Environmental Quality Incentives Program
2013 EQIP Signup

Minnesota Supplement for:
Practice Standard 449 – Irrigation Water Management

Supplemental Criteria

1. A payment is authorized on eligible acres, not to exceed 3 payments. Consult "**Irrigation Water Management Requirements for EQIP Contracts" (EQIP Schedule Attachment D)** for additional requirements. Review these requirements with applicants interested in irrigation water management (449) and append the requirements to contracts containing irrigation water management (449).
2. Acres must have been under center pivot irrigation for at least 2 of the past 5 years.
3. Phased-in implementation will result in all scheduled acres receiving full implementation of the practice by the end of the contract period.

Scenarios

1. Basic IWM ≤ 30 acres
A low intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, irrigation depths are based on rain gauge data, records are kept on paper copies, and calculations are made by hand.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

2. Basic IWM > 30 acres
A low intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, depth of irrigation based on rain gauge data or irrigation system runtime information, records are kept on paper copies, and calculations are made by hand.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

3. Intermediate IWM ≤ 30 acres

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in-field moisture sensors with manual downloads. Irrigation depths are recorded from a rain gauge or pumping records. Records are input manually into an irrigation scheduling computer program.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

4. Intermediate IWM > 30 acres

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in-field moisture sensors with manual downloads. Irrigation depths are recorded from a rain gauge or pumping records. Records are input manually into an irrigation scheduling computer program.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

5. Advanced IWM ≤ 30 acres

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equipped with telemetry data. Irrigation amounts are recorded from control settings and system runtime. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

6. Advanced IWM > 30 acres

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time

evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equipped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

7. Soil Moisture Sensors_YR1

This practice is a supporting practice for first year intermediate or advanced IWM contracts. It is not a stand-alone practice. This practice includes the installation of soil moisture sensors such as tensiometers, gyp blocks, capacitance sensors etc, that are installed and read to determine point in time soil moisture by depth. Scenario also includes labor associated with using soil moisture meters durign the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and read sensors or meter. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Meters used to read sensors may be portable.
Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities.
Associated Practices: 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management

8. Soil Moisture Sensors with Data Recorder_YR1

This practice is a supporting practice for first year advanced IWM contracts. It is not a stand-alone practice. This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Scenario also includes labor associated with using soil moisture sensors and loggers during the first year. Typical scenario involves installation of resistance sensor blocks in a 120 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season.
Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities.
Associated Practices: 449- Irrigation Water Management, 587-Structure for Water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management

9. Sprinkler Uniformity Test < 30

This practice is a supporting practice for first year IWM contracts. It is not a stand-alone practice. A "can-catch" test of a sprinkler irrigation system, using NRCS procedures, to

determine if an irrigation system is distributing water in accordance with NRCS uniformity standards. Typical system is a 30 acre center-pivot or one bed of a solid set cranberry irrigation system. In field measurements are made and data are analyzed using a spreadsheet. Equipment is borrowed from the University Extension or similar group.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

10. Sprinkler Uniformity Test > 30

This practice is a supporting practice for first year IWM contracts. It is not a stand-alone practice. A "can-catch" test of a sprinkler irrigation system, using NRCS procedures, to determine if an irrigation system is distributing water in accordance with NRCS uniformity standards. Typical system is a 125 acre center-pivot irrigation system. In field measurements are made in accordance with accepted protocol and data are analyzed using a spreadsheet to determine if NRCS requirements for uniformity are met.
Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities.
Associated Practices: 442-Irrigation System Sprinkler

ATTACHMENT D - IRRIGATION WATER MANAGEMENT REQUIREMENTS FOR EQIP CONTRACTS

- **Participants with EQIP contracts containing irrigation water management must fully implement items 1-9 the last year of the contract.**
- Implementation can be phased in over 2 years for multi-year contracts. The participant shall effectively manage the available irrigation water supply to:
  - Provide soil moisture conditions for the desired crop response
  - Minimize soil erosion, loss of plant nutrients and undesirable water loss
  - Protect water quality.
- Certify that planned irrigation water management operations have been completed to receive payment.

1st year of scheduled irrigation water management

1. Perform a uniformity check on irrigation pivots under contract to determine water application efficiency.
2. Install 2 rain gauges for each irrigated field (one under the pivot and one outside the influence of the pivot).
3. Determine available water holding capacity and infiltration rate of the planning soil type(s) in field(s) to be irrigated.
4. Review and select an irrigation scheduling method to document irrigation water needs. Scheduling methods could include Irrigation Check-Book, WISDOM or SCS Scheduler 3.0 computer programs, and other scheduling techniques.
5. Apply irrigation water so as not to cause excessive runoff or soil erosion.

Subsequent years of scheduled irrigation water management

Follow Provision 5 from above.

6. Correct significant application uniformity concerns.
7. During the growing season keep field specific daily records of rainfall and the quantity of irrigation water being applied (use flow meters or an alternative method).
8. Record and monitor crop growth and development, and daily evapotranspiration and crop water use.
9. Determine irrigation timing and application rates using the chosen irrigation scheduling system and information gathered above. Application timing and rates:
   a. Will not exceed the ability of the soil to store water in the root zone
   b. Will meet the moisture requirements for the crop for optimum production.
10. Decisions on rates and timing will be based on the scheduling system at least 90% of the time.

March 2004

NRCS – MN
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