



Unit 1

1. Tank Irrigation

Definition:

Tank irrigation involves storing rainwater in artificially constructed reservoirs or tanks for later use in irrigation.

Features:

- Common in **South India** (Tamil Nadu, Karnataka, Andhra Pradesh).
- Tanks are generally **earthen embankments** constructed across small streams.

Merits:

- ✓ Provides **water storage** for dry seasons.
- ✓ Improves **groundwater recharge**.
- ✓ Suitable for **undulating terrains** where canal irrigation is difficult.

Demerits:

- ✗ Evaporation losses are high.
- ✗ Limited water storage capacity.
- ✗ Requires **regular desilting** for maintenance

2. Well Irrigation

Definition:

Water is **lifted from underground sources** using wells for irrigation.

Types of Wells:

1. **Open Wells:** Shallow wells with water drawn by buckets or pumps.
2. **Tube Wells:** Deep wells (20-100m), fitted with pumps for large-scale irrigation.



Merits:

- ✓ **Independent water supply** for farmers.
- ✓ **Helps recharge groundwater** with excess water.
- ✓ **Less affected by seasonal changes** compared to tank irrigation.

Demerits:

- ✗ **Over-extraction leads to groundwater depletion.**
- ✗ **Initial cost of tube wells is high.**
- ✗ **Requires continuous electricity or diesel** for pumping.

3. Surface Irrigation

Definition:

Water is applied **directly to the land surface** and allowed to **flow by gravity**.

Types of Surface Irrigation:

1. **Flood Irrigation:** Entire field is covered with water.
2. **Border Strip Irrigation:** Water flows in parallel strips along the field.
3. **Check Basin Irrigation:** Fields are divided into small basins with controlled water entry.

Merits:

- ✓ **Simple and inexpensive** method.
- ✓ **Effective for heavy soils** with low infiltration rates.

Demerits:

- ✗ **High water wastage** due to runoff and evaporation.
- ✗ **Not suitable for sandy soils** due to quick drainage.



4. Sub-Surface Irrigation

Definition:

Water is supplied **below the soil surface**, reducing evaporation losses.

Types:

1. **Natural Sub-Surface Irrigation:** Water seeps from nearby water bodies or canals.
2. **Artificial Sub-Surface Irrigation:** Pipes or channels distribute water underground.

Merits:

- ✓ **Prevents water loss due to evaporation.**
- ✓ **Reduces weed growth** since surface soil remains dry.

Demerits:

- ✗ **High installation cost.**
- ✗ **Requires proper soil conditions** (not suitable for rocky soils).

5. Micro Irrigation

Definition:

Micro irrigation supplies **water in small quantities** close to the plant roots.

Types:

1. **Drip Irrigation** (Localized irrigation)
2. **Sprinkler Irrigation** (Overhead irrigation)

5.1 Drip Irrigation

- Water is delivered **drop by drop** at the root zone.
- **Best suited for:** Horticulture, orchards, and row crops.



Merits:

- ✓ Saves **50-70% of water** compared to flood irrigation.
- ✓ Reduces **weed growth** by keeping non-root areas dry.
- ✓ **Minimizes soil erosion.**

Demerits:

- ✗ **Clogging of drippers** is a problem.
 - ✗ **High initial investment** for pipes and emitters.
-

5.2 Sprinkler Irrigation

- Water is **sprayed like natural rainfall** using sprinklers.
- **Best suited for:** Sandy soils and uneven terrains.

Merits:

- ✓ **Uniform water distribution.**
- ✓ **Less labor required** for operation.
- ✓ Suitable for **undulating and sloped lands.**

Demerits:

- ✗ **High wind speed reduces efficiency.**
 - ✗ **Requires electricity for pumping.**
-

6. Ridge and Furrow Irrigation

Definition:

Water is applied in furrows (small channels) while crops grow on ridges.

Best for:

- **Row crops** like maize, sugarcane, and cotton.



Merits:

- ✓ Improves water efficiency by controlling flow.
- ✓ Prevents waterlogging in crops.
- ✓ Suitable for deep-rooted crops.

Demerits:

- ✗ Requires land leveling for uniform furrow depth.
- ✗ Not suitable for sandy soils with high infiltration.

Comparison Table of Irrigation Methods

Irrigation Type	Water Saving	Cost	Best Suited for	Limitations
Tank Irrigation	Low	Low	Rain-fed areas	High evaporation loss
Well Irrigation	Medium	Medium	Independent farmers	Groundwater depletion
Surface Irrigation	Low	Low	Large fields	High water wastage
Sub-Surface Irrigation	High	High	High-value crops	Expensive installation
Drip Irrigation	Very High	High	Orchards, row crops	Requires maintenance
Sprinkler Irrigation	Medium	Medium	Sandy & sloped land	Wind reduces efficiency
Ridge & Furrow	Medium	Low	Row crops (Maize, Sugarcane)	Requires field preparation

Conclusion

- Surface irrigation is traditional but wastes water.
- Micro irrigation (Drip & Sprinkler) saves 50-70% of water and is best for modern agriculture.
- Tank & well irrigation are region-specific.
- Choosing the right method depends on climate, crop type, and soil conditions.

