



**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM  
FOR AGRICULTURAL ENGINEERING  
KNQF LEVEL 5**

**(CYCLE 3)**

**PROGRAMME ISCED CODE: 0716 454 A**



**TVET CDACC  
P.O. BOX 15745-00100 NAIROBI**

## AGRICULTURAL SOIL AND WATER CONSERVATION

**UNIT CODE:** 0716 451 11A

**TVET CDACC UNIT CODE:** ENG/CU/AGR/CR/04/5/MA

**UNIT DURATION:** 140 Hours

### Relationship to Occupational Standards

This unit addresses the unit of competency: **Conserve agricultural soil and water.**

### Unit Description

This unit specifies the competencies required by an Agricultural Engineering Craftsperson to conserve agricultural soil and water. It involves designing, establishing and maintaining agricultural soil and water conservation structures

### Summary of Learning Outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	Design agricultural soil and water conservation structures	40
2.	Establish agricultural soil and water conservation structures	80
3.	Maintain agricultural soil and water conservation engineering structures	20
<b>TOTAL</b>		<b>140</b>

### Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Design agricultural soil and water conservation structures	3.1 Types of soil and water conservation structures e.g. 1.1.1 Terraces 1.1.2 Contours 1.1.3 Contour bunds 1.1.4 Mulch 1.1.5 Cut off drains	<ul style="list-style-type: none"><li>Practical</li><li>Project</li><li>Portfolio of evidence</li><li>Third party report</li><li>Written tests</li></ul>

Learning Outcome	Content	Suggested Assessment Methods
	<p>1.1.6 Retention ditches</p> <p>1.1.7 Water ways</p> <p>1.1.8 Check dams</p> <p>1.1.9 Gabions</p> <p>3.2 Consideration for design of soil and water conservation structures e.g.</p> <p>1.2.1 Type of soil and their characteristics.</p> <p>1.2.2 Type of structure</p> <p>1.2.3 Mean annual rain fall</p> <p>1.2.4 Run-off expected</p> <p>1.2.5 Vegetation cover</p> <p>1.2.6 Land terrain</p> <p>3.3 Costs involved in designing Soil and water conservation structures.</p> <p>3.4 Structural Design and Optimization of soil and water conservation structures using AI systems</p> <p>1.4.1 Smart Design Software</p> <p>1.4.2 Material Optimization</p> <p>1.4.3 Energy Efficiency Design</p>	<ul style="list-style-type: none"> <li>Oral questioning</li> </ul>
2. Establish agricultural soil and water conservation structures	<p>2.1 Relevant tools and equipment required to establish soil and water conservation structures</p> <p>2.2 Construction materials and equipment</p> <p>2.3 Construction procedures</p> <p>2.4 Installation of Renewable Energy in Irrigation</p> <p>2.4.1 Solar-Powered Pumps: Reduce carbon emissions and energy costs.</p>	<ul style="list-style-type: none"> <li>Practical</li> <li>Project</li> <li>Portfolio of evidence</li> <li>Third party report</li> <li>Written tests</li> <li>Oral questioning</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	<p>2.4.2 Wind-Powered Pumps:</p> <p>Utilized in areas with suitable wind conditions for sustainable water lifting.</p>	
3. Maintain agricultural soil and water conservation engineering structures	<p>3.5 Common failures of agricultural soil and water conservation engineering structures</p> <p>3.6 Maintenance practices of agricultural soil and water conservation engineering structures</p> <p>3.7 Tools and equipment of maintenance of agricultural soil and water conservation engineering structures</p>	<ul style="list-style-type: none"> <li>• Practical</li> <li>• Project</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> <li>• Written tests</li> <li>• Oral questioning</li> </ul>

#### **Suggested Methods of Delivery**

1. Demonstration
2. Projects
3. Group discussion
4. Direct instructions

#### **Recommended Resources for 25 Trainees**

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	<b>Learning Materials</b>			
	Projector		1	1:25
	Scientific calculators		25	1:1
	Computer with internet		1	1:25

<b>B</b>	<b>Learning Facilities &amp; infrastructure</b>			
	Classroom	40 M <sup>2</sup>	1	1:25
<b>C</b>	<b>Consumable materials</b>			
	Stationery	Assorted	1 rim of printing papers 1 packet of pens 1 packet of maker pens	1:25
<b>D</b>	<b>Tools and Equipment</b>			
	Acre farm		1	1:25
	Toolbox		1	1:25
	Testing kit		1	1:25