

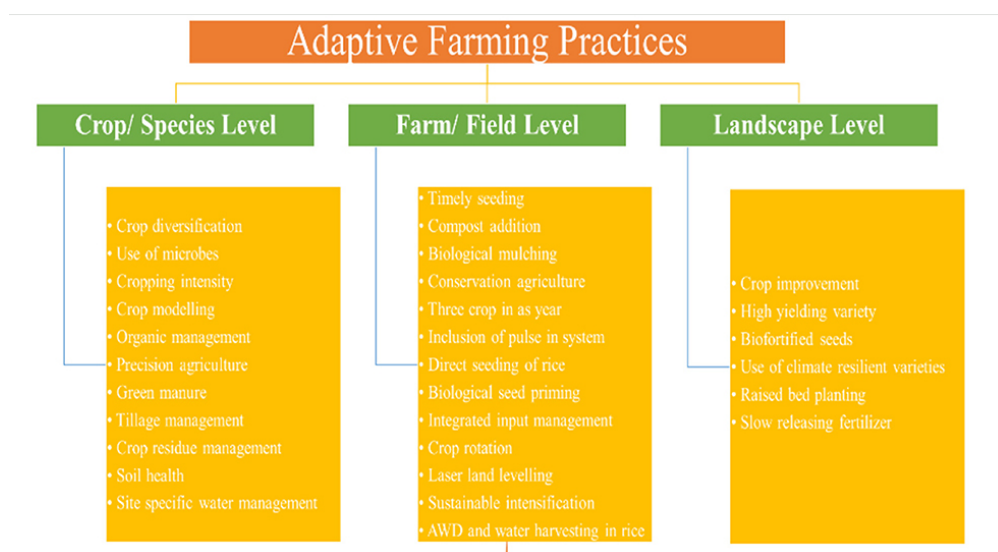
## Adaptive Agriculture

### Why in news?

The recent report of Centre for Science and Environment highlights that organic and natural farming offer several advantages over chemical-dependent inorganic methods.

### What is Adaptive agriculture?

- **Adaptive agriculture** - It refers to the necessity to *adapt to the reality of climate change* in our world, and to develop food systems to healthily feed our world.
- It acknowledges the need for individuals to develop and grow their own healthy personal relationships with all aspects of food production.
- **Focus** - It aims to increase the *resilience and sustainability of agricultural systems* in response to changing environmental conditions and challenges.
- **Methodologies** - It utilizes a broad spectrum of *strategies and skill-sets* for growing food responsibly.



