COMPETENCY STANDARDS

PEST AND NUTRIENT MANAGEMENT (RICE) LEVEL III

AGRICULTURE, FORESTRY AND FISHERY

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY
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COMPETENCY STANDARDS FOR
PEST AND NUTRIENT MANAGEMENT

Section 1 PEST AND NUTRIENT MANAGEMENT (RICE) QUALIFICATIONS

The **PEST AND NUTRIENT MANAGEMENT (Rice) Level III** Qualification consists of competencies that a person must achieve to conduct integrated nutrient management, apply integrated pest and disease management on rice, and monitor results of pest and nutrient management activities and provide feedback.

The units of competency comprising this qualification include the following:

Code	BASIC COMPETENCIES
400311210	Participate in workplace communication
400311211	Work in team environment
400311212	Solve/address general workplace problems
400311213	Develop career and life decisions
400311214	Contribute to workplace innovation
400311215	Present relevant information
400311216	Practice occupational safety and health policies and procedures
400311217	Exercise efficient and effective sustainable practices in the workplace
400311218	Practice entrepreneurial skills in the workplace
Code	**COMMON COMPETENCIES**
AFF321201	Apply safety measures in farm operations
AFF321203	Perform estimation and basic calculation
AFF 321202	Use farm tools
Code	**CORE COMPETENCIES**
AB-AFF0203114131301	Conduct integrated nutrient management
AB-AFF0203114131302	Apply integrated pest and disease management on rice
AB-AFF0203114131303	Monitor results of pest and nutrient management activities and provide feedback

A person who has achieved this Qualification is competent to be:

- Soil and nutrient technologist
- Crop advisor
- Restoration specialist

SECTION 2 COMPETENCY STANDARDS

These guidelines are set to provide the Technical Vocational Education and Training (TVET) providers with information and other important requirements to consider when designing training programs for **PEST AND NUTRIENT MANAGEMENT LEVEL III**

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 400311210

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to gather, interpret, and convey information in response to workplace requirements.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources***. 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information. 1.3 Appropriate ***medium*** is used to transfer information and ideas. 1.4 Appropriate non-verbal communication is used. 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed. 1.6 Defined workplace procedures for the location and	1.1 Effective verbal and nonverbal communication 1.2 Different modes of communication 1.3 Medium of communication in the workplace 1.4 Organizational policies 1.5 Communication procedures and systems 1.6 Lines of Communication 1.7 Technology relevant to the enterprise and the individual's work responsibilities 1.8 Workplace etiquette	1.1 Following simple spoken language 1.2 Performing routine workplace duties following simple written notices 1.3 Participating in workplace meetings and discussions 1.4 Preparing work-related documents 1.5 Estimating, calculating and recording routine workplace measures 1.6 Relating/ Interacting with people of various levels in the workplace 1.7 Gathering and providing basic information in response to

	storage of information are used. 1.7 Personal interaction is carried out clearly and concisely.		workplace requirements 1.8 Basic business writing skills 1.9 Interpersonal skills in the workplace 1.10 Active-listening skills
2. Perform duties following workplace instructions	2.1 Written notices and instructions are read and interpreted in accordance with organizational guidelines. 2.2 Routine written instruction are followed based on established procedures. 2.3 Feedback is given to workplace supervisor based instructions/ information received. 2.4 ***Workplace interactions*** are conducted in a courteous manner. 2.5 Where necessary, clarifications about routine workplace procedures and matters concerning conditions of employment are sought and asked from ***appropriate sources***. 2.6 Meetings outcomes are interpreted and implemented.	2.1 Effective verbal and non-verbal communication 2.2 Different modes of communication 2.3 Medium of communication in the workplace 2.4 Organizational/ Workplace policies 2.5 Communication procedures and systems 2.6 Lines of communication 2.7 Technology relevant to the enterprise and the individual's work responsibilities 2.8 Effective questioning techniques (clarifying and probing) 2.9 Workplace etiquette	2.1 Following simple spoken instructions 2.2 Performing routine workplace duties following simple written notices 2.3 Participating in workplace meetings and discussions 2.4 Completing work- related documents 2.5 Estimating, calculating and recording routine workplace measures 2.6 Relating/ Responding to people of various levels in the workplace 2.7 Gathering and providing information in response to workplace requirements 2.8 Basic questioning/querying 2.9 Skills in reading for information 2.10 Skills in locating
3. Complete relevant work- related documents	3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly. 3.2 Workplace data is recorded on	3.1 Effective verbal and non-verbal communication 3.2 Different modes of communication 3.3 Workplace forms and documents	3.1 Completing work- related documents 3.2 Applying operations of addition, subtraction, division and multiplication

	standard workplace forms and documents. 3.3 Errors in recording information on forms/ documents are identified and acted upon. 3.4 Reporting requirements to supervisor are completed according to organizational guidelines.	3.4 Organizational/ Workplace policies 3.5 Communication procedures and systems 3.6 Technology relevant to the enterprise and the individual's work responsibilities	3.3 Gathering and providing information in response to workplace requirements 3.4 Effective record keeping skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	May include: 1.1 Team members 1.2 Supervisor/Department Head 1.3 Suppliers 1.4 Trade personnel 1.5 Local government 1.6 Industry bodies
2. Medium	May include: 2.1 Memorandum 2.2 Circular 2.3 Notice 2.4 Information dissemination 2.5 Follow-up or verbal instructions 2.6 Face-to-face communication 2.7 Electronic media (disk files, cyberspace)
3. Storage	May include: 3.1 Manual filing system 3.2 Computer-based filing system
4. Workplace interactions	May include: 4.1 Face-to-face 4.2 Telephone 4.3 Electronic and two-way radio 4.4 Written including electronic means, memos, instruction and forms 4.5 Non-verbal including gestures, signals, signs and diagrams
5. Forms	May include: 5.1 HR/Personnel forms, telephone message forms, safety reports

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Prepared written communication following standard format of the organization 1.2 Accessed information using workplace communication equipment/systems 1.3 Made use of relevant terms as an aid to transfer information effectively 1.4 Conveyed information effectively adopting formal or informal communication
2. Resource Implications	**The following resources should be provided:** 2.1 Fax machine 2.2 Telephone 2.3 Notebook 2.4 Writing materials 2.5 Computer with Internet connection
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration with oral questioning 3.2 Interview 3.3 Written test 3.4 Third-party report
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or through an accredited institution

UNIT OF COMPETENCY : WORK IN A TEAM ENVIRONMENT

UNIT CODE : 400311211

UNIT DESCRIPTOR : This unit covers the skills, knowledge, and attitudes to identify one's roles and responsibilities as a member of a team.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Describe team role and scope	1.1 The ***role and objective of the team*** is identified from available ***sources of information***. 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources.	1.1 Group structure 1.2 Group development 1.3 Sources of information	1.1 Communicating with others, appropriately consistent with the culture of the workplace 1.2 Developing ways in improving work structure and performing respective roles in the group or organization
2. Identify one's role and responsibility within a team	2.1 Individual roles and responsibilities within the team environment are identified. 2.2 Roles and objectives of the team is identified from available ***sources of information***. 2.3 Team parameters, reporting relationships and responsibilities are identified based on team discussions and appropriate external sources.	2.1 Team roles and objectives 2.2 Team structure and parameters 2.3 Team development 2.4 Sources of information	2.1 Communicating with others, appropriately consistent with the culture of the workplace 2.2 Developing ways in improving work structure and performing respective roles in the group or organization
3. Work as a team member	3.1 Effective and appropriate forms of communications are used and interactions undertaken with team members	3.1 Communication Process 3.2 Workplace communication protocol	3.1 Communicating appropriately, consistent with the culture of the workplace

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	based on company practices. 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on ***workplace context***. 3.3 Protocols in reporting are observed based on standard company practices. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives.	3.3 Team planning and decision making 3.4 Team thinking 3.5 Team roles 3.6 Process of team development 3.7 Workplace context	3.2 Interacting effectively with others 3.3 Deciding as an individual and as a group using group think strategies and techniques 3.4 Contributing to Resolution of issues and concerns

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	May include: 1.1 Work activities in a team environment with enterprise or specific sector 1.2 Limited discretion, initiative and judgement maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	May include: 2.1 Standard operating and/or other workplace procedures 2.2 Job procedures 2.3 Machine/equipment manufacturer's specifications and instructions 2.4 Organizational or external personnel 2.5 Client/supplier instructions 2.6 Quality standards 2.7 OHS and environmental standards
3. Workplace context	May include: 3.1 Work procedures and practices 3.2 Conditions of work environments 3.3 Legislation and industrial agreements 3.4 Standard work practice including the storage, safe handling and disposal of chemicals 3.5 Safety, environmental, housekeeping and quality guidelines

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Worked in a team to complete workplace activity 1.2 Worked effectively with others 1.3 Conveyed information in written or oral form 1.4 Selected and used appropriate workplace language 1.5 Followed designated work plan for the job
2. Resource Implications	**The following resources should be provided:** 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Role play involving the participation of individual member to the attainment of organizational goal 3.2 Case studies and scenarios as a basis for discussion of issues and strategies in teamwork 3.3 Socio-drama and socio-metric methods 3.4 Sensitivity techniques 3.5 Written Test
4. Context for Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while task are being undertaken whether individually or in group

UNIT OF COMPETENCY : SOLVE/ADDRESS GENERAL WORKPLACE PROBLEMS

UNIT CODE : 400311212

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to apply problem-solving techniques to determine the origin of problems and plan for their resolution. It also includes addressing procedural problems through documentation, and referral.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify routine problems	1.1 Routine ***problems or procedural problem*** areas are identified. 1.2 Problems to be investigated are defined and determined. 1.3 Current conditions of the problem are identified and documented.	1.1 Current industry hardware and software products and services 1.2 Industry maintenance, service and helpdesk practices, processes and procedures 1.3 Industry standard diagnostic tools 1.4 Malfunctions and resolutions	1.1 Identifying current industry hardware and software products and services 1.2 Identifying current industry maintenance, services and helpdesk practices, processes and procedures. 1.3 Identifying current industry standard diagnostic tools 1.4 Describing common malfunctions and resolutions. 1.5 Determining the root cause of a routine malfunction
2. Look for solutions to routine problems	2.1 Potential solutions to problem are identified. 2.2 Recommendations about possible solutions are developed, ***documented***, ranked and presented to ***appropriate***	2.1 Current industry hardware and software products and services 2.2 Industry service and helpdesk practices, processes and procedures 2.3 Operating systems	2.1 Identifying current industry hardware and software products and services 2.2 Identifying services and helpdesk practices,

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	person for decision.	2.4 Industry standard diagnostic tools 2.5 Malfunctions and resolutions. 2.6 Root cause analysis	processes and procedures. 2.3 Identifying operating system 2.4 Identifying current industry standard diagnostic tools 2.5 Describing common malfunctions and resolutions. 2.6 Determining the root cause of a routine malfunction
3. Recommend solutions to problems	3.1 Implementation of solutions are ***planned***. 3.2 Evaluation of implemented solutions are planned. 3.3 Recommended solutions are documented and submit to appropriate person for confirmation.	3.1 Standard procedures 3.2 Documentation produce	3.1 Producing documentation that recommends solutions to problems 3.2 Following established procedures

RANGE OF VARIABLES

VARIABLE	RANGE
1. Problems/Procedural Problem	May include: 1.1 Routine/non – routine processes and quality problems 1.2 Equipment selection, availability and failure 1.3 Teamwork and work allocation problem 1.4 Safety and emergency situations and incidents 1.5 Work-related problems outside of own work area
2. Appropriate person	May include: 2.1 Supervisor or manager 2.2 Peers/work colleagues 2.3 Other members of the organization
3. Document	May include: 3.1 Electronic mail 3.2 Briefing notes 3.3 Written report 3.4 Evaluation report
4. Plan	May include: 4.1 Priority requirements 4.2 Co-ordination and feedback requirements 4.3 Safety requirements 4.4 Risk assessment 4.5 Environmental requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determine the root cause of a routine problem. 1.2 Identified solutions to procedural problems. 1.3 Produced documentation that recommends solutions to problems. 1.4 Followed established procedures. 1.5 Referred unresolved problems to support persons.
2. Resource Implications	2.1 Assessment will require access to a workplace over an extended period, or a suitable method of gathering evidence of operating ability over a range of situations.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Case Formulation 3.2 Life Narrative Inquiry 3.3 Standardized test The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : DEVELOP CAREER AND LIFE DECISIONS

UNIT CODE : 400311213

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes in managing one's emotions, developing reflective practice, and boosting self-confidence and developing self-regulation.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Manage one's emotion	1.1 ***Self-management strategies*** are identified. 1.2 Skills to work independently and to show initiative, to be conscientious, and persevering in the face of setbacks and frustrations are developed. 1.3 Techniques for effectively handling negative emotions and ***unpleasant situation*** in the workplace are examined.	1.1 Self-management strategies that assist in regulating behavior and achieving personal and learning goals (e.g. Nine self-management strategies according to Robert Kelley) 1.2 Enablers and barriers in achieving personal and career goals 1.3 Techniques in handling negative emotions and unpleasant situation in the workplace such as frustration, anger, worry, anxiety, etc.	1.1 Managing properly one's emotions and recognizing situations that cannot be changed and accept them and remain professional 1.2 Developing self-discipline, working independently and showing initiative to achieve personal and career goals 1.3 Showing confidence, and resilience in the face of setbacks and frustrations and other negative emotions and unpleasant situations in the workplace
2. Develop reflective practice	2.1 Personal strengths and achievements, based on self-assessment strategies and teacher feedback are contemplated. 2.2 Progress when seeking and responding to	2.1 Basic SWOT analysis 2.2 Strategies to improve one's attitude in the workplace 2.3 Gibbs' Reflective Cycle/Model (Description, Feelings,	2.1 Using the basic SWOT analysis as self-assessment strategy 2.2 Developing reflective practice through realization of limitations, likes/

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	feedback from teachers to assist them in consolidating strengths, addressing weaknesses and fulfilling their potential are monitored. 2.3 Outcomes of personal and academic challenges by reflecting on previous problem solving and decision making strategies and feedback from peers and teachers are predicted.	Evaluation, Analysis, Conclusion, and Action plan)	dislikes; through showing of self-confidence 2.3 Demonstrating self-acceptance and being able to accept challenges
3. Boost self-confidence and develop self-regulation	3.1 Efforts for continuous self-improvement are demonstrated. 3.2 Counter-productive tendencies at work are eliminated. 3.3 Positive outlook in life are maintained.	3.1 Four components of self-regulation based on Self-Regulation Theory (SRT) 3.2 Personality development concepts 3.3 Self-help concepts (e. g., 7 Habits by Stephen Covey, transactional analysis, psycho-spiritual concepts)	3.1 Performing effective communication skills – reading, writing, conversing skills 3.2 Showing affective skills – flexibility, adaptability, etc. 3.3 Self-assessment for determining one's strengths and weaknesses

RANGE OF VARIABLES

VARIABLE	RANGE
1. Self-management strategies	May include: 1.1 Seeking assistance in the form of job coaching or mentoring 1.2 Continuing dialogue to tackle workplace grievances 1.3 Collective negotiation/bargaining for better working conditions 1.4 Share your goals to improve with a trusted co-worker or supervisor 1.5 Make a negativity log of every instance when you catch yourself complaining to others 1.6 Make lists and schedules for necessary activities
2. Unpleasant situation	May include: 2.1 Job burn-out 2.2 Drug dependence 2.3 Sulking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Express emotions appropriately 1.2 Work independently and show initiative 1.3 Consistently demonstrate self-confidence and self-discipline
2. Resource Implications	**The following resources should be provided:** 2.1 Access to workplace and resource s 2.2 Case studies
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration or simulation with oral questioning 3.2 Case problems involving work improvement and sustainability issues 3.3 Third-party report
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment.

UNIT OF COMPETENCY : CONTRIBUTE TO WORKPLACE INNOVATION

UNIT CODE : 400311214

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to make a pro-active and positive contribution to workplace innovation.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify opportunities to do things better	1.1 ***Opportunities for improvement*** are identified proactively in own area of work. 1.2 ***Information*** are gathered and reviewed which may be relevant to ideas and which might assist in gaining support for idea.	1.1 Roles of individuals in suggesting and making improvements 1.2 Positive impacts and challenges in innovation 1.3 Types of changes and responsibility 1.4 Seven habits of highly effective people	1.1 Identifying opportunities to improve and to do things better. Involvement 1.2 Identifying the positive impacts and the challenges of change and innovation 1.3 Identifying examples of the types of changes that are within and outside own scope of responsibility
2. Discuss and develop ideas with others	2.1 ***People who could provide input*** to ideas for improvements are identified. 2.2 Ways of approaching people to begin sharing ideas are selected. 2.3 Meeting is set with relevant people. 2.4 Ideas for follow up are review and selected based on feedback. 2.5 ***Critical inquiry method*** is used to discuss and develop ideas with others.	2.1 Roles of individuals in suggesting and making improvements 2.2 Positive impacts and challenges in innovation 2.3 Types of changes and responsibility 2.4 Seven habits of highly effective people	2.1 Identifying opportunities to improve and to do things better. Involvement 2.2 Identifying the positive impacts and the challenges of change and innovation 2.3 Providing examples of the types of changes that are within and outside own scope of responsibility 2.4 Communicating ideas for change through small group

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
			discussions and meetings
3. Integrate ideas for change in the workplace	3.1 Critical inquiry method is used to integrate different ideas for change of key people. 3.2 Summarizing, analyzing and generalizing skills are used to extract salient points in the pool of ideas. 3.3 ***Reporting skills*** are likewise used to communicate results. 3.4 ***Current Issues and concerns*** on the systems, processes and procedures, as well as the need for simple innovative practices are identified.	3.1 Roles of individuals in suggesting and making improvements 3.2 Positive impacts and challenges in innovation 3.3 Types of changes and responsibility 3.4 Seven habits of highly effective people 3.5 Basic research skills	3.1 Identifying opportunities to improve and to do things better. Involvement 3.2 Identifying the positive impacts and the challenges of change and innovation 3.3 Providing examples of the types of changes that are within and outside own scope of responsibility 3.4 Communicating ideas for change through small group discussions and meetings 3.5 Demonstrating skills in analysis and interpretation of data

RANGE OF VARIABLES

VARIABLE	RANGE
1. Opportunities for improvement	May include: 1.1 Systems 1.2 Processes 1.3 Procedures 1.4 Protocols 1.5 Codes 1.6 Practices
2. Information	May include: 2.1 Workplace communication problems 2.2 Performance evaluation results 2.3 Team dynamics issues and concerns 2.4 Challenges on return of investment 2.5 New tools, processes and procedures 2.6 New people in the organization
3. People who could provide input	May include: 3.1 Leaders 3.2 Managers 3.3 Specialists 3.4 Associates 3.5 Researchers 3.6 Supervisors 3.7 Staff 3.8 Consultants (external) 3.9 People outside the organization in the same field or similar expertise/industry 3.10 Clients
4. Critical inquiry method	May include: 4.1 Preparation 4.2 Discussion 4.3 Clarification of goals 4.4 Negotiate towards a Win-Win outcome 4.5 Agreement 4.6 Implementation of a course of action 4.7 Effective verbal communication. See our pages: Verbal Communication and Effective Speaking 4.8 Listening 4.9 Reducing misunderstandings is a key part of effective negotiation 4.10 Rapport Building 4.11 Problem Solving 4.12 Decision Making 4.13 Assertiveness 4.14 Dealing with Difficult Situations
5. Reporting skills	May include: 5.1 Data management 5.2 Coding 5.3 Data analysis and interpretation

VARIABLE	RANGE
	5.4 Coherent writing 5.5 Speaking

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified opportunities to do things better. 1.2 Discussed and developed ideas with others on how to contribute to workplace innovation. 1.3 Integrated ideas for change in the workplace. 1.4 Analyzed and reported rooms for innovation and learning in the workplace.
2. Resource Implications	**The following resources should be provided:** 2.1 Pens, papers and writing implements 2.2 Cartolina 2.3 Manila papers
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Psychological and behavioral Interviews 3.2 Performance Evaluation 3.3 Life Narrative Inquiry 3.4 Review of portfolios of evidence and third-party workplace reports of on-the-job performance 3.5 Sensitivity analysis 3.6 Organizational analysis 3.7 Standardized assessment of character strengths and virtues applied
4. Context for Assessment	4.1 Competency may be assessed individually in the actual workplace or simulation environment in TESDA accredited institutions.

UNIT OF COMPETENCY : PRESENT RELEVANT INFORMATION

UNIT CODE : 400311215

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to present data/information appropriately.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Gather data/ information	1.1 Evidence, facts and information are collected. 1.2 Evaluation, terms of reference and conditions are reviewed to determine whether data/information falls within project scope.	1.1 Organizational protocols 1.2 Confidentiality 1.3 Accuracy 1.4 Business mathematics and statistics 1.5 Data analysis techniques/procedures 1.6 Reporting requirements to a range of audiences 1.7 Legislation, policy and procedures relating to the conduct of evaluations 1.8 Organisational values, ethics and codes of conduct	1.1 Describing organizational protocols relating to client liaison 1.2 Protecting confidentiality 1.3 Describing accuracy 1.4 Computing business mathematics and statistics 1.5 Describing data analysis techniques/ procedures 1.6 Reporting requirements to a range of audiences 1.7 Stating legislation, policy and procedures relating to the conduct of evaluations 1.8 Stating organisational values, ethics and codes of conduct
2. Assess gathered data/ information	2.1 Validity of data/ information is assessed. 2.2 Analysis techniques are applied to assess data/ information. 2.3 Trends and anomalies are identified.	2.1 Business mathematics and statistics 2.2 Data analysis techniques/ procedures 2.3 Reporting requirements to a range of audiences	2.1 Computing business mathematics and statistics 2.2 Describing data analysis techniques/ procedures 2.3 Reporting requirements to

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.4 ***Data analysis techniques*** and procedures are documented. 2.5 Recommendations are made on areas of possible improvement.	2.4 Legislation, policy and procedures relating to the conduct of evaluations 2.5 Organisational values, ethics and codes of conduct	a range of audiences 2.4 Stating legislation, policy and procedures relating to the conduct of evaluations 2.5 Stating organisational values, ethics and codes of conduct
3. Record and present information	Studied data/information are recorded. Recommendations are analysed for action to ensure they are compatible with the project's scope and terms of reference. Interim and final reports are analysed and outcomes are compared to the criteria established at the outset. Findings are presented to stakeholders.	3.1 Data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Legislation, policy and procedures relating to the conduct of evaluations 3.4 Organisational values, ethics and codes of conduct	3.1 Describing data analysis techniques/ procedures 3.2 Reporting requirements to a range of audiences 3.3 Stating legislation, policy and procedures relating to the conduct of evaluations 3.4 Stating organisational values, ethics and codes of conduct practices

RANGE OF VARIABLES

VARIABLE	RANGE
1. Data analysis techniques	May include: 1.1 Domain analysis 1.2 Content analysis 1.3 Comparison technique

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Determine data / information 1.2 Studied and applied gathered data/information 1.3 Recorded and studied data/information These aspects may be best assessed using a range of scenarios what ifs as a stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual, and improbable situations that may have happened.
2. Resource Implications	**Specific resources for assessment** 2.1 Evidence of competent performance should be obtained by observing an individual in an information management role within the workplace or operational or simulated environment.
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Written Test 3.2 Interview 3.3 Portfolio The unit will be assessed in a holistic manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation. Simulation may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual workplace and will include walk through of the relevant competency components.
4. Context for Assessment	4.1 In all workplaces, it may be appropriate to assess this unit concurrently with relevant teamwork or operation units.

UNIT OF COMPETENCY : PRACTICE OCCUPATIONAL SAFETY AND HEALTH POLICIES AND PROCEDURES

UNIT CODE : 400311216

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to identify OSH compliance requirements, prepare OSH requirements for compliance, perform tasks in accordance with relevant OSH policies and procedures.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify OSH compliance requirements	1.1 Relevant ***OSH requirements, regulations, policies and procedures*** are identified in accordance with workplace policies and procedures. 1.2 OSH activity non-conformities are conveyed to ***appropriate personnel***. 1.3 ***OSH preventive and control requirements*** are identified in accordance with OSH work policies and procedures.	1.1 OSH preventive and control requirements 1.2 Hierarchy of Controls 1.3 Hazard Prevention and Control 1.4 General OSH principles 1.5 Work standards and procedures 1.6 Safe handling procedures of tools, equipment and materials 1.7 Standard emergency plan and procedures in the workplace	1.1 Communication skills 1.2 Interpersonal skills 1.3 Critical thinking skills 1.4 Observation skills
2. Prepare OSH requirements for compliance	2.1 OSH work activity material, tools and equipment requirements are identified in accordance with workplace policies and procedures. 2.2 Required OSH materials, tools and equipment are acquired in accordance with workplace policies and procedures.	2.1 Resources necessary to execute hierarchy of controls 2.2 General OSH principles 2.3 Work standards and procedures 2.4 Safe handling procedures of tools, equipment and materials 2.5 Different OSH control measures	2.1 Communication skills 2.2 Estimation skills 2.3 Interpersonal skills 2.4 Critical thinking skills 2.5 Observation skills 2.6 Material, tool and equipment identification skills

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Required OSH materials, tools and equipment are arranged/ placed in accordance with OSH work standards.		
3. Perform tasks in accordance with relevant OSH policies and procedures	3.1 Relevant OSH work procedures are identified in accordance with workplace policies and procedures. 3.2 Work Activities are executed in accordance with OSH work standards. 3.3 ***Non-compliance work activities*** are reported to appropriate personnel.	3.1 OSH work standards 3.2 Industry related work activities 3.3 General OSH principles 3.4 OSH Violations Non-compliance work activities	3.1 Communication skills 3.2 Interpersonal skills 3.3 Troubleshooting skills 3.4 Critical thinking skills 3.5 Observation skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. OSH Requirements, Regulations, Policies and Procedures	May include: 1.1 Clean Air Act 1.2 Building code 1.3 National Electrical and Fire Safety Codes 1.4 Waste management statutes and rules 1.5 Permit to Operate 1.6 Philippine Occupational Safety and Health Standards 1.7 Department Order No. 13 (Construction Safety and Health) 1.8 ECC regulations
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself
3. OSH Preventive and Control Requirements	May include: 3.1 Resources needed for removing hazard effectively 3.2 Resources needed for substitution or replacement 3.3 Resources needed to establishing engineering controls 3.4 Resources needed for enforcing administrative controls 3.5 Personal Protective equipment
4. Non OSH-Compliance Work Activities	May include non-compliance or observance of the following safety measures: 4.1 Violations that may lead to serious physical harm or death 4.2 Fall Protection 4.3 Hazard Communication 4.4 Respiratory Protection 4.5 Power Industrial Trucks 4.6 Lockout/Tag-out 4.7 Working at heights (use of ladder, scaffolding) 4.8 Electrical Wiring Methods 4.9 Machine Guarding 4.10 Electrical General Requirements 4.11 Asbestos work requirements 4.12 Excavations work requirements

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Convey OSH work non-conformities to appropriate personnel 1.2 Identify OSH preventive and control requirements in accordance with OSH work policies and procedures 1.3 Identify OSH work activity material, tools and equipment requirements in accordance with workplace policies and procedures 1.4 Arrange/Place required OSH materials, tools and equipment in accordance with OSH work standards 1.5 Execute work activities in accordance with OSH work standards 1.6 Report OSH activity non-compliance work activities to appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Facilities, materials tools and equipment necessary for the activity
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Observation/Demonstration with oral questioning 3.2 Third party report
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

UNIT OF COMPETENCY : **EXERCISE EFFICIENT AND EFFECTIVE SUSTAINABLE PRACTICES IN THE WORKPLACE**

UNIT CODE : **400311217**

UNIT DESCRIPTOR : This unit covers knowledge, skills and attitude to identify the efficiency and effectiveness of resource utilization, determine causes of inefficiency and/or ineffectiveness of resource utilization and Convey inefficient and ineffective environmental practices.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify the efficiency and effectiveness of resource utilization	1.1 Required resource utilization in the workplace is measured using appropriate techniques. 1.2 Data are recorded in accordance with workplace protocol. 1.3 Recorded data are compared to determine the efficiency and effectiveness of resource utilization according to established ***environmental work procedures***.	1.1 Importance of Environmental Literacy 1.2 Environmental Work Procedures 1.3 Waste Minimization 1.4 Efficient Energy Consumptions	1.1 Recording Skills 1.2 Writing Skills 1.3 Innovation Skills
2. Determine causes of inefficiency and/or ineffectiveness of resource utilization	2.1 Potential causes of inefficiency and/or ineffectiveness are listed. 2.2 Causes of inefficiency and/or ineffectiveness are identified through deductive reasoning. 2.3 Identified causes of inefficiency and/or ineffectiveness are validated thru established environmental procedures.	2.1 Causes of environmental inefficiencies and ineffectiveness	2.1 Deductive Reasoning Skills 2.2 Critical thinking 2.3 Problem Solving 2.4 Observation Skills

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Convey inefficient and ineffective environmental practices	3.1 Efficiency and effectiveness of resource utilization are reported to ***appropriate personnel***. 3.2 Concerns related resource utilization are discussed with appropriate personnel. 3.3 Feedback on information/ concerns raised are clarified with appropriate personnel.	3.1 Appropriate Personnel to address the environmental hazards 3.2 Environmental corrective actions	3.1 Written and Oral Communication Skills 3.2 Critical thinking 3.3 Problem Solving 3.4 Observation Skills 3.5 Practice Environmental Awareness

RANGE OF VARIABLES

VARIABLE	RANGE
1. Environmental Work Procedures	May include: 1.1 Utilization of Energy, Water, Fuel Procedures 1.2 Waste Segregation Procedures 1.3 Waste Disposal and Reuse Procedures 1.4 Waste Collection Procedures 1.5 Usage of Hazardous Materials Procedures 1.6 Chemical Application Procedures 1.7 Labeling Procedures
2. Appropriate Personnel	May include: 2.1 Manager 2.2 Safety Officer 2.3 EHS Offices 2.4 Supervisors 2.5 Team Leaders 2.6 Administrators 2.7 Stakeholders 2.8 Government Official 2.9 Key Personnel 2.10 Specialists 2.11 Himself

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Measured required resource utilization in the workplace using appropriate techniques 1.2 Recorded data in accordance with workplace protocol 1.3 Identified causes of inefficiency and/or ineffectiveness through deductive reasoning 1.4 Validate the identified causes of inefficiency and/or ineffectiveness thru established environmental procedures 1.5 Report efficiency and effectiveness of resource utilization to appropriate personnel 1.6 Clarify feedback on information/concerns raised with appropriate personnel
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace 2.2 Tools, materials and equipment relevant to the tasks 2.3 PPE 2.4 Manuals and references
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination
4. Context for Assessment	4.1 Competency assessment may occur in workplace or any appropriately simulated environment 4.2 Assessment shall be observed while task are being undertaken whether individually or in-group

UNIT OF COMPETENCY : **PRACTICE ENTREPRENEURIAL SKILLS IN THE WORKPLACE**

UNIT CODE : **400311218**

UNIT DESCRIPTOR : This unit covers the outcomes required to apply entrepreneurial workplace best practices and implement cost-effective operations.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Apply entrepreneurial workplace best practices	1.1 ***Good practices*** relating to workplace operations are observed and selected following workplace policy. 1.2 Quality procedures and practices are complied with according to workplace requirements. 1.3 Cost-conscious habits in ***resource utilization*** are applied based on industry standards.	1.1 Workplace best practices, policies and criteria 1.2 Resource utilization 1.3 Ways in fostering entrepreneurial attitudes: ● Patience ● Honesty ● Quality-consciousness ● Safety-consciousness ● Resourcefulness	1.1 Communication skills 1.2 Complying with quality procedures
2. Communicate entrepreneurial workplace best practices	2.1 Observed good practices relating to workplace operations are communicated to the ***appropriate person.*** 2.2 Observed quality procedures and practices are communicated to appropriate person 2.3 Cost-conscious habits in resource utilization are communicated based on industry standards.	2.1 Workplace best practices, policies and criteria 2.2 Resource utilization 2.3 Ways in fostering entrepreneurial attitudes: ● Patience ● Honesty ● Quality-consciousness ● Safety-consciousness ● Resourcefulness	2.1 Communication skills 2.2 Complying with quality procedures 2.3 Following workplace communication protocol
3. Implement cost-effective operations	3.1 Preservation and optimization of workplace	3.1 Optimization of workplace resources	3.1 Implementing preservation and optimizing

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	resources is implemented in accordance with enterprise policy 3.2 Judicious use of workplace tools, equipment and materials are observed according to manual and work requirements. 3.3 Constructive contributions to office operations are made according to enterprise requirements. 3.4 Ability to work within one's allotted time and finances is sustained.	3.2 5S procedures and concepts 3.3 Criteria for cost-effectiveness 3.4 Workplace productivity 3.5 Impact of entrepreneurial mindset to workplace productivity 3.6 Ways in fostering entrepreneurial attitudes: ● Quality-consciousness ● Safety-consciousness	workplace resources 3.2 Observing judicious use of workplace tools, equipment and materials 3.3 Making constructive contributions to office operations 3.4 Sustaining ability to work within allotted time and finances

RANGE OF VARIABLES

VARIABLE	RANGE
1. Good practices	May include: 1.1 Economy in use of resources 1.2 Documentation of quality practices
2. Resources utilization	May include: 2.1 Consumption/ use of consumables 2.2 Use/Maintenance of assigned equipment and furniture 2.3 Optimum use of allotted /available time

EVIDENCE GUIDE

1. Critical aspects of competency	**Assessment requires evidence that the candidate:** 1.1 Demonstrated ability to identify and sustain cost-effective activities in the workplace 1.2 Demonstrated ability to practice entrepreneurial knowledge, skills and attitudes in the workplace.
2. Resource Implications	**The following resources should be provided:** 2.1 Simulated or actual workplace 2.2 Tools, materials and supplies needed to demonstrate the required tasks 2.3 References and manuals 2.3.1 Enterprise procedures manuals 2.3.2 Company quality policy
3. Methods of Assessment	**Competency in this unit should be assessed through:** 3.1 Interview 3.2 Third-party report
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY SAFETY MEASURES IN FARM OPERATIONS

UNIT CODE : AFF321201

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform safety measures effectively and efficiently. It includes identifying areas, tools, materials, time, and place in performing safety measures.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine areas of concern for safety measures	1.1 ***Work tasks*** are identified in line with farm operations 1.2 ***Place*** for safety measures are determined in line with farm operations 1.3 ***Time*** for safety measures are determined in line with farm operations 1.4 Appropriate ***tools, materials and outfits*** are prepared in line with job requirements	1.1 Different work tasks in farm operations 1.2 Place and time for implementation of safety measures 1.3 Different hazards in the workplace 1.4 Types of tools, materials and outfits 1.5 Preparation of tools, materials and outfits	1.1 Identifying work tasks in farm operations 1.2 Determining place and time for implementation of safety measures 1.3 Reading labels, manuals and other basic safety information 1.4 Identifying effective/functional tools, materials and outfit 1.5 Preparing tools, materials and outfits 1.6 Discarding defective tools, and materials
2. Apply appropriate safety measures	2.1 Tools and materials are used according to specifications and procedures 2.2 Outfits are worn according to farm requirements 2.3 Effectivity/shelf life/expiration of	2.1 Uses and functions of tools 2.2 Outfits and how to wear it. 2.3 Expiration/shelf life of materials 2.4 Proper disposal of expired materials	2.1 Using tools and materials in the workplace 2.2 Wearing of outfits 2.3 Observing expiration/ shelf life of materials 2.4 Disposing of expired materials

	materials are strictly observed 2.4 ***Emergency procedures*** are known and followed to ensure a safe work requirement 2.5 Hazards in the workplace are identified and reported in line with farm guidelines	2.5 Environmental rules and regulations 2.6 Emergency procedures 2.7 Hazards identification and reporting 2.8 Communication skills 2.9 OSHS	2.5 Following emergency procedures 2.6 Identifying and reporting of hazards in workplace area.
3. Safe keep /dispose tools, materials and outfit	3.1 Used tools and outfit are cleaned after use and stored in designated areas 3.2 Unused materials are properly labeled and stored according to manufacturers recommendation and farm requirements 3.3 Waste materials are disposed according to manufacturers, government and farm requirements	3.1 Procedures of cleaning used tools and outfits 3.2 Label and storage unused materials 3.3 Disposal of wastes materials 3.4 Manufacturers recommendation on keeping materials 3.5 Environmental rules and regulations	3.1 Cleaning used tools and outfit 3.2 Labelling and storing unused materials 3.3 Disposing waste materials

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work tasks	Work task may be selected from any of the subsectors: 1.1 Crop Production 1.2 Post-harvest 1.3 Agri-marketing 1.4 Farm Equipment
2. Place	May include: 2.1 Stock room/storage areas/warehouse 2.2 Field/farm/orchard
3. Time	May include: 3.1 Fertilizer and pesticides application 3.2 Feed mixing and feeding 3.3 Harvesting and hauling
4. Tools, materials, and outfits	May include: 4.1 Tools 4.1.1 Wrenches 4.1.2 Screwdriver 4.1.3 Pliers 4.2 Outfit 4.2.1 Masks 4.2.2 Gloves 4.2.3 Boots 4.2.4 Overall coats 4.2.5 Hat 4.2.6 Eye goggles
5. Emergency procedures	May include: 5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Hazards	May include: 6.1 Chemical 6.2 Electrical 6.3 Falls

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined areas of concern for safety measures 1.2 Applied appropriate safety measures according to industry requirements 1.3 Prepared tools, materials and outfit needed 1.4 Performed proper disposal of used materials 1.5 Cleaned and stored tools, materials, and outfit in designated facilities.
2. Resource Implications	The following resources should be provided: 2.1 Farm location 2.2 Tools, equipment, and outfits appropriate in applying safety measures
3. Method of Assessment	Competency in this unit must be assessed through: 3.1 Practical demonstration 3.2 Third Party Report
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : **PERFORM ESTIMATION AND BASIC CALCULATIONS**

UNIT CODE : **AFF321203**

UNIT DESCRIPTOR : This unit covers the knowledge, skills, and attitudes required to perform basic workplace calculations.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform estimation	1.1 Job requirements are identified from written or oral communications 1.2 Quantities of materials and resources required to complete a work task are estimated 1.3 The time needed to complete a work activity is estimated 1.4 Accurate estimate for work completion are made 1.5 Estimate of materials and resources are reported to appropriate person	1.1 Basic mathematical operations 1.2 Estimates percentage and ratios 1.3 Unit conversion 1.4 basic accounting and procedures a. production cost b. sales c. accounts receivables/payables	1.1 Ability to perform basic calculation 1.2 Communication skill 1.3 Analytical skill 1.4 Critical thinking skill
2. Perform basic workplace calculation	2.1 Calculations to be made are identified according to job requirements 2.2 Correct method of calculation identified 2.3 System and units of measurement to be followed are ascertained 2.4 Calculation needed to complete work tasks are performed using the four basic process of addition, division, multiplication, and subtraction		2.1 basic mathematical skill 2.2 analytical thinking skills 2.3 critical thinking skills

	2.5 Calculate whole fraction, percentage and mixed when are used to complete the instructions 2.6 Number computed in self checked and completed for alignment		

RANGE OF VARIABLES

VARIABLE	RANGE
1. Work tasks	Work task may be selected from any of the subsectors: 1.1 Crop Production 1.2 Post-harvest 1.3 Agri-marketing 1.4 Farm Equipment
2. Place	May include: 2.1 Stock room/storage areas/warehouse 2.2 Field/farm/orchard
3. Time	May include: 3.1 Fertilizer and pesticides application 3.2 Feed mixing and feeding 3.3 Harvesting and hauling
4. Tools, materials, and outfits	May include: 4.1 Tools 4.1.1 Wrenches 4.1.2 Screwdriver 4.1.3 Pliers 4.2 Outfit 4.2.1 Masks 4.2.2 Gloves 4.2.3 Boots 4.2.4 Overall coats 4.2.5 Hat 4.2.6 Eye goggles
5. Emergency procedures	May include: 5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Hazards	May include: 6.1 Chemical 6.2 Electrical 6.3 Falls

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined areas of concern for safety measures 1.2 Applied appropriate safety measures according to industry requirements 1.3 Prepared tools, materials and outfit needed 1.4 Performed proper disposal of used materials 1.5 Cleaned and stored tools, materials, and outfit in designated facilities.
2. Resource Implications	The following resources should be provided: 2.1 Farm location 2.2 Tools, equipment, and outfits appropriate in applying safety measures
3. Method of Assessment	Competency in this unit must be assessed through: 3.1 Practical demonstration 3.2 Third Party Report
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : **USE FARM TOOLS AND EQUIPMENT**

UNIT CODE : **AFF 321202**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to use farm tools and equipment. It includes selection, operation and preventive maintenance of farm tools and equipment.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select and use farm tools	1.1 Appropriate farm tools are identified according to requirement/use 1.2 Farm tools are checked for faults and defective tools reported in accordance with farm procedures 1.3 Appropriate tools and equipment are safely used according to job requirements and manufacturers conditions	• Different farm tools and its specification and uses • Ideal good work habits in using farm tools • Easy and safety standards during operation of farm equipment	• Calibrating of equipment
2. Select and operate farm equipment	2.1 Appropriate farm equipment is identified 2.2 Instructional manual of the farm tools and equipment is carefully read prior to operation 2.3 Pre-operation check-up is conducted in line with manufacturers manual 2.4 Faults in farm equipment are identified and reported in line with farm procedures	• Environmental Compliance Certificate (ECG) • Pre-operation check-up of equipment • Different faults of farm equipment	• Reading and interpreting instructional manual of farm tools and equipment • Ability to recognize defects/ faults of farm equipment • Following safety procedure

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.5 Farm equipment is used according to its function 2.6 Safety procedures are followed		
3. Perform preventive maintenance	3.1 Tools and equipment are cleaned immediately after use in line with farm procedures 3.2 Routine check-up and maintenance are performed 3.3 Tools and equipment are stored in designated areas in line with farm procedures	• Regular upkeep of equipment and farm tools • Routine check up and maintenance of farm equipment and tools • Proper storage of tools and farm equipment	• Perform proper management practices of safety measures • Effective work supervision in the operations of farm equipment • Preventive maintenance skills

NO RANGE OF VARIABLES

VARIABLE	RANGE
1. Farm equipment	Farm equipment Includes: 1.1 Engine 1.2 Pumps 1.3 Generators 1.4 Sprayers
2. Farm tools	Farm tools include: 2.1 Sickle 2.2 Cutters 2.3 Weighing scales 2.4 Hand tools 2.5 Measuring tools 2.6 Garden tools
3. Pre-operation check-up	Pre-operation check-up include: 3.1 Tires 3.2 Brake fluid 3.3 Fuel 3.4 Water 3.5 Oil 3.6 Lubricants 3.7 Battery

EVIDENCE GUIDE

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Correctly identified appropriate farm tools and equipment 1.2 Operated farm equipment according to manual specification 1.3 Performed preventive maintenance
2. Resource Implications	The following resources MUST be provided: 2.1 Service/operational manual of farm tools and equipment 2.2 Tools and equipment 2.3 Farm implements
3. Methods of Assessment	Competency may be assessed through: 3.1 Direct observation 3.2 Practical demonstration 3.3 Third Party Report
4. Context for Assessment	4.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

CORE COMPETENCIES

UNIT OF COMPETENCY : CONDUCT INTEGRATED NUTRIENT MANAGEMENT

UNIT CODE : AB-AFF0203114131301

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to determine nutrient requirements using recommended tools and methods, select the right element of fertilizer needed by the rice crop, and apply right amount of fertilizer at the right time.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Determine the nutrient requirements of rice plant	1.1 Different parts of the rice plants and its growth stages are identified 1.2 PalayCheck system is reviewed 1.3 Procedures of Soil samplings are followed according to standards 1.4 Soil samples are analyzed using ***appropriate methods and tools*** 1.5 Result of soil analysis is recorded to determine the right kind of fertilizer	1.1 Morphology and growth stages of the rice plant 1.2 Nine (9) key checks of the PalayCheck system 1.3 Components of agricultural soil 1.4 Balance fertilization strategy (BFS) 1.5 Physical and chemical properties of soil 1.6 MOET – Minus one element technique 1.7 Use of Soil Test Kit (STK) 1.8 LCC – leaf color chart 1.9 Rice crop manager application 1.10 Site Specific Management Principle (SSMP)	1.1 Collecting soil samples for laboratory and for MOET set-up 1.2 Communication skill 1.3 Mathematical skill 1.4 Analytical skill 1.5 Critical thinking skill 1.6 Interpersonal skill 1.7 Collaboration skill 1.8 Techno-savvy 1.9 Patient 1.10 Open-minded 1.11 Dedicated 1.12 Hardworking
2. Select right element of fertilizer needed by the rice crop	2.1 ***Classification and sources of fertilizer materials*** are determined according to form	2.1 Fertilizer terminologies 2.2 Classification and sources of	2.1 Analytical skill 2.2 Mathematical skill 2.3 Communication skill

	and the number of elements present 2.2 ***Fertilizer calculation*** is performed according to standards 2.3 Right kind of fertilizer is selected based on soil analysis result	fertilizer materials 2.3 Fertilizer forms or grade 2.4 Fertilizer calculation	2.4 Critical thinking skills 2.4 Dedicated 2.5 Hard-working 2.6 Persistent
3. Apply right amount of fertilizer at the right time	3.1 Right amount of fertilizer is applied to rice crops based on fertilizer computation, Rice Crop Manager recommendation 3.2 Right timing of fertilizer application is followed according to Palay key check 5 standards 3.3 Right technique of fertilizer application is utilized based on key check 5 standard	3.1 Palay check system: key check 5	3.1 Critical thinking skill 3.2 Analytical skill 3.3 Task-management skill 3.4 Job-environment skill 3.5 Task skill 3.6 Persistent 3.7 Hard working 3.8 Resilient

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate methods and tools	Appropriate methods and tools may include: 1.1. Soil laboratory testing 1.1.1. MOET – Minus one element technique (app/kit) 1.2. Use of Soil Test Kit (STK) 1.3. LCC – leaf color chart (app/chart) 1.4. Rice crop manager application 1.5. Site Specific Management Principle (SSMP)
2. Classification and sources of fertilizer materials	Classification and sources of fertilizer materials may include: 2.1 Classification for fertilizer materials according to: 2.1.1. type 2.1.2. form 2.1.3. number of fertilizer element present 2.2 Fertilizer sources for: 2.2.1 Nitrogen 2.2.2 Phosphorus 2.2.3 Potassium 2.2.4 Sulfur 2.2.5 Zinc
3. Fertilizer calculation	Fertilizer calculation may include: Formula for: 3.1. Amount of fertilizer material per hectare 3.2. Computation according to the number of fertilizer elements present: 3.2.1 Combination of single fertilizer materials 3.2.2 Combination incomplete and single fertilizer 3.2.3 Combination of complete and single fertilizer

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Determined nutrient requirements 1.1.1 Identified different parts of the rice plants and its growth stages 1.1.2 Reviewed Palay Check system 1.1.3 Followed procedures of Soil samplings 1.1.4 Analyzed soil samples 1.1.5 Recorded result of soil analysis 1.2 Selected right element of fertilizer needed by the rice crop 1.2.1 Determine classification/sources of fertilizer materials 1.2.2 Performed fertilizer calculation 1.2.3 Selected right kind of fertilizer 1.3 Apply right amount of fertilizer at the right time 1.3.1 Applied right amount of fertilizer 1.3.2 Followed right timing of fertilizer application 1.3.3 Utilized right technique of fertilizer application
2. Resource Implications	The following resources should be provided: 2.1 Farm location for soil samples 2.2 Farmland with established rice crop 2.2 MOET set-up/prototype 2.3 Smartphone with required application 2.4 PPE 2.5 Sample fertilizers
3. Method of Assessment	Competency in this unit must be assessed through: 3.1 Practical demonstration 3.2 Written 3.3 Interview
4. Context of Assessment	4.1 Competency maybe assessed in actual workplace or at the designated TESDA Accredited Assessment Center.

UNIT OF COMPETENCY : **APPLY INTEGRATED PEST AND DISEASE MANAGEMENT ON RICE**

UNIT CODE : **AB-AFF0203114131302**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes required to identify target pests and their natural enemies, and other beneficial organisms, select IPM strategies and prepare for the application, implement management control activities, and check performance of control activities.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify target pests and their natural enemies, and other beneficial organisms	**1.1 Pests,** which warrant action, and their ***natural enemies, and other beneficial organisms*** are identified according to ***general classification, life cycle and behavior and signs and symptoms and stage of plant growth*** 1.2. Superior is consulted as required to validate data on target pests and their natural enemies, and other beneficial organisms according to ***farm work procedures*** 1.3. Requirement for available ***biocontrol measures*** are assessed in line	1.1 IPM principles 1.2 Different types of pests 1.3 Natural enemies and other beneficial organisms 1.4 General classification of pests 1.5 Life cycle of the insect pest 1.6 Mode of damage to crop 1.7 Management pests 1.8 Farm work procedures 1.9 Biological control of pest 1.10 Use of diagnostic ICT tools	1.1 Communication skill 1.2 Analytical skill 1.3 Critical thinking skill 1.4 Interpersonal skill 1.5 Collaboration skill 1.6 Techno-savvy 1.7 Patient 1.8 Open-minded 1.9 Dedicated 1.10 Hardworking

	with the ***IPM*** strategy 1.4 ***ICT diagnostic and identification tools*** are used to identify problems and provide actionable advice on how to manage them		
2. Select IPM strategies and prepare for the application	2.1. Bio-control measures are selected according to target pests and their natural enemies, and other beneficial organisms, availability and appropriateness to prevailing pest density, level of severity/infestation, the ***environment*** and ***other relevant information*** in accordance with farm work procedures 2.2. All necessary ***supplies and materials, and tools, machinery, equipment, and facilities*** are prepared according to farm work procedures 2.3. Suitable ***PPE*** is selected according to ***OHS requirements***	2.1 IPM strategies a. cultural b. physical/mechanical c. biological d. chemical 2.2 Food web and food chain 2.3 Ecological engineering 2.4 Palay check system: key check 3 2.5 Classification and Use of Pesticides 2.6 Biological control agents 2.7 Environment	2.1 Analytical skill 2.2 Mathematical skill 2.3 Communication skill 2.4 Critical thinking skills 2.5 decision-making skill 2.4 Dedicated 2.5 Hard-working 2.6 Persistent
3. Implement management control activities	3.1. Appropriate control measures are implemented	3.1 Safe handling of pesticides 3.2 Use of different tools and	3.1 Sprayer Calibration

	in line with farm work procedures 3.2. Tools, machinery and equipment, facilities and ***PPE*** are used in accordance with ***OHS*** requirements	equipment (knap sack sprayer, power sprayer) 3.3 Storage of pesticides 3.4 Awareness on RA 9003 & RA 6969 and other legislations and regulations 3.5 OHS hazards and risks 3.5 PPEs	3.2 disposing of hazardous wastes 3.3 Critical thinking skill 3.4 Analytical skill 3.5 Task-management skill 3.6 Job-environment skill 3.7 Task skill 3.8 Persistent 3.9 Hard working 3.10 Resilient
4.Check performance of control activities	4.1. Management options implemented are recorded and monitored in line with farm work procedures 4.2. Supplemental and remedial actions are undertaken, as necessary, according to work instructions 4.3. ***Records*** are maintained according to standard procedures	4.1 Apply decision making tools (AESA Recommendation) 4.2 Record of daily monitoring activities	4.1 Sprayer Calibration 4.2 disposing of hazardous wastes 4.3 Critical thinking skill 4.4 Analytical skill 4.5 Task-management skill 4.6 Job-environment skill 4.7 Task skill 4.8 Persistent 4.9 Hard working 4.10 Resilient

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pests	Pests include: 1.1. Insect pests 1.2. Weeds 1.3. Diseases 1.4. Others (snails, birds, rodents,)
2. Natural enemies and beneficial organisms	Natural enemies and beneficial organisms include: 2.1. Parasites/parasitoids 2.2. Predators 2.3. Pollinators 2.4. Repellant or refuge plants 2.5. Micro-organisms and entomopathogens
3. General classification	General classification includes: 3.1. Defoliator, borer, miner, root feeder, etc. (for insect pests) 3.2. Grass, broad leaf, or sedge (for weeds) 3.3. Bacterium, fungus, virus, plant parasitic nematode, mycoplasma, viroid (for diseases)
4. Life cycle of insect pests and their natural enemies, and other beneficial organisms	Life cycle of insect pests and their natural enemies, and other beneficial organisms may include: 4.1 Complete life cycle 4.1.1. Egg 4.1.2. Larva 4.1.3. Pupa 4.1.4. Adult 4.2 Incomplete life cycle 4.2.1. Egg 4.2.2. Nymph 4.2.3. Adult
5. Behavior (for insect pests and natural enemies, and other beneficial organisms)	Behavior (for insect pests and natural enemies, and other beneficial organisms) include: 5.1. Where it stays/ Habitat 5.2. Diurnal/nocturnal 5.3. Destructive stage 5.4. Alternate hosts/predators 5.5. Reproduction as influenced by external factors 5.6. Response to external factors (e.g. rain, severe dehydration, shading) 5.7. Nature and extent of damage 5.8. Critical period of infestation
6. Signs and symptoms for insect pests and diseases	Signs and symptoms for insect pests and diseases may include: 6.1. Signs of pest infestation such as population density, severity of damage, etc. 6.2. Manifestations of the disease such as spotting, rotting, wilting, blighting, curling, yellowing, dwarfing, etc.

7. Stage of plant growth	Stage of plant growth include: 7.1. Seed / Seedling 7.2. Vegetative stage 7.3. Reproductive stage
8. Superior	Superior may include: 8.1. Supervisor 8.2. Pest specialist,
9. Farm work procedures	Farm work procedures may include: 9.1. Supervisor/s' oral and written instructions 9.2. Standard operating procedures 9.3. Pest management plan 9.4. Best practice guidelines on pest management 9.5. Good agricultural practices 9.6. OHS procedures
10. Bio-control measures	Bio-control measures may include: 10.1. Enhancement of population of natural enemies (e.g., avoid indiscriminate use of pesticides) 10.2. Supplemental use of other beneficial organisms (e.g., parasitoids, predators, insect pathogens, entomopathogens) 10.3. Planting repellent and trap crops 10.4. Selective use of botanical pesticides 10.5. Others (e.g., natural population build-up of frogs, lizards, snakes)
11. Integrated Pest Management (IPM)	Integrated Pest Management (IPM) include: 11.1 Biological 11.2 Cultural 11.3 Physical management
12. ICT diagnostic and identification tools	ICT diagnostic and identification tools may include: 12.1 Rice doctor 12.2 E-Damuhan 12.3 Weed ID
13. Environment	Environment may include: 13.1. Soil Fertility 13.2. Soil Type 13.3. Weather Conditions 13.4. Topography 13.5. Water, Etc.
14. Other relevant information	Other relevant information includes: 14.1. Crop variety 14.2. Cropping pattern/system 14.3. Stage of the crop
15.Supplies and materials	Supplies and materials may include: 15.1. farmer-level or village-laboratory massproduced biological control agents (e.g., parasitoids, predators, or insect pathogens) 15.2. other natural enemies, or beneficial organisms 15.3. selected botanical pesticides (e.g. chilli or hot pepper solution, marigold extracts)

	15.4. repellent crops (e.g. marigold) 15.5. trap crops (e.g. susceptible crops or alternate hosts of destructive pests) 15.6. cards 15.7. paper strips 15.8. measuring cup, others
16.Tools, machinery, equipment, and facilities	Tools, machinery, equipment, and facilities include: 16.1. sprayer/applicator 16.2. sweep nets, others 16.3. Meter stick 16.4. Flip charts (insect pests, natural enemies, and diseases) 16.5. Flash cards (insect pests, natural enemies, and diseases) 16.6. Storage area 16.7. Hazardous waste disposal area
17.Personal protective equipment	Personal protective equipment includes: 17.1. Rice paddy boots 17.2. Hat/Hard hat 17.3. Coveralls, Gloves 17.4. Protective eyewear 17.5. Respirator or face mask 17.6. Long sleeves 17.7. Sun protection (sun hat, sun-screen)
18.OHS requirements	OHS requirements include: 18.1. the safe operation and maintenance of tools, machinery, and equipment. 18.2. identifying hazards, assessing, and reporting risks. 18.3. emergency operating procedures. 18.4. safe lifting, carrying, and handling techniques. 18.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 18.6. manual on understanding hazards on the use of pesticides to natural enemies, humans, and other non-target organisms 18.7. safe systems and procedures for outdoor a. work including protection from solar radiation, b. protection of people in the workplace, c. protection from hazardous noise, mechanical d. vibration, organic and other dusts, and e. protection from fire risk.
19. Records	Records may include: 19.1. Date and time of application 19.2. Location 19.3. Specific control measures implemented 19.4. Supplies and materials used (quantity, cost, classification of pesticides used, etc.)

	19.5. Labor (man days and wage rates) 19.6. Field assessment records

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1 Identified target pests and their natural enemies, and other beneficial organisms 1.1.1 Identified pests which warrant action, and their natural enemies, and other beneficial organisms 1.1.2 Consulted supervisor or the pest specialist 1.1.3 Assessed requirements for available biocontrol measures 1.1.4 Used ICT diagnostic and identification tools 1.2 Selected IPM strategies and prepare for the application 1.2.1 Selected and applied appropriate biocontrol measures 1.2.2 Prepared all necessary supplies, materials, tools, machineries, equipment, and facilities 1.2.3 Selected suitable PPE 1.3 Implemented management control activities 1.3.1 Implemented appropriate control measures 1.3.2 Used Tools, machineries, equipment and facilities and PPE 1.4 Checked performance of control activities 1.4.1 Implemented management options 1.4.2 Undertook supplemental and remedial actions 1.4.3 Maintained records The skills and knowledge required to apply biocontrol measures for managing pests must be transferable to a different work environment. For example, this may include different vegetables, pests, and farms/areas.
2. Resource Implications	The following resources should be provided: 2.1 Vegetable farm or a simulated workplace/demo farm 2.2 Village-level bio-control mass-rearing laboratories 2.3. Enterprise procedures relating to biocontrol measures
3. Method of Assessment	Competency in this unit must be assessed through: 3.1. Direct observation with oral questioning 3.2. Demonstration with oral questioning 3.3. Portfolio assessment
4. Context of Assessment	4.1 Assessment should be in a vegetable farm or in a simulated workplace/demo farm 4.2 Ability to apply competency over time and on a number of occasions.

UNIT OF COMPETENCY : **MONITOR RESULTS OF PEST AND NUTRIENT MANAGEMENT ACTIVITIES AND PROVIDE FEEDBACK**

UNIT CODE : **AB-AFF0203114131303**

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitude in checking and recording performance of control activities and addressing the performance of control activities.

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Check and record performance of control activities	1.1 Targeted plant response ***to pest management activities***, as well as any non-targeted effects such as environmental impact or pest responses, is regularly monitored and recorded, according to work instructions, ***OHS requirements*** and protocols and standards 1.2 Progress report is prepared and submitted to supervisor as required, according to farm work procedures	1.1 Pest management activities 1.2 OHS requirements 1.3 Reporting requirements 1.4 Monitoring requirements	1.1 Analytical skill 1.2 Communication skill 1.3 Record keeping skill 1.4 Monitoring skill 1.5 Task-management skill 1.6 Accuracy 1.7 Environment-conscious 1.8 Positive work values 1.9 Work ethics 1.10 Cost conscious 1.11 Safety conscious
2.Address performance of control activities	2.1 Any gap or deviation from expected results of control activities are reported to supervisor according to standard procedures	2.1 Types of control measures 2.2 expected effects/impacts of control measures 2.3 Records 2.3 Possible remedial actions for gaps/deviations	2.1 Analytical skill 2.2 Mathematical skill 2.3 Communication skill 2.4 Critical thinking skills 2.5 decision-making skill 2.4 Dedicated 2.5 Hard-working

	2.2 Adjustments to control measures are implemented, where necessary, according to work instructions 2.3 ***Records*** are kept and updated regularly according to farm work procedures	between the effect/impact of control measures and actual results	2.6 Persistent

RANGE OF VARIABLES

VARIABLE	RANGE
1. Pest management activities	Pest management activities may include: 1.1. Bio-control measures 1.2. Physical control measures 1.3. Cultural management strategies 1.4. Chemical control measures
2. OHS requirements	OHS requirements may include: 2.1. the safe operation and maintenance of machinery and equipment including hydraulics and guarding of exposed moving parts. 2.2. identifying hazards, assessing, and reporting risks. 2.3. emergency operating procedures. 2.4. safe lifting, carrying, and handling techniques. 2.5. manual handling systems and procedures, handling and storage of hazardous substances, and the appropriate use of personal protective clothing and equipment. 2.6. safe systems and procedures for outdoor work including protection from solar radiation, protection of people in the workplace, protection from hazardous noise, mechanical vibration, organic and other dusts, and protection from fire risk.
3. Farm work procedures	Farm work procedures may include: 3.1. Supervisor/s' oral and written instructions 3.2. Standard operating procedures 3.3. Pest management plan 3.4. Best practice guidelines on pest management 3.5. Good agricultural practices 3.6. OHS procedures
4. Records	Records may include: 4.1. Date and time of monitoring 4.2. Location 4.3. Specific control measures implemented 4.4. Success of treatments 4.5. Observable negative effects on the environment 4.6. Effectivity of the control measures implemented / results of application

EVIDENCE GUIDE

1. Critical Aspects of Competency	Assessment requires evidences that the candidate: 1.1 Checked and recorded performance of control activities 1.1.1 Monitored and recorded results of control activities and provided feedback 1.1.2 Prepared and submitted progress report 3.2 Addressed performance of control activities 1.2.1 Reported any gap or deviation from expected results of control activities 1.2.2 Implemented adjustments to control measures 1.2.3 Updated kept records regularly The skills and knowledge required to monitor results of control activities and provide feedback must be transferable to a different work environment. For example, this may include different crops, control measures and farms/areas
2. Resource Implications	The following resources MUST be provided: 2.1. Vegetable farm or simulated workplace/demo farm 2.2. Enterprise procedures relating to pest management activities
3. Method of Assessment	Competency in this unit must be assessed through: 3.1. Direct observation with oral questioning 3.2. Demonstration with oral questioning 3.3. Portfolio assessment
4. Context of Assessment	4.1. Assessment should be in a workplace or in a simulated workplace 4.2. Demonstration of competency over time and on several occasions

GLOSSARY OF TERMS

1. **Fertilizer**	Is a natural or artificial substance containing the chemical elements that improve growth and productiveness of plants. Fertilizers enhance the natural fertility of the soil or replace chemical elements taken from the soil by previous crops. (https://www.britannica.com/topic/fertilizer)
2. Integrated Pest Management (IPM)	Integrated Pest Management or IPM, as it is commonly known, is a system of managing pests which is designed to be sustainable. IPM involves using the best combination of cultural, biological and chemical measures for particular circumstances, including plant biotechnology as appropriate (https://croplife.org/crop-protection/stewardship/integrated-pest-management/#:~:text=Integrated%20Pest%20Management%20or%20IPM,including%20plant%20biotechnology%20as%20appropriate)
3. Nutrient Management	Nutrient management is the process of managing the amount, source, timing, and method of nutrient application with the goal of optimizing farm productivity while minimizing nutrient losses that could create nutrient (biosolid) application environmental problems. (http://soilquality.org)
4. **Pest**	an insect or small animal that is harmful or damages crops (such as rats, mice, cockroaches, grasshopper etc.) (https://dictionary.cambridge.org/us/dictionary/english/pest)
5. **Pesticides**	a chemical substance used to kill harmful insects, small animals, wild plants, and other unwanted organisms (https://dictionary.cambridge.org/us/dictionary/english/pest)

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