Need for climate-smart agriculture in India

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Introduction:

The two most important issues facing humanity in the 21st century are climate change and food insecurity. The world's southern continents are reportedly experiencing severe drought due to climate change, which negatively impacts agricultural production and farmers' livelihoods.

Impacts of climate change on food systems:

1. Both population expansion and dietary changes are contributing to an increase in the demand for food. As a result of climate change, traditional farming practices are becoming less productive. Farmers are taking a variety of adaptation measures to reduce the negative effects of climate change.
2. The need for a holistic strategy is driven by climate change's dual challenges of adaptation and mitigation, and the pressing need for agricultural production to rise by 60% by 2050 in order to fulfill food demand.

A viable option:

As a viable option, climate smart agriculture (CSA) provides a holistic framework.
CSA comprises three pillars or objectives:

- Sustainably increase agricultural productivity and incomes
- Adapt and build resilience to climate change
- Reduce/remove GHG (greenhouse gases) emissions, where possible.
- Dimensions of climate-smart practices include water-smart, weather-smart, energy-smart, and carbon-smart practices. They improve productivity, deal with land degradation, and improve soil health.

Future impacts of climate change on agricultural productivity :

1. In India, crop yield decline owing to climate change (between 2010 and 2039) could be as high as 9%. In order to combat climate change and sustainably boost agricultural output and revenue, a radical reform of the agriculture industry is required.
2. United Nations' Sustainable Development Goals (SDG) aim to end hunger and enhance environmental management; CSA's foundation is in achieving these goals through sustainable agriculture and rural development.
3. National Action Plan on Climate Change (NAPCC) emphasises the role of climate resilient agriculture in India's adaptation measures.
4. Programmes such as the Soil Health Card Scheme (SHC) use precision nutrient management to optimise agricultural methods. The concept of precision farming is still somewhat novel in

India.

Advantages of climate smart agriculture (CSA):

1. CSA promotes crop diversification, increases water efficiency, and integrates drought resistant crop types, all of which help lessen the disruptive effects of climate change.
2. The importance of CSA lies in its ability to increase agricultural output while maintaining ecological stability, which is essential for long term food security and sustainable resource usage in a warming planet.
3. By reducing exposure to climate related dangers and shocks, CSA increases resilience in the face of long term stressors like shorter seasons and erratic weather patterns.
4. CSA also helps raise the economic autonomy of farmers. CSA causes a dramatic change in farming communities' economic and social structure by distributing information about and providing access to climate resilient methods.
5. As the climate changes, farmers, significantly those already disadvantaged, can gain enormously from adopting climatesmart techniques. The increasing popularity of CSA is a promising indicator for the future of biodiversity conservation.
6. CSA's ecosystem based approach and different crop varieties help cropland and wild regions coexist together. This collaborative effort helps to safeguard native plant species, keep pollinator populations stable, and mitigate the effects of habitat degradation.

Agriculture and climate change:

1. CSA aids in enhancing farmland carbon storage. The Paris Agreement goal of limiting global warming to 2 degree Celsius above pre-industrial levels by reducing GHG emissions is tied directly to the success of the CSA.
2. Agroforestry and carbon sequestration are two examples of CSA measures that could help India meet its international obligations and contribute to the global fight against climate change.

A unique juncture:

1. The majority of Indian farmers are small or marginal. Therefore, CSA can play a significant role in helping them increase their profits.
2. National Adaptation Fund for Climate Change, National Innovation on Climate Resilient Agriculture, Soil Health Mission, Pradhan Mantri Krishi Sinchayee Yojana, Paramparagat Krishi Vikas Yojana, BiotechKISAN, and Climate Smart Village are a few examples of government initiatives in India focusing on CSA.
3. Various public and private sector entities such as farmer producer organisations (FPOs) and NGOs are also working towards the adoption of CSA.

Conclusion:

CSA has the potential to assure food security, empower farmers, and protect our delicate ecosystems by merging innovation, resilience, and sustainability. In the face of a changing climate, the path of CSA stands out as a source of inspiration and transformation for a world working to ensure a sustainable future.