TRAINING REGULATIONS

SUGARCANE PRODUCTION NC II

AGRICULTURE, FORESTRY AND FISHERY SECTOR

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY

East Service Road, South Luzon Expressway (SLEX), Taguig City, Metro Manila

Technical Education and Skills Development Act of 1994

(Republic Act No. 7796)

Section 22, "Establishment and Administration of the National Trade Skills Standards" of the RA 7796 known as the TESDA Act mandates TESDA to establish national occupational skill standards. The Authority shall develop and implement a certification and accreditation program in which private industry group and trade associations are accredited to conduct approved trade tests, and the local government units to promote such trade testing activities in their respective areas in accordance with the guidelines to be set by the Authority.

The Training Regulations (TR) serve as basis for the:

1 Competency assessment and certification;
2 Registration and delivery of training programs; and
3 Development of curriculum and assessment instruments.

Each TR has four sections:

Section 1 **Definition of Qualification** - refers to the group of competencies that describes the different functions of the qualification.

Section 2 **The Competency Standards** - gives the specifications of competencies required for effective work performance.

Section 3 **Training Arrangements** - contains information and requirements in designing training program for certain Qualification. It includes curriculum design, training delivery; trainee entry requirements; tools and requirements; tools and equipment; training facilities and trainer's qualification.

Section 4 **Assessment and Certification Arrangements** - describes the policies governing assessment and certification procedure

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TRAINING REGULATIONS FOR

SUGARCANE PRODUCTION NC II

SECTION 1 SUGARCANE PRODUCTION NC II QUALIFICATION

The **Sugarcane Production NC II** Qualification consists of competencies that a person must have in order to establish sugarcane nursery, plant sugarcane, care and maintain sugarcane and ratoon crops and carry-out harvest and post- harvest operations. The individual has competencies in handling manual farming and sourcing of mechanized farming services for sugarcane farm area of ten (10) hectares and below.

It also includes competencies of a person must have to be able to practice occupational safety procedures, 7S of Good Housekeeping and observing environmental rules and regulations in waste management in all farm activities.

This Qualification is packaged from the competency map of the Agriculture, Forestry and Fishery Sector as shown in Annex A.

The Units of Competency comprising this Qualification include the following:

UNIT CODE	**BASIC COMPETENCIES**
500311105	Participate in workplace communication
500311106	Work in team environment
500311107	Practice career professionalism
500311108	Practice occupational health and safety procedures
UNIT CODE	**COMMON COMPETENCIES**
AGR321201	Apply Safety Measures in Farm Operations
AGR321202	Use Farm Tools and Equipment
AGR321203	Perform Estimation and Basic Calculation
UNIT CODE	**CORE COMPETENCIES**
AFF611310	Establish Sugarcane Nursery
AFF611311	Plant Sugarcane
AFF611312	Care for and Maintain Sugarcane and Ratoon Crops
AFF 611313	Carryout Harvest and Post-harvest Operation

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

- **Sugarcane Planter**
- **Sugarcane Farmer**
- **Sugarcane Farm Worker**
- **Sugarcane Propagator**
- **Harvester**

SECTION 2 COMPETENCY STANDARDS

This section gives the details of the contents of the basic, common and core units of competency required in **SUGARCANE PRODUCTION NC II.**

BASIC COMPETENCIES

UNIT OF COMPETENCY : PARTICIPATE IN WORKPLACE COMMUNICATION

UNIT CODE : 500311105

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 storage of information are used 1.7 Personal interaction is carried out clearly and concisely	• Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities	• Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions • Complete work related documents • Estimate, calculate and record routine workplace measures • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time 2.2 Own opinions are clearly expressed and those of others are listened to without interruption 2.3 Meeting inputs are consistent with the meeting purpose and established ***protocols*** 2.4 ***Workplace interactions*** are conducted in a courteous manner 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to 2.6 Meetings outcomes are interpreted and implemented	• Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities	• Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions • Complete work related documents • Estimate, calculate and record routine workplace measures • Ability to relate to people of social range in the workplace • Gather and provide information in response to workplace requirements
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 standard workplace forms and documents 3.3 Basic mathematical processes are used for routine calculations 3.4 Errors in recording information on forms/ documents are identified and properly acted upon 3.5 Reporting requirements to supervisor are completed according to organizational guidelines	• Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities	• Complete work related documents • Basic mathematical processes of addition, subtraction, division and multiplication • Gather and provide information in response to workplace requirements

RANGE OF VARIABLES

VARIABLE	RANGE
1. Appropriate sources	1.1. Team members 1.2. Suppliers 1.3. Trade personnel 1.4. Local government 1.5. Industry bodies
2. Medium	2.1. Memorandum 2.2. Circular 2.3. Notice 2.4. Information discussion 2.5. Follow-up or verbal instructions 2.6. Face to face communication
3. Storage	3.1. Manual filing system 3.2. Computer-based filing system
4. Forms	4.1. Personnel forms 4.2. Telephone message forms 4.3. Safety reports
5. Workplace interactions	5.1. Face to face 5.2. Telephone 5.3. Electronic and two-way radio 5.4. Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
6. Protocols	6.1. Observing meeting 6.2. Compliance with meeting decisions 6.3. Obeying meeting instructions

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 communication equipment 1.3. Made use of relevant terms as an aid to transfer information effectively 1.4. Conveyed information effectively adopting the formal or informal communication
2. Resource Implications	**The following resources should be provided:** 2.1. Fax machine 2.2. Telephone 2.3. Writing materials 2.4. Internet
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Direct Observation 3.2. Oral interview and written test
4. Context for Assessment	4.1. Competency may be assessed individually in the actual workplace or through accredited institution

UNIT OF COMPETENCY : WORK IN TEAM ENVIRONMENT

UNIT CODE : 500311106

UNIT DESCRIPTOR : This unit covers the skills, knowledge and attitudes to identify role and responsibility 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	• Communication process • Team structure • Team roles • Group planning and decision making	• Communicate appropriately, consistent with the culture of the workplace
2. Identify own role and responsibility within team	2.1 Individual role and responsibilities within the team environment are identified 2.2 Roles and responsibility of other team members are identified and recognized 2.3 Reporting relationships within team and external to team are identified	• Communication process • Team structure • Team roles • Group planning and decision making	• Communicate appropriately, consistent with the culture of the workplace

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Work as a team member	3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives 3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and ***workplace context*** 3.3 Observed protocols in reporting using standard operating procedures 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members	• Communication process • Team structure • Team roles • Group planning and decision making	• Communicate appropriately, consistent with the culture of the workplace • Interacting effectively with others

RANGE OF VARIABLES

VARIABLE	RANGE
1. Role and objective of team	1.1. Work activities in a team environment with enterprise or specific sector 1.2. Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment
2. Sources of information	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	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. Operated 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 1.6. Reported outcomes
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. Observation of the individual member in relation to the work activities of the group 3.2. Observation of simulation and or role play involving the participation of individual member to the attainment of organizational goal 3.3. Case studies and scenarios as a basis for discussion of issues and strategies in teamwork
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 : PRACTICE CAREER PROFESSIONALISM

UNIT CODE : 500311107

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes in promoting career growth and advancement.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Integrate personal objectives with organizational goals	1.1 Personal growth and work plans are pursued towards improving the qualifications set for the profession 1.2 Intra- and interpersonal relationships are maintained in the course of managing oneself based on performance ***evaluation*** 1.3 Commitment to the organization and its goal is demonstrated in the performance of duties	• Work values and ethics (Code of Conduct, Code of Ethics, etc.) • Company policies • Company operations, procedures and standards • Fundamental rights at work including gender sensitivity • Personal hygiene practices	• Appropriate practice of personal hygiene • Intra and Interpersonal skills • Communication skills
2. Set and meet work priorities	2.1 Competing demands are prioritized to achieve personal, team and organizational goals and objectives. 2.2 ***Resources*** are utilized efficiently and effectively to manage work priorities and commitments 2.3 Practices along economic use and maintenance of equipment and facilities are followed as per established procedures	• Work values and ethics (Code of Conduct, Code of Ethics, etc.) • Company policies • Company operations, procedures and standards • Fundamental rights at work including gender sensitivity • Personal hygiene practices • Time management	• Appropriate practice of personal hygiene • Intra and Interpersonal skills • Communication skills • Managing goals and time

