****

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**HORTICULTURE PRODUCER**

**LEVEL 5**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

First published 2019

© 2019, TVET CDACC

All rights reserved. No part of these occupational standards may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods without the prior written permission of the TVET CDACC, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law. For permission requests, write to the Council Secretary/CEO, at the address below:

**Council Secretary/CEO**

**TVET Curriculum Development, Assessment and Certification Council**

**P.O. Box 15745–00100**

**Nairobi, Kenya**

**Email: info@tvetcdacc.go.ke**

# 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 in the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 14 of 2012). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET 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. 14 of 2012 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 Horticulture Sector Skills Advisory Committee (SSAC), Food safety 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 basis for development of competency-based curriculum for Horticulture production level 5.

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.

**CHAIRPERSON**

**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 Horticulture and Food Safety Sector Skills Advisory Committee (SSAC) members for their contribution to the development and review 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.

**CHAIRPERSON**

**HORTICULTURE SECTOR SKILLS ADVISORY COMMITTEE**

# ABBREVIATIONS AND 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

# TABLE OF CONTENTS

[FOREWORD 1](#_Toc69380479)

[PREFACE 2](#_Toc69380480)

[ACKNOWLEDGMENT 3](#_Toc69380481)

[ABBREVIATIONS AND ACRONYMS 4](#_Toc69380482)

[TABLE OF CONTENTS 6](#_Toc69380483)

[KEY TO UNIT CODE 6](#_Toc69380484)

[BASIC UNITS OF COMPETENCY 8](#_Toc69380485)

[DEMONSTRATE COMMUNICATION SKILLS 9](#_Toc69380486)

[DEMONSTRATE NUMERACY SKILLS 14](#_Toc69380487)

[DEMONSTRATE EMPLOYABILITY SKILLS 32](#_Toc69380488)

[CORE UNITS OF COMPETENCY 52](#_Toc69380489)

[PRODUCE TROPICAL FRUITS 53](#_Toc69380490)

[PRODUCE SUB-TROPICAL FRUITS 61](#_Toc69380491)

[PRODUCE TEMPERATE FRUITS 67](#_Toc69380492)

[PRODUCE VINE FRUITS 75](#_Toc69380493)

[PRODUCE MUSHROOMS 83](#_Toc69380494)

[PRODUCE HERBS AND SPICES 89](#_Toc69380495)

[PRODUCE HORTICULTURAL NUTS 97](#_Toc69380496)

[PRODUCE ORNAMENTAL PLANTS 104](#_Toc69380497)

[PRODUCE CUT FLOWERS 109](#_Toc69380498)

[PRODUCE VEGETABLES 115](#_Toc69380499)

# 

# KEY TO UNIT CODE

**HO /OS /AT /BC /01/ 5/B**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control Version

# 

# BASIC UNITS OF COMPETENCY

# DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** HO/OS/HP/BC/01/5/B

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organisation

**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. Specific communication needs of clients and colleagues are identified and met based on workplace requirements 2. Different communication approaches are identified and applied according to clients’ needs 3. Conflict is identified and addressed as per the standards of the organization |
| 1. Contribute to the development of communication strategies | 1. Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as per organizations’ strategic plan 2. Channels of communication are established and reviewed based on the workplace needs 3. Communication training needs are identified and provided according to SOPs 4. Work related network and relationship are maintained based on workplace requirements 5. Negotiation and conflict resolution strategies are maintained as per the workplace procedures |
| 1. Conduct workplace interviews | 1. ***Communication strategies*** are identified and employed in ***interview situations*** based on workplace requirements 2. Records of interviews are made and maintained in accordance with organizational procedures 3. Effective questioning, listening and nonverbal communication techniques are used based on needs |
| 1. Facilitate group discussions | 1. Mechanisms to enhance ***effective group interaction*** are identified and implemented according to workplace requirements 2. Strategies to encourage group participation are identified and used as per organizations’ procedures 3. Meetings objectives and agenda are set and followed based on workplace requirements 4. Relevant information is provided and feedback obtained according to set protocols 5. Evaluation of group communication strategies is undertaken in accordance with workplace guidelines 6. Specific communication needs of individuals are identified and addressed as per individual needs |
| 1. Represent the organization | 1. Relevant presentations are researched and presented based on internal or external communication forums requirements Presentation is delivered in a clear and sequential manner as per the predetermined time 2. Presentation is made as per appropriate media 3. Difference views are respected based on workplace procedures 4. Written communication is done as per organizational standards 5. Inquiries are responded according to 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** |
| 1. Communication strategies may include but not limited to: | * Language switch * Comprehension check * Repetition * Asking confirmation * Paraphrase * Clarification request * Translation * Restructuring * Approximation * Generalization |
| 1. Interview situations may include but not limited to: | * Establishing rapport * Eliciting facts and information * Facilitating resolution of issues * Developing action plans * Diffusing potentially difficult situations |
| 1. Effective group interaction may include but not limited to: | * Identifying and evaluating what is occurring within an interaction in a non-judgmental 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 * Openness and flexibility in communication |

**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:

* Active listening
* Giving/receiving feedback
* Interpretation of information
* Role boundaries setting
* Negotiation
* Communication

**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

**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. Met communication needs of clients and colleagues 2. Contributed to the development of communication strategies 3. Conducted interviews 4. Facilitated group discussions 5. Represented the organization |
| 1. Resource Implications for competence assessment | The following resources should be provided:   1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed:   1. On the job 2. Off the job 3. During industrial attachment |
| 1. 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/02/5/B

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate numeracy skills. it involves calculating with whole numbers and familiar fractions, decimals, and percentages for work estimating, measuring, and calculating with routine metric measurements for work, using routine maps and plans for work, interpreting, drawing and constructing 2D and 3D shapes for work, interpreting routine tables, graphs and charts for work, collecting data and constructing routine tables and graphs for work and using basic functions of 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. Calculate with whole numbers and familiar fractions, decimals and percentages for work | 1. Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted as per SOPs 2. Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended as per SOPs 3. Calculations which may involve a number of steps are performed as per SOPs 4. Calculations done with whole numbers and routine or familiar fractions, decimals and percentages as per SOPs 5. Conversion between equivalent forms of fractions, decimals and percentages is done as per SOPs 6. Order of operations is applied to solve multi-step calculations as per SOPs 7. Problem solving strategies are appropriately applied as per SOPs 8. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per SOPs 9. Formal and informal mathematical language and symbolism are used to communicate the result of the task as per SOPs. |
| 2. Estimate, measure, and calculate with routine metric measurements for work | 1. Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements 2. Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements 3. Measurements are estimated and made using correct units as per measurement manuals. 4. Estimations and calculations done as per routine measurements 5. Conversions performed routinely as per metric units 6. Problem solving processes are used to undertake the tasks as per workplace procedures. 7. Estimations are made to check reasonableness of problem-solving process, outcome and its appropriateness to the context and task as per workplace procedures 8. Information is recorded using mathematical language and symbols appropriate to discuss the task as per workplace procedures. |
| 3. Use routine maps and plans for work | 1. Features are identified in routine maps and plans as per SOPs 2. Symbols and keys in routine maps and plans are clearly explained as per SOPs 3. Orientation of map to North is identified and interpreted as per SOPs 4. Understanding of direction and location is clearly demonstrated as per SOPs 5. Simple scale is applied to estimate length of objects, or distance to location or object as per SOPs 6. Directions are given and received using both formal and informal language as per SOPs |
| 4. Interpret, draw and construct 2D and 3D shapes for work | 1. Two dimensional shapes and routine three-dimensional shapes identified in everyday objects and in different orientations in accordance with job specifications 2. The use and application of shapes elaborately explained as per SOPs 3. Formal and informal mathematical language and symbols used to describe and compare the features of two-dimensional shapes and routine three-dimensional shapes as per workplace procedures. 4. Common angles identified in accordance with SOPs 5. Common angles in everyday objects are appropriately estimated as per SOPs 6. Formal and informal mathematical language are used to describe and compare common angles as per workplace procedures. 7. Common geometric instruments used to draw two dimensional shapes as per SOPs 8. Routine three dimensional objects constructed from given nets as per SOPs. |
| 5. Interpret routine tables, graphs and charts for work | 1. Routine tables, graphs and charts identified in predominately familiar texts and contexts as per tables and graph manuals 2. Common types of graphs and their different uses identified as per SOPs 3. Features of tables, graphs and charts identified as per workplace procedures 4. Information in routine tables, graphs and charts located and interpreted as per workplace procedures 5. Calculations are perform to interpret information as per SOPs 6. How statistics can inform and persuade interpretations is explained as per SOPs 7. Misleading statistical information is identified as per workplace procedures. 8. Information relevant to the workplace is discussed as per workplace procedures. |
| 6. Collect data and construct routine tables and graphs for work | 1. Features of common tables and graphs identified as per SOPs 2. Uses of ***different tables and graphs*** identified as per job specifications 3. Data and variables to be collected are determined as per workplace procedures. 4. The audience is determined as per the workplace procedures 5. Method of data collection is select as per job requirement 6. Data is collected as per SOPs 7. Information is collated in a table as per SOPs 8. Suitable scale and axes determined as per job specifications 9. Graph to present information is drafted and drawn as per SOPs 10. Data checked to ensure that it meets the expected results and context as per workplace procedures 11. Information is reported or discussed using formal and informal mathematical language as per workplace procedures |
| 7. Use basic functions of calculator | * 1. Keys are identified and used for ***basic functions on a calculator*** as per SOPs   2. Calculation is done using whole numbers, money and routine decimals and percentages as per SOPs   3. Calculation done with routine fractions and percentages as per SOPs   4. Order of operations is applied to solve multi-step calculations as per SOPs   5. Results are interpreted, displayed and recorded as per workplace procedures   6. Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task as per workplace procedures   7. Formal and informal mathematical language and appropriate symbolism and conventions used to communicate the result of the task as per workplace procedures. |

