REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

HORTICULTURE PRODUCER

LEVEL 6

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

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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 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. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). 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 shall be competency based, curriculum development shall be industry led, certification shall be based on demonstration of competence and mode of delivery shall allow for multiple entry and exit in TVET programmes.

These reforms 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 the purpose of developing a competency based curriculum for Horticulture producer. These Occupational Standards will also be the bases for assessment of an individual for competence certification.

It is my conviction that these Occupational Standards will play a great role towards development of competent human resource for the Agriculture sector's growth and sustainable development.

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

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. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification in TVET. This called for shift to CBET in order to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Aquaculture Sector Skills Advisory Committee (SSAC), German International Cooperation and Ministry of Agriculture, Livestock and Fisheries have developed these Occupational Standards for a Horticulture processor. TVET CDACC in conjunction with Micro Enterprises Support Programme Trust (MESPT) have reviewed this Occupational Standards and incorporated Food Safety. These standards will be the bases for development of competency based curriculum for Horticulture producer level 6.

The occupational standards are designed and organized with clear performance criteria for each element of a unit of competency. These standards also outline the required knowledge and skills as well as evidence guide.

I am grateful to the Council members, Council Secretariat, Horticulture SSAC, Food Safety SSAC, expert workers and all those who participated in the development and review of these occupational standards.

Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. EngTech.
CHAIRMAN, TVET CDACC

ACKNOWLEDGMENT

These Occupational Standards were developed through 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 inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVETCDACC) for providing guidance on the development of these Standards. My gratitude goes to Aquaculture Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

My gratitude also goes to NEPAD Planning and Coordinating Agency (NPCA) of the Africa Union Commission and German Ministry of Economic Cooperation and Development (BMZ) through its implementing agency German International Cooperation (GIZ) GmbH which enabled the development of these Standards through the CAADP ATVET project.

I also appreciate the office of the National Coordinator of GIZ CAADP ATVET Project which was instrumental in the cooperation between the project team, Ministry of Agriculture, Livestock and Fisheries (MoALF) and Ministry of Education.

Much gratitude goes to Micro Enterprises Support Program Trust (MESPT) who initiated the review process and the incorporation of Food Safety in the Curriculum. I acknowledge the Danish International Development Agency (DANIDA) and the European Union (EU) who sponsored the review process.

I acknowledge all other institutions which in one way or another contributed to the development of these standards.

CHAIRMAN
HORTICULTURE SECTOR SKILLS ADVISORY COMMITTEE

ACRONYMS

ATVET : Agricultural Technical and Vocational Education and Training

CAADP : Comprehensive Africa Agricultural Development Programme

CBET : Competency Based Education and Training

CDACC : Curriculum Development Assessment and Certification Council

CUR : Curriculum

DACUM : Develop a Curriculum

DANIDA Danish International Development Agency

EMCA : Environmental Management and Conservation Act

GAP : Good Agricultural Practices

GDP : Gross Domestic Product

GMOs : Genetically Modified Organisms

HCDA : Horticultural Crops Development Authority

HCP : Horticultural Crop Production

HNO : Horticultural Nursery Operator

IDM : Integrated Disease Management

IPM : Integrated Pest Management

IWM : Integrated Weed Management

KCSE : Kenya Certificate of Secondary Education

KNQA : Kenya National Qualifications Authority

MESPT Micro Enterprises Support Programme Trust

MoALF : Ministry of Agriculture Livestock and Fisheries

MoEST : Ministry of Education Science and Technology

NGO : Non-Governmental Organization

NOS : National Occupation Standard

OS : Occupational Standard

OSHA : Occupation Safety and Health Act

PPE : Personal Protective Equipment

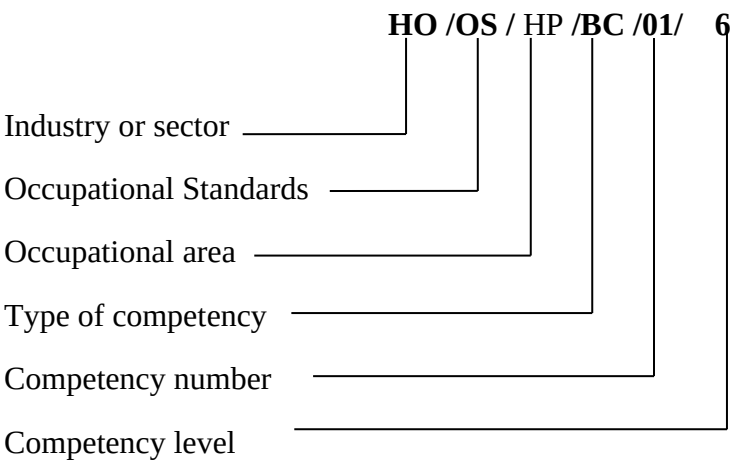
RPL : Recognition of Prior Learning

SSAC : Sector Skills Advisory Committee

TC : Tissue Culture

TVETA : Technical and Vocational Education and Training Authority

KEY TO UNIT CODE



OVERVIEW

Horticulture Producer level 6 consists of competencies that an individual must achieve to grow and manage horticultural produce. It entails producing tropical fruits, temperate fruits, vine fruits, mushrooms, herbs and spices, nuts, ornamental plants, cut flowers, vegetable crops and managing a horticultural farm.

The qualification consists of the following basic and core competencies:

BASIC COMPETENCIES

1. Demonstrate communication skills
2. Demonstrate numeracy skills
3. Demonstrate digital literacy
4. Demonstrate entrepreneurial skills
5. Demonstrate employability skills
6. Demonstrate environmental literacy
7. Demonstrate occupational safety and health practices

CORE COMPETENCIES

1. Produce tropical fruits
2. Produce sub-tropical fruits
3. Produce temperate fruits
4. Produce vine fruits
5. Produce mushrooms
6. Produce herbs and spices
7. Produce horticultural nuts
8. Produce ornamental plants
9. Produce cut flowers
10. Produce vegetable crops
11. Manage horticulture production farm

BASIC UNITS OF COMPETENCY

DEMONSTRATE COMMUNICATION SKILLS

UNIT CODE: HO/OS/HP/BC/01/6/B

UNIT DESCRIPTION

This unit covers the competencies required in meeting communication needs of clients and colleagues; developing, establishing, maintaining communication pathways and strategies. It also covers competencies for conducting interview, facilitating group discussion and representing the organization in various forums.

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. Meet communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met 1.2 Different approaches are used to meet communication needs of clients and colleagues 1.3 Conflict is addressed promptly and in a timely way and in a manner, which does not compromise the standing of the organization
2. Develop communication strategies	2.1 Strategies for effective internal and external dissemination of information are developed to meet the organization's requirements 2.2 Special communication needs are considered in developing strategies to avoid discrimination in the workplace 2.3 Communication ***strategies*** are analyzed, evaluated and revised where necessary to make sure they are effective
3. Establish and maintain communication pathways	3.1 Pathways of communication are established to meet requirements of organization and workforce 3.2 Pathways are maintained and reviewed to ensure personnel are informed of relevant information
4. Promote use of communication strategies	4.1 Information is provided to all areas of the organization to facilitate implementation of the strategy 4.2 Effective communication techniques are articulated and modelled to the workforce

	4.3 Personnel are given guidance about adapting communication strategies to suit a range of contexts
5. Conduct interview	5.1 A range of appropriate communication strategies are employed in ***interview situations*** 5.2 Records of interviews are made and maintained in accordance with organizational procedures 5.3 Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated
6. Facilitate group discussion	6.1 Mechanisms which enhance ***effective group interaction*** is defined and implemented 6.2 Strategies which encourage all group members to participate are used routinely 6.3 Objectives and agenda for meetings and discussions are routinely set and followed 6.4 Relevant information is provided to group to facilitate outcomes 6.5 Evaluation of group communication strategies is undertaken to promote participation of all parties 6.6 Specific communication needs of individuals are identified and addressed
7. Represent the organization	7.1 When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization 7.2 Presentation is clear and sequential and delivered within a predetermined time 7.3 Appropriate media is utilized to enhance presentation 7.4 Differences in views are respected 7.5 Written communication is consistent with organizational standards 7.6 Inquiries are responded in a manner consistent with organizational standard

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**
Communication ***strategies*** include but not limited to:	• Language switch • Comprehension check

	• Repetition • Asking confirmation • Paraphrase • Clarification request • Translation • Restructuring • Approximation • Generalization
Effective group interaction includes but not limited to:	• Identifying and evaluating what is occurring within an interaction in a nonjudgmental way • Using active listening • Making decision about appropriate words, behavior • Putting together response which is culturally appropriate • Expressing an individual perspective • Expressing own philosophy, ideology and background and exploring impact with relevance to communication
Situations include but not limited to:	• Establishing rapport • Eliciting facts and information • Facilitating resolution of issues • Developing action plans • Diffusing potentially difficult situations

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:

- Effective communication
- Active listening
- Giving/receiving feedback
- Interpretation of information
- Role boundaries setting
- Negotiation
- Establishing empathy
- Openness and flexibility in communication
- Communication skills required to fulfill job roles as specified by the organization
- Writing communications strategy

- Applying key elements of communications strategy

Required Knowledge

The individual needs to demonstrate knowledge of:

- Communication process
- Dynamics of groups and different styles of group leadership
- Communication skills relevant to client groups
- Flexibility in communication
- Communication skills relevant to client groups

Key elements of communications strategy

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: 1.1 Developed communication strategies to meet the organization requirements and applied in the workplace 1.2 Established and maintained communication pathways for effective communication in the workplace 1.3 Used communication strategies involving exchanges of complex oral information
2. Resource Implications	The following resources should be provided: 4. 1Access to relevant workplace or appropriately simulated environment where assessment can take place 4. 2Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation/Demonstration with Oral Questioning 3.2 Written Examination
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through accredited institution
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE NUMERACY SKILLS

UNIT CODE: HO/OS/HP/BC/02/6/B

UNIT DESCRIPTION

This unit describes the competencies required by a worker in order to apply a wide range of mathematical calculations for work; apply ratios, rates and proportions to solve problems; estimate, measure and calculate measurement for work; Use detailed maps to plan travel routes for work; Use geometry to draw and construct 2D and 3D shapes for work; Collect, organize and interpret statistical data; Use routine formula and algebraic expressions for work and use common functions of a scientific calculator

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. Apply a wide range of mathematical calculations for work	1.1 Mathematical information embedded in a range of workplace tasks and texts is extracted 1.2 Mathematical information is interpreted and comprehended 1.3 A range of mathematical and problem solving processes are select and used 1.4 Different forms of fractions, decimals and percentages are flexibly used 1.5 Calculation performed with positive and negative numbers 1.6 Numbers are expressed as powers and roots and are used in calculations 1.7 Calculations done using routine formulas 1.8 Estimation and assessment processes are used to check outcome 1.9 Mathematical language is used to discuss and explain the processes, results and implications of the task

2. Use and apply ratios, rates and proportions for work	2.1 Information regarding ratios, rates and proportions extracted from a range of workplace tasks and texts 2.2 Mathematical information related to ratios, rate and proportions is analyzed 2.3 Problem solving processes are used to undertake the task 2.4 Equivalent ratios and rates are simplified 2.5 Quantities are calculated using ratios, rates and proportions 2.6 Graphs, charts or tables are constructed to represent ratios, rates and proportions 2.6 The outcomes reviewed and checked 2.7 Information is record using mathematical language and symbols
3. Estimate, measure and calculate measurement for work	3.1 Measurement information embedded in workplace texts and tasks are extracted and interpreted 3.2 Appropriate workplace measuring equipment are identified and selected 3.3 Accurate measurements are estimate and made 3.4 The area of 2D shapes including compound shapes are calculated 3.5 The volume of 3D shapes is calculated using relevant formulas 3.6 Sides of right angled triangles are calculated using Pythagoras' theorem 3.7 conversions are perform between units of measurement 3.8 Problem solving processes are used to undertake the task 3.9 The measurement outcomes are reviewed and checked 3.10 Information is recorded using mathematical language and symbols appropriate for the task
4. Use detailed maps to plan travel routes for work	4.1 Different types of maps are identified and interpreted 4.2 Key features of maps are identified 4.3 Scales are identified and interpreted 4.4 Scales are applied to calculate actual distances 4.5 Positions or locations are determined using directional information 4.6 Routes are planned by determining directions and calculating distances, speeds and times

	4.7 Information is gathered and identified and relevant factors related to planning a route checked 4.8 Relevant equipment is select and checked for accuracy and operational effectiveness 4.9 Task is planned and recorded using specialized mathematical language and symbols appropriate for the task
5. Use geometry to draw 2D shapes and construct 3D shapes for work	5.1 A range of 2D shapes and 3D shapes and their uses in work contexts is identified 5.2 Features of 2D and 3D shapes are named and described 5.3 Types of angles in 2D and 3D shapes are identified 5.4 Angles are drawn, estimated and measured using geometric instruments 5.5 Angle properties of 2D shapes are named and identified 5.6 Angle properties are used to evaluate unknown angles in shapes 5.7 Properties of perpendicular and parallel lines are applied to shapes 5.8 Understanding and use of symmetry is demonstrated 5.9 Understanding and use of similarity is demonstrated 5.10 The workplace tasks and mathematical processes required are identified 5.11 2D shapes is drawn for work 5.12 3D shapes is constructed for work 5.13 The outcomes are reviewed and checked 5.14 Specialized mathematical language and symbols appropriate for the task are used
6. Collect, organize, and interpret statistical data for work	6.1 Workplace issue requiring investigation are identified 6.2 Audience / population / sample unit is determined 6.3 Data to be collected is identified 6.4 Data collection method is selected 6.5 Appropriate statistical data is collected and organized 6.6 Data is illustrated in appropriate formats 6.7 The effectiveness of different types of graphs are compared 6.8 The summary statistics for collected data is calculated 6.9 The results / findings are interpreted

