

**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**PEST MANAGEMENT TECHNICIAN**

**LEVEL 5**



TVET CDACC

P.O BOX 15745-00100

NAIROBI

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# FOREWORD

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

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution of Kenya 2010 and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programs.

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 Integrated Pest Management Level 5. 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 Agriculture sector’s growth and development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

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

The Technical and Vocational Education and Training Act No. 29 of 2013 and Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification. This called for a 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 labor force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with Integrated Pest Management Sector Skills Advisory Committee (SSAC), Pesticide Control Products Board supported by Wageningen University & Research of the Netherlands have developed these Occupational Standards for Integrated Pest Management Technician. These standards will be the bases for development of competency-based curriculum for Integrated Pest Management 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.

**CHAIRMAN,**

**TVET CDACC**

# ACKNOWLEDGMENT

These Occupational Standards were developed through combined efforts of various stakeholders from private and public organizations. I am thankful to the management of the 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 (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to Integrated Pest Management working group and Agriculture Sector Skills Advisory Committee (SSAC) members for their contribution to the development of these Standards. I thank all the individuals and organizations who participated in the validation of these Standards.

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

**CHAIR PERSON**

**AGRICULTURE SECTOR SKILLS ADVISORY COMMITTEE**

A**CRONYMNS**

AGR : Agriculture

AIDS : Acquired Immuno Deficiency Syndrome

BC : Basic Competence

CBET : Competency Based Education and Training

CC : Common Competence

CDACC : Curriculum Development Assessment and Certification Council

CPCP : Crop Pest Control Product

CPM : Crop Pest Management

CR : Core Competency

EMCA : Environmental Management and Coordination Act

FAO : Food and Agriculture Organization

FRAC : Fungicide Resistance Action Committee

GAP : Good Agricultural Practices

HIV : Human Immunodeficiency Virus

HRAC : Herbicide Resistance Action Committee

ICT : Information, Communication, Technology

IPM : Integrated Pest Management

IRAC : IRAC – Insecticide Resistance Action Committee

KS 1758 : Kenya Standard 1758

LD50 : Lethal Dose, 50%

MoEST : Ministry of Education Science and Technology

MRL : Maximum Residue Levels

NEMA : National Environmental Management Authority

NOS : National Occupation Standard

OS : Occupational Standard

OSHA : Occupation Safety and Health Act

PCP : Pest Control Products

PCPB : Pest Control Products Board

PHI : Post harvest Intervals

PPE : Personal Protective Equipment

RPL : Recognition of Prior Learning

SOP : Standard Operating Procedures

SSAC : Sector Skills Advisory Committee

SSP : Spray Service Provider

UPS : Uninterrupted Power Supply

# KEY TO UNIT CODE

**AGR /OS/CPM/BC /01/ 5/A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Control version

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# OVERVIEW

This course consists of competencies required by a worker in Integrated Pest Management to manage crop pest, manage pest control products, provide crop spray services, manage pest resistance and also manage pest control products waste.

It consists of the following units of competencies:

**BASIC COMPETENCIES**

|  |  |
| --- | --- |
| **UNIT OF COMPETENCY CODE** | **UNIT OF COMPETENCY TITLE** |
| AGR/OS/CPM/BC/01/5/A | Demonstrate communication skills |
| AGR/OS/CPM/BC/02/5/A | Demonstrate numeracy skills |
| AGR/OS/CPM/BC/03/5/A | Demonstrate digital literacy |
| AGR/OS/CPM/BC/04/5/A | Demonstrate entrepreneurial skills |
| AGR/OS/CPM/BC/05/5/A | Demonstrate employability skills |
| AGR/OS/CPM/BC/06/5/A | Demonstrate environmental literacy |
| AGR/OS/CPM/BC/07/5/A | Demonstrate occupational safety and health practices |

**COMMON COMPETENCIES**

|  |  |
| --- | --- |
| **UNIT OF COMPETENCY CODE** | **UNIT OF COMPETENCY TITLE** |
| AGR/OS/CPM/CC/01/5/A | Demonstrate knowledge of agricultural crops |
| AGR/OS/CPM/CC/02/5/A | Demonstrate knowledge on crop pests |
| AGR/OS/CPM/CC/03/5/A | Demonstrate knowledge on crop pest control products |
| AGR/OS/CPM/CC/04/5/A | Apply principles of Food Safety |

**CORE COMPETENCIES**

|  |  |
| --- | --- |
| **UNIT OF COMPETENCY CODE** | **UNIT OF COMPETENCY TITLE** |
| AGR/OS/CPM/CR/01/5/A | Manage crop pest |
| AGR/OS/CPM/CR/02/5/A | Manage crop pest control products |
| AGR/OS/CPM/CR/03/5/A | Provide crop spray service |
| AGR/OS/CPM/CR/04/5/A | Manage crop pest resistance |
| AGR/OS/CPM/CR/05/5/A | Manage crop pest control products waste |
| AGR/OS/CPM/CR/06/5/A | Scout crop pest |

# BASIC UNITS OF COMPETENCY

## DEMONSTRATE COMMUNICATION SKILLS

**UNIT CODE:** AGR/OS/CPM/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 organization

**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 presentation 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. 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, behaviour * 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 |
| 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 |

**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 | 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:** AGR/OS/CPM/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. |
| 1. 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. |
| 1. 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 |
| 1. 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. |
| 1. 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. |
| 1. 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 |
| 1. 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. Use basic functions of calculator may include but not limited to: | * Addition * Multiplication * Calculate ratios * Conversion of ratios into percentages |
| 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 |

**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 | 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:** AGR/OS/CPM/BC/03/5/B

**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 concepts***are 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. Tablets 2. Laptops 3. Desktop computers 4. Calculators 5. Internet 6. Smart phones 7. Operation Manuals |
| 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 |
| 1. 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 :** AGR/OS/CPM/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.

|  |  |
| --- | --- |
| 1. **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 | 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:** AGR/OS/CPM/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. 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. Resource may include but not limited to: | * Human * Financial * Hardware * Software |
| 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:** AGR/OS/CPM/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:** AGR/OS/CPM/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 counselling 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 | 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. |

# COMMON UNIT OF COMPETENCY

## DEMONSTRATE KNOWLEDGE ON AGRICULTURAL CROP

**UNIT CODE:** AGR/OS/CPM/CC/01/5/A

**UNIT DESCRIPTION**

This unit covers competencies required to understand agricultural crops. It involves knowing plant taxonomy, cropping patterns, crop growth stages and crop growth requirements.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENTS**  **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. Plant taxonomy | * 1. Crops are classified depending on names, ***classes****,* ***description, maturity, uses, growth patterns*** |
| 1. Crop Propagation | * 1. ***Propagation methods*** are outlined   2. Advantages and disadvantages of propagation methods are outlined. |
| 1. Cropping patterns | * 1. ***Cropping patterns*** are outlined as per farm practices   2. Advantages and disadvantages of cropping patterns identified |
| 1. Crop growth stages | * 1. ***Crop growth stages*** are identified   2. Susceptible stages are determined |
| 1. Crop growth requirements | * 1. ***Environmental factors*** are identified   2. ***Nutritional factors*** are identified |

