DRYLAND FARMING - GS III MAINS

Q. What is dryland agriculture? Highlighting its significance, enumerate the issues in dryland agriculture in the case of India.

News: *More research into dryland agriculture needed: Siddaramaiah*

What's in the news?
- Emphasising on the need for ensuring that the outcomes of farm research reached farmlands, Chief Minister Siddaramaiah called on the farm universities to take up extensive research on developing rain-fed agriculture in dry lands.

Key takeaways:
- Out of the 141 million hectares of estimated net sown area, close to 80 million hectares is under dryland farming, generally practiced in arid regions of the country with annual rainfall less than 750 mm and the crop-growing season is less than 200 days.

Dryland Farming:
- Dryland farming is farming in the regions with less than 75 cm annual rainfall. It is characterized by
    - Low rainfall with high variability.
    - Lack of assured irrigation and dependence on monsoon.
    - Subsistence farming mainly.
- Dryland farming has become a prominent approach to ensure sustainable food security, especially with a growing population and mounting pressure on natural resources.

Contribution of Dryland Farming:
Major dry farming crops include millets, oilseeds, pulses, maize, cereals and cotton.
- Almost 80 percent of Sorghum (Jowar) and Maize, 90 percent of Pearl millet (Bajra), 75 percent of oilseeds and approximately 95 percent of pulses are obtained from dryland agriculture.
- Contributions to wheat and rice production are also important, because 33 percent of wheat and 66 percent of rice are still rainfed.
- Drylands also contribute more than 70 percent of cotton to textile industries.

Despite struggling with issues of scanty resources, environmental stress, and low productivity, dryland agriculture is producing nearly 44 percent of the total food grains in the country.

Challenges in Dryland Farming:

Dryland farming involves cultivating crops without or with very limited irrigation, relying primarily on natural rainfall.

1. Rainfall:

- These regions experience low, erratic and unevenly distributed rainfall, ranging from 375 mm to 1125 mm, making them less productive and economically fragile.
- The distribution of rainfall during the crop period is often uneven. Crops may receive excessive rain when it is not needed and insufficient rain when they require it the most.
- Late arrival of the monsoon delays crop sowing, resulting in poor yields. In contrast, if monsoon rains recede early, the crops face drought-like conditions during critical growth stages, leading to reduced crop yields.

2. Soils:

- Dryland areas typically have poor and degraded soils with low water retention capabilities and various nutrient deficiencies such as nitrogen and phosphorus deficiencies.
- The weak soil structure and depleting groundwater tables make these areas more susceptible to drought and drought-like conditions.

3. Temperature:

- Huge variations in temperature affect crop growth and yields and deteriorate quality of produce in most cases.

4. Landholdings:

- Landholdings are generally small (less than two hectares), fragmented, and scattered, which makes farming less remunerative and difficult.

Significance of Dryland Farming:

1. Diverse Agro-climatic Zones:

- India's unique geographical location results in varied climatic conditions and cropping patterns across the country.

2. Addressing Climate Change:

- Dryland farming helps address climate change and ensures sustainable food security.

3. Reduce the Risk of Crop Failure:

- Cultivation is in accordance with agro-ecological regions of the country
- Most of the dryland crops are hardy and drought resistant.
- Example - Jowar, bajra, ragi, pulses, oilseeds.

4. Water-efficient way of Farming:

- Hardy crops do not require much irrigation-major drain on water resources, Example - 90% of the total groundwater extracted is used in agriculture mainly for irrigation.

- It relies mainly on rainfall.

5. Combat the Problems of Malnutrition:
- Hardy and nutritious crops including Jowar, bajra, ragi, pulses, oilseeds, cottonseed, sunflower, and safflower are excellent sources of nutrition.
- Example - Pulses are the cheapest source of protein.

6. Growth of Agro-processing:
- The industrial crops like cotton, groundnuts, oilseeds, pulses are major inputs to agro processing businesses.
- Help in making agriculture more export-oriented.

Strategies for Sustainable Dryland Farming:
1. Integrated Farming:
- Dryland farmers can increase productivity by adopting integrated farming models with multiple crops.

2. Crop Selection:
- Maximizing productivity in dryland conditions requires selecting suitable crops adapted to the environment.

3. Technology Adoption:
- Utilizing drip irrigation, water harvesting and precision farming improves water-use efficiency and yields.

4. Soil Conservation:
- Mitigate erosion and retain soil moisture through practices like contour ploughing, terracing and mulching.

5. Capacity Building:
- Empower farmers through training and knowledge transfer on dryland farming techniques.

6. Market Support:
- Strengthen market infrastructure and value chains to enhance profitability and market access.

7. Research and Development:
- Continued efforts are needed to develop crop varieties and technologies for dryland farming.

WAY FORWARD:
- Emphasis on location-specific research, rainwater harvesting and soil health management.
- Integrated farming modules for risk-proofing small and marginal farmers.

- Exploiting cutting-edge technologies like remote sensing and GIS for resource characterization.
- Development of nanotechnology-based products for dryland agriculture.
- Implementing energy efficiency, precision agriculture and renewable energy sources in dryland regions.

Despite its challenges, dryland farming has enormous potential for sustainable agriculture in India. By understanding local conditions, adopting appropriate practices and providing the necessary support, dryland farmers can overcome limitations and achieve abundant crop production, contributing to food security and rural development.