation seasons, such as selecting suitable crops and varieties, adjusting planting dates, using irrigation and fertilization and adopting climate-smart practices.

- **Water related effects**

Climate change and water related effects are closely interrelated and both influence each other as water both a cause and a consequence of climate change as well. The main effects include changes in precipitation patterns, which can lead to more floods or droughts, depending on the region and season. This can affect water availability, quality and demand for various sectors and users. Another effect is rising sea levels which can result from melting ice sheets and glaciers and thermal expansion of seawater. This can threaten coastal areas, infrastructure and ecosystems, and increase the risk of saltwater intrusion into freshwater sources. Climate change and water related effects pose significant challenges for water management, planning and governance as they increase the uncertainty variability and complexity of water resources.

- **Related impacts and effects of climate change**

According to Dessler (2014) [24] of all the holocausts that have afflicted mankind such as plagues, earthquakes, tsunami, smallpox, HIV & AIDS etc none has the greatest threat to wipe out lives on Earth through either continuous flooding or permanent drought than climate change. The IPCC (2019) [15] report has succinctly identified the most relevant impacts of climate change on human health as changes in conditions, temperature, rainfall, humidity and wind likely to alter the intensity and geographical distribution of extreme weather events, raise water levels in coastal regions, alter the distribution of vector insects and mammals, exacerbate health-relevant air pollution, intensify the existing burden or malnutrition and increase human exposure to toxic substances due to the deterioration of natural and man-made environment.

A number of people think climate change mainly means warmer temperatures, but temperature rise is only the beginning of the story. Earth is a system where everything is connected, changes in one area can influence changes in many others (Binswange *et al.*, 2022) [28] as suggested in **Figure 2** climate change have direct, indirect and socio-economic effect which all lead to agricultural vulnerability and extreme weather conditions. The consequences of climate change now include among others, intense droughts, water scarcity, severe fires, rising sea levels flooding, melting polar ice, catastrophic storms and declining biodiversity (World Bank, 2017) [9] as shown in **Figure 2**.

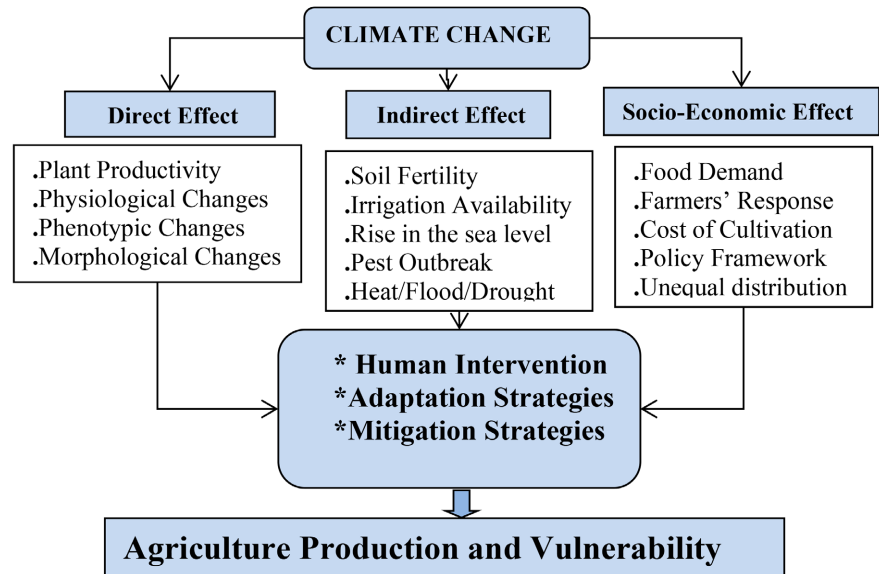


Figure 2. Direct, indirect and socio-economic effects of climate change in Zimbabwe.

According to World Bank (2017) [9], people are experiencing climate change in diverse ways. It affects our health, ability to grow food, housing, safety and work. Some of us are already more vulnerable to climate impacts such as people living in small island developing States. Conditions like sea-level rise and salt-water intrusion have advanced to the point where whole communities have had to relocate. In the future the number of climate, refugees is expected to rise (World Bank, 2017) [9].

Climate change affects the hydrology including underground water level, water temperature, river flow and water quality of lakes and marshes by impacting precipitation, evaporation and soil moisture content (Thomas, 2020) [10].

In addition, climate change has a wide range of impacts on the rural economy including agricultural productivity, revenues of the farm household and asset values and it also affects the agricultural infrastructure through the change in water sources available for agriculture (Thomas, 2020) [10].

