



PadhAI

Kurukshetra

August Edition



Welcome to PadhAI

KURUKSHETRA MONTHLY COVERAGE

You are here because you understand a fundamental truth of UPSC preparation: ***it's not about reading everything – it's about reading what truly matters, in the right way, at the right time.***

Magazines like Kurukshetra offer deep insights into rural development, governance, social schemes, and grassroots policy implementation. Yet for many aspirants, the challenge lies in separating exam-relevant content from general narratives.

PadhAI's Kurukshetra coverage is designed to do exactly that - ***filter, structure, and align policy discussions with UPSC requirements.***

Why This Kurukshetra Coverage Matters

At PadhAI, we don't reproduce articles. We ***extract core themes***, map them with the syllabus, and connect them with ***Prelims and Mains PYQs***.

Every topic included here:

- carries relevance for ***GS Papers or Essay***,
- strengthens understanding of ***developmental and governance issues, and***
- builds ***analytical depth*** rather than surface-level knowledge.

Nothing is added for volume.

Everything is added for value.

Part of the PadhAI Preparation Ecosystem

This Kurukshetra coverage forms part of a larger, integrated learning system that includes:

- early and concise ***monthly magazines***,
- ***daily PIB summaries*** with exam-focused clarity,
- ***monthly compliance tracking***,
- complete ***Prelims & Mains PYQs with structured answers***,
- relevant ***news article summaries***, and
- ***personal tutor chat support*** for continuous guidance.

The aim is simple:

one trusted ecosystem instead of multiple scattered sources.

Our Guiding Philosophy

At PadhAI, everything is built around one belief:

- *Learn only what matters.*
- *Learn it the right way.*
- *Learn it at the right time.*

We don't believe in shortcuts.

We believe in clarity, consistency, and cumulative preparation.

A Final Note

UPSC preparation is demanding and often overwhelming.

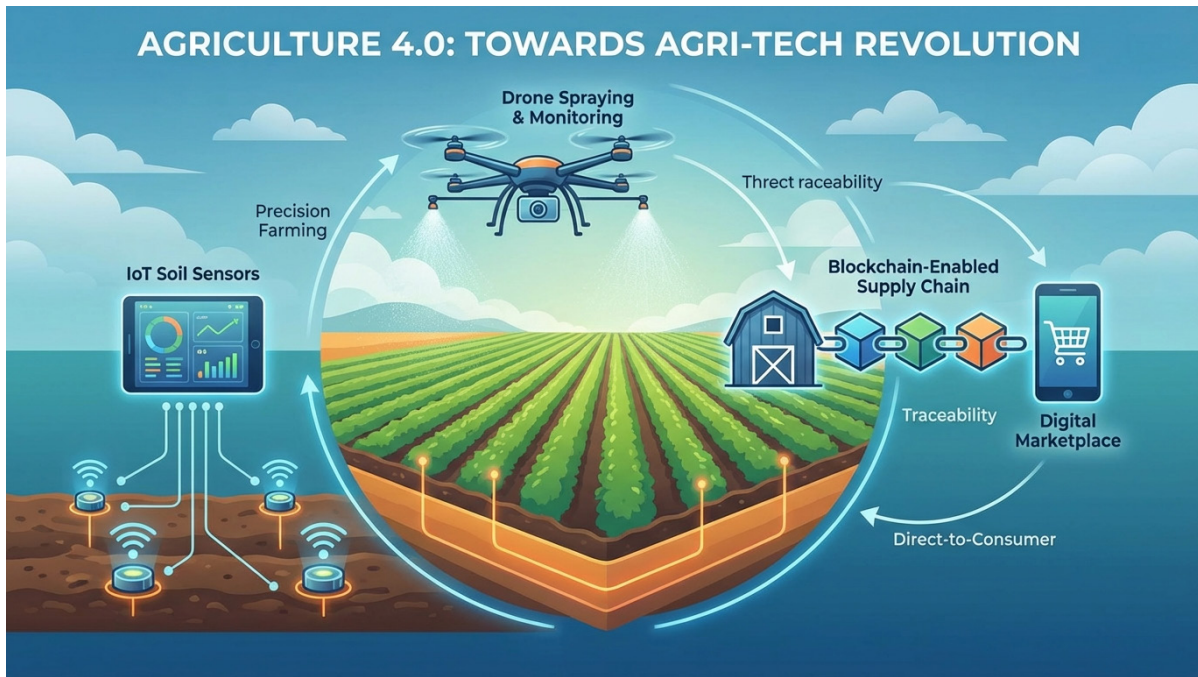
PadhAI exists to ensure you prepare with ***direction, relevance, and confidence*** — never blindly, never alone.

If this **Kurukshetra** coverage helps you save time, connect policy with practice, and strengthen your answers, then it has served its purpose.

Welcome to PadhAI.

A community built to prepare — not to overwhelm.

Topic I: Agriculture 4.0: Towards Agri-Tech Revolution



Summary: Agriculture 4.0 represents a transformative shift in Indian farming, leveraging **digital technologies** like AI, IoT, blockchain, and robotics to move beyond traditional methods. Its primary objective is to enhance productivity, ensure food security, and boost farmer incomes by transitioning from subsistence farming to high-efficiency **precision agriculture**.

Background: Despite being the backbone of the economy, Indian agriculture suffers from yields that are **20–60% lower than global averages**, high climate dependence, and a significant digital divide. With nearly **90% of farmers owning less than 2 hectares of land**, Agriculture 4.0 is necessary to overcome resource stress and labor shortages through data-driven efficiency.

Key Points:

- **Precision Farming:** IoT sensors can reduce irrigation needs by up to **50%**, while drones enable targeted application of inputs.
- **Dual Paradigm:** The revolution works through **SmartFarm Digitisation** (on-farm tech like sensors and automated irrigation) and **SmartAgriSphere Digitisation** (ecosystem-level tech like blockchain supply chains and digital marketplaces).
- **Agri Stack:** A Comprehensive Agriculture Management System (CAMS) that uses **Aadhaar-linked farmer IDs** to provide seamless access to credit, insurance, and land records.
- **Post-Harvest Efficiency:** Digital platforms and blockchain provide **farm-to-fork traceability**, reducing middlemen and post-harvest losses which currently range from 0.9% to 15.8%.

Prelims Facts (One Liners):

1. Agriculture employs **42.3% of India's workforce** and contributes 18.2% to its GDP.

2. India's rice yield is **3.85 t/ha**, significantly lower than China's 6.57 t/ha.
3. **52% of Indian farming** remains entirely rainfall-dependent.
4. The **Digital India programme** aims to provide broadband connectivity to 2.5 lakh villages.
5. 17% of India's groundwater blocks are currently categorized as **overexploited**.

MCQ Practice: Q. In the context of "Agriculture 4.0," what is the primary function of the "Agri Stack" (CAMS) initiative? A) To replace manual labor with robotics in all 2.5 lakh villages. B) To provide a unified digital database of farmers for evidence-based policy and credit-insurance linkages. C) To mandate 100% organic farming for all smallholders owning <2 ha. D) To exclusively monitor groundwater overexploitation levels.

Answer: B (Agri Stack provides Aadhaar-linked IDs and crop data to ensure evidence-based planning and easy access to institutional credit and insurance.)

Topic 2: Conservation Agriculture: Practices and Perspectives



Summary:

Conservation Agriculture (CA) is a sustainable, resource-efficient farming system designed to reconcile **productivity with environmental conservation**. It moves away from the resource-intensive methods of the Green Revolution to address soil degradation and groundwater depletion through natural resource management.

Background: The Green Revolution, while ensuring food security, led to **unsustainable resource use and air pollution**. To counter these effects, the FAO promoted CA as an agro-ecosystem management system that ensures food security and profitability while conserving the environment.

