UNIT-I: Introduction to Agricultural Practices

Introduction:

India is one of the oldest agricultural civilisations and a world leader in production of vegetables, fruits, milk, eggs and fish. Agriculture gives us food, jobs, entrepreneurship opportunities and built our socio-cultural life.

According to Economic survey 2024-25, agriculture contributes 16% to India's GDP and employs 46.1% of the workforce.

The *Kṛiṣhi-parāśhara* provides a detailed account of traditional agricultural techniques, including soil preparation, crop selection, irrigation techniques, seasonal planning and pest management. It blends scientific observations and ecology to present natural methods that are relevant today to address issues, like soil degradation, climate unpredictability and the overuse of chemical fertilisers.

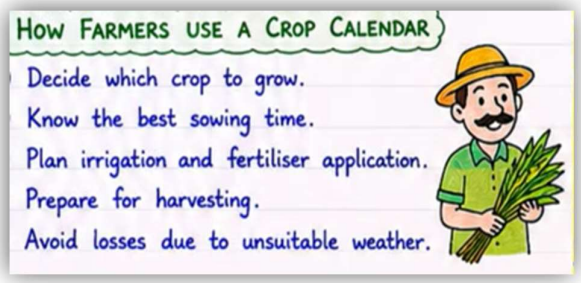
- Provides food & nutrition
- Supports rural livelihoods
- Strengthens communities & culture
- Use modern Technology (AI, Drone, robotics)
- Opens Job opportunities

CROP CALENDAR

A crop calendar is a yearly farming timetable that tells farmers which crops are sown, grown and harvested during different months of the year according to local climate, rainfall and soil conditions.

IMPORTANCE OF CROP CALENDAR:

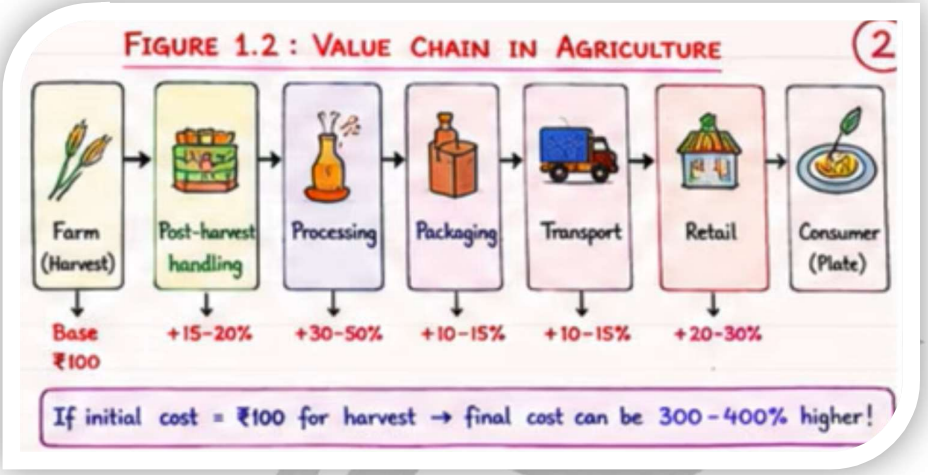
- Helps farmers plan agricultural activities.
- Improves crop production
- **Optimal Timing:** It ensures activities like sowing, weeding, and pesticide application occur at the exact right time, preventing crop failure and maximizing yield.
- **Resource Management:** It allows farmers to efficiently manage water, fertilizers, and labor, reducing waste.
- **Financial Planning:** It helps in developing a cash flow budget, tracking credit requirements, and avoiding financial shortages.
- **Climate Adaptation:** It guides adjustments in planting and harvesting schedules based



on historical climate data and weather forecasts.

	RABI SEASON (Winter Crops)	ZAID SEASON (Summer Crops)	KARIF SEASON (Monsoon Crops)
Sowing	Oct- Nov	March- April	June- July
Growing	Nov-March	April-June	July- August
Harvesting	March- April	June	Sep- Oct
Climate	Cool weather, less water	Hot summer	Hot weather with heavy rainfall
Examples	Wheat, Mustard, Barley	Watermelon, Cucumber, Pumpkin	Rice, Cotton

VALUE CHAIN



In agriculture, a value chain represents the full sequence of interconnected activities required to bring a product from the farm to the consumer.
At every step—such as input supply, farming, processing, and distribution—value is added to the product

Key Stages in the Agricultural Value Chain

The agricultural value chain is generally broken down into five primary stages:

- **Input Supply:** This foundational step involves providing farmers with necessary resources to grow crops or raise livestock. It includes seeds, fertilizers, pesticides, fuel, and farming machinery.
- **Production:** This includes all on-farm activities, such as land preparation, planting, irrigation, weed management, and harvesting.
- **Processing:** The transformation of raw agricultural goods into intermediate or consumer-ready products. Examples include milling wheat into flour, pressing olives into oil, or canning vegetables.
- **Distribution:** The logistical processes required to store, handle, and transport products from farms or processing plants to wholesale and retail markets.
- **Marketing and Sales:** The final activities involved in promoting, wholesaling, and retailing the agricultural product to the end consumer.

