

ARUSHA TECHNICAL COLLEGE

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CIVIL ENGINEERING DEPARTMENT

1.0. SHORT COURSE TITLE: Irrigation Water Quality, Crop Water Requirement and Irrigation Schedule.

2.0. HOST DEPARTMENT: Civil Engineering Department

3.0. VENUE/PLACE: Arusha Technical College (ATC)

4.0. COURSE DURATION: 1 Week

5.0. COURSE COST: TZS 300,000/= (Tuition fee & educational field visits)

6.0. OBJECTIVES

6.1. General Objectives

This course focuses on estimating crop water requirement for irrigation scheduling/planning, management and sustainability of irrigation schemes.

6.2. Specific Objectives

At the end of the course, a trainee should be able to:

- (i) Measure, classify and interpret classes of irrigation water quality.
- (ii) Manage water salinity strategically at field level.
- (iii) Determine crop water requirements and irrigation schedule.

7.0. COURSE OUTCOME

Upon the completion of course, the trainee should be able to:

- (i) Apply criteria for water analysis and interpretation.
- (ii) Calculate water requirements of different crops by both direct and indirect methods.
- (iii) Plan an irrigation schedule.

7.0. TARGET GROUP

Field technicians, farm officers and any other interested person working in irrigation schemes with interest in increasing crop production

TIME TABLE

		ACTIVITY	TIME
DAY 1	SESSION 1	Introduction to irrigation water quality: <ul style="list-style-type: none"> • The importance of assessing Irrigation water quality • Criteria for a complete water quality analysis. • Types of salt problems existing 	2 hours
	SESSION 2	Classification of irrigation water quality basing on: <ul style="list-style-type: none"> • Salinity hazard, Sodium hazard, Carbonates & Bicarbonates • Trace elements and other problems 	3 hours
	SESSION 3	Interpretation of irrigation water quality classes basing on: <ul style="list-style-type: none"> • Salinity hazard, Sodium hazard, Carbonates & Bicarbonates • Trace elements and other problems 	3 hours
DAY 2	SESSION 1	Modification of irrigation water quality classes: <ul style="list-style-type: none"> • Residual Sodium Carbonate, Boron and conditional use of low quality water • Soil characteristics, water table, effective rainfall, types of crops. 	2 hours
	SESSION 2	Crop irrigation water and soil salinity tolerance: <ul style="list-style-type: none"> • Salinity and Crop growth stage • Salinity management • Leaching; Subsurface drainage and Seed placement 	3hours
	SESSION 3	Other salinity management techniques: <ul style="list-style-type: none"> • Residue management, More frequent irrigations, Pre- 	

		<ul style="list-style-type: none"> plant irrigation Chemical amendments and changing of irrigation methods 	3 hours
DAY 3	SESSION 1	Water sampling for laboratory analysis.	2 hours
	SESSION 2	Measurement of water quality	3hours
	SESSION 3	Complete water quality criterion interpretation.	3 hours
DAY 4	SESSION 1	<p>Crop water requirement and irrigation schedule concepts: (definitions& descriptions)</p> <ul style="list-style-type: none"> Crop Water Requirement (CWR) Total available moisture (TAM) Readily available moisture (RAM) Irrigation, Irrigation depth, and net Irrigation Evapotranspiration/ Consumptive use (ET) Crop Coefficient (Kc) Percolation Gravitational Moisture Field Capacity 	2 hours
	SESSION 2	<p>Methods of quantifying crop water requirement:</p> <ul style="list-style-type: none"> Direct Methods – e.g. Tank and Lysimeter Observation Method and Field Experimentation in plots. 	3hours
	SESSION 3	<p>Indirect methods-empirical methods of quantifying crop water requirement:</p> <ul style="list-style-type: none"> Blaney-Criddle method Radiation Method Evaporation Pan. 	3 hours
DAY 5	SESSION 1	Introduction to irrigation schedule.	2 hours
	SESSION 2	<p>Methods for determination of irrigation schedule:</p> <ul style="list-style-type: none"> Plant observation method Estimation method and 	3hours

		<ul style="list-style-type: none">• Simple calculation method	
	SESSION 3	CROPWAT software	3 hours