Conservation Security Program

Irrigation Water Management

Irrigation System Screening Worksheet

Name: _____

Farm/Ranch: _____

Washington NRCS
Natural Resources Conservation Service

Irrigation System Screening Worksheet

This eligibility tool is designed to help irrigated producers conduct a self assessment for their eligibility in the Conservation Security Program. CSP is a voluntary program that provides financial and technical assistance to promote the conservation and improvement of soil, water, air, energy and animal life on Tribal and private working lands. This procedure will result in assigning an Irrigation System Value to the irrigation system being evaluated.

The way that this value works is that it starts with a base value that is assigned to the specific type of irrigation system in use. Then modifiers are applied based on the level of management and the efficiency of the delivery system. A bonus is given if runoff from the irrigated field is captured for reuse.

When this self assessment is complete, the landowner will have calculated an
Irrigation System Value for the irrigation system being evaluated. The Irrigation System Value is not an efficiency number, but an indicator or evaluation of how well the system is doing. If the Irrigation System Value is over 50, the landowner may be eligible for the CSP. This self assessment is simple and should take less than 5 minutes to complete. A basic hand calculator is needed to complete the Irrigation System Screening Tool Worksheet. In addition, basic knowledge of the irrigation system and management practices is necessary. Definitions of the various terms are included in this tool.

The payment levels for Irrigation Enhancement have been determined for each individual watershed in the CSP Program. The level of payment is based on the importance of enhanced irrigation to the quality and quantity of water in that watershed.

Irrigation System Screening Worksheet

Example in Italics	Example Values	Your System Values
System Type – From Table 1. ***Graded Furrow***	**75**	
Measurement Method – From Table 2. ***Whole Farm- manually recorded***	**0.93**	
Scheduling Method – From Table 3. ***Soil Moisture by NRCS feel method***	**0.93**	
Water Control – From Table 4. ***Flow rates are adequately controlled.***	**0.98**	
Water Conveyance- From Table 5. ***Open Canal – Lined***	**0.98**	
Land Slope – From Table 6. ***Land Leveled***	**0.94**	
Tailwater Capture and Reuse – From Table 7. ***Tailwater not Captured***	**1.00**	
Irrigation System Value **75 x 0.93 x 0.93 x 0.98 x 0.98 x 0.94 x 1.0 = 58.6**	**58.6**	

Directions:

1. **Use tables on the following page to determine your irrigation system values. Place these values in the column titled "Your System".**

2. **Calculate Your Irrigation System Value by MULTIPLYING each of the values found for your irrigation system.**

3. **If the resulting Irrigation System Value is 50 or greater you may be eligible for the CSP program. Contact you local NRCS Field Office for further eligibility screening.**

4. **If your Irrigation System Value is less than 50 you are not eligible for participation in the CSP Program. Consider utilizing other USDA programs to improve your irrigation system.**

Irrigation System Screening Tables

Table 1. Irrigation System Type	
Border Irrigation	**Value**
Graded Border	80
Level or Basin	90
Contour Level Field Crop	70
Border Ditch	60
Furrow Irrigation	**Value**
Level or Basin	90
Graded Furrow	75
Contour Furrow	75
Corrugations	75
Surge	80
Flood Irrigation	**Value**
Controlled	60
Uncontrolled	50
Contour Ditch	60
Sprinkler Irrigation	**Value**
Big Gun or Boom	60
Hand Line or Wheel Line	70
Solid Set (above canopy)	75
Solid Set (below canopy)	80
Center Pivot Irrigation	**Value**
Generic	80
Low Pressure Improved	83
LEPA	92
LESA	89
LPIC	87
MESA	85
Variable Rate Irrigation (VRI)	87
Lateral Move Irrigation	**Value**
Generic	82
LEPA, LESA, LPIC, MESA	87
Micro Irrigation	**Value**
Point Source	90
Sprays	85
Continuous Tape	90
Subsurface Drip irrigation	92
Sub-Irrigation	**Value**
Subirrigated	75

Irrigation System Screening Tables

Table 2. Method of Measuring Flow	Value
No Flow Measuring device	0.90
Whole farm-manually recorded	0.93
Whole farm-automatic recorded	0.95
Whole farm plus individual field manual	0.97
Whole farm plus individual field automatic recorded	1.00

Table 3. Method of Scheduling Irrigation	Value
Visual crop stress	0.90
Soil moisture by NRCS feel method	0.93
Check book scheduling, irrigation scheduler, etc	0.96
Irrigation scheduling via pan evaporation or atmometer for field	0.97
Irrigation scheduling via regional weather network	0.98
Soil moisture using Gypsum blocks, moisture probe, etc	0.99
Continuous measurement of soil moisture, water applied and ET	1.00

Table 4. Ability to Control Water Distribution	Value
Very poor diversion facilities. Little control of flow rate to farm	0.90
Can control flow rates to farm, but the on-farm delivery system operation is very hard to deliver the desired flow to any given field.	0.94
Flow rates to each field are adequately controlled. Flow rates to each set are difficult to control	0.98
All flow rates to each set are adequately controlled	1.00

Table 5. Water Conveyance	Value
Open ditch or canal - sand/gravel	0.90
Open ditch or canal - sandy loam	0.93
Open ditch or canal - clay soil	0.96
Open canal – lined	0.98
Closed conduit pipeline	1.00

Table 6. Precision of Land Slope	Value
Land smoothed	0.90
Land leveled	0.94
Land precision leveled	0.98
Land precision leveled - slope <= .005	1.00
A sprinkler system is utilized	1.00

Table 7. Tailwater Captured and Reused	Value
No Tailwater or Tailwater not captured	1.00
Irrigation System Type less than or equal to 60	1.25
Irrigation System Type between 61 and 80	1.15
Irrigation System Type greater than 80	1.10

Descriptions and Definitions

Irrigation System Type: This section represents the system type associated with the field or farm. Some systems are clearly more efficient and easier to manage than other systems. Simply select the system that best describes your system. Local terminology may be slightly different but the system names should be adequate to describe most systems.

Definition of terms related to Center Pivots:

LEPA - Low Energy Precision Application
a) Farmed in Circular Rows (except Linear Move Systems)
b) Nozzle Height is 18 inches or lower
c) Nozzle Spacing is alternate row, up to a maximum of 80 inches
d) Discharge is through a drag sock or hose on the ground, or through a bubble shield or pad
e) Only applicable to crops planted with furrows or beds
f) Maximum of 1% slope in most of field
g) Furrow Diked or other means of preventing irrigation water movement away from point of application

LESA - Low Elevation Spray Application
a) Farmed in any row direction
b) Nozzle Height is 18 inches or lower
c) Nozzle Spacing is alternate row, up to a maximum of 80 inches
d) Discharge is through spray nozzles
e) Applicable on crops flat planted, drilled, or planted with furrows or beds
f) Maximum of 3% slope in most of field
g) Furrow Diked or other means of preventing irrigation water movement away from point of application

LPIC - Low Pressure In Canopy
a) Farmed in any row direction
b) Nozzle Height is 18 inches to 36 inches
c) Nozzle Spacing up to 120 inches (10 feet)
d) Discharge is in the crop canopy
e) Maximum of 3% slope in most of field
f) Systems that utilize bubble nozzles or drag hoses for a portion of the crop year and spray nozzles for a portion of the crop year but do not meet all LEPA criteria should be considered LPIC systems

MESA - Mid Elevation Spray Application
a) Farmed in any row direction
b) Nozzle Height is more than 36 inches (3 feet) and less than 84 inches (7 feet)
c) Nozzle Spacing up to 120 inches (10 feet)
d) Discharge is above the crop canopy
e) Maximum of 3% slope in most of field

Variable-Rate Irrigation (VRI), also called site-specific irrigation or precision irrigation, is a relatively new concept in agriculture. Variable-rate irrigation is a tool of Precision Farming that involves the delivery of irrigation water in optimum amounts over an entire field.

Method of Measuring Flow: Water measurement is a critical component of any well planned and managed irrigation system. Knowing how much water is delivered to a farm, field, or irrigation set is critical to making efficient use of water.

- **No flow measuring devices** - No flow measuring devices are present. The applicant has no way of measuring and recording the amount of water delivered to the farm, to the fields, or to the irrigation set.

- **Flow measurement - whole farm, manually recorded** - The applicant has a measuring device (calibrated flume or flow meter) that can be used to measure the amount of water that is delivered to the farm. It may be a flow meter on a well that serves one field or a calibrated flume that measures water delivered through a distribution system to the farm. The measurement system does not automatically record the measurement. The applicant must inspect the measurement device and manually record the results in a routine manner and the results used in irrigation planning and scheduling.

