



**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM**

**FOR**  
**AGRICULTURAL ENGINEERING**  
**KNQF LEVEL 6**

**(CYCLE 3)**

**PROGRAMME ISCED CODE: 0716 554 A**



**TVET CDACC**  
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**NAIROBI**

## **FARM GREEN ENERGY HARNESSING**

**UNIT CODE:** 0716 451 15A

**TVET CDACC UNIT CODE:** ENG/CU/AGR/CR/06/5/MA

**UNIT DURATION:** 140 Hours

### **Relationship to Occupational Standards**

This unit addresses the unit of competency: **Harness farm green energy**

### **Unit Description**

This unit specifies the competencies required by an Agricultural Engineering Technologist Level 6 to harness farm green energy. It involves, designing farm green energy harnessing system, installing farm green energy harnessing system and maintaining farm green energy harnessing system.

### **Summary of Learning Outcomes**

<b>S/No</b>	<b>Learning Outcomes</b>	<b>Duration (Hours)</b>
1.	Design farm green energy harnessing system	40
2.	Install farm green energy harnessing system	80
3.	Maintain farm green energy harnessing system	20
<b>TOTAL</b>		<b>140</b>

### **Learning Outcomes, Content and Suggested Assessment Methods**

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
1. Design farm green energy harnessing system	1.1.Green energy technologies e.g. 1.1.1 Solar 1.1.2 Wind 1.1.3 Bioenergy 1.1.4 Geothermal 1.1.5 Hydropower 1.2.Types of green energy harnessing systems. 1.2.1 Solar powered system 1.2.2 Biogas plant	<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>

Learning Outcome	Content	Suggested Assessment Methods
	<p>1.2.3 Hydropower system</p> <p>1.2.4 Wind turbine system</p> <p>1.3. Characteristics of green energy designs</p> <p>1.3.1 Energy efficiency</p> <p>1.3.2 Renewable energy generation</p> <p>1.4. Factors to consider when designing PV system</p> <p>1.5. Solar PV system components e.g.</p> <p>1.5.1 Solar PV array</p> <p>1.5.2 Charge controller</p> <p>1.5.3 Battery bank</p> <p>1.5.4 Inverter</p> <p>1.5.5 Utility meter</p> <p>1.5.6 Electric grid</p> <p>1.6. Types of solar panels</p> <p>1.6.1 Monocrystalline</p> <p>1.6.2 Polycrystalline</p> <p>1.7. Biogas designs</p> <p>1.7.1 Dome</p> <p>1.7.2 Floating drum</p> <p>1.8. Determination of material requirements for green energy technologies</p> <p>1.9. How to design different green energy systems</p> <p>1.10. Factors to consider when designing green energy systems e.g.</p> <p>1.11. Computations during design of green energy technologies</p>	

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	1.12. Costs involved in designing green energy systems	
2. Install farm green energy harnessing system	<p>2.1 Relevant tools and equipment required to install a farm green energy system</p> <ul style="list-style-type: none"> <li>2.1.1 Hand tools</li> <li>2.1.2 Land clearing machinery</li> <li>2.1.3 Green energy installation kit</li> <li>2.1.4 Construction tools and materials</li> <li>2.1.5 Testing tools and accessories</li> <li>2.1.6 Pipes and fittings</li> <li>2.1.7 Excavators</li> </ul> <p>2.2 Types of green energy systems</p> <p>2.3 Materials used and availability</p> <p>2.4 Farm green energy installation procedures</p> <p>2.5 Methods of testing installed farm green energy technologies</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>
3. Maintain farm green energy harnessing system	<p>3.1 Inspection of farm green energy harnessing systems</p> <p>3.2 Faults in farm green energy harnessing system</p> <p>3.3 Repair and maintain farm green energy harnessing systems</p> <p>3.4 Maintenance practices on farm green energy harnessing system using AI systems</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**

- Demonstration
- Projects

- Group discussion
- Direct instructions

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

<b>S/No.</b>	<b>Category/Item</b>	<b>Description/Specifications</b>	<b>Quantity</b>	<b>Recommended Ratio</b> (Item: Trainee)
<b>A</b>	<b>Learning Materials</b>			
	Projector		1	1:25
	Scientific calculators		25	1:25
	Computer with internet		1	1:25
	Latest version of AutoCAD software		1	1:25
	Latest version of ArchCAD software		1	1:25
	Installation manuals		1	1:25
<b>B</b>	<b>Learning Facilities &amp; infrastructure</b>			
	Classroom	40 M <sup>2</sup>	1	1:25
	Workshop	40 M <sup>2</sup>	1	1:25
<b>C</b>	<b>Consumable materials</b>			
1.	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>			

	Solar panels	300W polycrystalline	1	1:25
	Solar panels	300W monocrystalline solar	2	1:13
	Testing kits		2	1:13
	Battery	24V	5	1:5
	Battery chargers		2	113
	Charge controllers		2	1:13
	A set of connecting wires			
	Set of hand tools		2	1:13
	Toolbox		1	1:25