

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARD**

**FOR**

**HORTICULTURE FARM ATTENDANT**

**LEVEL 4**

**PROGRAMME CODE: 0812 354 A**

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**FOREWORD**

The provision of quality education and training is fundamental to the Government’s overall strategy for social-economic development. Quality education and training will contribute to the achievement of Kenya’s development blueprint, Vision 2030 and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. These reforms resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No.14 of 2012). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

The reforms also demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for developing a Competency-Based Education and Training (CBET) curriculum for Horticultural Farm attendant Level 4. These Occupational Standards will also be the basis for the assessment of an individual for competency certification.

It is my conviction that these Occupational Standards will play a great role in the development of a competent human resource for sustainable development.

**PREFACE**

Kenya Vision 2030 aims to transform the country into a newly industrializing, middle-income country providing a high-quality life to all its citizens by the year 2030. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills, and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency-Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 and Sessional Paper No. 14 of 2012 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by the industry as well as increase the global competitiveness of the Kenyan labour force.

The National Polytechnics, in conjunction with the industry experts through the Industry Advisory Board (IAB), sector regulator boards, TVETA authority, and qualification awarding institution has developed these Occupational Standards for Horticultural Farm attendant Level 4. The occupational standards will be the basis for the development of a competency-based education and training curriculum for Horticultural Farm attendant Level 4.

I am grateful to the Governing Council Members, TVETA, sector regulators, the industry experts, and subject experts who participated in the development of these standards.

**ACKNOWLEDGMENT**

These Occupational Standards were developed through the combined effort of various stakeholders from private and public organizations. I am thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided input towards the development of these Occupational Standards.

I also thank all the individuals and organizations who participated in the validation of these Occupational Standards.

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# ABBREVIATIONS AND ACRONYMS

PPE’S Personal protective equipment’s

HSE Health, safety and environment

CPU Central Processing unit

RAM Random Access Memory

CD Compact Disc

DVD Digital Video Disc

HDMI High-Definition Multimedia Interface

DVI Digital Visual Interface

VGI Video Graphics Array

USB Universal Serial Bus

CV Curriculum Vitae

TV Television

ISDN Integrated Services Digital Network

OSHA Occupational Safety and Health Act

CDACC Curriculum development, assessment and certification council

|  |  |
| --- | --- |
| TVET | Technical and Vocational Education Training |
| TVETA | Technical and Vocational Education Training Authority |

# KEY TO UNIT CODE

Sector / Industry

Sub Sector

Occupational Area

Version Control

Unit of Competence Number

ISCED level, Programme Orientation and Level of Completion

xx

x

xxx

x

x

x

# 

**OVERVIEW**

Horticultural crops Production Level 4 qualification consists of competencies required by a person to attend to a horticulure farm**.** It includes producing vegetable crops, herbs and spices, operating farm irrigation and drainage systems and farm machinery, improving soil fertility and producing tropical fruits, cut flowers

Units of competency comprising horticultural crops production include the following core units:

|  |  |  |
| --- | --- | --- |
| **Unit Code** | **Unit Title** |  |
| 0812 251 01A | Produce Vegetable Crops in open environment |  |
| 0812 251 02A | Produce Vegetable Crops in protected environment |  |
| 0812 251 03A | Produce Herbs and Spices in open environment |  |
| 0812 251 04A | Produce Herbs and spices in protected environment |  |
| 0812 351 05A | Operate farm irrigation and drainage systems |  |
| 0716 351 06A | Operate farm machinery |  |
| 0812 351 09A | Produce tropical fruits Crops |  |
| 0812 351 09A | Produce Cut Flowers |  |

# PRODUCE VEGETABLE CROPS IN OPEN ENVIRONMENT

**UNIT CODE:** 0812 251 01A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce vegetable crops in open environment. 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.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the **key outcomes** which make up **workplace function.** | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| --- | --- |
| 1. Propagate vegetable crop seedlings in open environment | * 1. Market survey is undertaken as per vegetable crop type demand   2. Sources of finances are managed as per financial procedures   3. Business planning is undertaken as per resource implications   4. Vegetable crop seeds are selected for propagation as per ecological requirements   5. Work safety measures are observed as per the work requirements   6. Vegetable crop parts are identified as per vegetable crop type.   7. Tools and equipment are assembled as per work requirements   8. Suitable site is identified based on vegetable crop type   9. Water for irrigation is applied as per vegetable crop type   10. Crop nursery is prepared as per vegetable crop type   11. Tools and equipment are maintained as per type.   12. Crop nursery ***management practices*** are carriedoutas per vegetable crop type   13. Farm activities costs is documented as per task requirements   14. Waste is disposed in accordance with EMCA 2015 requirements   15. Emerging trends are applied in nursery preparation as per current technological development |
| 1. Prepare land for growing vegetable crop | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Land is cleared as per agronomic requirements   4. ***Land tillage*** is carried out as per agronomic requirements.   5. Soil testing is carried out as per soil testing procedure.   6. ***Soil amendments*** is applied as per soil analysis report   7. Planting furrows are made as per vegetable crop type   8. Farm activities costs is documented as per task requirements   9. Tools and equipment are maintained as per type.   10. Waste is disposed in accordance with EMCA 2015 requirements   11. Records on land preparations are developed and shared based on workplace policy   12. Emerging trends are applied in preparing Land as per current technological development |
| 1. Grow vegetable crop | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Land is watered as per vegetable crop type requirement   4. Vegetable seedlings are transplanted as per agronomics requirements   5. Vegetable seeds are planted as per agronomics requirements   6. ***Mulching*** of the vegetable crops is carried out as per agronomic requirements.   7. Vegetable crops are watered as per vegetable crop type requirement.   8. Vegetable crops are gapped and thinned based as per agronomic requirements   9. Vegetable crops are trained and pruned as per agronomic requirements   10. ***Crop protection measures*** are applied as per agronomic requirement   11. ***Crop nutrition measures*** are undertaken as per vegetable crop type requirement.   12. Food safety measures are implemented in conformity with assessment standards   13. Tools and equipment are maintained as per type.   14. Farm activities costs is documented as per task requirements   15. Waste is disposed in accordance with EMCA requirements   16. Emerging trends are applied in growing vegetable crop type as per current technological development |
| 1. Harvest vegetable crop | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. ***Maturity indices*** are observed as per vegetable crop type.   4. Food safety measures during harvesting are implemented in conformity to assessment standards   5. Crop ***Picking*** is carried out as per vegetable crop type   6. Produce is transported to the pack house as per vegetable crop type requirements   7. Tools and equipment are maintained as per type.   8. Farm activities costs is documented as per task requirements   9. Harvest records are developed and maintained as per   10. Waste is disposed in accordance with EMCA requirements   11. Emerging trends are applied in harvesting vegetable crop type as per current technological development |
| 1. Undertake post- harvest activities | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements.   3. Post harvest food safety measures are observed in in conformity to assessment standards   4. Harvested vegetables are received at the packhouse as per vegetable crop type requirement.   5. Vegetables are sorted as per vegetable crop type requirement.   6. Produce is cleaned as per the vegetable crop type requirements.   7. Vegetables are graded as per market requirements.   8. Vegetables are packaged as per market requirements.   9. Produce is stored as per vegetable crop type requirement.   10. Tools and equipment are maintained as per type.   11. Farm activities costs is documented as per task requirements.   12. Waste is disposed in accordance with EMCA requirements.   13. Emerging trends are applied in undertaking post-harvest activities as per current technological development. |
| 1. Undertake marketing activities | * 1. Crop price is compared based on different markets.   2. Produce price range and market is decided based on the market demand.   3. ***Basic value addition*** is undertaken as per the market demand.   4. Farm activities costs is documented as per task requirements.   5. Waste is disposed in accordance with EMCA requirements.   6. Emerging trends are applied in undertaking Marketing activities as per current technological development. |