5. Recommendations

Switching energy systems from fossil fuels to renewable like solar will reduce the emissions driving climate change, but we have to start now. While growing coalition of countries is committing to net zero emissions by 2050 about half of emissions cuts must be in place by 2030 to keep warming below 1.5°C. Fossil fuel production must decline by roughly 12% annually between 2025 and 2030.

5.1. Adapting to Climate Change Consequences

According to Craig *et al.* (2016) [1], adaptation refers to adjusting to the current or expected impacts of climate change, by reducing vulnerability and increasing resilience. Zimbabweans will have to adapt to survive the changes in the climate.

Adaptation should involve building the resilience of human communities and ecosystems to environmental shocks as well as implementing sustainable development measures that focus on improved natural resource management and strengthening social networks. Adaptation should be tailored to specific environments and societies. It should be influenced by local people and communities in participation with development agencies supported by local and national government structures. Local adaptation initiatives should be constructed on indigenous knowledge in collaboration with scientific research and technological advances as well. In addition, local communities should be helped on how to prepare disaster risk reduction plans. Some of the adaptation options include:

- Improving disaster risk management and early warning systems such as flood defenses, evacuation plans and emergency response.
- Constructing climate-resilient infrastructure and services such as reliable water supply, sanitation, health and education.
- Protecting and monitoring natural ecosystems such as wetlands, mangroves and forests that can provide buffer zones, habitat and carbon storage.
- Promoting sustainable agriculture and food systems such as crop diversification, irrigation and agroforestry that can enhance food security and livelihoods.
- Empowering and supporting vulnerable groups such as women, children, indigenous peoples and poor communities that are most affected by climate change.
- Strengthening local and national capacities and governance such as planning, monitoring and evaluation that can enable effective and participatory decision-making on climate change.

5.2. Water, Land, Vegetation and Communities

Zimbabwe should shift its focus and attention to management of water, land use, vegetation, and environmental preservation and on strengthening human communities.

- On water management

The priority should be given to protecting and conserving underground water resources by reducing soil erosion and conserving wetlands and aquifers.

- On land management

The focus should be on soil protection by controlling human activities like mining, urbanization, deforestation and improving agriculture.

- On vegetation management

It is crucial to conserve forests since vegetation has beneficial impacts on weather, soil and water systems. Agroforestry, control of wildfires and encouraging crop diversification are equally important.

- On human communities

Human communities can be strengthened by raising awareness about climate change and building capacity for adaptation strategies that build on indigenous

knowledge (Chanza, 2015) [37]. Also, educating local communities to strengthen their abilities to deliberate and act collectively by encouraging participation is a way to eventually achieve this.

5.3. Mitigation Recommendations

Mitigation refers to reducing greenhouse gas emissions or enhancing carbon sinks, such as forests that can absorb carbon dioxide from the atmosphere. Implementing green credit finance is one of the most crucial climate change mitigation strategies. Green credit finance is the provision of loans, grants, or other financial instruments to support environmentally friendly projects such as renewable energy, energy efficiency, sustainable agriculture, and natural resources management [13]. Green credit finance can help address the financing gap for climate action in the agriculture sector, by mobilizing public and private capital, reducing risks and costs and creating incentives and enabling conditions for climate-smart investments.

Some of the mitigation options include:

- Switching to renewable energy sources such as solar, wind and hydropower.
- Improving energy efficiency and conservation in buildings, transportation and industry.
- Promoting low-carbon lifestyles and behaviors such as recycling, composting and using public transport.
- Implementing carbon pricing, such as taxes or cap-and-trade systems, than can incentivize emission reductions and generate revenue for green investments.
- Supporting research and innovation in clean technologies and practices.
- Zimbabwe as a nation needs stronger, effective and efficient representation in international climate change negotiations in order to secure technical support and funding for adaptation.
- At both local and national levels, Zimbabwe needs to explore options for more efficient and cleaner power generation and encourage the use of renewable energy, particularly solar power and biogas.
- Mining, manufacturing and other heavy industrial enterprises should be encouraged to improve the energy efficiency of their operations and reduce emissions and land degradation as well.
- Companies that emit harmful gases should be heavily fined and also encouraged to invest in mitigation and adaptation measures through corporate social responsibility projects.

6. Conclusion

We believe that this paper serves to persuade policy formulators, decision-makers, and the government of Zimbabwe of the urgent need to prepare Zimbabweans to counter climate change and its attendant risks. More importantly from this paper is that we must act now to address the biggest threat to humanity and envi-

ronment today.

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Conflicts of Interest

The authors declare no conflicts of interest.

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