	6.10 Data is checked to ensure that it meets the expected results and content 6.11 Information from the results including tables, graphs and summary statistics is extracted and interpreted 6.12 Mathematical language and symbols are used to report results of investigation
7. Use routine formula and algebraic expressions for work	7.1 Understanding of informal and symbolic notation, representation and conventions of algebraic expressions is demonstrated 7.2 Simple algebraic expressions and equations are developed 7.3 Operate on algebraic expressions 7.4 Algebraic expressions are simplified 7.5 Substitution into simple routine equations is done 7.6 Routine formulas used for work tasks are identified and comprehended 7.7 Routine formulas are evaluate by substitution 7.8 Routine formulas transposed 7.9 Appropriate formulas are identified and used for work related tasks 7.10Outcomes are checked and result of calculation used
8. Use common functions of a scientific calculator for work	8.1 Required numerical information to perform tasks is located 8.2 The order of operations and function keys necessary to solve mathematical calculation are determined 8.3 Function keys on a scientific calculator are identified and used 8.4 Estimations are referred to check reasonableness of problem solving process 8.5 Appropriate mathematical language, symbols and conventions are used to report results

RANGE

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

Variable	**Range**

1. Geometry	May include but not limited to: 2.1 Scale drawing 2.2 Triangles 2.3 Simple solid 2.4 Round 2.5 Square 2.6 Rectangular 2.7 Triangle 2.8 Sphere 2.9 Cylinder 2.10 Cube 2.11 Polygons 2.12 Cuboids

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:

- Applying Fundamental operations (addition, subtraction, division, multiplication)
- Using calculator
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Types of common shapes
- Differentiation between two dimensional shapes / objects
- Formulae for calculating area and volume
- Types and purpose of measuring instruments
- Units of measurement and abbreviations
- Fundamental operations (addition, subtraction, division, multiplication)
- Rounding techniques
- Types of fractions
- Different types of tables and graphs
- Meaning of graphs, such as increasing, decreasing, and constant value
- Preparation of basic data, tables & graphs

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	Critical aspects of Competency Assessment requires evidence that the candidate: 1.1 Applied a wide range of mathematical calculations for work 1.2 Used and applied ratios, rates and proportions for work 1.3 Estimated, measured and calculated measurement for work 1.4 Used detailed maps to plan travel routes for work 1.5 Used geometry to draw 2D shapes and construct 3D shapes for work 1.6 Collected, organized, and interpreted statistical data for work 1.7 Used routine formula and algebraic expressions for work 1.8 Used common functions of a scientific calculator for work
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation/Demonstration with Oral Questioning 3.2 Written Examination
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through accredited institution
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE DIGITAL LITERACY

UNIT CODE: HO/OS/HP/BC/03/6/B

UNIT DESCRIPTION

This unit covers the competencies required to effectively use digital devices such as smartphones, tablets, laptops and desktop PCs. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop PCs for purposes of communication, work performance and management at the work place.

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. Identify appropriate computer software and hardware	1.1 Concepts of ICT are determined in accordance with computer equipment 1.2 Classifications of computers are determined in accordance with manufacturers specification 1.3 ***Appropriate computer software*** is identified according to manufacturer's specification 1.4 ***Appropriate computer hardware*** is identified according to manufacturer's specification 1.5 Functions and commands of operating system are determined in accordance with manufacturer's specification
2. Apply security measures to data, hardware, software in automated environment	2.1 ***Data security and privacy are classified*** in accordance with the prevailing technology 2.2 ***Security threats*** reidentified ***and control measures*** are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected. 2.4 Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
3. Apply computer software in solving tasks	3.1 ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation 3.2 ***Word processing utilities*** are applied in accordance with workplace procedures 3.3 Worksheet layout is prepared in accordance with work procedures 3.4 Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures

	3.5 Continuous data manipulated on worksheet is undertaken in accordance with work requirements 3.6 Database design and manipulation is undertaken in accordance with office procedures 3.7 Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures
4. Apply internet and email in communication at workplace	4.1 Electronic mail addresses are opened and applied in workplace communication in accordance with office policy 4.2 Office internet functions are defined and executed in accordance with office procedures 4.3 ***Network configuration*** is determined in accordance with office operations procedures 4.4 Official World Wide Web is installed and managed according to workplace procedures
5. Apply Desktop publishing in official assignments	5.1 Desktop publishing functions and tools are identified in accordance with manufactures specifications 5.2 Desktop publishing tools are developed in accordance with work requirements 5.3 Desktop publishing tools are applied in accordance with workplace requirements 5.4 Typeset work is enhanced in accordance with workplace standards
6. Prepare presentation packages	6.1 Types of presentation packages are identified in accordance with office requirements 6.2 Slides are created and formulated in accordance with workplace procedures 6.3 Slides are edited and run in accordance with work procedures 6.4 Slides and handouts are printed according to work requirements

RANGE

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

Variable	**Range**
Appropriate computer software may include but not limited to:	A collection of instructions or computer tools that enable the user to interact with a *computer*, its hardware, or perform tasks.

Appropriate computer hardware may include but not limited to:	Collection of physical parts of a computer system such as; • Computer case, monitor, keyboard, and mouse • All the parts inside the computer case, such as the hard disk drive, motherboard and video card
Data security and privacy may include but not limited to:	• Confidentiality of data • Cloud computing • Integrity -but-curious data surfing
Security and control measures may include but not limited to:	• Counter measures against cyber terrorism • Risk reduction • Cyber threat issues • Risk management • Pass-wording
Security threats may include but not limited to:	• Cyber terrorism • Hacking
Word processing concepts may include but not limited to:	Using a special program to create, edit and print documents
Network configuration may include but not limited to:	Organizing and maintaining information on the components of a computer network

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:

- Analytical skills
- Interpretation
- Typing
- Communication
- Computing (applying fundamental operations such as addition, subtraction, division and multiplication)
- Using calculator
- Basic ICT skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Software concept

- Functions of computer software and hardware
- Data security and privacy
- Computer security threats and control measures
- Technology underlying cyber-attacks and networks
- Cyber terrorism
- Computer crimes
- Detection and protection of computer crimes
- Laws governing protection of ICT
- Word processing;
    - ✓ Functions and concepts of word processing.
    - ✓ Documents and tables creation and manipulations
    - ✓ Mail merging
    - ✓ Word processing utilities
- Spread sheets;
    - ✓ Meaning, formulae, function and charts, uses and layout
    - ✓ Data formulation, manipulation and application to cells
    - ✓
- Database;
    - ✓ Database design, data manipulation, sorting, indexing, storage retrieval and security
- Desktop publishing;
    - ✓ Designing and developing desktop publishing tools
    - ✓ Manipulation of desktop publishing tools
    - ✓ Enhancement of typeset work and printing documents
- Presentation Packages;
    - ✓ Types of presentation Packages
    - ✓ Creating, formulating, running, editing, printing and presenting slides and handouts
- Networking and Internet;
    - ✓ Computer networking and internet.
    - ✓ Electronic mail and world wide web
- Emerging trends and issues in ICT;
    - ✓ Identify and integrate emerging trends and issues in ICT
    - ✓ Challenges posed by emerging trends and issues

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: 1.1 Identified and controlled security threats 1.2 Detected and protected computer crimes 1.3 Applied word processing in office tasks 1.4 Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 1.5 Opened electronic mail for office communication as per workplace procedure 1.6 Installed internet and World Wide Web for office tasks in accordance with office procedures 1.7 Integrated emerging issues in computer ICT applications 1.8 Applied laws governing protection of ICT
2. Resource Implications	2.1 Tablets 2.2 Laptops and 2.3 Desktop PCs 2.4 Desktop computer 2.5 Lap top 2.6 Calculator 2.7 Internet 2.8 Smart phone 2.9 Operations Manuals
3. Methods of Assessment	Competency may be assessed through: 3.1 Written Test 3.2 Demonstration 3.3 Practical assignment 3.4 Interview/Oral Questioning 3.5 Demonstration
4. Context of Assessment	Competency may be assessed in an off and on the job setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE UNDERSTANDING OF ENTREPRENEURSHIP
UNIT CODE: HO/OS/HP/BC/04/6/B

UNIT DESCRIPTION

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
1. Demonstrate understanding of an Entrepreneur	1.1 Entrepreneurs and Business persons are distinguished as per ***principles of entrepreneurship*** **1.2** ***Types of entrepreneurs*** are identified as per principles of entrepreneurship **1.3** Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship **1.4** ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship 1.5 Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship
2. Demonstrate understanding of Entrepreneurship and self-employment	2.1 Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship 2.2 Importance of self-employment is analysed based on business procedures and strategies 2.3 ***Requirements for entry into self-employment*** are identified according to business procedures and strategies 2.4 Role of an Entrepreneur in business is determined according to business procedures and strategies 2.5 Contributions of Entrepreneurs to National development are identified as per business procedures and strategies 2.6 Entrepreneurship culture in Kenya is explored as per business procedures and strategies 2.7 Born or made Entrepreneurs are distinguished as per entrepreneurial traits
3. Identify Entrepreneurship opportunities	3.1 Sources of business ideas are identified as per business procedures and strategies 3.2 ***Business ideas*** and opportunities are generated as per business procedures and strategies 3.3 Business life cycle is analysed as per business procedures and strategies 3.4 Legal aspects of business are identified as per procedures and strategies 3.5 Product demand is assessed as per market strategies 3.6 Types of ***business environment*** are identified and evaluated as per business procedures

	3.7 Factors to consider when evaluating business environment are explored based on business procedure and strategies 3.8 Technology in business is incorporated as per best practice
4. Create entrepreneurial awareness	4.1 ***Forms of businesses*** are explored as per business procedures and strategies 4.2 Sources of business finance are identified as per business procedures and strategies 4.3 Factors in selecting source of business finance are identified as per business procedures and strategies 4.4 ***Governing policies*** on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies 4.5 Problems of starting and operating SSEs are explored as per business procedures and strategies
5. Apply entrepreneurial motivation	5.1 ***Internal and external motivation*** factors are determined in accordance with ***motivational theories*** 5.2 Self-assessment is carried out as per ***entrepreneurial orientation*** 5.3 Effective communications are carried out in accordance with ***communication principles*** 5.4 Entrepreneurial motivation is applied as per motivational theories
6. Develop innovative business strategies	6.1 Business innovation strategies are determined in accordance with the organization strategies 6.2 Creativity in business development is demonstrated in accordance with business strategies 6.3 ***Innovative business strategies*** are developed as per business principles 6.4 Linkages with other entrepreneurs are created as per best practice

	6.5 ICT is incorporated in business growth and development as per best practice
7. Develop Business Plan	7.1 Identified Business is described as per business procedures and strategies 7.2 Marketing plan is developed as per business plan format 7.3 Organizational/Management plan is prepared in accordance with business plan format 7.4 Production/operation plan in accordance with business plan format 7.5 Financial plan is prepared in accordance with the business plan format 7.6 Executive summary is prepared in accordance with business plan format 7.7 Business plan is presented as per best practice

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** include but not limited to:
1. Types of entrepreneurs but not limited to:	1.1 Innovators 1.2 Imitators 1.3 Craft 1.4 Opportunistic **1.5** Speculators
2. Principles of Entrepreneurship but not limited to:	2.1 Visionary 2.2 Solution provider 2.3 Accountability 2.4 Growth and marketing 2.5 Resilient 2.6 Tenacious
3. Characteristics of Entrepreneurs include but not limited to:	3.1 Creative 3.2 Innovative 3.3 Planner 3.4 Risk taker 3.5 Networker 3.6 Confident 3.7 Flexible 3.8 Persistent 3.9 Patient 3.10 Independent 3.11 Future oriented 3.12 Goal oriented
4. Requirements for entry into self-employment	4.1 Technical skills 4.2 Management skills 4.3 Entrepreneurial skills 4.4 Resources 4.5 Infrastructure
5. Internal motivation include but not limited to:	5.1 Interest 5.2 Passion 5.3 Freedom 5.4 Prestige
6. Business environment	6.1 External 6.2 Internal

	6.3 Intermediate
7. Forms of businesses	7.1 Sole proprietorship 7.2 Partnership 7.3 Limited companies 7.4 Cooperatives
8. Governing policies	8.1 Increasing scope for finance 8.2 Promoting cooperation between entrepreneurs and private sector 8.3 Reducing regulatory burden on entrepreneurs 8.4 Developing IT tools for entrepreneurs
9. External motivation include but not limited to:	9.1 Rewards 9.2 Punishment 9.3 Enabling environment 9.4 Government policies
10. Entrepreneurial orientation include but not limited to:	10.1 Passion 10.2 Interest 10.3 Hobbies 10.4 Skills
11. Innovative business strategies include but not limited to:	11.1 New products 11.2 New methods of production 11.3 New markets 11.4 New sources of supplies 11.5 Change in industrialization
12. Communication principles include but not limited to:	12.1 Feed back 12.2 Attention 12.3 Clarity 12.4 Timeliness 12.5 Adequacy 12.6 Consistency 12.7 Informality
13. Motivational theories include but not limited to:	13.1 Marslows theory 13.2 McClelland theory 13.3 Fredrick Tylors theory

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:

- Assessing a range of alternative products and strategies
- Critically analyzing information, summarizing and making sense of previous and current market trends
- Identifying changing consumer preferences and demographics
- Thinking "outside the box"
- Ensuring quality consistency
- Reducing lead time to product/service delivery
- Management
- Using formal problem-solving procedures, e. g., root-cause analysis, six sigmas
- Communication
- Applying motivational principles, e. g., positive stroking, behavior modification
- Assessing range of alternatives rather than choosing the easiest option
- Achieving ownership and credibility for the enterprise vision
- Critically analyzing information, summarizing and making sense of previous and current market trends
- Developing solutions and practical strategies which are "outside the box"

Required Knowledge

The individual needs to demonstrate knowledge of:

- Entrepreneurial competencies
    - ✓ Decision making
    - ✓ Business communication
    - ✓ Change management
    - ✓ Coping with competition
    - ✓ Risk taking
    - ✓ Net working
    - ✓ Time management
    - ✓ Leadership
- Factors affecting entrepreneurship development
- Principles of Entrepreneurship
- Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,
- Conflict resolution
- Health, safety and environment (HSE) principles and requirements
- Customer care strategies
- Basic financial management
- Business strategic planning

- Impact of change on individuals, groups and industries
- Government and regulatory processes
- Local and international market trends
- Product promotion strategies
- Market and feasibility studies
- Government and regulatory processes
- Local and international business environment
- Concepts of change management
- Relevant developments in other industries
- Regional/ County business expansion strategies
- Innovation in business

