

SUSTAINABLE HOUSE BUILDING: GREEN HOUSE

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Abstract

Thanks to a multitude of environmental stressors and poor adaptation ability the African continent is most vulnerable to climate change. Climate change stresses agriculture through rising temperatures and shifting patterns of precipitation, as well as increased soil instability, climate variability, pests and crop disease, and increased atmospheric carbon dioxide. Numerous strategies are being taken to increase these underserved famers ' potential for adaptation. Education on farming practices, food storage and preparation can be important steps in improving food safety. Educational programs are a method for educating farmers about the stressors of climate change and how they impact farming practices and food safety. Small, compact greenhouse solutions work to alleviate some of the effects of climate change and provide strategies for smallholder farmers to adjust to climate change. Greenhouses could not reverse climate change but are well suited to enhancing agricultural sector adaptive ability in developing nations. This article looks at sustainable greenhouses and their role in mitigating the effect of climate change on small holder farmers.

Keywords: *climate change, sustainability, green house, carbon dioxide.*

I. INTRODUCTION

The global population is increasing rapidly and is estimated to exceed 9 billion people by 2050. This growth is especially rapid in developing countries: the average population of at least 49 developing countries is growing twice as fast as the population of the most developed countries. The food security crisis, a major issue in sub-Saharan Africa where one in three people is malnourished, is aggravated by this concern. This tenuous condition is already being affected by climate change, and its consequences are predicted to deteriorate over time. In late 2007, food prices rose sharply, contributing to political and social unrest worldwide. Many of the demonstrations were due to, at least in part, high food prices. In addition, the gradual desertification of the area around the Sahara Desert by Sub-Saharan

Africa threatens food security. A number of these events have been attributed to climate change and are expected to escalate in the future. Farmers need ways to address these challenges to ensure their need for food security[1].

Agriculture is heavily reliant on unique climatic conditions that can be undermined by climate change. While global food production will increase with mild warming and more atmospheric carbon dioxide, extreme temperature changes will have the opposite effect of rising precipitation levels and other stressors of climate change. In the United States, where the effects of climate change are relatively well known, farmers can adapt to climate change stressors by changing their planting timetables and utilizing technologies such as silos, dams, and advanced irrigation techniques. Nonetheless, this adaptive potential (the ability to modify actions in response to changing conditions) is very limited in Sub-Saharan Africa. This is partly due to a lack of planning, inadequate infrastructure and poorly designed business processes[2].

To increase these underserved farmers' capacity for adaptation, various strategies are being taken. Training in agricultural practices, food storage and preparation can be essential steps in improving food safety. Educational projects are a way of informing farmers about climate change stressors and how they affect agricultural practices and food safety[3].

Innovative ways to enhance food security include the implementation of new technologies, such as irrigation systems and solar food dryers. These are distinct methods of food processing and storage that lead to improved food security. While other steps in the food value chain merit attention, production is the most sensitive issue. The process and technology needed to transfer food from producer to consumer is monitored by food value chains. This article looks at low-cost greenhouses, another agricultural technology, and offers an update on how to counter some of the detrimental effects of climate change by leveraging them.

Greenhouses are structures that allow the production of crops throughout the year and reduce by about 30 percent the growth time. This may contribute to a 300 per cent increase in crop yields. Water intake is thus reduced by about 60 percent. Low-cost greenhouses are particularly important because they are more affordable than other agricultural technologies for farmers who most need them. This article explores how sustainable greenhouses will help counter the effects of climate change and food scarcity in sub-Saharan Africa. It starts by presenting a technology overview and ends by reviewing the opportunities and challenges associated with improving food security and adaptive capability. This topic is of particular interest to government agencies, non-profit organizations and development organizations that are pursuing realistic, sustainable solutions to improving food security in regions at risk[4].

II. AFFORDABLE GREEN HOUSE SPECIFICATION

Greenhouses are structures covered in plastic or glass that prolong the growing seasons and increase food production. In many parts of sub-Saharan Africa, large commercial greenhouses run, but their costs render them inaccessible to many small farmers. These greenhouses, for instance, sell for around \$2,500 in Kenya, a price point that is far out of reach for most subsistence farmers. Instead of metal and glass, inexpensive greenhouses are

made of wood and plastic glazing, which lowers the plant's expense to around \$350. Their smaller size cheaper materials and easier design make them more affordable to small holder families while still offering the advantage of water conservation, climate control and pest protection[5].

