

1. Land Use Categories and Records

In India, land-use records are maintained by the **Land Revenue Department**. The total area for which these records are available is called the **reporting area**, which differs from the **geographical area** measured by the Survey of India.

While the geographical area remains fixed, the reporting area can change based on revenue estimates.

The Land Revenue Records classify land into nine categories:

1. **Forests:** Identified and demarcated by the government for forest growth; this category may increase in records without an actual increase in forest cover.
2. **Barren and Wastelands:** Hilly terrains, deserts, and ravines that cannot be cultivated with current technology.
3. **Land put to Non-agricultural Uses:** Infrastructure (roads, canals), settlements (rural/urban), and industries.
4. **Permanent Pastures and Grazing Lands:** Mostly owned by the village 'Panchayat' or the government.
5. **Area under Miscellaneous Tree Crops and Groves:** Land under orchards/fruit trees, not included in the Net Sown Area; much of it is privately owned.
6. **Culturable Wasteland:** Land left uncultivated for more than five years; it can be reclaimed for agriculture.

7. **Current Fallow:** Land left uncultivated for one or less than one agricultural year to recoup fertility.
8. **Fallow other than Current Fallow:** Cultivable land left uncultivated for 1–5 years.
9. **Net Area Sown:** The physical extent of land where crops are sown and harvested.

2. Land-use Changes in India

Land-use is influenced by economic activities. Three types of economic changes affect land use in India:

- **Size of the Economy:** Increasing population and income growth raise pressure on land, bringing marginal lands into use.
- **Composition of the Economy:** The secondary and tertiary sectors grow faster than the primary sector, leading to a shift from agricultural to non-agricultural land uses, especially around urban sprawls.
- **Pressure on Land:** Although agriculture's contribution to GDP declines, the population dependent on it declines much more slowly, and the absolute number of people to be fed increases.

Historical Trends (1950–51 to 2019–20):

- **Increases:** Highest rate of increase is in **non-agricultural uses** due to infrastructure and urban expansion. Forests and Net Sown Area also showed increases.
- **Declines:** Barren/wasteland, culturable wasteland, and fallow lands (other than current) have registered declines as they are pressed into use for other sectors.

3. Common Property Resources (CPRs)

Land ownership is divided into **private land** and **CPRs**.

- **Definition:** CPRs are community natural resources where every member has usage rights but no individual property rights.
- **Significance:** They provide fodder, fuel, and minor forest products. They are crucial for the **landless and marginal farmers** who depend on livestock.
- **Gender Impact:** In rural areas, women perform most fodder and fuel collection; they are heavily impacted by the degradation of CPRs.

4. Agricultural Land Use and Cropping Intensity

Agriculture is a purely **land-based activity**, meaning the quality of land directly affects productivity. Land ownership also carries social status and provides security for credit and life contingencies.

Measuring Land Pressure:

- **Total Cultivable Land:** The sum of Net Sown Area, all fallow lands, and culturable wasteland.
- **Cropping Intensity (CI):** This measures how many times a piece of land is used in a year.
 - $CI = \left(\frac{\text{Net Sown Area}}{\text{Gross Cropped Area}} \right) \times 100$.
 - High cropping intensity is desirable for land-scarce, labour-abundant countries like India to reduce unemployment and maximize resource use.



5. Cropping Seasons and Farming Types

India has three distinct cropping seasons, primarily in the north and interior:

1. **Kharif (June–September):** Tropical crops like rice, cotton, jute, maize, jowar, bajra, and tur.
2. **Rabi (October–March):** Temperate and subtropical crops like wheat, gram, and mustard.
3. **Zaid (April–June):** Short-duration summer crops (watermelon, cucumber, vegetables, fodder) grown on irrigated lands.

In southern India, high temperatures allow tropical crops to be grown thrice a year if soil moisture is available.

Types of Farming (by Moisture Source):

- **Irrigated Farming:**
 - **Protective:** Supplemental water to protect crops from moisture deficiency.

- **Productive:** High water input to achieve high productivity.
- **Rainfed Farming (Barani):**
 - **Dryland:** Found in regions with <75 cm rainfall; grows hardy crops like ragi, bajra, and gram.
 - **Wetland:** Rainfall exceeds soil moisture needs; grows water-intensive crops like rice, jute, and sugarcane.