**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. Different tables and graphs may include but not limited to: | * Bar Graphs * Flow Charts * Pie Charts * Pictograph * Line Graphs * Time Series Graphs * Stem and Leaf Plot * Histogram * Dot Plot * Scatter plot |
| 1. Use basic functions of calculator may include but not limited to: | * Addition * Multiplication * Calculate ratios * Conversion of ratios into percentages |

**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:

* Measuring
* Logical thinking
* Computing
* Drawing of graphs
* Applying mathematical formulas
* Analytical

**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 | Assessment requires evidence that the candidate:   1. Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages 2. Estimated, measured and calculated with routine metric measurements 3. Applied simple scale to estimate length of objects or distance to location or object 4. Used formal and informal mathematical language to describe and compare common angles 5. Used common geometric instruments to draw two dimensional shapes 6. Collected data and constructed routine tables and graphs 7. Used basic functions of calculator correctly |
| 1. Resource Implications for competence assessment | The following resources should be provided:   1. Access to relevant workplace or appropriately simulated environment where assessment can take place 2. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed in:   1. On the job 2. Off the job 3. Industrial attachment |
| 1. 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/03/5/A

**UNIT DESCRIPTION**

This unit covers the competencies required to demonstrate digital literacy. It involves identifying appropriate computer software and hardware, applying security measures to data, hardware, software in automated environment, applying computer software in solving tasks, applying internet and email in communication at workplace, applying desktop publishing in official assignment and preparing presentation packages.

**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. Concepts of ICT are determined in accordance with computer equipment 2. Classifications of computers are determined in accordance with manufacturers specification 3. Appropriate computer software is identified according to manufacturer’s specification 4. ***Appropriate computer hardware*** is identified according to manufacturer’s specification 5. Functions and commands ofoperating system are determined in accordance withmanufacturer’s specification |
| 1. Apply security measures to data, hardware, software in automated environment | 1. ***Data security and privacy are classified*** in accordance with the prevailing technology 2. ***Security threats*** areidentified, **and *control measures*** are applied in accordance with laws governing protection of ICT 3. Computer threats and crimes are detected in accordance with Information security management guidelines 4. Protection against computer crimes is undertaken in accordance with laws governing protection of ICT |
| 1. Apply computer software in solving tasks | 1. Word processing conceptsare applied in resolving workplace tasks, report writing and documentation as per job requirements 2. Word processing utilities are applied in accordance with workplace procedures 3. Worksheet layout is prepared in accordance with work procedures 4. Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures 5. Continuous data manipulated on worksheet is undertaken in accordance with work requirements 6. Database design and manipulation is undertaken in accordance with office procedures 7. Data sorting, indexing, storage, retrieval and security is provided in accordance with workplace procedures |
| 1. Apply internet and email in communication at workplace | 1. Electronic mail addresses are opened and applied in workplace communication in accordance with office policy 2. Office internet functions are defined and executed in accordance with office procedures 3. Network configuration is determined in accordance with office operations procedures 4. Official World Wide Web is installed and managed according to workplace procedures |
| 1. Apply desktop publishing in official assignments | 1. Desktop publishing functions and tools are identified in accordance with manufactures specifications 2. Desktop publishing tools are developed in accordance with work requirements 3. Desktop publishing tools are applied in accordance with workplace requirements 4. Typeset work is enhanced in accordance with workplace standards |
| 1. Prepare presentation packages | 1. Types of presentation packages are identified in accordance with office requirements 2. Slides are created and formulated in accordance with workplace procedures 3. Slides are edited and run in accordance with work procedures 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** |
| 1. Appropriate computer hardware may include but not limited to: | * Computer case * Monitor * keyboard * mouse |
| 1. Data security and privacy may include but not limited to: | * Confidentiality of data * Cloud computing * Integrity -but-curious data surfing |
| 1. Security and control measures may include but not limited to: | * Counter measures against cyber terrorism * Risk reduction * Cyber threat issues * Risk management * Pass wording |
| 1. Security threats may include but not limited to: | * Cyber terrorism * Hacking |

**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
* 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
* Microsoft suite

**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. Identified and controlled security threats 2. Detected and protected computer crimes 3. Applied word processing in office tasks 4. Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 5. Opened electronic mail for office communication as per workplace procedure 6. Installed internet and World Wide Web for office tasks in accordance with office procedures 7. Integrated emerging issues in computer ICT applications 8. Applied laws governing protection of ICT |
| 1. Resource Implications | The Following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Written Test 2. Observation 3. Practical assignment 4. Interview/Oral Questioning |
| 1. Context of Assessment | Competency may be assessed in:   1. Off the job 2. On the job setting 3. Industrial attachment |
| 5. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

**DEMONSTRATE ENTREPRENEURIAL SKILLS**

**UNIT CODE :** HO/OS/HP/BC/04/5/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, identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation, developing business innovative strategies and developing business plan.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT** | **PERFORMANCE CRITERIA** |
| 1. Demonstrate understanding of an Entrepreneur | 1. Entrepreneurs and Businesspersons are distinguished as per principles of entrepreneurship 2. ***Types of entrepreneurs*** are identified as per principles of entrepreneurship 3. Ways of becoming an Entrepreneur are identified as per principles of Entrepreneurship 4. ***Characteristics of Entrepreneurs*** are identified as per principles of Entrepreneurship 5. Factors affecting Entrepreneurship development are explored as per principles of Entrepreneurship |
| 1. Demonstrate understanding of Entrepreneurship and self-employment | 1. Entrepreneurship and self-employment are distinguished as per principles of entrepreneurship 2. Importance of self-employment is analysed based on business procedures and strategies 3. ***Requirements for entry into self-employment*** are identified according to business procedures and strategies 4. Role of an Entrepreneur in business is determined according to business procedures and strategies 5. Contributions of Entrepreneurs to National development are identified as per business procedures and strategies 6. Entrepreneurship culture in Kenya is explored as per business procedures and strategies 7. Born or made Entrepreneurs are distinguished as per entrepreneurial traits |
| 1. Identify Entrepreneurship opportunities | 1. Sources of business ideas are identified as per business procedures and strategies 2. Business ideas and opportunities are generated as per business procedures and strategies 3. Business life cycle is analysed as per business procedures and strategies 4. Legal aspects of business are identified as per procedures and strategies 5. Product demand is assessed as per market strategies 6. Types of ***business environment*** are identified and evaluated as per business procedures 7. Factors to consider when evaluating business environment are explored based on business procedure and strategies 8. Technology in business is incorporated as per best practice |
| 1. Create entrepreneurial awareness | 1. ***Forms of businesses*** are explored as per business procedures and strategies 2. Sources of business finance are identified as per business procedures and strategies 3. Factors in selecting source of business finance are identified as per business procedures and strategies 4. ***Governing policies*** on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies 5. Problems of starting and operating SSEs are explored as per business procedures and strategies |
| 1. Apply entrepreneurial motivation | 1. ***Internal and external motivation*** factors are determined in accordance with motivational theories 2. Self-assessment is carried out as per entrepreneurial orientation 3. Effective communications are carried out in accordance with communication principles 4. Entrepreneurial motivation is applied as per motivational theories |
| 1. Develop innovative business strategies | 1. Business innovation strategies are determined in accordance with the organization strategies 2. Creativity in business development is demonstrated in accordance with business strategies 3. ***Innovative business strategies*** are developed as per business principles 4. Linkages with other entrepreneurs are created as per best practice 5. ICT is incorporated in business growth and development as per best practice |
| 1. Develop Business Plan | 1. Identified Business is described as per business procedures and strategies 2. Marketing plan is developed as per business plan format 3. Organizational/Management plan is prepared in accordance with business plan format 4. Production/operation plan in accordance with business plan format 5. Financial plan is prepared in accordance with the business plan format 6. Executive summary is prepared in accordance with business plan format 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** |
| 1. Types of entrepreneurs may include but not limited to: | * Innovators * Imitators * Craft * Opportunistic * Speculators |
| 1. Characteristics of Entrepreneurs may include but not limited to: | * Creative * Innovative * Planner * Risk taker * Networker * Confident * Flexible * Persistent * Patient * Independent * Future oriented * Goal oriented |
| 1. Requirements for entry into self-employment may include but not limited to | * Technical skills * Management skills * Entrepreneurial skills * Resources * Infrastructure |
| 1. Internal and external motivation may include but not limited to: | * Interest * Passion * Freedom * Prestige * Rewards * Punishment * Enabling environment * Government policies |
| 1. Business environment may include but not limited to: | * External * Internal * Intermediate |
| 1. Forms of businesses may include but not limited to: | * Sole proprietorship * Partnership * Limited companies * Cooperatives |
| 1. Governing policies may include but not limited to: | * Increasing scope for finance * Promoting cooperation between entrepreneurs and private sector * Reducing regulatory burden on entrepreneurs * Developing IT tools for entrepreneurs |
| 1. Innovative business strategies may include but not limited to: | * New products * New methods of production * New markets * New sources of supplies * Change in industrialization |