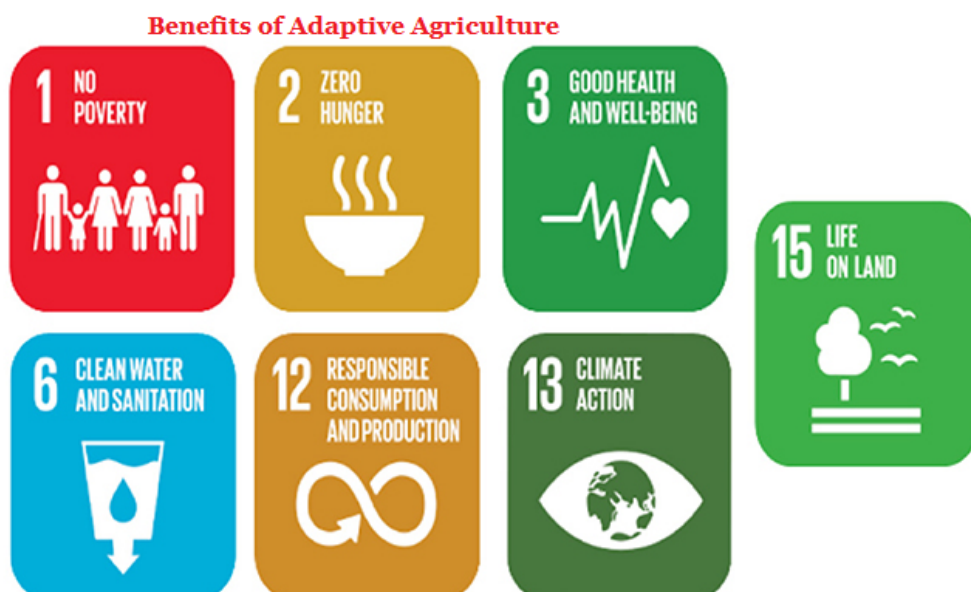
### Examples of Adaptive Agriculture

- **Climate-Resilient Crops**- Development and use of crop varieties that are resistant to extreme weather conditions.
- **Conservation Tillage**- Reducing soil disturbance to maintain soil health and reduce erosion.
- **Agroecology**- Designing farming systems that mimic natural ecosystems and promote biodiversity.
- **Organic Farming**- It is an agricultural system that uses natural inputs and processes to produce crops and livestock.
  - It avoids synthetic chemicals, such as pesticides, fertilizers, and genetically modified organisms (GMOs).
- **Natural Farming**- It often associated with the philosophy of Japanese farmer Masanobu Fukuoka, emphasizes minimal human intervention and allows nature to take its course.
  - It is often called "do-nothing farming."

To know more about Climate Smart Agriculture, click [here](#)

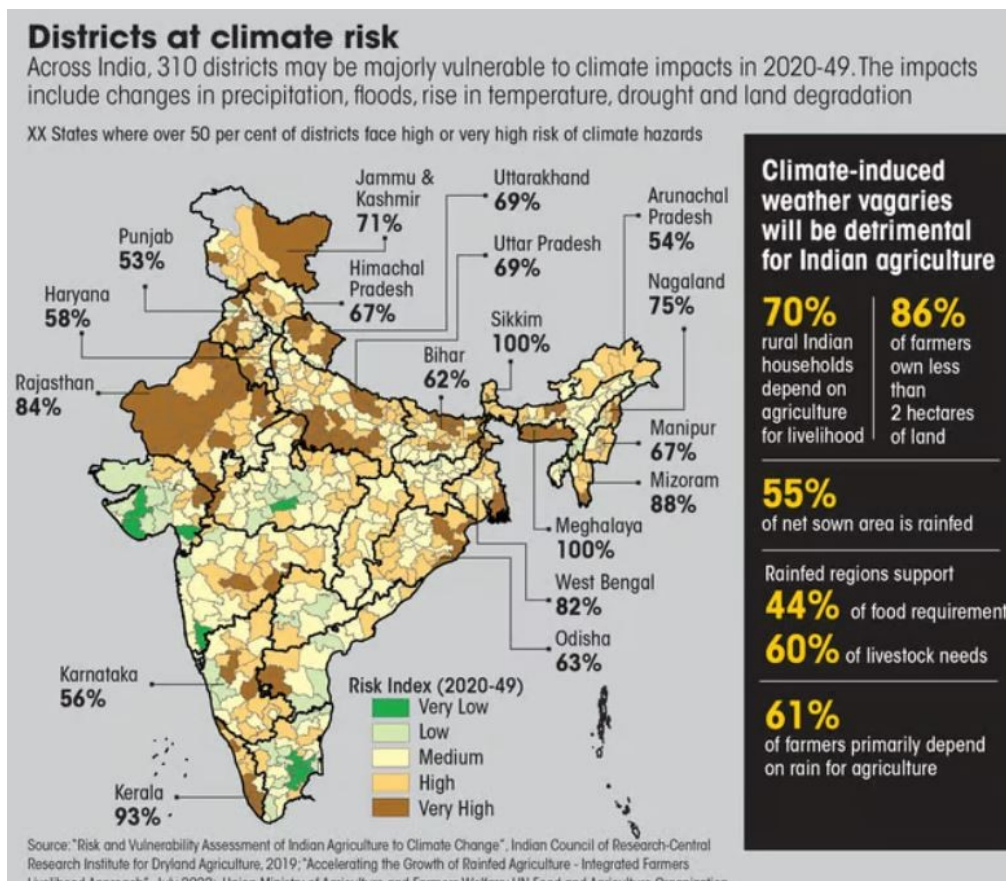
### What are its benefits?