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
3. Maintain professional growth and development	3.1 ***Trainings and career opportunities*** are identified and availed of based on job requirements 3.2 ***Recognitions*** are sought/received and demonstrated as proof of career advancement 3.3 ***Licenses and/or certifications*** relevant to job and career are obtained and renewed	• Work values and ethics (Code of Conduct, Code of Ethics, etc.) • Company policies • Company operations, procedures and standards • Fundamental rights at work including gender sensitivity • Personal hygiene practices	• Appropriate practice of personal hygiene • Intra and Interpersonal skills • Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Evaluation	1.1 Performance Appraisal 1.2 Psychological Profile 1.3 Aptitude Tests
2. Resources	2.1 Human 2.2 Financial 2.3 Technology 2.3.1 Hardware 2.3.2 Software
3. Trainings and career opportunities	3.1 Participation in training programs 3.1.1 Technical 3.1.2 Supervisory 3.1.3 Managerial 3.1.4 Continuing Education 3.2 Serving as Resource Persons in conferences and workshops
4. Recognitions	4.1 Recommendations 4.2 Citations 4.3 Certificate of Appreciations Commendations 4.6 Awards 4.7 Tangible and Intangible Rewards
5. Licenses and/or certifications	5.1 National Certificates 5.2 Certificate of Competency 5.3 Support Level Licenses 5.4 Professional Licenses

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Attained job targets within key result areas (KRAs) 1.2 Maintained intra - and interpersonal relationship in the course of managing oneself based on performance evaluation 1.3 Completed trainings and career opportunities which are based on the requirements of the industries 1.4 Acquired and maintained licenses and/or certifications according to the requirement of the qualification
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace or assessment location 2.2 Case studies/scenarios
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Portfolio Assessment 3.2 Interview 3.3 Simulation/Role-plays 3.4 Observation 3.5 Third Party Reports 3.6 Exams and Tests
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

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

UNIT CODE : **500311108**

UNIT DESCRIPTOR : This unit covers the outcomes required to comply with regulatory and organizational requirements for occupational health and safety.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Identify hazards and risks	1.1 ***Safety regulations*** and workplace safety and hazard control practices and procedures are clarified and explained based on organization procedures 1.2 ***Hazards/risks*** in the workplace and their corresponding indicators are identified to minimize or eliminate risk to co-workers, workplace and environment in accordance with organization procedures 1.3 ***Contingency measures*** during workplace accidents, fire and other emergencies are recognized and established in accordance with organization procedures	• OHS procedures and practices and regulations • Personal hygiene practices • Hazards/risks identification and control • Organization safety and health protocol • Safety consciousness • Health consciousness	• Practice of personal hygiene • Hazards/risks identification and control skills • Interpersonal skills • Communication skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
2. Evaluate hazards and risks	2.1 Terms of maximum tolerable limits which when exceeded will result in harm or damage are identified based on threshold limit values (TLV) 2.2 Effects of the hazards are determined 2.3 OHS issues and/or concerns and identified safety hazards are reported to designated personnel in accordance with workplace requirements and relevant workplace OHS legislation	• OHS procedures and practices and regulations • Personal hygiene practices • Hazards/risks identification and control • Threshold Limit Value -TLV • OHS indicators • Organization safety and health protocol • Safety consciousness • Health consciousness	• Practice of personal hygiene • Hazards/risks identification and control skills • Interpersonal skills • Communication skills
3. Control hazards and risks	3.1 Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace are consistently followed 3.2 Procedures for dealing with workplace accidents, fire and emergencies are followed in accordance with organization OHS policies 3.3 ***Personal protective equipment (PPE)*** is correctly used in accordance with organization OHS procedures and practices 3.4 Appropriate assistance is provided in the event	• OHS procedures and practices and regulations • PPE types and uses • Personal hygiene practices • Hazards/risks identification and control • OHS indicators • Organization safety and health protocol • Safety consciousness • Health consciousness	• Practice of personal hygiene • Hazards/risks identification and control skills • Interpersonal skills • Communication skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	of a workplace emergency in accordance with established organization protocol		
4. Maintain OHS awareness	4.1 ***Emergency-related drills and trainings*** are participated in as per established organization guidelines and procedures 4.2 ***OHS personal records*** are completed and updated in accordance with workplace requirements	• OHS procedures and practices and regulations • PPE types and uses • Personal hygiene practices • OHS indicators • Organization safety and health protocol • Safety consciousness • Health consciousness	• Practice of personal hygiene • Interpersonal skills • Communication skills

RANGE OF VARIABLES

VARIABLE	RANGE
1. Safety regulations	**May include but are not limited to:** 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 Philippine Occupational Safety and Health Standards 1.6 DOLE regulations on safety legal requirements 1.7 ECC regulations
2. Hazards/Risks	**May include but are not limited to:** 2.1 Physical hazards – impact, illumination, pressure, noise, vibration, temperature, radiation 2.2 Biological hazards - bacteria, viruses, plants, parasites, mites, molds, fungi, insects 2.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 2.4 Ergonomics 2.4.1 Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles 2.4.2 Physiological factors – monotony, personal relationship, work out cycle
3. Contingency measures	**May include but are not limited to:** 3.1 Evacuation 3.2 Isolation 3.3 Decontamination 3.4 (Calling designed) emergency personnel
4. PPE	**May include but are not limited to:** 4.1 Mask 4.2 Gloves 4.3 Goggles 4.4 Hair Net/cap/bonnet 4.5 Face mask/shield 4.6 Ear muffs 4.7 Apron/Gown/coverall/jump suit 4.8 Anti-static suits
5. Emergency-related drills and training	5.1 Fire drill 5.2 Earthquake drill 5.3 Basic life support/CPR 5.4 First aid 5.5 Spillage control 5.6 Decontamination of chemical and toxic 5.7 Disaster preparedness/management

VARIABLE	RANGE
6. OHS personal records	6.1 Medical/Health records 6.2 Incident reports 6.3 Accident reports 6.4 OHS-related training completed

EVIDENCE GUIDE

1. Critical aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Explained clearly established workplace safety and hazard control practices and procedures 1.2 Identified hazards/risks in the workplace and its corresponding indicators in accordance with company procedures 1.3 Recognized contingency measures during workplace accidents, fire and other emergencies 1.4 Identified terms of maximum tolerable limits based on threshold limit value- TLV. 1.5 Followed Occupational Health and Safety (OHS) procedures for controlling hazards/risks in workplace 1.6 Used Personal Protective Equipment (PPE) in accordance with company OHS procedures and practices 1.7 Completed and updated OHS personal records in accordance with workplace requirements
2. Resource Implications	**The following resources should be provided:** 2.1 Workplace or assessment location 2.2 OHS personal records 2.3 PPE 2.4 Health records
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation
4. Context for Assessment	4.1 Competency may be assessed in the work place or in a simulated work place setting

COMMON COMPETENCIES

UNIT OF COMPETENCY : APPLY SAFETY MEASURES IN FARM OPERATIONS

UNIT CODE : AGR 321201

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	• Different work tasks in farm operations • Place and time for implementation of safety measures • Different hazards in the workplace • Types of tools, materials and outfits • Preparation of tools, materials and outfits	• Identifying work tasks in farm operations • Determining place and time for implementation of safety measures • Reading labels, manuals and other basic safety information • Identifying effective/ functional tools, materials and outfit • Preparing tools, materials and outfits • 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	• Uses and functions of tools • Outfits and how to wear it. • Expiration/shelf life of materials • Proper disposal of expired materials	• Using tools and materials in the workplace • Wearing of outfits • Observing expiration/shelf life of materials

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Effectivity/shelf life/expiration of materials are strictly observed 2.4 ***Emergency procedures*** are known and followed to ensure a safework requirement 2.5 Hazards in the workplace are identified and reported in line with farm guidelines	• Environmental rules and regulations • Emergency procedures • Hazards identification and reporting • Communication skills • OSHS	• Disposing of expired materials • Following emergency procedures • Identifying and reporting of hazards in workplace area.
3. Safekeep /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 manufacturer's recommendation and farm requirements. 3.3 Waste materials are disposed according to manufacturers, government and farm requirements.	• Procedures of cleaning used tools and outfits • Label and storage unused materials • Disposal of wastes materials • Manufacturers' recommendation on keeping materials • Environmental rules and regulations	• Cleaning used tools and outfit • Labeling and storing unused materials • 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	2.1 Stock room/storage areas/warehouse 2.2 Field/farm/orchard
3. Time	3.1 Fertilizer and pesticides application 3.2 Feed mixing and feeding 3.3 Harvesting and hauling
4. Tools, materials and outfits	4.1 Tools 4.1.1 Wrenches 4.1.2 Screw driver 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	5.1 Location of first aid kit 5.2 Evacuation 5.3 Agencies contract 5.4 Farm emergency procedures
6. Hazards	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 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

UNIT OF COMPETENCY : USE FARM TOOLS AND EQUIPMENT

UNIT CODE : AGR 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.

LEMENT	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 are safely used according to job requirements and manufacturers conditions	• Types and uses of farm tools • Characteristics of functional tools • Checking tools for defects/faults • Segregation and reporting defective tools • Uses of tools	• Identifying farm tools for the work • Checking the conditions of tools • Reporting defective tools • Using tools
2. Select and operate farm equipment	2.1 Identify appropriate ***farm equipment*** 2.2 Instructional manual of the farm tools and equipment are 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	• Types and operations of farm equipment • Standards operating procedures of farm equipment • Instructional manual of equipment • Pre-operation check-up • Equipment Specification • Procedures in calibrating and use of equipment • Equipment faults identification and reporting • Operation of equipment	• Identifying appropriate farm equipment for the work • Reading instructional manual. • Conducting pre-operation check-up • 2.4Identifying faults/defects of farm equipment • Reporting on defective farm equipment • Operating farm equipment • Following safety procedures.

LEMENT	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.	• Codes and Regulations on environmental protection • Safety and keeping of equipment every after use • Safety measures	
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	• Cleaning procedures of tools and equipment • Maintenance procedures of farm equipment • Storage of tools and equipment • Designated storage areas	• Cleaning tools and equipment • Performing routinely check-up of tools and equipment • Maintaining farm equipment • Storing tools and equipment

RANGE OF VARIABLES

VARIABLE	RANGE
1. Farm equipment	1.1 Engine 1.2 Pumps 1.3 Generators 1.4 Sprayers
2. Farm tools	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	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	2.1 Service/operational manual of farm tools and equipment 2.2 Tools and equipment 2.3 Farm implements
3. Method of Assessment	**Competency in this unit must be assessed through:** 3.1 Direct observation 3.2 Practical demonstration 3.3 Third Party Report
4. Context of Assessment	4.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

UNIT OF COMPETENCY : PERFORM ESTIMATION AND BASIC CALCULATION

UNIT CODE : AGR 321203

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	• Job requirements/labor needs • Calculation of quantities of materials and resources required • Calculation of time for job completion • Preparation of estimate report • Basic mathematical operations • Percentage and ratios • Unit Conversion	• Identifying job requirements/labor • Estimating quantities of materials and resources required • Estimating time for job completion • Performing basic calculation • Compute percentage • Convert English to metric systems of measurement • Preparing estimate report
2. Perform basic workplace calculation	2.1 ***System and units of measurement*** to be followed are ascertained 2.2 Calculation needed to complete work tasks are performed using the ***four basic mathematical operation*** 2.3 Calculate whole fraction, percentage and mixed when are used to complete the instructions 2.4 Number computed is checked following work requirements	• Four basic mathematical operation • System and units of measurement • Fraction, percentage and ratio • Material take-off • Materials costing	• Compute bill of materials • Compute project cost

RANGE OF VARIABLES

VARIABLE	RANGE
1. Four basic mathematical operation	1.1 Addition 1.2 Subtraction 1.3 Multiplication 1.4 Division
2. System of measurement	2.1 English 2.2 Metric
3. Units of measurement	3.1 Area 3.2 Volume 3.3 Weight 3.4 Length

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Performed estimation 1.2 Performed basic workplace calculation 1.3 Applied corrective measures as maybe necessary
2. Resource Implications	2.1 Relevant tools and equipment for basic calculation 2.2 Recommended data
3. Method of Assessment	**Competency in this unit must be assessed through:** 3.1 Practical demonstration 3.2 Written examination
4. Context of Assessment	4.1 Assessment may occur in the workplace or in a simulated workplace or as part of a team under limited supervision

CORE COMPETENCY

UNIT OF COMPETENCY : ESTABLISH SUGARCANE NURSERY

UNIT CODE : AFF611310

UNIT DESCRIPTOR : This unit covers the knowledge and skills required to select sugarcane nursery site and perform nursery operations including preparation and handling of planting materials, land preparation, planting and replanting, crop care, and cutback operation (stalk cutting). This includes both the formal and non-formal nursery operations.

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS

1. Select nursery site	1.1 ***Site inspection*** is conducted based on established farm practices.
	1.2 Soil samples are gathered for laboratory analysis in accordance with standard procedures.
	1.3 Selected site is secured based on ***nursery requirements***.
		• Site selections
		  ○ Topography
		  ○ Site inspection procedures
		• Nursery site requirements (land area, drainage and water source)
		• Land area measurement
		• Preparation of site inspection report
		• Soil sample collection procedure
		• Correct amount of soil sample
		• Location of soil samples
		• Crops planted
		• Soil moisture
		• Proper labeling
		• Handling soil sample for analysis
		• Soil nutrients
		• Calculation of soil samples collected
		• Sample label
		• OSHS practices
		• Nursery site securing procedures
			• Measuring area using staking method
			• Conducting site inspection
			• Preparing inspection report
			• Identifying soil type
			• Collecting soil samples
			• Packing and labeling soil samples
			• Transporting soil samples to the laboratory
			• Preparing securing materials
			• Preparing bill of materials
			• Securing nursery site

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Types of site securing materials (fences, signage) • Cost estimation for securing materials • Measurement of securing materials and farm perimeters • Bill of materials	
2. Prepare nursery tools and farm implements	2.1 ***Tools, farm implements and equipment*** are prepared according to work requirements. 2.2 Basic pre-operative checking of tools and farm implements is performed in accordance with manufacturer's manual and GAP standard. 2.3 Worn-out and corroded are segregated and treated according to maintenance plan and procedures.	• Types of farm tools, implements and equipment • Selection procedure • Handling of tools, farm implements and equipment • Cost estimates for tools, farm implements and equipment • Canvass report and bill of materials • OSHS practices • Procedures for preoperative checking • Calibration of equipment • Checklist report • OSHS practices • GAP • Procedure for determining worn-out and corrosions in tools • Segregation and treatment of damaged goods • Handling of worn out and corroded tools • Cost estimate for treatment and maintenance of worn out and corroded tools • Inspection report and recommendation • Maintenance plan	• Selecting tools and implements • Checking and calibrating tools and equipment • Preparing inspection report and recommendation ○ Preparing checklist report • Wearing PPEs • Segregating worn out and corroded tools • Performing preventive maintenance/minor repairs/trouble shooting

ELEMENTS	PERFORMANCE CRITERIA *Italicized* terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Waste Management Act • Risks and hazard in segregation and handling corroded tools • OSH Standards	
3. Secure planting materials	3.1 ***Planting materials*** are obtained from ***reliable sources*** 3.2 Planting materials are handled following prescribed procedure. 3.3 Planting materials are ***treated*** following standard protocol. 3.4 Planting materials are determined according to kinds, varieties and adaptability in the district. 3.5 ***Quality planting materials*** are selected according to prescribed characteristics.	• Released recommended varieties • Kinds of planting materials • Sugarcane varieties • Morphological and agronomic characteristics • Characteristics of good planting materials • Print materials of adaptable varieties and planting materials • Protocol in obtaining planting materials • Estimation of quantity of planting materials • Email or written request • Filling-up Client Satisfaction • Report form from government offices • Telephone conversation • Procedures in handling planting materials • Care of planting materials • Procedure for selection • Characteristics of high quality planting materials • OSHS practices • GAP	• Sourcing information of adaptable varieties from research stations and print materials • Preparing simple letter of request • Estimating quantity and costing planting materials to be obtained • Obtaining planting materials • Filling-up client satisfaction report • Handling planting materials from receipt to nursery site • Selecting good quality planting materials • Wearing PPEs • Practicing GAP in selecting quality planting materials • Measuring and preparing treatment solution • Handling chemicals • Treating planting materials

