

Sprinkler Irrigation - Types

Sprinkler and Micro irrigation Systems



Dr Bibhuti Bhusan Sahoo
Assistant Professor
Department of Agricultural Engineering

Types of Sprinkler Irrigation System

- There are several types of sprinkler irrigation system, broadly divided into two groups
 - **Set system** operate with the sprinklers set in a fixed position.
 - **Continuous move system** operate while sprinkler is moving through the field.
- **Set systems** may be further divided according to *whether or not sprinklers must be moved through a series of positions during the course of irrigating a field*
 - **Periodic move system**: those systems must be moved.
 - **Fixed system**: those not requiring any movement.

"Periodic move" Sprinkler Irrigation Systems

- These are further classified into
 - Hand move
 - End tow
 - Side-roll laterals
 - Side-move laterals
 - Gun and Boom sprinklers

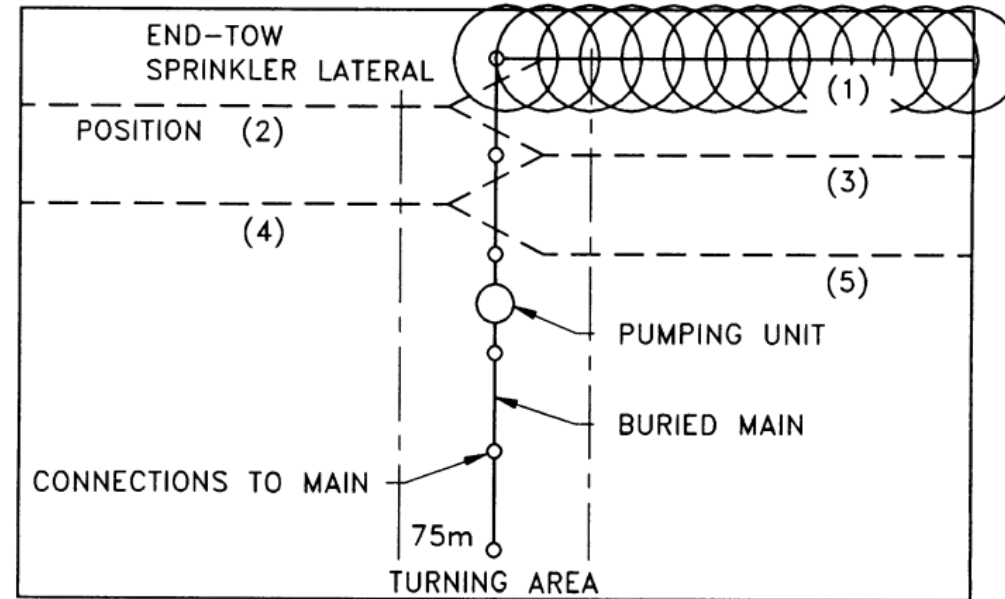
Hand Move Lateral System

- Consists of either portable or buried pipeline with valve outlets at intervals for attaching the portable laterals.
- Each pipe section has either centre mounted or end mounted riser pipe supporting a sprinkler head.
- Can be used for variety of crops on all types of topography.
- Requires high labour.



End Tow Lateral System

- Similar to hand-move lateral system, except that the **main line is buried in centre** and **laterals are rigidly coupled**.
- Laterals are towed lengthwise over the mainline from one side to the other in an S fashion.



- 20 to 30 hp tractor can tow 400m long lateral of 100mm \varnothing lateral.

Side Roll Lateral System

- Similar to hand-move lateral system.
- Lateral pipes are rigidly coupled, and each joint of pipe is supported by a large wheel.
- Lateral line form the axle of the wheel; rolls sideways when twisted.
- Best adapted to rectangular fields with uniform topography for low growing crops.

