

Chapter 1 – Crop Production and Management

Agricultural Practices

→ **Crop**: When plants of the same kind are cultivated at one place on a large scale.

→ **Kharif Crops**: Crops sown in the rainy season (June to September).

Example: Paddy, Maize, Soybean, Groundnut, Cotton.

→ **Rabi Crops**: Crops grown in the winter season (October to March).

Example: Wheat, Gram, Pea, Mustard.

Basic Practices of Crop Production



Food for all!

→ **Preparation of Soil**: The first step. Involves turning and loosening the soil to allow roots to penetrate deep and breathe easily.

→ **Tilling / Ploughing**: The process of loosening and turning the soil using a plough.

→ **Crumbs**: Big pieces of soil that need to be broken down with a plank.

→ **Sowing**: Planting healthy, good quality seeds into the soil. Often done using a Seed Drill to sow at equal distances and depths.



Starts with seeds.

→ **Manure**: An organic substance obtained from the decomposition of plant or animal waste. Enhances water holding capacity and soil texture.

→ **Fertilizers**: Chemical substances rich in particular nutrients (e.g.,

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Urea, NPK). Excessive use makes soil less fertile and causes water pollution.

Irrigation and Protection

→ **Irrigation**: The supply of water to crops at regular intervals.

 Save water!

→ **Modern Methods**: Sprinkler system (useful for uneven land) and Drip system (water falls drop by drop directly near the roots; best for saving water).

→ **Weeds**: Undesirable plants that grow naturally along with the crop, competing for nutrients and water.

→ **Weedicides**: Chemicals used to control and kill weeds (e.g., 2,4-D).

Harvesting & Storage

→ **Harvesting**: The cutting of crop after it is mature. Usually takes 3-4 months for a cereal crop.

→ **Threshing**: The process of separating the grain seeds from the chaff.

→ **Combine**: A machine which is both a harvester and a thresher.

→ **Winnowing**: Separation of grain and chaff by wind, used by farmers with small holdings.

→ **Storage**: Grains must be dried in the sun to

 Keep rats away!

prevent moisture, insects, and fungi. Stored in silos or granaries.

→ **Animal Husbandry**: Rearing animals on a large scale for food and other

purposes.

Chapter 2 - Microorganisms

→ Living things in the environment we can't see with naked eyes are **microorganisms** or **microbes**.

→ Major groups are: Bacteria, Fungi, Protozoa, Algae.

→ **Pathogens**: Bacteria which causes diseases to

 **Make us sick!**

human and animals.

→ **Pasteurisation**: A process by which something is heated to a high temperature for a few seconds or minutes, then suddenly cooled and packed. This stops the growth of bacteria.

→ **Symbiotic Relationship**: When two different living organisms make a relation for the benefit of one or both.

 +  = Win-Win

→ **Fermentation**: A biological process in which bacteria break down sugar into simpler substances, usually without oxygen.

★ **Exam Tip!**
Remember it happens **WITHOUT** oxygen.

Chapter 3 - Coal And Petrol

Natural Resources

→ **Inexhaustible Natural Resource**: Sun, Air.

☀ **Never ends!**

→ **Exhaustible Natural Resource**: Forest, Coal,

🪨 **Limited supply.**

Minerals.

Coal & Its Products

→ **Coke**: Tough, porous black substance come from coal by processing. It name 'Carbonization'.

→ **Pyrolysis**: Chemical decomposition of organic

🔥 **No oxygen!**

materials in absence of oxygen, like getting coke from coal.

→ **Coal Tar**: Come from coal after getting coke. Thick liquid unpleasant smell, it's mixture of about 200 substance.

→ **Coal Gas**: Flammable gas used in industries.

Chapter 4 – Combustion and Flame

Combustion Basics

- **Combustion**: Burning of anything.
- **Combustible or fuel**: Thing that get burn.
- **Ignition Temperature**: lowest temperature at which something get burn.  Minimum heat needed.
- **Inflammable substance**: Anything catch fire easily like Petrol.
- **Calorific value**: Amount of heat produced in burning of fuel of 1 kg. As expressed in unit kilojoule per kg (kJ/kg).  Energy measured in kJ/kg.

Types of Combustion

- **Rapid Combustion**: Anything that burn rapidly like Gas Stove.
- **Spontaneous Combustion**: Anything burn at room temperature, without any cause like Phosphorus.  Starts on its own!
- **Explosion**: Burning of Crackers.

Chapter 5 - Conservation of Land & Animals

- **Desertification**: when fertile land become  Turns to desert.
unfertile like desert due to drought or soil erosion.
- **Infiltration Rate**: Speed at which land or soil drinks water.
- **Wildlife Sanctuary**: Area where animals are protected from any disturbance to them and their habitat.
- **National Park**: Area reserved for wild life where they can freely use their habitat and natural resources.
- **Biosphere Reserve**: Large areas of protected land for conservation of wild life, plant, animal resources and traditional life of the tribals living in the area.
- **Endemic Species**: Certain types of animals only  Unique to one place.
live in certain part of world like Giant Squirrel.

Chapter 6 - Reproduction

→ **Gametes**: Sex cells used in Reproduction (Sperm + Egg (ovum) = Gametes).

→ **Zygote**: When both male & female sex cells  **First single cell.**
formed and mix (fertilized) they make a single cell named zygote.

→ **Embryo**: when single cell zygote converted into multi cell called embryo and begin growth of body parts.

→ **Foetus**: Stage when all the parts of the body is  **Body parts visible.**
available or we can see.

→ **Viviparous**: Animals which give birth to babies.