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: 1.1 Distinguished entrepreneurs and business persons correctly 1.2 Identified ways of becoming an entrepreneur appropriately 1.3 Explored factors affecting entrepreneurship development appropriately 1.4 Analysed importance of self-employment accurately 1.5 Identified requirements for entry into self-employment correctly 1.6 Identified sources of business ideas correctly 1.7 Generated Business ideas and opportunities correctly 1.8 Analysed business life cycle accurately 1.9 Identified legal aspects of business correctly 1.10 Assessed product demand accurately 1.11 Determined Internal and external motivation factors appropriately 1.12 Carried out communications effectively 1.13 Identified sources of business finance correctly 1.14 Determined Governing policy on small scale enterprise appropriately 1.15 Explored problems of starting and operating SSEs effectively 1.16 Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly 1.17 Prepared executive summary correctly

	1.18 Determined business innovative strategies appropriately 1.19 Presented business plan effectively
2. Resource Implications	The following resources should be provided: 2.1 Check list 2.2 Research tools (Questionnaire, interview guide, observation schedule) 2.3 Materials, tools, equipment and machines relevant
3. Methods of Assessment	3.1 Written tests 3.2 Observation 3.3 Oral questions 3.4 Third party report 3.5 Interviews 3.6 Case problems 3.7 Portfolio
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE EMPLOYABILITY SKILLS

UNIT CODE: HO/OS/HP/BC/05/6/B

UNIT DESCRIPTON

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

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. Conduct self-management	1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives 1.2 Emotions are managed as per workplace requirements 1.3 Individual performance is evaluated and monitored according to the agreed targets. 1.4 Assertiveness is developed and maintained based on the requirements of the job. 1.5 Accountability and responsibility for own actions are demonstrated. 1.6 Self-esteem and a positive self-image are developed and maintained. 1.7 Time management, attendance and punctuality are observed as per the organization policy. 1.8 Goals are managed as per the organization's objective 1.9 Self-strengths and weaknesses are identified as per ***personal objectives*** 1.10 Critics are managed as per personal objectives
2. Demonstrate interpersonal communication	2.1 Listening and understanding is demonstrated as per communication policy 2.2 Writing to the needs of the audience is demonstrated as per communication policy

	2.3 Speaking, reading and writing is demonstrated as per communication policy 2.4 Negotiation skills are demonstrated as per communication policy 2.5 Empathizing is demonstrated as per the communication policy 2.6 Numeracy is applied as per the communication policy 2.7 Internal and external customers' needs are identified and interpreted as per the communication policy 2.8 Persuasion is demonstrated as per the communication policy 2.9 Communication nnetworks are established as per the SOPs 2.10 Information is shared as per communication structure
3. Demonstrate critical safe work habits	3.1 Stress is managed in accordance with workplace procedures. 3.2 Punctuality and time consciousness is demonstrated in line with workplace policy. 3.3 Personal objectives are integrated with organization goals based on organization's strategic plan. 3.4 ***Resources*** are utilized in accordance with workplace policy. 3.5 Work priorities are set in accordance to workplace procedures. 3.6 Leisure time is recognized in line with organization policy. 3.7 Abstinence from ***drug and substance abuse*** is observed as per workplace policy. 3.8 Awareness of HIV and AIDS is demonstrated in line with workplace requirements. 3.9 Safety consciousness is demonstrated in the workplace based on organization safety policy. 3.10 ***Emerging issues*** are dealt with in accordance with organization policy.
4. Lead a workplace team	4.1 Performance expectations for the ***team*** are set 4.2 Duties and responsibilities are assigned in accordance with the organization policy. 4.3 Team parameters and ***relationships*** are identified according to set rules and regulations. 4.4 ***Forms of communication*** in a team are established according to office policy.

	4.5 Communication is carried out as per workplace place policy and requirements of the job. 4.6 Team performance is supervised 4.7 ***Feedback*** on performance is collected and analyzed based on established team learning process 4.8 Conflicts are resolved between team members in line with organization rules and regulations. 4.9 ***Gender mainstreaming*** is undertaken in accordance with set regulations. 4.10 Human rights are adhered to in accordance with existing protocol. 4.11 Healthy relationships are developed and maintained for harmonious co-existence in line with workplace.
5. Plan and organize work	5.1 Task requirements are identified as per the workplace objectives 5.2 Task is interpreted in accordance with safety (OHS), environmental requirements and quality requirements 5.3 Work activity is organized with other involved personnel as per the SOPs 5.4 Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5.5 Work activities are monitored and evaluated in line with organization procedures. 5.6 Job planning is documented in accordance with workplace requirements. 5.7 Planning and organizing of work activities is reviewed as per the workplace requirements 5.8 Time is managed achieve workplace set goals and objectives.
6. Maintain professional growth and development	6.1 Personal training needs are identified and assessed in line with the requirements of the job. 6.2 ***Training and career opportunities*** are identified and availed based on job requirements. 6.3 Resources for training are mobilized and allocated based organizations skills needs. 6.4 Licensees and certifications relevant to job and career are obtained and renewed. 6.5 ***Personal growth*** is pursued towards improving the qualifications set for the profession.

	6.6 Work priorities and commitments are managed based on requirement of the job and workplace policy. 6.7 Recognitions are sought as proof of career advancement in line with professional requirements.
7. Demonstrate workplace learning	7.1 Own learning is managed as per workplace policy. 7.2 Learning opportunities are sought and allocated based on job requirement and in line with organization policy. 7.3 Contribution to the learning community at the workplace is carried out. 7.4 ***Range of media for learning*** are established as per the training need 7.5 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job 7.6 Enthusiasm for ongoing learning is demonstrated 7.7 Time and effort is invested in learning new skills-based job requirements 7.8 Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace. 7.9 Awareness of Occupational Health and Safety procedures are demonstrated in use of technology in the workplace. 7.10 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy. 7.11 New systems are developed and maintained in accordance with the requirements of the job. 7.12 Opportunities that are not obvious are identified and exploited in line with organization objectives. 7.13 Opportunities for performance improvement are identified proactively in area of work. 7.14 Awareness of personal role in workplace ***innovation*** is demonstrated.
8. Demonstrate problem solving skills	8.1 Creative, innovative and practical solutions are developed based on the problem 8.2 Independence and initiative in identifying and solving problems is demonstrated. 8.3 Team problems are solved as per the workplace guidelines

	8.4 Problem solving strategies are applied as per the workplace guidelines 8.5 Problems are analyzed and assumptions tested as per the context of data and circumstances
9. Manage workplace ethics	9.1 Policies and guidelines are observed as per the workplace requirements 9.2 Self-worth and profession is exercised in line with personal goals and organizational policies 9.3 Code of conduct is observed as per the workplace requirements 9.4 Personal and professional integrity is demonstrated as per the personal goals 9.5 Commitment to jurisdictional laws is demonstrated as per the workplace requirements

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.

Range	**Variable**
Drug and substance abuse include but not limited to:	Commonly abused • Alcohol • Tobacco • Miraa • Over-the-counter drugs • Cocaine • Bhang • Glue
Feedback includes but not limited to:	• Verbal • Written • Informal • Formal

Relationships includes but not limited to:	• Man/Woman • Trainer/trainee • Employee/employer • Client/service provider • Husband/wife • Boy/girl • Parent/child • Sibling relationships
Forms of communication include but not limited to:	• Written • Visual • Verbal • Non verbal • Formal and informal
Team includes but not limited to:	• Small work group • Staff in a section/department • Inter-agency group
Personal growth includes but not limited to:	• Growth in the job • Career mobility • Gains and exposure the job gives • Net workings • Benefits that accrue to the individual as a result of noteworthy performance
Personal objectives include but not limited to:	• Long term • Short term • Broad • Specific
Trainings and career opportunities includes but not limited to	• Participation in training programs o Technical o Supervisory o Managerial o Continuing Education • Serving as Resource Persons in conferences and workshops
Resource include but not limited to:	• Human • Financial • Technology o Hardware o Software
Innovation include but not limited to:	• New ideas • Original ideas • Different ideas

	• Methods/procedures • Processes • New tools
Emerging issues include but not limited to:	• Terrorism • Social media • National cohesion • Open offices
Range of media for learning include but not limited to:	• Mentoring • peer support and networking • IT and courses

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:

- Personal hygiene practices
- Intra and Interpersonal skills
- Communication skills
- Knowledge management
- Interpersonal skills
- Critical thinking skills
- Observation skills
- Organizing skills
- Negotiation skills
- Monitoring skills
- Evaluation skills
- Record keeping skills
- Problem solving skills
- Decision Making skills
- Resource utilization skills
- Resource mobilization skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Work values and ethics
- Company policies
- Company operations, procedures and standards
- Occupational Health and safety procedures
- Fundamental rights at work

- Personal hygiene practices
- Workplace communication
- Concept of time
- Time management
- Decision making
- Types of resources
- Work planning
- Resources and allocating resources
- Organizing work
- Monitoring and evaluation
- Record keeping
- Workplace problems and how to deal with them
- Negotiation
- Assertiveness
- Team work
- Gender mainstreaming
- HIV and AIDS
- Drug and substance abuse
- Leadership
- Safe work habits
- Professional growth and development
- Technology in the workplace
- Learning
- Creativity
- Innovation
- Emerging issues
    - Social media
    - Terrorism
    - National cohesion

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: 1.1 Conducted self-management 1.2 Demonstrated interpersonal communication 1.3 Demonstrated critical safe work habits 1.4 Demonstrated the ability to lead a workplace team 1.5 Planned and organized work

	1.6 Maintained professional growth and development 1.7 Demonstrated workplace learning 1.8 Demonstrated problem solving skills 1.9 Demonstrated the ability to manage ethical performance
2. Resource Implications	The following resources should be provided: 2.1 Case studies/scenarios
3. Methods of Assessment	Competency in this unit may be assessed through: • Oral Interview • Observation • Third Party Reports • Written
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE ENVIRONMENTAL LITERACY

UNIT CODE: HO/OS/HP/BC/06/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to follow procedures for environmental hazard control, follow procedures for environmental pollution control, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, develop and adhere to environmental protection principles/strategies/guidelines, analyze resource use, develop resource conservation plans and implement selected plans.

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. Control environmental hazard	1.1 ***Storage methods*** for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS. 1.2 ***Disposal methods*** of hazardous wastes are followed at all times according to environmental regulations and OSHS. 1.3 ***PPE*** is used according to OSHS.
2. Control environmental Pollution control	2.1 Environmental pollution ***control measures*** are compiled following standard protocol. 2.2 Procedures for solid waste management are observed according Environmental Management and Coordination Act 1999 2.3 Methods for minimizing ***noise pollution*** complied following environmental regulations.
3. Demonstrate sustainable resource use	3.1 Methods for minimizing wastage are complied with. 3.2 Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle) 3.3 Methods for economizing or reducing resource consumption are practiced.
4. Evaluate current practices in relation to resource usage	4.1 Information on resource efficiency systems and procedures are collected and provided to the work group where appropriate.

	4.2 Current resource usage is measured and recorded by members of the work group. 4.3 Current purchasing strategies are analyzed and recorded according to industry procedures. 4.4 Current work processes to access information and data is analyzed following enterprise protocol.
5. Identify Environmental legislations/conventions for environmental concerns	5.1 Environmental legislations/conventions and local ordinances are identified according to the different environmental aspects/impact 5.2 Industrial standard/environmental practices are described according to the different environmental concerns
6. Implement specific environmental programs	6.1 Programs/Activities are identified according to organizations policies and guidelines. 6.2 Individual roles/responsibilities are determined and performed based on the activities identified. 6.3 Problems/constraints encountered are resolved in accordance with organizations' policies and guidelines 6.4 Stakeholders are consulted based on company guidelines
7. Monitor activities on Environmental protection/Programs	7.1 Activities are periodically monitored and Evaluated according to the objectives of the environmental program 7.2 Feedback from stakeholders are gathered and considered in Proposing enhancements to the program based on consultations 7.3 Data gathered are analyzed based on Evaluation requirements 7.4 Recommendations are submitted based on the findings 7.5 Management support systems are set/established to sustain and enhance the program 7.6 Environmental incidents are monitored and reported to concerned/proper authorities
8. Analyze resource use	8.1. All resource consuming processes are Identified 8.2. Quantity and nature of Resource consumed is determined 8.3. Resource flow is analyzed through different parts of the process. 8.4. Wastes are classified for possible source of resources.

9. Develop resource Conservation plans	9.1. Efficiency of use/conversion of resources is determined following industry protocol. 9.2. Causes of low efficiency of use of resources are Determined based on industry protocol. 9.3. Plans for increasing the efficiency of resource use are developed based on findings.

