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MODERN IRRIGATION TO SUPPORT THE LARGE SCALE AGRICULTURE DEVELOPMENT

Large scale agricultural development for food crops will only be successful if supported by best fit agricultural practices, including the application of modern irrigation.. Irrigation is the artificial application of water to the land or soil. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall. To reach targeted production a long the year, the water supply using the modern mechanized irrigation system is a must. The modern irrigation must supply water at rates, in quantities and at times needed to meet farm irrigation requirements and schedule. The most popular of the modern irrigation systems to support water supply at farm irrigation namely Sprinkle Irrigation, Center Pivot Irrigation and Lateral Move Irrigator system.

Sprinkle Irrigation

Definition: Type of application system use sprinkles operating to form and distribute "rain like" droplets over the land surface. **Requirement:** deep well water sources ; high total volume and volumetric flow rate water sourc; good water source quality; power Units (electric motor and internal combustion engine); irrigation pumping machine. **The advantages** are adaptable to most soils and terrains, high efficiencies of water (90 %), little labor requirement, it can be used for chemical and fertilizer application. The disadvantages are water quality factor is required to determine the total volume and volumetric flow rate, need a lot of deep well as water source, environmental unfriendly due to ground water destruction.



Figure 1. Sprinkle Irrigation

Center Pivot Irrigation

Definition: The frequent, slow application of water either directly onto the land surface or into the root zone of the crop. **Requirement:** Flat to nearly flat topography, deep well water sources, high total volume and volumetric flow rate water source, good water source quality, power Units (electric motor and internal combustion engine, irrigation pumping machine). **The advantages:** high efficiencies of water, little labor requirement, applicable for large scale implementation. The disadvantages are need a lot of deep well as water source, unusable for water source with high concentration of chemical, biological and suspended load material, environmental less friendly due to ground water destruction.



Figure 2. Center Pivot Irrigation

Lateral move irrigator system

Definition: Mechanized irrigation system a form of sprinkler irrigation consisting of several segments of pipe joined together and supported by trusses mounted on wheeled towers with sprinklers positioned along its length. The lateral move systems allow farmers to irrigate up to 98 percent of a square or rectangular fields, as well as handle "L-shaped" fields. **Requirement:** Flat to undulating terrain topography, deep well or surface water ,high total volume and volumetric flow rate water source,equipped by water treatment. **The advantages:** high efficiencies of water (90-95 %) ,little labor requirement, applicable for large scale implementation, It can be used for chemical and fertilizer application. There are two most popular lateral move irrigatio system,i.e: Hose-Fed Laterals System and Ditch-Fed Systems.

Hose-Fed Laterals Systems

These systems are designed to irrigate fields from 80 to 320 acres in size and have two power source options: an onboard diesel engine generator set or electricity supplied by a long, heavy-duty cable. The length of the hose depends on the gallonage and field conditions. The two-wheel systems are designed for fields up to 1,300 feet wide. The four-wheel systems can irrigate fields up to 2,600 feet wide.



Figure 3. Lateral move irrigator system

Ditch-Fed Systems

These laterals are easily adapted to existing flood irrigation sites and can be used on fields from 80 to 400 acres in size. Existing ditches are often used when water is supplied from the edge of the field. However, producers can use a variety of ditch types including level concrete, plastic-lined or earthen and sloped concrete. Depending on the ditch type, water is drawn into the system through a choice of self-cleaning floating or rolling inlets. The power to pump the water and generate electricity is supplied by an onboard diesel engine generator set or via an electric cable connected to the power outlet boxes along the line of travel.



Figure 4. Ditch-Fed Systems

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