Key Points:

- **Three Core Principles:** CA is built on **minimal soil disturbance** (zero tillage), **permanent soil cover** (mulching with crop residues), and **crop diversification**.
- **Economic Savings:** Zero-tillage saves approximately **60 litres of fuel per hectare** and reduces cultivation costs by ₹2,000–3,000/ha.
- **Environmental Impact:** CA can sequester up to **3,667 kg of CO₂ per hectare annually**, mitigating climate change and avoiding the need for stubble burning.
- **Social Benefit:** The reduction in manual labor and tillage requirements significantly **reduces drudgery**, particularly for women farmers.

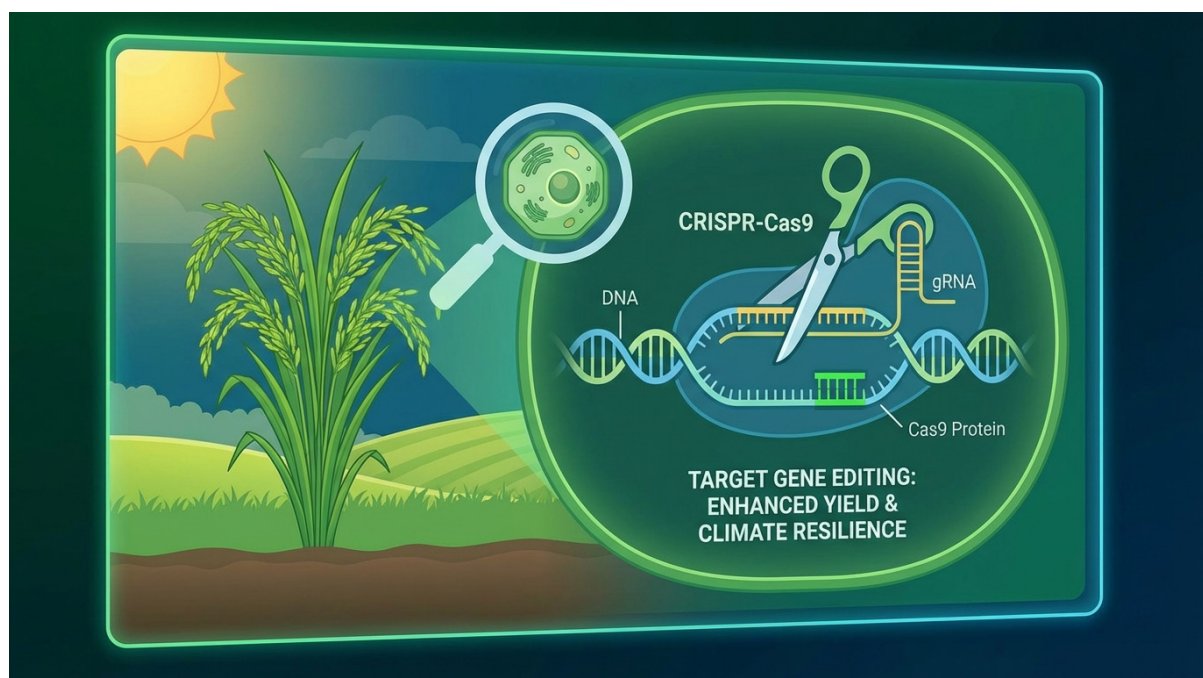
Prelims Facts (One Liners):

1. Over **7 lakh farmers** in India currently practice CA across 2.5–3 million hectares.
2. The **Namo Drone Didi Yojana** supports women farmers by integrating drone technology into conservation practices.
3. A success story in **Bihar (Rajapur village)** saw wheat yields rise from 3.5 t/ha to 5.5 t/ha through 100% zero-tillage adoption.
4. CA is primarily practiced in the **Indo-Gangetic plains** but is being scaled to drylands for pulses and oilseeds.,

MCQ Practice: Q. Which of the following is NOT one of the three core principles of Conservation Agriculture (CA) as defined by the FAO? A) Permanent soil organic cover B) Minimal mechanical soil disturbance C) Intensive use of chemical fertilizers to double yield D) Diversification of crop species

Answer: C (CA focuses on resource efficiency and minimal soil disturbance; intensive chemical use is a hallmark of conventional intensive farming, which CA seeks to reform.)

Topic 3: Gene Editing Technology in Agriculture



Summary:

Gene editing is a path-breaking biotechnology that allows for the **precise modification of DNA** without the introduction of foreign genetic material. Led by **CRISPR-Cas9** technology, it offers solutions for nutritional security, higher productivity, and climate-resilient crops that mimic natural mutations.

Background: Traditional genetic modification (GM) often involves foreign DNA, leading to complex regulatory hurdles. Gene editing, specifically **SDN-1 and SDN-2**, was exempted from stringent GM rules in India in 2022 because the resulting plants are equivalent to those developed through conventional breeding.

Key Points:

- **CRISPR-Cas9 Discovery:** Revolutionized by **Jennifer Doudna and Emmanuelle Charpentier**, who received the Nobel Prize in 2020.
- **New Varieties (2025):** ICAR released **DRR Rice 100 (Kamla)**, which offers a 20% higher yield and 20-day earlier maturity, and **Pusa DST Rice 1** for saline/alkaline soils.
- **Nutritional Security:** Development of **Golden Rice and Maize** enriched with Vitamin A, and "High-GABA" tomatoes for heart health.
- **Livestock Innovation:** India's first gene-edited sheep, developed by SKUAST-Kashmir, shows **30% higher muscle mass**.

Prelims Facts (One Liners):

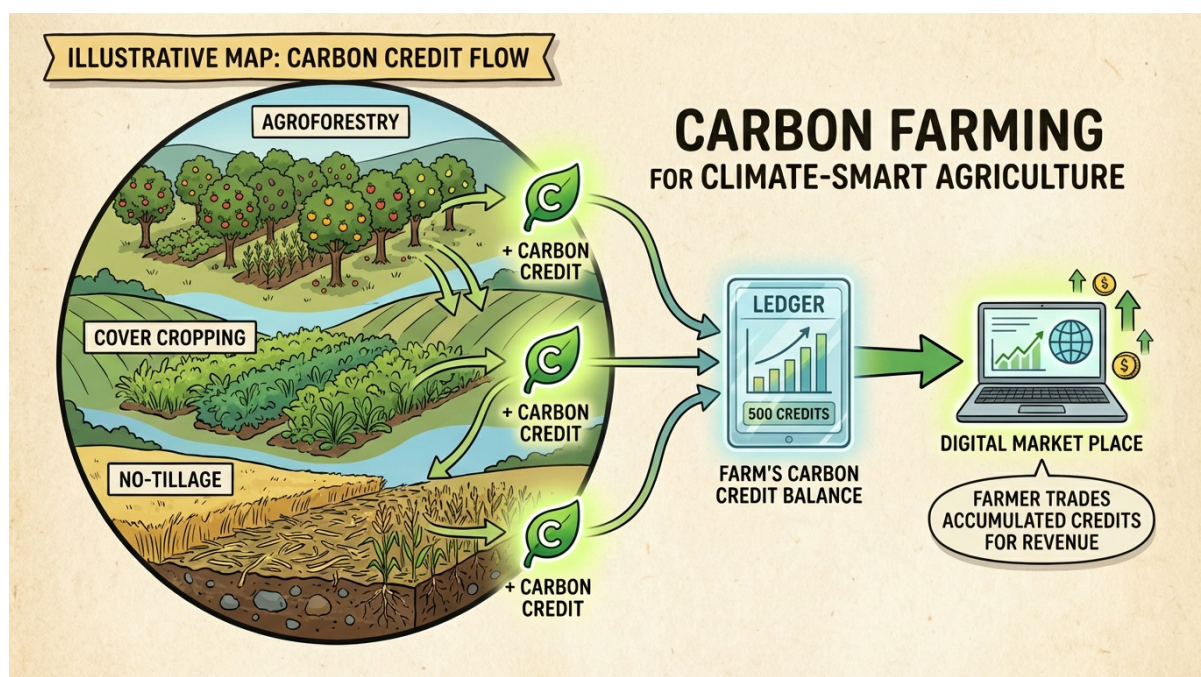
1. India's 2022 guidelines exempt **SDN 1 and SDN 2** genome-edited plants from the Environment Protection Act's GM rules.
2. The **Biotechnology Ignition Grant (BIG)** provides up to ₹50 lakh to support agri-biotech startups.
3. India's seed industry is projected to reach **USD 5.01 billion by 2030**.

