

Drip Irrigation for enhancing productivity



Conventional irrigation system

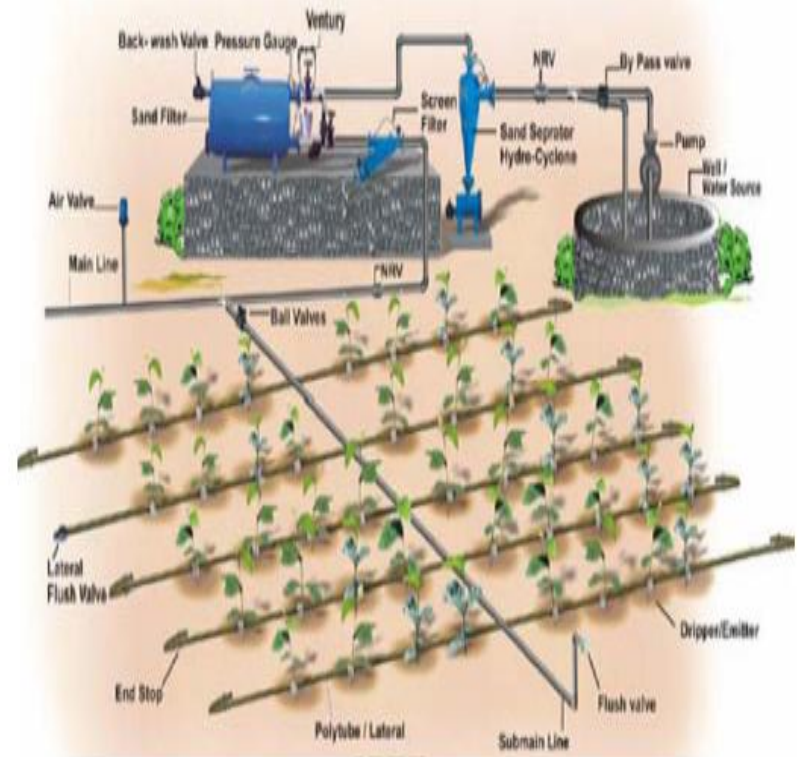
- Canal irrigation through construction of large dam and channels
- Wild flooding of water from field to field at one go
- Flows over the crop and affects soil aeration
- Water runs without being taken by plants
- Wastage of water is huge

Micro irrigation system

- Water is appropriately used & absorbed by root zone of plants
- Farmer has to be sensitized for less water use, agronomic practices and different technology aspect of drip irrigation as more land can be irrigated
- saves water upto 70% & 30% of conventional water can produce the same or more yield
- Increase in yield upto 40%
- Crop grows consistently, healthier & matures fast
- Early maturity leads to quicker return on investments
- Fertiliser use efficiency increases by 30%
- Cost of fertilisers, inter-culturing & labour gets reduced
- Undulating terrains, water logged, uncultivated, sandy & hilly lands can be brought under productive cultivation
- Scope exist for unseasonal crops during water scarce period & protective cultivation at a later stage.
- High initial investment, but return is quick

How drip works?

- Uses a network of mainlines, sub mains, lateral lines with emission points spaced appropriately.
- Each dripper/ emitter supplies a measured amount of water & nutrient to the root zone as per requirement of plant
- Hence plant not suffers from water stress & enhance quality, optimum growth & high yield



Types of drip Irrigation system

Based on pressure management:

- Pressure compensated drip system
- Normal drip system

Based on use of water lifting device:

- Directly pumping and using drip for irrigation
- Pumping to a tank and using gravity flow for drip system

Components of drip system

- Filter
- Mainline
- Sub main line
- Laterals
- Emitters
- Control valves
- Flush valves
- Air release valve
- Pressure gauge
- End caps

Operational requirements

- Irrigation must be frequent
- Water & fertigation applied slowly as per requirement of crop
- Filters need to be cleaned periodically
- Discharge rate should be checked periodically
- Water pressure at inlet & outlet of filter and laterals to be monitored

Limitation of drip system

- ❑ High Initial Cost
- ❑ Clogging of emitters
- ❑ Damage Chances
- ❑ Short Life Span especially of laterals
- ❑ Salt accumulation
- ❑ High level of technology and equipments are required

Design of drip system

- Layout, size, length of mains, sub-mains, laterals are decided based on slope and size of land
- Emitter selection, number of emitters, water discharge and pumping schedule are decided based on type of crop, their spacing
- Type of pump and water source are also need to be

Different models of drip irrigation

Features	Model-I	Model-II	Model-III	Model-IV	Model-V
For plot size up to 0.1 Ha	√	√			√
For cluster of farmers, with aggregate plot size up to 1 Ha				√	
For large farmers, plot size up to 1 Ha			√		
Assured power supply & to run on 0.5 hp electric pumpset	√				
Power supply not assured & to run on 1.5 hp petrol start kerosene pumpset		√			
Power supply not assured & can run on 5 hp diesel pumpset			√	√	
Power supply not assured & to run on 1.5 hp kerosene pumpset / manual pump					√
Variations in slope within the plot minimized through land leveling	√	√			
Variations slope minimized by land leveling , separate submains & control valve			√	√	
Variation in slope is managed through pressure compensated drip system					√
Drip system to run on direct pumping	√	√	√	√	
Drip system to be supported with an overhead drum for gravity flow of water					√
Area coverage: 1000 sq.mtr. (0.1 ha. / 25 decimals) as single plot	√	√			√
Area coverage: 10000 sq.mtr. (1 ha) as single plot			√		
Area coverage: 10000 sq.mtr. (1 ha.) as a cluster of 10 plots				√	

Model I: 0.1 ha. with Electric Pump set

- a. For small farmers, plot size up to 0.1 Ha
- b. Individual farmer with no shared water lifting facility
- c. Assured power supply & to run on 0.5 hp electric pumpset
- d. Variations in slope within the plot minimized through land leveling
- e. Drip system to run on direct pumping
- f. Area coverage: 1000 sq.mtr. (0.1 ha. / 25 decimals) as single plot

Model II: 0.1 ha. with 1.5 HP Petrol Start Kerosene Pump set

- a. For small farmers, plot size up to 0.1 Ha
- b. Individual farmer with no shared water lifting facility
- c. Power supply not assured & to run on 1.5 hp petrol start kerosene pumpset
- d. Variations in slope within the plot minimized through land leveling
- e. Drip system to run on direct pumping
- f. Area coverage: 1000 sq.mtr. (0.1 ha. / 25 decimals)) as single plot.

Model III: 1 ha. Individual plot with 5 HP Diesel Pump set

- a. For large farmers, plot size up to 1 Ha
- b. Individual farmer with own water lifting facility
- c. Power supply not assured & to run on 5 hp diesel pumpset
- d. Variations slope minimized through land leveling, use of separate sub-mains & control valve
- e. Drip system to run on direct pumping
- f. Area coverage: 10000 sq.mtr. (1 ha) as single plot

Model IV: 1 ha. on Cluster basis for 10 farmers **(avg.) with Common 5 HP Diesel Pump set**

- a. For cluster of small farmers, with aggregate plot size up to 1 Ha
- b. Cluster of farmers with shared water lifting facility
- c. Power supply not assured & to run on 5 hp diesel pumpset
- d. Variations in slope within the plot minimized through land leveling and use of separate submains and control valve
- e. Drip system to run on direct pumping .
- f. Area coverage: 10000 sq.mtr. (1 ha.) as a cluster of 10 plots

Model V: 0.1 ha. with Overhead Plastic Tank & Electric Pump set

- a. For small farmers, plot size up to 0.1 Ha
- b. Individual farmer with no shared water lifting facility
- c. Power supply not assured & to run on 1.5 hp petrol start kerosene pumpset / electric / manual pump
- d. No variations in slope within the plot
- e. Drip system to run on overhead plastic drum
- f. Drip system to be used will be pressure compensated
- g. Area coverage: 1000 sq.mtr. (0.1 ha./ 25 decimals) as single plot

UNDP/JSLPS & NABARD joint initiative for pilot demonstration at Anagara, Ranchi

- 25 farmers with each 25 decimal (0.1 he) using model V
- Poly house nursery with capacity to produce 50,000 vegetable saplings every month