**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 performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Vegetable crop include but not limited to: | * + Leaf vegetables * Kales * Cabbage * Black nightshade (Managu)   + Fruit vegetables * Tomatoes * Capsicum * Cucumber   + Root and Tuber * Onions * Carrots * Garlic |
| 1. Work safety measures   include but not limited to: | * + Personal Safety   + PPEs   + Warning signage   + Tools and equipment safety |
| 1. Land tillage include but not limited to: | * + Primary tillage   + Secondary tillage   + Tertiary tillage |
| 1. Management practices include but not limited to: | * + Watering   + Thinning   + Pricking out   + Shading   + Weeding   + Pest and diseases control   + Hardening off |
| 1. Soil amendment include but not limited to: | * + Manure application   + Gypsum and lime   + Fertilizer application |
| 1. Mulching include but not limited to: | * + Organic mulch   + Inorganic mulch |
| 1. Crop protection measuresinclude but not limited to: | * + Biological   + Cultural   + Mechanical   + Chemical |
| 1. Crop nutrition measures include but not limited to: | * + Chemical Fertilizers application   + Organic Fertilizers application |
| 1. Maturity indices include but not limited to: | * + Horticultural maturity   + Market maturity   + Physiological maturity |
| 1. Picking include but not limited to: | * + Cutting   + Uprooting   + Digging   + Pinching |
| 1. Basic value additions include but not limited to: | * + Waxing   + Packaging   + Product Processing |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Measuring skills
* Spraying skills
* Observation skills
* Record keeping skills
* Marketing skills
* Analytical skills
* Agronomic practices skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Crop husbandry practices
* Waste management practices
* Soil and water conservation measures
* Types of Soil
* Soil composition
* Plant anatomy
* Types of weeds and their control
* Safety measures
* Weather patterns
* Pests control measures
* Ecological zones
* Irrigation methods
* Food safety measures
* Basic financial literacy
* Greenhouse structures
* Crop nutrition measures

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Selected vegetable crop seeds for propagation as per ecological requirements   2. Observed work safety measures as per the work requirements   3. Assembled tools and equipment as per work requirements   4. Carried out crop nursery management practices as per vegetable crop type   5. Carried out Land tillage as per agronomic requirements.   6. Carried out soil testing as per soil testing procedure   7. Applied soil amendments as per soil analysis report   8. Applied crop protection measures as per agronomic practice procedure   9. Applied crop nutrition measures as per crop requirement.   10. Applied maturity indices as per vegetable crop type.   11. Stored produce as per vegetable crop type   12. Applied food safety measures as per conformity assessment standards   13. Disposed waste in accordance with EMCA 2015 requirements |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place. 2. Access to relevant work environments. 3. Resources relevant to the proposed activities or task. |
| 1. Methods of assessment | Competency may be assessed through:   * 1. Observation   2. Oral questioning   3. Written tests   4. Practical’s   5. Projects |
| 1. Context of Assessment | Competency may be assessed:   * 1. On-the-job   2. Simulated workplace environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

**PRODUCE VEGETABLE CROPS IN PROTECTED ENVIRONMENT**

**UNIT CODE:** 0812 251 02A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce vegetable crops in protected environment. It involves setting up protected environment, growing vegetable crop in protected environment, harvesting vegetable crop, undertaking post-harvest activities, undertaking value addition processes and undertaking marketing activities.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| 1. Set up Protected Environment | * 1. Market survey is undertaken as per vegetable crop type demand.   2. ***High value Vegetable crops*** seeds are selected for propagation as per market demand.   3. Work safety measures are observed as per the work requirements.   4. Tools and equipment are assembled as per work requirements.   5. Suitable ***production structure*** is prepared as per work instructions.   6. Soil and water are conserved as per agronomic requirements.   7. Water for irrigation is applied as per water analysis report.   8. Crop nursery is established as per vegetable crop type.   9. Propagation media is prepared based on the crop requirement and work instructions.   10. Nursery trays are selected and treated as per safety requirements.   11. Crop nursery management practices are carried out as per vegetable crop type   12. Tools and equipment are maintained as per type   13. Farm activities costs is documented as per task requirements   14. Waste is disposed in accordance with EMCA 2015 requirements   15. Food safety measures are implemented as per conformity assessment standards |
| 1. Grow Vegetable Crop in protected environment | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Mapal troughs are watered as per crop water requirements   4. Seedbed is prepared as per vegetable crop manual.   5. Vegetable crop is established as per crop requirement.   6. Mulching of the vegetable crops is carried out as per agronomic requirements.   7. Vegetable crops are watered as per crop requirement.   8. Vegetable crops are gaped and thinned based as per crop requirement.   9. Vegetable crops are trained, trellised and pruned as per crop requirement.   10. Pests and diseases are identified as per crop type   11. Crop protection measures are applied as per pests and diseases.   12. Crop nutrition measures are implemented as per crop requirement.   13. Food safety measures are implemented as per conformity assessment standards   14. Tools and equipment are maintained as per manufactures manual   15. Farm activities costs is documented as per task requirements and workplace policy.   16. Waste is disposed in accordance with EMCA 2015 requirements |
| 1. Harvest Vegetable Crop | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. ***Maturity indices*** are observed as per vegetable crop type.   4. ***Picking*** of the crop is carried out as per the vegetable type   5. Produce is transported to the pack house as per the Vegetable type requirements.   6. Tools and equipment are maintained as manufactures manual.   7. Farm activities costs is documented as per task requirement and workplace policy.   8. Waste is disposed in accordance with EMCA 2015 requirements   9. Emerging trends are applied in harvesting vegetable crop as per current technological development. |
| 1. Undertake Post Harvest Activities | 1. Work safety measures are observed as per the workplace policy. 2. Tools, equipment and materials are assembled as per work requirements. 3. Harvested vegetables are received at the packhouse as per workplace policy. 4. Vegetables are sorted as per vegetable type and workplace policy. 5. Produce is cleaned as per the vegetable crop requirements and workplace policy. 6. Vegetables are graded as per market requirements. 7. Vegetables are packaged as per market requirements. 8. Produce is Stored as per vegetable crop type 9. Tools and equipment are maintained as per manufactures manual. 10. Farm activities costs is documented as per task requirements 11. Waste is disposed in accordance with EMCA 2015 requirements 12. Emerging trends are applied in undertaking post-harvest activities as per current technological development |
| 1. Undertake Value Addition Processes | * 1. Work safety measures are observed as per the workplace policy.   2. Tools, equipment and materials are assembled as per work requirements.   3. vegetable crops are sorted and graded as per market product type.   4. Vegetable produce is cleaned as per crop type   5. Basic processing is undertaken as per market product type.   6. Tools and equipment are maintained as per manufactures’ manual   7. Farm activities costs is documented as per task requirements and workplace policy.   8. Waste is disposed in accordance with EMCA 2015 requirements   9. Emerging trendsin value addition as per current technological development |
| 1. Undertake Marketing Activities | 1. Crop price is compared based on different markets. 2. Produce price range and market is decided based on the market demand. 3. Basic value addition is undertaken as per the market demand and vegetable requirement. 4. Farm activities costs is documented as per task requirements 5. Waste is disposed in accordance with EMCA 2015 requirements 6. Emerging trends are applied in undertaking Marketing activities as per current technological development |

