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# **AI3019**

## **SUSTAINABLE AGRICULTURE AND FOOD SECURITY**

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# **UNIT – II**

## **SUSTAINABLE AGRICULTURE**

**Agroforestry:** Agroforestry combines traditional agricultural practices with tree cultivation. This helps to reduce soil erosion and increase carbon sequestration, while also providing a source of income for farmers.

**Water Harvesting:** Water harvesting is a simple and effective way to capture rainfall and store it for future use. This can be especially helpful for farmers in areas prone to long periods of drought.

**Climate-Smart Agriculture:** Climate-smart agriculture is a set of practices that aim to increase agricultural productivity while also reducing greenhouse gas emissions. This includes practices such as the use of improved crop varieties, efficient irrigation systems, and sustainable land management.

## FOOD GRAIN PRODUCTION AT STATE LEVEL:

India's food grain production is a vital aspect of its agricultural sector. Here's a breakdown of the top food grain-producing states in India:

### Top Food Grain-Producing States –

- i. **Uttar Pradesh:** Ranks first in total food grain production, accounting for a significant portion of the country's wheat, barley, sugarcane, potato, and lentil production .
- ii. **Punjab:** Known as the "Granary of India," Punjab is a leading producer of wheat and rice, contributing significantly to the country's food grain production .
- iii. **Madhya Pradesh:** A major producer of soybeans, wheat, and pulses, Madhya Pradesh plays a crucial role in India's food grain production .
- iv. **Rajasthan:** The largest producer of bajra (pearl millet) in India, Rajasthan also produces significant amounts of wheat, pulses, and oilseeds .
- v. **Bihar:** A major producer of rice, wheat, and maize, Bihar contributes significantly to India's food grain production .

Food Grain Production Data According to the Ministry of Agriculture and Farmers Welfare, India's total food grain production for 2022-23 was estimated at 3296.87 lakh tonnes, with the top crops being

- i. Rice: 1357.55 lakh tonnes

- ii. Wheat: 1105.54 lakh tonnes
- iii. Nutri/Coarse Cereals\*: 573.19 lakh tonnes
- iv. Maize: 380.85 lakh tonnes
- v. Pulses: 260.58 lakh tonnes

### **State-Wise Production Data**

The state-wise food grain production data for 2022-23

- i. Uttar Pradesh: 529.51 lakh tonnes
- ii. Punjab: 354.11 lakh tonnes
- iii. Madhya Pradesh: 335.55 lakh tonnes
- iv. Rajasthan: 245.11 lakh tonnes
- v. Bihar: 234.51 lakh tonnes

### **Strategies for improving food grain production:**

#### **Crop Selection and Planning**

##### **1. Choose high-yielding varieties:**

Select crop varieties that are high-yielding, disease-resistant, and suitable for local climate conditions.

##### **2. Crop diversification:**

Grow a diverse range of crops to reduce dependence on a single crop and promote ecological balance.

##### **3. Crop rotation:**

Implement crop rotation to maintain soil fertility, reduce pests and diseases, and promote beneficial microorganisms.

#### **Soil Management**

##### **1. Soil testing:**

Conduct regular soil tests to determine nutrient levels and pH.

**2. Organic amendments:**

Use organic amendments like compost, manure, and green manure to improve soil fertility and structure.

**3. Conservation tillage:**

Implement conservation tillage to reduce soil erosion, improve soil moisture, and promote soil biota.

**Irrigation and Water Management****1. Efficient irrigation systems:**

Implement efficient irrigation systems like drip irrigation and sprinkler irrigation to reduce water waste.

**2. Water harvesting:**

Harvest rainwater and store it for non-rainy seasons to reduce dependence on groundwater

**3. Crop water management:**

Implement crop water management practices like mulching and crop spacing to reduce water evaporation.

**INDICATORS OF SUSTAINABLE FOOD AVAILABILITY:**

1. **Food Availability** refers to the physical existence of food, be it from own production or on the markets.
2. **Food Access** is ensured when all households and all individuals within those households have sufficient resources to obtain appropriate foods for a nutritious diet.
  - Depends on the level of household resources -capital, labour, and knowledge, and also on prices;
  - Function of the physical environment, social environment and policy environment, which determine how effectively households are able to utilize their resources to meet their food security objectives; and
  - Drastic changes in conditions, such as during periods of drought or social conflict, may seriously disrupt food production and threaten the food access of affected households.
3. **Food Utilization** has a socio-economic and a biological aspect. If sufficient and nutritious food is both available and accessible:
  - **socio-economic**
    - households make decisions/choices on what food to consume (demand) and how the food is allocated within the household;
    - Unequal distribution leads to suffering from food deficiency;
    - the same is true if the composition of the consumed food is unbalanced;
  - **biological utilization of food** – Focused at the individual level food security, which refers to the ability of the human body to take food and translate it into either energy that is used to undertake daily activities or is stored.

Utilization requires not only an adequate diet, but also:

  - a healthy physical environment, including safe drinking water and adequate sanitary facilities (so as to avoid disease); and
  - an understanding of proper health care, food preparation, and storage processes.