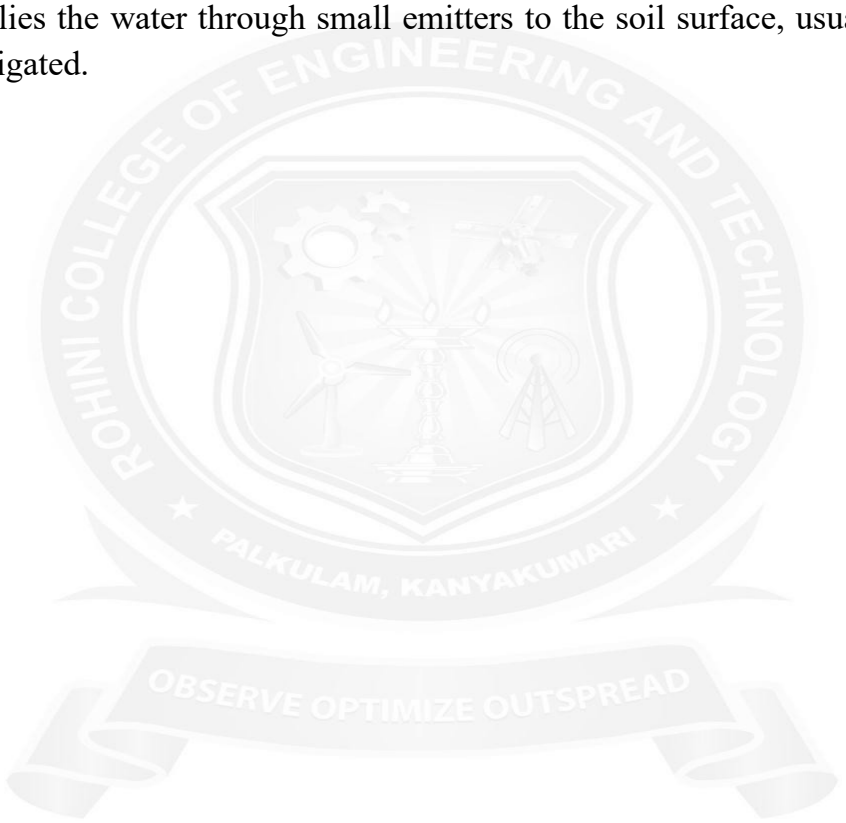
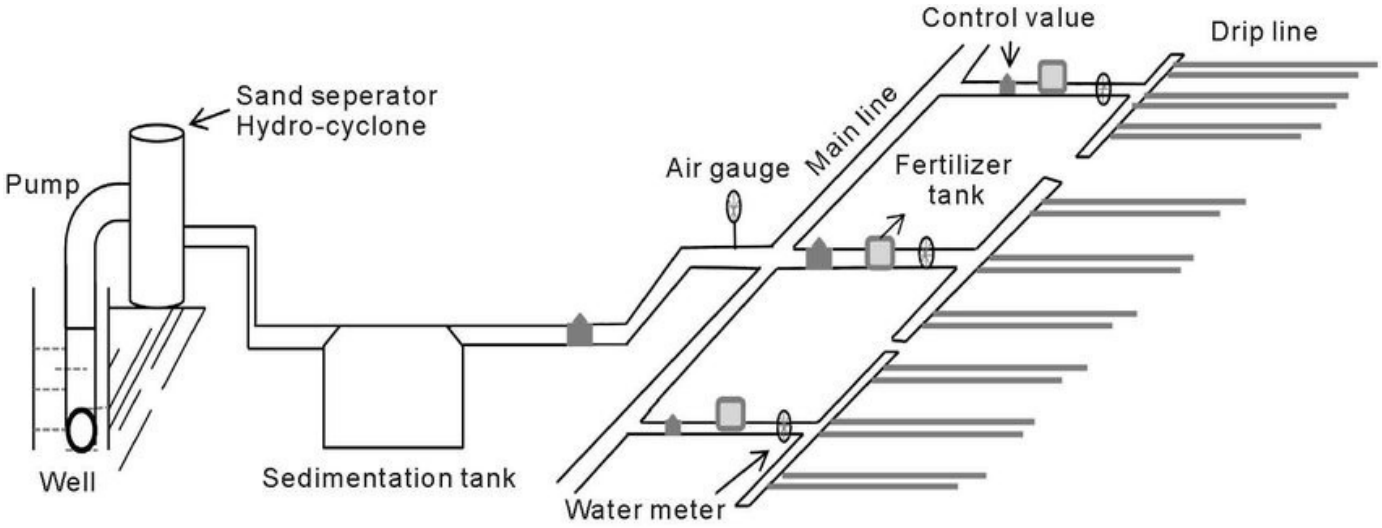
DRIP IRFUGATION

- Drip irrigation, also known as trickle irrigation or micro irrigation is an irrigation method which minimizes the use of water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters.
- It is becoming popular for row crop irrigation. This system is used in place of water scarcity as it minimizes conventional losses such as deep percolation, evaporation and run-off or recycled water is used for irrigation.
- Small diameter plastic pipes fitted with emitters or drippers at selected spacing to deliver the required quantity of water are used. Drip irrigation may also use devices called micro-spray heads, which spray water in a small area, instead of dripping emitters.
- Subsurface drip irrigation (SDI) uses permanently or temporarily buried drip per line or drip tape located at or below the plant roots.
- Pump and valves may be manually or automatically operated by a controller Drip irrigation is the slow, frequent application of water to the soil though emitters placed along a water delivery line.
- The term drip irrigation is general, and includes several more specific methods. Drip irrigation applies the water through small emitters to the soil surface, usually at or near the plant to be irrigated.