**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
* Management
* Problem-solving
* Root-cause analysis
* Communication

**Required Knowledge**

The individual needs to demonstrate knowledge of:

* Decision making
* Business communication
* Change management
* Competition
* Risk
* 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
* Relevant developments in other industries
* Regional/ County business expansion 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. Distinguished entrepreneurs and business persons correctly 2. Identified ways of becoming an entrepreneur appropriately 3. Explored factors affecting entrepreneurship development appropriately 4. Analysed importance of self-employment accurately 5. Identified requirements for entry into self-employment correctly 6. Identified sources of business ideas correctly 7. GeneratedBusiness ideas and opportunities correctly 8. Analysed business life cycle accurately 9. Identified legal aspects of business correctly 10. Assessed product demand accurately 11. Determined Internal and external motivation factors appropriately 12. Carried out communications effectively 13. Identified sources of business finance correctly 14. Determined Governing policy on small scale enterprise appropriately 15. Explored problems of starting and operating SSEs effectively 16. Developed Marketing, Organizational/Management, Production/Operation and Financial plans correctly 17. Prepared executive summary correctly 18. Determined business innovative strategies appropriately 19. Presented business plan effectively |
| 1. Resource Implications for competence assessment | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place |
| 1. Methods of Assessment | Competency may be assessed through:   1. Written tests 2. Oral questions 3. Third party report 4. Interviews 5. Portfolio |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. 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/05/5/B

**UNIT DESCRIPTION**

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

**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. Personal vision, mission and goals are formulated based on potential and in relation to organization objectives 2. Emotional intelligence is demonstrated as per workplace requirements. 3. Individual performance is evaluated and monitored according to the agreed targets. 4. Assertiveness is developed and maintained based on the requirements of the job. 5. Accountability and responsibility for own actions are demonstrated based on workplace instructions. 6. Self-esteem and a positive self-image are developed and maintained based on values. 7. Time management, attendance and punctuality are observed as per the organization policy. 8. Goals are managed as per the organization’s objective 9. Self-strengths and weaknesses are identified based on personal objectives |
| 1. Demonstrate interpersonal communication | 1. Writing skills are demonstrated as per communication policy 2. Negotiation and persuasion skills are demonstrated as per communication policy 3. Internal and external stakeholders’ needs are identified and interpreted as per the communication policy 4. Communication networks are established based on workplace policy 5. Information is shared as per communication policy |
| 1. Demonstrate critical safe work habits | 1. Stress is managed in accordance with workplace policy. 2. Punctuality and time consciousness is demonstrated in line with workplace policy. 3. Personal objectives are integrated with organization goals based on organization’s strategic plan. 4. ***Resources*** are utilized in accordance with workplace policy. 5. Work priorities are set in accordance to workplace goals and objectives. 6. Leisure time is recognized and utilized in line with personal objectives. 7. ***Drugs and substances of abuse*** are identified and avoided based on workplace policy. 8. HIV and AIDS prevention awareness is demonstrated in line with workplace policy. 9. Safety consciousness is demonstrated in the workplace based on organization safety policy. 10. ***Emerging issues*** are identified and dealt with in accordance with organization policy. |
| 1. Lead small teams | 1. Performance targets for the ***team*** are set based on organization’s objectives 2. Duties are assigned in accordance with the organization policy. 3. ***Forms of communication*** in a team are established according to organization’s policy. 4. Team performance is evaluated based on set targets as per workplace policy. 5. Conflicts are resolved between team members in line with organization policy. 6. Gender related issues are identified and mainstreamed in accordance workplace policy. 7. Human rights and fundamental freedoms are identified and respected as Constitution of Kenya 2010. 8. Healthy relationships are developed and maintained in line with workplace. |
| 1. Plan and organize work | 1. Task requirements are identified as per the workplace objectives 2. Task is interpreted in accordance with safety (OHS ), environmental requirements and quality requirements 3. Work activity is organized with other involved personnel as per the SOPs 4. Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5. Work activities are monitored and evaluated in line with organization procedures. 6. Job planning is documented in accordance with workplace requirements. 7. Time is managed achieve workplace set goals and objectives. |
| 1. Maintain professional growth and development | 1. Personal training needs are identified and assessed in line with the requirements of the job. 2. ***Training and career opportunities*** are identified and utilized based on job requirements. 3. Resources for training are mobilized and allocated based organizations and individual skills needs. 4. Licensees and certifications relevant to job and career are obtained and renewed as per policy. 5. Work priorities and personal commitments are balanced and managed based on requirements of the job and personal objectives. 6. Recognitions are sought as proof of career advancement in line with professional requirements. |
| 1. Demonstrate workplace learning | 1. Learning opportunities are sought and managed based on job requirement and organization policy. 2. Improvement in performance is demonstrated based on courses attended. 3. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job 4. Time and effort is invested in learning new skills based on job requirements 5. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy. 6. New systems are developed and maintained in accordance with the requirements of the job. 7. Awareness of personal role in workplace ***innovation*** is demonstrated based on requirements of the job. |
| 1. Demonstrate problem solving skills | 1. Creative, innovative and practical solutions are developed based on the problem 2. Independence and initiative in identifying and solving problems is demonstrated based on requirements of the job. 3. Team problems are solved as per the workplace guidelines 4. Problem solving strategies are applied as per the workplace guidelines 5. Problems are analyzed and assumptions tested as per the context of data and circumstances |
| 1. Demonstrate workplace ethics | 1. Policies and guidelines are observed as per the workplace requirements 2. Self-worth and professionalism is exercised in line with personal goals and organizational policies 3. Code of conduct is observed as per the workplace requirements 4. Integrity is demonstrated as per legal requirement |

**RANGE**

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

|  |  |
| --- | --- |
| **Range** | **Variable** |
| 1. Resource may include but not limited to: | * Human * Financial * Hardware * Software |
| 1. Drug and substance abuse may include but not limited to: | Commonly abused   * Alcohol * Tobacco * Miraa * Over-the-counter drugs * Cocaine * Bhang * Glue |
| 1. Feedback may include but not limited to: | * Verbal * Written * Informal * Formal |
| 1. Relationships may include but not limited to: | * Man/Woman * Trainer/trainee * Employee/employer * Client/service provider * Husband/wife * Boy/girl * Parent/child * Sibling relationships |
| 1. Forms of communication may include but not limited to: | * Written * Visual * Verbal * Non verbal * Formal and informal |
| 1. Team may include but not limited to: | * Small work group * Staff in a section/department * Inter-agency group |
| 1. Personal growth may include 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 | |
| 1. Personal objectives may include but not limited to: | * Long term * Short term * Broad * Specific |
| 1. Trainings and career opportunities may include but not limited to | * Participation in training programs * Technical * Supervisory * Managerial * Continuing Education * Serving as Resource Persons in conferences and workshops |
| 1. Innovation may include but not limited to: | * New ideas * Original ideas * Different ideas * Methods/procedures * Processes * New tools |
| 1. Emerging issues may include but not limited to: | * Terrorism * Social media * National cohesion * Open offices |
| 1. Range of media for learning may 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:

* Communication
* Critical thinking
* Observation
* Organizing
* Negotiation
* Monitoring
* Evaluation
* Record keeping
* Problem solving
* Decision Making
* Resource utilization
* Resource mobilization

**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
* Gender mainstreaming
* HIV and AIDS
* Drug and substance abuse
* Leadership
* Safe work habits
* Professional growth and development
* Technology in the workplace
* 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. Conducted self-management 2. Demonstrated interpersonal communication 3. Demonstrated critical safe work habits 4. Led small teams 5. Planned and organized work 6. Maintained professional growth and development 7. Demonstrated workplace learning 8. Demonstrated problem solving skills 9. Demonstrated workplace ethics |
| 1. Resource Implications | |  | | --- | | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place | |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Oral questioning 2. Portfolio of evidence 3. Third Party Reports 4. Written tests |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. 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/06/5/B

**UNIT DESCRIPTION**

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs and monitoring activities on environmental protection/programs.

