United States Department of Agriculture

CONSERVATION ENHANCEMENT ACTIVITY

E449F

CONSERVATION STEWARDSHIP PROGRAM

Intermediate IWM— Year 1, Equipment with Soil moisture or Water Level monitoring

Conservation Practice 449: Irrigation Water Management

APPLICABLE LAND USE: Crop (Annual & Mixed); Crop (Perennial); Pasture

RESOURCE CONCERN ADDRESSED: Insufficient Water

ENHANCEMENT LIFE SPAN: 1 year

Enhancement Description

This activity involves monitoring soil moisture or water levels within a surface irrigated field for intermediate irrigation water management by utilizing technological equipment to gather field specific data concerning weather, soil moisture or water levels throughout the irrigation season. The equipment is installed and utilized to log data and retrieve the data periodically throughout the season, so irrigation decisions can be made based on scientific data. Maximum time between data retrievals is weekly.

Monitoring will be for the entire irrigation season and data gathered will be used to make sound decisions on irrigation water use.

Criteria

General

- Equipment may include: soil moisture sensor with data collection systems; weather stations that collect solar radiation, wind speed and direction, rainfall,

temperature; water level sensor with data collection system; permanent flowmeter

- Data to be monitored includes: irrigation water applied, crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions.
- The installation includes the purchase and installation of equipment with data collection systems that can continuously record data throughout the irrigation season.
- Irrigation water management plan is followed and includes, as per NRCS Conservation Standard Practice Irrigation Water Management (Code 449):
    - An irrigation system layout map showing the main pipeline(s), irrigated area, soil moisture sensor/water level sensor locations (if used) and soils.
    - Method used to measure or determine the flow rate or volume of the irrigation water applications
    - Measurement records showing the amount of water used to irrigate as it comes on to the farm and goes into each field
    - Documentation of the scientific method used to schedule the timing and amount of irrigation application
    - Irrigation water management plan explaining:
        - How irrigation meets crop needs while maximizing irrigation water efficiency
        - Seasonal or annual planned water application volumes by crop
        - Management allowable depletion (MAD) and depth of the managed crop root zone or water level for each crop and stage of growth
        - Evaluation of irrigation system distribution uniformity and necessary changes to ensure uniform irrigation
        - Information on how to recognize irrigation induced erosion and how to mitigate it
        - Indicate how data from the sensor location and depths will be considered to make field-wide irrigation decisions
        - Water application scheduling based on soil moisture or water level monitoring and/or evapotranspiration monitoring from the weather station

- Recordkeeping documents for the irrigator to use during the operation and management

CONSERVATION STEWARDSHIP PROGRAM

Additional Criteria of soil moisture devices

- Installation of each soil moisture set will include the ability to collect data at a minimum of 2 approved depths based on crop and soil characteristics of the region
- Number of soil moisture sets will be installed based on the irrigation water management plan designed per water source using the following criteria: field topography, crop rotation and the soils throughout the field.

Additional Criteria of flow measurement devices

- Permanent flow meters will be installed at all wells/relifts that are included in the approved IWM plan

Additional Criteria of water level devices

- Sensor is installed in a basin field with a data logger with the ability to capture an image of the movement of the gauge. Images are captured at a minimum of twice a day

Additional Criteria of weather stations

CONSERVATION STEWARDSHIP PROGRAM

- Weather station is installed in a central location as defined by the irrigation water management plan, but no more than 2 miles separation

- Weather stations will record each of the following at a minimum of four times per hour:
  - High and low temperature
  - Precipitation
  - Humidity
  - Wind speed and duration and direction
  - Solar radiation

CONSERVATION STEWARDSHIP PROGRAM

Documentation and Implementation Requirements

Participant will:

Prior to implementation

- Acquire an irrigation water management plan meeting NRCS Conservation Practice Irrigation Water Management (Code 449) requirements
- Acquire NRCS approval of all irrigation water management devices that will be utilized for the plan implementation

During installation or implementation

- Ensure each irrigation water management device is installed to manufacturer recommendations
- Record irrigation data such as location, date, duration, and flow rate of all irrigation operations, rainfall, evapotranspiration, and soil moisture or water level data
- Monitor the devices during the growing season to determine timing and amounts of water to apply based on soil moisture/water level sensor, field checks and weather data

After implementation

- Make the following items available for review by NRCS to verify implementation of the enhancement:
    - Irrigation water management plan is followed, and records kept
    - Changes made to address distribution uniformity deficiencies
    - Utilization documentation of any sensor used throughout the growing season as well as certification of their proper installation

NRCS will:

Prior to implementation

- Provide and explain NRCS Conservation Practice Standard Irrigation Water Management (Code 449) as it relates to implementing this enhancement

- Provide additional assistance to the participant as requested
- Review and approve producer's selected equipment After Implementation
- Verify installation of all irrigation water management equipment
- Verify implementation of the irrigation water management plan by:
    - Reviewing records kept during enhancement implementation

NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and meets all criteria and requirements.

Participant Name _____ Contract Number _____

Total Amount Applied _____ Fiscal Year Completed _____

X

_____ _____

NRCS Technical Adequacy Signature Date

Sign and Certify in Oregon Supplement below

Design Approvals & Acknowledgements:

Design Approval	Date	Job Approval Authority
Designed by:		
Approved by:		

Client's Acknowledgement Statement:

The client acknowledges:

- I have received a copy of the specification and understand the contents and requirements.
- It is my responsibility to obtain all necessary permits and/or rights and to comply with all ordinances and laws pertaining to the application of this practice.
- I will not begin installation of this practice until I have received appropriate approval to do so. I understand NRCS also has Federal and state laws to comply with that may take some time to address (e.g. cultural resources).

Client's Signature	Date

Certification Documentation:

☐	Field Evaluation: Post-treatment inventory, measurements, notes, as-built, and supporting documentation (document completion in conservation plan), as required.
☐	Map(s): Including field numbers, fields treated, and units treated (may document on conservation plan map), as required.
☐	Photos or other supporting documentation (e.g., seed tags, soil tests, receipts, invoices, spray records, fertilizer records, etc.)
Brief Description of Work Accomplished (types of equipment used, date of application, extents and quantities installed, etc.)	

Certification Statement:

The employee certifies the implementation of this conservation practice:

- Meets the purpose, general criteria, and any required additional criteria as documented in the conservation practice standard and/or enhancement sheet.
- Meets the specifications contained herein and is complete.
- Conforms to my existing Job Approval Authority controlling factors and levels.

Name	Date	Job Approval Authority

Field Level Certification – For multiple applications of this design.				
Land Unit/ Contract Item Number	Date	Unit(s)	Amount Installed	Certifier