**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.

|  |  |
| --- | --- |
| **VARIABLES** | **RANGE:** |
| 1. Classesmay include but not limited to: | * + Monocotyledons   + Dicotyledons   + Flowering   + Non flowering |
| 1. Description may include but not limited to: | * + Narrow leaves   + Grasses   + Cereals   + Broad leaved   + legumes |
| 1. Use may include but not limited to: | * + Food and feeds crop   + Legumes   + Cereals   + Roots and tubers   + Fodder crops   + Cover crops   + Tree crops   + Horticulture   + Fruits   + Vegetables   + Herbs and spices   + Flowers   + Industrial (cash crops)   + Fibres   + Sericulture   + Oils and nuts   + Beverages   + Sugarcane |
| 1. Cropping patterns may include but not limited to: | * + Mixed cropping   + Mono cropping   + Intercropping   + Relay cropping |
| 1. Growth stages may include but not limited to: | * + Seedlings   + Vegetative   + Flowering   + Seed/fruit formation   + Harvesting and storage |
| 1. Environmental factors may include but not limited to: | * + Light hours   + Temperature   + Water   + Soil types |
| 1. Nutritional factors may include but not limited to: | * + Macro elements   + Nitrogen   + Phosphorus   + Potassium   + Calcium   + Trace elements   + Boron   + Magnesium   + Molybdenum |
| 1. Propagation methods may include but not limited to: | * + Seed   + Vegetative   + Cutting   + Budding   + Tissue culture.   + Cultivars   + GMOs   + Hybrids |

**REQUIRED SKILLS AND KNOWLEDGE**

**Required skills**

* Distinguish types of crops
* Distinguish healthy from unhealthy crops

**Required knowledge**

* Farming systems
* Crop growth stages
* Abiotic plant disorders
* Biotic plant disorders
* Effects of cropping patterns on pests
* Agro-ecological zones
* CropsAct2013
* Seeds and plant variety CAP 326
* AFA Act, 2013

**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. Understood what constitute agricultural crops   2. Understood plant taxonomy   3. Identified cropping patterns   4. Identified crop growth stage   5. Understood crop growth requirements |
| 1. Resource Implications | The following resources must be provided:   * 1. Crop schedules   2. Internet connectivity   3. Access to relevant sources of information   4. Fertigation schedules |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. Farm/Field Observation   3. Oral |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   3. During industrial attachment |
| 1. Guidance information for assessment | 5.1 Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |

## DEMONSTRATE KNOWLEDGE ON CROP PESTS

**UNIT CODE:** AGR/OS/CPM/CC/02/5/A

**UNIT DESCRIPTION**

This unit covers competencies required to identify agricultural crop pests. It involves classification, biology and ecology of pests. It involves understanding predisposing factors for pest outbreak and key diagnostic pointers.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENTS**  **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 terms are elaborated in the Range.*** |
| 1. Classification of pests | 1.1 Pest ***categories*** are identified  1.2 Origin ***and distribution*** of the pest is established  1.3 ***Status*** of the pest is established |
| 1. Biology of pests | 2.1 ***Taxonomic*** classification is identified  2.2 Life cycle is outlined  2.3***Hosts*** are identified  2.4 Dispersal and spread mechanisms are identified  2.5 ***Pest-host interactions*** are identified |
| 1. Ecology of pests | 3.1 Conducive environment for pest growth are identified  3.2 Pest behavior in the environment is outlined |
| 1. Predisposing factors for pest outbreaks | 4.1 The ***disease triangle*** is outlined   * 1. Close proximity to source of a pest |
| 1. Key diagnostic symptoms | * 1. ***Observable damages*** are identified   2. Laboratory analysis |
| 1. Scouting tools and use | * 1. Scouting tools are identified   2. Use of the tools is demonstrated   3. Maintenance of the tools is demonstrated |

**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** May include but not limited to) |
| 1. Pest category | * + Insects   + Fungi   + Bacteria   + Viruses   + Phytoplasma   + Nematodes   + Rodents   + Weeds |
| 1. Origin and distribution | * + Native   + Exotic   + Migratory   + Cosmopolitan   + Localized   + Sporadic |
| 1. Status | * Minor pest * Major pest * Strategic/ notifiable |
| 1. Observable damages | * + Malformation of plant parts   + Change of normal plant color   + Loss of plant parts   + Death   + Galls   + Yellowing   + Chlorosis   + Mottling   + Superficial growths on leaves   + Rotting   + Death   + Damping off   + Discoloration   + Spots & cankers |
| 1. Hosts | * + Main   + Alternate   + Refugia |
| 1. Disease triangle | * + Conducive environment   + Susceptible host   + Virulent populations   + Time |
| 1. Pest-host crop interactions | * Competition for nutrients * Transmission of pathogens by vectors |

**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:

* Pest diagnostic skills
* Effective communications skills
* Analytical skills
* GIS skills
* Report writing skills
* Interpersonal skills

**Required knowledge**

The individual needs to demonstrate knowledge of:

* Taxonomy
* Signs and symptoms of pest damage
* Crop pest interactions and the environment

**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 crop pests correctly   2. Classified crop pests correctly   3. Identified different stages of pests’ life cycle   4. Diagnosed signs and symptoms of crop damage correctly   5. Identified scouting tool and equipment correctly   6. Demonstrated on the use of the tools correctly   7. Managed the tools effectively |
| * + 1. Resource Implications | The following resources should be provided:   * 1. Pest outbreak reports   2. Journal papers |
| * + 1. Methods of Assessment | Competency in this unit may be assessed through:   * 1. Direct observation   2. Demonstration with oral questioning   3. Practical in the field   4. Written tests |
| * + 1. Context of Assessment | Competency may be assessed individually in the actual workplace or through accredited institution |
| * + 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## DEMONSTRATE KNOWLEDGE ON CROP PEST CONTROL PRODUCTS

**UNIT CODE:** AGR/OS/CPM/CC/03/5/A

**UNIT DESCRIPTION.**

This unit covers competencies required to understand pest control products. It involves; CPCPs classification, CPCPs chemistry and understanding legal and regulatory framework.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up  Work place 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. Classify CPCPs | * 1. CPCPs are classified according to***; mode of action, target organism, methods of action, toxicity, formulation***   2. Safety of CPCPs is declared according to; ***convectional, biologicals, mechanicals***   3. Labels and pictograms are observed |
| * + 1. Legal and regulatory framework | * 1. Legal and illegal CPCPs are differentiated as per PCP Act and WHO/FAO regulations   2. ***Multilateral conventions/protocols/treaties*** are observed***.*** |
| * + 1. Pest control equipment and use | 1. Pest control equipment are identified 2. Use of the equipment is demonstrated 3. Maintenance of the equipment is demonstrated |
| * + 1. Chemistry of CPCPs | * 1. CPCPs are identified according to chemical ***structure*** |

**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.

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| **VARIABLE** | **RANGE** |
| 1. Toxicity may include but not limited to: | * + WHO classification   + GHS classification |
| 1. Target organism may include but not limited to: | * + Insecticides   + Fungicides   + Herbicides   + Termiticides   + Rodenticides |
| 1. Mode of action may include but not limited to: | * + Contact   + Systemic   + Ingestion |
| 1. Methods of action may include but not limited to: | * + Prevention   + Curative   + Seed treatment   + Pre emergence   + Post emergence |
| 1. Conventional may include but not limited to: | * + Synthetic   + Semi chemicals |
| 1. Biologicals may include but not limited to: | * + Parasitoids   + Predators   + Botanical extracts |
| 1. Mechanicals may include but not limited to: | * + Traps   + Mulch   + Scare crow |
| 1. Formulation may include but not limited to: | * Liquids * Powders |
| 1. Chemical structure may include but not limited to: | * Organochlorines * Carbamates * Organophosphates * Pyrethroids |
| 1. Multilateral Conventions/protocols/treaties may include but not limited to: | * Montreal convention1989 * Rotterdam convention1998 * Basel convention 1992 * Stockholm convention 2004 |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Mitigate CPCPs incidences
* PCP handling
* PCP classification
* Identifying legal and illegal CPCPs

