



Climate Resilient Agriculture

For Prelims: [Climate-resilient agriculture](#), [FAO](#), [climate change](#), [National Innovations on Climate Resilient Agriculture \(NICRA\)](#), [Indian Council of Agricultural Research \(ICAR\)](#), [Agroforestry](#)

For Mains: [Climate-resilient agriculture](#), [National Innovations on Climate Resilient Agriculture \(NICRA\)](#)

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Why in News?

Recently, the Union government is planning to **unveil a framework to promote [climate-resilient agriculture](#)** in 50,000 villages located in climatically-vulnerable districts.

What is Climate Resilient Agriculture (CRA)?

▪ About:

- According to the [Food and Agriculture Organization \(FAO\)](#), climate resilient agriculture is defined as “the ability of an agricultural system to anticipate and prepare for, as well as adapt to, absorb and recover from the impacts of changes in climate and extreme weather”.

▪ Impact of Climate Change on Agriculture:

- [National Innovations on Climate Resilient Agriculture \(NICRA\)](#), a network project of the [Indian Council of Agricultural Research \(ICAR\)](#) studied the impact of climate change on agriculture and farmers.
- Studies indicate that in the absence of adaptation measures, climate change projections are likely to reduce irrigated rice yields by 3%, rainfed rice yields by 7 to 28%, wheat yield by 3.2-5.3%, maize yield by 9-10% and increased the soybean yield by 2.5-5.5% for the **period 2020-2039**.
- Extreme events like **drought affect food** and nutrient consumption, increase incidence of poverty, encourage outmigration, increase indebtedness and reduce farmers' capacity to adapt to [climate change](#).

▪ CRA Practices:

- **Agroforestry:** [Agroforestry](#) involves the **cultivation of trees** along with crops, which can help to improve soil health, reduce soil erosion, and enhance biodiversity.
 - This practice helps to **increase soil moisture retention**, and provide multiple benefits to farmers.
- **Soil and Water Conservation:** Techniques such as **contour bunding, farm ponds, and check dams** can help to improve soil moisture retention, reduce soil erosion,

and increase groundwater recharge.

- These practices can also help farmers to **cope with droughts and water scarcity**, which are becoming more frequent due to climate change.
- **Sustainable Agriculture:** Practices such as [crop diversification](#), [organic farming](#), and integrated pest management help to reduce the use of chemical inputs and improve soil health.
 - These practices also reduce [greenhouse gas emissions](#) and improve farmers' income and food security.
- **Livestock Management:** [Livestock management](#) practices such as **stall-feeding** and **mixed cropping** can improve the productivity and resilience of livestock systems.
 - These practices also **reduce the pressure on natural resources** such as grazing lands, which are becoming scarce due to climate change.

What are Steps Taken by the Government for Climate Resilient Agriculture?

- The Government is implementing the [National Action Plan on Climate Change \(NAPCC\)](#) which provides a **policy framework** for climate action in the country.
- **National Mission for Sustainable Agriculture (NMSA)** is one of the Missions within the NAPCC to make Indian agriculture more resilient.
 - NMSA was approved for three major components i.e. [Rainfed Area Development \(RAD\)](#), On Farm Water Management (OFWM) and [Soil Health Management \(SHM\)](#).
 - Subsequently, four new programmes were introduced namely [Soil Health Card \(SHC\)](#), Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development in North Eastern Region (MOVCDNER) and [Per Drop More Crop](#).
 - In addition, the restructured [National Bamboo Mission \(NBM\)](#) was launched in April 2018.
- [Indian Council of Agricultural Research \(ICAR\)](#) has launched a flagship network project namely [National Innovations in Climate Resilient Agriculture \(NICRA\)](#) in 2011 to promote climate resilient agricultural practices.
 - It is a **multi-sectoral, multi-location program** carrying the major mandate of addressing climate change and variability, and addressing a range of stakeholders needs across the country.
 - Research, demonstration and **capacity building are the three major components**, besides providing policy briefs on several aspects related to agriculture and climate change.
 - The salient achievements of ICAR on climate resilient agriculture includes development of 1888 **climate resilient crop varieties**, development of District Agriculture Contingency Plans (DACPs) for 650 Districts etc.
- **Government has introduced flagship yield based [Pradhan Mantri Fasal Bima Yojana \(PMFBY\)](#) along with Restructured Weather Based Crop Insurance Scheme (RWBCIS) from Kharif 2016 to protect the farmers including small land-owners from climate hazards.**
 - The scheme aims at supporting sustainable production in agriculture sector by way of providing financial support to farmers suffering crop loss/damage due to unforeseen natural calamities, adverse weather incidence to stabilize income of farmers.

Other Initiatives Related to Agriculture

- [National Mission of Natural Farming \(NMNF\)](#)
- [Mission Organic Value Chain Development for North Eastern Region \(MOVCDNER\)](#)
- [National Mission on Sustainable Agriculture](#)

- [Paramparagat Krishi Vikas Yojana \(PKVY\)](#)
- [Sub-mission on AgroForestry \(SMAF\)](#)
- [Rashtriya Krishi Vikas Yojana](#)
- [AgriStack](#)
- [Digital Agriculture Mission](#)
- [Unified Farmer Service Platform \(UFSP\)](#)
- [National e-Governance Plan in Agriculture \(NeGP-A\)](#)
- **PM's 'NAMO Drone Didi' scheme**

What are the Key Challenges Related to Climate Resilient Agriculture?

- **Developing countries** are more vulnerable to climate risks since they rely mostly on agriculture, and lack the necessary technologies to manage the risk. For example in India **65% of the population** is engaged in agriculture and allied activities.
 - Due to the absence of **adequate mitigation and adaptation measures**, these poor farmers remain trapped in a cycle of low income, high debt, and poverty.
- The MSP regime currently focusses on few crops and **other crops are not assisted adequately** which results in lesser diversification of crops.
- Too much **reliance on groundwater particularly in northern India** negates the efforts done in the realm of sustainable agriculture.
- The agriculture sector contributes approximately 14% to the country's greenhouse gas emissions, with the **use of synthetic nitrogen fertilisers** significantly raising nitrous oxide emission rates.
- **India's agricultural productivity is relatively low** compared to other major producers, with an **average rice yield of about 2.5 tons per hectare**, whereas China averages about 6.5 tons per hectare.
- The most challenging political aspect of climate change policy is the **inadequate recognition by village Panchayats** or local self-governing bodies leading to lack of policy initiative at the ground level.

Way Forward

- The adverse impact of climate change on developing countries can be mitigated through **integrated approaches** such as technological advancements, meteorology, and data sciences.
 - The **National Innovations in Climate Resilient Agriculture (NICRA) Scheme** should be **implemented in all risk-vulnerable villages** to protect farmers from climate and meteorological incidents.
- There is a **need for diversification of crops** that will enable agricultural ecosystems to adapt to climate change.
 - Crop diversity also helps ensure **food security, enhancing soil fertility**, controlling pests, and bringing yield stability.
- The **ambit of drip irrigation should be extended** from high-value horticultural crops to wider varieties of crops.
 - The government should carefully reconsider electricity subsidies for groundwater extraction, as they significantly contribute to falling groundwater levels.
 - Tools which optimise irrigation schedules, conserve water, and minimise environmental impact must be used.
- Since **organic farming** has the potential to **minimise greenhouse gases** the Ministry should promote organic farming to help farmers adapt to climate change.

- Fertilizer Nitrogen is prohibited in organic farming which **leads to lower nitrous oxide emissions**.
- **Krishi Vigyan Kendras (KVK)** needs improvements in **infrastructure and technological facilities**. They should **use technological innovations** to impart information 24/7, and in **vernacular languages**. These changes will revamp existing KVKs and equip them to meet climate-related challenges.
- There needs to be **increased public investment in advancing and disseminating climate-resilient crop varieties**. These crops would have **heightened tolerance to temperature and precipitation fluctuations** and will be more proficient in water and nutrient utilisation.
 - **The agricultural policy must prioritise improvements in crop productivity**, and formulate safety nets to cope with climate change-induced risks.
- Efforts by governance in the realm of climate change may not yield results **unless the local government is included** in the agriculture policy formulation.
 - Since Panchayats can leverage funds from several government schemes, awareness at that level will be beneficial.
 - **Introducing a ranking system at the national or regional level** for villages adopting the best climate-resilient practices may incentivise adoption of such practices.

Drishti Mains Question:

Q. What are the major challenges faced in implementing climate-resilient agricultural practices, and suggest measures to overcome these challenges?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q. In the context of India's preparation for Climate -Smart Agriculture, consider the following statements:(2021)

1. The 'Climate-Smart Village' approach in India is a part of a project led by the Climate Change, Agriculture and Food Security (CCAFS), an international research programme.
2. The project of CCAFS is carried out under Consultative Group on International Agricultural Research (CGIAR) headquartered in France.
3. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India is one of the CGIAR's research centres.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

Q. With reference to the 'Global Alliance for ClimateSmart Agriculture (GACSA)', which of the following statements is/are correct? (2018)

1. GACSA is an outcome of the Climate Summit held in Paris in 2015.
2. Membership of GACSA does not create any binding obligations.
3. India was instrumental in the creation of GACSA.

Select the correct answer using the code given below:

(a) 1 and 3 only

(b) 2 only

(c) 2 and 3 only

(d) 1, 2 and 3

Ans: (b)

Mains:

Q. How far is Integrated Farming System (IFS) helpful in sustaining agricultural production? **(2019)**

PDF Reference URL: <https://www.drishtiias.com/printpdf/climate-resilient-agriculture-2>