RANGE

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

Variable	Range
PPE May include but are not limited to	1.1 Mask 1.2 Gloves 1.3 Goggles 1.4 Safety hat 1.5 Overall 1.6 Hearing protector
Environmental pollution control measures may include but are not limited to:	2.1 Methods for minimizing or stopping spread and ingestion of airborne particles 2.2 Methods for minimizing or stopping spread and ingestion of gases and fumes 2.4 Methods for minimizing or stopping spread and ingestion of liquid wastes
Wastes may include but are not limited to:	3.1 Unnecessary waste 3.2 Necessary waste
Waste management Procedures may include but are not limited to:	4.1 Sorting 4.2 Storing of items 4.2 Recycling of items 4.3 Disposal of items
Resources may include but are not limited to:	5.1 Electric 5.2 Water 5.3 Fuel 5.4 Telecommunications 5.5 Supplies 5.6 Materials

Workplace environmental hazards may include but are not limited to:	6.1Biological hazards 6.2 Chemical and dust hazards 6.3 Physical hazards
Organizational systems and procedures may include but are not limited to:	7.1 Supply chain, procurement and purchasing 7.2 Quality assurance 7.3 Making recommendations and seeking approvals
Legislations/Conventions may include but are not limited to:	8.1 EMCA 1999 8.2 Montreal Protocol 8.3 Kyoto Protocol
Environmental aspects/impacts may include but are not limited to:	9.1 Air pollution 9.2 Water pollution 9.3 Noise pollution 9.4 Solid waste 9.5 Flood control 9.6 Deforestation/Denudation 9.7 Radiation/Nuclear /Radio Frequency/ Microwaves 9.8 Situation 9.9 Soil erosion (e.g. Quarrying, Mining, etc.) 9.10 Coral reef/marine life protection
Industrial standards / Environmental practices may include but are not limited to:	10.1 ISO standards 10.2 Company environmental management systems (EMS)
Periodic may include but are not limited to:	11.1 hourly 11.2 daily 11.3 weekly 11.4 monthly 11.5 quarterly 11.6 yearly
Programs/Activities may include but are not limited to:	12.1 Waste disposal (on-site and off-site) 12.2 Repair and maintenance of equipment 12.3 Treatment and disposal operations 12.4 Clean-up activities 12.5 Laboratory and analytical test 12.6 Monitoring and evaluation 12.7 Environmental advocacy 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:

- Following storage methods of environmentally hazardous materials
- Following disposal methods of hazardous wastes
- Using PPE
- Practicing OSHS
- Complying environmental pollution control
- Observing solid waste management
- Complying methods of minimizing noise Pollution
- Complying methods of minimizing wastage
- Employing waste management procedures
- Economizing resource consumption
- Listing of resources used
- Measuring current usage of resources
- Identifying and reporting workplace environmental hazards
- Conveying all environmental issues
- Following environmental regulations
- Identifying environmental regulations
- Assessing procedures for assessing compliance
- Collecting information on environmental and resource efficiency systems and procedures, and Providing information to the work group
- Measuring and recording current resource usage
- Analysing and recording current purchasing strategies.
- Analysing current work processes to access information and data and Assisting identifying areas for improvement
- Analysing resource flow
- Determining efficiency of use/conversion of resources
- Determining causes of low efficiency of use
- Developing plans for increasing the efficiency of resource use
- Checking resource use plans
- Complying to regulations/licensing requirements
- Determining benefit/cost of plans
- Ranking proposals based on benefit/cost compared to limited resources
- Checking proposals meet regulatory requirements
- Monitoring implementation
- Making adjustments to plan and implementation
- checking new resource usage

Required Knowledge

The individual needs to demonstrate knowledge of:

- Storage methods of environmentally hazardous materials
- Disposal methods of hazardous wastes
- Usage of PPE Environmental regulations
- OSHS
- Types of pollution
- Environmental pollution control measures
- Different solid wastes
- Solid waste management
- Different noise pollution
- Methods of minimizing noise pollution
- Methods of minimizing wstage
- Waste management procedures
- Economizing of resource consumption
- Principle of 3Rs
- Types of resources
- Techniques in measuring current usage of resources
- Calculating current usage of resources
- Types of workplace environmental hazards
- Environmental regulations
- Environmental regulations applying to the enterprise.
- Procedures for assessing compliance with environmental regulations.
- Collection of information on environmental and resource efficiency systems and procedures,
- Measurement and recording of current resource usage
- Analysis and recording of current purchasing strategies.
- Analysis current work processes to access information and data Analysis of data and information
- Identification of areas for improvement
- Resource consuming processes
- Determination of quantity and nature of resource consumed
- Analysis of resource flow of different parts of the resource flow process
- Use/conversion of resources
- Causes of low efficiency of use
- Increasing the efficiency of resource use
- Inspection of resource use plans
- Regulations/licensing requirements
- Determine benefit/cost for alternative resource sources
- Benefit/costs for different alternatives
- Components of proposals
- Criteria on ranking proposals

- Regulatory requirements
- Proposals for improving resource efficiency
- Implementation of resource efficiency plans
- Procedures in monitor implementation
- Adjustments of implementation plan
- Inspection of new resource usage

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: 1.1 Controlled environmental hazard 1.2 Controlled environmental pollution 1.3 Demonstrated sustainable resource use 1.4 Evaluated current practices in relation to resource usage 1.5 Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 1.6 Described industrial standard environmental practices according to the different environmental issues/concerns. 1.7 Resolved problems/ constraints encountered based on management standard procedures 1.8 Implemented and monitored environmental practices on a periodic basis as per company guidelines 1.9 Recommended solutions for the improvement of the program 1.10 Monitored and reported to proper authorities any environmental incidents
2. Resource Implications	The following resources should be provided: 2.1 Workplace with storage facilities 2.2 Tools, materials and equipment relevant to the tasks (e.g. Cleaning tools, cleaning materials, trash bags) 2.3 PPE, manuals and references 2.4 Legislation, policies, procedures, protocols and localordinances relating to environmental protection 2.5 Case studies/scenarios relating to environmental Protection
3 Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration 3.2 Oral questioning

		3.3 Written examination 3.4 Interview/Third Party Reports 3.5 Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad) 3.6 Simulations and role-play
4	Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: HO/OS/HP/BC/07/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to lead the implementation of workplace's safety and health program, procedures and policies/guidelines.

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. Identify workplace hazards and risk	1.1 ***Hazards*** in the workplace and/or its ***indicators*** of its presence, are identified 1.2 ***Evaluation and/or work environment*** measurements of OSH hazards/risk existing in the workplace is conducted by Authorized personnel or agency 1.3 ***OSH issues and/or concerns*** raised by workers are Gathered
2. Identify and implement appropriate control measures	2.1 Prevention ***and control measures***, including use of s***afety gears / PPE (personal protective equipment)*** for specific hazards identified and implemented 2.2 ***Appropriate risk controls*** based on result of OSH hazard evaluation is recommended. 2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures.
3. Implement OSH programs, procedures and policies/ guidelines	3.1 Information to work team about company OSH program, procedures and policies/guidelines are provided 3.2 Implementation of OSH procedures and policies/ guidelines are participated 3.3 Team members are trained and advised on OSH standards and procedures 3.4 Procedures for maintaining ***OSH-related records*** are implemented

RANGE

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

Variable	Range
1. ***Hazards may include*** but are not limited to:	1.1. Physical hazards – impact, illumination, pressure, noise, vibration, extreme temperature, radiation 1.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 1.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 1.4 Ergonomics Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles Physiological factors – monotony, personal relationship, work out cycle 1.6 Safety hazards (unsafe workplace condition) – confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris 1.7 Unsafe workers' act (Smoking in off-limited areas, Substance and alcohol abuse at work)
2. ***Indicators may include*** but are not limited to:	2.1 Increased of incidents of accidents, injuries 2.2 Increased occurrence of sickness or health complaints/ symptoms 2.3 Common complaints of workers related to OSH 2.4 High absenteeism for work-related reasons
3. ***Evaluation and/or work environment measurements*** may include but are not limited to:	3.1 Health Audit 3.2 Safety Audit 3.3 Work Safety and Health Evaluation 3.4 Work Environment Measurements of Physical and Chemical Hazards

4. ***OSH issues and/or concerns*** may include but are not limited to:	4.1 Workers' experience/observance on presence of work hazards 4.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks) 4.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines
5. ***Prevention and control measures*** may include but are not limited to:	5.1 Eliminate the hazard (i.e., get rid of the dangerous machine 5.2 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 5.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 5.4 Use administrative controls to reduce the risk (i.e. give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule) 5.5 Use engineering controls to reduce the risk (i.e. use safety guards to machine) 5.6 Use personal protective equipment 5.7 Safety, Health and Work Environment Evaluation 5.8 Periodic and/or special medical examinations of workers
6. ***Safety gears /PPE (Personal Protective Equipments)*** may include but are not limited to:	6.1 Arm/Hand guard, gloves 6.2 Eye protection (goggles, shield) 6.3 Hearing protection (ear muffs, ear plugs) 6.4 Hair Net/cap/bonnet 6.5 Hard hat 6.6 Face protection (mask, shield) 6.7 Apron/Gown/coverall/jump suit 6.8 Anti-static suits 6.9 High-visibility reflective vest

7. ***Appropriate risk controls***	Appropriate risk controls in order of impact are as follows: 7.1 Eliminate the hazard altogether (i.e., get rid of the dangerous machine) 7.2 Isolate the hazard from anyone who could be harmed (i.e., keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 7.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 7.4 Use administrative controls to reduce the risk (i.e., train workers how to use equipment safely; train workers about the risks of harassment; issue signage) 7.5 Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users) 7.6 Use personal protective equipment (i.e., wear gloves and goggles when using the machine)
8. ***Contingency measures*** may include but are not limited to:	8.1 Evacuation 8.2 Isolation 8.3 Decontamination 8.4 (Calling designed) emergency personnel
9. ***Emergency procedures*** may include but are not limited to:	9.1 Fire drill 9.2 Earthquake drill 9.3 Basic life support/CPR 9.4 First aid 9.5 Spillage control 9.6 Decontamination of chemical and toxic 9.7 Disaster preparedness/management 9.8 se of fire-extinguisher
10. ***Incidents and emergencies*** may include but are not limited to:	10.1 Chemical spills 10.2 Equipment/vehicle accidents 10.3 Explosion 10.4 Fire 10.5 Gas leak 10.6 Injury to personnel 10.7 Structural collapse 10.8 Toxic and/or flammable vapors emission.
11. ***OSH-related Records*** may include but are not limited to:	11.1 Medical/Health records 11.2 Incident/accident reports 11.3 Sickness notifications/sick leave application 11.4 OSH-related trainings obtained

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:

- Skills on preliminary identification of workplace hazards/risks
- Knowledge management
- Critical thinking skills
- Observation skills
- Coordinating skills
- Communication skills
- Interpersonal skills
- Troubleshooting skills
- Presentation skills
- Training skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- General OSH Principles
- Occupational hazards/risks recognition
- OSH organizations providing services on OSH evaluation and/or work environment measurements (WEM)
- National OSH regulations; company OSH policies and protocols
- Systematic gathering of OSH issues and concerns
- General OSH principles
- National OSH regulations
- Company OSH and recording protocols, procedures and policies/guidelines
- Training and/or counseling methodologies and strategies

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: 1.1 Identifies hazards/risks in the workplace and/or its indicators 1.2 Requests for evaluation and/or work environment measurements of OSH hazards/risk in the workplace 1.3 Gathers OSH issues and/or concerns raised by workers

	1.4 Identifies and implements prevention and control measures, including use of PPE (personal protective equipment) for specific hazards 1.5 Recommends appropriate risk controls based on result of OSH hazard evaluation and OSH issues gathered 1.6 Establish contingency measures, including emergency procedures in accordance with organization procedures 1.7 Provides information to work team about company OSH program, procedures and policies/guidelines 1.8 Participates in the implementation of OSH procedures and policies/guidelines 1.9 Trains and advises team members on OSH standards and procedures 1.10 Implements procedures for maintaining OSH-related records
2. Resource Implications	The following resources should be provided: 2.1 Workplace or assessment location 2.2 OSH personal records 2.3 PPE 2.4 Health records
3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation 3.4 Observation/Demonstration and oral questioning
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

CORE UNITS OF COMPETENCY

PRODUCE TROPICAL FRUITS

UNIT CODE: HO/OS/HP/CR/01/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce tropical fruits. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing tropical fruits orchard, producing tropical fruits, harvesting tropical fruits, determining productivity and quality of fruits produced; carrying out post-harvest handling of the fruits, evaluating implementation of the food safety management plan and generating production report.

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. Carry out food safety risk assessment for production and post-harvest handling of tropical fruits	**1.1** Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standards*** **1.2** Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established ***evaluation criteria***
2. Develop food safety management plan for tropical fruit production and post-harvest handling processes	2.1 Resources are collected as per the risks assessment 2.2 ***Food safety management plan is developed*** based on the risk assessment report. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.5 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7 Approval of the developed plan is sought from the top management
3. Implementation of the food safety management	1.1 The management plan is adopted as per the laid down procedures 1.2 Communication of the plan is done to the entire team through the official channel

plan for tropical fruit production and post-harvest handling processes	1.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan 1.4 Practices and procedures for production and post-harvest handling processes for tropical fruits are carried out and documented as per the management plan.
4. Prepare to produce tropical fruits	***4.1Tropical fruits*** to be established are determined in accordance with ***Agro Ecological Zone (AEZ)***, farm plan and market demand 4.2 O**rchard** site is selected based on fruit chosen and the farm plan 4.3 ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of fruit to be established 4.4 Soil for analysis is sampled as per ***soil sampling procedure*** 4.5 Soil erosion is controlled based on topography, soil type and level of degradation. 4.6 Orchard/land is prepared according to ***agronomic requirements*** of the fruit 4.7 Planting materials are sourced in accordance with procurement procedures, **phyto-*sanitary requirements*** and the size of the orchard to be established 4.8 Planting holes for tropical fruit seedlings are prepared based on agronomic requirements***, Good Agricultural Practices (GAP)*** and MoALF fruits production manual
5. Produce tropical fruits	1.1 Seedlings are planted based on agronomic requirements 1.2 Planted tropical fruit seedlings are pruned as per agronomic requirements 1.3 Orchard is protected from weeds, pests and diseases as per GAP 1.4 Established tropical fruit trees are fed based on soil analysis report 1.5 Established tropical fruit trees are watered, mulched and trained according to environmental conditions and growth habits 1.6 Physiological disorders in the tropical fruit trees are managed as per the MoALF fruits production manual 1.7 Tropical fruit trees are induced to flower as per GAP and fruit tree type 1.8 Tropical fruits are harvested in accordance with MoALF fruits production manual
6. Evaluate production of tropical fruits	1.1 Quality of tropical fruits is assessed based on ***fruit quality parameters***, and MoALF fruits production manual 1.2 Quantity of fruits produced is assessed based on MoALF production manual

	1.3 Return on investment is determined as per accounting principles 1.4 Recommendations are made based on evaluation report.
7. Evaluate implementation of the food safety management plan for tropical fruit production and post-harvest handling processes	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
8. Complete production of tropical fruits	8.1 Post-harvest handling of the tropical fruits is carried out as per MoALF production manual 8.2 Tropical fruits production report is generated in accordance with the production procedures 8.3 Tropical fruits production report is shared according to farm policies 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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**
Sources of food safety hazards include but not limited to**:**	• Water • Soil • Sites
Food safety hazards include but not limited to:	• Chemical • Microbial • Physical
Preventive measures include but not limited to:	• Personnel hygiene • Rodent control • Bird control • Clean as you go • Preventive maintenance of equipment
Corrective actions include but not limited to:	• Training and re-training • Procedure change

Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan includes but not limited to:	• Financial • Stationery • Computers • Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • EMCA • OSHA • CROPS ACT • KEPHIS ACT
Tropical fruits includes but not limited to:	Varieties of : • Mangoes • Oranges • Papaya • Pineapple • Custard • Avocado • Bananas

Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Dibbler • Pegs
Equipment includes but not limited to:	• 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
Materials and Supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Fencing wire • Staking sticks • Nails • Herbicides • Pesticides

	• Pheromones
Soil sampling procedure includes but not limited to:	The process of: • soil collection • packaging and • submission for analysis
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on fruits • Use of additives on fruits • Rules maximum levels of agro-chemical residues in fruits • Rules on marketing and labelling of fruits • Rules on materials intended to come into contact with fruits • Rules on certification of fruit producers
Planting materials includes but not limited to:	• Seeds • seedlings • splits • crowns • slips • Cuttings • Suckers • Tissue culture
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Fruit quality parameters includes but not limited to:	• Fruit Color • Fruit skin texture • Uniformity • Presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests , diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Food safety management plan development
- Food safety in tropical fruit production
- Hazard identification
- Risk assessment
- Sources of quality water
- Agro Ecological Zonation
- Tropical fruit orchard establishment and management
- Types of tropical fruits
- Physiology of sub-tropical fruits
- Types of tools and equipment used in production of tropical fruits
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for tropical fruit trees
- Husbandry practices in tropical fruit production
- Tropical fruit production Technologies
- Flower induction
- Maturity indices in tropical fruits

- Harvesting and Post Harvesting Handling of tropical fruits
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- General management of tropical fruit production farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land 1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established fruits suitable for the Agro Ecological zone, market demand 1.5 Followed required process of producing fruits 1.6 Efficiently used the inputs 1.7 Harvested and carried out post-harvest handling of tropical fruits 1.8 Observed food safety requirements in production of tropical fruits 1.9 Documented and maintained food safety records in production of tropical fruits
2. Resource Implications (required for assessment)	The following resources must be provided during assessment 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guideline 2.4 Procurement policy 2.5 Good Agricultural Practices manual 2.6 MoALF fruits Production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment

	Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of tropical fruits.

