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Climate Change and the Postharvest Subsector

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SUMMARY

Postharvest losses account for more than 50 percent of total food production and climate change has been found to contribute significantly to these food losses. Climate change is one of the major causes of famine, especially in Sub-Saharan Africa. These changes negatively impact the quality, shelf life, and safety of harvested crops while also exacerbating postharvest losses due to heat stress and pest outbreaks. This article highlights the effect of climate change on the postharvest subsector, the mitigation and adaptation measures to address these effects and climate-smart postharvest technologies to minimise losses and support farmers' livelihoods in the face of an ever-changing climate.

INTRODUCTION

Globally, agriculture is one of the most vulnerable sectors to climate change particularly in Africa, where 90–95 percent of food production is rainfed (Campbell, 2022). In this wise, postharvest losses account for more than 50 percent of total food production, and climate change has been found to contribute significantly to these losses (FAO,2019). Climate changes are pointed to as one of the most important causes of recent famines, especially in Sub-Saharan Africa and with a projected global population increase from more than 7 billion in 2012 to 9 billion in 2050, it is estimated that food production must increase by more than 70% to meet future demand. However, experts have observed that increasing food production is not the solution to this food deficit but rather attention should be paid to postharvest management to reduce losses. Climate is the earth's normal weather over a very long time. These changes can be natural or anthropogenic. According to paleoclimatologists, climate always takes a hundred or thousand years to change. These changes are naturally induced (orbital causes, volcanic activity, rearrangements of continents and oceans). However, since the industrial revolution in the 1760s, the climate has been changing much faster, with the earth's temperature rising faster than ever before. This effect is known as global warming caused by an increase in the emission of greenhouse gases from human activities (burning of fossil fuel, agriculture, deforestation). Wild fire, flooding, the disappearance of islands, rising sea levels, melting of ice in the antarctica and variability in weather conditions have all been attributed to changes in the climate.

Climate change refers to long-term changes in temperature, precipitation patterns, and increased frequency of extreme weather events such as droughts, floods, and storms. Climate is always changing however; human actions and inactions have tremendously influenced rapid changes in global climatic conditions. The impact of climate change on agriculture and food security is a major issue of global concern. Over the years the effect of climate change on food systems have primarily focused on agricultural production while neglecting the impact on the postharvest subsector. Climate change is widely recognised for its profound effects on agricultural production; its impacts go far beyond the fields having a significant effect on the postharvest sector. These effects have resulted in an increasing level of postharvest losses (PHL). The postharvest subsector encompasses all the activities and processes that occur after crops have been harvested until they reach the consumer. These activities include handling, storage, processing, packaging, transportation, and marketing of agricultural products. This subsector plays a critical role in food security, reducing waste, and improving the economic value of agricultural products. The primary goal of the postharvest subsector is to maintain the quality, safety, and nutritional value of food while minimising losses and ensuring that products reach consumers in good condition. Climate change directly influences the primary causes of PHL which result in to biological, chemical, physical and mechanical damage (Johnson et al, 2024).

Effect of Climate Change on the Postharvest Subsector

Several quantitative and qualitative studies have affirmed the effect of climate change on the postharvest sector. These include the following:

- Higher temperatures can cause heat stress, affecting farmers during labourious activities like harvesting, threshing, and drying.

- Increased temperatures and moist weather conditions could result in grain being harvested with more than the 12-14% moisture required for stable storage.
- High temperatures and humidity increase the risk of mould growth, fungal growth, and mycotoxin contamination in stored crops.
- Climate change events may decrease the effectiveness of commercial grain protectants.
- Climate change events may lead to increased chemical and bio-deterioration of stored products, resulting in shorter shelf life.
- Irregular rains can dampen the mature crop before harvesting, which could result in economic loss.
- Erratic rainfall patterns hinder drying, potentially leading to rotting or germination, and wasting productive hours to re-dry wet harvests.
- The difficulty in predicting storage duration and planning postharvest management investment has increased.
- Fruit flavour, sugar content and fruit firmness have been reported to be affected by high temperatures.
- Flooding or drought can reduce water quality and increase the risk of pathogen transfer during the handling and storage of agricultural produce.
- Increased cost of storage, which reduces producer incomes and raises consumer prices.
- Increase in biological causes of PHLs such as mice, rats, insects, and microorganisms as a result of warmer and more humid conditions.
- Climate change can also disrupt the transportation of agricultural produce.

Mitigation and Adaptation Measures to Address the Effect of Climate Change on the Postharvest Subsector

Mitigation and adaptation measures are crucial to address the challenges posed by climate change on the postharvest subsector. Adaptation measure are defined as attempts to limit susceptibility to climate change while mitigation strategies aim at curbing the causes of climate change.

Adaptation measures to climate change for post-harvest agriculture involve mainly employing ‘good’ postharvest management practices such as:

(i) prompt harvesting and sorting to reduce the risk of carrying over pests from the field to stores;
(ii) Appropriate drying practices and re-drying in case the produce gets damp to reduce mycotoxin contamination;
(iii) protecting produce from rain by using covered or roofed structures when drying;
(iv) improved storage facilities and management.

Mitigation strategies include afforestation and reforestation, replacement of fossil fuels with renewable energy sources, recycling and reuse of organic and inorganic wastes, consumption of more plant-based food in order to minimise greenhouse gases emissions, use of renewable energy sources for processing, utilisation of climate-smart storage technologies like parabolic-shaped solar dryer (PSSDs) or the multi-crop dryer and sensitisation on the causes and effects of climate change.

CONCLUSION

Climate change is a global issue. Its impact on the postharvest subsector is enormous and multifaceted. This presents significant challenges to food and nutrition security, as well as economic stability. Proactive measures are crucial for ensuring the safety of our planet for future generations. Our climate-smart actions today will significantly impact the future! Be climate-smart; save the earth, save yourself and save posterity!

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