

Drip Irrigation – Water Efficient Irrigation Technique

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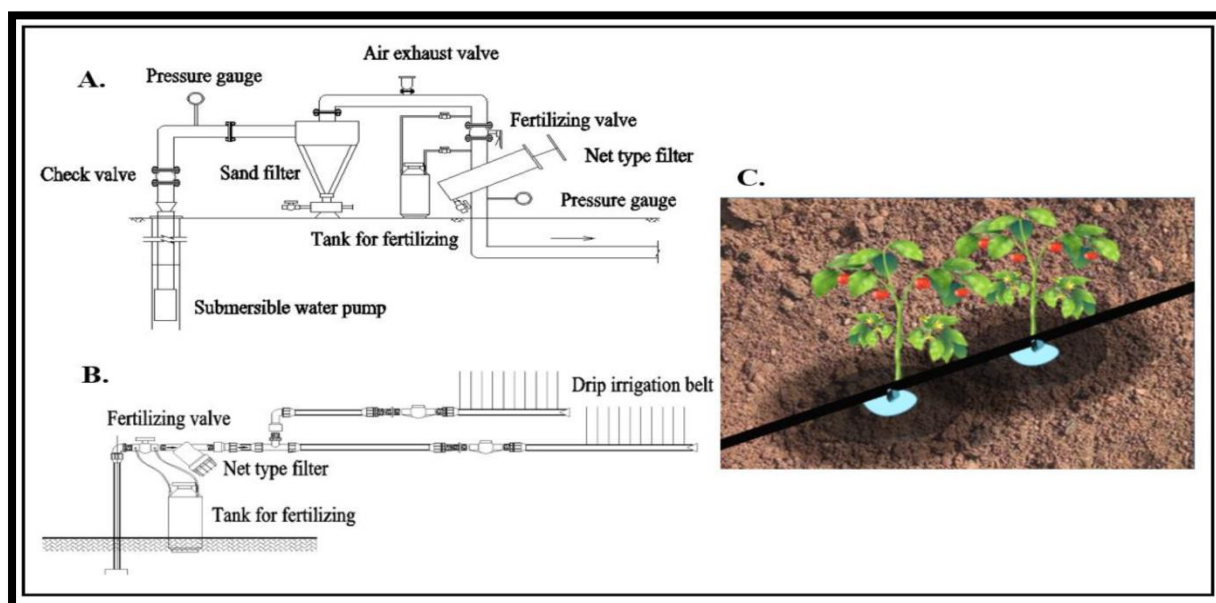
Drip irrigation is an efficient and economical way to water your yard and garden. Used commonly in drier areas of the country, drip irrigation is becoming more popular in the Northeast. Unlike other forms of irrigation, such as sprinklers that are only 65-75% efficient, drip irrigation 90% efficient at allowing plants to use the water applied. And, it reduces runoff and evaporation. Drip irrigation applies the water slowly at the plant root zone where it is needed most.

Drip irrigation has more commonly been used in commercial nursery and farm operations; however, homeowners are beginning to take advantage of its uses and benefits. As a homeowner, you can use drip irrigation in your vegetable and perennial gardens, and to water trees and shrubs.



How Does Drip Irrigation System Work?

Water and nutrients are delivered across the field in pipes called ‘dripperlines’ featuring smaller units known as ‘Drippers’. Each dripper emits drops containing water and fertilizers, resulting in the uniform application of water and nutrients direct to each plant's root zone, across an entire field.



Is Drip Irrigation the Same as Micro Irrigation?

Drip irrigation and micro-irrigation are slightly different low-pressure, precision-delivery irrigation systems. Micro-irrigation systems are also sometimes called micro-spray. In a true drip irrigation system, water does indeed ‘drip.’ Either from the slits in the tubing itself or drip irrigation emitters mounted at the base of a plant. Micro-sprinkler irrigation uses the same piping and low-pressure delivery to bring water to the field as drip irrigation. But, in a micro-irrigation system, water is delivered through small, low-pressure sprinkler devices mounted on short risers staked into the drip tubing.

Micro-irrigation sprinkler heads are adjustable for how wide of an area they spray although a 3 to 10 feet diameter is most common. The spray pattern can be adjusted to accommodate for different pattern diameters, like part of a circle or a full circle. Operators can also change the spray method by switching out the sprinkler heads. Bubblers, misters, streams and spray pattern sprinkler nozzle heads are all options.



