

## MANAGE HYDROPONIC FARM

ISCED UNIT CODE: 0811 551 24A

TVETCDACC UNIT CODE: HO/CU/HP/CR/04/6/MA

### UNIT DESCRIPTION

This unit specifies the competencies required to setup and run a hydroponic farm. It involves installing hydroponic system, preparing hydroponic plant media, establishing hydroponic plants, managing hydroponic plants and performing hydroponic crops post-harvest practices.

### ELEMENTS AND PERFORMANCE CRITERIA

| ELEMENT   | PERFORMANCE CRITERIA   |
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| These describe the key outcomes which make up workplace functions | These are assessable statements which specify the required level of performance for each of the elements<br><i>(Bold and italicized terms are elaborated in the range)</i>   |
| 1. Install hydroponic system                                      | 1.1 <b>Personal protective equipment's</b> are worn as per work requirement<br>1.2 <b>Tools, equipment</b> and <b>materials</b> are assembled as per work requirement<br>1.3 Hydroponic systems are designed as per <b>type of hydroponic system</b><br>1.4 A work schedule for installation of hydroponic system is prepared as per type of hydroponic system<br>1.5 Hydroponic system is setup as per work procedure |
| 2. Prepare hydroponic plant media                                 | 2.1 Personal protective equipment's are worn as per work requirement<br>2.2 Tools, equipment and materials are assembled as per work requirement<br>2.3 <b>Hydroponic planting media</b> are prepared as per work requirement  |

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|   | 2.4 Nutrient solutions to use at different growth stages are determined   |
| 3. Establish hydroponic plants                      | <p>3.1 Personal protective equipment's are worn as per work requirement</p> <p>3.2 Tools, equipment and materials are assembled as per work requirement</p> <p>3.3 <b>Hydroponic planting materials</b> are prepared as per <b>agronomic requirement</b></p> <p>3.4 Hydroponic plants are transplanted as per agronomic requirement</p>   |
| 4. Manage hydroponic plants                         | <p>4.1 Personal protective equipment's are worn as per work requirement</p> <p>4.2 Tools, equipment and materials are assembled as per work requirement</p> <p>4.3 <b>Cultural practices</b> are carried out as per agronomic requirements</p> <p>4.4 <b>Nutrient solutions</b> are prepared and fed to hydroponic plants as per crop requirement</p> <p>4.5 <b>Chemical analysis of planting media</b> is carried out as per work procedure</p> <p>4.6 Pest and diseases are scouted and controlled as per agronomic requirement</p> <p>4.7 Hydroponic plants are harvested as per crop maturity indices</p> |
| 5. Perform hydroponic plants post-harvest practices | <p>5.1 Tools and equipment for carrying out post-harvest practices are assembled as per work requirement</p> <p>5.2 Quality and quantity of cut flowers is assessed as per work procedures</p> <p>5.3 <b>Post-harvest practices</b> are carried out in accordance to agronomic requirement</p> <p>5.4 Hydroponics plants <b>marketing techniques</b> are applied as per organizational policy</p> <p>5.5 Waste management is undertaken in accordance to work requirement</p>   |

## RANGE

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

| Variable   | Range   |
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| 1. Personal protective equipment<br>may include but are not limited to:  | <ul style="list-style-type: none"><li>• Gloves</li><li>• Safety goggles</li><li>• Safety boots</li><li>• Overalls</li><li>• Dust coat</li><li>• Ear muffs</li><li>• Face masks</li></ul>  |
| 2. Tools, equipment and materials<br>may include but are not limited to: | <ul style="list-style-type: none"><li>• Hoes</li><li>• Machetes</li><li>• Secateurs</li><li>• Shovels</li><li>• Soil auger</li><li>• Panga</li><li>• Pegs</li><li>• Hammer</li><li>• Saw</li><li>• Bucket</li><li>• Secateurs</li><li>• Shears</li><li>• Dibbler</li><li>• Pegs</li><li>• Spray pumps</li><li>• Watering cans</li><li>• Hose pipes</li><li>• Plough</li></ul> |

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|  | <ul style="list-style-type: none"> <li>• Harrows</li> <li>• Ridges</li> <li>• Boom sprayer</li> <li>• Pruning saw</li> <li>• Wire strainer</li> <li>• Traps</li> <li>• Pipe sprinklers</li> <li>• Scouting flags</li> <li>• Storage tanks</li> <li>• Tractors</li> <li>• Grading shed</li> <li>• Bud count square</li> <li>• Meteorological equipment</li> <li>• Pesticides</li> <li>• Fertilizers</li> <li>• Stationery</li> <li>• Manures</li> <li>• Seedlings /planting materials</li> <li>• Khaki paper bags size 3</li> <li>• Rope</li> <li>• Nets</li> <li>• Translucent papers</li> <li>• Papers</li> <li>• Fencing wire</li> <li>• Staking sticks</li> <li>• Nails</li> <li>• Herbicides</li> <li>• Pesticides</li> <li>• Pheromones</li> <li>• Seeds</li> <li>• Seedlings</li> <li>• Splits</li> </ul> |
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|  | <ul style="list-style-type: none"> <li>• Crowns</li> <li>• Slips</li> <li>• Cuttings</li> <li>• Suckers</li> <li>• Plantlets</li> </ul>   |
| 3. Hydroponic systems  | <ul style="list-style-type: none"> <li>• Deep water float system</li> <li>• Nutrient film technique (NFT)</li> <li>• Drip</li> <li>• Wick</li> <li>• Aeroponics</li> <li>• Ebb and Flow</li> </ul>                    |
| 4. Hydroponic planting media may include but are not limited to      | <ul style="list-style-type: none"> <li>• Pumice</li> <li>• Vermiculite</li> <li>• Perlite</li> <li>• Cocoa peat</li> <li>• Peat moss</li> <li>• Rock wool</li> </ul>  |
| 5. Hydroponic planting materials may include but are not limited to: | <ul style="list-style-type: none"> <li>• Seeds</li> <li>• Splits</li> <li>• Suckers</li> <li>• Buds</li> <li>• Bulbils</li> <li>• Cuttings</li> <li>• Corms</li> <li>• Tissue culture</li> <li>• Seedlings</li> </ul> |
| 6. Agronomic requirements may include but are not limited to         | <ul style="list-style-type: none"> <li>• Gapping</li> <li>• Thinning</li> <li>• Pruning</li> <li>• Training</li> <li>• De- suckering</li> <li>• Watering</li> </ul>   |