Although urbanisation is rapid, growing cities offer a number of opportunities, but there are limitations in the proliferation of slums, high land prices, and construction materials that make houses unfit for the segment at the bottom of the pyramid. Therefore, the need for affordable housing for low-income groups would considerably increase. Most importantly, they must also be green when we are constructing homes for those parts of society. Green and sustainability principles are fortunately or unfortunately community-agnostic, in the sense that they also need to handle waste a little more carefully, be thrifty in energy & water use, handle waste in a hygienic manner to avoid epidemic outbreaks, reduce the use of virgin materials and above all improve their own quality of life[6].

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- *Glazing:* Glass or plastic glazing is the principal design feature of any green house. Plastic glazing is used to shield the plants from ultra-violet light and to maintain temperature stability within the glass or plastic glazing. This also leads to climate stability and allows the plant to grow at a faster rate. Low transport and easy plastic glazing installation, however, are some of the advantages over the glass, but regular maintenance and repair of the plastic tears is required. It has a total life span of 5 years. But by using glass, we can solve all these flaws[4].

- *Frame:* the frame of the affordable green house is the wood which is locally available everywhere. However wood must be treated to increase its life span and protect from the termite.

- *Drip irrigation:* Drip irrigation is a system where water flows through a filter through special drip pipes, with emitters placed at different spacing's. Water is dispersed through the emitters directly into the soil near the roots by a special slow-release device. If the drip irrigation system is properly built, installed and operated, drip irrigation can help achieve water conservation by reducing evaporation and deep runoff. Compared to other forms of irrigation systems, such as floods or overhead sprinklers, water may be directed more directly to the plant roots[7]. Additionally, gout can eradicate many diseases transmitted by irrigation water. Drip irrigation is suitable for any farmable slope and for most soils. Simple self made system is cheap and effective commercial drip irrigation.

III. CLIMATE CHANGE STRESSORS AND AFFORDABLE GREEN HOUSE

This paper addresses five major climate change stressors: increasing temperatures and increased climate variability, changing rainfall levels, soil instability, increased insect and crop diseases, and increased atmospheric carbon dioxide levels. The paper demonstrates how sustainable greenhouses deal with the effects of these stressors on smallholder farming.

- *Rising Temperatures and Increased Climate Variability:* Global climate change has had noticeable environmental effects already. Glaciers have shrunk, ice on rivers and lakes has melted faster, plant and animal ranges have shifted, and trees are flowering sooner. There are now changes that scientists had previously predicted would result from global climate change: loss of sea ice, rapid rise in sea level, and longer, more intense heat waves. Scientists are highly confident that global temperatures will continue to rise for decades to come, largely due to human-made greenhouse gases[8].
- *Changing Precipitation Rate:* rate of precipitation is mainly depending upon the change of the temperature but this rate has the devastating effect on the crops and plant .if current trend continue than the drought and regular rainfall agricultural yield by up 50 %.Periods of intense rain can be harmful in same way as the long dry periods. Heavy rainfall is very unwanted for the crop like tomato when they are growing in the open air atmosphere. Greenhouse is the main advantage in this case to protect the crop.greenhouse also have the gutter around their perimeter which divert the heavy rainfall and minimize the crop run off with the rain water[8].
- *Soil Vulnerability:*The long-term effect on soil quality is caused by climate change. Growing the risk of climate change puts a lot of stress on the quality of the soil and soil erosion, both of which directly affect the yield of crops. The Green House, which is the product of the long dry season and quick blowing wind, is a good medium to protect soil erosion. Owing to heavy rain as well as the slope of the landscape at the respective areas, soil is often eroded. However, dry soil is more vulnerable than wet soil to erosion.Green house is helpful to stop soil erosion and also helpful to avoids the wash out eroded soil[9].
- *Increased Pests and Crop Diseases:*In warmer weather conditions, which go hand in hand with many climate change stressors, the prevalence of pathogens and pests is likely to grow. Warmer winter temperatures allow repeated reproduction of pests such as grasshoppers many times a year, exacerbating the threat to agriculture. Conditions that tend to be warmer and wetter can also promote the production of moulds, fungi and bacteria that damage plants[10].

IV. CONCLUSION

As it contributes to life's survival on Earth, the greenhouse effect is important. The planet's temperature would be similar to that felt on the moon without the greenhouse effect. The surface can reach 134 degrees Celsius (273 degrees Fahrenheit) on the lunar surface during the day and -153 degrees Celsius (-244 degrees Fahrenheit) at night, with no temperature changes being mediated by the atmosphere. This dramatic temperature shift forced NASA to develop special gear to protect moon landing astronauts from both extremes. A big swing in the temperature of the Planet would have created an atmosphere that is poisonous to most living beings

V. REFERENCES

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