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Procedure for chemical treatment and soaking in water • Control of pests and diseases • Incubation of treated planting materials • Computation measuring dosages • Cost estimate of chemicals • Bill of materials	
4. Set up nursery	4.1. Lay-outing is conducted in accordance with ***planting requirements***. 4.2. ***Land preparation*** is performed in accordance with established farm procedures. 4.3. Planting materials are planted according to recommended ***planting procedures***. 4.4. Mechanized farm services are sourced according to work requirement. 4.5. Planting activities are conducted based on farm plan.	• Procedure for lay-outing • Design of lay-out • Area measurement • Nursery lay-out and interpretation • Procedure for proper land preparation and liming if required • Soil type and condition • Cost estimates for land preparation, liming and organic amendments application • Carbon monoxide emission • GAP • Procedure for planting and basal fertilization • Methods of planting • Varietal characteristics • Fertilizer requirement based on soil analysis • Calculation of planting density • Computation of basal fertilizer requirement • Record planting activities • Fertilizer residues/ contamination of waterways	• Performing lay-outing activities • Measuring area • Applying required materials (lime, organic amendments) based on soil analysis • Preparing land • Demonstrating proper planting of cane point using different recommended planting practices • Applying properly basal fertilizer • Canvassing or survey mechanized service providers and their costs • Sourcing mechanized farm services

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Farm mechanization • Cost estimates of mechanized farm services • Report of canvass • Carbon monoxide emission from burned fuel • Clean Air Act	
5. Maintain nursery	5.1 Replanting is performed as required following established farm practices. 5.2 ***Cultural practices/activities for nursery maintenance*** the district are carried out according to established farm practices. 5.3 Pests and diseases are monitored according to GAP. 5.4 Control measures are applied according to GAP. 5.5 Safety precautionary measures are practiced according to OSHS.	• Procedure for replanting and irrigation • Soil and weather condition • Estimation of percent germination • Estimation of replanting cost • Estimation of irrigation cost • Hazard from use of cutting and digging tools • OSH Standards • Procedure of cultural practices/activities • Sugarcane agronomy ○ Nutrition ○ Pest Control ○ Irrigation and drainage • Cost Estimation ○ Fertilizer computation ○ Calculate duration and frequency of irrigation • Carbon monoxide emission • Fertilizer contamination • Procedure on GAP • Pests and diseases of sugarcane • Percent infection/ infestation	• Performing replanting for missing hills • Performing irrigation • Performing cultural practices for nursery maintenance • Estimating cost of nursery maintenance • Conducting damage assessment and monitoring • Performing control measures • Wearing PPEs • Disposing wastes • Estimating chemical dosages • Practicing safety precautionary measures relating to nursery maintenance

ELEMENTS	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Calculation of damage • Incidence report • Control measures of pests and diseases of sugarcane • Computation and measuring dosages • Cost estimate of chemicals and biocontrol agents and their application • Proper application of chemicals and disposal of used containers • Proper storage of pesticides • Procedures on safety precautionary measures • OSHS Practices on maintenance of nursery	
6. Harvest planting materials	6.1 Tools are used in accordance to prescribed procedures 6.2 Age of canes at cutback is determined based on farm plan. 6.3 Stalks are cut following established cutting techniques. 6.4 Planting materials are ***handled*** in accordance with the prescribed procedures 6.5 Work ***safety measures*** are observed following OSHS	• Preparation of harvesting tools • Sugarcane agronomy • Computation of volume of planting materials to be produced • Production report • Hazard from use of cutting tools and exposure to snake and insect bites • Procedure on age determination for cutback • Computation of average number of cane points per stalk • Procedure on cane cutting • OSHS Standards on harvesting	• Filling up production data form • Preparing harvesting tools • Checking the appearance of the canes for cut back visually • Estimating the average number of cane per hectare • Performing the appropriate cutting method • Handling of planting materials • Practicing OSHS