**RANGE**

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

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Vegetable crop include but not limited to: | * + Leafy vegetables * Lettuce * Spinach   + Fruit vegetables * Tomatoes * Capsicum * Cucumber   + Root and Tuber * Onions * Carrots * Garlic |
| 1. Production structure include but not limited to: | * + Greenhouse   + Shade nets |
| 1. Maturity indices include but not limited to: | * + Horticultural maturity   + Market maturity   + Physiological maturity |
| 1. Picking include but not limited to: | * + Cutting   + Uprooting   + Digging   + Pinching |
| 1. Basic value additions include but not limited to: | * + Waxing   + Packaging   + Product processing |
| 1. Plant physiology process include but not limited to: | * + Photosynthesis   + Transpiration   + Respiration   + Osmosis   + Diffusion |
| 1. Emerging trends include but not limited to: | * + New technologies for pests and diseases control   + Food system transformations   + Automated agriculture systems   + Climate smart agriculture   + Digital Agriculture |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Agronomic practices skills
* Measuring skills
* Spraying skills
* Observation skills
* Record keeping skills
* Marketing skills
* Analytical skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types of soilless media
* Plant anatomy and physiology
* Crop husbandry practices
* Waste management practices
* Soil and water conservation measures
* Safety measures
* Weather patterns
* Pests and disease control measures
* Types of weeds and their control
* Ecological zones
* Irrigation methods
* Food safety measures
* Basic financial literacy
* Greenhouse structures
* Crop nutrition measures

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Selected vegetable crop seeds for propagation as per ecological requirements   2. Carried out vegetable crop nursery management practices as per vegetable crop type   3. Watered vegetable crops as per crop requirement   4. Identified the vegetable crop pests and diseases as per crop type   5. Applied Crop protection measures as per pests and diseases   6. Undertook crop nutrition measures as per crop requirement.   7. Observed maturity indices as per vegetable crop type.   8. Carried out picking of the crop as per maturity indices   9. Stored produce as per vegetable crop type   10. Applied vegetable food safety measures based on confirmation assessment standards |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place. 2. Access to relevant work environments. 3. Resources relevant to the proposed activities or task. |
| 1. Methods of assessment | Competency may be assessed through:   * 1. Observation   2. Oral questioning   3. Written tests   4. Practical’s   5. Projects |
| 1. Context of Assessment | Competency may be assessed:   * 1. On-the-job   2. Simulated workplace environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

**PRODUCE HERBS AND SPICES IN OPEN ENVIRONMENT**

**UNIT CODE:** 0812 251 03A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce Herbs and Spices in open environment. It involves propagating herbs and spices seedlings in open environment, preparing land for herbs and spices, growing herbs and spices, harvesting herbs and spices, undertaking post-harvest activities and undertaking marketing activities.