PRODUCE SUB-TROPICAL FRUITS

UNIT CODE: HO/OS/HP/CR/02/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce sub-tropical fruits. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing sub-tropical fruits orchard, producing sub-tropical fruits, harvesting sub-tropical fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits, evaluating implementation of the food safety management plan and generating production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of sub-tropical fruits	1.1 Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standard*s** 1.2 Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established **risks *evaluation criteria***
2 Develop food safety management plan for production and post-harvest handling processes of sub-tropical fruits	2.1 Resources are collected as per the risks assessment 2.2 ***Food safety management plan is developed*** based on the risk assessment report. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.5 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7 Approval of the developed plan is sought from the top management

3 Implementation of the food safety management plan for production and post-harvest handling processes of sub-tropical fruits	3.1 The management plan is adopted as per the laid down procedures. 3.2 Communication of the plan is done to the entire team through the official channel 3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan 3.4 are availed as identified in the management plan 3.5 Practices and procedures for production and post-harvest handling processes for sub-tropical fruits are carried out and documented as per the management plan.
4. Prepare to produce sub-tropical fruits	**4.1** ***Sub-tropical fruits*** to be establish are determined in accordance with ***Agro Ecological Zone (AEZ)***, farm plan and market demand **4.2** **Orchard** site is selected based on fruit tree chosen and the farm plan **4.3** ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of fruit to be established **4.4** Soil for analysis is sampled as per ***soil sampling procedure*** **4.5** Soil erosion is controlled based on topography, soil type and level of degradation. **4.6** Orchard / Land is prepared according to ***agronomic requirements*** of the fruit **4.7** Planting materials are sourced in accordance with procurement procedures, **phyto-*sanitary requirements*** and the size of the orchard to be established **4.8** Planting holes for sub-tropical fruit seedlings are prepared based on agronomic requirements ***,Good Agricultural Practices (GAP)*** and MoALF fruits production manual
5 Produce sub-tropical fruits	5.1 Seedlings are planted based on agronomic requirements 5.2 Planted sub-tropical fruit seedlings are pruned as per agronomic requirements 5.3 Orchard is protected from weeds, pests and diseases as per GAP 5.4 Established sub-tropical fruit trees are fed based on soil analysis report 5.5 Established sub-tropical fruit trees are watered, mulched and trained according to environmental conditions and growth habits 5.6 Physiological disorders in the sub-tropical fruit trees are managed as per the MoALF fruits production manual 5.7 Sub-tropical fruit trees are induced to flower as per GAP and fruit tree type 5.8 Sub-tropical fruits are harvested in accordance with the MoALF fruits production manual

6 Evaluate production of sub-tropical fruits	6.1 Quality of Sub-tropical fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual 6.2 Quantity of fruits produced is assessed based on MoALF production manual 6.3 Return on investment is determined as per accounting principles 6.4 Recommendations are made based on evaluation report.
7 Complete production of sub-tropical fruits	7.1 Postharvest handling of the sub-tropical fruits is carried out as per MoALF production manual 7.2 Sub-tropical fruits production report is generated in accordance with the production procedures 7.3 Sub-tropical fruits production report is shared according to farm policies 7.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)
8 Evaluate implementation of the food safety management plan for production and post-harvest handling processes of sub-tropical fruits	8.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 8.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan

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**
Sources of food safety hazards include but not limited to:	• Water • Soil • Sites

Food safety hazards include but not limited to:	• Chemical
	  • Heavy metals
	  • Pesticides
	• Microbial
	• Physical

Preventive measures include but not limited to:	• Personnel hygiene • Rodent control • Bird control

	• Clean as you go • Preventive maintenance of equipment
Corrective actions include but not limited to:	• Training and re-training • Procedure change
Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan include but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Sub-tropical fruits includes but not limited to:	Varieties of : • Tree tomatoes • straw berry • guava

	• loquat • lime • white sapote
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Dibbler • Pegs
Equipment includes but not limited to:	• 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
Materials and Supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Fencing wire • Staking sticks

	• Nails • Herbicides • Pesticides • Pheromones
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on fruits • Use of additives on fruits • Rules maximum levels of agro-chemical residues in fruits • Rules on marketing and labelling of fruits • Rules on materials intended to come into contact with fruits • Rules on certification of fruit producers
Planting materials includes but not limited to:	• Seeds • seedlings • splits • crowns • slips • Cuttings • Suckers • Tissue culture
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Fruit quality parameters includes but not limited to:	• Fruit Color • fruit skin texture • uniformity • presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in production of sub-tropical fruits
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Sub-tropical fruit orchard establishment and management
- Types of sub-tropical fruits
- Physiology of sub-tropical fruit trees
- Types of tools and equipment used in production of sub-tropical fruits
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for sub-tropical fruit trees
- Husbandry practices in sub-tropical fruit production

- Subtropical fruit production Technologies
- Flower induction
- Maturity indices in sub-tropical fruits
- Harvesting and Post Harvesting Handling of sub-tropical fruits
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- General management of sub-tropical fruit production farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land 1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established fruits suitable for the Agro Ecological zone, market demand 1.5 Followed required process of producing fruits 1.6 Efficiently used the inputs 1.7 Harvested and carried out post-harvest handling of sub-tropical fruits 1.8 Observed food safety requirements in production and post-harvest handling processes of sub-tropical fruits 1.9 Documented and maintained food safety records in production and post-harvest handling of sub-tropical fruits
2. Resource Implications	The following resources must be provided during assessment : 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guideline 2.4 Procurement policy 2.5 Good Agricultural Practices manual 2.6 MoALF fruits Production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reports
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job

	4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of sub-tropical fruits.

PRODUCE TEMPERATE FRUITS

UNIT CODE: HO/OS/HP/CR/03/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce temperate fruits. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing temperate fruits orchard, producing temperate fruits, harvesting temperate fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits, evaluating implementation of the food safety management plan and generating a production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of temperate fruits	**1.1** Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standard*s** **1.2** Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established ***evaluation criteria***
2. Develop food safety management plan for production and post-harvest handling processes of temperate fruits	2.1 Resources are collected as per the risks assessment 2.2 ***Food safety management plan is developed*** based on the risk assessment report. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.5 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7 Approval of the developed plan is sought from the top management
3. Implementation of the food safety management plan for production and	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel

post-harvest handling processes of temperate fruits	3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for temperate fruits are carried out and documented as per the management plan.
4. Produce temperate fruits	4.1 Seedlings are planted based on agronomic requirements 4.2 Planted temperate fruit seedlings are pruned as per agronomic requirements 4.3 Orchard is protected from weeds, pests and diseases as per GAP 4.4 Established temperate fruit trees are fed based on soil analysis report 4.5 Established temperate fruit trees are watered, mulched and trained according to environmental conditions and growth habits 4.6 Physiological disorders in the temperate fruit trees are managed as per the MoALF fruit production manual 4.7 Temperate fruit trees are induced to flower as per GAP and fruit tree type 4.8 Temperate fruits are harvested in accordance with the MoALF fruits production manual
5. Evaluate production of temperate fruits	5.1 Quality of temperate fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual 5.2 Quantity of fruits produced is assessed based on MoALF production manual 5.3 Return on investment is determined as per accounting principles 5.4 Recommendations are made based on evaluation report.
6. Evaluate implementation of the food safety management plan for production and post-harvest handling processes of temperate fruits	6.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 6.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
7. Complete production of temperate fruits	7.1 Postharvest handling of the temperate fruits is carried out as per MoALF production manual 7.2 Temperate fruits production report is generated in accordance with the production procedures 7.3 Temperate fruits production report is shared according to farm policies

	7.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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
Sources of food safety hazards include but not limited to**:**	• Water • Soil • Sites

Food safety hazards include but not limited to:	• Chemical
	  • MRL's
	  • Heavy metals
	• Microbial
	• Physical

Preventive measures include but not limited to:	• Personnel hygiene • Waste management • Water sampling and testing • Rodent control • Bird control • Clean as you go • Preventive maintenance of equipment
Corrective actions include but not limited to:	• Training and re-training • Procedure change
Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources includes but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers

	• Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Temperate fruits includes but not limited to:	• Plums • Pears • Apples • Peaches • Apricot
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Dibbler • Pegs
Equipment includes but not limited to:	• 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
Materials and supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Trellising wire and poles • Fencing wire • Staking sticks • Nails • Herbicides • Pesticides • Pheromones
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on fruits • Use of additives on fruits

	• Rules maximum levels of agro-chemical residues in fruits • Rules on marketing and labelling of fruits • Rules on materials intended to come into contact with fruits • Rules on certification of fruit producers
Planting materials includes but not limited to:	• Seeds • Seedlings • Cuttings
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Fruit quality parameters includes but not limited to:	• Fruit Color • Fruit skin texture • Uniformity • Presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in production of temperate fruits
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Temperate fruit orchard establishment and management
- Types of temperate fruits
- Physiology of temperate fruits
- Types of tools and equipment used in production of temperate fruits
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for temperate fruit trees
- Husbandry practices in temperate fruit production
- Temperate fruit production Technologies
- Flower induction
- Maturity indices in temperate fruits
- Harvesting and Post Harvesting Handling of temperate fruits
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- Harvesting and Post Harvesting Handling of temperate fruits
- General management of temperate fruit production farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land 1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established fruits suitable for the Agro Ecological zone, market demand 1.5 Followed required process of producing fruits 1.6 Efficiently used the inputs

	1.7 Harvested and carried out post-harvest handling of temperate fruits 1.8 Observed food safety requirements in temperate fruit production 1.9 Documented and maintained food safety records in production of temperate fruits
2. Resource Implications (required for assessment)	The following resources must be provided during assessment: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guideline 2.4 Procurement policy 2.5 Good Agricultural Practices manual 2.6 MoALF fruits Production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reporting
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of temperate fruits.

PRODUCE VINE FRUITS

UNIT CODE: HO/OS/HP/CR/04/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce vine fruits. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing vine fruits orchard, producing vine fruits, harvesting vine fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits, evaluating implementation of the food safety management plan and generating production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of vine fruits	1.1 Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standards*** 1.2 Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established ***evaluation criteria***
2. Develop food safety management plan for production and post-harvest handling processes of vine fruits	**2.1** Resources are collected as per the risks assessment **2.2** ***Food safety management plan is developed*** based on the risk assessment report **2.3** ***Preventive measures*** are established as per identified risks. **2.4** ***Corrective actions*** are established as per identified risks. **2.5** Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. **2.6** The management plan is evaluated as per the established standards **2.7** Approval of the developed plan is sought from the top management
3. Implementation of the food safety management plan for	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel

production and post-harvest handling processes of vine fruits	3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for vine fruits are carried out and documented as per the management plan.
4. Prepare to produce Vine Fruits	**4.1 Vine fruits** to be established are determined in accordance with **Agro Ecological Zone (AEZ)**, farm plan and market demand **4.2** Orchard site is selected based on fruit tree chosen and the farm plan **4.3** Tools, equipment, materials and supplies are identified and sourced based on the type of fruit to be established **4.4** Soil for analysis is sampled as per **soil sampling procedure** **4.5** Soil erosion is controlled based on topography, soil type and level of degradation. **4.6** Orchard / Land is prepared according to **agronomic requirements** of the fruit **4.7** Planting materials are sourced in accordance with procurement procedures, **phyto-sanitary requirements** and the size of the orchard to be established **4.8** Planting holes for vine fruit seedlings are prepared based on agronomic requirements, **Good Agricultural Practices (GAP)** and MoALF fruits production manual
5. Produce Vine Fruits	5.1 Seedlings are planted based on agronomic requirements 5.2 Planted vines are pruned as per agronomic requirements 5.3 Orchard is protected from weeds, pests and diseases as per GAP 5.4 Established vines are fed based on soil analysis report 5.5 Established vines are watered, mulched and staked and trained according to environmental conditions and growth habits 5.6 Physiological disorders in the vines are managed as per the MoALF fruit production manual 5.7 Vines are induced to flower as per GAP and fruit tree type 5.8 Vine fruits are harvested in accordance with the MoALF fruits production manual
6. Evaluate production of Vine Fruits	1.1 Quality of vine fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual 1.2 Quantity of fruits produced is assessed based on MoALF production manual 1.3 Return on investment is determined as per accounting principles 1.4 Recommendations are made based on evaluation report
7. Evaluate implementation	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements***

of the food safety management plan for production and post-harvest handling processes of vine fruits	7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
8. Complete production of Vine Fruits	8.1 Postharvest handling of the vine fruits is carried out as per MoALF production manual 8.2 Vine fruits production report is generated in accordance with the production procedures 8.3 Vine fruits production report is shared according to farm policies 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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**
Sources of food safety hazards include but not limited to::	• Water • Soil • Sites