- **Increases water holding capacity** - Sustainable agriculture practices make the soil porous, thus enabling it to hold more water.
- **Better growth of plants** - The porous soil allows the roots to go deeper and absorb more nutrients.
- **Build resilience** - Increased microbial health of soil leads to aggregate stability, making plants stronger and resilient to any weather changes.
- **Enhance productivity**- It can potentially *enhance agricultural productivity* through improved practices and technologies.
- **Economic viability**- It helps farmers to better manage risks and uncertainties, leading to *more stable incomes and livelihoods*.
- **Promote sustainability** - It promotes *long-term sustainability* by reducing environmental impact & conserving natural resources.



## Why India needs adaptive agriculture?

- With a 1.4 billion population, 7500km vast coastline, and 58% of the population with agricultural dependence, India is particularly susceptible to climate change.
- **Increased extreme weather events** - The Global Climate Risk Index of Germanwatch, identifies India as one of the top countries that suffered most from extreme weather events during 2000-19.
  - It is alarming as agriculture employs 42.3% of the country's population and has a share of 18.2% in its GDP, according to the "Economic Survey 2023-24".
- **Elevated climate risks** - ICAR found that 90% of India's districts face climate risks, with 54% categorized as having "high" or "very high" risk.



- **Agricultural vulnerability** - 55% of the net sown area relies on rainwater, making it highly vulnerable to climate change.
  - As of 2022, these rainfed regions, meet 44% of the country's food requirement and support 60% of the livestock.
- Thus, a substantial part of food security and the livelihood of 61% of farmers who rely on rainfed agriculture depends on whether the rain arrives at the right place at the right time in the right quantities.
- **Rural vulnerability** - Almost 70% of rural households depend on agriculture, with 86% being small and marginal farmers.

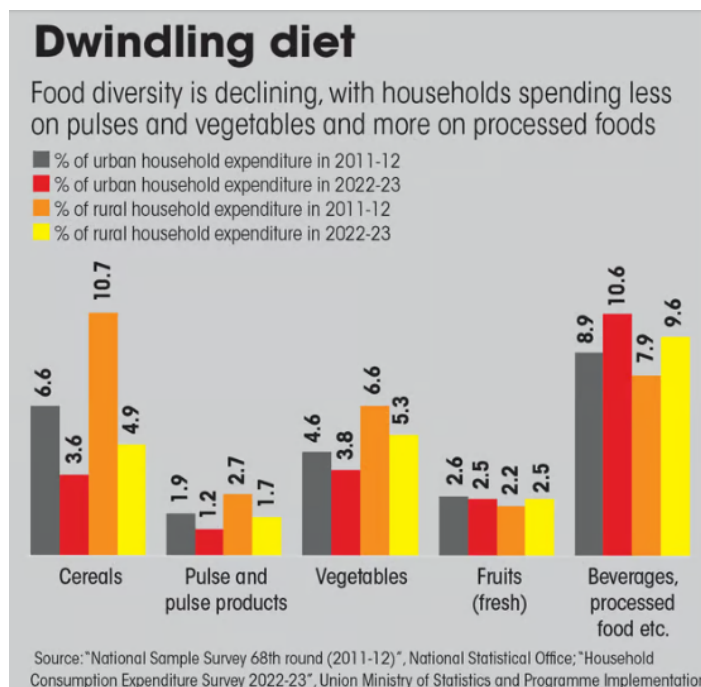
## What are the challenges in implementing it?

- **Adoption challenges** - As per government data, till March 2023,
  - Combined organic area - 4.2% of the net sown area of the country

- Organic farmers – 3% of the 146 million agricultural landholders



- **Lack of quality inputs** – Farmers find it difficult to prepare organic and bio-inputs due to lack of knowledge and availability of inputs, and due to the time and labour needed for it.
- **Unfair returns** – Issues in securing fair and remunerative prices.
- **Practical difficulties** – There are ineffectiveness of the recommended package of practices in different ground-level scenarios.
- **Marketing issues** – Small and marginal farmers face challenges in marketing their produce due to lengthy supply chains, poor value addition and lack of economies of scale.
  - They produce 70% of vegetables and over 50% of fruits and cereals.
- **Current MSP system** – It primarily supports wheat and rice, promotes monoculture, strains water resources, and reduces crop diversity which impacts farmer’s resilience.



