REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

AGRICULTURAL ENGINEERING

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0716 554 A

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

AGRICULTURAL POST HARVEST PROCESSES

UNIT CODE: 0716 551 22A

TVET CDACC UNIT CODE: ENG/OS/AGR/CR/02/6/MA

Relationship to Occupational Standards

This unit addresses the unit of competency: **Carry out agricultural post-harvest processes.**

Duration of Unit: 120 hours

Unit Description

This unit specifies the competencies required by an Agricultural Engineering Technologist Level 6 to carry out agricultural post-harvest processes. It involves transporting farm produce, sorting, cleaning and grading of farm products, drying and farm produce, processing of farm produce, packaging of farm produce, storing farm produce and managing agricultural waste and by-products.

Summary of Learning Outcomes

S/No.	Learning Outcomes	Duration (Hours)
1.	Transport farm produce	4
2.	Sort, clean and grade farm produce	30
3.	Dry and cool farm produce	20
4.	Process farm produce	30
5.	Package farm produce	10
6.	Handle farm produce	10
7.	Store farm produce	10
8.	Manage agricultural waste and by-product	6
TOTAL		**120**

Learning Outcomes, Content and Suggested Assessment Methods:

Learning Outcome	Content	Suggested Assessment Methods

1. Transport farm produce	1.1 Types of produce 1.1.1 Perishable 1.1.2 Non-perishable 1.1.3 Bulky 1.1.4 High-value 1.2 Factors to consider in farm produce transportation: 1.2.1 Timelines 1.2.2 Means of transport 1.2.3 Nature of produce 1.3 Techniques and means of produce transportation 1.3.1 Road 1.3.2 Rail 1.3.3 Water 1.3.4 Air 1.4 Regulations and compliance requirements in produce transportation 1.4.1 Permits 1.4.2 Hygiene 1.4.3 Standards 1.5 Handling procedures to minimize damage and spoilage during transport	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
2. Sort, clean and grade farm produce	2.1 Requirements for sorting, cleaning, and grading 2.2 Standard Operating Procedures (SOPs) in sorting, cleaning, and grading	• Practical • Project • Portfolio of evidence • Third party report • Written tests

	2.3 Marketing standards and quality specifications 2.4 Relevant regulations in sorting, cleaning, and grading 2.5 Types of machines and tools used 2.6 Techniques for different types of produce	• Oral questioning
3. Dry or cool farm produce	3.1 Preparation procedures before drying and cooling 3.2 Types of structures and equipment for drying and cooling 3.3 Factors influencing drying and cooling: 3.3.1 Produce type 3.3.2 Timelines 3.3.3 Standards 3.3.4 Weather conditions 3.4 Step-by-step drying and cooling processes 3.5 Testing techniques and standards for dried and cooled produce	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
4. Process farm produce	4.1 Procedures for preparing farm produce for processing 4.2 Methods for processing different farm produce 4.3 Standards in farm produce preparation	• Practical • Project • Portfolio of evidence • Third party report • Written tests

	4.4 Identification and use of processing equipment 4.5 Factors to consider when processing farm produce: 4.5.1 Timelines 4.5.2 Produce type 4.5.3 Scale of processing	• Oral questioning
5. Package farm produce	5.1 Methods of packaging based on produce type 5.2 Selection of packaging material 5.3 Packaging standards and compliance (e.g., KEBS) 5.4 Use of packaging machines 5.5 Labelling requirements and traceability	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
6. Handle farm produce	6.1 Factors to consider during farm produce handling: 6.1.1 Produce type, 6.1.2 Post-harvest stage 6.1.3 Handling machines and equipment 6.2 Correct handling procedures to maintain quality 6.3 Safety measures in handling farm produce	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
7. Store farm produce	7.1 Storage structures and facilities	• Practical • Project • Portfolio of evidence

	7.2 Optimal storage conditions for different produce types 7.3 Pest control measures and monitoring	• Third party report • Written tests • Oral questioning
8. Manage agricultural waste and by-products	8.1 Methods of agricultural waste management 8.1.1 Composting 8.1.2 3Rs 8.1.3 Incineration 8.1.4 Biogas production 8.2 Regulations governing agricultural waste disposal	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning

Suggested Methods of Instruction

- Projects
- Demonstration by trainer
- Practice by the trainee
- Field trips
- On-job training
- Discussions

Recommended Resources

- Stationery
- Computers
- Manuals
- Projectors
- Internes
- Workshop tools and materials
- PPEs
- Occupational safety and health act (OSHA)

- Work injury benefits act (WIBA)
- Manufacturers' catalogues
- British standards

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
	Projector	LCD/LED projector with HDMI/USB input	1	1:25
	Scientific calculators	Standard scientific functions for computations	25	1:1
	Computer with internet	For presentations, demonstrations, and record keeping	1	1:25
	Whiteboard & Markers	Large whiteboard with assorted markers	1	1:25
	Post-Harvest Processing Manuals	Detailed guides covering transport, sorting, cleaning, drying, cooling, packaging, and storage	25	1:1
	Posters & Charts	Illustrations of processing	5	1:5

		methods, machinery, and safety procedures		
	Reference Textbooks	Agricultural engineering and post-harvest handling texts	5	1:5
B	**Learning Facilities & infrastructure**			
	Classroom	40 m^2	1	1:25
	Workshop	40 m^2	1	1:25
	Processing shed	Equipped for sorting, cleaning, drying, cooling	1	1:25
	Storage room	Pest-proof and climate-controlled	1	1:25
	Water supply system	Clean, treated water for cleaning produce	1	1:25
	Waste disposal system	For agricultural waste/by-products	1	1:25
C	**Consumable materials**			
	Stationery	Assorted	1 rim of printing papers 1packet of maker pens	1:25
D	**Tools and Equipment**			

	Produce crates	Plastic or wooden ventilated crates	5	1:5
	Sorting tables	Stainless steel / food-grade material	5	1:5
	Screens	For cleaning, grading	1	1:25
	Weighing scales	Digital scales for produce measurement	5	1:5
	Moisture meters	For checking moisture levels in produce	5	1:5
	Microwave	For drying	1	1:25
	UV light	Detecting contamination	1	1:25
	Drying racks	Mesh or tray-type	5	1:5
	Cooling equipment	Small cold storage/fridge units	1	1:25
	Packaging machines	Manual/semi-automatic sealers	1	1:25
	Cleaning equipment	Produce washers / brush cleaners	1	1:25
	Storage bins	Airtight for cereals and grains	5	1:5
	Trolley jack	For moving bulk produce	1	1:25