**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. Storage methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS. 2. Disposal methods of hazardous wastes are followed always according to environmental regulations and OSHS. 3. ***PPE*** is used according to OSHS. |
| 1. Control environmental Pollution control | 1. Environmental pollution ***control measures*** are compiled following standard protocol. 2. Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999 3. Methods for minimizing ***noise pollution*** is complied with based on Noise and Excessive Vibration Pollution and Control Regulations, 2009 |
| 1. Demonstrate sustainable resource use | 1. Methods for minimizing wastage are complied with. 2. Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle) 3. Methods for economizing and reducing resource consumption are practiced as per the Environmental Management and Coordination Act 1999 |
| 1. Evaluate current practices in relation to resource usage | 1. Information on resource efficiency ***systems and procedures***are collected and provided to the work group where appropriate. 2. Current resource usage is measured and recorded by members of the work group. 3. Current purchasing strategies are analyzed and recorded according to industry procedures. 4. Current work processes to access information and data is analyzed following enterprise protocol. |
| 1. Identify Environmental legislations/conventions for environmental concerns | 1. Environmental ***legislations/conventions*** and local ordinances are identified according to the different ***environmental aspects/impact*** 2. ***Industrial standard/environmental practices*** are described according to the different environmental concerns |
| 1. Implement specific environmental programs | 1. Programs/Activities are identified according to organizations policies and guidelines. 2. Individual roles/responsibilities are determined and performed based on the activities identified. 3. Problems/constraints encountered are resolved in accordance with organizations’ policies and guidelines 4. Stakeholders are consulted based on company guidelines |
| 1. Monitor activities on Environmental protection/Programs | 1. Activities are periodically monitored and evaluated according to the objectives of the environmental Program 2. Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations 3. Data gathered are analyzed based on evaluation requirements 4. Recommendations are submitted based on the findings 5. Management support systems are set/established to sustain and enhance the program 6. Environmental incidents are monitored and reported to concerned/proper authorities |

**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. PPE may include but not limited to: | * Mask * Gloves * Goggles * Safety hat * Overall * Hearing protector * Safety boots |
| 1. Environmental pollution control measures may include but not limited to: | * Methods for minimizing or stopping spread and ingestion of airborne particles * Methods for minimizing or stopping spread and ingestion of gases and fumes * Methods for minimizing or stopping spread and ingestion of liquid wastes |
| 1. Waste management procedures may include but not limited to: | * Sorting * Storing of items * Recycling of items * Disposal of items |
| 1. Resources may include but not limited to: | * Electric * Water * Fuel * Telecommunications * Supplies * Materials |
| 1. Workplace environmental hazards may include but not limited to: | * Biological hazards * Chemical and dust hazards * Physical hazards |
| 1. Organizational systems and procedures may include but not limited to: | * Supply chain, procurement and purchasing * Quality assurance * Making recommendations and seeking approvals |

**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:

* Observation
* Measuring
* Writing
* Communication
* Analytical
* Monitoring
* Evaluation

**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
* Solid Waste Act
* Methods of minimizing wastage
* Waste management procedures
* Economizing of resource consumption
* 3Rs principle
* 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.
* Measurement and recording of current resource usage
* 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. Controlled environmental hazard 2. Controlled environmental pollution 3. Demonstrated sustainable resource use 4. Evaluated current practices in relation to resource usage 5. Demonstrated knowledge of environmental legislations and local ordinances according to the different environmental issues /concerns. 6. Described industrial standard environmental practices according to the different environmental issues/concerns. 7. Resolved problems/ constraints encountered based on management standard procedures 8. Implemented and monitored environmental practices on a periodic basis as per company guidelines 9. Recommended solutions for the improvement of the Program 10. Monitored and reported to proper authorities any environmental incidents |
| 1. Resource Implications | The following resources should be provided:   1. Workplace with storage facilities 2. Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.) 3. PPE 4. Manuals and references 5. Legislation, policies, procedures, protocols and local ordinances relating to environmental protection 6. Case studies/scenarios relating to environmental Protection |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Interview/Third Party Reports 5. Portfolio of evidence |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. 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/07/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement OSH programs, 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. ***Hazards*** in the workplace are identified ***based their indicators*** 2. Risks and hazards are evaluated based on legal requirements. 3. ***OSH concerns*** raised by workers are addressed as per legal requirements. |
| 1. Control OSH hazards | 1. Hazard prevention ***and control measures*** are implemented as per legal requirement. 2. Risk assessment is conductedand a risk matrix developed based on likely impact. 3. ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures. |
| 1. Implement OSH programs | 1. Company OSH program are identified, evaluated and reviewed based on legal requirements. 2. Company OSH programs are implemented as per legal requirements. 3. Workers are capacity built on OSH standards and procedures as per legal requirements 4. ***OSH-related records*** are maintained as per legal 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** |
| 1. Hazards may include but are not limited to: | * Physical hazards * Biological hazards * Chemical hazards * Ergonomics * Psychological factors * Physiological factors * Safety hazards * Unsafe workers’ act |
| 1. Indicators may include but are not limited to: | * Increased of incidents of accidents, injuries * Increased occurrence of sickness or health complaints/ symptoms * Common complaints of workers related to OSH * High absenteeism for work-related reasons |
| 1. Evaluation and/or work environment measurements may include but are not limited to: | * Health Audit * Safety Audit * Work Safety and Health Evaluation * Work Environment Measurements of Physical and Chemical Hazards |
| 1. OSH issues and/or concerns may include but are not limited to: | * Workers’ experience/observance on presence of work hazards * Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks) * Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines |
| 1. Prevention and control measures may include but are not limited to: | * Eliminate the hazard * Isolate the hazard * Substitute the hazard with a safer alternative * Use administrative controls to reduce the risk * Use engineering controls to reduce the risk * Use personal protective equipment * Safety, Health and Work Environment Evaluation * Periodic and/or special medical examinations of workers |
| 1. Safety gears /PPE (Personal Protective Equipment’s) may include but are not limited to: | * Arm/Hand guard, gloves * Eye protection (goggles, shield) * Hearing protection (ear muffs, ear plugs) * Hair Net/cap/bonnet * Hard hat * Face protection (mask, shield) * Apron/Gown/coverall/jump suit * Anti-static suits * High-visibility reflective vest |
| 1. Appropriate risk controls | * Eliminate the hazard altogether * Isolate the hazard from anyone who could be harmed * Substitute the hazard with a safer alternative * Use administrative controls to reduce the risk * Use engineering controls to reduce the risk * Use personal protective equipment |
| 1. Contingency measures may include but are not limited to: | * Evacuation * Isolation * Decontamination * Emergency personnel |
| 1. Emergency procedures may include but are not limited to: | * Fire drill * Earthquake drill * Basic life support/CPR * First aid * Spillage control * Decontamination of chemical and toxic * Disaster preparedness/management * Set of fire-extinguisher |
| 1. Incidents and emergencies may include but are not limited to: | * Chemical spills * Equipment/vehicle accidents * Explosion * Fire * Gas leak * Injury to personnel * Structural collapse * Toxic and/or flammable vapors emission. |
| 1. OSH-related Records may include but are not limited to: | * Medical/Health records * Incident/accident reports * Sickness notifications/sick leave application * 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:

* Communication
* Interpersonal
* Presentation
* Risk assessment
* Evaluation
* Critical thinking
* Problem solving
* Negotiation

**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. Identified hazards in the workplace based their indicators 2. Evaluated workplace hazards based on legal requirements. 3. Addressed OSH concerns raised by workers as per legal requirements. 4. Implemented hazard prevention and control measures as per legal requirement. 5. Conducted risk assessment as per legal requirement. 6. Developed risk matrix based on likely impact. 7. Recognized and established contingency measures in accordance with organization procedures. 8. Identified, evaluated and reviewed company OSH program based on legal requirements. 9. Implemented company OSH programs as per legal requirements. 10. Capacity built workers on OSH standards and procedures as per legal requirements 11. Maintained OSH-related records as per legal requirements. |
| 1. Resource Implications for competence assessment | The following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place |
| 1. Methods of Assessment | Competency in this unit may be assessed through:   1. Observation 2. Oral questioning 3. Written test 4. Portfolio of Evidence 5. Interview 6. Third party report |
| 1. Context of Assessment | Competency may be assessed:   1. On-the-job 2. Off-the –job 3. During Industrial attachment |
| 1. 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/01/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce tropical fruits. It includes carrying out food safety risk assessment, developing the food safety management plan, implementing the food safety management plan, preparing tropical fruits orchard, producing tropical fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits 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 tropical fruits | * 1. ***Tropical fruits*** to be establish are determined in accordance with Agro Ecological Zone (AEZ), farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| * 1. Prepare to produce tropical fruits | * 1. Orchard site is selected based on fruit tree chosen and the farm plan   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of fruit to be established   3. Soil for analysis is sampled as per ***soil sampling procedure***   4. Soil erosion is controlled based on topography, soil type and level of degradation.   5. Orchard / Land is prepared according to ***agronomic requirements*** of the fruit   6. Planting materials are sourced in accordance with procurement procedures, ***phyto-sanitary requirements*** and the size of the orchard to be established   7. Planting holes for tropical fruit seedlings are prepared based on agronomic requirements, Good Agricultural Practices (GAP) and MoALF fruits production manual |
| * 1. Produce tropical fruits | * 1. Food safety procedures are followed to produce tropical fruits   2. Seedlings are planted based on agronomic requirements   3. Planted tropical fruit seedlings are pruned as per agronomic requirements   4. Orchard is protected from weeds, pests and diseases as per GAP   5. Established tropical fruit trees are fed based on soil analysis report   6. Established tropical fruit trees are watered, mulched and trained according to environmental conditions and growth habits   7. Physiological disorders in the tropical fruit trees are managed as per the MoALF fruits production manual   8. Tropical fruit trees are induced to flower as per GAP and fruit tree type   9. Tropical fruits are harvested in accordance with the MoALF fruits production manual |
| 1. Maintain the food safety management plan to produce tropical fruits | * 1. The food safety management plan is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. Resourcesare requisitioned and utilized as identified in the food safety management plan.   4. Vegetable seedlings production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate production of tropical fruits | * 1. Quality of tropical fruits is assessed based on fruit quality parameters and MoALF fruits production manual and as per the food safety management plan   2. Quantity of fruits produced is assessed based on MoALF production manual   3. Return on investment is determined as per accounting principles |
| 1. Complete production of tropical fruits | * 1. Post-harvest handling of the tropical fruits is carried out as per MoALF production manual and the food safety management plan   2. Tropical fruits production report is generated in accordance with the production procedures   3. Tropical fruits production report is shared according to farm policies   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** |
| 1. Tropical fruits may include but not limited to: | Varieties of:   * Mangoes * Oranges * Papaya * Pineapple * Custard * Avocado * Bananas |
| 1. Sources of food safety hazards may include but not limited to: | * Water * Soil * Agro-Chemicals * Planting materials * Organic and inorganic fertilizer |
| 1. Food safety hazards mayinclude but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Hammer * Saw * Bucket * Shears * Dibbler * Pegs |
| 1. Equipment may include 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 |
| 1. Materials and Supplies may include 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 * Pheromones |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. Agronomic requirements may include but not limited to: | * Growing cycle and growing period * Radiation * Temperature * Rooting * Aeration * Water quantity and quality * Nutrients * Salinity * Pests * Diseases * Weeds * Wind |
| 1. Phyto-sanitary requirements may include 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 |
| 1. Good Agricultural Practices (GAP) may include 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 |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |

**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
* Record keeping
* Basic hygiene
* 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
* 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 tropical fruit trees
* 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

**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. Prepared planting land to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared land   3. Observed safety measures by using Personal Protective Equipment (PPE ) and correct tools   4. Established fruits suitable for the Agro Ecological zone, market demand   5. Followed required process of producing fruits   6. Efficiently used the inputs   7. Harvested and carried out post-harvest handling of tropical fruits   8. Observed food safety requirements in production of tropical fruits   9. Documented and maintained food safety records in production of tropical fruits |
| 1. Resource Implications for competence assessment | The Following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Observation   2. Written tests   3. Oral questioning   4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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/02/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce tropical fruits. It includes carrying out food safety risk assessment, developing the food safety management plan, implementing the food safety management plan, preparing sub-tropical fruits orchard, producing sub-tropical fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits 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. ***Sub-tropical fruits*** to be establish are determined in accordance with Agro Ecological Zone (AEZ), farm plan and market demand 2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards*** 3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials*** 4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| * 1. Prepare to produce sub-tropical fruits | * 1. Orchard site is selected based on fruit tree chosen and the farm plan   2. Tools, equipment, materials and supplies are identified and sourced based on the type of fruit to be established   3. Soil for analysis is sampled as per soil sampling procedure   4. Soil erosion is controlled based on topography, soil type and level of degradation.   5. Orchard / Land is prepared according to agronomic requirements of the fruit   6. Planting materials are sourced in accordance with procurement procedures, phyto-sanitary requirements and the size of the orchard to be established   7. Planting holes for sub-tropical fruit seedlings are prepared based on agronomic requirements***, Good Agricultural Practices (GAP)*** and MoALF fruits production manual |
| * 1. Produce sub-tropical fruits | * 1. Food safety procedures are followed to produce sub-tropical fruits   2. Seedlings are planted based on agronomic requirements   3. Planted sub-tropical fruit seedlings are pruned as per agronomic requirements   4. Orchard is protected from weeds, pests and diseases as per GAP   5. Established sub-tropical fruit trees are fed based on soil analysis report   6. Established sub-tropical fruit trees are watered, mulched and trained according to environmental conditions and growth habits   7. Physiological disorders in the sub-tropical fruit trees are managed as per the MoALF fruits production manual   8. Sub-tropical fruit trees are induced to flower as per GAP and fruit tree type   9. Sub-tropical fruits are harvested in accordance with the MoALF fruits production manual |
| * 1. Maintain the food safety management plan to produce subtropical fruits | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources***are requisitioned and utilized as identified in the food safety management plan.   4. Sub-tropical fruits production practices and procedures are carried out and documented as per the food safety management plan. |
| * 1. Evaluate production of sub-tropical fruits | * 1. Quality of sub-tropical fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual and as per the food safety management plan   2. Quantity of fruits produced is assessed based on MoALF production manual   3. Return on investment is determined as per accounting principles |
| * 1. Complete production of sub-tropical fruits | * 1. Post-harvest handling of the sub-tropical fruits is carried out as per MoALF production manual and the food safety management plan   2. Sub-tropical fruits production report is generated in accordance with the production procedures   3. Sub-tropical fruits production report is shared according to farm policies   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** |
| 1. Sub-tropical fruits may include but not limited to: | Varieties of :   * Tree tomatoes * straw berry * guava * loquat * lime * white sapote |
| 1. Sources of food safety hazards may include but not limited to: | * Water * Growth media * Organic and inorganic fertilizer * Site |
| 1. Food safety hazards may include but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Good Agricultural Practices (GAP) may include 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 |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazard’s evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources may include but not limited to: | * Financial * Adequately trained personnel * Stationery * Computers * Printers * Projectors |
| 1. Fruit quality parameters may include 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
* Record keeping
* Basic hygiene
* 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
* 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
* Sub-tropical 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

**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. Prepared planting land to a level suitable to the planting material 2. Sourced planting materials adequate for the prepared land 3. Observed safety measures by using Personal Protective Equipment (PPE ) and correct tools 4. Established fruits suitable for the Agro Ecological zone, market demand 5. Followed required process of producing fruits 6. Efficiently used the inputs 7. Harvested and carried out post-harvest handling of sub-tropical fruits 8. Observed food safety concerns in sub-tropical fruit production 9. Documented and maintained food safety records in production of sub-tropical fruits |
| 1. Resource Implications for competence assessment | The Following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Written tests 3. Oral questioning 4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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/03/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce temperate fruits. It includes carrying out food safety risk assessment, developing the food safety management plan, implementing the food safety management plan, preparing temperate fruits orchard, producing temperate fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits 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 temperate fruits | * 1. ***Temperate fruits*** to be establish are determined in accordance with Agro Ecological Zone (AEZ), farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce temperate fruits | * 1. Orchard site is selected based on fruit tree chosen and the farm plan   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of fruit to be established   3. Soil for analysis is sampled as per ***soil sampling procedure***   4. Soil erosion is controlled based on topography, soil type and level of degradation.   5. Orchard / Land is prepared according to ***agronomic requirements*** of the fruit   6. Planting materials are sourced in accordance with procurement procedures, ***phyto-sanitary requirements*** and the size of the orchard to be established   7. Planting holes for temperate fruit seedlings are prepared based on agronomic requirements ***,Good Agricultural Practices*** (GAP***)*** and MoALF fruits production manual |
| 1. Produce temperate fruits | * 1. Food safety procedures are followed to produce temperate fruits   2. Seedlings are planted based on agronomic requirements   3. Planted temperate fruit seedlings are pruned as per agronomic requirements   4. Orchard is protected from weeds, pests and diseases as per GAP   5. Established temperate fruit trees are fed based on soil analysis report   6. Established temperate fruit trees are watered, mulched and trained according to environmental conditions and growth habits   7. Physiological disorders in the temperate fruit trees are managed as per the MoALF fruit production manual   8. Temperate fruit trees are induced to flower as per GAP and fruit tree type   9. Temperate fruits are harvested in accordance with the MoALF fruits production manual |
| 1. Maintain the food safety management plan to produce temperate fruits | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources***are requisitioned and utilized as identified in the food safety management plan.   4. Vegetable seedlings production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate production of temperate fruits | * 1. Quality of temperate fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual and as per the food safety management plan   2. Quantity of fruits produced is assessed based on MoALF production manual   3. Return on investment is determined as per accounting principles |
| 1. Complete production of temperate fruits | * 1. Post-harvest handling of the temperate fruits is carried out as per MoALF production manual and the food safety management plan   2. Temperate fruits production report is generated in accordance with the production procedures   3. Temperate fruits production report is shared according to farm policies   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** |
| 1. Temperate fruits may include but not limited to: | * Plums * Pears * Apples * Peaches * Apricot |
| 1. Sources of food safety hazardsmay include but not limited to: | * Water * Site * Growth media * Organic and inorganic fertilizers |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Shears * Dibbler |
| 1. Equipment may include 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 |
| 1. Materials and supplies include 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 * Pheromones |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. 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 |
| 1. 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 |
| 1. 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 |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources mayinclude but not limited to: | * Financial * Adequate trained personnel * Stationery * Computers * Printers * Projectors |
| 1. 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
* Record keeping
* Basic hygiene
* 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
* Risk assessment
* Traceability system
* Sources of quality water
* Agro Ecological Zonation
* Temperate fruit orchard establishment and management
* Types of temperate fruits
* Physiology of temperate fruit trees
* 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

