

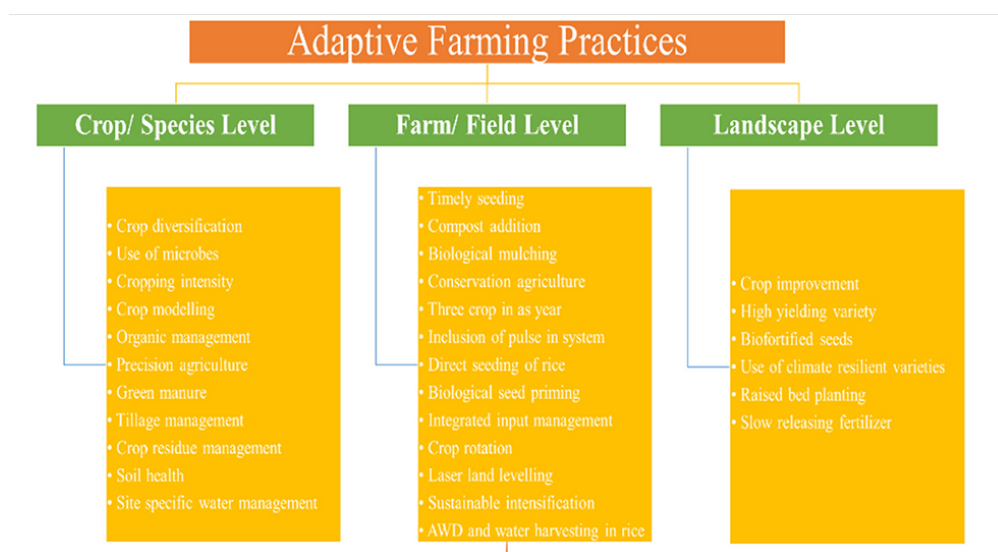
Adaptive Agriculture

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.



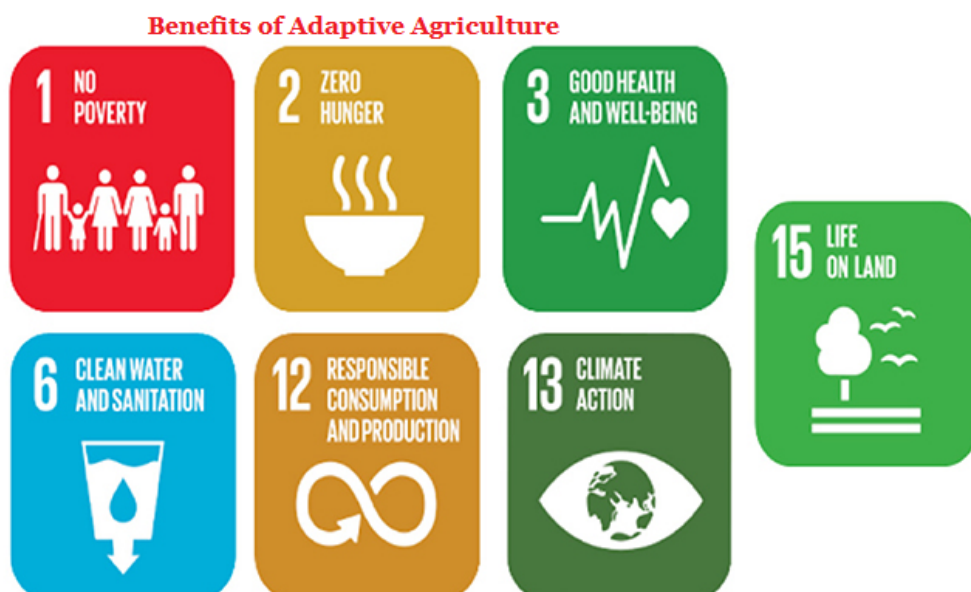
Examples of Adaptive Agriculture

- **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](#)

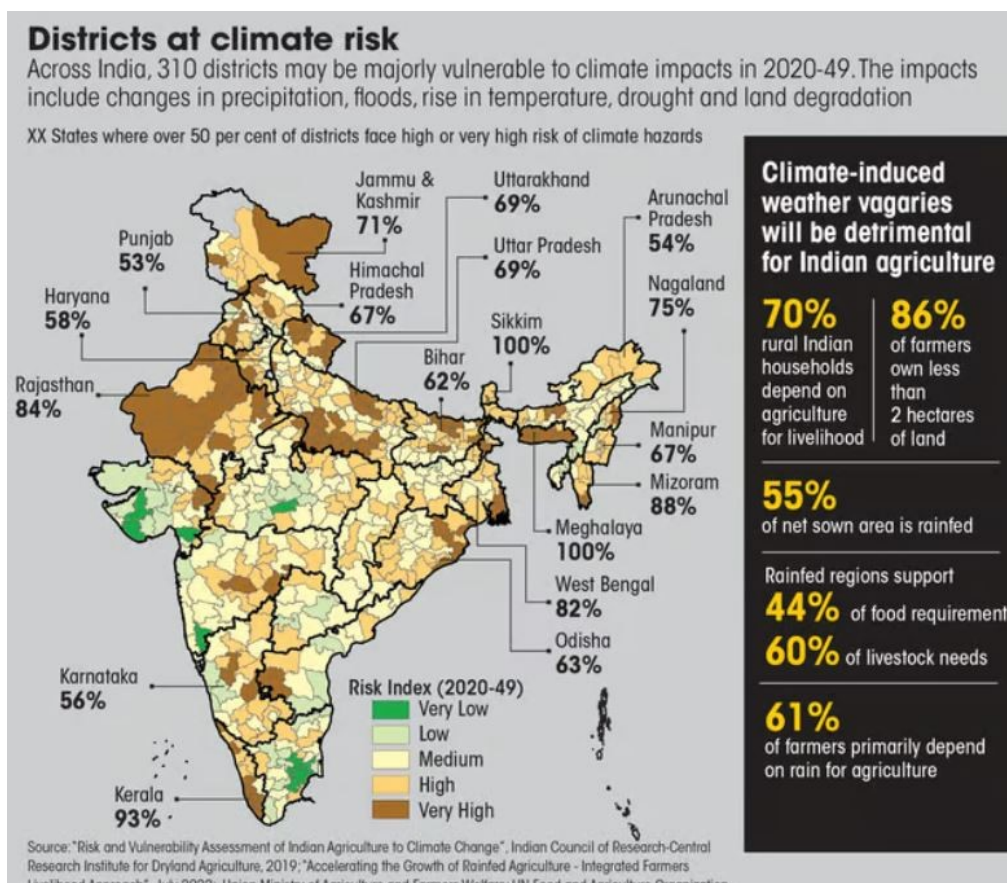
What are its benefits?

- **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.

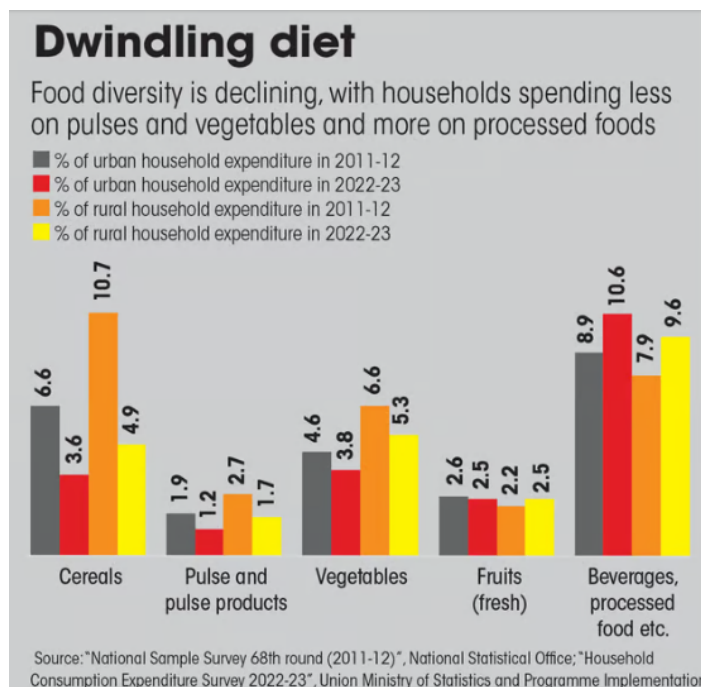
What are the challenges in implementing it?

- **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.

Haryana	• Mera Pani Meri Virasat - To <i>incentivizes crop diversification</i> with procurement under MSP.
Odisha	• Millet Mission - It promotes millet cultivation with <i>incentives and procurement guarantees</i> .
Karnataka	• Raitha Siri - It supports organic farming with incentives and procurement for millets, pulses, and oilseeds.
Maharashtra	• Project on Climate Resilient Agriculture (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](#)