



**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**AGRICULTURE AND EXTENSION TECHNICIAN**

**LEVEL 5**

**(CYCLE 3) PROGRAMME CODE: 0811 454A**



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**NAIROBI**

## PRODUCE HORTICULTURAL CROPS

UNIT CODE: 0811 451 08A

TVET CDACC UNIT CODE: AGR/OS/EXT/CR/03/4/MA

### UNIT DESCRIPTION

This unit specifies competencies required to produce horticultural crops. It involves preparing land, establishing and managing selected horticultural crops. It also involves harvesting and storage as well as processing and marketing of the selected horticultural crops

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the <b>key outcomes</b> which makeup <b>work place function</b> .	These are <b>assessable</b> statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the range.</b></i>
1. Prepare planting materials	1.1 <i><b>Personal protective equipment</b></i> is donned as per work requirement 1.2 Tools and equipment are assembled as per work requirement 1.3 <i><b>Planting materials</b></i> are obtained as per crop requirement
2. Prepare horticulture crop seedbed	2.1 Personal protective equipment is donned as per work requirement 2.2 <i><b>Land preparation tools</b></i> and <i><b>equipment</b></i> are assembled as per work requirement 2.3 Land is cleared as per agronomic requirements 2.4 <i><b>Tillage operations</b></i> are carried out as per agronomic requirements 2.5 <i><b>Soil conservation measures</b></i> are applied as per work procedure 2.6 Records are prepared as per work procedure

3. Plant Horticultural crops	<p>3.1 Personal protective equipment is donned as per work requirement</p> <p>3.2 <b>Farm inputs</b> are assembled as per work requirement</p> <p>3.3 <b>Horticultural crop</b> is established as per crop requirements</p> <p>3.4 Records are prepared as per work procedure</p>
4. Manage Horticultural crops	<p>4.1 Personal protective equipment is donned as per work requirement</p> <p>4.2 Farm inputs are assembled as per work requirement</p> <p>4.3 <b>Field management practice</b> is carried out as per crop agronomic requirements</p> <p>4.4 Records are prepared as per work procedure</p>
5. Harvest Horticultural crops	<p>5.1 Personal protective equipment is donned as per work requirement</p> <p>5.2 <b>Harvesting tools and equipment</b> are assembled as per work requirement</p> <p>5.3 Maturity indices are applied in determining crop maturity as per market demand</p> <p>5.4 <b>Harvesting method</b> is applied as per horticultural crop requirement</p> <p>5.5 Records are prepared as per work procedure</p>
6. Process Horticultural crop products	<p>6.1 Personal protective equipment is donned as per work requirement</p> <p>6.2 <b>Processing tools, equipment and machines</b> are assembled as per work requirement</p> <p>6.3 Processing of Horticultural crop is carried out as per work procedure</p> <p>6.4 Products are marketed as per workplace procedure</p> <p>6.5 <b>Records</b> are prepared as per work procedure</p>

## RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect.

1. Personal protective equipment includes but not limited to:	<ul style="list-style-type: none"><li>• Overall or over coat</li><li>• Gumboots</li><li>• Gloves</li><li>• Head gear</li><li>• Face mask</li></ul>
2. Land preparation tools and equipment includes but not limited to:	<p><b>Tools</b></p> <ul style="list-style-type: none"><li>• Land clearing tools/equipment/machinery<ul style="list-style-type: none"><li>- Axes</li><li>- Panga</li><li>- Rake</li><li>- Slasher</li></ul></li><li>• Tillage tools/equipment/machinery<ul style="list-style-type: none"><li>- Fork jembe</li><li>- Harrows</li><li>- Hoe</li><li>- Tractor</li></ul></li></ul> <p><b>Equipment</b></p> <ul style="list-style-type: none"><li>• Mower</li><li>• Rotavator</li><li>• Wheelbarrow</li><li>• Ridgers</li><li>• Moulboard plough</li><li>• Disc plough</li><li>• Disc harrow</li></ul>

3. Planting materials includes but not limited to:	<ul style="list-style-type: none"> <li>• Seeds</li> <li>• Vegetative materials <ul style="list-style-type: none"> <li>• Cuttings</li> <li>• Vines</li> <li>• Suckers</li> <li>• Splits</li> <li>• Setts</li> </ul> </li> </ul>
4. Tillage operations include but not limited to;	<ul style="list-style-type: none"> <li>• Primary cultivation</li> <li>• Secondary cultivation</li> <li>• Tertiary operations</li> </ul>
5. Soil conservation measures include but not limited to;	<ul style="list-style-type: none"> <li>• Contour planting</li> <li>• Terraces</li> <li>• Gabbions</li> <li>• Mulching</li> <li>• Cover cropping</li> <li>• Minimum tillage</li> <li>• Crop rotation</li> <li>• Intercropping</li> </ul>
6. Farm inputs includes but not limited to;	<ul style="list-style-type: none"> <li>• Fertilizers</li> <li>• Seeds</li> <li>• Vegetative propagation materials</li> <li>• Manures</li> </ul>
7. Field management practices include but are not limited to:	<ul style="list-style-type: none"> <li>• Watering</li> <li>• Mulching</li> <li>• Gapping</li> <li>• Thinning</li> <li>• Crop protection from weeds, pests and diseases</li> <li>• Training</li> </ul>