**ELEMENTS AND PERFORMANCE CRITERIA**

| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| --- | --- |
| 1. Propagate herbs and spices seedlings in open environment | * 1. Market survey is undertaken as per herbs and spices type demand   2. ***Herbs and spices*** seeds are selected for propagation as per ecological requirements   3. Work safety measures are observed as per the work requirements.   4. Herbs and spices parts are identified as per herbs and spices crop type.   5. Tools and equipment are assembled as per work requirements   6. Suitable site is Identified based on soil analysis report   7. Soil and water are conserved as per agronomic requirements.   8. Soil sterilization is undertaken as per soil analysis   9. Water for irrigation is applied as per crop type   10. Crop nursery is prepared as per herbs and spices crop type   11. Crop nursery ***management practices*** are carriedoutas per herbs and spices crop   12. Tools and equipment are maintained as per type.   13. Farm activities costs is documented as per task requirements   14. Waste is disposed in accordance with EMCA 2015 requirements   15. Emerging trends are applied in nursery preparation as per current technological development |
| 1. Prepare land for growing herbs and spices | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements   3. ***Land tillage*** is carried out as per agronomic requirements   4. Soil testing is carried out as per soil testing procedure.   5. Land is cleared as per agronomic requirements   6. Soil amendments is applied as per soil analysis report   7. Planting furrows are made as per herbs and spices crop type   8. Tools and equipment are maintained as per type.   9. Farm activities costs is documented as per task requirements   10. Waste is disposed in accordance with EMCA 2015 requirements   11. Emerging trends in preparing Land as per current technological development |
| 1. Grow herbs and spices | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Land is watered as per herbs and spices crop type   4. Food safety measures are implemented in conformity with assessment standards   5. Herbs and spices seedlings are transplanted as per agronomics requirements   6. Herbs and spices seeds are planted as per agronomics requirements   7. ***Mulching*** of the herbs and spices crops is carried out as per agronomic requirements.   8. Herbs and spices crops are watered as per crop type requirement   9. Herbs and spices crop are gapped and thinned as per agronomic requirements   10. Herbs and spices crop are trained and pruned as per agronomic requirements   11. Weeds, pests and diseases are controlled as per agronomic requirement   12. ***Crop nutrition measures*** are undertaken as per crop type requirement   13. Food safety measures are implemented in conformity with assessment standards   14. Tools and equipment are maintained as per type.   15. Farm activities costs is documented as per task requirements   16. Waste is disposed in accordance with EMCA requirements   17. Emerging trends are applied in growing herbs and spices as per current technological development |
| 1. Harvest herbs and spices | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements   3. ***Maturity indices*** are observed as per herbs and spices crop type.   4. Food safety measures during harvesting are implemented in conformity to assessment standards   5. Crop ***Picking*** is carried out as per the herbs and spices type   6. Produce is transported to the pack house as per the herbs and spices type requirements   7. Tools and equipment are maintained as per type.   8. Farm activities costs is documented as per task requirements   9. Waste is disposed in accordance with EMCA requirements   10. Emerging trends are applied in harvesting herbs and spices as per current technological development |
| 1. Undertake post -harvest activities | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements   3. Post Harvest food safety measures are implemented in conformity to assessment standards   4. Harvested herbs and spices are received at the packhouse as per herbs and spices types   5. Herbs and spices are sorted as per herbs and spices type   6. Produce is cleaned as per the herbs and spices crop type requirements   7. Herbs and spices are graded as per market requirements   8. Herbs and spices are packaged as per market requirements   9. Produce is Stored as per herbs and spices crop type   10. Tools and equipment are maintained as per type   11. Farm activities costs is documented as per task requirements   12. Waste is disposed in accordance with EMCA requirements   13. Emerging trends are applied in post-harvest activities as per current technological development |
| 1. Undertake marketing activities | * 1. Crop price is compared based on different markets   2. Produce price range and market is decided based on the market demand   3. ***Basic value addition*** is undertaken as per the market demand   4. Farm activities costs is documented as per task requirements   5. Waste is disposed in accordance with EMCA requirements   6. Emerging trends are applied in undertaking marketing activities as per current technological development |

**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 performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Herbs and spices include but not limited to: | * + Coriander   + Rosemary   + Mint   + Basil   + Ginger   + Turmeric |
| 1. Work safety measures   include but not limited to: | * + PPEs   + Warning signage   + Tools and equipment safety |
| 1. Management practices include but not limited to: | * + Watering   + Thinning   + Pricking out   + Shading   + Weeding   + Pest and diseases control   + Hardening off |
| 1. Soil Components | * + Physical properties of soil   + Chemical properties of soil   + Biological properties of soil |
| 1. Land tillage include but not limited to: | * + Primary tillage   + Secondary tillage   + Tertiary tillage |
| 1. Soil amendment include but not limited to: | * + Manure application   + Liming   + Fertilizer application |
| 1. Mulching include but not limited to: | * + Organic mulch   + Inorganic mulch |
| 1. Crop nutrition measures include but not limited to: | * + Chemical Fertilizers application   + Organic Fertilizers application |
| 1. Maturity indices include but not limited to: | * + Horticultural maturity   + Market maturity   + Physiological maturity |
| 1. Picking include but not limited to: | * + Cutting   + Uprooting   + Digging   + Pinching |
| 1. Basic value additions include but not limited to: | * + Waxing   + Packaging   + Product Processing |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Measuring skills
* Spraying skills
* Observation skills
* Record keeping skills
* Marketing skills
* Analytical skills
* Agronomic practices skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Crop husbandry practices
* Waste management practices
* Soil and water conservation measures
* Soil composition
* Plant anatomy
* Types of weeds and their control
* Types of Soil
* Safety measures
* Weather patterns
* Pests and diseases control measures
* Ecological zones
* Irrigation methods
* Food safety measures
* Basic financial literacy
* Crop nutrition measures

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires that candidates:   * 1. Observed Work safety measures as per the work requirements   2. Selected Herbs and spices seeds for propagation as per ecological requirement   3. Carried out crop nursery management practices as per vegetable crop type   4. Carried out soil testing as per soil testing procedures   5. Applied Soil amendments as per soil analysis report   6. Disposed waste in accordance with EMCA 2015 requirements   7. Applied crop protection measures as per agronomic requirement   8. Undertook crop nutrition measures as per herbs and spices crop type requirement.   9. Identified maturity indices as per herbs and spices crop type.   10. Stored produce as per herbs and spices crop type requirement   11. Implemented food safety measures for herbs and spices as per conformity assessment standards |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place. 2. Access to relevant work environments. 3. Resources relevant to the proposed activities or task. |
| 1. Methods of assessment | Competency may be assessed through:   * 1. Observation   2. Oral questioning   3. Written tests   4. Practicals   5. Projects |
| 1. Context of Assessment | Competency may be assessed:   * 1. On-the-job   2. Simulated workplace environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