→ **Oviparous**: Which lay eggs, not babies.

→ **Metamorphosis**: Change of larva into adult frog.  **Tadpole to Frog.**

→ **Binary fission**: when a single cell divide itself for its offspring like Amoeba.

Chapter 7 - Adolescence

Glands and Hormones

→ **Menarche**: first menstruation cycle.

→ **Pituitary Gland**: Control all other glands, Release  **The Master Gland!**

growth hormones, Help you grow taller and develop body parts. Control sperm and egg formation, Control menstrual cycle, maintain water balance, Control uterus contraction during delivery, milk.

→ **Thyroid Gland**: Control Metabolism (How fast your body use energy/ food).

→ **Goitre Disease**: In this Thyroid Gland become  **Needs Iodine!**
enlarge, mostly due to iodine deficiency.

→ **Metabolism**: is control by Thyroxine hormone secret by Thyroid Gland.

→ **Adrenal Gland**: Handle stress, Release adrenaline  **Fight or Flight!**
(epinephrine). This hormone make your heart beate faster and prepare for fight or flight. Also maintain salt and water.

→ **Pancreas**: Produce enzymes for Digestion, Such  **Controls Blood Sugar.**
as Amylase (break down carbs), Lipase (break down Fats), Proteases/Trypsin (break down Protein), Insulin (lower Blood Sugar), Glucagon (Raise blood Sugar).

Chapter 8 - Force

Force and Motion

→ **Magnitude**: 'how big' or 'how strong' something is, It tells size/amount/value. It don't tell direction.

→ **Vector**: It consist the value of both magnitude and direction.  Has direction too!

→ **Motion**: Something moving in respect of observer.

→ **Muscular Force**: like lifting a bucket so use our muscles, so it is called Muscular force.

→ **Contact Force**: A Force Applied when two or more things touch each other. like - Magnetic is not contact force.

Chapter 9 – Friction

Understanding Friction

- **Electrostatic force**: When we rub 2 things against each other they get charged electrons. This is also no contact force but usually work very closely. ⚡ **Static charge!**
- **Pressure**: Force applied on specific area, like put palm on table, in the area your palm hit is pressure. In simple words: It's how much force acting on specific area.
- **Atmospheric Pressure**: Pressure applied by atmosphere to the things due to moving particles of air and other things.
- **Friction**: At microscopic level things have irregularities, These bumps interlock and resist motion that resistance called Friction. 🛑 **Resists motion.**
- **Rolling Friction**: In Rolling Friction, Things roll, so they don't get stuck That so cause less friction. 🛞 **Wheels make it easy!**

Chapter 11 - Sound

Sound Waves

→ **Amplitude**: Height of sound wave. Higher the height = Higher/Louder the sound.

→ **Pitch**: Number of waves per second. That's the reason why high pitch sound travel longer distance.

→ **Hearing limit**: If sound is less than 20 Hz (20 vibration or waves) human can't hear. 20KHz (20,000) also not audible.

💡 20 Hz to 20,000 Hz only!

Chapter 12 - Electricity & Lightning

Charges

→ **Charges**: Charged in different object attract each other like Ballon repel each other if both are charged but a charge ballon and a charge pen refil will attract each other.

→ **Electroscope**: A device used to check any object that if it conduct charges.

→ **Earthing**: charges flow through conductors and earth is conductor but have zero voltage, when charges flow they always go to the path where lowest charges are present.

 Safe path for electricity.

→ **Lightning**: How Lighting happened: when There is cloud and water air comes, air makes water droplet and ice move very fast in clouds, movement cause electric charges (like Rubbing ballons).

Chapter 13 – Light

Reflection & Light

- **Incident Ray**: Ray which strike any surface is called the incident ray.
- **Reflected Ray**: Ray comes back after reflecting.
- **Normal**: Point where Reflected ray meet incident ray.

→ **Angles**: Angle of Incidence: Angle between normal and incident ray. Angle of reflection: Angle between

 Angle of Incidence
= Angle of Reflection

normal and reflected ray.

- **Regular Surface**: where light goes and comes on same angle and form perfect image like mirror. Irregular surface: scattered light everywhere so a clear image don't form like a wall.

The Human Eye

- **Cornea**: outer layer of eye that protect internal organs of eyes.

→ **Iris**: Behind Cornea we have Iris. Amount of 'Melanin' determin colour of the Iris, usually high

 Controls light & color.

'melanin' result in dark colours such as 'brown' or visa versa. Iris also control how much amount of light goes in the eyes.

- **Retina**: It contains several nerve cells with these cells we feel the light.

Major cells are two types: Cones (sensitive to bright lights and sense colours) and Rods (sensitive to low light).

- **Blind Spot**: At the junction of the optic nerve and the retina there are no sensory cells, so no vision is possible at that spot.
- **Moving Images**: If anything moves 16 times in 1  **24 FPS trick!**
second eyes perceived that object as moving. Usually old films used (24 FPS) 24 images per second so we perceived it as movie.
- **Eyesight limit**: If a person have good eyesight he/she should be able to read from 30cm.
- **Cataract (मोतियाबिंद)**: Natural 'opaque' lens is become cloudy, and new artificial lens is installed.
- **Vitamin A**: Is good for eyes.

Light Properties

- **White Light**: consist 7 colours. Actually white is not colours It mix of all colours together.
- **Dispersion**: Splitting light into its constituent  **Like a rainbow!**
colours.
- **Sight in Dark**: Can you see object in the dark room? No, we cannot see objects in dark room, because we see object only a light get Reflected from and object and goes into our eyes.

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