A micro-irrigation system is helpful for crops that have a widespread, like strawberries, or if farmers need to utilize their irrigation system to help cool off their crops during hot weather. A micro-irrigation system is also preferred in sandy soils because they disperse water over a larger area. Versus when water is delivered from a true drip system on sandy soils the water tends to move directly down rather than in a horizontal pattern and may not provide adequate soil moisture to support crop growth.

Components of a Drip Irrigation System

Water Source

Drip irrigation may use water from a pond, irrigation ditch, groundwater or municipal water source (such as county or city water) simply by connecting to a standard faucet from a garden hose. However, high iron content, which may exist in well systems, is unacceptable for drip irrigation systems as it clogs emitters.

Pumping System

A pumping system moves the water to the field from the source. Pumping systems may be electrical, diesel, gas or even solar-powered. Because drip irrigation systems are low-pressure systems, even gravity can be used to pressurize drip lines, unlike center pivot irrigation or sprinkler irrigation systems. In a gravity-fed system, farmers have access to water from a mounted water tank or barrels.

Distribution System

The distribution system carries the water from the source to the field head and is connected to a mainline. A distribution system may be a PVC pipe or any tube large enough in diameter to deliver the needed quantity of water to the field. Depending on the crops in production, the distribution system may be permanent versus moveable (such as a flat tube).

Mainline Tubing

Flexible tubing typically ½ inch in diameter. In the case of a drip irrigation system, mainline tubing typically runs at the head of the irrigated field and drip tape is connected to it, running at a 90-degree angle into the field. In the case of micro-sprinkler irrigation, smaller diameter mainline tubing typically is fed into a larger diameter header and sprayers are punched into the tubing where needed.



Drip Tape or Drip Tube

The drip tape or drip tube runs off the mainline tubing. Drip tape has slits designed into the tube so that water drips out. A drip tube requires emitters inserted wherever a drip point is desired.

Pressure Regulator

Drip irrigation is a low-pressure system, running around 25 pounds per square inch (PSI) pressure but most pumps or water systems deliver well above that much water pressure. Pressure regulators monitor the pressure rate so the drip lines aren't blown out while in operation and start leaking.

Filter

Screened filters are used to remove dirt, sediment and debris that would clog up emitters, micro-sprinklers and drip tape lines. Filters are essential if water is sourced from a pond, irrigation ditch or stream. In that case, a farmer may install a larger, more robust filter at the pump site.

Emitter Tubing

Emitter tubing is small, flexible tubing inserted into drip tubing or mainline tubing and anchored to a point where the water drips out.

Sprayers and Emitters

Micro-irrigation sprinkler nozzles or sprayers installed on short risers inserted into drip tube. Emitters are inserted into the drip tube.

Chemical Injector

A device that mixes and fertilizer or chemicals with water and sends it through the drip line. This allows farmers to use their drip irrigation system for fertilizing and crop protection needs.

Backflow Preventers

A gauge that prevents water from being siphoned back into the water source. This is particularly important if farmers source water from a potable source (such as a home well or municipal water system).

System Controller

A programmable controller that monitors the amount of water sent through the system and turns the system on and off. System controllers are often part of the drip irrigation manifold



controlling the entire system. A controller may include next-gen technology, such as variable-rate irrigation systems allowing farmers to respond to current field moisture conditions.

Goof Plugs, Valves, Flush Valves and More

There are many parts to a drip system, depending on the complexity. Goof plugs plug holes in mainline tubing that are no longer needed. Valves are used to turn different sections on and off. Flush valves at the end of mainlines and even drip lines flush out debris or sediment in case of clogging. Connectors connect two lengths of mainline pipe or drip tape together. Adapters connect a larger diameter tube to a smaller one.

Benefits of Drip Irrigation

- Prevents disease by minimizing water contact with the leaves, stems, and fruit of plants.
- Allows the rows between plants to remain dry, improving access and reducing weed growth.
- Saves time, money, and water because the system is so efficient.
- Decreases labor.
- Increases effectiveness on uneven ground.
- Reduces leaching of water and nutrients below the root zone.

Why the world needs drip Irrigation System?

By 2050, there'll be 10 billion people living on our planet, and 20% less arable land per person to *grow enough calories*. Include increasing water scarcity, and it's clear why we need a way to increase agricultural productivity *and* resource efficiency. That's where drip irrigation system fits in, changing the economics of global agriculture by allowing farmers to produce more calories per hectare and cubic metre of water.

- Reduce impact of drought and climate change on food production
- Avoid contamination of ground water and rivers caused by fertilizer leaching
- Support rural communities, reduce poverty, reduce migration to cities