

CLIMATE SMART AGRICULTURE: WHY AND HOW?

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ABSTRACT

Climate change is a hard reality and may not be ignored. The continuously changing weather conditions affect crop yields by causing various biotic and abiotic stress. Climate-smart agriculture is a new way to adapt and mitigate climate change without compromising crop yields. Adopting climate-smart technologies help to sequester the carbon in the soil, reduces GHGs emission and prevent soil erosion and water erosion.



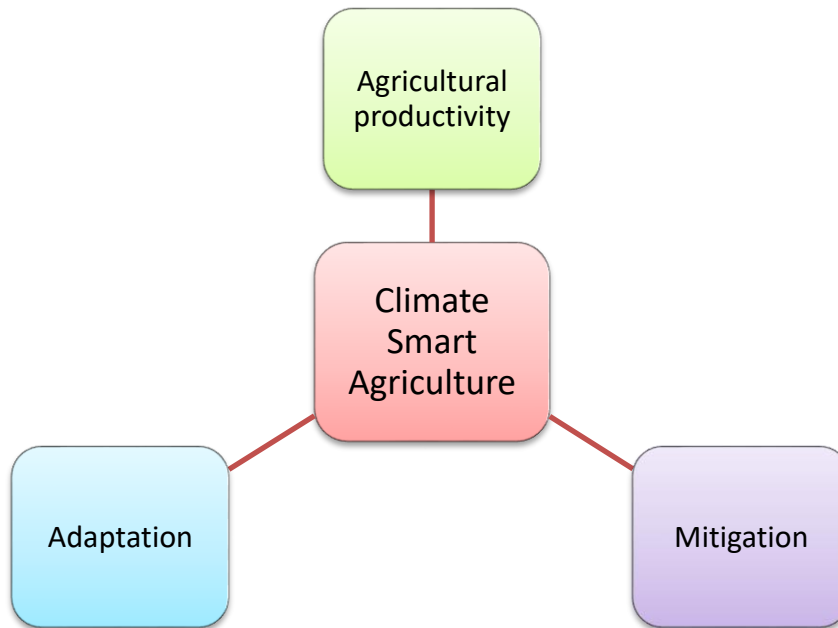
INTRODUCTION

Environmental conditions play a big role in agricultural production and sustainability. During the last century, considerable climate changes occurred, including the rise in CO₂ and temperature, erratic and aberration in rainfall patterns etc. This resulted in a decline in the productivity of crops in different parts of the world, where some parts were more affected than others. Hence, this brings the need to devise new innovative strategies to adapt and mitigate the effects of climate change to sustain agricultural productivity.

Climate-smart agriculture refers to a holistic approach that manages landscapes to support adapting agricultural methods, crops and livestock to the effect of climate change by sustaining food security. Climate-smart agriculture is based on three core pillars: 1) Increasing agricultural productivity, 2) Adaptation to climate change, and 3) Mitigation of greenhouse gases.

WHY CLIMATE SMART AGRICULTURE?

The industrial revolution in the 19th century and post-green revolution changes in landscape management laid the foundation of climate change through accelerated emission of greenhouse gases into the environment. In addition, the focus on increasing productivity on the expanse of available resources led to increased atmospheric GHGs and temperature. Due to this, weather conditions are significantly affected, leading to erratic and aberrant rainfall, drought, cyclones, and flood. The climate-smart agriculture gives hope to manage the resources optimally and efficiently to sustain agricultural productivity, help to adapt the weather abnormalities and reduce greenhouse gas emissions from the agriculture sector.



PRACTICES TO BE ADOPTED FOR CLIMATE SMART AGRICULTURE

ADOPTION OF NEW CROP VARIETIES: Breeders are continuously developing site-specific varieties and more resistant to climatic aberration. New crop varieties come with higher yield potential and resistance to biotic and abiotic stresses that help maintain agricultural sustainability by adapting to the new climatic conditions.

CROP MANAGEMENT: Appropriate crop management techniques may play a big role in an agricultural system's becoming climatic smart. The benefits of crop management strategies, which include conservation tillage, crop rotation, intercropping, crop diversification, the inclusion of leguminous crops in cropping systems, mulching, residue retention, organic farming, etc., have already been documented. These benefits include improved soil fertility, breaking the disease-pest cycle, and adding soil organic matter for carbon sequestration.

SOIL AND WATER MANAGEMENT: The faulty management practices resulted in the loss of top fertile soil and water. Adopting terrace farming, contour farming, contour bunding, strip farming etc., may help reduce soil erosion. In contrast, the adoption of appropriate techniques for irrigation, such as drip irrigation, sprinkler irrigation, rain gun, etc., may be adopted to minimize water loss and maximize water use for improving agricultural productivity.

NUTRIENT MANAGEMENT: Nutrient management is essential to achieve the desired agricultural productivity. Due to climate changes, nutrients applied to the soil can affect crop productivity and accelerate

the GHGs emission from farming. Hence, in climate-smart agriculture, the emphasis is given for adopting integrated nutrient management strategies where the sole dependency on fertilizer application for nutrient application is avoided. The practices like green manuring, organic manure application, variable rate nutrient application, site-specific nutrient management and nutrient expert are recommended for improving crop productivity and carbon sequestration.

AGROFORESTRY AND INTEGRATED FARMING SYSTEM: Adopting an agroforestry system is a great way to improve agriculture productivity and adapt and mitigate climate change. In agroforestry systems, trees are planted with the crop to sequester the carbon and prevent soil erosion. In addition, the trees provide fruits, fodder, fuel, and protection against soil erosion. Again, adopting an integrated farming system allows poor farmers to improve their nutritional and livelihood security by optimizing their resources and recycling the by-products.

BENEFITS

- ✓ Improvement in factor productivity.
- ✓ Improvement in soil fertility
- ✓ Reduction in the pest-disease incidence
- ✓ Reduction in soil and water erosion
- ✓ Carbon sequestration
- ✓ Decrease in GHGs from farm
- ✓ Increase in Yield
- ✓ Improvement in the B: C ratio

CONCLUSION

Climate change is a hard reality and may not be ignored. The continuously changing weather conditions affect crop yields by causing various biotic and abiotic stress. Climate-smart agriculture is a new way to adapt and mitigate climate change without compromising crop yields. Adopting climate-smart technologies help to sequester the carbon in the soil, reduces GHGs emission and prevent soil erosion and water erosion.