4. Gene-edited wheat is being developed to reduce **acrylamide**, a carcinogenic substance.

MCQ Practice: Q. In May 2025, ICAR released a new gene-edited rice variety named "Kamla" (DRR Rice 100). Which of the following is a key benefit of this variety? A) It requires 50% more fertilizer to achieve peak yield. B) it contains foreign DNA from drought-resistant cacti. C) It matures 20 days earlier and lowers methane emissions by 9 tonnes/ha. D) It is the first variety designed exclusively for indoor vertical farming.

Answer: C (Kamla is a climate-smart variety that matures earlier, saves water, and significantly reduces methane emissions.)

Topic 4: Carbon Farming for Climate-Smart Agriculture



Summary:

Carbon farming involves agricultural practices that enhance **Soil Organic Carbon (SOC)** and vegetative storage, effectively turning farms into carbon sinks. By removing CO₂ from the atmosphere, farmers can earn **carbon credits**, creating a new revenue stream while building climate resilience.

Background: Agriculture is responsible for **20% of global GHG emissions**. With 170 million hectares of arable land, India has a carbon sequestration potential worth **\$63 billion**, yet the practice remains underutilized among its 85% smallholder population.

Key Points:

- **Monetization:** One carbon credit is equivalent to **1 tonne of CO₂ removal or reduction**.
- **Practices:** Includes **agroforestry** (integrating trees), **biochar** (long-term carbon sink), and the **4Rs of Nutrient Management** (Right time, rate, source, place).
- **Carbon Markets:** India amended the **Energy Conservation Act in 2022** to establish a domestic Indian Carbon Market, linking farmers to voluntary markets.

- **MRV System:** The success of carbon farming depends on a robust **Measuring, Reporting, and Verification** infrastructure to validate carbon sequestration.

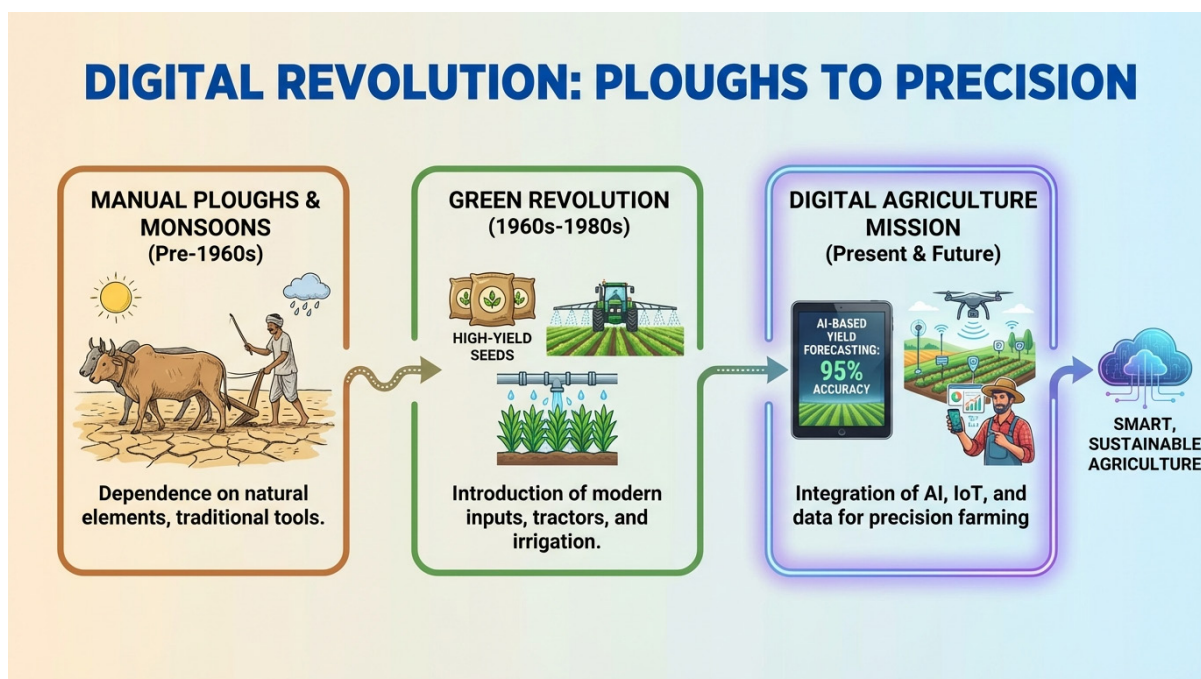
Prelims Facts (One Liners):

