



Improving Efficiency of Agricultural Irrigation Systems

Short Course Information Sheet

Objective:

Increase the capacity building of trainees on the importance of maintaining high irrigation system efficiency for reducing water losses especially from groundwater reservoirs, irrigation efficiency types, factors affecting and the techniques used to improve it.

Duration Time:

20 hours over five days (4hr/day)

Targeted Audiences:

Irrigation engineers, agricultural students, farmers as individual or as water users associations.

Expected Outputs:

Attendees of the short course will be able to:

- 1- Understand the importance of irrigation system efficiency in reducing water use for agricultural production as mean to conserve groundwater reservoir.,
- 2- Be aware of Yemen irrigation system efficiency situation in comparison with that for other Arab and worldwide countries.,
- 3- Know problems generated from low irrigation system efficiency.,
- 4- Recognize types of irrigation system efficiency and how to calculate each one.,
- 5- Understand factors affecting efficiency irrigation system.,
- 6- Identify methods to improve efficiency of different irrigation systems and ways to overcome its related problems.

Contents:

Introduction

Worldwide Irrigation Systems Efficiency

- 1) *Definition of irrigation efficiency*
- 2) *Worldwide irrigation systems efficiencies*
- 3) *Situation of irrigation systems efficiencies in Yemen*

Problems Related to Poor Efficiency of Irrigation Systems

- 1) *Increase of Water Losses*

A Short course with support of:





- a. *Water loss by runoff*
- b. *Water loss by evaporation*
- c. *Water loss by deep percolation*
- 2) *Problems related to type of irrigation system*
 - a. *Problems related to surface irrigation systems*
 - i. *Design dimensions of the system*
 - ii. *Operating scheduling*
 - iii. *Services management*
 - iv. *Climate conditions*
 - b. *Problems related to pressurized irrigation systems*
 - i. *System design specifications*
 - ii. *Operating scheduling*
 - iii. *System maintenance*
 - iv. *Climate conditions*
- 3) *Reduction in Crop Yield Quantity and Quality*
 - a. *Inequity plant growth*
 - b. *Propagation of crop diseases*
- 4) *Low Economic benefit*
 - a. *High production cost*
 - b. *Low income*

Classification of irrigation system efficiency

- a) *Reservoir Storage Efficiency*
- b) *Water application efficiency*
- c) *Water distribution efficiency*
- d) *Water requirement efficiency*
- e) *Water conveyance efficiency*
- f) *Water farm efficiency*
- g) *Water use efficiency*
- h) *Crop water use efficiency*
- i) *Water project efficiency*

Distribution uniformity

- 1- *Christiansen's Uniformity Coefficient*
- 2- *Low-Quarter Distribution Uniformity*
- 3- *Deep Percolation Ratio and Tail Water Ratio*
 - a. *Deep Percolation Ratio*
 - b. *Tail Water Ratio*

Methods to improve efficiency of irrigation systems

- 1) *Improve Surface Irrigation System Efficiency*
 - a. *Using conveyance pipe*
 - b. *Implement surge irrigation management*

A Short course with support of:





- c. Deficit irrigation management*
- 2) Improve Pressurized Irrigation System Efficiency*
 - a. Improve efficiency of drip irrigation system*
 - b. Improve efficiency of sprinkle irrigation system*
- 3) Reduce water evaporation from ground surface*
 - a. Mulching technique*
 - b. Greenhouse/drip irrigation system*

Irrigation Management for Water Efficiency

Additional Practices for Irrigation Water Efficiency