

Practice: 449 - Irrigation Water Management

Scenario #1 - Basic IWM

**Scenario Description:**

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 and Appearance method, volumes of irrigation water are based on energy or water district bills, 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 125

**Total Scenario Cost:** \$1,452.40

**Scenario Cost/Unit:** \$11.62

**Cost Details:**

Component Name	ID	Description	Unit	Cost	QTY	Total
<b>Labor</b>						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$19.35	8	\$154.80
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.55	32	\$1,297.60

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Scenario #2 - Soil Moisture Sensors, Medium Intensity, First Year

**Scenario Description:**

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 the labor associated with using the equipment for the first year. Typical Scenario involves installation of resistance sensor blocks in a 125 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. This scenario only applies to year one IWM. The appropriate labor only IWM scenario applies in subsequent contract years. 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.

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$1,718.55

**Scenario Cost/Unit:** \$1,718.55

**Cost Details:**

Component Name	ID	Description	Unit	Cost	QTY	Total
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$26.79	10	\$267.90
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.55	16	\$648.80
<b>Materials</b>						
Data Logger	1453	Data Logger W/Graphic Output for water management. Materials only.	Each	\$596.50	1	\$596.50
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.96
<b>Mobilization</b>						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$58.39	1	\$58.39

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Scenario #3 - Soil Moisture Sensors, High Intensity, First Year

**Scenario Description:**

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. Data is transmitted by telemetry. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger with telemetry to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Scenario also includes the labor associated with using the equipment for the first year. Typical Scenario involves installation of resistance sensor blocks in a 125 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. This scenario only applies to year one IWM. The appropriate labor only IWM scenario applies in subsequent contract years. 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.

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Soil moisture data is transmitted by telemetry to producer's home computer to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Monitoring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** \$2,801.49

**Scenario Cost/Unit:** \$2,801.49

**Cost Details:**

Component Name	ID	Description	Unit	Cost	QTY	Total
<b>Labor</b>						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$26.79	10	\$267.90
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.55	16	\$648.80
<b>Materials</b>						
Data Logger with Telemetry System	1454	Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only.	Each	\$1,679.44	1	\$1,679.44
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.96
<b>Mobilization</b>						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$58.39	1	\$58.39

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Scenario #4 - Labor Only, Medium or High Intensity, Subsequent Years

**Scenario Description:**

The labor only component of an irrigation water management system for producers using medium or high intensity IWM with soil moisture sensors. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit:: Acre

Scenario Typical Size: 125

Total Scenario Cost: \$648.80

Scenario Cost/Unit: \$5.19

**Cost Details:**

Component Name	ID	Description	Unit	Cost	QTY	Total
<b>Labor</b>						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$40.55	16	\$648.80