### What are the measures taken by the government?

- National Initiative on Climate Resilient Agriculture – It was launched in 2011, spearheaded by ICAR-Central Research Institute for Dryland Agriculture (CRIDA).
- It aims to improve production and risk management technologies.

*National Initiative on Climate Resilient Agriculture India's first programme to*

enhance climate resilience of agriculture.

- CGIAR Research Program on Climate Change, Agriculture, and Food Security, a large-scale intervention on climate-smart agriculture that was launched in 2010.
- It was implemented on a pilot basis in Bihar, Haryana, Punjab, Maharashtra, Telangana and Madhya Pradesh.
- National Mission for Sustainable Agriculture - NMSA was launched in 2014-15, to make agriculture more productive, sustainable, and climate resilient.
- **Paramparagat Krishi Vikas Yojana-** It is under NMSA, aimed at promoting organic farming practices.
- **Mission Organic Value Chain Development for North East Region-** It is a specific initiative aimed at promoting organic farming in the northeastern states of India.
- It seeks to develop a comprehensive organic value chain in the region, which includes *production, processing, marketing, and consumption*.
- **National Mission on Natural Farming-** The aims to promote *natural farming practices across the country*.
- It encourages a shift towards farming methods that enhance soil health, reduce dependency on chemical inputs, and improve sustainability in agriculture.
- **National Cooperative Organics Limited-** In 2023, the Union Ministry of Cooperation launched NCOL *to enhance the marketing of organic produce* through cooperatives.
- It introduced the "**Bharat Organics**" brand to improve their sale.
- **Bio-input Resource Centres-** These are planned under the NMNF to address the gaps in knowledge, availability of inputs, and support for preparing organic and bio-inputs.
  - Union Budget 2024-25 proposes setting up *10,000 bio-input resource centres* and to include 10 million farmers in natural farming over the next two years, supported by certification and branding.
- Promoting FPOs - Both the Union and state governments have been promoting formation of Farmer Producer Organisations. The efforts have culminated in a 2020 scheme to establish and promote 10,000 FPOs by 2027-28, with a budget of Rs 6,865 crore.

States like Karnataka, Odisha and Uttarakhand already procure organic produce and link it with the public distribution system and the Integrated Child Development Scheme.

## State government Initiatives

### Andhra Pradesh

- **Andhra Pradesh Community Managed Natural Farming (APCNF)-** It aims to make natural farming more climate-resilient and lucrative.
- It is the *largest natural farming programme* in India and globally in terms of farmer enrolment.

<b>Haryana</b>	• <b>Mera Pani Meri Virasat</b> - To <i>incentivizes crop diversification</i> with procurement under MSP.
<b>Odisha</b>	• <b>Millet Mission</b> - It promotes millet cultivation with <i>incentives and procurement guarantees</i> .
<b>Karnataka</b>	• <b>Raitha Siri</b> - It supports organic farming with incentives and procurement for millets, pulses, and oilseeds.
<b>Maharashtra</b>	• <b>Project on Climate Resilient Agriculture</b> (POCRA) • It focused on water security, protected cultivation, agri-enterprises, and value chain strengthening. • Subsidies are given via Direct Benefit Transfer (DBT).

### What lies ahead?

- Introduce MSP for all crops under a legal framework.
- Invest in R&D to develop climate-resilient crops, innovative irrigation techniques, and soil management practices tailored to diverse agro-ecological zones.
- Encourage collaboration between government, private sector, and research institutions to drive innovation and scaling of adaptive agriculture solutions.
- Leverage digital technologies such as precision agriculture, remote sensing, and data analytics to enhance decision-making and resource management.

### References

1. [Down to Earth| Need for Adaptive Agriculture in India](#)
2. [Down to Earth| Initiatives by India for Sustainable Agriculture](#)
3. [Down to Earth| Challenges of Adaptive Agriculture](#)