



## KENYATTA UNIVERSITY

### UNIVERSITY EXAMINATIONS 2010/2011

#### SECOND SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE (LAND AND WATER MANAGEMENT)

#### KRM 509: IRRIGATION AND WATER MANAGEMENT

**DATE:** Friday 1<sup>st</sup> April, 2011

**TIME:** 2.00 p.m. – 5.00 p.m.

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#### INSTRUCTIONS

*Answer Question ONE and any other TWO Questions.*

1. (a) Explain the following terms:
- (i) Supplemental Irrigation
  - (ii) Water harvesting
  - (iii) Drip Irrigation
  - (iv) Transpiration ratio
  - (v) Soil Salinity [10 marks]
- (b) Two thirds of Kenya is arid-semi arid. There is need for extensive and intensive irrigation practice to make this area productive for agriculture. Its potential area for irrigation is estimated at 244,200 hectares but only about 10% of the hectareage is currently under irrigation. Table below shows hectareage under irrigation per region:

| Type of Irrigation | Western      | Central       | Eastern      | N. Eastern | Nyanza       | R.Valley      | Coast        |
|--------------------|--------------|---------------|--------------|------------|--------------|---------------|--------------|
| 1                  | 0            | 17,440        | 1,622        | 0          | 0            | 3624          | 293          |
| 2                  | 1200         | 1,830         | 4,019        | 570        | 1975         | 7366          | 2124         |
| 3                  | <u>700</u>   | <u>5,537</u>  | <u>72</u>    | <u>50</u>  | <u>1766</u>  | <u>490</u>    | <u>2200</u>  |
| Total              | <u>1,900</u> | <u>24,807</u> | <u>5,713</u> | <u>620</u> | <u>3,741</u> | <u>11,480</u> | <u>4,637</u> |

Key

1 = Commercial large scale irrigation.

2 = Smallholder irrigation schemes (group based and individual).

3 = Centrally managed schemes (NIB).

Using the table, answer the following questions:

- (i) Why is Central Kenya having the highest hectarage under irrigation and yet it is under semi-humid/humid climate region, therefore not affected by droughts like Eastern province? [5 marks]
- (ii) With the help of data from the table and your knowledge on irrigation projects in Kenya.
  - (a) What are the major problems facing irrigation programmes in Kenya? [5 marks]
  - (b) What is the contribution of smallholder irrigation schemes currently in Kenya? Discuss their future role in food production with 2030 Kenyan vision in mind. [7 marks]
  - (c) What role might water-harvesting technology contribute in food production in Kenya? [3 marks]
2.
  - (a) Name the various surface irrigation methods and explain their advantages and disadvantages. [10 marks]
  - (b) Explain the factors to be considered when selecting a suitable irrigation method for an area. [5 marks]
3.
  - (a) Name and explain the three important characteristics of water quality for irrigation purposes. [6 marks]
  - (b) Define the following soils and explain how they are reclaimed for agricultural purposes:
    - (i) Saline soils
    - (ii) Alkali soils
    - (iii) Saline-alkali soils [9 marks]
4.
  - (a) What are the specific advantages of drip irrigation over sprinkler irrigation? [3 marks]
  - (b) Why is drainage a necessary consideration in irrigation projects? [6 marks]
  - (c) Define consumptive use and explain the factors that affect it. [5 marks]

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