Popular Article

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Recent Advances in Climate Smart Agriculture Relevant to Smart Farming

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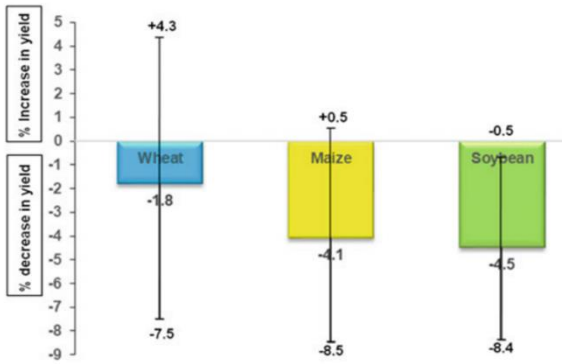
Introduction

A growing global population and changing diets are driving up the demand for food. Nearly 690 million or 8.9 percent of the global population are hungry. The food security challenge will only become more difficult, as the world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people. The environmental impacts of satisfying this increased food demand will be further aggravated by climate change1 . The problem also works in reverse. Agriculture is a major part of the climate problem. It currently generates 19–29% of total greenhouse gas (GHG) emissions. Around one-third of total production in the world is wasted, which in and of itself embodies a large carbon footprint.

Impact of Climate Change on Agriculture



- Changes in weather patterns
- Cyclonic disturbances
- Sea level rise (1.3mm/ yr)
- Changes in agricultural yields
- Decline in fresh water supply
- Impact on human health
- Impact on forest and natural ecosystem

Need of Climate Smart Agriculture

Climate change accelerates degradation processes in already-degraded environments and has negative impact on food production and food system. In India, the countrywide decline in major crop yields due to climate change effects between 2010 and 2039 could be as high as Nine percent. This has heightened the need to embrace the notion of Climate Smart Agriculture (CSA) in the face of

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climatic vagaries to reduce the negative impacts of climate change on agricultural systems. A transformation of the agricultural sector, including crop and livestock production, fisheries and forestry, is urgently needed to respond to climate change and sustainably increase agricultural productivity and incomes. Climate-smart agriculture is rooted in sustainable agriculture and rural development objectives which, if reached, would contribute to achieving the Millennium Development Goals (MDGs) of reducing hunger and improved environmental management.

CSA Definition

"Climate smart agriculture is an approach that helps guide actions to transform agri-food systems towards green and climate resilient practices." Food and Agriculture Organization.

Three pillars of CSA-

- Productivity: CSA aims to sustainably increase agricultural productivity and incomes from crops, livestock and fish, without having a negative impact on the environment.
- Adaptation: These services which are essential for maintaining productivity and our ability to adapt to climate changes.
- Mitigation: Wherever and whenever possible, CSA should help to reduce greenhouse gas emissions. This implies that we reduce emissions for each calorie or kilo of food, fiber and fuel that we produce, that we avoid deforestation from agriculture, and that we manage soils and trees in ways that maximize their potential to act as carbon sinks and absorb carbon dioxide (CO2) from the atmosphere.

Climate Smart Agriculture: Characteristics

- Contrary to conventional agricultural development, CSA systematically integrates climate change into the planning and development of sustainable agricultural systems.
- CSA"s three primary pillars are interrelated concerns-increased productivity, enhanced resilience and reduced emissions. However, the resultant trade-offs often cannot maximize the pillars simultaneously, only optimize them.
- CSA maintains ecosystem services: Ecosystems provide the agricultural sector with a number of unpaid services –clean natural water, materials, food, sunlight etc. CSA attempts to ensure the sustainability of these services, preventing their degradation.
- CSA is not a rigid set of particular practices, technologies or methodologies- it is only a concept amenable to adaptation. It has multiple entry points, ranging from the development of technologies and practices to the elaboration of climate change models and scenarios, information technology, insurance schemes, value chains and the strengthening of institutional and political enabling environments.

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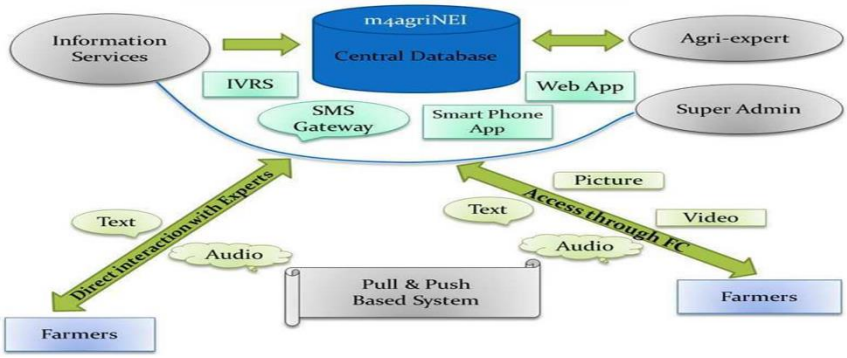
Dimensions Of Climate Smart Agriculture

- Weather smart
- Water smart
- Carbon smart
- Nutrient smart
- Energy smart
- Knowledge smart



Smart farming

- Application of modern information and communication technologies into agriculture.
- Include big data, the cloud and internet of things.
- Helps in tracking, monitoring, automating and analysing operation.
- used in agricultural production systems along with animal husbandry, horticulture, fisheries and forestry

why smart farming?

- To increase agricultural productivity
- To prevent soil degradation
- To reduce chemical application
- For the efficient use of water resources
- To disseminate modern farm practices
- To reduce cost of production
- To improve socio-economic status of farmers

Smart farming objectives- Agriculture with minimized financial & environmental risk.

Economic: optimum input quantities are more precisely targeted to realize maximum benefits

Environmental: input quantities are more judiciously utilized to minimized negative environmental impact.

Smart farming technologies

- Remote sensing
- Global Positioning System
- Geographic Information System
- Variable-Rate Technology

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