

Practice: 449 - Irrigation Water Management

Scenario: #1 - Basic IWM 30 acres or less

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 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, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

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 30 acre corn field with a surface 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 30

Total Scenario Cost: \$913.22

Scenario Cost/Unit: \$30.44

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$45.66	20	\$913.22
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Practice: 449 - Irrigation Water Management

Scenario: #2 - Basic IWM over 30 acres

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 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, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

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 50 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 50

Total Scenario Cost: \$825.52

Scenario Cost/Unit: \$16.51

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	4	\$94.95
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	\$45.66	16	\$730.57

Practice: 449 - Irrigation Water Management

Scenario: #3 - Annual Crops, Vegetables, 1st Year

Scenario Description: 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; and the labor of using the equipment over a 12-week growing season for the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and utilize sensors and readings in making IWM decisions during first year. Typical Scenario involves installation of resistance sensor blocks in a 20 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors and manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 12-week growing season. Meters used to read sensors may be portable. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre annual crops with sprinkler or micro irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$1,316.76

Scenario Cost/Unit: \$65.84

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	16	\$379.78
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	\$45.66	8	\$365.29

Mobilization

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	\$69.62	2	\$139.24
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Materials

Soil Moisture Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	\$285.50	1	\$285.50
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #4 - Annual Crops, Vegetables, 1st Year, with Data Logger

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 and readings in making IWM decisions over a 12-week growing season for the first year. Typical Scenario involves installation of resistance sensor blocks in a 20 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors and manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 12-week growing season. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre annual crops with sprinkler or micro irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer periodically downloads continuously recorded soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$2,224.25

Scenario Cost/Unit: \$111.21

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	16	\$379.78
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	\$45.66	8	\$365.29

Mobilization

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	\$69.62	2	\$139.24
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Materials

Data Logger	1453	Data Logger W/Graphic Output for water management. Materials only.	Each	\$596.50	2	\$1,192.99
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #5 - Annual Crops, Vegetables, 2nd and 3rd Year

Scenario Description: A system to monitor irrigation water applied to field crops over a 12-week growing season. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Subscription to real-time weather records and rainfall record keeping is used. The producer must manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded). Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre annual crops with sprinkler or micro irrigation.

After Situation: Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$745.07

Scenario Cost/Unit: \$37.25

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	16	\$379.78
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	\$45.66	8	\$365.29

Practice: 449 - Irrigation Water Management

Scenario: #6 - Perennial Crops, Orchards, 1st Year

Scenario Description: 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; and the labor of using the equipment over a 26-week growing season for the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and utilize sensors and readings in making IWM decisions during first year. Typical Scenario involves installation of resistance sensor blocks in a 20 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors and manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 26-week growing season. Meters used to read sensors may be portable. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre perennial crops with sprinkler or micro irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: <Unknown>

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$1,554.12

Scenario Cost/Unit: \$77.71

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	26	\$617.14
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	\$45.66	8	\$365.29

Mobilization

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	\$69.62	2	\$139.24
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Materials

Soil Moisture Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	\$285.50	1	\$285.50
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #7 - Perennial Crops, Orchards, 1st Year, with Data Logger

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 and readings in making IWM decisions over a 26-week growing season for the first year. Typical Scenario involves installation of resistance sensor blocks in a 20 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors and manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 26-week growing season. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre perennial crops with sprinkler or micro irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer periodically downloads continuously recorded soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: <Unknown>

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$2,461.61

Scenario Cost/Unit: \$123.08

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	26	\$617.14
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	\$45.66	8	\$365.29

Mobilization

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	\$69.62	2	\$139.24
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Materials

Data Logger	1453	Data Logger W/Graphic Output for water management. Materials only.	Each	\$596.50	2	\$1,192.99
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #8 - Perennial Crops, Orchards, 2nd and 3rd Year

Scenario Description: A system to monitor irrigation water applied to specialty crops over a 26-week growing season. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 10 acres. Subscription to real-time weather records and rainfall record keeping is used. The producer must manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded). Record keeping involves a weekly analysis, monthly documentation and a year-end report. 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, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer 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 20 acre perennial crops with sprinkler or micro irrigation.