- **Flow measurement - whole farm, automatic recorded** - Flow measurement are taken utilizing the process described immediately above but the measurements are automatically recorded and are used in planning and scheduling irrigations.

- **Flow measurement - whole farm plus individual field, manual** - The applicant has the ability to measure water that comes to the whole farm as well as to each individual field. The flow measurements are obtained utilizing a measuring device such as a flow meter. In this instance the applicant can measure the water flowing to the farm and to each field. He routinely checks and records the data manually and uses the results to plan and schedule irrigations.

- **Flow measurement - whole farm plus individual field, automatic recorded** - The applicant has the ability to measure water flowing to the farm and to each field using flow meters or flumes. The results are automatically recorded using a recording device and used for planning and scheduling irrigations.

Method of Scheduling Irrigation

- **Visual crop stress** - Water management decisions are made from visual indicators related to crop growth. In some instances the crops may be stressed before decisions are made to add needed water.

- **Soil moisture by NRCS feel method** - Soil moisture is used as the factor to determine when water is to be added using the NRCS feel method. The manager has received some training and has a publication that describes the NRCS feel method.

- **Check book scheduling, irrigation scheduler, etc. -** A check book method is used to track and schedule irrigations. Training and fact sheets are available from land grant universities and the results are commonly utilized to manage timing and application of irrigation water.

- **Irrigation scheduling via pan evaporation or atmometer for field -** Other slightly more sophisticated systems provide reliable methods for scheduling irrigation water applications. Pan evaporation and atmometers are listed here but other devices may be available.

- **Irrigation scheduling via regional weather network -** An irrigation scheduling system or network that includes weather stations that track climatic conditions and predict irrigation water needs is utilized. These may include on site weather stations or regional weather stations that are operated by commercial or public entities. These networks may be on-line or a group of operators within the watershed area that are moving toward precision water application.

- **Soil moisture using gypsum blocks, moisture probe, etc. -** Methods to track soil moisture including gypsum block, tensiometers, soil moisture probes and other similar tools are used. With calibration these methods become very accurate.

- **Continuous measurement of soil moisture, water applied and ET -** This combines all methods soil Climate and Checkbook to perform Precision application

Ability to Control Water Distribution: This management enhancement recognizes the ability of the irrigator to manage, direct and control the water flow stream on to the farm, across the farm to one or more fields, and to multiple irrigation sets that may be on the farm or field. The better the control, the higher the irrigation enhancement. Most pumped and piped distribution systems provide adequate control to each set.

- Very poor diversion facilities, little control of flow rate to farm
- Can control flow rates to farm, but the on farm delivery system is such that it is very hard to deliver the desired flow to any given field
- Flow rates to each field are adequately controlled. Flow rates to each set are difficult to control
- All flow rates to each set are adequately controlled – Should be selected for Center Pivots and other pumped and piped distribution systems

Water Conveyance: Water movement across the farm is a critical component. Losses occur from evaporation and deep percolation within the ditch. Sandy soils have more potential for water losses than clay soils. Lined ditches and canals have evaporation losses but limited deep percolation losses. Closed conduits are the most efficient water delivery systems.

- **Open ditch or canal, sand/gravel -** Ditches and canals may involve a combination of soils with part of the conveyance in sandy soils and part in clay soils. Select the factor that is predominant

- **Open ditch or canal, sandy loam -** Ditches and canals may involve a combination of soils with part of the conveyance in sandy soils and part in clay soils. Select the factor that is predominant

- **Open ditch or canal, clay soil -** Ditches and canals may involve a combination of soils with part of the conveyance in sandy soils and part in clay soils. Select the factor that is predominant

- **Open canal, lined** – Concrete, plastic, or other impervious materials

- **Closed conduit pipeline** – Plastic, concrete, or other pipeline materials

Precision of Land Slope: Precision leveled fields have higher efficiency potential and are easier to manage that less controlled grades and slopes. This enhancement category recognizes this factor.

- **Land smoothed -** This factor represents land that has been smoothed. Highs and lows have been manipulated to provide a more uniform flow of water but not to the precision listed below. This is the value that should be selected if any of the factors below do not apply.

- **Land leveled -** Land that has been leveled but conventional survey and construction equipment has been utilized.

- **Land precision leveled** - This factor represents land that has been precision leveled utilizing laser controlled equipment with high quality control. The grade will be more than 1/2%.

- **Land precision leveled, slope <= .005 -** This factor represents precision leveled land that is 1/2 % grade or less.

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