Food safety hazards include but not limited to:	• Chemical
	  • Pesticides
	  • Heavy metals
	• Microbial
	• Physical

Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity

Resources for implementing the food safety management plan include but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying *Preventive measures* and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Vine fruits includes but not limited to:	• Grapes • Passion fruits • Dates • Kiwi • Water melons
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Dibbler • Pegs

Equipment includes but not limited to:	• 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
Materials and supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Trellising wire and poles • Fencing wire • Staking sticks • Nails • Herbicides • Pesticides • Pheromones
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity

	• Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on fruits • Use of additives on fruits • Rules maximum levels of agro-chemical residues in fruits • Rules on marketing and labelling of fruits • Rules on materials intended to come into contact with fruits • Rules on certification of fruit producers
Planting materials includes but not limited to:	• Seeds • seedlings • Cuttings
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Fruit quality parameters includes but not limited to:	• Fruit Color • fruit skin texture • uniformity • presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil sampling
- Observation

- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in production of vine fruits
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Vine fruit orchard establishment and management
- Types of vine fruits
- Physiology of vines
- Types of tools and equipment used in production of vine fruits
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for vine fruit trees
- Husbandry practices in vine fruit production
- Vine fruit production Technologies
- Flower induction
- Maturity indices in vine fruits
- Harvesting and Post Harvesting Handling of vine fruits
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- General management of vine fruit production farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land

	1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established fruits suitable for the Agro Ecological zone, market demand 1.5 Followed required process of producing fruits 1.6 Efficiently used the inputs 1.7 Harvested and carried out post-harvest handling of vine fruits 1.8 Observed food safety requirements in vine fruit production 1.9 Documented and maintained food safety records in production of vine fruits
2. Resource Implications	The following resources must be provided during assessment: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guideline 2.4 Procurement policy 2.5 Good Agricultural Practices manual 2.6 MoALF fruits Production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reporting
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of vine fruits.

PRODUCE MUSHROOMS

UNIT CODE: HO/OS/HP/CR/05/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce mushrooms. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing mushroom production structures and substrates, spawning, managing and harvesting the mushrooms, determining productivity and quality of mushrooms produced, evaluating implementation of the food safety management plan, carrying out post-harvest handling of mushrooms and generating production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes for mushroom	1.1 Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standard*s** 1.2 Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established risks ***evaluation criteria***
2. Develop food safety management plan for production and post-harvest handling processes for mushroom	2.1 Resources are collected as per the risk assessment 2.2 ***Food safety management plan is developed*** based on the risk assessment report. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.5 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7 Approval of the developed plan is sought from the top management
3. Implementation of the food safety management plan for production and post-harvest handling	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel

processes for mushroom	3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for mushroom are carried out and documented as per the management plan.
4. Prepare to produce mushroom	4.1 The type of ***Mushroom*** to be established is determined in accordance with ***market demand*** 4.2 The ***mushroom house*** is sited according to farm plans 4.3 ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job 4.4 The mushroom house is constructed depending on MoALF production guidelines 4.5 ***Starter culture*** for mushroom is prepared according to ***culturing procedures*** 4.6 Starter culture for mushroom is treated according to ***treatment*** guidelines 4.7 The ***substrate*** is prepared and placed in production structures according to production guidelines 4.8 The ***spawns*** are sourced and cultured according to production guidelines
5. Produce mushroom	5.1 The starter culture is put in place based on MoALF production guidelines 5.2 Mushroom are spawned on the substrate as per production guidelines 5.3 Established mushrooms are managed as per MoALF production guidelines 5.4 Established mushroom are protected from pests and diseases as per MoALF production guidelines 5.5 Established mushroom are harvested as per production guidelines
6. Evaluate the production of mushroom	1.5 Quality of mushroom is assessed based on ***mushroom quality parameters*** as per production manual 1.6 Quantity of mushroom produced is assessed based on production practices 1.7 Return on investment is determined as per accounting principles
7. Evaluate implementation of the food safety management plan for production and post-harvest handling	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan

processes for mushroom	
8. Complete production of mushrooms	8.1 Post-harvest handling of the mushrooms is carried out as per MoALF production manual 8.2 Mushroom production report is generated in accordance with the production procedures 8.3 Mushroom production report is shared according to farm policies 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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**
Sources of food safety hazards include but not limited to:	• Water • Growing media • Sites • Construction materials

Food safety hazards include but not limited to:	• Chemical
	  • Heavy metals
	  • Pesticides
	• Microbial
	• Biological
	• Physical

Sources of materials include but not limited to:	• Spawn • Inputs • Spray equipment • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan includes but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers

	• Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Mushroom includes but not limited to:	• Oyster, • shiitake and • white button
Tools include but not limited to:	• Weighing scale
Materials include but not limited to:	• Poly tubes • Lockable drum • Table spoon • Sisal twines • Supplement –soya bean meal • Plant residues –stalks and bran • Polythene bags • Shelves • Shade • Spawn • Water • Substrate
Equipment include but not limited to:	• PPE –hand gloves, dust coat, dust masks • Hand spray equipment • Oven • Basin
Materials and supplies include but are not limited to:	• Methylated spirit • Lime • Fuel for heating substrate • Molasses • Sisal twine • Soap

Mushroom production structures includes but not limited to:	• Mushroom House • Shelves • Plastic Bags • Heat Oven
Treatment includes but not limited to:	• heating • steaming • use of chemicals
Culturing procedures includes but not limited to:	• tissue culture techniques • multi spore print method • single/mono spore print method
Spawns include but not limited to:	• Spores • mycelia
Substrate includes but not limited to:	Compost on which to grow mushroom like sugarcane bagasse, leaves, banana fiber and leaves and cotton waste
Spawning includes but not limited to:	Seeding the substrate with mushroom inoculums
Starter culture includes but not limited to:	Nutrients used by mycelium growth and include that are • organic soils, • plant growth regulators, • vitamins, • amino acids and • complex organic supplements, • carbohydrates, • water media matrix, and • appropriate PH 7.2-7.5
Quality parameters includes but not limited to:	• uniformity, • presence or absence of damage from bruises from pests or mishandling

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration

- Technical Report writing
- Produce handling
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in mushroom production
- Hazard identification
- Risk assessment
- Traceability
- Agro Ecological Zonation
- Mushroom production structure Management
- Types of mushrooms
- Physiology of mushrooms
- Types of tools and equipment used in production of mushrooms
- Sourcing/Procurement Procedures (I.E. Seedlings, Supplies)
- Accounting principles
- Mushrooms production Terminologies
- Mushroom production Technologies
- Occupational Safety and Health Procedures
- Controlling Pests and Diseases in mushrooms
- Soil Testing
- Regulations and Standards of establishing mushroom production structures
- Waste Management
- Determining mushroom maturity
- Harvesting and Post Harvesting Handling of mushrooms
- General management of mushroom production farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land 1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established mushrooms suitable for the Agro Ecological zone, market demand 1.5 Applied safety measures by using Personal Protective Equipment 1.6 Followed required process of producing mushrooms 1.7 Efficiently used the inputs 1.8 Harvested mushrooms and carried out post-harvest handling of mushrooms 1.9 Observed food safety requirements in mushroom production 1.10 Documented and maintained food safety records in production of mushrooms
2. Resource Implications	The following resources must be provided during assessment: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling procedure 2.4 Procurement policy and procedure 2.5 Good Agricultural Practices manual 2.6 MoALF mushroom production manual 2.7 Accounting principles 2.8 Farm policy 2.9 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be accessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reports
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of mushrooms.

PRODUCE HERBS AND SPICES

UNIT CODE: HO/OS/HP/CR/06/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce quality and clean herbs and spices. It includes carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in preparing herbs and spices seedbed, producing herbs and spices while observing regulatory requirements and keeping accurate production records, determining productivity and quality of herbs and spices produced, carrying out post-harvest handling of the herbs and spices, evaluating implementation of the food safety management plan and generating the production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of herbs and spices	1.1 Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standards*** 1.2 Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established risks ***evaluation criteria***
2. Develop food safety management plan for production and post-harvest handling processes of herbs and spices	**2.1** Resources are collected as per the risk assessment **2.2** ***Food safety management plan is developed*** based on the risk assessment report. **2.3** ***Preventive measures*** are established as per identified risks. **2.4** ***Corrective actions*** are established as per identified risks. **2.5** Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. **2.6** The management plan is evaluated as per the established standards **2.7** Approval of the developed plan is sought from the top management

3. Implementation of the food safety management plan for production and post-harvest handling processes of herbs and spices	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel 3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for herbs and spices are carried out and documented as per the management plan.
4. Prepare to produce herbs and spices	4.1 ***Herbs and spices*** to be established are determined in accordance with ***Agro Ecological Zone (AEZ)***, farm plan and market demand 4.2 Herbs and spices seedbed site is selected based on herbs and spices chosen and the farm plan 4.3 Tools, equipment, materials and supplies are identified and sourced based on the type of herbs and spices to be established 4.4 Soil for analysis is sampled as per ***soil sampling procedure*** 4.5 Soil erosion is controlled based on topography, soil type and level of degradation. 4.6 Seedbed is prepared according to ***agronomic requirements*** of the herbs and spices 4.7 Planting materials are sourced in accordance with procurement procedures, **phyto-*sanitary requirements*** and the size of the seed-bed to be established 4.8 Planting holes for herbs and spices seedlings are prepared based on agronomic requirements ***,Good Agricultural Practices (GAP)*** and MoALF herbs and spices production manual
5. Produce herbs and spices	2.1 Seedlings are planted based on agronomic requirements 2.2 Seed bed of herbs and spices is watered, thinned, gapped, mulched and weeded per environmental conditions and growth habits, GAP and MoALF herbs and spices production manual 2.3 Planted herbs and spices are pruned as per agronomic requirements 2.4 Herbs and spices are pruned and protected from pests and diseases as per agronomic requirements, GAP and MoALF herbs and spices production manual 2.5 Established herbs and spices are fed based on soil analysis report

	2.6 Physiological disorders in the herbs and spices are managed as per the MoALF herbs and spices production manual 2.7 Herbs and spices are harvested in accordance with the MoALF herbs and spices production manual
6. Evaluate production of herbs and spices	6.1 Quality of herbs and spices is assessed based on herbs and spices ***quality parameters*** and MoALF herbs and spices production manual 6.2 Quantity of herbs and spices produced is assessed based on MoALF herbs and spices production manual 6.3 Return on investment is determined as per accounting principles 6.4 Recommendations are made based on evaluation report
7. Evaluate implementation of the food safety management plan for production and post-harvest handling processes of herbs and spices	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
8. Complete production of herbs and spices	8.1 Post-harvest handling of the herbs and spices is carried out as per MoALF herbs and spices production manual 8.2 Herbs and spices production report is generated in accordance with the production procedures 8.3 Herbs and spices production report is shared according to farm policies 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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**
Sources of food safety hazards include but not limited to**:**	• Water • Growth media • Sites

Food safety hazards include but not limited to**:**	• Chemical
	  • Heavy metals
	  • Pesticides

	• Biological • Physical
Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Packaging materials • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan includes but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Herbs and spices include but not limited to:	• Coriander • Parsley • Garlic • Ginger • Dill

	• Chives • Mint • Rosemary • Thyme
Planting materials include but not limited to:	• Seeds • Cuttings • Seedlings • Bulbs • Tubers
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Dibbler • Pegs
Equipment includes but not limited to:	• Spray pumps • Watering cans • Hose pipes • Plough • Harrows • Ridges • Boom sprayer • Pruning saw • Traps • Pipe sprinklers • Scouting flags • Storage tanks • Tractors
Materials and supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers

	• Fencing wire • Nails • Herbicides • Pesticides
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on herbs and spices • Use of additives on herbs and spices • Rules maximum levels of agro-chemical residues in herbs and spices • Rules on marketing and labelling of herbs and spices • Rules on materials intended to come into contact with herbs and spices • Rules on certification of producers of herbs and spices
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Herbs and spices quality parameters includes but not limited to:	• Color • Size • smell • uniformity • presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training

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

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in production of herbs and spices
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Establishment and management of herbs and spices farm
- Types of herbs and spices
- Physiology of herbs and spices
- Types of tools and equipment used in production of herbs and spices
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for herbs and spices
- Husbandry practices in production of herbs and spices
- Herbs and spices production Technologies
- Flower induction
- Maturity indices in herbs and spices
- Harvesting and Post Harvesting Handling of herbs and spices
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures

- General Management of herbs and spices farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land 1.3 Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 1.4 Established herbs and spices suitable for the Agro Ecological zone, market demand 1.5 Followed required process of producing herbs and spices 1.6 Efficiently used the inputs 1.7 Harvested herbs and spices and carried out post-harvest handling of herbs and spices 1.8 Prepared accounting documents 1.9 Prepared production report 1.10 Observed food safety requirements in herbs and spices production 1.11 Documented and maintained food safety records in production of herbs and spices
2. Resource Implications	The following resources must be provided: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guidelines 2.4 Procurement policy 2.5 Good Agricultural Practices manual 2.6 MoALF herbs and spices production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Third party reporting 3.4 3Oral questioning
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is

for assessment	recommended. Attitude is assessed alongside production of herbs and spices

PRODUCE HORTICULTURAL NUTS

UNIT CODE: HO/OS/HP/CR/07/6/B

UNIT DESCRIPTION

This unit specifies the competencies required in carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan to produce quality and clean nuts by making adequate preparation, before establishing, planting, carrying out husbandry practices and harvesting the nuts while observing regulatory requirements, keeping accurate production record, carrying out post-harvest handling of nuts, evaluating the implementation of the food safety management plan and generating a production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of horticultural nuts	**1.1** Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standard*s** **1.2** Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established ***evaluation criteria***
2. Develop food safety management plan for production and post-harvest handling processes of horticultural nuts	2.1 Resources are collected as per the risk assessment 2.2 ***Food safety management plan is developed*** based on the risk assessment report. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.3 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7Approval of the developed plan is sought from the top management