After Situation: Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$982.43

Scenario Cost/Unit: \$49.12

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	26	\$617.14
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	\$45.66	8	\$365.29

Practice: 449 - Irrigation Water Management

Scenario: #9 - Field Crops, Grains, 1st Year

Scenario Description: 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; and the labor of using the equipment over a 19-week growing season for the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and utilize sensors and readings in making IWM decisions during first year. Typical Scenario involves installation of resistance sensor blocks in a 50 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors and manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 19-week growing season. Meters used to read sensors may be portable. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 25 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer decides when to irrigate his field crops (ex: corn, soybeans, wheat) 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 50 acre corn field with sprinkler irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 50

Total Scenario Cost: \$910.48

Scenario Cost/Unit: \$18.21

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	4.75	\$112.75
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	\$45.66	8	\$365.29

Materials

Soil Moisture Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	\$285.50	1	\$285.50
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #10 - Field Crops, Grains, 1st Year, with Data Logger

Scenario Description: 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; and the labor of using the equipment over a 19-week growing season for the first year. 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 and readings in making IWM decisions over a 19-week growing season for the first year. Typical Scenario involves installation of resistance sensor blocks in a 50 acre field of irrigated cropland. Producer periodically monitors data to manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded) during the 19-week growing season. Meters used to read sensors may be portable. Subscription to real-time weather records and rainfall record keeping is used. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 25 acres. Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer decides when to irrigate his field crops (ex: corn, soybeans, wheat) 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 50 acre corn field with sprinkler irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Area Managed

Scenario Unit: Acre

Scenario Typical Size: 50

Total Scenario Cost: \$1,817.97

Scenario Cost/Unit: \$36.36

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	4.75	\$112.75
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	\$45.66	8	\$365.29

Materials

Data Logger	1453	Data Logger W/Graphic Output for water management. Materials only.	Each	\$596.50	2	\$1,192.99
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	4	\$146.94

Practice: 449 - Irrigation Water Management

Scenario: #11 - Field Crops, Grains, 2nd and 3rd Year

Scenario Description: A system to monitor irrigation water applied to field crops over a 19-week growing season. Soil moisture data is reviewed 3 times per week at each sensor site (two sensors per site) with one sensor site per 25 acres. Subscription to real-time weather records and rainfall record keeping is used. The producer must manually turn on and off the water supply in accordance with the soil moisture readings and keep records for each irrigation cycle (run time, inches applied, and total flow recorded). Record keeping involves a weekly analysis, monthly documentation, and a year-end report. 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, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation: The farmer decides when to irrigate his field crops (ex: corn, soybeans, wheat) 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 50 acre corn field with sprinkler irrigation.

After Situation: Producer has installed 2 sensors at each monitoring site at different depths. Producer uses periodic soil moisture measurements to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. 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.

Scenario Feature Measure: Irrigated Are Managed

Scenario Unit: Acre

Scenario Typical Size: 50

Total Scenario Cost: \$478.03

Scenario Cost/Unit: \$9.56

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	4.75	\$112.75
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	\$45.66	8	\$365.29

Practice: 449 - Irrigation Water Management

Scenario: #17 - 1st Year, Computer Record Keeping System

Scenario Description: This practice includes the installation of a computer-based system and weather station that is monitored to determine crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions of high value crops. Data is automatically transmitted from dielectric soil moisture sensors to a computer program that recommends irrigation cycles based on actual soil moisture conditions and local weather data. Requires manually turning on and off the water supply according to system recommendations. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 25 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; 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: To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

After Situation: Producer has installed a weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

Scenario Feature Measure: Acreage of cropland

Scenario Unit: Acre

Scenario Typical Size: 25

Total Scenario Cost: \$7,225.56

Scenario Cost/Unit: \$289.02

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

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 Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	\$285.50	1	\$285.50
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	\$36.74	2	\$73.47
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	\$460.51	1	\$460.51
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	\$627.96	1	\$627.96
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	\$1,024.76	1	\$1,024.76

Mobilization

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	\$69.62	1	\$69.62
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Labor

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	\$23.74	40	\$949.45
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Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$102.74	20	\$2,054.84
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Practice: 449 - Irrigation Water Management

Scenario: #18 - Use Computer Record Keeping System

Scenario Description: Irrigation water is applied to high value crops based on data automatically transmitted from dielectric soil moisture sensors to a computer program that recommends irrigation cycles based on actual soil moisture conditions and local weather data. This scenario assumes all system components are in place (sensors, transmitter, etc.) Requires manually turning on and off the water supply according to system recommendations. Includes monthly recording of flowmeter readings and the time to manage and monitor the system for the entire growing system. Records are kept to compare system recommendations to actual application rates from flow meter data. Typical Scenario involves installation on a 25 acre field of irrigated cropland. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; 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: To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

After Situation: Producer has an installed weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

Scenario Feature Measure: Acre of cropland

Scenario Unit: Acre

Scenario Typical Size: 25

Total Scenario Cost: \$1,257.68

Scenario Cost/Unit: \$50.31

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

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	\$23.74	40	\$949.45
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$102.74	3	\$308.23