

Subsurface Drip Irrigation

September 2009

Subsurface drip irrigation (SDI) is a irrigation method in which water is applied directly to the root zone of plants by means of applicators such as orifices, emitters, or porous tubing that is placed below the ground surface. It is more efficient than flood or sprinkler irrigation, due in a large part to reduced evaporation.

Such systems involve a pressurized water distribution system, and include a variety of components such as pumps, valves, filters, chemical injectors, and a distribution system of solid pipes and flexible tape or tubes. They have gained attention in recent years by farmers in the Southwest, and offer a number of advantages including:

- SDI is a low pressure, low volume irrigation system suitable for high return value crops such as vegetables and nuts.
- If managed properly, they can increase yields and decrease, water, nutrient, pesticide, and labor requirements.
- They have a high distribution uniformity allowing for high application efficiency, and reduce weed growth.
- They can irrigate sloping or irregularly shaped land areas that cannot be flood irrigated.
- There is no runoff which results in reduced soil erosion or wasted water.
- Soil moisture and fertility in the root zone can be maintained at optimum levels.
- There are fewer tractor passes through the field.

As with other irrigation methods, concerns arise and SDI is no exception. Some concerns include initial system cost, power cost, emitter uniformity, system hygiene, longevity, fertility, maintenance, germination, crop performance, and rotation into other crops.

Efficiency of Micro-Irrigation Systems

Application efficiency, which is the percentage of applied water beneficially used by the crop, can approach 100 percent for SDI. High efficiency is also realized with fertilizer application. Injected fertilizer is applied directly to the root area, and can be applied at any time and in any dosage without wetting plant foliage.

To realize the best efficiency, excessive back flushing that wastes water and energy and creates a water disposal problem should be avoided. When plugging occurs the causes need to be determined and addressed, and filter screens need to be kept clean.

Properly designed systems are not only highly efficient in their use of water, but also wise energy use for less water use means less pumping and such systems require fewer tractor passes.

For additional information

To determine whether a subsurface drip irrigation system is right for you contact your local NRCS Field Office for an assessment of your needs, objectives, and resources.

Typical design layout

