

# **PRODUCTION OF VEGETABLE CROPS IN OPEN ENVIRONMENT**

**ISCED UNIT CODE:** 0812 251 01A

**TVETCDACC UNIT CODE:** HO/CU/HP/CR/01/3/MA

## **Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce Vegetable Crops in open environment

**Duration of Unit:** 80 Hours

### **Unit Description**

This unit specifies the competencies required to produce vegetable crops. It involves propagating vegetable crop seedlings, preparing land for vegetable crop, growing vegetable crop, harvesting vegetable crop, undertaking post-harvest activities and undertaking marketing activities.

**NOTE: The trainer to choose at least one vegetable in each category in the range for propagation. The choice should be based on ecological zone, interest of trainees and market demands.**

### **Summary of Learning Outcomes**

<b>SNO</b>	<b>Learning Outcome</b>	<b>Duration (hours)</b>
1.	Propagate vegetable crop seedlings	15
2.	Prepare land for growing vegetable crop	15
3.	Grow vegetable crop	15
4.	Harvest vegetable crop	10
5.	Undertake post-harvest activities	15
6.	Undertake marketing activities	10

## Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Propagate vegetable crop seedlings in open environment	<p>1.1 Definition of horticulture</p> <p>1.2 Types of horticultural crops</p> <ul style="list-style-type: none"> <li>1.2.1 Vegetables</li> <li>1.2.2 Fruits</li> <li>1.2.3 Herbs and spices</li> <li>1.2.4 Cut Flowers</li> <li>1.2.5 Ornamental plants</li> <li>1.2.6 Mushrooms</li> <li>1.2.7 Nuts</li> </ul> <p>1.3 Procedures for occupational safety and health.</p> <p>1.4 Market survey on suitable crop</p> <ul style="list-style-type: none"> <li>1.4.1 Consumer preferences</li> <li>1.4.2 Maturity period</li> <li>1.4.3 Ecological requirements</li> <li>1.4.4 Resistant to pests and diseases.</li> <li>1.4.5 Sources of finances</li> <li>1.4.6 Vegetable crop business plan</li> </ul> <p>1.5 Planting materials</p> <ul style="list-style-type: none"> <li>1.5.1 Types</li> <li>1.5.2 Sources</li> <li>1.5.3 Preparation</li> </ul> <p>1.6 Uses of the vegetable crops</p> <p>1.7 Basic plant anatomy</p> <p>1.8 Classification of vegetable crops</p> <ul style="list-style-type: none"> <li>1.8.1 Leaf vegetables <ul style="list-style-type: none"> <li>• Kales</li> <li>• Cabbage</li> <li>• Black nightshade (Managu)</li> </ul> </li> <li>1.8.2 Fruit vegetables <ul style="list-style-type: none"> <li>• Tomatoes</li> <li>• Capsicum</li> <li>• Cucumber</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral assessment</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> <li>• Written assessment</li> <li>• Project</li> <li>• Practical</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	<p>1.8.3 Root and Tuber</p> <ul style="list-style-type: none"> <li>• Onions</li> <li>• Carrots</li> <li>• Garlic</li> </ul> <p>1.9 Tools, equipment, supplies and materials</p> <ul style="list-style-type: none"> <li>1.9.1 Identification</li> <li>1.9.2 Sourcing</li> <li>1.9.3 Use</li> <li>1.9.4 Maintenance</li> <li>1.9.5 Storage</li> </ul> <p>1.10 Types of Nurseries</p> <ul style="list-style-type: none"> <li>1.10.1 Sunken beds</li> <li>1.10.2 Raised Beds</li> <li>1.10.3 Flat beds</li> </ul> <p>1.11 Factors to be considered for site selection for nurseries.</p> <ul style="list-style-type: none"> <li>• Nursery bed preparation</li> </ul> <p>1.12 Propagating of the planting materials</p> <p>1.13 Nursery Management practices</p> <ul style="list-style-type: none"> <li>1.13.1 Weeding</li> <li>1.13.2 Mulching</li> <li>1.13.3 Watering/ Irrigation – Types of irrigation</li> <li>1.13.4 Shading</li> <li>1.13.5 Pricking out</li> <li>1.13.6 Pest and diseases control</li> <li>1.13.7 Hardening off</li> </ul> <p>1.14 Procedures for occupational safety and health.</p> <p>1.15 Record Keeping</p> <p>1.16 Waste management practices</p> <ul style="list-style-type: none"> <li>• 3Rs of waste disposal</li> </ul>	
2. Prepare land for growing vegetable crop	<p>2.1 Procedures for occupational safety and health</p> <p>2.2 Tools, equipment, supplies and materials</p> <ul style="list-style-type: none"> <li>2.1.1 Identification</li> <li>2.1.2 Sourcing</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral assessment</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	<p>2.1.3 Use      2.1.4 Maintenance      2.1.5 Storage</p> <p>2.3 Soil management</p> <p>2.4 Soil and water conservation measures</p> <p>2.5 Land preparation</p> <ul style="list-style-type: none"> <li>2.5.1 Clearing</li> <li>2.5.2 Primary tillage</li> <li>2.5.3 Secondary tillage</li> <li>2.5.4 Tertiary operations</li> </ul> <p>2.6 Soil amendments</p> <ul style="list-style-type: none"> <li>• Manure application</li> <li>• Liming</li> <li>• Gypsum</li> <li>• Fertilizer application</li> </ul> <p>2.7 Record keeping</p> <p>2.8 Wastes management practices</p>	<ul style="list-style-type: none"> <li>• Written assessment</li> <li>• Practical</li> </ul>
3. Grow vegetable crop	<p>3.1 Procedures for occupational safety and health</p> <p>3.2 Tools, equipment, supplies and materials</p> <ul style="list-style-type: none"> <li>3.2.1 Identification</li> <li>3.2.2 Sourcing</li> <li>3.2.3 Use</li> <li>3.2.4 Maintenance</li> <li>3.2.5 Storage</li> </ul> <p>3.3 Planting/transplanting procedure</p> <p>3.4 Field agronomic practices</p> <ul style="list-style-type: none"> <li>3.4.1 Spacing</li> <li>3.4.2 Watering/ Irrigation</li> <li>3.4.3 Gapping</li> <li>3.4.4 Thinning</li> <li>3.4.5 Mulching</li> <li>3.4.6 Pruning</li> <li>3.4.7 Training</li> <li>3.4.8 Crop rotation</li> <li>3.4.9 Intercropping</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Oral assessment</li> <li>• Portfolio of evidence</li> <li>• Third party report</li> <li>• Written assessment</li> <li>• Practical</li> <li>• Projects</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	<p>3.5 Weeding</p> <ul style="list-style-type: none"> <li>3.5.1 Importance of weeding</li> <li>3.5.2 Methods of weeding.           <ul style="list-style-type: none"> <li>• Biological method</li> <li>• Mechanical method</li> <li>• Cultural method</li> <li>• Chemical method</li> </ul> </li> </ul> <p>3.6 Crop protection</p> <ul style="list-style-type: none"> <li>3.6.1 Types of pests and diseases</li> <li>3.6.2 Methods of controlling pests and diseases</li> <li>3.6.3 Integrated Pest and diseases Management</li> <li>3.6.4 Efficient use of crop protection products</li> </ul> <p>3.7 Crop nutrition</p> <ul style="list-style-type: none"> <li>3.7.1 Types of fertilizers</li> <li>3.7.2 Method of fertilizer application</li> <li>3.7.3 Efficient use of fertilizer</li> </ul> <p>3.8 Food safety measures</p> <p>3.9 Record keeping</p> <p>3.10 Wastes management practices</p> <ul style="list-style-type: none"> <li>3.10.1 3Rs of waste disposal</li> </ul>	
4. Harvest vegetable crop	<p>4.1 Procedures for occupational safety and health</p> <p>4.2 Tools, equipment, supplies and materials</p> <ul style="list-style-type: none"> <li>4.2.1 Identification</li> <li>4.2.2 Sourcing</li> <li>4.2.3 Use</li> <li>4.2.4 Maintenance</li> <li>4.2.5 Storage</li> </ul> <p>4.3 Maturity indices</p> <ul style="list-style-type: none"> <li>4.3.1 Horticultural maturity</li> <li>4.3.2 Physiological maturity</li> </ul>	<ul style="list-style-type: none"> <li>● Observation</li> <li>● Oral assessment</li> <li>● Portfolio of evidence</li> <li>● Third party report</li> <li>● Written assessment</li> <li>● Practical</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	<p>4.4 Methods of harvesting</p> <p>    4.4.1 Pinching</p> <p>    4.4.2 Uprooting</p> <p>    4.4.3 Cutting</p> <p>4.5 Food safety measures</p> <p>4.6 Record keeping</p> <p>4.7 Wastes management practice</p> <p>    4.7.1 Rs of waste disposal</p>	
5. Undertake post-harvest activities	<p>5.1 Procedures for occupational safety and health</p> <p>5.2 Tools, equipment, supplies and materials</p> <p>    5.2.1 Identification</p> <p>    5.2.2 Sourcing</p> <p>    5.2.3 Use</p> <p>    5.2.4 Maintenance</p> <p>    5.2.5 Storage</p> <p>5.3 Post-harvest handling practices</p> <p>    5.3.1 Weighing</p> <p>    5.3.2 Cleaning</p> <p>    5.3.3 Sorting</p> <p>    5.3.4 Grading</p> <p>    5.3.5 Packaging</p> <p>    5.3.6 Storage</p> <p>    5.3.7 Waxing</p> <p>5.4 Food safety measures</p> <p>5.5 Record keeping</p> <p>5.6 Wastes management practice</p> <p>    5.6.1 3Rs of waste disposal</p> <p>5.7 Emerging trends-</p> <p>    5.7.1 Automated grading</p> <p>    5.7.2 Packaging innovations</p>	<ul style="list-style-type: none"> <li>● Observation</li> <li>● Oral assessment</li> <li>● Portfolio of evidence</li> <li>● Third party report</li> <li>● Written assessment</li> <li>● Practical</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
6. Undertake marketing activities	6.1 Market survey techniques 6.2 Channels/medium/mode of marketing produce 6.3 Pricing techniques 6.4 Customer value-based pricing <ul style="list-style-type: none"> <li>6.4.1 Cost – based pricing</li> <li>6.4.2 Competition based pricing</li> <li>6.4.3 New- product pricing</li> <li>6.4.4 The 4Ps in marketing</li> <li>6.4.5 Product</li> <li>6.4.6 Place</li> <li>6.4.7 Price</li> <li>6.4.8 Promotion</li> </ul> 6.5 Basic value addition 6.6 Record keeping 6.7 Wastes management practice <ul style="list-style-type: none"> <li>6.7.1 3Rs of waste disposal</li> </ul> 6.8 Emerging trends <ul style="list-style-type: none"> <li>6.8.1 e – marketing</li> </ul>	<ul style="list-style-type: none"> <li>● Observation</li> <li>● Oral assessment</li> <li>● Portfolio of evidence</li> <li>● Third party report</li> <li>● Written assessment</li> </ul>