**PRODUCE HERBS AND SPICES IN PROTECTED ENVIRONMENT**

**UNIT CODE:** 0812 251 04A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce herbs and spices in protected environment. It involves setting up protected environment, growing herbs and spices in protected environment, harvesting herbs and spices, undertaking post harvesting activities and undertaking marketing activities.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| 1. Set up Protected Environment | * 1. Market survey is undertaken as per herbs and spices crop type demand   2. ***Herbs and Spices*** seeds are selected for propagation as per market demand   3. ***Work safety measures*** are observed as per the work requirements   4. Tools and equipment are assembled as per work requirements   5. Suitable ***production structure*** is prepared and managed as per work instructions   6. Crop nursery is prepared as per herbs and spices type   7. ***Propagation media*** is prepared based on work instructions   8. Nursery trays are Selected and treated as per work instructions   9. Water for irrigation is applied as per water analysis report   10. Crop nursery management practices are carried out as per herbs and spices crop type   11. Tools and equipment are maintained as per type   12. Farm activities costs is documented and shared as per task requirements   13. Waste is disposed in accordance with EMCA 2015 requirements   14. Emerging trends are applied in Nursery preparation as per current technological development |
| 1. Grow Herbs and Spices in protected environment | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Plant parts identified as per crop type   4. ***Physiological processes*** are described as per plant part   5. Mapal troughs are watered as per crop water requirements   6. Herbs and Spices seedlings are transplanted as per agronomics requirements   7. Mulching of the Herbs and Spices is carried out as per agronomic requirements.   8. Herbs and Spices are watered as per crop requirement.   9. Herbs and Spices are gaped and thinned based as per agronomic requirements   10. Herbs and Spices are trained, trellised and pruned as per crop type   11. Pests and diseases are identified as per crop type   12. Crop protection measures are applied as per pests and diseases   13. Crop nutrition measures are undertaken as per crop requirement.   14. Tools and equipment are maintained as per type   15. Farm activities costs is documented as per task requirements   16. Waste is disposed in accordance with EMCA requirements   17. Emerging trends are applied in growing Herbs and Spices as per current technological development |
| 1. Harvest Herbs and Spices | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements   3. ***Maturity indices*** are observed as per Herbs and Spices crop type.   4. ***Picking*** of the crop is carried out as per the Herbs and Spices type   5. Produce is transported to the pack house as per the Herbs and Spices type requirements   6. Tools and equipment are maintained as per type   7. Farm activities costs is documented as per task requirements   8. Waste is disposed in accordance with EMCA 2015 requirements   9. Emerging trends are applied in harvesting Herbs and Spices as per current technological development |
| 1. Undertake Post Harvest Activities | * 1. Work safety measures are observed as per the work requirements.   2. Tools, equipment and materials are assembled as per work requirements   3. Harvested Herbs and Spices are received at the packhouse as per Herbs and Spices type   4. Herbs and Spices are sorted as per Herbs and Spices type   5. Produce is cleaned as per the Herbs and Spices crop requirements   6. Herbs and Spices are graded as per market requirements   7. Herbs and Spices are packaged as per market requirements   8. Produce is Stored as per Herbs and Spices crop type   9. Tools and equipment are maintained as per type   10. Farm activities costs is documented as per task requirements   11. Waste is disposed in accordance with EMCA 2015 requirements   12. Emerging trends are applied in post-harvest activities as per current technological development |
| 1. Undertake Value Addition Processes | * 1. Work safety measures are observed as per the work requirements   2. Tools, equipment and materials are assembled as per work requirements   3. Herbs and Spices are sorted and graded as per market product type   4. Herbs and Spices are cleaned as per crop type   5. Basic processing is undertaken as per market product type   6. Tools and equipment are maintained as per type   7. Farm activities costs is documented as per task requirements   8. Waste is disposed in accordance with EMCA 2015 requirements   9. Emerging trendsin value addition as per current technological development |
| 1. Undertake Marketing Activities | * 1. Crop price is compared based on different markets   2. Produce price range and market is decided based on the market demand   3. ***Basic value addition*** is undertaken as per the market demand   4. Farm activities costs is documented as per task requirements   5. Waste is disposed in accordance with EMCA 2015 requirements   6. ***Emerging trends*** are applied in undertaking marketing activities as per current technological development |

**RANGE**

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

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| --- | --- |
| **Variable** | **Range** |
| 1. Herbs and spices crops include but not limited to: | * + Coriander   + Rosemary   + Mint   + Basil   + Ginger   + Turmeric   + Chives   + Lemon grass |
| 1. Propagation structure may include but not limited to: | * + Green houses   + Shed nets |
| 1. Work safety measures   include but not limited to: | * + PPEs   + Warning signage   + Tools and equipment safety |
| 1. Propagation media may include but not limited to: | * + Peat moss   + Coco peat   + Vermiculite |
| 1. Plant physiology process include but not limited to: | * + Photosynthesis   + Transpiration   + Respiration   + Osmosis   + Diffusion |
| 1. Maturity indices include but not limited to: | * + Horticultural maturity   + Market maturity   + Physiological maturity |
| 1. Picking include but not limited to: | * + Cutting   + Uprooting   + Digging   + Pinching |
| 1. Basic value additions include but not limited to: | * + Waxing   + Packaging   + Product processing |
| 1. Emerging trends include but not limited to: | * + New technologies for pests and diseases control   + Food system transformations   + Automated agriculture systems   + Climate smart agriculture   + Digital Agriculture |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Agronomic practices skills
* Measuring skills
* Spraying skills
* Observation skills
* Record keeping skills
* Marketing skills
* Analytical skills

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Soil composition
* Plant anatomy and physiology
* Crop husbandry practices
* Waste management practices
* Soil and water conservation measures
* Types of Soil
* Safety measures
* Weather patterns
* Pests and disease control measures
* Types of weeds and their control
* Ecological zones
* Irrigation methods
* Food safety measures
* Basic financial literacy
* Greenhouse structures
* Crop nutrition measures

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Selected herbs and spices crop seeds for propagation as per market demand   2. Maintained protected environment propagation structure as per work instructions   3. Carried out crop nursery management practices as per Herbs and spices crop type   4. Established herbs and spices as per agronomic requirements   5. Watered herbs and spices crop as per crop requirement   6. Identified pests and diseases as per crop type   7. Applied crop protection measures as per pests and diseases   8. Undertook crop nutrition measures as per crop requirement.   9. Observed maturity indices as per Herbs and spices crop type.   10. Carried out harvesting of the crop as per the Herbs and spices type   11. Stored produce as per Herbs and spices crop type   12. Implemented herbs and spices safety measures as per conformity assessment standards |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place. 2. Access to relevant work environments. 3. Resources relevant to the proposed activities or task. |
| 1. Methods of assessment | Competency may be assessed through:   * 1. Observation   2. Oral questioning   3. Written tests   4. Practical’s   5. Projects |
| 1. Context of Assessment | Competency may be assessed:   * 1. On-the-job   2. Simulated workplace environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## OPERATE FARM IRRIGATION AND DRAINAGE SYSTEM

**UNIT CODE:** 0811 351 05A

**UNIT DESCRIPTION**

This unit specifies the competencies required by Horticulture Farm Attendant to operate farm irrigation and drainage system. It involves selecting designs of farm irrigation and drainage systems, installing farm irrigation and drainage systems and maintaining farm irrigation and drainage systems.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms*** ***are elaborated in the Range.*** |
| 1. Prepare to install farm irrigation and drainage system | 1. Farm irrigation and drainage system design selected as per workplace procedure 2. ***Farm irrigation and drainage system*** work drawingis prepared as per work requirement 3. Farm irrigation and drainage system material costing is prepared as per approved designs and drawing 4. Farm irrigation and drainage system material schedule is prepared based on design and drawing |
| 1. Install farm irrigation and drainage systems | * 1. ***Personal protective equipment*** are worn as per work procedure   2. ***Farm irrigation and drainage system tools and equipment*** are assembled as per work requirements.   3. Farm irrigation and drainage system is installed as per approved designs and work drawings   4. Farm irrigation and drainage system is tested as per work requirements |
| 1. Maintain farm irrigation and drainage systems | 1. Personal protective equipment are worn as per work procedure 2. Farm irrigation and drainage system tools and equipmentare assembled as per work requirement 3. Farm irrigation and drainage systemmaintenance schedule is prepared as per irrigation and drainage system manuals 4. Farm irrigation and drainage system is maintained as per work requirement |