3. Implementation of the food safety management plan for production and post-harvest handling processes of horticultural nuts	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel 3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for horticultural nuts are carried out and documented as per the management plan.
4. Prepare to produce nuts	4.1 **Nuts** to be established are determined in accordance with **Agro Ecological Zone,** farm plan and market demand 4.2 Site for production of the nuts is selected as per the farm plan 4.3 ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job 4.4 Soil for analysis is sampled as per ***sampling procedure*** 4.5 Soil erosion is controlled based on topography, soil type and level of degradation Planting land is prepared in accordance with the planting material 4.6 Holes for planting nuts are prepared in accordance with ***Good Agricultural Practices (GAP) manual*** and Nuts production manual 4.7 Planting materials are sourced in accordance with procurement procedure and laid down policies 4.8 Quantities of ***planting material*** is determined based on the acreage to be planted
5. Produce Nuts	5.1 Nuts are planted as per Good Agricultural Practices (GAP) manual and MoALF nuts production manual 5.2 Nut farm is watered, mulched, gapped and weeded and protected from pests and diseases as per the nuts MoALF production manual 5.3 Nuts are fed based on soil analysis report 5.4 Physiological disorders in the nut trees are managed as per the MoALF nuts production manual 5.5 Nuts are pruned as per the MoALF nuts production manual 5.6 Nuts are harvested in accordance with the MoALF nuts production manual
6. Evaluate nuts produced	***6.1 Quality*** of nuts produced is evaluated based on nuts quality parameters 6.1 ***Quantity*** of nuts produced is evaluated based on nuts production manual

	6.2 ***Return on investment*** is determined as per accounting principles 6.3 Recommendations are made based on evaluation report
7. Evaluate implementation of the food safety management plan for production and post-harvest handling processes of horticultural nuts	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
8. Complete production of nuts	8.1 Post harvesting handling of nuts is carried out as per MoALF nuts production manual 8.2 Nuts production report is generated in accordance with MoALF nuts production manual 8.3 Nuts production reports are shared in accordance with farm policy 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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
Sources of food safety hazards include but not limited to**:**	• Water • Soil • Sites

Food safety hazards include but not limited to**:**	• Chemical
	  • Heavy metals
	  • Allergens
	  • Pesticides
	• Biological
	• Physical

Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility

Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan includes but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors • Source of power
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture.
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Nuts include but not limited to:	• Macadamia • Ground nuts • Cashew nuts • Coconuts
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears

	• Dibbler • Pegs
Equipment includes but not limited to:	• 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
Materials and supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Papers • Fencing wire • Nails • Herbicides • Pesticides
Soil sampling procedure includes but not limited to:	The process of • soil collection • packaging • submission for analysis
Agronomic requirements includes but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind

Planting materials includes but not limited to:	• Seeds • Seedlings, • cuttings
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on fruits • Use of additives on fruits • Rules maximum levels of agro-chemical residues in fruits • Rules on marketing and labelling of fruits • Rules on materials intended to come into contact with fruits • Rules on certification of fruit producers
Good Agricultural Practices (GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability
Nut quality parameters includes but not limited to:	• Nut Color • Nut skin texture • uniformity • presence or absence of damage from bruises or pests on pests

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests, diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Produce handling
- Soil sampling
- Observation

- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in horticultural nuts production
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Establishment and management of nut farm
- Types of nuts
- Physiology of nut trees
- Types of tools and equipment used in production of nuts
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for nuts
- Husbandry practices in nuts production
- Nut production Technologies
- Maturity indices in nuts
- Harvesting and post harvesting handling of nuts
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- General Management of nut farm

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: 1.1 Prepared planting land to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared land

	1.3 Established nuts suitable for the Agro Ecological zone, market demand 1.4 Observed safety measures by using Personal Protective Equipment 1.5 Followed required process of producing nuts 1.6 Efficiently used the inputs 1.7 Harvested and carried out post-harvest handling of nuts 1.8 Prepared production report 1.9 Observed food safety requirements in horticultural nuts production 1.10 Documented and maintained food safety records in production of horticultural nuts
2. Resource Implications	The following resources must be provided: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guideline 2.4 Procurement procedure 2.5 Good Agricultural Practices guidelines 2.6 MoALF Nuts production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Third party reporting 3.4 Oral questioning
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of nuts.

PRODUCE ORNAMENTAL PLANTS

UNIT CODE: HO/OS/HP/CR/08/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce quality and clean ornamental plants. It involves preparing the growing structures for ornamental plants, planting, carrying out husbandry practices on the ornamental plants while observing regulatory requirements and keeping production records, acclimatizing the ornamental plants and generating a production report.

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 produce ornamental plants	1.1 ***Ornamental plants*** to be established are determined in accordance with ***Agro Ecological Zone***, farm plan and market demand 1.2 Site for production of the ornamental plants is selected as per the farm plan 1.3 ***Tools, equipment , materials and supplies*** are identified and sourced based on the requirements of the job 1.4 Soil for analysis is sampled as per ***sampling procedure*** 1.5 Soil erosion is controlled based on topography, soil type and level of degradation 1.6 ***Propagation structure*** is prepared in accordance with the ornamental plants production manual 1.7 Soil based planting medium is prepared in accordance with Good Agricultural Practices (GAP) manual and ornamental plants production manual 1.8 Soilless planting medium is prepared in accordance with Good Agricultural Practices (GAP) manual and ornamental plants production manual 1.9 P***lanting materials*** for the ornamental plants are sourced in accordance with ***phyto-sanitary requirements***, procurement procedure and acreage to be planted
2. Produce ornamental plants	2.1 Seedlings/seeds are planted/potted as per ***potting containers*** and ornamental plants production manual.

	2.2 Ornamental plants are watered, weeded, pruned, supported/trained as per the ornamental plants production manual. 2.3 Established ornamental plants are fed based on soil analysis report. 2.4 Established ornamental plants are protected from pests and diseases as per GAP 2.5 Physiological disorders in the ornamental plants are managed as per the ornamental plants production manual 2.6 Ornamental plants are acclimatized as per ornamental plants production manual
3. Evaluate ornamental plants produced	3.1 Quality of ornamental plants produced is evaluated based on ornamental plants production manual 3.2 Quantity of ornamental plants produced is evaluated based on ornamental plants production manual 3.3 Return on investment is determined as per accounting principles 3.4 Recommendations are made based on evaluation report
4. Complete production of ornamental plants	4.1 Ornamental plants production is documented in accordance with ornamental plants production manual 4.2 Ornamental plants production reports are shared in accordance with farm policy

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
Ornamental plants include but not limited to:	• Asters • Chrysanthemum • Bougainvillea • Statice • Marigold • Geranium • Larkspur • Petunia
Planting materials include but not limited to:	• Seeds • Seedlings • Cuttings • Tubers

	• Splits • Tissue culture
Propagation *structures* include but not limited to:	• Lath House • Net House
Potting containers	• Pots • Boxes • Planters • Trays
Tools includes but not limited to:	• Hoes • Machetes • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Pegs
Equipment includes but not limited to:	• Spray pumps • Watering cans • Hose pipes • Plough • Harrows • Pruning saw • Wire strainer • Traps • Pipe sprinklers • Scouting flags • Storage tanks • Tractors
Materials and Supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Fencing wire • Nails • Herbicides

	• Pesticides
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Soilless growing medium includes but not limited to	• peat moss • perlite • vermiculite • sand
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on plants • Rules maximum levels of agro-chemical residues in plants • Rules on materials intended to come into contact with plants • Rules on certification of ornamental producers
Good Agricultural Practices(GAP) includes but not limited to:	• Field hygiene • Selection of clean planting materials • Safe use of agro-chemicals • Maximum Residual Levels of agro-chemicals used • Environmental sustainability

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
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests , diseases and nutrients deficiency scouting
- Equipment calibration

- Technical Report writing
- handling of ornamental plants
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Sources of quality water
- Agro Ecological Zonation
- Establishment and management of ornamental plants
- Landscaping
- Types of ornamental plants
- Physiology of ornamental plants
- Types of tools and equipment used in production of ornamental plants
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for ornamental plants
- Soilless growing medium
- Husbandry practices in ornamental plants
- Ornamental plants production Technologies
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- Acclimatization Of Ornamental Plants
- General management of ornamental plants production farm

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: 1.1 Prepared planting/potting structure/containers to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared structure/container 1.3 Prepared planting medium as per the HCDA phytosanitary requirements

	1.4 Established ornamental plants suitable for the market demand 1.5 Applied safety measures by using Personal Protective Equipment 1.6 Followed required process of producing ornamental plants 1.7 Efficiently used the inputs 1.8 Acclimatized the ornamental plants 1.9 Prepared accounting documents 1.10 Prepared production report
2. Resource Implications	The following resources must be provided: 2.1 Assessment location 2.2 Farm plan 2.3 Soil sampling guidelines 2.4 Laid down procurement policies 2.5 Good Agricultural Practices manual 2.6 Ornamental plants production manual 2.7 Farm policy
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reporting
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of ornamental plants.

PRODUCE CUT FLOWERS

UNIT CODE: HO/OS/HP/CR/09/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce quality and clean cut flowers. It involves preparation of the production structures, planting, carrying out husbandry practices while observing regulatory requirements and keeping accurate production records, carrying out postharvest handling of the flowers and generating a production report.

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 produce cut flowers	1.1 **Cut flowers** to be established are determined in accordance with **Agro Ecological Zone**, farm plan and market demand 1.2 Site for production of the cut flowers is selected as per the farm plan 1.3 ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of cut flower to be established 1.4 Soil for analysis is sampled as per ***sampling procedure*** 1.5 1.5Propagation structure is prepared in accordance with the cut flowers production manual 1.6 Soil-based growing medium is prepared in accordance with ***Good Agricultural Practices (GAP)*** manual and cut flowers production manual 1.7 ***Soilless growing medium*** is prepared in accordance with Good Agricultural Practices (GAP) manual and cut flowers production manual 1.8 ***Planting materials*** are sourced for in accordance with HCDA phyto-***sanitary requirements, procurement procedures*** and the acreage to be planted.
2. Produce cut flowers	2.1 Cut flowers are planted as per Good Agricultural Practices (GAP) manual and cut flowers production manual 2.2 Cut flowers are watered, weeded, supported, thinned, pinched, disbudded, and pruned as per the cut flowers production manual 2.3 Cut flowers are fertigated and chemigated based on the nutrient requirement of the cut flowers 2.4 Pests and diseases in cut flowers are controlled based on GAP and cut flowers production manual

	2.5 Physiological disorders in the cut flowers are managed as per the cut flowers production manual 2.6 Cut flowers are induced to flower as per GAP and type of cut flower 2.7 2.The cut flowers are harvested as per cut flowers production
3. Evaluate production of cut flowers	3.1 Quality of cut flowers produced is evaluated based on ***flower quality parameters*** and cut flowers production manual 3.2 Quantity of cut flowers produced is evaluated based on cut flowers production manual 3.3 ***Return on investment*** is determined as per accounting principles 3.4 Recommendations are made based on evaluation report
4. Complete production of cut flowers	4.1 Post-harvest handling of cut flowers is carried out as per flower production manual 4.2 Cut flowers production is documented in accordance with cut flowers production manual 4.3 Cut flowers production reports are shared in accordance with farm policy 4.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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**
Cut flowers include but not limited to:	• Roses • Carnation • Alstromeria • Gypsophila • Ornis • Hydrangea • Strelitzia • Arabicum • Orchids • Agapanthus • Delphinium

Planting materials include but not limited to:	• Cuttings • bulbs • Tubers • Corms • Tissue culture • Embryo culture • Buds • Suckers • Corms
Soilless growing medium include but not limited to:	• Vermiculite • Perlite • Pumice • Coco peat
Tools includes but not limited to:	• Hoes • Machetes • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Secateurs • Shears • Pegs
Equipment includes but not limited to:	• Spray pumps • Watering cans • Hose pipes • Plough • Harrows • Pruning saw • Wire strainer • Traps • Pipe sprinklers • Scouting flags • Storage tanks • Tractors
Materials and Supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery

	• Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Fencing wire • Nails • Herbicides • Pesticides
Materials and Supplies includes but not limited to:	• Pesticides • Fertilizers • Stationery • Manures • Seedlings /planting materials • Khaki paper bags size 3 • Rope • Nets • Translucent papers • Papers • Fencing wire • Nails • Herbicides • Pesticides
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Soilless growing medium includes but not limited to	• peat moss • perlite • vermiculite • sand
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity

	• Pests • Diseases • Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on plants • Rules maximum levels of agro-chemical residues in plants • Rules on materials intended to come into contact with plants • Rules on certification of ornamental producers

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
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Fertigation and chemigation in production of cut flowers
- 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
- Types of tools and equipment used in production of cut flowers
- Structures for production of cut flowers
- Types of cut flowers
- Physiology of cut flowers
- Soil sampling and testing
- Soil conservation
- 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
- Occupational Safety and Health Procedures
- Harvesting and Post Harvesting Handling of cut flowers
- General management of cut flowers production farm

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: 1.1 Prepared planting structure to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared structure 1.3 Prepared growing medium as per the HCDA phyto-sanitary guide 1.4 Established cut flowerssuitable for the market demand 1.5 Applied safety measures by using Personal Protective Equipment 1.6 Followed required process of producing ornamental plants 1.7 Efficiently used the inputs 1.8 Harvested and carried out post-harvest handling of cut flowers 1.9 Prepared accounting documents 1.10 Prepared production report
2. Resource Implications	The following resources must be provided: 2.1 Assessment location 2.2 Farm plan 2.3 Soils sampling guidelines 2.4 Laid down procurement policies

	2.5 Good Agricultural Practices manual 2.6 HCDA phyto-sanitary guide 2.7 Cut flowers production manual 2.8 Farm policy
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Interviews
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of cut flowers.

PRODUCE VEGETABLE CROPS

UNIT CODE: HO/OS/HP/CR/10/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to produce quality and clean vegetables. It involves carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan in seedbed preparation, planting, carrying out husbandry practices on the vegetables while observing regulatory requirements and keeping accurate production records, carrying out post-harvest handling of vegetables, evaluating implementation of the food safety management plan and generating a production report.