### **Suggested Methods of Instruction**

- Instructor-led facilitation
- Demonstration by trainer
- Practical work by trainees
- Group discussions
- Presentations
- Projects
- Case studies
- Problem based learning
- Experiential learning
- Question and answer
- Team training
- Team learning

- E-learning
- Academic trips

### Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A</b>	<b>Learning Materials</b>			
	GAP guidelines manuals		5 pcs	1:5
	MoALF Vegetable production manual		5 pcs	1:5
<b>B</b>	<b>Learning Facilities &amp; infrastructure</b>			
1.	Lecture/theory room	40 M <sup>2</sup>	1	1:25
2.	Tools and Equipment storage facility		1	1:25
3.	Chemical and fertilizer storage facility		1	1:25
4.	Agricultural Land	One Acre	1	1:25
<b>C</b>	<b>Consumable materials</b>			
1.	Manure	Wheelbarrows/tins of farm yard manure	2	2:25
2.	Fertilizers	Planting 2 top dressing	3 bags of 50kg	3:25
3.	Planting materials	Seeds, seedling, vegetative material	1kg of seeds/acre	1:25
4.	Mulching materials	Organic and inorganic of 30microns	20 bales of organic mulch 4rolls of inorganic mulch	20:25 4:25
5.	Khaki paper bags and stickers	0.5kg bag	4 packets of khaki bag and 200 stickers	4:25
6.	Seedling trays	66 cells tray	50 trays	2:25
7.	Layout string	Sisal twine	2 rolls	2:25

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
8.	Twining string	Nylon	5 rolls	5:25
9.	Binding wire	Staking binding wire	50kg	50:25
10.	Stationery	Assorted	1 rim of printing papers 1 packet of pens 1packet of maker pens	1:25
11.	Staking sticks	Wooden sticks 1.5m long	250 sticks	10:1
12.	Nails	3 inches and 4 inches	2kgs	1:25
13.	Pesticides	Herbicides Insecticides Nematicides Fungicides	1Litre of each	1:25
14.	Rooting hormones	Powder	200grams	1:25
15.	Pheromones+traps	2pheromones Tuta absoluta and fruit fly	50 pieces	2:1
16.	Scouting flags	3 fabric ribbon-Red, yellow, green	75	3:1
17.	Pest control traps	Sticky traps	2	2:1
18.	Personal protective Equipment (PPEs)	Set-(overall, gloves, respirator, gumboot, goggles) Spray suit	25 5	1:1 1:5
19.	Packaging materials	Assorted-3 different packaging materials	1	3:1
<b>D</b>	<b>Tools and Equipment</b>			
1.	Hoes/jembe		25 pcs	1:1
2.	Panga		10 pcs	1:3
3.	Slasher		10 pcs	1:3
4.	Secateurs		15 pcs	1:2
5.	Spade		15 pcs	1:2
6.	Soil augur		5 pcs	1:5

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
7.	Pegs		100 pcs	4:1
8.	Hammer		15 pcs	1:2
9.	Saw		15 pcs	1:2
10.	Bucket		15 pcs	1:2
11.	Dibbler		15 pcs	1:2
12.	Garden trowel		15 pcs	1:2
13.	Measuring tape		10 pcs	1:3
14.	Knapsack's sprayers		5 pcs	1:5
15.	Irrigation equipment	A complete set of irrigation system	1 set	1:1
16.	Storage tanks	3, 000 litres capacity	1	1:1
17.	Watering can	5litre can- plastic/metallic	5 pcs	1:5