1. India has the **second-highest number of Clean Development Mechanism (CDM) projects** globally.
2. Indian soils are capable of storing **3–8 billion tonnes of CO₂ annually** for up to 30 years.
3. **Dhaincha** is a common cover crop used in rice–wheat systems to increase soil organic carbon.
4. Carbon farming aligns with India's **Net Zero 2070** commitment.,

MCQ Practice: Q. What is the economic value of "one carbon credit" in the context of international climate agreements? A) The cost of one solar-powered irrigation pump. B) The price of 100 kg of bio-fortified rice. C) One tonne of CO₂ removal or emission reduction. D) A 50% subsidy on precision farming hardware.

Answer: C (Under the UNFCCC and the Paris Agreement, one carbon credit represents one tonne of CO₂ reduced or removed from the atmosphere.),

Topic 5: Digital Revolution: Ploughs to Precision



Summary: The digital revolution in agriculture marks a shift from subsistence farming to **data-driven precision farming**. By integrating AI, IoT, drones, and satellite imagery, India aims to make farming more sustainable, profitable, and resilient against climate risks.,

Background: While agricultural GVA has risen significantly since 2011, its relative share in the total economy has declined. Digital interventions are necessary to modernize the sector, which still supports **46% of the population**.

Key Points:

- **Digital Agriculture Mission (2024):** Allocated **₹2,817 crore** for 2025–26 to focus on AI, drones, and digital farmer registries.
- **e-NAM:** A national digital market that has integrated **1,522 mandis**, ensuring fair pricing for over 1.79 crore farmers.
- **AI Success:** Microsoft's **Farm Vibes** pilot in Maharashtra resulted in a 40% yield increase and 50% less water use.
- **Namo Drone Didi Scheme:** A ₹1,261 crore initiative training **15,000 women Self-Help Groups (SHGs)** in drone usage for agricultural spraying.

Prelims Facts (One Liners):

1. Agricultural GVA rose from ₹15.02 lakh crore (2011–12) to **₹48.78 lakh crore** (2023–24).
2. Over **24.74 crore Soil Health Cards** have been issued, now featuring GIS and QR code technology.
3. The **m-Kisan SMS service** has reached 8.93 crore farmers with plant protection advisories.
4. **Rural internet users** now account for 55% of the total users in India.
5. **Common Service Centres (CSCs)** provide soil testing and agri-advisories in 77% of rural areas.

MCQ Practice: Q. Which initiative is specifically designed to empower women in the agricultural technology sector by training them in drone operations? A) PM-KISAN B) AgriStack Project C) Namu Drone Didi Scheme D) Soil Health Card Scheme

Answer: C (The Namu Drone Didi Scheme, launched in 2023, provides training and financial support to 15,000 women SHGs for drone usage in farming.)