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. Carry out food safety risk assessment for production and post-harvest handling processes of vegetable crops	1.1 Possible ***sources of food safety hazards*** *are* identified guided by the process flow diagram developed as per established ***standard*s** 1.2 Risks identified are assessed as per the previous use of the site and ***sources of materials*** 1.3 Risks are evaluated and characterized as per established ***evaluation criteria***
2. Develop food safety management plan for for production and post-harvest handling processes of vegetable crops	2.1 Resources are collected as per the risk assessment 2.2 Management plan is developed based on the risk assessment. 2.3 ***Preventive measures*** are established as per identified risks. 2.4 ***Corrective actions*** are established as per identified risks. 2.5 Standard operating procedures for preventing and mitigating food safety risks are developed based on the management plan. 2.6 The management plan is evaluated as per the established standards 2.7 Approval of the developed plan is sought from the top management

3. Implementation of the food safety management plan for production and post-harvest handling processes of vegetable crops	3.1 The management plan is adopted as per the laid down procedures 3.2 Communication of the plan is done to the entire team through the official channel 3.3 ***Resources for implementing the food safety management plan*** are availed as identified in the management plan 3.4 Practices and procedures for production and post-harvest handling processes for vegetable crops are carried out and documented as per the management plan.
4.Prepare to produce vegetables	***4.1 Vegetables (exotic, indigenous and Asian)***to be established are determined in accordance with ***Agro Ecological Zone, farm plan*** and ***market demand*** ***4.2*** Site for production of the vegetables is selected as per the ***farm plan*** ***4.3 Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job ***4.4*** Soil for analysis is sampled as per ***sampling procedure*** ***4.5*** Soil erosion is controlled based on topography, soil type and level of degradation ***4.6 Propagation structure*** is prepared in accordance with the vegetables production manual ***4.7 Soil-based growing medium*** is prepared in accordance with ***Good Agricultural Practices (GAP)*** manual and vegetables production manual and ***HCDA phyto-sanitary requirements*** ***4.8 Soilless growing medium*** is prepared in accordance with GAP manual and vegetables production manual and HCDA phyto-sanitary requirements ***4.9 Planting materials*** are sourced in accordance with procurement procedure phyto-sanitary requirements and size of the vegetable seedbed. ***4.10*** Planting holes vegetable seedlings are prepared based on agronomic requirements, GAP and MoALF vegetable production manual
5.Establish vegetables gardens	5.1 Vegetables are planted as per agronomic requirements 5.2 ***Vegetable seed bed is*** gapped, thinned, weeded, watered in accordance with MOALF vegetables production manual 5.3 Vegetables are trained, pruned and de-suckered as per the MOALF vegetables production manual

	5.4 Established vegetables are fed in accordance with GAP and the MOLF vegetables production manual and soil analysis report 5.5 Pests and diseases in vegetables are controlled based on GAP and vegetables production manual 5.6 Physiological disorders in the vegetables are managed as per the vegetables production manual 5.7 Root and tuber vegetables are earthed up and cured of as per the vegetables production manual 5.8 The vegetables are harvested as per the vegetables production
6. Evaluate vegetables produced	6.1 ***Quality*** of vegetables produced is evaluated based on ***vegetable quality parameters*** and vegetables production manual 6.2 ***Quantity*** of vegetables produced is evaluated based on vegetables production manual 6.3 ***Return on investment*** is determined as per accounting principles 6.4 Recommendations are made based on the evaluation report
7. Evaluate implementation of the food safety management plan for production and post-harvest handling processes of vegetable crops	7.1 Internal verification of the plan is carried out as per the management plan and ***statutory requirements*** 7.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
8. Complete production of vegetables	8.1 Post-harvest handling of vegetables is carried out as per MoALF production manual 8.2 Vegetables production is documented in accordance with vegetables production manual 8.3 Vegetables production reports are shared in accordance with farm policy 8.4 Waste management is undertaken in accordance with Environmental Management and Coordination Act (EMCA)

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
Sources of food safety hazards include but not limited to:	• Water • Soil • Sites

Food safety hazards include but not limited to:	• Chemical
	  • MRL's
	  • Heavy metals
	• Biological
	• Physical

Sources of materials include but not limited to:	• Seedlings • Inputs • Spray equipment • Irrigation kits • Harvesting equipment • Transport facilities • Holding facility
Evaluation criteria includes consideration of:	• Prevalence • Probability • Severity
Resources for implementing the food safety management plan includes but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors
Food safety management plan development includes but not limited to	• Listing hazards • Identifying preventive measures and their control limit • Establishing monitoring procedures • Establishing corrective action • Records to be kept • Checking and reviewing the plan
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Exotic vegetables include but not limited to:	• Cole crops: cabbage, kales, broccoli, and cauliflower • Solanaceae: tomato, Irish potato, capsicum • Legumes: French beans, garden peas: • Root vegetables: onions, carrots • Others: Sweet corn, lettuce, spinach, asparagus, cucumber, melons, squash

Indigenous and Asian vegetables include but are not limited to:	• Eggplant/ brinjals, • capsicums, • okra , • karella, • moringa, • black nightshade, • Spider weed, • amaranths, • cowpeas, • pumpkin, • crotalaria
Growing structures include but are not limited to:	• seed bed • greenhouses • shade houses • hotbeds • cold beds • pots
Planting materials include but not limited to:	• cuttings • seedlings • seeds • bulbs • tubers • corms • tissue culture • embryo culture • buds • suckers
Soil based growing medium includes but not limited to:	• forest soil • sub soil
Tools includes but not limited to:	• Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Pegs • Hammer • Saw • Bucket • Shears
Equipment includes but not limited to:	• Spray pumps • Watering cans • Hose pipes • Plough • Harrows

	• Ridges • Boom sprayer • Pruning saw • Wire strainer • Traps • Pipes sprinklers • Scouting flags • Storage tanks • Gutters • Tractors • Grading shed • Bud count square
Materials and supplies includes but not limited to:	• Manures • Seedlings • Khaki paper bags size 3 • Rope • Nets • Trellising wire • poles • Pesticides • Pheromones • Fertilizers • Stationery • Nails • Fencing wire • Fencing wire • Staking sticks • Pegs
Soil sampling procedure includes but not limited to:	The process of • soil collection, • packaging and • submission for analysis
Soilless growing medium includes but not limited to	• peat moss • perlite • vermiculite • sand
Agronomic requirements include but not limited to:	• Growing cycle and growing period • Radiation • Temperature • Rooting • Aeration • Water quantity and quality • Nutrients • Salinity • Pests • Diseases

	• Weeds • Wind
Phyto-sanitary requirements includes but not limited to:	• Rules on use of agro-chemicals on plants • Rules maximum levels of agro-chemical residues in plants • Rules on materials intended to come into contact with plants • Rules on certification of ornamental producers

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:

- Analytical
- Sampling
- Training
- Tilling
- Measuring
- Leveling
- Gaping
- Pruning
- Spraying
- Pests , diseases and nutrients deficiency scouting
- Equipment calibration
- Technical Report writing
- Soil sampling
- Observation
- Negotiation
- Digital literacy

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in production of vegetable crops
- Hazard identification
- Risk assessment
- Traceability
- Sources of quality water
- Agro Ecological Zonation
- Types of tools and equipment used in production of vegetables
- Structures for production of vegetables
- Types of vegetables

- Physiology of vegetables
- Soil sampling and testing
- Soil conservation
- Phyto-sanitary requirements
- Good Agricultural Practices
- Sources of quality planting materials for vegetables
- Husbandry practices in vegetable production
- Vegetable production Technologies
- Procedures for calibration of equipment
- Soilless growing medium
- Maturity indices in vegetables
- Harvesting and Post Harvesting Handling of vegetables
- Accounting principles
- Production records and reports
- Waste Management
- Occupational Safety and Health Procedures
- Harvesting and Post Harvesting Handling of vegetables
- General management of vegetable farm

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: 1.1 Prepared planting structures to a level suitable to the planting material 1.2 Sourced planting materials adequate for the prepared structure 1.3 Prepared planting medium (soil based and soilless) as per the KEPHIS guide 1.4 Established vegetables suitable for the market demand 1.5 Applied safety measures by using Personal Protective Equipment 1.6 Followed required process of producing vegetables 1.7 Efficiently used the inputs 1.8 Harvested and carried out post-harvest handling of vegetables 1.9 Prepared accounting documents 1.10 Prepared production report 1.11 Observed food safety requirements in vegetable crops production 1.12 Documented and maintained food safety records in production of vegetable crops

2. Resource Implications	The following resources must be provided: 2.1 Assessment location 2.2 Farm plan 2.3 Procurement policies 2.4 Good Agricultural Practices manual 2.5 KEPHIS guide 2.6 MoALF vegetables production manual 2.7 Farm policy 2.8 Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reporting
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry sector, workplace and job roles) is recommended. Attitude is assessed alongside production of vegetables

MANAGE HORTICULTURAL PRODUCTION FARM

UNIT CODE: HO/OS/HP/CR/11/6/B

UNIT DESCRIPTION

This unit specifies the competencies required to manage horticultural production farm. It involves carrying out food safety risk assessment, developing food safety management plan, implementing the food safety management plan, generating management tools, allocating resources, monitoring and evaluating the management process, evaluating implementation of the food safety management plan and generating management reports.

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. Ensure implementation of the food safety management plan for management of horticultural production farm	1.1 The management plan is adopted as per the laid down procedures *1.2* Communication of the plan is done to the entire team through the official channel 1.3 ***Resources*** are availed as identified in the management plan 1.4 Practices and procedures for the horticultural nursery are carried out and documented as per the management plan
2. Prepare to manage horticultural production farm	2.1 Strategic plan is prepared in accordance with the business environment analysis report 2.2 ***Annual Implementation Plan*** is developed based on Strategic Plan 2.3 Budget is prepared as per the Annual Implementation Plan 2.4 ***Resources*** required are sourced in accordance with Strategic Plan and Standard Operations Procedures 2.5 ***Management Information System*** is installed in accordance with the farm needs 2.6 ***Financial plan*** is prepared based on the Strategic Plan
3. Manage horticultural production farm	3.5 Management functions are carried out in accordance with the Strategic Plan 3.6 ***Resources*** are allocated in accordance with the annual implementation plan 3.7 Finances are utilized based on the financial plan

4. Evaluate management of horticultural production farm	4.1 Monitoring and evaluation is undertaken according to Strategic Plan, Annual Implementation Plan and Standard Operation Procedures 4.2 Auditing of the production is carried out based on the Strategic Plan, Annual Implementation Plan 4.3 Audit queries are reported and addressed
5. Food safety management system for management of horticultural production farm is evaluated	5.1 Verification of the plan is carried out as per the management plan and ***statutory requirements*** 5.2 The implementation is assessed for its effectiveness and measures put in place for improvement as per the management plan
6. Complete management of horticultural production farm	6.1 Management report is prepared based on Strategic Plan and Annual Implementation Plan 6.2 Management report is shared with relevant partners in accordance with **Standard Operation Procedures**
7. Farm documentation is maintained	7.1 Provide resources required for documentation 7.2 Training of the resource persons 7.3 Confirm accuracy of the documentation

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**
Annual Implementation Plan includes but not limited to:	• Annual Activities • Annual Costs • Annual schedules
Management Information System includes but not limited to:	• Collecting of information • processing of information • use of ICT equipment
Resources include but not limited to:	• Materials • Energy • Services • Staff • Knowledge • Other assets that are transformed to produce benefit

Standard Operation Procedures include but not limited to:	• set of step-by-step instructions for carrying out routine operations • set of step-by-step instructions for operating machines and equipment
Farm plan includes but not limited to	• Land layout • Cropping calendars • Rotational plans
Resources include but not limited to:	• Financial • Adequate trained personnel • Stationery • Computers • Printers • Projectors • PCPB List of registered products
Standards include but not limited to	• General principles of hygiene. • Code of general hygienic practice for horticultural food industry. • Code of Practice for Horticulture
Statutory requirements includes but not limited to:	• PCPB ACT (list of registered products) • WRA ACT • OSH ACT • EMC ACT • CROPS ACT • KEPHIS ACT
Practices and procedures include but not limited to:	• GAP • Approve use of manure and water • Approved fertilisers • Approved agrochemicals • Observance of PHI

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:

- Analytical
- Sampling
- Training
- Supervisory
- Public Communication
- Negotiation
- Planning
- Organizing

- Performance Management
- Technical report writing
- Controlling
- Coordinating
- Problem solving
- Critical thinking
- Decision making
- Persuasion
- Management of Financial Resources
- Systems and processes Analysis
- Systems and processed Evaluation

Required knowledge

The individual needs to demonstrate knowledge of:

- Good agricultural practices (GAP)
- Food safety management plan development
- Food safety in horticultural produce processing unit operations
- Hazard identification
- Risk assessment
- Temperature and humidity control
- Traceability
- Strategic planning
- resource allocation
- coordination of people and resources
- Farm as an organization
- Policy formulation
- Daily farm operations
- Financial management
- Machines and tools, including their designs, uses, repair, and maintenance
- practical application of engineering science and technology
- Building and Construction
- Human behavior and performance
- Laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules
- Public Safety and Security
- Sales and Marketing
- Economics and Accounting
- Delegation
- Staff recruitment
- Motivation

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: 1.1 Prepared a strategic plan 1.2 Prepared a budget 1.3 Installed a Management Information System 1.4 Prepared a financial plan 1.5 Carried out farm planning 1.6 Allocated resources 1.7 Monitored and evaluated farm activities 1.8 Developed a farm report 1.9 Shared a farm report 1.10 Observed food safety requirements in managing horticultural production farm 1.11 Documented and maintained food safety records in managing horticultural production farm
2. Resource Implications	The following resources must be provided: 1. Farm business plan 2. Standard Operations Procedures 3. Business operating environment assessment report 4. Required standards and regulations as pertains Code of Practice for Horticulture
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Written tests 3.3 Oral questioning 3.4 Third party reporting
4. Context of Assessment	Competency may be assessed: 4.1 Off-the-job 4.2 On-the-job 4.3 Work placement -attachment Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	What can be assessed in holistic assessment (with other units relevant to the industry Sector, workplace and job roles) is recommended. Attitude is assessed alongside management of horticultural crops production farm