DEPARTMENT OF AI&DS, AI&ML, CSE & IT
UNIT FUNDAMENTALS

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SUBJECT NAME: WATER AND SOIL CONSERVATION

UNIT I – WATER CONSERVATION

SYLLABUS:

Water harvesting principles and techniques – Irrigation Principles – Surface Irrigation – Sprinkler Irrigation – Micro irrigation – Benefits of Water Conservation.

Introduction:

Water Harvesting

The term 'water harvesting' is usually taken to mean the immediate collection of rainwater running off surfaces upon which it has fallen directly.

Importance of Water Harvesting:

- Improvement in the quality of ground water.
- Rise in the water levels in wells and bore wells that are drying up.
- Mitigation of the effects of drought and attainment of drought proofing.

Rain Water Harvesting principles and its techniques:

Rain Water Harvesting: Rainwater harvesting is a sustainable process that helps in preserving rain water for different purposes and for the future needs as well.

Techniques of Rain water Harvesting: 1. Roof top harvesting 2. Run off harvesting

1. **Roof top harvesting:** This method include the catchment area as the roof top in rural and urban area. This include Roof top of houses, flats, factories, offices, complexes.
2. **Runoff harvesting:** Here the runoff water is collected- Gardens, driveways, landscapes, open fields, parks, roads and pavements and other open areas of the environment can be used to harvest the rain water runoff.

1. Roof Top Harvesting:

It is a technique of capturing and storing of rain water for future utilization.

Rainwater Harvesting: Rainwater harvesting is defined as the method for inducing, collecting, storing and conserving local surface runoff for agriculture in arid and semi-arid regions. Three types of water harvesting are covered by rainwater harvesting.

2. Runoff Harvesting

Runoff harvesting for short and long term is done by constructing structures as given below.

Techniques: Contour bunds, semicircular hoop, trapezoidal bunds, graded bunds, rock catchment, ground catchment, Dugout Ponds, Embankment Type Reservoirs

Irrigation: Irrigation is an artificial application of water to the soil. It is usually used to assist the growing of crops in dry areas and during periods of inadequate rainfall.

Need of the Irrigation

• India is basically an agricultural country, and all its resources depend on the agricultural.
• Water is evidently the most vital element in the plant life.

Advantages of irrigation

Advantages of irrigation can be direct as well as indirect.

I. Direct Benefits

• The grower has many choices of crops and varieties and can go for multiple cropping for cultivation
• Crop plants respond to fertilizer and other inputs and there by productivity is high.
• Quality of the crop is improved.

II. Indirect Benefits

• Modify soil or climate environment – leaching.
• Lessen risk of catastrophic damage caused by drought.
• Increase income & national cash flow, Increase labor employment, Increase standard of living.

Disadvantages of Irrigation: The following are the disadvantages of irrigation.

- Water logging.
- Salinity and alkalinity of land.
- Ill aeration of soil.
- Pollution of underground water.

III. Effects of irrigation system:

- Irrigation not only contributes to increased crop production but may also reduce variability in production through improved control of the crop environment.
- Breeding Area for Mosquitoes. We know that the most suitable place to grow mosquitoes is the water in which there is no current.

Different Types of Irrigation

The main different types of irrigation are:

1. Surface Irrigation
2. Sprinkler Irrigation
3. Micro irrigation

Surface Irrigation

Surface irrigation is the oldest form of irrigation techniques. In this technique, water is applied and distributed over the surface of soil by gravity, i.e., from an area of higher elevation to that of lower region in order to dampen and thereby infiltrate the soil. It is the most common form of irrigation throughout the world.

Sprinkler Irrigation: The sprinkler (overhead or pressure) irrigation system conveys water to the field through pipes (aluminium or PVC) under pressure with a system of nozzles. This system is designed to distribute the required depth of water uniformly, which is not possible in surface irrigation. Water is applied at a rate less than the infiltration rate of the soil hence the runoff from irrigation is avoided.

Micro irrigation:

Micro irrigation methods are precision irrigation methods of irrigation with very high irrigation water efficiency. In many parts of the country there is decline of irrigation water and conventional methods are having low water use efficiency.

Drip irrigation system:

Drip irrigation system, also known as 'trickle irrigation system', is a method of applying the required amount of water directly to the root zones of plants through drippers or emitters at frequent intervals. In this system, water is applied drop-by-drop or by a micro jet on the soil surface or sub-surface at a rate lower than the infiltration rate of the soil.

Difference between Sprinkler Irrigation System and Drip Irrigation System:

Drip irrigation:

1) In drip irrigation distributing pipes has holes to supply water.
2) In drip irrigation there is maximum use of available water.

Sprinkler irrigation:

1) In sprinkler irrigation, a nozzle is attached in the pipe.
2) There isn't maximum use of available water.

Benefits of Water Conservation

Water conservation is the technique of efficiently utilising water and cutting down its wastage or unnecessary usage. Since fresh, clean water is now considered a limited resource, water conservation has become important and imperative.