

This publication describes the various types of irrigation systems used in Florida, their applications, limitations, and estimated costs. Characteristics of systems are presented in Table 1. Table 2 summarizes estimated labor requirements and costs.

SUBSURFACE IRRIGATION

Florida has about one million acres utilizing subsurface irrigation (Irrigation Journal, 1987). Subsurface irrigation has historically been one of the most common forms of irrigation practiced in Florida. Under subsurface irrigation, water is applied to the field through lateral ditches or underground pipes spaced on centers from 10 to 200 feet apart from which water moves horizontally by subsurface flow to form a perched (mounded) water table on an existing hardpan or on a naturally occurring high water table. Water then moves upward to the root zone by capillary forces. This irrigation method is used with a variety of crops including citrus, sugarcane, vegetables, pasture, and hay. There are four main variations of sub-surface irrigation practiced in Florida: open ditch seepage, semi-closed seepage, sub-irrigation and crown flood.

Seepage Systems

Open ditch seepage irrigation is common on vegetable crops and sugarcane. With this method water is conveyed from the pump to the field by open field ditches and then is distributed through the field by a network of lateral ditches. The water table is generally held at a constant level. Due to deep percolation and evaporation, there may be significant conveyance losses with this method.

Conveyance losses are eliminated with the semi-closed seepage system since water is brought to the field through underground PVC pipe. Lateral ditches are generally shallower and closer together. They are often installed on a grade, and the irrigation water is either continuously or periodically distributed through the ditches. Therefore, with these systems, the perched water table may be held constant or allowed to fluctuate. For both the open ditch and the semi-closed seepage methods, the ditches serve both for drainage and for irrigation.

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Sub-irrigation

Water is both conveyed to and distributed through the field by underground pipe with sub-irrigation. The field distribution pipe is perforated and can function both for drainage and irrigation. Clogging problems may develop in the perforated pipe due to iron ochre deposits (Ford, 1987).

Crown Flood

Crown flood subsurface irrigation is common with citrus. With this method, raised beds are formed on which the trees are planted. The beds provide elevation above what is often a naturally occurring high water table, allowing for more root development. The resulting furrows between the beds are used to distribute water for irrigation and to provide a flow path for drainage water.

Subsurface irrigation requires flat topography, a soil layer with limiting permeability, and soils with a high degree of lateral hydraulic conductivity, such as the sandy flatwoods soils and the organic soils of south Florida. The efficiencies of these methods are quite variable and are dependent on the depth to the naturally occurring water table, the permeability of the hardpan, and management of the system. Efficiencies are generally low, ranging from 20 to 60 percent. Major advantages of these systems are low initial costs and low levels of management that is required. The well or water source capacity normally required ranges from 8 to 25 gpm/ac, but is sometimes more, depending on irrigation system efficiency.

SPRINKLER SYSTEMS

Sprinkler irrigation systems are adaptable to many crops, soils and topographical conditions. These systems are common in Florida and can be categorized by how they are moved or cycled to irrigate a field. Sprinkler systems can be grouped into the following broad categories: solid set, portable set, guns, center pivots, and lateral moves.

Solid Set Systems

Solid set systems take two forms: