Irrigation Systems Evaluation

Introduction

• The material provided in this section is intended to serve as a framework for irrigation system evaluation training.
• Trainers should modify the training material referenced as necessary to achieve the planned skill level for the trainees.
• Trainers are encouraged to include locally developed training materials to complement and/or supplement the referenced material.
• As new training materials are developed by trainers, they are encouraged to furnish copies to the National Employees Development Center for inclusion in future versions of the Toolbox.

Suggested Objectives

• Perform an irrigation system evaluation in a safe manner using accepted procedures.
• Determine irrigation system operating performance by gathering necessary data, and calculating and analyzing applicable efficiency values and/or operating costs.
• Determine irrigation system performance by calculating distribution uniformity, or pattern efficiency, if applicable.
• Make recommendations for improvement, if needed, based on the results of evaluations.

Suggested Outline

I. Introduction
II. Body
   A. Irrigation Evaluation
      1. Necessary equipment
      2. Safety measures.
      3. Procedure
   B. Operating Performance
      1. Collection of field data
      2. Calculate/analyze applicable efficiency values
   C. Irrigation System Performance
      1. Data evaluation and display
      2. Distribution uniformity
      3. Pattern efficiency
   D. Recommendations For Improvement
      1. If needed
      2. Based on results of evaluation
III. Summary
Irrigation Systems Evaluation

Systems Included

5. Lateral Move (Linear Move) Sprinkler System Irrigation Evaluation.
10. Surface Irrigation System Evaluation.
15. Level Basin/Levee Irrigation System Evaluation.
Irrigation Systems Evaluation

1. Fixed (Solid Set) Sprinkler Irrigation Evaluation

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 11.

Toolbox Material


2. Periodic Move Sprinkler Irrigation System Evaluation

Reference Material

- Irrigation Guide. Chapter 9, 15.
- NEH 15, Chapter 11.

Toolbox Material

- Video “Irrigation Energy Conservation”, Oklahoma State University (Located in IIWM Plan)
- Video Irrigation Training Series, Module 930(DRAFT), Periodic Move Sprinkler Irrigation Evaluation, USDA, NRCS (video & story board).
- Video “Irrigation Water Management”, Oklahoma State University (Located in IIWM Plan)
Irrigation Systems Evaluation

3. Center Pivot Sprinkler Irrigation Evaluation

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 11.
- Center Pivot Electrical Safety, Slide Presentation prepared by Dickey and Underwood (slides & story board), NRCS, Texas, 817-774-1217.
- Center Pivot Irrigation Safety, presentation from Texas Section ASAE meeting 10/91, NRCS, Texas, 817-774-1217.

Toolbox Materials

- Video “Center Pivot Sprinkler Irrigation Evaluation”, Irrigation Training Series, Module 931, NRCS, with Video, Parts A, B, and C.
- Video - “Irrigation Energy Conservation and Irrigation Water Management”, Oklahoma State University (Located in IWM Plan)
4. Traveling Gun Sprinkler Irrigation Evaluation

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 11.

Toolbox Material

- Lesson Plan “Evaluation of Traveling Gun”, NRCS, FL.

5. Lateral Move (Linear Move) Sprinkler Irrigation System

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 11.

Toolbox Material

- Video “Irrigation Energy Conservation and Irrigation Water Management”, Oklahoma State University (Located in IWM Plan)
6. Level Border Irrigation Evaluation

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 11.

Toolbox Material

- Video "Level Border Irrigation Evaluation", Module 910, Irrigation Training Series, NRCS.

7. Graded Border Irrigation System Evaluation

Reference Material

- Irrigation Guide, Chapter 9, 15.
- NEH 15, Chapter 4.

Toolbox Material

- Video "Graded Border Irrigation Evaluation", Irrigation Training Series, Module 911, with Video, Parts A and B, NRCS.
8. Level Furrow Irrigation Evaluation

Reference Material

- Irrigation Guide Chapter 9, 15.
- NEH 15, Chapter 5.
- Engineering, Technical Note 17, Evaluating Surge Flow Irrigation, NRCS, Colorado.

Toolbox Material

- Lesson Plan “Gathering & Evaluating Data for Furrow Irrigation”, NRCS, OR.
- Video “Irrigation Energy Conservation and Irrigation Water Management”, Oklahoma State University (Located in IWM Plan)
9. Graded Furrow Irrigation Evaluation

Reference Material

- Irrigation Guide, Chapter 9,15.
- Engineering, Technical Note 17, Evaluating Surge Flow Irrigation, NRCS, Colorado.

Toolbox Material

- Lesson Plan “Gathering & Evaluating Data for Furrow Irrigation”, NRCS, OR.
- Video “Irrigation Energy Conservation and Irrigation Water Management”, Oklahoma State University (Located in IWM Plan)

10. Subsurface Irrigation System Evaluation

Reference Material

- Irrigation Guide 9, 15.
- NEH, Part 624, Water Table Control.
- Agricultural Drainage and Subirrigation Systems, Maumee Valley RC&D Defiance, Ohio, 1/94.

Toolbox Material

Lesson Plan “Evaluation of Subsurface Irrigation System”, NRCS, FL.
Irrigation Systems Evaluation

11. Contour Ditch Irrigation System Evaluation

Reference Material

- Irrigation Guide chapter 9,15.
- NEH 15.

Toolbox Material

None

12. Trickle Irrigation Evaluation

Reference Material

- Irrigation Guide Chapter 9 Microsystems.

Toolbox Material

- Lesson Plan “Evaluation of Trickle Irrigation System”, NRCS, FL.
Irrigation Systems Evaluation

13. Pumping Plant Evaluation

Reference Material

- Irrigation Guide Chapter 9.

Toolbox Material

- Lesson Plan “Pumping Plant Evaluation”, Irrigation Training Series, Module 950 (DRAFT), NRCS.
- Publication “Irrigation Water Management- Interdisciplinary Team Special Program”, SNCT Engineering Technical Note, 707, USDA, SCS, 12/82.
- Video “Irrigation Energy Conservation and Irrigation Water Management”, Oklahoma State University (Located in IWM Plan)

14. Low Energy Precision Application (LEPA)/Low Pressure In Canopy Application (LPIC) System Evaluation

Reference Material

None

Toolbox Material

None
Irrigation Systems Evaluation

15. Level Basin/Levee Evaluation

Reference Material

Toolbox Material


All Methods

Facilitation Options

- Self-paced,
- Facilitator guided, or
- Formal training course.

Evaluation

Each state should develop an evaluation procedure which addresses the level of competence before and after training.

Appendix

Software

Irrigation Systems Evaluation

Contents of Toolbox

- Publication and Audio Tape: Trickle Irrigation System Evaluation - Field Guide
- Publication “Module 910 - Level Border Irrigation Evaluation”, NRCS
- Publication “Module 911 - Graded Border Irrigation Evaluation”, NRCS
- Lesson Plans: “Efficiencies”, NRCS
- Lesson Plan “Evaluation of Subirrigation Systems”, NRCS, FL
- Lesson Plan “Evaluating Data Obtained From a Border Irrigation”, NRCS
- Lesson Plan “Gathering Data for Evaluating a Border Irrigation”, NRCS
- Lesson Plan “Pumping Plant Evaluation”, Irrigation Training Series”, Module 950 (DRAFT), NRCS
- Lesson Plan “Evaluation of Center Pivot System”, NRCS, FL
- Lesson Plan “Evaluating Data Obtained From a Sprinkler Irrigation”, NRCS
- Lesson Plan “Data Gathering and Acquisition Methods”, NRCS
- Lesson Plan “Gathering Data for Evaluating Furrow or Corrugation Irrigation”, NRCS, OR
- Lesson Plan “Evaluating Data Obtained From a Furrow or Corrugation Irrigation”, NRCS
- Lesson Plan “Gathering Data for Evaluating a Sprinkler Irrigation”, NRCS
- Lesson Plan “Evaluation of a Trickle Irrigation System”, NRCS, FL
- Lesson Plan “Evaluation of a Traveling Gun Sprinkler Irrigation System”, Lesson Plan Outline, NRCS, FL
- Lesson Plan “Evaluation of a Fixed (Solid Set) Sprinkler System”, NRCS, FL
- Lesson Plan “Troubleshooting”, NRCS
- Lesson Plan “Safety Considerations in Evaluating Natural Gas and Electric Pumping Plants”, NRCS
- Video “Level Border Irrigation Evaluation”, Irrigation Training Series, Module 910, NRCS
- Video “Center Pivot Sprinkler Irrigation Evaluation” (2), Irrigation Training Series, Module 931, NRCS, with Video, Parts A, B and C
- Video “Periodic Move Sprinkler Irrigation Evaluation”, Irrigation Training Series, Module 930 (DRAFT), NRCS
- Video “Graded Border Irrigation Evaluation”, Irrigation Training Series, Module 911, NRCS, Parts A and B
- Video “Level Border Irrigation Evaluation”, Irrigation Training Series, Module 910, NRCS
- Video “Irrigation Management”, Oklahoma State University
- Video “Irrigation Energy Conservation”, Oklahoma State University