AI & TECHNOLOGY IN AGRICULTURE

Artificial Intelligence and technology are transforming agriculture from a guesswork-based industry to a highly precise, data-driven science. By leveraging IoT sensors, drones, and machine learning, farmers optimize yields, reduce chemical and water usage, and automate labour-intensive tasks like harvesting and crop monitoring.

- IMD (India Meteorological Department) provides block and district level weather forecasts via SMS, All India radio, Kishan Portal etc.
- App like BHARAT-VISTAAR give agro-climate data.
- Gramin Krishi Mausam Sewa (GKMS) is a flagship weather-based advisory scheme implemented by the India Meteorological Department (IMD) and the Ministry of Earth Sciences. It generates district and block-level weather forecasts and translates them into actionable, crop-specific farming advisories to help farmers optimize resources and minimize weather-related losses.

CS: WEATHER KEEPERS OF LADAKH

- Ladakh is a cold desert, very little rainfall. Irrigation depends on glacial meltwater.
- Temp: 25-30°C in summer & -25 to -8°C in winter
- Unpredictable weather can destroy crops.
- Livestock (Like Goat, camel, yaks etc) also affected by climate.
- high-altitude, cold-desert climate, restricting open-field cultivation to a brief 5-6 month summer window (May to October)

PROCESSES RELATED TO AGRICULTURAL PRACTICES

Agricultural practices refer to the systematic processes used to cultivate crops and raise livestock. The core cultivation cycle follows seven sequential steps: **soil preparation**, **sowing**, **manuring**, **irrigation**, **weeding/pest control**, **harvesting**, and **storage**

ACTIVITY/ PRACTICAL WORK FOR STUDENTS:

ACTIVITY: SOIL TESTING AND AMENDMENT. (MASON JAR TEST)

Prepare the Sample: Dig down 4-6 inches in your agricultural area to gather a representative sample. Sift out large rocks, twigs, and debris
Fill the Jar: Fill a straight-sided clear mason jar about one-third full with your soil.
Add Water and Surfactant: Fill the jar almost to the top with clean water, leaving just a little room to shake. Add 1 teaspoon of a dispersing agent like dishwasher soap or powdered laundry detergent to prevent the soil particles from clumping together.
Shake Vigorously: Secure the lid tightly and shake the jar aggressively for 3-5 minutes so all soil particles are completely suspended in the water
Allow to Settle (Measurements):

1 Minute (Sand): Set the jar on a level surface. Wait 60 seconds, then mark the top of the settled layer on the outside with a permanent marker. This is the **sand**.
2-6 Hours (Silt): Leave the jar completely undisturbed for several hours. The next layer to settle is the **silt**. Mark the top of this new layer.
24-48 Hours (Clay): Leave the jar for 1-2 days until the water is mostly clear. The very top layer is the **clay**. Mark this top layer. Floating organic matter will rest above the clay line.

Calculating and Using Your Results

To find the percentage of each particle, use the following formula: $Percentage = \frac{Thickness\ of\ Layer}{Total\ Height} \times 100$

Result	Action to be taken
Clay % is more than 20%- This will create water logging conditions to suffocation of roots.	Add river sand or red-garden soil to correct it.
Sand % is more than 80% - this will hold very little water	Add compost or garden-soil. It will increase water holding capacity.

ACTIVITY:PH TEST FOR SOIL

Soil pH testing measures the acidity or alkalinity of your soil on a scale from 0 to 14, where 7.0 is neutral, anything below 7.0 is acidic, and anything above is alkaline. Most garden plants thrive in a slightly acidic to neutral range of **6.0 to 7.0**, as this range optimizes nutrient availability

The Home Pantry Method (Quick Estimate)

This is an easy, zero-cost way to check if your soil is strongly acidic or alkaline using standard kitchen ingredients

Collect two samples: Dig down about 4–6 inches to gather soil from your root zone. Place a couple of spoonfuls into two separate, clean containers.
Test for Alkalinity: Add ½ cup of white vinegar to the first container. If it **fizzes or bubbles**, your soil is **alkaline** (pH > 7).
Test for Acidity: If the vinegar doesn't react, add distilled water to the second container to create a muddy slurry. Add ½ cup of baking soda and stir. If it **fizzes or bubbles**, your soil is **acidic** (pH < 7).
Neutral Soil: If neither test produces a reaction, your soil is roughly **neutral**.

Result	Action to be taken
pH<6 (Acidic)	Add compost, wood ass, lime or dolomite
pH>8.5(Alkaline)	Extra water & drain, add compost, sulphur fertiliser