**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. Prepared planting land to a level suitable to the planting material 2. Sourced planting materials adequate for the prepared land 3. Observed safety measures by using Personal Protective Equipment (PPE ) and correct tools 4. Established fruits suitable for the Agro Ecological zone, market demand 5. Followed required process of producing fruits 6. Efficiently used the inputs 7. Harvested and carried out post-harvest handling of temperate fruits 8. Observed food safety requirements in temperate fruit production 9. Documented and maintained food safety records in production of temperate fruits |
| 1. Resource Implications for competence assessment | The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Written tests 3. Oral questioning 4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial Attachment |
| 1. 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/04/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce vine fruits. It includes carrying out food safety risk assessment, developing the food safety management plan, implementing the food safety management plan, preparing vine fruits orchard, producing vine fruits, determining productivity and quality of fruits produced, carrying out post-harvest handling of the fruits 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. ***Vine fruits*** to be establish are determined in accordance with Agro Ecological Zone (AEZ), farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce Vine Fruits | * 1. Orchard site is selected based on fruit tree chosen and the farm plan   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of fruit to be established   3. Soil for analysis is sampled as per ***soil sampling procedure***   4. Soil erosion is controlled based on topography, soil type and level of degradation.   5. Orchard / Land is prepared according to ***agronomic requirements*** of the fruit   6. Planting materials are sourced in accordance with procurement procedures, ***phyto-sanitary requirements*** and the size of the orchard to be established   7. Planting holes for vine fruit seedlings are prepared based on agronomic requirements***, Good Agricultural Practices (GAP)*** and MoALF fruits production manual |
| 1. Produce Vine Fruits | * 1. Food safety procedures are followed to produce vine fruits   2. Seedlings are planted based on agronomic requirements   3. Planted vines are pruned as per agronomic requirements   4. Orchard is protected from weeds, pests and diseases as per GAP   5. Established vines are fed based on soil analysis report   6. Established vines are watered, mulched and staked and trained according to environmental conditions and growth habits   7. Physiological disorders in the vines are managed as per the MoALF fruit production manual   8. Vines are induced to flower as per GAP and fruit tree type   9. Vine fruits are harvested in accordance with the MoALF fruits production manual |
| 1. Maintain the food safety management plan to produce vine fruits | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources***are requisitioned and utilized as identified in the food safety management plan.   4. Vine fruits production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate production of Vine Fruits | * 1. Quality of vine fruits is assessed based on ***fruit quality parameters*** and MoALF fruits production manual and as per the food safety management plan   2. Quantity of fruits produced is assessed based on MoALF production manual   3. Return on investment is determined as per accounting principles   4. Recommendations are made based on evaluation report. |
| 1. Complete production of Vine Fruits | * 1. Post-harvest handling of the vine fruits is carried out as per MoALF production manual and the food safety management plan   2. Vine fruits production report is generated in accordance with the production procedures   3. Vine fruits production report is shared according to farm policies   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** |
| 1. Vine fruits may include but not limited to: | * Grapes * Passion fruits * Dates * Kiwi * Water melons |
| 1. Sources of food safety hazards mayinclude but not limited to: | * Water * Site * Growth media * Organic and inorganic fertilizers |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Food safety hazards may include but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Hammer * Saw * Bucket * Shears * Dibbler * Pegs |
| 1. Equipment may include 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 |
| 1. Materials and supplies may include 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 * Pheromones |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. Agronomic requirements may include but not limited to: | * Growing cycle and growing period * Radiation * Temperature * Rooting * Aeration * Water quantity and quality * Nutrients * Salinity * Pests * Diseases * Weeds * Wind |
| 1. Phyto-sanitary requirements may include 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 |
| 1. 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 |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources may include but not limited to: | * Financial * Adequately trained personnel * Stationery * Computers * Printers * Projectors |
| 1. 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
* Record keeping
* Basic hygiene
* 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
* Food safety in production of vine fruits
* Risk assessment
* Traceability
* Sources of quality water
* Agro Ecological Zonation
* Vine fruit orchard establishment and management
* Types of vine fruits
* Physiology of vines
* Growth characteristics 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

**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. Prepared planting land to a level suitable to the planting material 2. Sourced planting materials adequate for the prepared land 3. Observed safety measures by using Personal Protective Equipment (PPE) and correct tools 4. Established fruits suitable for the Agro Ecological zone, market demand 5. Followed required process of producing fruits 6. Efficiently used the inputs 7. Harvested and carried out post-harvest handling of vine fruits 8. Observed food safety requirements in vine fruit production 9. Documented and maintained food safety records in production of vine fruits |
| 1. Resource Implications for competence assessment. | The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Written tests 3. Oral questioning 4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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/05/5/B

**UNIT DESCRIPTION**

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

**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. The type of ***Mushroom*** to be established is determined in accordance with market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce mushroom | * 1. The ***mushroom house*** is sited according to farm plans   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job   3. The mushroom house is constructed depending on MoALF production guidelines   4. Starter culture for mushroom is treated according to ***treatment*** guidelines   5. The ***substrate*** is prepared and placed in production structures according to production guidelines   6. The ***spawns*** are sourced and cultured according to production guidelines |
| 1. Produce mushroom | * 1. Food safety procedures are followed to produce mushrooms   2. The starter culture is put in place based on MoALF production guidelines   3. Mushroom are spawned on the substrate as per production guidelines   4. Established mushrooms are managed as per MoALF production guidelines   5. Established mushroom are protected from pests and diseases as per MoALF production guidelines   6. Established mushroom are harvested as per production guidelines |
| 1. Maintain the food safety management plan to produce mushrooms | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources*** are requisitioned and utilized as identified in the food safety management plan.   4. Mushrooms production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate the production of mushroom | * 1. Quality of mushroom is assessed based on ***mushroom quality parameters*** as per production manual and the food safety management plan   2. Quantity of mushroom produced is assessed based on production practices   3. Return on investment is determined as per accounting principles |
| 1. Complete production of mushrooms | * 1. Post-harvest handling of the mushrooms is carried out as per MoALF production manual and the food safety management plan   2. Mushroom production report is generated in accordance with the production procedures and instructions given.   3. Mushroom production report is shared according to farm policies   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** |
| 1. Mushroom may include but not limited to: | * Oyster, * shiitake and * white button |
| 1. Sources of food safety hazards may include but not limited to: | * Water * Growth media * Site * Organic and inorganic fertilizers |
| 1. Food safety hazardsinclude but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Spawn * Inputs * Spray equipment * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Mushroom production structures may include but not limited to: | * Mushroom House * Shelves * Plastic Bags * Heat Oven |
| 1. Tools may include but not limited to: | * Weighing scale |
| 1. Materials may 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 |
| 1. Equipment may include but not limited to: | * PPE –hand gloves, dust coat, dust masks * Hand spray equipment * Oven * Basin |
| 1. Materials and supplies may include but are not limited to: | * Methylated spirit * Lime * Fuel for heating substrate * Molasses * Sisal twine * Soap |
| 1. Treatment may include but not limited to: | * heating * steaming |
| 1. Substrate may include but not limited to: | * Compost on which to grow mushroom like sugarcane bagasse, leaves, banana fibre and leaves and cotton waste |
| 1. Spawns may include but not limited to: | * Spores * mycelia |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources may include but not limited to: | * Financial * Adequate trained personnel * Stationery * Computers * Printers * Projectors |
| 1. Mushroom quality parameters mayinclude 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
* Record keeping
* Basic hygiene
* Tilling
* Measuring
* Levelling
* 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
* Food safety in mushroom production
* 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. Prepared planting land to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared land   3. Observed safety measures by using Personal Protective Equipment (PPE ) and correct tools   4. Established mushrooms suitable for the Agro Ecological zone, market demand   5. Applied safety measures by using Personal Protective Equipment   6. Followed required process of producing mushrooms   7. Efficiently used the inputs   8. Harvested mushrooms and carried out post-harvest handling of mushrooms   9. Observed food safety requirements in mushroom production   10. Documented and maintained food safety records in production of mushroom |
| 1. Resource Implications for competence assessment | The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Observation   2. Written tests   3. Oral questioning   4. Third party reports |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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/06/5/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 the 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, and carrying out post-harvest handling of herbs and spices.

**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. ***Herbs and spices*** to be establish are determined in accordance with Agro Ecological Zone (AEZ***)***, farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce herbs and spices | * 1. Herbs and spices seedbed site is selected based on herbs and spices chosen and the farm plan   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of herbs and spices to be established   3. Soil for analysis is sampled as per soil sampling procedure   4. Soil erosion is controlled based on topography, soil type and level of degradation.   5. Seedbed is prepared according to ***agronomic requirements*** of the herbs and spices   6. Planting materials are sourced in accordance with procurement procedures, ***phyto-sanitary requirements*** and the size of the seedbed to be established   7. Planting holes for herbs and spices seedlings are prepared based on agronomic requirements***, Good Agricultural Practices (GAP)*** and MoALF herbs and spices production manual |
| 1. Produce herbs and spices | * 1. Food safety procedures are followed to produce herbs and spices   2. Seedlings are planted based on agronomic requirements   3. 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   4. Planted herbs and spices are pruned as per agronomic requirements   5. Herbs and spices are pruned and protected from pests and diseases as per agronomic requirements, GAP and MoALF herbs and spices production manual   6. Established herbs and spices are fed based on soil analysis report   7. Physiological disorders in the herbs and spices are managed as per the MoALF herbs and spices production manual   8. Herbs and spices are harvested in accordance with the MoALFherbs and spices production manual |
| 1. Maintain the food safety management plan to produce herbs and spices | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources*** are requisitioned and utilized as identified in the food safety management plan.   4. Herbs and spices production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate production of herbs and spices | * 1. Quality of herbs and spices is assessed based on herbs and spices ***quality parameters*** and MoALF herbs and spices production manual and as per the food safety management plan   2. Quantity of herbs and spices produced is assessed based on MoALF herbs and spices production manual   3. Return on investment is determined as per accounting principles   4. Recommendations are made based on evaluation report. |
| 1. Complete production of herbs and spices | * 1. Post-harvest handling of the herbs and spices is carried out as per MoALF herbs and spices production manual and the food safety management plan   2. Herbs and spices production report is generated in accordance with the production procedures   3. Herbs and spices production report is shared according to farm policies   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** |
| 1. Herbs and spices may include but not limited to: | * Coriander * Parsley * Garlic * Ginger * Dill * Chives * Mint * Rosemary * Thyme |
| 1. Sources of food safety hazardsmayinclude but not limited to: | * Water * Growth media * Site * Organic and inorganic fertilizers |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Packaging materials * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Toolsmayinclude but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Secateurs * Shears * Dibbler * Pegs |
| 1. Equipmentmayinclude 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 |
| 1. Materials and supplies may include 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 |
| 1. Agronomic requirements may include but not limited to: | * Growing cycle and growing period * Radiation * Temperature * Rooting * Aeration * Water quantity and quality * Nutrients * Salinity * Pests * Diseases * Weeds * Wind |
| 1. Phyto-sanitary requirements may include 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 |
| 1. Good Agricultural Practices (GAP) may include 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 |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources mayinclude but not limited to: | * Financial * Adequate trained personnel * Stationery * Computers * Printers * Projectors |
| 1. Herbs and spices quality parameters may include 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
* Basic hygiene
* Record keeping
* 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
* Food safety in production of herbs and spices
* 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