- Subsurface irrigation is the application of water below the soil surface. Emitter discharge rates for drip and subsurface irrigation are generally less than 12 liters per hour.



Components of Drip Irrigation System (Listed in Order from Water Source)

(a) Pump or pressurised water source.

(b) Water Filter(s) - Filtration Systems : Sand Separator, Cyclone, Screen Filter, Media Filters.

(c) Fertigation Systems (Venturi injector).

(d) Backwash Controller.

(e) Main Line (larger diameter Pipe and Pipe Fittings).

(f) Hand-operated, electronic, or hydraulic Contvl Valves and Safety Valves.

(g) Smaller diameter polytube (often referred to as "laterals").

(h) Poly fittings and Accessories (to make connections).

(i) Emitting Devices at plants (Example : Emitter or Drippers, micro spray heads, inline drippers, trickle rings).

Suitabi1ity:and Limitation

(a) From stand point of crops, soil, and topography, drip irrigation is best suited for tree, vine, and row crops. A lot of research work has been conducted to establish the suitability of drip irrigation for different vegetable crops. Drip irrigation has been found suitable both for field vegetable crops and also under covered cultivation practices.

(b) With respect to water quantity and quality, drip irrigation uses a slower rate of water application over a longer period of time than other irrigation methods. The most economical design would have

water flowing into the farm area throughout most of the day, every day, during peak use periods. If water is not available on a continuous basis, on-farm water storage may be necessary.

(c) Though a form of pressurized irrigation, drip is a low pressure, low flow rate method. These conditions require small flow channel openings in the emission devices, which are prone to plugging.

(d) High efficiencies are USP of drip irrigation system. Properly designed and maintained drip systems are capable of high efficiencies. Design efficiencies should be on the order of 90 to 95%.

(e) Labour and energy considerations are very important consideration in drip irrigation system. Due to their low flow characteristics, drip irrigation systems usually have few sub-units, and are designed for long irrigation times.

(f) Drip irrigation systems generally use less energy than other forms of pressurized irrigation systems. The emission devices usually operate at pressures ranging from 5 to 25 PSI. Additional pressure is required to compensate for pressure losses through the control head (filters and control valves) and the pipe network.

(g) Economic factors need special attention in case drip irrigation system as initial cost and operational cost is reasonably high. Drip systems costs can vary greatly. Depending on crop (plant. and therefore. emitter and hose spacings) and type of hose employed (permanent or "disposable" thin-walled tubing).

Advantages

The advantages of drip irrigation are :

1. Minimised fertilizerlnutrient loss due to localized application and reduced leaching, allows safe use of recycled water.
2. High water distribution efficiency. Moisture within the root zone can be maintained at field capacity.
3. Leveling of the field not necessary. Soil type plays less important role in frequency of irrigation, minimised soil erosion.
4. Highly uniform distribution of water, i.e. controlled by output of each nozzle.
5. Lower labour cost.
6. Early maturity and good harvest.
7. Foliage remains dry thus reducing the risk of disease.

Performance Indicator	Conventional Irrigation Methods	Drip Irrigation
Water saving	Waste lot of water. Losses occur due to percolation, runoff and evaporation	40-70% of water can be saved over conventional irrigation methods. Runoff and deep percolation losses are nil or

		negligible.
Water use efficiency	30-50%, because losses are very high	80-95%
Saving in labour	Labour engaged per irrigation is higher than drip	Labour required only for operation and periodic maintenance of the system
Weed infestation	Weed infestation is very high	Less wetting of soil, weed infestation is very less or almost nil.
Use of saline water	Concentration of salts increases and adversely affects the plant growth. Saline water cannot be used for irrigation	Frequent irrigation keeps the salt concentration within root zone below harmful level
Diseases and pest problems	High	Relatively less because of less atmospheric humidity
Suitability in different soil Type	Deep percolation is more in light soil and with limited soil depths. Runoff loss is more in heavy soils	Suitable for all soil types as flow rate can be controlled
Water control	Inadequate	Very precise and easy
Efficiency of fertilizer use	Efficiency is low because of heavy losses due to leaching and runoff	Very high due to reduced loss of nutrients through leaching and runoff water
Soil erosion	Soil erosion is high because of large stream sizes used for irrigation.	Partial wetting of soil surface and slow application rates eliminate any possibility of soil erosion
Increase in crop yield	Non-uniformity in available moisture reducing the crop yield	Frequent watering eliminates moisture stress and yield can be increased up to 15- 150% as compared to conventional methods of irrigation.