



REPUBLIC OF KENYA



NAVCDP

National Agricultural Value Chain Development Project
Transitioning from Subsistence to Commercial Farming

Introduction to Climate Change and Climate Smart Agriculture





Introduction

Climate change and food and nutrition insecurity pose two of the greatest development challenges of our time. Yet a more sustainable food system can not only heal the planet but also ensure food security for all. Today, the global agri-food system emits one-third of all emissions. Global food demand is estimated to increase to feed a projected global population of 9.7 billion people by 2050. Traditionally, the increase in food production has been linked to agricultural expansion and the unsustainable use of land and resources. This creates a vicious circle, leading to an increase in emissions.

Food systems are the leading source of methane emissions and biodiversity loss, and they use around 70% of fresh water. If food waste were a country, it would be the third-highest emitter in the world. Meanwhile, emissions from agriculture are increasing in developing countries, which is a worrying trend that must be reversed. Without significant climate mitigation action in the agri-food sector, the Paris Agreement goals cannot be reached. Agriculture is the primary cause of deforestation, threatening pristine ecosystems such as the Amazon and the Congo Basin. Without action, emissions from food systems will rise even further with increasing food production.

Achieving the Triple Wins of Climate Smart Agriculture (CSA)

Climate Smart Agriculture (CSA) is a set of agricultural practices and technologies which simultaneously boost productivity, enhance resilience, and reduce GHG emissions. Although it is built on existing agricultural knowledge, technologies, and sustainability principles, CSA is distinct in several ways. It has an explicit focus on addressing climate change in the agri-food system. CSA systematically considers the synergies and tradeoffs that exist between productivity, adaptation, and mitigation. It encompasses a range of practices and technologies that



are tailored to specific agro-ecological conditions and socio-economic contexts, including the adoption of climate-resilient crop varieties, conservation agriculture techniques, agroforestry, precision farming, water management strategies, and improved livestock management. By implementing these practices, the following triple-win results can be achieved:

1. **Increased productivity:** Produce more and higher quality food without putting an additional strain on natural resources, to improve nutrition security and boost incomes, especially for 75% of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods.
2. **Enhanced resilience:** Reduce vulnerability to droughts, pests, diseases and other climate-related risks and shocks, and improve the capacity to adapt and grow in the face of longer-term stresses like increased seasonal variability and more erratic weather patterns.
3. **Reduced emissions:** Reduce greenhouse gas emissions of the food system, avoid deforestation due to cropland expansion, and increase the carbon sequestration of plants and soils.



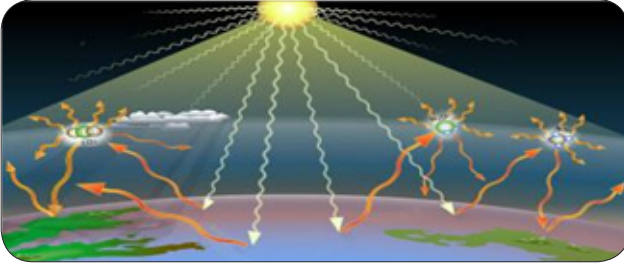
1. **Sustainably increasing agricultural productivity and incomes**
2. **Adapting and building resilience to climate change**
3. **Reducing and / or removing greenhouse gases emissions, where possible**

Source: FAO, 2017.

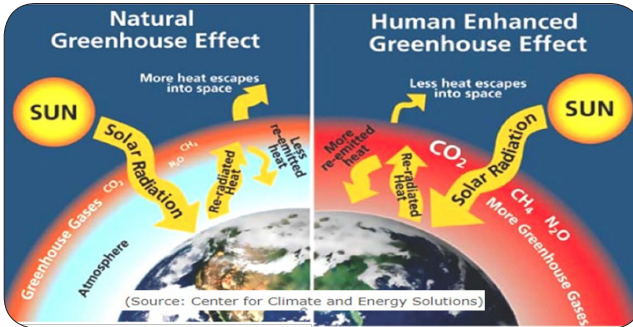
Main Pillars of CSA

Global warming and climate change

The effect of global warming manifests in various phenomena such as heat waves, rising sea levels, and increased incidences of draughts, among many other observed occurrences. As illustrated, global warming and climate change are intertwined.



Concept of global warming and climate change



Global warming and its causes

The greenhouse effect

Greenhouse gases, (including CO₂) accumulate in the atmosphere. They absorb thermal radiation (heat) from the earth's surface and redirect it back down to the earth, heating the planet. This is called the greenhouse effect, which is a natural phenomenon.



Greenhouse effect



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