**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. Prepared planting land to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared land   3. Observed safety measures by using Personal Protective Equipment (PPE) and correct tools   4. Established herbs and spices suitable for the Agro Ecological zone, market demand   5. Followed required process of producing herbs and spices   6. Efficiently used the inputs   7. Harvested herbs and spices and carried out post-harvest handling of herbs and spices   8. Prepared accounting documents   9. Prepared production report   10. Observed food safety requirements in herbs and spices production   11. Documented and maintained food safety records in production of herbs and spices |
| 1. Resource Implications | The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Observation   2. Written tests   3. interviews   4. Oral questioning |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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 herbs and spices |

## **PRODUCE HORTICULTURAL NUTS**

**UNIT CODE:** HO/OS/HP/CR/07/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to establish and maintain horticultural nut orchard. It includes carrying out food safety risk assessment, developing the food safety management plan, implementing the food safety management plan in production of cashew nuts, macadamia and coconut. The activities involved include land preparation, planting, weeding, nutrient application, control of pests and diseases, harvesting and post-harvesting handling of nuts while keeping accurate records

**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. **Nuts** to be establish are determined in accordance with Agro Ecological Zone***,*** farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce nuts | * 1. Site for production of the nuts is selected as per the farm plan   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job   3. Soil for analysis is sampled as per ***sampling procedure***   4. Soil erosion is controlled based on topography, soil type and level of degradation Planting land is prepared in accordance with the planting material   5. Holes for planting nuts are prepared in accordance with ***Good Agricultural Practices (GAP) manual*** and Nuts production manual   6. Planting materials are sourced in accordance with procurement procedure and laid down policies   7. Quantities of ***planting material*** is determined based on the acreage to be planted |
| 1. Produce Nuts | * 1. Food safety procedures are followed to produce horticultural nuts   2. Nuts are planted as per Good Agricultural Practices (GAP) manual and MoALF nuts production manual   3. Nut farm is watered, mulched, gapped and weeded and protected from pests and diseases as per the nuts MoALF production manual   4. Nuts are fed based on soil analysis report   5. Physiological disorders in the nut trees are managed as per the MoALF nuts production manual   6. Nuts are pruned as per the MoALF nuts production manual   7. Nuts are harvested in accordance with the MoALF nuts production manual |
| 4. Maintain the food safety management plan to produce horticultural nuts | * 1. The ***food safety management plan*** is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. ***Resources*** are requisitioned and utilized as identified in the food safety management plan.   4. Horticultural nuts production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate nuts produced | * 1. Quality of nuts produced is evaluated based on nuts quality parameters and as per the food safety management plan   2. Quantity of nuts produced is evaluated based on nuts production manual   3. Return on investment is determined as per accounting principles   4. Recommendations are made based on evaluation report |
| 1. Complete production of nuts | * 1. Post harvesting handling of nuts is carried out as per MoALF nuts production manual and the food safety management plan   2. Nuts production report is generated in accordance with MoALF nuts production manual   3. Nuts production reports are shared in accordance with farm policy   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** |
| 1. Nuts may include but not limited to: | * Macadamia * ground nuts * cashew nuts * coconuts |
| 1. Sources of food safety hazardsmayinclude but not limited to: | * Water * Growth media * Site * Organic and inorganic fertilizers |
| 1. Food safety hazardsinclude but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides * Allergens * Mycotoxins (aflatoxin) |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Shears * Dibbler |
| 1. Equipment may include 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 |
| 1. Materials and supplies may include but not limited to: | * Pesticides * Fertilizers * Stationery * Manures * Seedlings /planting materials * Khaki paper bags size 3 * Rope * Papers * Fencing wire * Nails * Herbicides |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection * packaging * submission for analysis |
| 1. Good Agricultural Practices (GAP) may include 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 |
| 1. Planting materials may include but not limited to: | * Seeds * Seedlings, * Cuttings |
| 1. Food safety management plan may include but not limited to | * Listing of hazards * Hazards evaluation * Identifying Preventive measures and their control limit * Establishing monitoring procedures * Establishing corrective action * Records to be kept * Checking and reviewing the plan |
| 1. Resources may include but not limited to: | * Financial * Adequate trained personnel * Stationery * Computers * Printers * Projectors * Source of power |

**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
* Basic hygiene
* Record keeping
* 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
* Food safety in horticultural nuts production
* 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

**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. Prepared planting land to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared land   3. Established nuts suitable for the Agro Ecological zone, market demand   4. Observed safety measures by using Personal Protective Equipment   5. Followed required process of producing nuts   6. Efficiently used the inputs   7. Harvested and carried out post-harvest handling of nuts   8. Prepared production report   9. Observed food safety requirements in horticultural nuts production   10. Documented and maintained food safety records in production of horticultural nuts |
| 1. Resource Implications for competence assessment | The Following resources should be provided:   1. Access to relevant workplace where assessment can take place 2. Appropriately simulated environment where assessment can take place 3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Observation   2. Written tests   3. interviews   4. Oral questioning |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial Attachment |
| 1. 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/01/5/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. ***Ornamental plants*** to be established are determined in accordance with Agro Ecological Zone*,* farm plan and market demand 2. Site for production of the ornamental plants is selected as per the farm plan 3. ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job 4. Soil for analysis is sampled as per ***sampling procedure*** 5. Soil erosion is controlled based on topography, soil type and level of degradation 6. ***Propagation structure*** is prepared in accordance with the ornamental plants production manual 7. Soil based planting medium is prepared in accordance with Good Agricultural Practices (GAP) manual and ornamental plants production manual 8. Soilless planting medium is prepared in accordance with Good Agricultural Practices (GAP) manual and ornamental plants production manual 9. ***Planting materials*** for the ornamental plants are sourced in accordance with ***phyto-sanitary requirements***, procurement procedure and acreage to be planted |
| 1. Produce ornamental plants | 1. Seedlings/seeds are planted/potted as per ***potting containers*** and ornamental plants production manual. 2. Ornamental plants are watered, weeded, pruned, supported/trained as per the ornamental plants production manual. 3. Established ornamental plants are fed based on soil analysis report. 4. Established ornamental plants are protected from pests and diseases as per GAP 5. Physiological disorders in the ornamental plants are managed as per the ornamental plants production manual 6. Ornamental plants are acclimatized as per ornamental plants production manual |
| 1. Evaluate ornamental plants produced | 1. Quality of ornamental plants produced is evaluated based on ornamental plants production manual 2. Quantity of ornamental plants produced is evaluated based on ornamental plants production manual 3. Return on investment is determined as per accounting principles 4. Recommendations are made based on evaluation report |
| 1. Complete production of ornamental plants | 1. Ornamental plants production is documented in accordance with ornamental plants production manual 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** |
| 1. Ornamental plants may include but not limited to: | * Asters * Chrysanthemum * Bougainvillea * Statice * Marigold * Geranium * Larkspur * Petunia |
| 2. Tools may include but not limited to: | * Hoes * Machetes * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Secateurs * Shears |
| 3. Equipment may include but not limited to: | * Spray pumps * Watering cans * Hose pipes * Plough * Harrows * Pruning saw * Wire strainer * Traps * Pipe sprinklers * Scouting flags * Storage tanks * Tractors |
| 1. 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 |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. Propagation structures may include but not limited to: | * Lath House * Net House |
| 1. Planting materials may include but not limited to: | * Seeds * Seedlings * Cuttings * Tubers * Splits * Tissue culture |
| 1. Potting containers may include but not limited to: | * Pots * Boxes * Planters * Trays |