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|   | <ul style="list-style-type: none"> <li>• Nutrient application</li> </ul>   |
| 7. Crop protection practices may include but are not limited to:            | <ul style="list-style-type: none"> <li>• Pest control</li> <li>• Disease control</li> <li>• Weed control</li> </ul>  |
| 8. Cultural practices may include but are not limited to:                   | <ul style="list-style-type: none"> <li>• Gapping</li> <li>• Thinning</li> <li>• Training</li> <li>• Weeding</li> <li>• Pruning</li> </ul>  |
| 9. Nutrient solution may include but are not limited to:                    | <ul style="list-style-type: none"> <li>• Solution A (Calcium nitrate, iron)</li> <li>• Solution B (magnesium sulphate, potassium nitrate, mono potassium phosphate, manganese sulphate, zinc sulphate, copper sulphate and Borax 11%)</li> </ul> |
| 10. Chemical analysis of planting media may include but are not limited to: | <ul style="list-style-type: none"> <li>• pH</li> <li>• Electrical conductivity</li> <li>• Nutrient concentration</li> </ul>  |
| 11. Post-harvest practices may include but are not limited to:              | <ul style="list-style-type: none"> <li>• Transportation</li> <li>• Cleaning</li> <li>• Sorting</li> <li>• Grading</li> <li>• Drying</li> <li>• Processing</li> <li>• Packaging</li> <li>• Branding</li> <li>• Storage</li> </ul>                 |
| 12. Marketing techniques may include but are not limited to:                | <ul style="list-style-type: none"> <li>• Online marketing</li> <li>• Influencer marketing</li> <li>• Referrals</li> </ul>  |

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|  | <ul style="list-style-type: none"> <li>• Advertisement</li> <li>• Auctioneering</li> <li>• Public relation</li> <li>• Cold calling</li> <li>• Content marketing</li> <li>• Invoicing</li> <li>• Loyalty programs</li> </ul> |
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## REQUIRED KNOWLEDGE AND SKILLS

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

### Required knowledge

The individual needs to demonstrate knowledge of:

- Components of hydroponic system
- Sources of quality water
- Hydroponic farming tools and equipment
- Physiology of hydroponic plants
- Phyto-sanitary requirements
- Sources of quality planting materials
- Husbandry practices in hydroponic farming
- Procedures for calibration of equipment
- Harvesting and Post Harvesting Handling of hydroponic plants
- Record keeping and accounting
- Waste Management practices
- Occupational Safety and Health Procedures

### Required skills

The individual needs to demonstrate the following skills:

- Measuring
- Levelling
- Gapping

- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Observation
- Negotiation
- Digital literacy
- Networking

## EVIDENCE GUIDE

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

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| 1. Critical aspects of competency | <p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Used personal protective equipment as per work requirement</li> <li>1.2 Designed and setup hydroponic system as per hydroponic system requirements</li> <li>1.3 Treated planting materials based on agronomic requirements.</li> <li>1.4 Prepared propagation media in accordance to agronomic requirements.</li> <li>1.5 Raised hydroponic plants as per agronomic requirements.</li> <li>1.6 Carried out crop protection practices on hydroponic plants as per work procedure</li> <li>1.7 Carried out fertigation in accordance to crop nutrient requirement</li> <li>1.8 Carried out pruning, training and de-suckering based on crop requirement</li> <li>1.9 Harvested hydroponics plants as per maturity indices</li> <li>1.10 Carried out post-harvest handling of hydroponic plants in accordance to work requirement</li> <li>1.11 Managed wastes generated in production process in accordance to work requirement</li> </ul> |
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| 2. Resource implications               | <p>The following resources should be provided:</p> <p>2.1 Appropriately simulated environment where assessment can take place</p> <p>2.2 Access to relevant work environment</p> <p>2.3 Resources relevant to the proper activities or tasks</p> |
| 3. Methods of assessment               | <p>Competency in this unit may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Portfolio of evidence</p> <p>3.4 Interviews</p> <p>3.5 Third party report</p> <p>3.6 Written tests</p>                         |
| 4. Context of assessment               | <p>Competency may be assessed:</p> <p>4.1 Workplace or simulated workplace</p>   |
| 5. Guidance information for assessment | <p>Holistic assessment with other units relevant to the industry sector and workplace job role is recommended.</p>   |