

Climate Smart Agriculture: Opportunities and Challenges

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Introduction

India is the largest producer of milk, pulses and 2nd largest producer of rice, wheat etc., Even though we are the supreme producer of major agricultural commodities we are not up to the mark in order to feed the growing population. Along with this climate change again acts as a Barrier in producing agriculture produce and Global population and changing diet are driving up to the demand for the food. Ocean health declining, natural resources including soil, water and biodiversity all are depleting. A 2020 report found that nearly 8.9% of the global population are hungry, it also estimated that we should produce about 70% more food by 2050 to feed an estimated 9 billion people. Along with this agriculture is intensified by extreme vulnerability to climate change. Climate change negative impacts are already felt in form of increase in temperature, weather variability etc., So in order to tackle climate variation and feed large population we may use climate smart practices as a means. Climate change refers to the variation in the Earth's global climate or in regional climates over time. It could show up as a change in climate normal for a given place and time of year, from one decade to the next.

Global Warming

Global warming is the long-term heating of Earth's climate system observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere.

Impact of climate change on Agriculture

Major stresses that will exert pressure on agriculture are:

- Change in rainfall patterns.
- Severe water stressed conditions in arid and semiarid areas.
- Changes in availability of irrigation water.
- It triggers some of the extreme events such as floods, Droughts etc.,

History of Climate smart agriculture

2009: Term Climate-Smart Agricultural development.

2010: 1st Global Conference on Food Security, Agriculture and Climate Change in The Hague - the concept of CSA was presented.

2012: At the 2nd Global Conference in Hanoi, Vietnam: Climate-Smart Agriculture Sourcebook advanced the CSA concept intending to benefit primarily smallholder farmers and vulnerable people in developing countries.

2013: 3rd Global Conference in Johannesburg, South Africa, discussions began on a climate smart agriculture alliance.

2014: Climate Summit in New York, the Global Alliance for Climate- Smart Agriculture Action plan was presented.

2015: The world Bank Group developed Climate change Action Plan as well as its 2025 targets to set Up climate Action.

2017: 4th global science conference held on climate smart agriculture in Johannesburg, south Africa.

2019: 5th global science conference on climate smart agriculture held in Bali, Indonesia.

3 pillars of climate smart agriculture

Increased productivity

Producing more and better food to improve nutrition security and boost the incomes especially of 75% of the world's poor who live in the rural areas and mainly rely on agriculture for their livelihood.

Adaptation

Strengthens resilience to climate related vulnerability like drought, pests, diseases and other climate related risks and shocks. It also improves the capacity to get adopted to the stresses like shortened seasons or any other erratic weather patterns.

Mitigation

It reduces the emissions produced from each calorie or kilo of food produced, It identifies ways to absorb carbon out of the atmosphere. It helps to reduce the greenhouse gases, emissions etc.,

Opportunities of climate smart Agriculture

- Proven Practices helps to achieve a Triple win for food security, adaptation and mitigation.
- Gives attention to climate risk management.
- Gives attention to Landscape Approaches.

By increasing the organic content of the soil through conservation tillage, its water holding capacity increases, making yield more resilient and reducing erosion. Soil carbon capture also helps mitigate climate change.

In many region, agriculture is an extremely risky business, so it gives its full attention to climate risk management practices.

Integrated planning of land, agriculture, forests, fisheries, and water to ensure synergies are captured. such approaches are essential if emissions from land cover change and deforestation are to be reduced.

Research Opportunity

- ❖ Evaluating new and existing climate-smart and gender sensitive agricultural options.
- ❖ Understanding the barriers to adoption of different climate-smart agricultural practices.
- ❖ Building evidence of the benefits of climate-smart agriculture.
- ❖ Identification of socio-economic and institutional barriers for adopting climate-smart portfolio.

Benefits of CSA

- ✓ Stable yields.
- ✓ Drought buffering.
- ✓ Reduced field preparation costs and reduced soil erosion.
- ✓ Climate change mitigation.

Challenges to CSA adoption

To do climate smart agriculture we need appropriate soil type and crop residues or other mulch. Farmers should get fertilizer and herbicides at affordable price. We need to put more effort to control weed. In climate smart agriculture we might get yield benefits little delayed. Scaling up CSA is complex because it involves more than scaling up technological innovations in agriculture. Envisioning, implementing and monitoring CSA requires integrating biophysical, socioeconomic and institutional dimensions, at different scales for successful scaling up CSA requires identifying and promoting appropriate practices, technologies or models (new, improved, adapted) within favorable enabling environments comprising supportive institutional arrangements, policies and financial investments at local to international levels. There is need to develop ICT-based agricultural information management and delivery system and effective and relevant modification and redesigning in available technologies and setting up of awareness and capacity building programs for farmers.

Conclusion

Developing countries must undergo a significant transformation in order to meet the related challenges of food security and climate change. Effective climate-smart practices already exist and could be implemented in developing country agricultural systems. Adopting an ecosystem approach, working at landscape scale and ensuring intersectional coordination and cooperation is crucial for effective climate change responses. Climate change is more complex and threatening than any other ecological problem. Farming practices are exposed to several, interconnected ecological, economic and social pressures motivated by climate change. There is need to enhance investment flows based on private sector activity and public-private partnerships to strengthen and establish well-networked with local organizations. Similarly scaling out climate-informed advisories and early warning should be taken on priority for reaching to last mile of village. Realizing the digital era in food systems, scaled out climate-resilient technologies and low-emission practices should be adopted.

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