IRRIGATION – PURPOSE AND USEAGES

Uses of Irrigation Water
- Evapotranspirational demand.
- Overall consumptive use.
- Alleviation of heat stress.
- Frost protection.
- System maintenance and performance evaluation.
- Chemigation / Fertigation.
- Salinity control.
- Field preparation.

Evapotranspirational Demand
- Amount transpired to sustain plant life.
- Plus soil surface evaporation.
- Based on primarily climate parameters.

Consumptive Use
- Transpiration component of ET demand.
- Plus water maintained for increased plant biomass production.

Plant Cooling
- Alleviation of plant stress due to heat.
- Appropriate for mid-day usage.
- Slow plant development during early season warm periods.

Cold Protection
- For use during sporadic localized freezes
  - 1 cal/g released for 1°C drop
  - 80 cal/g released as water freezes
  - 596 cal/g from plants
System Maintenance
- Uniformity tests
- Operational tests and general maintenance
  - Flushing
  - Leak detection and prevention
  - Clog detection and prevention

Chemigation
- Irrigation is the delivery system
  - Primarily for fertilizer delivery.
  - Herbicide.
  - Insecticide.
  - Nematicide.

Leaching
- All irrigation water contains trace amounts of salts.
- Move salts out of the root zone with excess water.

Crop Establishment
- Water absorption for underdeveloped plants.
- Especially after transplanting, but before roots have an established footprint in the soil.

Field Preparation
- Developing soil structure to compliment plant development.
- Aids in soil retention of fumigants.
- Aid in soil bed formation.

Miscellaneous
- Preventing wind erosion during period of little to no ground cover.
- Cleaning fruit and leaf surfaces prior to harvests.
Consequences of Improper Design

- Endangerment.
- Waste of natural resources.
- Pollution.
- Poor economics.

Endangerment

- Inadequate design can impact operator safety:
  - When electric circuits are not properly designed/installled to avoid potential shock hazards for a wet environment.
  - When primer movers are improperly sized, mounted, aligned, or shielded.
  - When chemical injection systems are not design/installled to prevent chemical to operator exposure.
  - When components are not appropriately sized/selected to match the require pressure of the system.

Endangerment

- Inadequate design can impact public health:
  - When required backflow prevention devices were improperly design/installled/managed.
  - When chemical injection systems are not design/installled to excessive amounts of chemical to be released, causing a pollution/exposure hazard.

Waste of Natural Resources

- Improper design/installation can lead directly to poor uniformity.
- The concept of uniformity is to apply the requisite amount of water throughout the field at as near to the required depth as economically feasible.
- The less uniform a system the more excess water (and nutrients in the case of fertigation) will be applied such the minimum requirement of water is applied throughout the field.

Pollution

- An improperly design/installled system can lead to excessive leaching of chemicals from the soil profile.
- An improperly design/installled system can lead to excessive runoff carrying chemicals and sediment from production areas into water bodies.

Poor, Poor Economics

- An improperly design/installled system can impact overall system economics negatively by:
  - Excessive use of water carries the added costs of the water and the fuel to pump it, as well as potential fines for permit violations.
  - Excessive use of water will add chemical costs during fertigation events.
  - Inadequate use of water will impact yields.
  - Impacting system longevity.