**Required knowledge**

* Chemical name, common name and trade name for CPCPs
* Convectional and biologicals CPCPs
* Benefits and challenges of CPCPs
* Formulations in the form of emulsifiable concentrated, wettable powders, suspensions, concentrated, dusts, granules, combustible material, aerosols and encapsulated materials
* PCP Act
* Interpretation of pictograms on labels
* Influence of weather factors on effectiveness and behaviour of CPCPs
* Hazards associated with the transfer of pesticides into incorrectly labelled containers
* Legal obligations concerning consumers under National food safety Policy
* PHIs and MRIs

**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. Classified CPCPs correctly   2. Interpreted Labels and pictograms correctly.   3. Understood CPCPs chemical structure   4. Implemented and maintained safety measures   5. Maintained proper CPCP record   6. Maintained legal CPCPs |
| 1. Resource Implications | The following resources must be provided:   * 1. PPEs   2. Records   3. Safety pictograms   4. Safety material- first aid kit, first aider   5. PCP store   6. Spray equipment   7. Pen |
| 1. Methods of Assessment | * 1. Competency may be accessed through:   2. Written   3. Farm/Field Observation   4. Oral |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   3. Combination |
| 1. Guidance information for assessment | * 1. Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |

## APPLY PRINCIPLES OF FOOD SAFETY

**UNIT CODE:** AGR/OS/CPM/CC/04/5/A

**UNIT DESCRIPTION**

This unit covers competencies required to apply principles of food safety. It involves principles of food safety, legal and regulatory framework, predisposing factors of food contamination. It also involves understanding market requirements and promotion of Integrated Pest Management**.**

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENTS**  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. Food safety principles | * 1. Origin of food is established.   2. Production practices are verified   3. Pesticide residues are determined by analysis   4. Biotechnology policies are identified |
| * + - 1. Legal and regulatory framework | * 1. National/international ***legal framework*** is observed |
| * + - 1. Predisposing factors of food contamination | * 1. ***Chemical contaminants*** are identified   2. ***Biological contaminants*** are identified   3. ***Physical contaminants*** are identified |
| * + - 1. Market requirements | * 1. CPCPsuse restriction is observed   2. MRLs are observed as per FAO/WHO guidelines   3. Periodic residue analysis is conducted as per SOPs   4. ISO food safety management systems are observed. |
| * + - 1. Promote IPM principles | 1. GAP are observed 2. Cultural methods are deployed 3. Biological methods are deployed 4. Chemical methods are deployed 5. Low risk pesticides are used 6. Safe use of pesticides is observed |

**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. Legal framework may include but not limited to: | * + WHO   + CODEX Alimentarius   + WTO   + KS1758   + EFSA |
| 1. Chemical contaminants may include but not limited to: | * + Pesticides   + Fertilizers   + Oils   + Mycotoxins |
| 1. Biological contaminants may include but not limited to: | * + Pathogens * Bacteria * Virus * Fungi * Nematodes   + Insects   + Rodents |
| 1. Physical contaminants may include but not limited to: | * + Soil   + Glass   + Metal   + Hair   + Plastic |
| 1. Awareness creation materials may include but not limited to: | * + Reference materials   + Brochures   + Posters   + Media briefs   + Documentaries |

# CORE UNITS OF COMPETENCIES

## MANAGE CROP PEST

**UNIT CODE:** AGR/OS/CPM/CR/01/6/A

**UNIT DESCRIPTION**

This unit covers competencies required to manage crop pest. It involves assessing farm site, developing, implementing and monitoring IPM strategy. It also involves evaluating crop pest management.

For a trainee to be competent in this unit he/she must also undertake competency on manage CPCPs, provide crop spray services and scouting crop pest

**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. Assess farm site | * 1. Farm assessment checked is developed as per SOP   2. Scout report is reviewed as per agro ecological zones, pest and crop   3. Assessment is carried out as per ***farm assessment checklist***   4. ***Farm site assessment report*** is prepared according to SOP |
| * 1. Develop IPM Plan | * 1. IPM plan is designed according to ***IPM principles***   2. Pest prevention options are selected from proven methods   3. Pest control options are selected in accordance with the pests, safety to humans and environment, ***market requirements***, ***threshold levels*** and cost   4. ***Pest management options*** are selected and integrated in accordance with ***scout report*** *and* ***good agricultural practices (GAP)***   5. ***IPM plan*** developed as per standard format   6. ***Cost benefit analysis*** of the options is undertaken as per recommended formula   7. Availability and practicality of technologies, needs and specifications are identified as per the pest and crop |
| * 1. Implement IPM plan | * 1. ***Tool, equipment and materials and CPCPs*** are selected and acquired as per selected IPM options   2. Pest prevention and control options are applied in accordance with GAP   3. ***Occupational Safety considerations*** are adhered to as per OSHA, established guidelines and regulations   4. Food safety is adhered to as per GAP and market requirements.   5. IPM options selected are applied as per ***prevailing conditions*** |
| * 1. Monitor IPM plan | * 1. ***Monitoring tools, equipment and materials*** are assembled as per task requirement   2. Customized monitoring templates are developed as per standard requirements   3. Scouting is conducted as per the scouting sheet   4. Scouting report is prepared as per guidelines   5. ***Monitoring report*** is prepared as per the reporting guidelines |
| * 1. Evaluate crop pest management | * 1. Monitoring reports are reviewed as per SOPs   2. IPM plan effectiveness is assessed based on quantity and quality of yields and pest infestation levels   3. Safety of the IPM plan is evaluated as per GAPs   4. Cost- Benefit analysis of implementing the IPM plans carried out as per recommended formula/cost benefit ratio   5. Suitability of the IPM plans evaluated as per the users’ needs, environmental impact and guidelines.   6. ***Side effects*** of crop pest management are evaluated and documented as per GAP and SOPs.   7. Crop pest management evaluation report is prepared as per reporting guidelines/SOP |

**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.

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| --- | --- |
| **VARIABLE** | **RANGE (**May include but not limited to:) |
| 1. Farm assessment checklist may include but not limited to: | * + Nature of crop enterprise   + pests and crop information   + site / location observations   + soil information   + farm hygiene situation   + crop management practices   + Weather |
| 1. Farm assessment report may include but not limited to: | * Nature of the report * Pests and crop information * Site/location information * Soil information. * Farm hygiene situation * Crop management practices * Recommendations * Desk reports   + Check in the internet |
| 1. IPM Principle may include but not limited to: | * + Identification and understanding of pest   + Monitoring to determine distribution, trends, population damage   + Decision making (to act or not to act) based on availability of technology, efficacy, tractability of application, safety, cost, market requirements   + Pest Prevention and Control options   + Resistance management   + Evaluation |
| 1. Pest management options may include but not limited to: | * Cultural methods * Early land preparation * Use of resistance varieties * Field hygiene * Netting * Cropping systems * Crop rotation * Sanitation * Resistant varieties * Good Agricultural Practices * Biological methods; * predators, * Pathogens, * Parasitoids, * Botanicals, * Biopesticides, * Mechanical / physical methods * Mulching * Solarization, * Hand picking, * physical barriers, * deep ploughing, * traps * Chemical methods * Herbicides, * Insecticides, * Fungicides, * Bactericides, * Acaricides |
| 1. Crop market requirements may include but not limited to: | * + - Set MRLs     - Crop variety,     - Size,     - Tolerance to damage,     - Maturity,     - Pest infestation |
| 1. Threshold levels (Variables) may include but not limited to: | * + - Crop of interest     - Economic importance of the crop     - Population of pests     - Damage caused by the pest     - weather |
| 1. Scout report may include but not limited to: | * + Type/ variety of crop   + Crop growth stage   + Type of pest   + Stage of pest   + Pest population   + Prevailing weather conditions   + Damage levels |
| 1. Good Agriculture practices may include but not limited to: | * + Food safety (MRLs, contamination)   + Pre-Planting Practices   + Land and Seed bed preparation   + Planting practices   + Post Planting practices   + Timing and weather conditions |
| 1. Cost benefit analysis may include but not limited to: | * + Cost of agro input   + Cost of labour/charges   + Produce selling price   + Gross margin analysis |
| 1. IPM plan may include but not limited to: | * + Combination of effective, safe, affordable and sustainable pest preventive and pest control options |
| 1. Side effects may include but not limited to: | * + Phytotoxicity   + Invasiveness   + Health effects |
| 1. Occupational safety considerations may include but not limited to: | * + Hazard and risk mitigation measures to protect people and the environment based on risk assessment of plant protection methods used and or products and application used before during and after use |
| 1. Prevailing weather conditions may include but not limited to: | * + Rain   + Sun   + Wind   + Available technology |
| 1. Available Technologies may include but not limited to: | * Management options registered and available in Kenya |
| 1. Tools and materials may include but not limited to: | * + Handles   + Traps (Yellow, blue, Light, water, etc)   + Software   + Dissecting kit   + Sweep net |
| 1. Template may include but not limited to: | * + Date of monitoring   + Pest control measures in use   + Crop variety   + Date of planting   + Soil type   + Crop area and spacing   + Pest prevalence and growth stage   + Key pest of the crop |
| 1. Side effects may include but not limited to: | * + Phytotoxicity   + Invasiveness   + Health effects   + Environmental impact |
| 1. Prevailing conditions may include but not limited to: | * + Rain   + Sun   + Wind   + Available technology |
| 1. Monitoring report may include but not limited to: | * + Plant health improvement   + Changes in pest numbers   + Quality and quantity of produce   + Profitability of the enterprise   + Food safety of the produce |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Ability to conduct farm assessment
* Ability to identify different pest control options/methods
* Recognize general characteristics of pest damage
* Ability to identify crop and crop stages
* Report writing

**Required knowledge**

* Crop variety market requirements
* Methods of pest control
* Pest control methods
* Correct stages of development of crops, pests and disease in relation to crop safety and maximizing the effectiveness of treatment
* Safety guidelines and regulations in managing crop pests
* Equipment and technical capacity requirements in managing crop pests
* Monitoring performance of the plan
* Certification schemes
* Sanitary and phytosanitary requirements
* Evaluating performance of the plan
* characteristics of healthy plants
* Insect feeding behaviour for diagnosis of the cause of pest damage symptoms
* MRLs and PHIs
* Epidemiology of major causal agents of diseases
* Factors that favour occurrence of pests out breaks
* Characteristics and lifecycles of crop pests
* Pest incidences to particular cropping practices/field history
* Pest incidences to pest mobility, host specific, weather and climate
* Cost benefits for different control options
* Pest dispersal and ability to transmit diseases
* Pesticide mode of action and formulation
* Banned or restricted pesticides
* Site factors and their influence on cropping and crop management
* Factors involved in rotation decision and in variety choice
* Importance of soil management and crop nutrition in IPM

**EVIDENCE GUIDE**

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

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| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Interpreted scout report correctly 2. Assessed the farm site appropriately 3. Developed IPM plan effectively 4. Collected farm data correctly 5. Applied appropriate crop pest control methods. 6. Used correct PPEs 7. Selected appropriated scouting pattern 8. Collected appropriate samples 9. Recorded detailed scout findings 10. Audited different pest control options 11. Compiled report and recommendation for pest control methods |
| 1. Resource Implications | The following resources must be provided:   * 1. Transport to the field   2. Data collection sheet   3. Sampling tools   4. PPEs   5. Pens   6. List pest control products/ registered crop varieties   7. Internet connectivity   8. Air time   9. Smart phone   10. Pest control products application equipment.   11. Access to relevant sources of information |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. Oral   3. Farm/Field Observation |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   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. |

## MANAGE CROP PEST CONTROL PRODUCTS

**UNIT CODE:** AGR/OS/CPM/CR/02/6/A

**UNIT DESCRIPTION**

This unit specifies competencies required to manage CPCPs. It involves; identifying CPCPs premise location, procuring and transporting CPCPs, storing/stocking and displaying CPCPs as well as maintain record and disposing CPCPs waste.

**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 CPCPs suppliers and premise location | * 1. CPCPs suppliers are identified as per PCPB guidelines   2. ***CPCP premise*** is located as per Good Agricultural Practices / FAO guidelines.   3. CPCP premise is constructed/ acquired in accordance with *GAP, FAO* and PCPB guidelines.   4. ***Relevant licenses*** are acquired as per PCPB and county government |
| 1. Procure and transport CPCPs | * 1. List of ***registered CPCPs*** is accessed from Pest Control Products Board   2. CPCPs licensed dealers are identified as per PCPB records.   3. Legal and illegal CPCPs are differentiated as per PCP Act and regulations.   4. Legal but restricted CPCPs (class 1) are handled as per PCP Act and regulations.   5. CPCPs are purchased according to toxicity, target pest, crops, cost, efficacy, formulation, Mixing, mode of action and client’s needs   6. CPCP labels are read and interpreted in accordance with CPCPs labelling regulations.   7. CPCPs are separately packaged and transported in accordance with best practice |
| 1. Store / stock management and display of CPCPs | * 1. CPCPs are stored according to ***PCPB requirements***   2. CPCPs are stocked as per ***stock management practices***   3. CPCPs are displayed in accordance with SOPs/FAO guidelines.   4. CPCP store risks are identified as per best practice   5. Mitigation options for accidents and mis-use of CPCPs are identified and applied as per guidelines. |
| 1. Document and record CPCPs | * 1. CPCP record keeping is carried out as per SOPs   2. CPCP ***tracking*** is carried out for traceability   3. ***Spraying Protocol*** of pests/diseases are identified   4. Safety of records enhanced   5. Systems for fast retrieval of documents is developed |
| 1. Dispose CPCPs waste | * 1. CPCPs waste is identified in accordance with PCPB ***guidelines***   2. CPCPs waste is contained in accordance with guidelines   3. CPCPs waste is disposed in accordance with guidelines. |

**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. CPCPs premise as per guidelines may include but not limited to: | * + Design of a CPCP premise   + Location of CPCPs in a premise   + Soundness of the construction material   + Safety precautions for a CPCPs premise   + Ventilation |
| 1. CPCPs Licensed dealers may include but not limited to: | * + Licensing requirements for a PCP dealer |
| 1. Registered CPCPs may include but not limited to: | * + Registered CPCPs by PCPB   + Approved labels   + Interpretation of the label   + Product range |
| 1. Illegal CPCPs may include but not limited to: | * + Unregistered CPCPs   + Expired CPCPs   + Counterfeit |
| 1. Restricted CPCPs may include but not limited to: | * + Applied by professionals only   + Not found over the counter   + Bought from the suppliers (companies) |
| 1. Toxicity may include but not limited to: | * + Class I   + Class II   + Class III   + Class IV |
| 1. Target pest may include but not limited to: | * + Insects e.g. trips   + Weeds e.g. oxalis   + Pathogen e.g. fungi, bacteria |
| 1. Formulation may include but not limited to: | * + Solids   + Liquids   + Gases |
| 1. Mixing may include but not limited to: | * + Not contaminating water bodies |
| 1. Mode of action may include but not limited to: | * + Contact   + Systemic |
| 1. Best practice may include but not limited to: | * + Away from food and feed   + Away from passengers/ driver cabin   + Uses of cool boxes   + Separated based on formulation, pack size and packaging material |
| 1. PCPB Requirements may include but not limited to: | * + First in fast out   + Purchase of only required quantities   + Place powder formulations above liquid formulations in the shelves |
| 1. Spraying protocol may include but not limited to: | * + Number of sprays per season   + Type of molecule to be sprayed |
| 1. Guidelines may include but not limited to: | * + Direction of wind   + Soundness of the construction material |
| 1. Stock management practices may include but not limited to: | * + First in first out of pest control products   + Storing of powders above liquids   + Stock accessibility   + Labelling of shelves |
| 1. PCPB store requirements may include but not limited to: | * + Permanent structure   + Concrete floor   + Running water   + First aid kit   + Well ventilated protective clothing |
| 1. Tracking may include but not limited to: | * + Used/date/amount/PHIs/MRLs for complete |
| 1. Spraying protocols may include but not limited to: | * + Number of sprays per season   + Type of molecule to be sprayed   + Direction of wind |
| 1. Guidelines may include but not limited to: | * + EMCA   + FAO   + PCPB |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Disposal CPCPs waste
* Mitigate CPCPs incidences
* Good record keeping

**Required knowledge**

* Chemical name, common name and trade name for CPCPs
* Convectional and biopesticides
* Benefits and practical limitation of biological control agents
* Formulations in relations to the choice of application equipment
* formulations in the form of emulsifiable concentrated, wettable powders, suspensions, concentrated, dusts, granules, combustible material, aerosols and encapsulated materials
* Additives e.g., surfactants, dilutants and dispersing, dispensing and emulsifying agents
* Registered CPCPs
* PCP Act and EMCA
* Classification of CPCPs
* Prevailing market requirements
* Oral toxicity, dermal toxicity and LD50
* Interpretation of pictograms on labels
* Influence of weather factors on effectiveness and behaviour of CPCPs
* Hazards associated with the transfer of pesticides into incorrectly labelled containers
* Good storage and stock management
* Mode of action of major groups of herbicides, nematicides, insecticides, fungicides and plant growth regulators
* Influence of weather factors on effectiveness and behaviour of CPCPs
* Legal obligations concerning consumers under National food safety Policy
* PHIs and MRIs

**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 CPCPs correctly   2. Procured and transported CPCPs correctly   3. Located CPCPs store correctly   4. Stored/stocked and displayed CPCPs effectively   5. CPCPs records maintained properly   6. Identified Spraying protocols correctly   7. Maintained CPCPs quality in the store efficiently   8. Disposed CPCPs waste appropriately |
| 1. Resource Implications | The following resources must be provided:   * 1. PPEs   2. Records   3. Safety pictograms   4. Safety material- first aid kit, first aider   5. PCP store   6. Spray equipment |
| 1. Methods of Assessment | * 1. Competency may be accessed through:   2. Written   3. Farm/Field Observation   4. Oral questioning |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   3. During industrial attachment |
| 1. Guidance for assessment | * 1. Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |

## PROVIDE CROP SPRAY SERVICE

**UNIT CODE:** AGR/OS/CPM/CR/03/6/A

**UNIT DESCRIPTION**

This unit covers competencies required to offer crop spray service. It involves carrying out spray need assessment, preparing spray contracts and procuring CPCPs and equipment. It also includes calibrating equipment and PCP volumes, mixing, applying and disposing PCP waste. It also involves maintaining PCP application equipment as well as preparing and sharing crop spray service reports.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| --- | --- |
| **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 crop spray need assessment and prepare crop spray contracts | * 1. ***Spray service*** need assessment is carried out as per SOPs.   2. ***Spray service providers*** are identified as per AAK/PCPB database   3. ***Spray contract*** document are prepared and signed as per agreed terms |
| 1. Procure crop pest control products and equipment | * 1. Relevant CPCPs equipment are acquired as per best practices   2. CPCPs are procured as per PCPB guidelines   3. Records of CPCPs and equipment are maintained as per guidelines |
| 1. Calibrate equipment and CPCP volumes | * 1. Calibration tools and PPEs are identified as per crop and CPCPs   2. Calibration of the equipment is carried out as per crop, crop growth stage, CPCPs   3. Calibrated equipment is tested as per manufacturers manual   4. CPCPs volumes is calibrated as per unit area |
| 1. Mix and apply pest control products | * 1. Mixing site is selected and prepared according FAO/PCPB guidelines   2. Safety measures are applied as per OSHA guidelines   3. CPCP mixing is done in accordance to CPCP approved label   4. CPCP spray mix is applied on the crops as per CPCP approved label   5. Mixing site is cleaned as per best practice   6. CPCP application and incidence records are maintained as per WHO/FAO guidelines |
| 1. Dispose crop pest control products waste | * 1. CPCP waste disposal site is identified as per FAO/NEMA /PCPB guidelines   2. CPCP waste is contained as per FAO guidelines   3. CPCP waste disposed as per NEMA and PCPB guidelines |
| 1. Maintain PCP application Equipment | * 1. CPCP application equipment is cleaned and dried as per manufacturers manual and SOP   2. CPCP application equipment is maintained as per manufacturers manual   3. CPCP application equipment are stored in accordance with manufacturer manual |
| 1. Prepare and discuss crop spray service report | * 1. Crop Spray service report is prepared based on the contract   2. Spray service report is discussed with the client as per contract   3. The spray service report is shared and filed as per SOP |

**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.

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| **VARIABLE** | **RANGE** |
| Spray service may include but not limited to: | * + Spraying conventional CPCPs   + Applying biological |
| Spray service providers may include but not limited to: | * + Trained and certified   + Identification card |
| Crop spray Contracts may include but not limited to: | * + Agreement between the service provider and the client   + Spraying terms of reference   + Payment terms |
| CPCPs equipment are acquired may include but not limited to: | * + Procure   + Hire   + Borrow   + Government aid |
| Mixing site may include but not limited to: | * + Proximity to water bodies,   + grazing lands,   + human habitation, |
| Safety measure may include but not limited to: | * + Use of protective clothing   + Observance of label requirements   + Avoid contamination of water bodies and non targets |
| CPCPs equipment may include but not limited to: | * + Knapsack sprayers   + Mist blowers   + Pheromone traps |
| Equipment is maintained may include but not limited to: | * + Greasing/oiling   + Unblocking   + Repairing   + Replacements |
| Calibration may include but not limited to: | * + type of nozzle   + Size of equipment   + type of CPCP   + Type of equipment   + Stage of crop growth   + Target pest |
| PCP application may include but not limited to: | * + Weather conditions,   + PPEs   + Formulation CPCPs   + Spill kits and first aid kits |
| Set standards may include but not limited to: | * + transport   + storage   + disposal of pest control products |
| SOP may include but not limited to: | * + step wise procedure /sequence of activity when applying CPCPs |
| Set guidelines may include but not limited to: | * + Include legal notice on disposal of pest control products waste, FAO and codex |
| Verification may include but not limited to: | * + Leakage   + Discharge   + Pressure   + Blockage   + Nozzle with reference to target |
| Formulation may include but not limited to: | * + Solids   + Liquids   + Gases |
| Waste disposal may include but not limited to: | * + Incineration in licensed facilities   + Deactivation system/soak pit |
| Maintenance of CPCPs equipment may include but not limited to: | * + Cleaning and drying   + Lubrications   + Repair   + Safe storage   + Calibrations |
| Spray service report may include but not limited to: | * + Date of application   + Area/crop applied   + PHI/re-entry intervals   + Name SSP and contacts   + Type of CPCPs and pest |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills**

* Report writing
* Basic computer skill
* Diagnosis of diseased plant materials
* Distinguish different types of pests
* Negotiation
* Record keeping
* Application methods
* Calibration of application equipment
* Waste disposal of CPCPs
* Spraying skills

**Required knowledge**

* Formulations of CPCPs
* Formulation in relation to the choice of application equipment
* Application methods
* Different CPCPs
* Legal and illegal CPCPs
* Distinguish different types of pests
* Label interpretation
* Safety and hazards related to pest and pesticides
* Calibration and maintenance of sprayers
* Growth stages of the crop
* Abiotic plant disorders
* Signs and symptoms of different plant pests and diseases
* Effects of cropping patterns on pests
* Understand principles of Integrated pest management
* Food safety
* Role of GAP towards crop pest management
* Different units of measurement
* Safe handling of materials and preparation for application
* Safety of operators during application of CPCPs
* Types of nozzles
* Relationship between pressure, nozzle size, speed, droplet size and coverage
* Mixing of CPCPs
* CPCP dosage
* Degree of retention and distribution of chemical
* Agro-ecological Zones
* Farming systems
* Beneficial organisms
* Biology of different pests and beneficial organisms
* Crop Pest Control Products
* Procurement of CPCPs
* Nature of plant surfaces
* Relationship between pressure, nozzle size, speed, droplet size and coverage
* Equipment Faults
* Communication
* Procurement of CPCPs
* Public relations
* Contract preparation
* Interpret scout report

**EVIDENCE GUIDE**

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

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| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:  crop spray service need assessment is carried out appropriately   * 1. Contract documents are prepared and interpreted   2. CPCPs and spray equipment are procured effectively   3. Calibrated spray equipment correctly   4. Identified appropriate CPCP and equipment   5. Identified appropriate CPCP and equipment source   6. Correctly followed CPCP label instructions   7. Disposed CPCP waste judiciously   8. Mitigated for accidents and mis-use of CPCPs   9. Maintain CPCP records effectively   10. Used PPEs appropriately |
| 1. Resource Implications | The following resources must be provided:   * 1. Stationery   2. PPEs (Gumboots, overall, mask…)   3. Spraying equipment   4. Calibration tools (calculator, tape measure)   5. Mixing equipment   6. Mixing site   7. Computer/laptop   8. First aid kit |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. Farm/Field Observation   3. oral |
| 1. Context of Assessment | Competency may be assessed:   * 1. On the job   2. Off the job or   3. Combination |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |

## MANAGE CROP PEST RESISTANCE

**UNIT CODE:** AGR/OS/CPM/CR/04/6/A

**UNIT DESCRIPTION**

This unit covers competencies required to manage pest resistance. It involves identifying types and sources of crop pest resistance, developing, implementing and monitoring pest resistance management strategy. It also involves evaluation and reporting on crop pest resistance management.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| **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. Monitor and Identify types and sources of crop pest resistance | * 1. ***Farm history*** on the use of CPCPs and its efficacy is determined as per farm records   2. Resistance ***detection methods and tools*** are identified as per guidelines.   3. ***Types of pest resistance*** is established as per WHO manual. |
| 1. Develop crop pest resistance management plan | * 1. Record of pest resistance in the farm/region is determined as per farm records/regional reports.   2. Alternative or combination of ***control and prevention methods*** and their need-based application are identified as per best practices.   3. ***Efficacy of CPCPs*** is reviewed as per PCPB guidelines   4. CPCPs with different mode of action ***FRAC, IRAC, HRAC*** are identified as per PCPB guidelines.   5. ***Refugia*** is identified as per best practices. |
| 1. Implement crop pest resistance management plan | * 1. Tools, equipment and materials are selected acquired and used as per best practices.   2. CPCPs with different mode of action FRAC, IRAC, HRAC are used as per PCPB guidelines   3. different control and prevention options are used as per best practice   4. Methods and time of application is adjusted as per best practice.   5. Cost benefit analysis of the options is calculated as per market index/best practice.   6. ***Risk assessment*** of pest management options is carried out as per best practice.   7. ***Safety considerations*** are put in place |
| 1. Monitor and evaluate crop pest resistance management plan | * 1. ***Monitoring tools, equipment and materials*** are assembled as per task requirement   2. Pest resistance management templates are developed as per standard requirements   3. Scouting is conducted as per scouting sheet and scouting report prepared.   4. Pest control and prevention options are compared as per best practise and control level determined as per guidelines   5. Inconsistency in performance is checked   6. ***Monitoring report*** is prepared as per the reporting guidelines and reviewed as per SOPs   7. Pest resistance management strategy effectiveness is assessed based on quantity and quality of yields and pest infestation levels   8. Safety of the pest resistance management strategy is evaluated as per GAPs   9. Cost- Benefit analysis of implementing the pest resistance management strategy is carried out as per best practice   10. ***Side effects of pest resistance*** management strategy are evaluated and documented as per GAP and SOPs.   11. ***Control levels*** are evaluated as per best practice |
| 1. Prepare report on pest resistance management | 1. Pest resistance management evaluation report is prepared as per reporting guidelines/SOP for the region and national level 2. Suitability of the pest resistance management plan, as per the user’s needs, environmental impact and guidelines reported. |

**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.

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| **VARIABLE** | **RANGE** |
| Detection tools and methods may include but not limited to: | * Lens * Forceps * Specimen bottle * Preservatives * Comparison of performance with similar CPCPs treatments |
| Crop Pest resistance may include but not limited to: | * Reduced susceptibility of a pest to crop pest control products * Adverse weather condition affecting efficacy of CPCPs * Natural selection * Gene mutation * improper management options employed * Ineffectiveness of certain CPCPs |
| Farm History may include but not limited to: | * Previous pest management options * Previous pest attacks * Infestation levels after treatment * Previous crops in the field |
| Resistance detection methods may include but not limited to: | * Laboratory bio assays * Field observation * Biochemical methods |
| Types of pest resistance may include but not limited to: | * Multiple resistance * Cross resistance * Biological resistance |
| Control methods may include but not limited to: | * + Pest prevention methods     - Resistant varieties     - Cultural practises   + Pest control methods     - Biological     - Physical     - Chemical |
| Efficacy of CPCPs may include but not limited to: | * Target crop * Target pest * Rate of application * Time of application * Level/dose rate * Application method * Storage of the CPCPs * Shelf life of the products |
| FRAC, IRAC, HRAC may include but not limited to: | * Resistance classification * Alternating resistance classes |
| Use of refugia | * Untreated areas/fields near treated fields/crops * Protected pest in the fields/on crops * Areas with exposed crops to pest attack |
| Risk assessment may include but not limited to: | * Application methods * Cost of new control option * Effect of environment on pest control * Effects on non-target organisms |
| Safety consideration may include but not limited to: | * Food safety * worker safety * Product safety * Environment * Animal |
| Monitoring report may include but not limited to: | * Pest resistance * Pest control and preventions option applied |
| Control levels may include but not limited to: | * Amount of CPCPs used * Number of sprays applied * Level of infestation observed |
| Negative side effects may include but not limited to: | * Drifting to unintended areas * Water pollution (quick infiltration in soil, run-off, leaching) * Human health side effects (including acute and chronic diseases) * Biodiversity lose (e.g. pollinators and bee population) |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Ability to identify different pest control options/methods
* Ability to recognize general characteristics of pest resistance
* Ability to collect samples
* Ability to collect and collate data
* Ability to analyse lab and field trials results
* Report writing

**Required knowledge**

* Symptoms and signs of proper plant growth
* Feeding behaviour of pests which will provide a basis for diagnosis of the cause of pest damage symptoms
* Factors causing pest resistance to pesticides
* Characteristics and lifecycles of crop pests
* Pest incidences, pest mobility, host specific, weather and climate
* Cost benefits for different control options
* Pesticide mode of action and formulation
* Available pest control products/methods

**EVIDENCE GUIDE**

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

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| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   * 1. Identified types and sources of resistance correctly   2. Developed pest resistance management plan correctly   3. Implemented and monitored pest resistance management plan efficiently   4. Evaluated pest resistance management plan accurately   5. Compiled report and recommendation for pest resistance management methods   6. Developed skill to interpret scout report   7. Assessed the site and the field   8. Collected farm data   9. Applied appropriate pest control method.   10. Use of the list of approved pest control products   11. Compiled report and recommendation for pest control options |
| 1. Resource Implications | The following resources must be provided:   * 1. Transport to the field   2. Data collection sheet   3. Sampling tools   4. Pens   5. List pest control products/ registered crop varieties   6. Internet connectivity   7. Air time   8. Smart phone   9. Pest control products application equipment.   10. Access to relevant sources of information |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. Farm/Field Observation   3. Oral |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   3. During industrial attachment |
| 1. Guidance for assessment | 5.1 Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |

## MANAGE CROP PEST CONTROLPRODUCTS WASTE

**UNIT CODE:** AGR/OS/CPM/CR/05/6/A

**UNIT DESCRIPTION**

This unit covers competencies required to manage pest control products waste. It involves: identification of sources and types of CPCP waste, developing, implementing and monitoring waste management plan. It also includes evaluation of CPCP waste management.

**ELEMENTS AND PERFORMANCE CRITERIA**

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| --- | --- | --- |
| **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 sources and types of CPCPs waste. | * 1. Types of ***CPCPs waste*** are identified as per FAO/PCPB guidelines.   2. Sources of CPCPs waste are identified as per PCPB guidelines. | |
| 1. Develop CPCP waste management plan | * 1. Person responsible for PCP waste management will be specified as per NEMA and PCPB guideline   2. Identify and classify CPCP waste as per FAO, NEMA and PCPB guidelines   3. measures are identified to reduce amount of CPCP waste as per best practice   4. CPCPs waste collection centres are set up in accordance with set regulations   5. safeguard collected CPCP waste as per FAO, NEMA and PCPB guidelines   6. CPCP waste are disposed as per FAO, NEMA and PCPB guidelines | |
| 1. Implement CPCP waste management plan | * 1. CPCPs waste is taken to collection centres in accordance with set regulations   2. CPCP waste is transported to disposal site using relevant transport as per FAO, NEMA guidelines   3. Modes of CPCP waste disposal are applied as per FAO/PCPB guidelines |
| 1. Monitor CPCP Waste management plan | * 1. Modes of CPCP waste disposal are checked and maintained as per guidelines.   2. Environmental contamination is determined as per set guidelines   3. Amount of CPCP waste generated is determined as per stock records.   4. Set standards/regulations are complied with in accordance to manufacturers specifications/ laboratory results. |
| 1. Evaluate CPCP Waste management | * 1. Monitoring reports are reviewed as per SOPs   2. Waste management strategy is assessed   3. Safety of the waste management strategy is evaluated as per GAPs   4. Cost- Benefit analysis of implementing waste management is carried out as per recommended formula/ cost benefit ratio   5. Waste management evaluation report is prepared as per reporting guidelines |

**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

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| **VARIABLE** | **RANGE** |
| 1. CPCPs Waste may include but not limited to: | * Rinsate * Illegal products * Unregistered products * Counterfeit * Expired products * Obsolete products * Spillage * Drifts * Empty product containers * Old equipment |
| 1. Modes of CPCP waste disposal may include but not limited to: | * Soak pit * Incineration * Deactivation system |
| 1. Set standards may include but not limited to: | * Guidelines – FAO, * Regulations- EMCA, NEMA, PCP Act, Biosafety Act., OSHA Act. * Kenya constitution 2010 (Chapter 5) * International treaties. * Market standards - KS 1758, global GAP |
| 1. PPEs may include but not limited to: | * Gumboots * Overall/ apron * Gloves * Masks/respirator * Googles * Hat /head cover |
| 1. Containment materials/ equipment may include but not limited to: | * Saw dust * Sand * Bucket * Shovel * Broom * Drum * Hose pipe |

**Required skills and knowledge**

**Required skills**

* Handling of equipment and materials
* Use of PPEs
* Contain and safe-guard CPCPs waste.
* Conduct first Aid

**Required knowledge**

* Legislation on CPCPs waste disposal
* Principles of waste management
* Waste management plan
* CPCPs and their properties
* Risks/Hazards associated with CPCPs
* First-Aid requirements

**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 classified types and sources of CPCP waste correctly.   2. Developed, implemented and monitored CPCP waste management plan   3. Demonstrated handling of CPCPs waste responsibly.   4. Demonstrated disposal of CPCP waste /related waste effectively   5. Demonstrated proper use of PPEs. |
| 1. Resource Implications | The following resources must be provided:   * 1. Transport   2. Containment equipment and materials.   3. PPEs   4. Disposal site   5. Water   6. Incinerator   7. Set regulations. |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. /Farm Field Observation |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   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. |

## SCOUT CROP PESTS

**UNIT CODE:** AGR/OS/CPM/CR/06/5/A

**UNIT DESCRIPTION**

This unit covers competencies required to scout crop pests. It involves; developing scouting template, identifying and assessing the farm, selecting sampling unit, scouting units and scouting patterns. It also involves examining plants for pest infestation, collecting and analysing plant, soil and pest samples as well as recording findings and compiling scout reports.

**ELEMENTS AND PERFORMANCE CRITERIA**

|  |  |
| --- | --- |
| **ELEMENT**  These describe the key outcomes which make up workplace function. | **PERFORMANCE CRITERIA**  These are **assessable** statements which specify the required level of performance for each of the elements.  ***Bold and italicized terms are elaborated in the Range*** |
| 1. Develop scouting template | 1.1 Tools and equipment to develop scouting template are /acquired as per the ***standard operating procedures***  1.2 content for the template is determined in accordance with current and previous ***pest and disease*** occurrence***s*** and ***crop protocol***  1.3 Draft ***scouting template*** is developed as per ***guidelines***  1.4 Scouting template is pretested in accordance with guidelines.  1.5 Scouting template is developed as per guidelines |
| 1. Conduct site assessment | * 1. Farm is identified as per survey maps   2. Farm is mapped and size determined in accordance with available maps   2.2 Prevailing ***weather*** conditions are established as per meteorological records  2.3. Crops and ***cropping patterns*** of the area identified as per farm management handbooks  2.4. ***Crop growth stage*** and size is determined as per established ***morphological parameters***  2.5 Pest and disease occurrence is established. |
| 1. Establish scouting patterns and points | 3.1 Scouting route is planned as per site assessment  3.2 ***Scouting pattern*** is established as per the land shape, terrain size, crops  3.3 Scouting points are established as per best practice, pests’ type and land size  3.4. ***Scouting methods/techniques*** are established as per pest type and bio ecology, crop  3.5 Scouting patterns and point are tested and reviewed as per best practise |
| 1. Examine plants for pest infestation | 3.2 Pest scouting, ***scoring*** and recording is conducted as per FAO.  3.3 Pests and host samples are ***collected and preserved*** as per recommended technique and National Museum ***standards***  3.4 Samples are ***labelled****,* ***packaged*** and ***transported*** as per FAO standards |
| 1. Conduct sample analysis and Prepare Scout report | * 1. Samples are sorted according to ***labels***   2. Samples are analysed in accordance with best practices.   3. Results are compared with pest management decision guides.   4. Conclusions and drawn as per the findings.   5. Recommendations are made from as per conclusions findings   6. ***Scout Report*** is prepared as per SOPs |

**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.

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| **VARIABLE** | **RANGE** (May include but not limited to) |
| 1. Standard operating procedures may include but not limited to: | * + Procurement procedures   + Template development procedures   + Operating procedures |
| 1. Crop Pests and diseases may include but not limited to: | * + Insects   + Diseases * Bacterial, * Fungi, * virus   + Nematodes   + Weeds |
| 1. Set Guidelines may include but not limited to: | * + Scout manuals   + Threshold manuals |
| 1. Pest and disease occurrences may include but not limited to: | * + Distribution   + Pest list map   + Incidence and severity |
| 1. Crop Protocols may include but not limited to: | * + Crop variety   + Maturity time   + Husbandry /agronomic requirements   + Common pest   + Control measures   + Recommended CPCPs |
| 1. Scouting template may include but not limited to: | * Pest scouting score sheet * Databasing scouting data * Summary statistics for scouting scores |
| 1. Weather conditions may include but not limited to: | * + Rainfall and humidity   + Drought or dry condition   + Cloudy conditions   + Sunny conditions   + Wind   + Temperature |
| 1. Cropping patterns may include but not limited to: | * + Mono cropping   + Inter cropping   + Mixed cropping   + Crop Rotation |
| 1. Morphological parameters may include but not limited to: | * + Crop growth stage * Initial stage * Vigorous leafy stage * Flowering stage * Fruiting stage   + Crop Size   + No of Leaves   + Days after germination |
| 1. Scouting pattern and points may include but not limited to: | * + Borderline   + Zigzag   + Spot scouting   + Satellite images |
| 1. Scouting method/technique may include but not limited to: | * + Observation   + Shake and beat   + Knock down sprays   + Bait   + Brush off   + Counts   + Swiping nets   + Trapping (sticky traps, pheromones)   + Hand picking   + Plucking   + Aspirators   + Collecting nets   + Extractors   + Sieving |
| 1. Scoring scale may include but not limited to: | * + Damage assessment on crop   + Disease/pest incidence   + Disease/pest severity   + Counting |
| 1. Scout template may include but not limited to: | * + Date of scouting   + Farm name and size   + crop type and variety   + Crop growth stage   + Pest type and stage   + level of crop damage   + level of infestations   + weather conditions   + Sampling points |
| 1. Weather conditions may include but not limited to: | * + Rainfall and humidity   + Drought or dry condition   + Cloudy conditions   + Sunny conditions   + Wind   + Temperature |
| 1. Cropping pattern may include but not limited to: | * + Mono cropping   + Mixed cropping   + Relay cropping |
| 1. Samples may include but not limited to: | * + Crop specimens   + Soil specimen   + Disease specimen   + Insect specimen   + Weed specimen |
| 1. Sample Packaging may include but not limited to: | * + Card boards   + Old newspapers   + Paper /plastic bags   + Petri dishes   + Vials   + Bottles |
| 1. Sample labelling may include but not limited to: | * + Date   + Name of the farm/plot   + block number   + type of crop   + type of pest |
| 1. Sample Preservation may include but not limited to: | * + Drying   + Pinning   + Wet preservation   + Slide preservation   + Freezing |
| 1. Sample Analysis may include but not limited to: | * + visual observation   + chemical   + Physical |
| 1. Scout Report may include but not limited to: | * + Analysed variables   + Thresholds   + Correlations between variables   + Decisions made   + Modifications required   + Lessons learnt   + Challenges   + Threat   + Recommendations |

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required Skills**

* Use of scouting equipment
* Basic computer skill
* Sample collection and preservation of different stages of the pests
* Diagnose diseased plant materials
* Types of pests and diseases
* Packaging of specimens
* Data collection and collation
* Report writing

**Required knowledge**

* Different template to be used
* Variables to include in the template.
* Growth stages of the crop
* Abiotic plant disorders
* Signs and symptoms of different plant pests and diseases
* Effects of cropping patterns on pests
* Different units of measurement
* Agro-ecological Zones
* Farming systems
* Beneficial organisms
* Biology of different pests and beneficial organisms
* Sampling methods
* Scoring methods for different pest and diseases
* Pest Incidences and severity
* Alternative hosts of the pest
* Biology and ecology of different pests
* Signs and symptoms of pest damage
* Ability to negotiate
* Biotic and abiotic factors
* Stages of plant growth
* Characteristics of pest damage
* Symptoms of poor plant growth
* Scout template development
* Scout report interpretation
* Feeding behaviour of various pests
* Biology of major causal agents of diseases
* Factors that determine occurrence of pests’ damage and its importance
* Characteristics and lifecycles of crop pests
* Pest incidences to particular cropping practices
* Pest incidences to pest mobility, host specific, weather and climate

**EVIDENCE GUIDE**

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

|  |  |
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| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   * 1. Scouting template developed accurately   2. Planned Scouting route effectively   3. Established scouting patterns and points correctly   4. Collected farm data accurately   5. established Prevailing weather conditions correctly   6. Identified Crops and cropping patterns correctly   7. Determined Crop growth stage and size correctly   8. Established sampling methods and techniques tested and reviewed   9. Scouting patterns and points conducted pest scouting, scoring and recording   10. Collected and preserved Pest and host samples labelled, packaged and transported   11. Samples developed/prepared   12. Scout report appropriately |
| 1. Resource Implications | The following resources must be provided:   * 1. Transport to the field   2. Data collection sheet   3. Sampling tools- sampling bags, forceps, sucking tubes, white sheet,   4. Gumboots   5. Magnifying lens   6. Overall/ coat   7. Hot spot markers   8. Identification charts |
| 1. Methods of Assessment | Competency may be accessed through:   * 1. Written   2. Farm/Field Observation |
| 1. Context of Assessment | Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated field setup.   * 1. On the job   2. Off the job or   3. During industrial attachment |
| 1. Guidance information for assessment | 5.1 Holistic assessment with other units relevant to the industry sector, workplace, and job role is recommended. |