	<ul style="list-style-type: none"> <li>• Fertilizer application</li> <li>• Pruning</li> </ul>
8. Harvesting tools and equipment include but not limited to;	<ul style="list-style-type: none"> <li>• Sickle</li> <li>• Axe</li> <li>• Harrow</li> <li>• Chopper</li> </ul>
9. Harvesting methods include but not limited to;	<ul style="list-style-type: none"> <li>• Hand picking</li> <li>• Use of tools</li> <li>• Use of machinery</li> </ul>
10. Horticultural crops include but not limited to:	<ul style="list-style-type: none"> <li>• Vegetables: <ul style="list-style-type: none"> <li>- Brassicas – cabbage, kales, cauliflower, Brussel sprouts etc.</li> <li>- Solanaceae – tomato, pepper, brinjals etc.</li> <li>- Root and bulb crops – carrots, onions, raddish, beetroot etc.</li> <li>- Cucurbits – cucumber, pumpkin, melon etc.</li> <li>- Salad crops – celery, lettuce, parsley etc.</li> <li>- Legumes – French beans, green peas etc.</li> <li>- Herbs and spices – coriander, chives, dill, ginger etc.</li> </ul> </li> <li>• Pomology (fruits) <ul style="list-style-type: none"> <li>- Citrus</li> <li>- Avocado</li> <li>- Mango</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>- Banana</li> <li>- Passion fruits</li> <li>- Pawpaw</li> <li>- Guavas</li> <li>• Floriculture <ul style="list-style-type: none"> <li>- Carnations</li> <li>- Roses</li> <li>- Chrysanthemums</li> <li>- Hibiscus</li> </ul> </li> <li>• Landscaping <ul style="list-style-type: none"> <li>- Bedding plants and flowers</li> <li>- Shrubs and trees</li> </ul> </li> <li>• Turfs</li> </ul>
11. Records include but not limited to;	<ul style="list-style-type: none"> <li>• Inventory records</li> <li>• Financial records</li> <li>• Yield and production records</li> <li>• Payroll and labour records</li> <li>• Farm input utilization record</li> </ul>
12. Processing tools and equipment include but not limited to;	<ul style="list-style-type: none"> <li>• Blender</li> <li>• Motar and pestle</li> <li>• Weighing scale</li> <li>• Knives/cutting materials</li> <li>• Weighing cup</li> <li>• Bowl choppers</li> <li>• bandsaws</li> <li>• slicers</li> <li>• Marinating vacuum tumblers</li> <li>• Peelers</li> <li>• Picklers</li> </ul>

13. Processing machines include but not limited to;	<ul style="list-style-type: none"> <li>• Grinding machine</li> <li>• Dryers</li> <li>• Blenders</li> <li>• Blanchers</li> <li>• Freezers</li> <li>• Dryers</li> <li>• Pasteurizing machine</li> <li>• Fermenters</li> </ul>
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## REQUIRED KNOWLEDGE AND SKILLS

This section describes the skills and knowledge required for this unit of competency.

### Required skills

The individual needs to demonstrate the following skills:

- Tilling
- Tools and equipment classification
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests , diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil conservation
- Observation
- Negotiation
- Digital literacy



### **Required knowledge**

The individual needs to demonstrate knowledge of:

- Sources of quality water
- Agro- Ecological Zonation
- Farm establishment and management
- Types of annual crops and physiology of different annual crops
- Types of tools and equipment used in production of annual crops
- Soil fertility and soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for annual crops
- Husbandry practices in annual crops production
- Maturity indices in annual crops
- Harvesting and Post Harvesting Handling of annual crops
- Accounting principles, farm records and reports
- Waste Management
- Occupational Safety and Health Procedures

### **EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

<p>1. Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Donned Personal Protective Equipment (PPE ) as per work requirement</li> <li>1.2 Planting materials was obtained as per crop requirement</li> <li>1.3 Carried out tillage operations as per agronomic requirements</li> <li>1.4 Soil conservation measures was applied as per work procedure</li> <li>1.5 Horticultural crop was established as per crop requirements</li> <li>1.6 Field management practice was carried out as per crop agronomic requirements</li> <li>1.7 Harvesting tools and equipment was assembled as per work requirement</li> <li>1.8 Maturity index was applied in determining crop maturity as per market demand</li> <li>1.9 Harvesting method was applied as per crop requirement</li> <li>1.10 Processing tools, equipment and machines was assembled as per work requirement</li> <li>1.11 Processing of horticultural crop was carried out as per work procedure</li> <li>1.12 Product was marketed as per workplace procedure</li> <li>1.13 Record was prepared as per work procedure</li> </ul>
<p>2. Resource Implications (required for assessment )</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 Appropriately simulated environment where assessment can take place</li> <li>2.2 Access to relevant workplace assessment environment</li> <li>2.3 Resources relevant to the proposed assessment activity or tasks</li> </ul>
<p>3. Methods of Assessment</p>	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>3.24 Practical assessment</li> </ul>

	3.25 Project 3.26 Portfolio of evidence 3.27 Third party report 3.28 3.29 Written assessment 3.30 Oral assessment
4. Context of Assessment	This competency may be assessed in a workplace or in a simulated workplace.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.