Irrigation Training Toolbox
Irrigation System Evaluation

Lesson Plan
Evaluation of a Traveling Gun Sprinkler Irrigation System

National Employee Development Center
Natural Resources Conservation Service
Fort Worth, Texas
October 1996

IRRIGATION WATER MANAGEMENT

LESSON PLAN

TITLE: Evaluation of Traveling Gun

OBJECTIVE: To provide the participants with the basic knowledge to evaluate the uniformity and efficiency of irrigation by traveling gun.

METHOD: Lecture and demonstration.

INTRODUCTION: The effectiveness of a farmer's irrigation water management practices can be based on the uniformity and efficiency of the irrigation system. The amount of water applied should be sufficient to reach field capacity in the root zone but should not exceed it. The water must be applied uniformly over the field so that each part of field will have the same opportunity to take in water. The evaluation of a system can measure these values.

Evaluation of Traveling Gun

1. Values to be determined

   a. DU - Distribution Uniformity
   b. AELQ - Application Efficiency of Low Quarter
   c. PELQ - Potential Application Efficiency of Low Quarter

2. Information Required

   a. Frequency of normal irrigations
   b. MAD and SMD
   c. Nozzle diameter and type for estimating flow rate
   d. Pressure at nozzle
   e. Depth of water caught in catch containers
   f. Travel speed at test location and extreme ends of towpaths
   g. Spacing between towpaths
   h. Rate of discharge from water piston (if applicable)
   i. Additional data required on form

3. Equipment Needed

   a. Pressure gauge (0-150 psi) with pitot tube
   b. Stopwatch
   c. Catch containers (1 quart size)
   d. 500 ml graduated cylinder
   e. 100 foot tape
   f. Soil probe

g. Manufacturer's sprinkler performance chart and speed specifications
h. Shovel
i. Hand level
j. Form for recording data
k. 2-5 gallon bucket and hose for water piston types

4. Field Procedures

a. Select test location
b. Locate catch containers
c. Record SMD
d. Record traveling gun specifications
e. Check hose length and diameter and inlet and outlet pressures
f. If water piston powered, record discharge rate
g. Measure spacing between towpaths, towpath length and general slope
h. Measure evaporation losses
i. Measure travel speed of unit
j. Check pressure of sprinkler nozzle and estimate discharge
k. Record wind speed and direction and dry wedge
l. Measure and record depth of water in catch containers
m. Complete computations on form

5. Utilization of Field Data

a. Compute and evaluate DU
b. Compute and evaluate PELQ and average depth applied, D
c. Application efficiency
d. Application rate
e. Analysis
   (1) Operational checks
   (2) Runoff
   (3) Underirrigation
   (4) Improvements
   (5) Edge effects

6. Summary - Questions and Answers

References: Florida Irrigation Guide-SCS