- **Coarse Cereals:** Include **Jowar** (Maharashtra leads), **Bajra** (Rajasthan leads in hot/dry conditions), and **Maize** (grows all over India except the Punjab and Northeast).

Pulses and Oilseeds

- **Pulses:** Rich in protein and restore fertility via **nitrogen fixation**. India is the world leader. **Gram** (rabi) and **Tur/Arhar** (marginal lands) are the main varieties.

- **Oilseeds:** Occupy 14% of cropped area. **Groundnut** (Gujarat leads), **Rapeseed/Mustard** (Rajasthan leads), **Soyabean** (MP and Maharashtra produce 90%), and **Sunflower**.

Fibre and Other Crops

- **Cotton:** Tropical kharif crop. Grows short staple (Indian) and long staple (**nama/American**). India ranks second globally; leading producers are Gujarat, Maharashtra, and Telangana.

- **Jute:** Cash crop for coarse cloth/bags. West Bengal produces three-fourths of India's output.

- **Sugarcane:** Tropical irrigated crop. UP produces two-fifths of national output; Maharashtra and Gujarat are also major producers.

- **Tea:** Plantation beverage crop; started in 1840s in Assam. Grown on hill slopes with well-drained soils. India ranks second globally; **Assam** contributes more than half.

- **Coffee:** Tropical plantation crop. India grows the superior **Arabica** variety. Mostly cultivated in the Western Ghats (Karnataka, Kerala, Tamil Nadu).



6. Major Crops of India

Foodgrains occupy two-thirds of India's total cropped area.

Cereals (54% of cropped area)

- **Rice:** The most important staple. A crop of tropical humid areas but grown widely via irrigation. India is the **second-largest producer** (22% of world production). Leading states: West Bengal, UP, Punjab. West Bengal grows three varieties: **aus, aman, and boro**.
- **Wheat:** Primarily a rabi crop of the temperate zone. Concentrated in north/central India. Leading states: UP, MP, Punjab, Haryana, Rajasthan.

7. Agricultural Development and the Green Revolution

Post-independence, the goal was increasing foodgrains via cash-to-food crop switches, intensification, and expanding cultivated area.

- **Green Revolution:** Introduced mid-1960s with **High Yielding Varieties (HYVs)** of wheat and rice (from Mexico and Philippines).
- **Prerequisites:** Assured irrigation, chemical fertilizers, and pesticides.
- **Impact:** Made India self-reliant but initially created **regional disparities**, as it was confined to Punjab, Haryana, and Western UP until the 1970s.

8. Problems of Indian Agriculture

1. **Dependence on Erratic Monsoon:** Only 33% of land is irrigated; drought and floods are constant threats.
2. **Low Productivity:** Yields are much lower than international levels in the USA, Russia, and Japan.
3. **Financial Constraints:** Modern inputs are expensive, leading to **indebtedness** among small farmers.
4. **Lack of Land Reforms:** Exploitative revenue systems (Mahalwari, Ryotwari, Zamindari) were replaced by reforms that were poorly implemented due to a lack of political will.
5. **Fragmentation of Landholdings:** Shrinking average farm sizes make holdings uneconomic.
6. **Lack of Commercialisation:** Many small farmers practice subsistence farming for self-consumption.
7. **Underemployment:** Seasonal unemployment lasts 4–8 months, especially in unirrigated tracts.

9. Environmental Problems and Land Degradation

Faulty irrigation and development have led to **land degradation**, defined as a temporary or permanent decline in productive capacity.

- **Irrigated areas:** Face **alkalisation**, **salinisation**, and waterlogging.
- **Rainfed areas:** Suffer from water and wind erosion.
- **Chemical use:** Toxic amounts of pesticides and insecticides have built up in the soil profile.
- **Cropping patterns:** Multiple cropping has displaced leguminous crops, stopping natural nitrogen fixation.

Management and Conservation:

- **National Mission for Sustainable Agriculture (NMSA):** Promotes climate-resilient and composite farming systems.
- **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** Aims for "Har khet ko pani" (water for every field) via protective irrigation.
- **Watershed Management:** Integrated management of land, water, and vegetation. Examples include the success in **Jhabua** (greening CPRs) and **Ralegan Siddhi** (economic transformation via percolation tanks).
- **Rainwater Harvesting:** Used to recharge aquifers and dilute contaminants like fluoride and nitrates. Structures like **Kund or Tanka** in Rajasthan are traditional examples.