

# **Irrigation Training Toolbox Irrigation System Evaluation**

## **Lesson Plan Evaluating Data Obtained From a Border Irrigation**

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

IRRIGATION WATER MANAGEMENT  
Lesson Plan No. 6

Title: Evaluating Data Obtained From a Border Irrigation.

Objective: Give each participant experience in plotting and evaluating data obtained from a border irrigation.

Time: 4 hours.

Location: Office.

Method: Classroom discussion and supervision.

Key Points:

A. Plotting.

1. Plot accumulative intake curve on log paper by plotting accumulative depth (D) in inches against time (T) in minutes.
2. Plot on 10x10" graph paper:
  - a. Advance curve (time vs stations).
  - b. Recession curve (time vs stations).
  - c. Minimum opportunity time curve as determined by B-11. This curve is plotted parallel to the advance curve.

B. Computations.

1. Determine the amount of moisture that was in the soil profile before irrigation. Total the amount of moisture determined to be in each significant layer of the root zone by both the estimating and computation procedure.  $D_1$  (on EXHIBIT - IWM - 1 and 4).
2. Determine the moisture holding capacity of the soil profile in the root zone;  $D_2$ .
  - a. Estimating - On EXHIBIT - IWM - 4.
    - (1) From the physical properties of the soil and the use of feel chart, determine the available moisture holding capacity of each significant layer of the soil profile.
    - (2) Record information.
    - (3) Total the available moisture  $D_2$  for the root zone of the soil profile.

b. Measuring - EXHIBIT - IWM - 1

- (1) From Speedy Moisture Tester measurements of

BORDER IRRIGATION EVALUATION

1. Farm \_\_\_\_\_ Field \_\_\_\_\_ Crop \_\_\_\_\_ Last Irr. \_\_\_\_\_ Date \_\_\_\_\_  
 Soil \_\_\_\_\_ WHC \_\_\_\_\_ IR \_\_\_\_\_ Slope \_\_\_\_\_  
 Border Width \_\_\_\_\_ Length \_\_\_\_\_ Time of Set \_\_\_\_\_ Stream Size \_\_\_\_\_  
 Depth of appl. needed  $D_n$  - Moisture at FC - Moisture before irrigation  
 $D_n = \text{_____} " = \text{_____} " = \text{_____} "$
2. Depth of water delivered or applied  $D_d = \frac{Q \text{ (cfs x T (hrs.))}}{A \text{ (acres)}} = \text{_____} \times \text{_____} = \text{_____} "$
3. Minimum opportunity time = Recession time - Advance time at minimum station  
 $T_o \text{ Minimum} = T_R - T_A = \text{_____} - \text{_____} = \text{_____} \text{ minutes}$
4. Minimum depth of water infiltrated at station receiving Min.  $T_o$   $F_m = \text{_____} "$   
 (From infiltrometer curve or family of intake curves)
5. Was adequate irrigation obtained? \_\_\_\_\_ Does  $F_m = D_n$
6. Ave. depth infiltrated  $F_o \text{ Ave.} = \frac{\text{Sum of } F_o \text{ s}}{\text{no. of Sta.}} = \text{_____} " = \text{_____} "$
7. Uniformity of application  $U_i = \frac{F_m \text{ Minimum}}{F_o \text{ Average}} \times 100 = \text{_____} " = \text{_____} \%$
8. Irrigation efficiency  $E = \frac{\text{Depth needed}}{\text{Depth applied}} = \frac{D_n}{D_d} \times 100 = \text{_____} " = \text{_____} \%$
9. Required opportunity time to infiltrate desired amount of water  
 $T_o = \text{_____} \text{ Min. (from infiltrometer curve in family of intake curves)}$
10. Required application time  $T_a = T_o - T_L$  (Lag time before recession)  
 $T_a = \text{_____} \text{ Min.} - \text{_____} \text{ Min.} = \text{_____} \text{ Min.}$
11. Irrigation frequency =  $\frac{\text{Depth of Application needed}}{\text{Peak Daily Consumptive Use}} \frac{D}{U_p} = \text{_____} " = \text{_____} \text{ Days}$
12. Recommendations: