

1.0 INTRODUCTION

Zambia is endowed with a lot of natural resources and has been one of the major producers of copper and other minerals such as cobalt and emeralds. The country has large tracts of fertile arable land, which is suitable for agriculture. In the past five years, agriculture has been identified as one of the key sectors that could drive Zambia's economy.

Yet Zambia is among the world's countries most affected by hunger according to the global hunger index. There are also several agricultural related challenges that smallholder farmers in Zambia are facing. These include food insecurity, low farm incomes and high rural poverty levels. For example, rural poverty levels have remained persistently high at about 76% while maize average yields have remained around 2 metric tonnes (MT) per hectare (ha) when the world average is about 5 MT/ha. Despite an annual considerable share of the agricultural budget going towards the input subsidy program commonly known as the Farmer Input Support Programme (FISP), the above mentioned challenges have persisted. Partly this could be explained by monocropping being practiced by the majority of smallholder farmers in Zambia, injudicious use of chemical fertilizers/herbicides, burning of crop residues, weak soil erosion control measures amongst other poor agricultural practices. This is also perpetuated by policies that have consistently promoted the extensive production of maize even in areas where maize does not suit the soil and whether pattern.

Since the 1990s, Zambia has experienced some of its worst droughts and floods causing a major threat to the growth of the agricultural sector. This is increasingly becoming common as a huge challenge in the face of Climate change. Climate change has also affected sectors like mining and manufacturing that have been recording low productivity due to electric power deficits and load shedding caused by low water levels in reservoirs, resulting in job losses.

This was more eminent between 2010 and 2015. Load shedding has exacerbated deforestation due to increased use of charcoal and firewood.



In other words, load shedding is undoubtedly one of the primary drivers of increased production, trade, and demand for charcoal among Zambian households. The number of charcoal kilns produced per person has increased.

The likely impact of load shedding in Zambia is likely to lead to more clearing of forests and woodlands, unlike clearing land for agriculture, this is expected to lead to losses of forest ecosystem functions and forest ecosystem goods and services.

The contribution of smallholder farmers to the growth of the agricultural sector in Zambia cannot be over emphasized. Zambia has identified agriculture as one of the key pillars for economic growth and poverty reduction. To promote growth of the agriculture sector smallholder farmers need to embrace climate-resilient farming approaches and technologies by adapting to the changing climate faster and more comprehensively. One way to achieve this is by embracing sustainable agricultural practices that conserve natural resources and improve fertility of the soil. In turn this is likely to improve agricultural productivity, farm system resilience and improvement in household agricultural nutrition levels as well as dietary diversity. A famous quote by Wendell Berry simply states: “A sustainable agriculture does not deplete soils or people.”

Sustainable agriculture is different from conventional agriculture. Sustainable agriculture has the following basic features:

- It helps to maintain or improve soil quality and fertility because it increases the organic matter content of the soil and minimizes losses from soil erosion;
- It helps to improve internal nutrient cycles on the farm and in turn this reduces the dependence on external fertilizers.



2.0 SOME CAUSES OF CLIMATE CHANGE

i. Deforestation

Deforestation, which in Zambia is mainly caused by charcoal production, has destroyed many natural habitats. Agricultural land has been degraded as a result of deforestation and inappropriate agricultural practices.



To reduce deforestation and forest degradation, there is need to promote sustainable agriculture in order to discourage indiscriminate land clearing that may lead to deforestation. Another viable option would be having effective extension services that would encourage

farmers to diversify into other enterprises that do not encourage deforestation e.g. bee-keeping, fish farming, mushroom, etc.



ii. Modern agriculture

Modern agricultural practices contribute to loss of productive farmland and as a result farmers tend to abandon that land once it becomes eroded. Consequently, they make new fields in new areas e.g. forest areas and this leads into deforestation as they have to cut trees in making new fields. The other contributing factor to climate change from modern agriculture is the huge use of inorganic or chemical fertilizers, pesticides and herbicides which contribute to loss of soil organic and biodiversity.

3.0 SOME EFFECTS OF CLIMATE CHANGE

i. Changes in precipitation patterns(floods and droughts)



ii. Water depletion



4.0 ADAPTATION TO CLIMATE CHANGE

There are various adaptation measures that rural farming communities can apply in mitigating effects of climate change. Some of the agro-techniques for sustainable agriculture are:

i. Irrigation and rainwater management



ii. Application of animal/compost/organic manure to improve soil fertility



5.0 SOME BENEFITS OF SUSTAINABLE AGRICULTURE

Benefits of sustainable agriculture include the following:

- Increased production and productivity of crops over time
- Increased crop diversity in crop production
- Diversified and improved income base with moderate input use
- Improved environmental and land management practices
- Improved soil fertility
- Improved water retention as this can mitigate against low and/or variable rainfall
- Reduced soil erosion
- Improved household dietary diversity



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SUSTAINABLE AGRICULTURAL PRACTICES AND ADAPTATION TO CLIMATE CHANGE



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