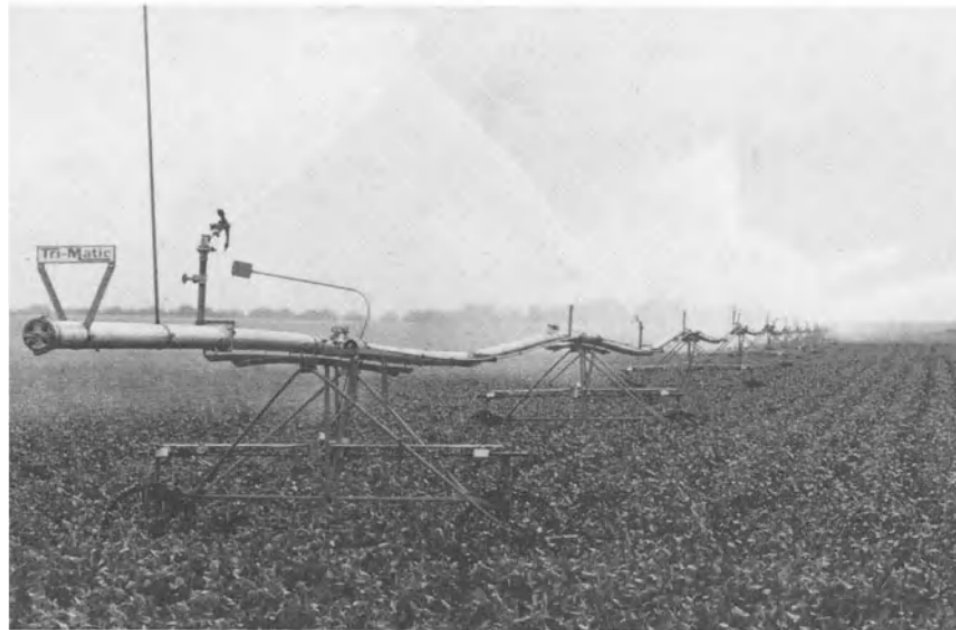
Side Roll Lateral System

- All sprinkler provided with a **self leveller** to keep the sprinkler **upright** regardless of the position at which lateral pipe is stopped
- Laterals provided with at least two wind braces, one on either side of the power mover, as well as **a flexible or telescopic section to connect the lateral to the main line hydrant valves.**



Side Move Lateral System

- Periodically moved across field in a similar manner to side roll systems.
- Difference being the pipeline is carried over wheels on small 'A' frame instead of serving as axle.
- Suitable for most field and vegetable crops.



Gun or Boom Sprinkler

- Gun or giant sprinkler has larger range nozzles attached to long discharge tubes.
- Most gun sprinkler are rotated by means of a rocker arm drive.
- It can be set to irrigate a part circle also.



Gun or Boom Sprinkler

- Boom sprinklers have rotating arms 18 to 36m in length.
- Water is discharged through nozzle strategically positioned along the arms.
- The arms or booms are supported by a cable suspension system and mounted on a four wheel trailer.



Gun or Boom Sprinkler

- Both gun and boom sprinkler systems are both well - adapted to **supplemental irrigation** and to **use on irregularly shaped fields or fields or fields with obstructions**.
- Boom sprinklers provide a more uniform water application and somewhat smaller droplets than gun sprinkler.
- These sprinklers produce **relatively high application rates and large water drops that tend to compact the soil surface** and to create runoff problems.
- Therefore, **these sprinklers are most suitable for coarse-textured soil with high infiltration rates** and **for relatively mature crops** that need only supplemental irrigation.

Fixed Sprinkler System

- Has enough lateral pipe and sprinkler heads so that **none of the laterals need to be moved** for irrigation purposes **after being placed** in the field.
- To irrigate field, sprinkler need to be cycled on or off.
- Three main types of fixed system
 - Hand-move laterals
 - Buried, or permanent laterals
 - Sequencing-valve laterals.
- Hand-move laterals can be moved from field to field as crop rotation or irrigation plan for farm is changed.
- Permanent buried laterals are placed underground 40 to 75 cm deep, with only riser pipe and sprinkler head above the field.

Fixed Sprinkler System

- The sequencing valve laterals may be buried, placed on the soil-surface, or suspended on cables above the crop. A valve on each sprinkler riser turns the sprinkler on and off when a control signal is received. Most sequencing-valve systems with small sprinklers use pressure change in the water supply to activate the valves.

Continuous Move Sprinkler Irrigation System

Assignment

Describe the use advantage and dis-advantage of different types of continuous move sprinkler irrigation system.



!!!-Thank you-!!!