**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. Prepared planting/potting structure/containers to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared structure/container   3. Prepared planting medium as per the HCDA phytosanitary requirements   4. Established ornamental plants suitable for the market demand   5. Applied safety measures by using Personal Protective Equipment   6. Followed required process of producing ornamental plants   7. Efficiently used the inputs   8. Acclimatized the ornamental plants   9. Prepared accounting documents   10. Prepared production report |
| 1. Resource Implications | The Following resources should be provided:  2.1 Access to relevant workplace where assessment can take place  2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   1. Observation 2. Written tests 3. Oral questioning 4. Third party reporting |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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/09/5/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. **Cut flowers** to be established are determined in accordance with Agro Ecological Zone, farm plan and market demand 2. Site for production of the cut flowers is selected as per the farm plan 3. ***Tools, equipment, materials and supplies*** are identified and sourced based on the type of cut flower to be established 4. Soil for analysis is sampled as per ***sampling procedure*** 5. 1.5Propagation structure is prepared in accordance with the cut flowers production manual 6. Soil-based growing medium is prepared in accordance with Good Agricultural Practices (GAP) manual and cut flowers production manual 7. ***Soilless growing medium*** is prepared in accordance with Good Agricultural Practices (GAP) manual and cut flowers production manual 8. ***Planting materials*** are sourced for in accordance with HCDA phyto***-***sanitary requirements***,*** procurement proceduresand the acreage to be planted. |
| 1. Produce cut flowers | 1. Cut flowers are planted as per Good Agricultural Practices (GAP) manual and cut flowers production manual 2. Cut flowers are watered, weeded, supported, thinned, pinched, disbudded, and pruned as per the cut flowers production manual 3. Cut flowers are fertigated and chemigated based on the nutrient requirement of the cut flowers 4. Pests and diseases in cut flowers are controlled based on GAP and cut flowers production manual 5. Physiological disorders in the cut flowers are managed as per the cut flowers production manual 6. Cut flowers are induced to flower as per GAP and type of cut flower 7. 2.The cut flowers are harvested as per cut flowers production |
| 1. Evaluate production of cut flowers | 1. Quality of cut flowers produced is evaluated based on flower quality parameters and cut flowers production manual 2. Quantity of cut flowers produced is evaluated based on cut flowers production manual 3. Return on investment is determined as per accounting principles 4. Recommendations are made based on evaluation report |
| 1. Complete production of cut flowers | 1. Post-harvest handling of cut flowers is carried out as per flower production manual 2. Cut flowers production is documented in accordance with cut flowers production manual 3. Cut flowers production reports are shared in accordance with farm policy 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** |
| 1. Cut flowers may include but not limited to: | * Roses * Carnation * Alstromeria * Gypsophila * Ornis * Hydrangea * Strelitzia * Arabicum * Orchids * Agapanthus * Delphinium |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Shovels * Soil augur * Panga * Hammer * Saw * Bucket * Secateurs * Shears * Pegs |
| 1. Equipment may include but not limited to: | * Spray pumps * Watering cans * Hose pipes * Plough * Harrows * Pruning saw * Wire strainer * Traps * Pipe sprinklers * Scouting flags * Storage tanks * Tractors |
| 4. Materials and Supplies may include 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 |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. Soilless growing mediummayinclude but not limited to | * peat moss * perlite * vermiculite * sand |
| 1. Planting materials may include but not limited to: | * Cuttings * bulbs * Tubers * Corms * Tissue culture * Embryo culture * Buds * Suckers * Corms |
| 1. 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
* Levelling
* 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. Prepared planting structure to a level suitable to the planting material   2. Sourced planting materials adequate for the prepared structure   3. Prepared growing medium as per the HCDA phyto-sanitary guide   4. Established cut flowers suitable for the market demand   5. Applied safety measures by using Personal Protective Equipment   6. Followed required process of producing ornamental plants   7. Efficiently used the inputs   8. Harvested and carried out post-harvest handling of cut flowers   9. Prepared accounting documents   10. Prepared production report |
| 1. Resource Implications | The following resources must be provided:  The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2.2 Appropriately simulated environment where assessment can take place  2.3 Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Observation   2. Written tests   3. Oral questioning   4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. During Industrial attachment |
| 1. 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 VEGETABLES**

**UNIT CODE:** HO/OS/HP/CR/10/5/B

**UNIT DESCRIPTION**

This unit specifies the competencies required to produce quality and clean vegetables. It involves carrying out food safety risk assessment, developing the 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 harvest and post-harvest handling practices and generating a production record.

**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 vegetables | * 1. Vegetables ***(exotic, indigenous and Asian)*** to be establish are determined in accordance with Agro Ecological Zone, farm plan and market demand   2. Possible ***sources of food safety hazards*** are identified guided by the process flow diagram developed as per established ***standards***   3. The level of food safety risks isassessed and established as perthe previous use of the site and ***sources of materials***   4. Risks are evaluated and characterized as per established ***evaluation criteria*** |
| 1. Prepare to produce vegetables | * 1. Site for production of the vegetables is selected as per the ***farm plan***   2. ***Tools, equipment, materials and supplies*** are identified and sourced based on the requirements of the job   3. Soil for analysis is sampled as per ***sampling procedure***   4. Soil erosion is controlled based on topography, soil type and level of degradation   5. Propagation structure is prepared in accordance with the vegetables production manual   6. ***Soil-based growing medium*** is prepared in accordance with Good Agricultural Practices (GAP) manual and vegetables production manual and ***HCDA phyto-sanitary requirements***   7. Planting materials are sourced in accordance with procurement procedure phyto-sanitary requirements and size of the vegetable seedbed.   8. Planting holes vegetable seedlings are prepared based on agronomic requirements, GAP and MoALF vegetable production manual |
| 1. Establish vegetables gardens | * 1. Food safety procedures are followed to produce vegetable crops   2. Vegetables are planted as per agronomic requirements   3. Vegetable seed bed isgapped, thinned, weeded, watered in accordance with MOALF vegetables production manual   4. Vegetables are trained, pruned and de-suckered as per the MOALF vegetables production manual   5. Established vegetables are fed in accordance with GAP and the MOLF vegetables production manual and soil analysis report   6. Pests and diseases in vegetables are controlled based on GAP and vegetables production manual   7. Physiological disorders in the vegetables are managed as per the vegetables production manual   8. Root and tuber vegetables are earthed up and cured of as per the vegetables production manual   9. The vegetables are harvested as per the vegetables production |
| 1. Maintain the food safety management plan to produce vegetable crops | * 1. The food safety management plan is adopted as per the laid down procedures.   2. Communication of the food safety management plan is done to the entire team through the official channel   3. Resourcesare requisitioned and utilized as identified in the food safety management plan.   4. Vegetable crops production practices and procedures are carried out and documented as per the food safety management plan. |
| 1. Evaluate vegetables produced | * 1. Quality of vegetables produced is evaluated based on vegetable quality parameters and vegetables production manual and as per the food safety management plan   2. Quantityof vegetables produced is evaluated based on vegetables production manual   3. Return on investment is determined as per accounting principles   4. Recommendations are made based on the evaluation report |
| 1. Complete production of vegetables | * 1. Post-harvest handling of vegetables is carried out as per MoALF production manual and the food safety management plan   2. Vegetables production is documented in accordance with vegetables production manual   3. Vegetables production reports are shared in accordance with farm policy   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** |
| 1. Exotic vegetables may 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. |
| 1. Indigenous and Asian vegetables may include but are not limited to: | * Eggplant/ brinjals, * Capsicums, * Okra , * Karella, * Moringa, * Black nightshade, * Spider weed, * Amaranths, * Cowpeas, * Pumpkin, * Crotalaria |
| 1. Sources of food safety hazardsmay include but not limited to: | * Water * Growth media * Site * Organic and inorganic fertilizers |
| 1. Food safety hazards may include but not limited to: | * Biological * Physical * Chemical * Heavy metals * Pesticides |
| 1. Standards may include but not limited to: | * General principles of hygiene. * Code of general hygienic practice for horticultural food industry. * Code of Practice for Horticulture |
| 1. Sources of materials may include but not limited to: | * Seedlings * Inputs * Spray equipment * Irrigation kits * Harvesting equipment * Transport facilities * Holding facility |
| 1. Evaluation criteria may include consideration of: | * Prevalence * Probability * Severity |
| 1. Tools may include but not limited to: | * Hoes * Machetes * Secateurs * Shovels * Soil augur * Panga * Pegs * Hammer * Saw * Bucket * Shears |
| 1. Equipment may include 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 |
| 1. Materials and supplies may include 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 |
| 1. Soil sampling procedure may include but not limited to: | The process of   * soil collection, * packaging and * submission for analysis |
| 1. Soil based growing medium may include but not limited to: | * Forest soil * Sub soil |
| 1. 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
* Record keeping
* Basic hygiene
* 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
* Food safety in production of vegetable crops
* 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 vegetable plants
* 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

**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. Prepared planting structures to a level suitable to the planting material 2. Sourced planting materials adequate for the prepared structure 3. Prepared planting medium (soil based and soilless) as per the HCDA phyto-sanitary guide 4. Established vegetables suitable for the market demand 5. Applied safety measures by using Personal Protective Equipment 6. Followed required process of producing vegetables 7. Efficiently used the inputs 8. Harvested and carried out post-harvest handling of vegetables 9. Prepared accounting documents 10. Prepared production report 11. Observed food safety requirements in vegetable crops production 12. Documented and maintained food safety records in production of vegetable crops |
| 1. Resource Implications | The Following resources should be provided:   * 1. Access to relevant workplace where assessment can take place   2. Appropriately simulated environment where assessment can take place   3. Materials relevant to the proposed activity or tasks |
| 1. Methods of Assessment | Competency may be assessed through:   * 1. Observation   2. Written tests   3. Oral questioning   4. Interviews |
| 1. Context of Assessment | Competency may be assessed:   1. Off-the-job 2. On-the-job 3. Work placement -attachment   Off the job assessment must be undertaken in a closely simulated workplace environment. |
| 1. 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 |