**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** |
| 1. Farm irrigation and drainage system may include but are not limited to: | * Surface * Sub surface * Sprinkler * Trickle * Centre pivot |
| 1. Personal protective equipment may include but are not limited to: | * Eye protection equipment * Hearing protection equipment * Feet protection equipment * Respiratory protection equipment * Gloves * Full body suits |
| 1. Farm irrigation and drainage system tools and equipment may include but are not limited to: | * Drip kit * Pipes * Fittings * Water meter * Flow meters * Pumps |

**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:

* Data analysis and presentation
* Computer application packages
* Field assessment procedures
* Different land condition
* Different farm tools and materials
* Soil and water conservation measures
* Occupational safety and health procedures

**Required skills**

The individual needs to demonstrate the following skills:

* Record keeping and accounting
* Planning
* Technical report writing
* Digital literacy
* Measuring
* Decision making
* Communication

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   1. Wornpersonal protective equipmentas per work requirement 2. Prepared working drawings as per work requirements 3. Prepared bill of quantities as per approved designs and drawings 4. Prepared material schedule based on design and drawings 5. Installed irrigation and drainage systems according to designs and working drawings 6. Prepared maintenance schedule as per irrigation and drainage system 7. Maintained irrigation and drainage systems as per work requirement |
| 1. Resource implications | The following resources should be provided:  2.1 Appropriately simulated environment where assessment can take place  2.2 Access to relevant work environment  2.3 Resources relevant to the proposed activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * Practical * Project * Portfolio of evidence * Third party report * Written tests * Oral questioning |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## OPERATE FARM MACHINERY

**UNIT CODE:** 0716 351 06A

**UNIT DESCRIPTION**

This unit specifies the competencies required by Horticulture Farm Attendant to operate farm machinery. It involves operation of hand tools and equipment, tillage machinery, planting machinery, crop protection machinery, harvesting machinery and agro-processing machinery.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the **key outcomes** which make up **workplace function**. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| 1. Operate hand tools and equipment | 1. Personal protective equipment is worn as per safety procedures 2. ***Hand tools*** and ***equipment*** are assembled as per work requirement 3. Hand tools and equipment are utilized as per work procedure 4. Hand tools and equipment are serviced as per work procedure 5. Hand tools and equipment are stored as per work procedure |
| 1. Operate tillage machinery | * 1. ***Personal protective equipment*** is worn as per safety procedures   2. ***Tillage machinery*** is operated as per work procedures   3. Tillage machinery is maintained as per work procedure   4. Tillage machinery is stored as per work procedure |
| 1. Operate planting machinery | * 1. Personal protective equipment is worn as per safety procedure   2. ***Planting machinery*** is calibrated as per work requirement   3. Planting machinery is operated as per work procedure   4. Planting machinery is maintained as per work procedure   5. Planting machinery is stored as per work procedure |
| 1. Operate crop protection machinery | * 1. Personal protective equipment is worn as per safety procedure   2. ***Crop protection machinery*** calibrated as per work requirement   3. Crop protection machinery is operated as per work requirement   4. Crop protection machinery is maintained as per work procedure   5. Crop protection machinery is stored as per work requirement |
| 1. Operate harvesting machinery | * 1. Personal protective equipment is worn as per safety procedures   2. Harvesting machinery is operated as per work procedures   3. Harvesting machinery is maintained as per work requirement   4. Harvesting machinery is stored as per work requirement |
| 1. Operate agro-processing machinery | * 1. Personal protective equipment is worn as per safety procedures   2. ***Agro-processing machinery*** is operated as per work requirement   3. Agro-processing machinery is maintained and repaired as per work requirement   4. Agro-processing machinery is stored as per work requirement |

**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 performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Personal protective equipment may include but are not limited to: | * Eye protection equipment * Hearing protection equipment * Feet protection equipment * Respiratory protection equipment * Gloves * Full body suits |
| 1. Hand tools and equipment may include but are not limited to: | * Garden tools and equipment * Livestock handling tools and equipment * Cultivation tools and equipment * Harvesting tools and equipment * Crop protection tools and equipment |
| 1. Tillage machinery may include but are not limited to: | * Ploughs * Harrows * Tillers * Rotavators * Subsoilers |
| 1. Planting machinery may include but are not limited to: | * Seed drills * Planters * Ridgers * Fertilizer distributors * Manure spreaders |
| 1. Crop protection machinery may include but are not limited to: | * Hand sprayer * Boom sprayer * Knapsack sprayer * Dusters |
| 1. Harvesting machinery may include but are not limited to: | * Balers * Mowers * Combined harvesters * Potato harvester * Threshers |
| 1. Processing machinery may include but are not limited to: | * Mills * Grinders * Shellers * Dryers * Elevators conveyors |
| 1. Secondary tillage machinery may include but are not limited to: | * Harrows * rotary tillers |
| 1. Sowing machinery may include but are not limited to: | * seed drill * planters * potato planter |
| 1. Crop protection machinery may include but are not limited to: | * boom sprayer * dusters * knapsack sprayers |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

The individual needs to demonstrate the following skills:

* Identification
* Drawing
* Communication
* Demonstration
* Interpersonal
* Calculation
* Analytical
* Observation
* Problem solving
* First aid
* Innovation
* Creativity

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Types and sources of farm power
* Tractor engine
* Tractor systems and their principles of operation
* Power transmission in a tractor
* Tractor components, controls and features and operational functions
* Tractor steering systems and features
* Attached equipment, features and operational functions and procedures
* Operating principles and operating of farm machinery
* Maintenance of tractors
* Maintenance of farm tools, equipment and machinery

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Wore Personal protective equipment per safety procedures 2. Utilized hand tools and equipment as per work procedure 3. Serviced Hand tools and equipment as per work procedure 4. Operated Tillage machinery as per manufacturer’s manual 5. Calibrated Planting machinery as per manufacturer’s manual 6. Operated Planting machinery as per manufacturer’s manual 7. Calibrated Crop protection machinery as per manufacturer’s manual 8. Operated Crop protection machinery as per manufacturer’s manual 9. Operated Harvesting machinery as per manufacturer’s manual 10. Operated Agro-processing machinery is as per work requirement |
| 1. Resource Implications | The following resources must be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proper activities or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Practical tests 2. Written tests 3. Oral questioning 4. Interviewing |
| 1. Context of Assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job roles is recommended. |

## 

# PRODUCE TROPICAL FRUITS

**UNIT CODE:** 0812 351 08A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce quality and clean tropical fruits. It involves preparing tropical fruits planting materials, establishing tropical fruits, managing tropical fruits and performing tropical fruits post-harvest practices.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace functions | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements  ***(Bold and italicized terms are elaborated in the range)*** |
| 1. Establish tropical fruits nursery | 1. ***Personal protective equipment*** are worn as per work requirement 2. Tools, equipment and materials are assembled as per work requirement. 3. Nursery site is marked based on farm layout 4. Nursery site soil sampling is performed as per work procedure 5. Nursery is prepared according to agronomic requirements of ***tropical fruits***. 6. Planting materials are raised in nursery as per agronomic requirement 7. Tropical fruits ***nursery management practices*** are performed as per agronomic requirements. |
| 1. Establish tropical fruits orchard | 1. Personal protective equipment are worn as per work requirement 2. Tools, equipment and materials are assembled as per work requirement 3. Orchard site is marked based on farm plan 4. Land clearing is performed as per agronomic requirements 5. ***Tillage practices*** are carried out as per agronomic requirements 6. Soil and water conservation measures are applied as per agronomic needs 7. ***Soil amendments*** are applied as per soil analysis report 8. Seedlings are transplanted based on agronomic requirements |
| 1. Manage tropical fruits | 1. Tools and equipment for carrying out management practices are assembled as per work requirement 2. Gapping is carried out on tropical fruits as per agronomic requirements 3. Training and pruning are carried out on tropical fruits as per agronomic requirements 4. ***Crop protection practices*** are carried out on tropical fruits as per agronomic requirement 5. Physiological disorders are managed as per agronomic requirement 6. ***Fertilizers*** are applied as per agronomic requirements 7. Tropical fruit trees are mulched as per agronomic requirements 8. Tropical fruit trees are watered as per agronomic requirements 9. Tropical fruit trees are induced to flower as per agronomic requirements 10. Tropical fruits are harvested as per agronomic requirement 11. Waste management is undertaken in accordance to work requirement |
| 1. Perform tropical fruits post-harvest practices | 1. Tools and equipment for carrying out post-harvest practices are assembled as per work requirement 2. Quality and quantity of tropical fruits is assessed as per work procedures 3. ***Post-harvest practices*** are carried out in accordance to work requirement 4. Tropical fruits ***Marketing techniques*** are applied as per organizational policy. 5. Waste management is undertaken in accordance to work requirement |

**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** |
| 1. Tropical fruits may include but are not limited to: | * Mangoes * Oranges * Papaya * Pineapple * Pawpaw * Avocado * Bananas * Passion fruit * Tree tomatoes * Guava * Loquat * Lime * White sapote * Dragon fruit |
| 1. Tools may include but are not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Hammer * Saw * Bucket * Shears * Dibbler * Pegs |
| 1. Equipment may include but are not limited to: | * Spray pumps * Watering cans * Hose pipes * Plough * Harrows * Ridgers * Boom sprayer * Pruning saw * Wire strainer * Traps * Pipe sprinklers * Scouting flags * Storage tanks * Tractors * Grading shed * Bud count square * Meteorological equipment |
| 1. Planting materials may include but are not limited to: | * Seeds * Suckers * Seedlings * Cuttings * Tubers * Tissue culture * Buds * Corms * Suckers * Corms Pesticides * Fertilizers * Stationery * Manures * Rope * Nets * Papers * Fencing wire * Staking sticks * Nails * Herbicides |
| 1. Nursery management practices may include but are not limited to: | * Mulching * Gapping * Thinning * Pruning * Training * Watering * Fertilizer application * Pest and diseases control |
| 1. Personal protective equipment may include but are not limited to: | * Gumboots * Gloves * Overalls * Dust coats * Masks |
| 1. Tillage practices may include but are not limited to | * Primary tillage * Secondary tillage * Tertiary tillage |
| 1. Soil amendments may include but are not limited to: | * Organic and inorganic fertilizers * Agricultural lime * Agricultural gypsum |
| 1. Crop protection practices may include but are not limited to: | * Pest control * Disease control * Weed control |
| 1. Fertilizers may include but are not limited to | * Organic manure * Basal inorganic fertilizer * Foliar fertilizer * Fertigation fertilizer |
| 1. Post-harvest practices may include but are not limited to: | * Transportation * Cleaning * Sorting * Grading * Drying * Processing * Packaging * Branding * Storage |
| 1. Marketing techniques may include but are not limited to: | * Online marketing * Influencer marketing * Referrals * Advertisements * Auctioneering * Public relations * Cold calling * Content marketing * Invoicing * Loyalty programs |

**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:

* Food safety in production of tropical fruits
* Sources of quality water
* Agro Ecological Zonation
* Types of tools and equipment used in production of tropical fruits
* Structures for production of tropical fruits
* Types of tropical fruits
* Physiology of tropical fruits
* Soil and water conservation measures
* Phyto-sanitary requirements
* Sources of quality planting materials for tropical fruits
* Husbandry practices in tropical fruits production
* Tropical fruits production Technologies
* Procedures for calibration of equipment
* Maturity indices in tropical fruits
* Harvesting and Post Harvesting Handling of tropical fruits
* Record keeping and accounting
* Waste Management
* Occupational Safety and Health Procedures

**Required skills**

The individual needs to demonstrate the following skills:

* Measuring
* Levelling
* Gaping
* Grafting
* Pruning
* Spraying
* Pests, diseases and nutrients deficiency scouting
* Equipment calibration
* Technical Report writing
* Observation
* Negotiation
* Digital literacy
* Soil sampling

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   * 1. Used personal protective equipment as per work requirement   2. Treated planting materials based on agronomic requirements.   3. Prepared tropical fruits nursery as per agronomic requirement   4. Raised tropical fruits seedlings as per work procedure   5. Prepared land for establishing tropical fruits as per agronomic requirement   6. Applied soil amendments as per soil analysis report   7. Transplanted Seedlings based on agronomic requirements   8. Carried out crop protection practices on tropical fruits as per work procedure   9. Maintained plant population as per agronomic requirement   10. Carried out pruning, training and de-suckering based on crop requirement   11. Applied fertilizers in accordance to crop nutrient requirement   12. Harvested tropical fruits as per maturity indices   13. Carried out tropical fruits post-harvest practices in accordance to work requirement   14. Managed wastes generated in production process in accordance to work requirement |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proper activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   * 1. Practical tests   2. Oral questioning   3. Portfolio of evidence   4. Third party report   5. Written tests |
| 1. Context of assessment | Competency may be assessed:   1. Workplace 2. simulated workplace environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |

## 

## PRODUCE CUT FLOWERS

**UNIT CODE:** 0812 351 09A

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce quality and clean-cut flowers. It involves establishing cut flowersnursery, establishing cut flowers, managing cut flowers and performing cut flowers post-harvest practices.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**  These are assessable statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the range.*** |
| 1. Establish cut flowers nursery | 1. ***Personal protective equipment*** are worn as per work requirement 2. ***Tools, equipment*** and ***materials*** are assembled as per work requirement 3. Nursery site is marked based on farm layout 4. Nursery site soil sampling is performed as per work procedure 5. Propagation media is prepared in accordance with agronomic requirements 6. Planting materials are treated based on ***agronomic requirements.*** 7. Planting materials are raised in nursery as per work procedure. 8. ***Cut flowers*** ***nursery management*** ***practices*** are performed as per agronomical requirements. |
| 1. Establish cut flowers | 1. Personal protective equipment are worn as per work requirement 2. Tools, equipment and materials are assembled as per work requirement 3. Land clearing is performed as per agronomic requirements 4. ***Tillage practices*** are carried out as per agronomic requirements 5. Soil and water conservation measures are applied as per agronomic needs 6. ***Soil amendments*** are applied as per soil analysis report 7. Seedlings are transplanted based on agronomic requirements |
| 1. Manage cut flowers | 1. Tools and equipment for carrying out management practices are assembled as per work requirement 2. Gapping is carried out as per agronomic requirements 3. Training and pruning are carried out as per agronomic requirements 4. ***Crop protection practices*** are carried out as per agronomic requirement 5. Physiological disorders are managed as per agronomic requirement 6. ***Fertilizers*** are applied as per agronomic requirements 7. Mulching is carried out as per agronomic requirements 8. Watering is carried out as per agronomic requirements 9. Cut flowers are harvested as per agronomic requirement 10. Waste management is undertaken in accordance to work requirement |
| 1. Perform cut flowers post-harvest practices | 1. Tools and equipment for carrying out post-harvest practices are assembled as per work requirement 2. Quality and quantity of cut flowers is assessed as per work procedures 3. ***Post-harvest practices*** are carried out in accordance to work requirement 4. Cut flower ***marketing techniques*** are applied as per organizational policy 5. Waste management is undertaken in accordance to work requirement |

**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 performance.

|  |  |
| --- | --- |
| **Variable** | **Range** |
| 1. Personal protective equipment may include but are not limited to: | * Gloves * Safety goggles * Safety boots * Overalls * Dust coat * Ear muffs * Face masks |
| 1. Cut flowers may include but are not limited to: | * Roses * Carnations * Chrysanthemum * Orchids * Alstroemeria * Tulips * Marigold * Hibiscus * Gladiolus * Aster |
| 1. Tools, equipment and materials may include but are not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Secateurs * Shears * Dibbler * Pegs * Spray pumps * Watering cans * Hose pipes * Plough * Harrows * Ridges * Boom sprayer * Pruning saw * Wire strainer * Traps * Pipe sprinklers * Scouting flags * Storage tanks * Tractors * Grading shed * Bud count square * Meteorological equipment * Pesticides * Fertilizers * Stationery * Manures * Planting materials * Rope * Nets * Translucent papers * Papers * Fencing wire * Staking sticks * Nails * Herbicides * Pesticides * Pheromones * Seeds * seedlings * splits * crowns * slips * Cuttings * Suckers * Plantlets |
| 1. Nursery management practices may include but are not limited to: | * Mulching * watering * fertilizer application * weed control * pest control * disease control * shading * hardening off |
| 1. Tillage practices may include but are not limited to: | * Primary tillage * Secondary tillage * Tertiary tillage |
| 1. Soil amendments may include but are not limited to: | * Agricultural Lime * Agricultural gypsum * Fertilizers |
| 1. Crop protection practices may include but are not limited to: | * Pest control * Disease control * Weed control * Integrated pest management * Integrated weed management |
| 1. Fertilizers may include but are not limited to: | * + Organic manure   + Basal inorganic fertilizer   + Foliar fertilizer * Fertigation fertilizer |
| 1. Post-harvest practices may include but are not limited to: | * Washing * Cleaning * Grading * Bunching * Packing * Storage |
| 1. Marketing techniques may include but are not limited to: | * Online marketing * Influencer marketing * Referrals * Advertisements * Auctioneering * Public relations * Cold calling * Content marketing * Invoicing * Loyalty programs |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills**

The individual needs to demonstrate the following skills:

* Tilling
* Nursery preparation
* Planting
* Measuring
* Levelling
* Gaping
* Pruning
* Support
* Spraying
* Fertigation and chemigation in cut flowers production
* Pests, diseases and nutrients deficiency scouting
* Equipment calibration
* Technical Report writing
* handling of cut flowers
* Soil sampling
* Observation
* Negotiation
* Digital literacy

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Sources of quality water
* Agro Ecological Zonation
* Cut flowers production tools and equipment
* Cut flowers production structures
* Types of cut flowers
* Physiology of cut flowers
* Soil sampling and testing
* Soil and water conservation measures
* Phyto-sanitary requirements
* Good Agricultural Practices
* Sources of quality planting materials for cut flowers
* Husbandry practices in cut flowers production
* Cut flowers production Technologies
* Fertigation and chemigation in production of cut flowers
* Procedures for calibration of equipment
* Soilless growing medium
* Flower induction
* Maturity indices in cut flowers
* Harvesting and Post Harvesting Handling of cut flowers
* Accounting principles
* Production records and reports
* Waste Management practices
* Occupational Safety and Health Procedures
* Harvesting and Post Harvesting Handling of cut flowers

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical aspects of competency | Assessment requires evidence that the candidate:   1. Used personal protective equipment as per work requirement 2. Treated planting materials based on agronomic requirements. 3. Prepared cut flower nursery as per agronomic requirement 4. Raised cut flower seedlings as per work procedure 5. Prepared land for establishing cut flower as per agronomic requirement 6. Applied soil amendments as per soil analysis report 7. Transplanted seedlings based on agronomic requirements 8. Carried out crop protection practices on cut flower as per work procedure 9. Maintained plant population as per agronomic requirement 10. Carried out pruning, training and de-suckering based on crop requirement 11. Applied fertilizers in accordance to crop nutrient requirement 12. Harvested cut flower as per maturity indices 13. Performed cut flower post-harvest practices in accordance to work requirement 14. Managed wastes generated in production process in accordance to work requirement |
| 1. Resource implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place 2. Access to relevant work environment 3. Resources relevant to the proper activities or tasks |
| 1. Methods of assessment | Competency in this unit may be assessed through:   1. Practical tests 2. Oral questioning 3. Portfolio of evidence 4. Interviews 5. Third party report 6. Written tests |
| 1. Context of assessment | Competency may be assessed:   * 1. Workplace   2. Simulated work environment |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector and workplace job role is recommended. |