RANGE OF VARIABLES

VARIABLE	RANGE
1. Site inspection	**Site inspection includes:** 1.1 Site visitation 1.2 Verifying size of the area 1.3 Verifying presence of nursery farm requirements
2. Nursery requirements	**Nursery requirements include:** 2.1 Water source 2.2 Topography 2.3 Drainage 2.4 Soil type 2.5 Accessibility (transport) 2.6 Distance to the proposed or existing sugarcane plantation site 2.7 Demand of planting materials
3. Tools, farm implements and equipment	**Tools, farm implements and equipment may include, but not limited to:** 3.1. Tools: 3.1.1 Digging tools 3.1.2 Cane cutting tools 3.1.3 Measuring tools 3.1.4 Soil auger 3.1.5 Cane knife 3.1.6 Ruler 3.2. Farm implements and equipment: 3.2.1 Water pumps 3.2.2 Sub-soiler/Ripper 3.2.3 Plow (Disc/Moldboard) 3.2.4 Disc harrow 3.2.5 Furrower 3.2.6 Leveler/grader 3.2.7 Mechanical planter 3.2.8 Cultivators/Weeder/cut-away/inter-row 3.2.9 Trash rake 3.2.10 Irrigation system and parts 3.2.11 Fertilizer/lime applicator 3.2.12 Shredder/Mulcher 3.2.13 Trailer 3.2.14 Sprayer 3.2.15 Standing manual rain gauge 3.2.16 Tractors 3.2.17 Hauling trucks 3.2.18 Bull carts 3.2.19 Carabao

VARIABLE	RANGE
4. Planting materials	**Planting materials include:** 4.1. Cane points (cutback/top points) 4.2. Micro-propagated plantlets 4.3. Replanting materials – chipped tillers, Pre-germinated single-eye cane point 4.4. Whole stalk
5. Reliable sources	**Reliable sources include:** 5.1 Nurseries 5.2 Mill District Development Council (MDDC) Nurseries 5.3 Micro-propagation facilities 5.4 Progressive farms
6. Treatment of planting materials	**Treatment includes the following:** 6.1. Physical 6.2. Chemical
7. Quality planting materials	**Characteristics of quality planting materials:** 7.1 Damage-free 7.2 Viable-two to three eye cutting 7.3 Pure 7.4 Pest and disease-free 7.5 Diameter 7.6 Length of internodes 7.7 Age of canes
8. Planting requirements	**Planting requirements include the following:** 8.1. Furrow distance 8.2. Density 8.3. Planting pattern 8.4. Depth of planting
9. Land preparation	**Land preparation includes the following:** 9.1. Clearing 9.2. Sub-soiling 9.3. Plowing 9.4. Harrowing 9.5. Furrowing 9.6. Levelling
10. Planting procedures	**Planting procedures includes:** 10.1. Dry season 10.1.1 Soaking of cane points 10.1.2 Incubation of cane points 10.1.3 Parallel position 10.2. Wet season 10.2.1 Slanting position
11. Cultural practices/activities for nursery maintenance	**Cultural practices / activities for nursery maintenance include:** 11.1. Weeding/cultivation 11.1.1 Strip weeding 11.1.2 Inter-row/general weeding

VARIABLE	RANGE
	11.1.3 Blanket weeding 11.1.4 Application of herbicides 11.2. Construction of drainage canals 11.3. Application of fertilize 11.3.1 Organic or compost 11.3.2 Inorganic/chemicals/synthetics 11.4. Irrigation
12. Handling of planting materials	12.1. Presence of leaf sheath 12.2. Cover planting materials to maintain moisture 12.3. Immediate delivery of planting materials to plant site 12.4. Bagging/tying of planting materials
13. Safety measures	13.1. Wearing of PPE 13.2. Handling of tools 13.3. Following instructions of manual in equipment operation 13.4. Awareness and control of various hazards of the operation

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Selected nursery site 1.2. Prepared nursery tools and farm implements 1.3. Secured planting materials 1.4. Set-up nursery 1.5. Maintained nursery 1.6. Harvested planting materials 1.7. Performed measurement/computation of area and number of canepoints for planting and for harvest
2. Resource Implications	**The following resources should be provided**: 2.1. Shed 2.2. Writing instruments 2.3. Nursery tools/ implements/ equipment 2.4. Nursery supplies 2.5. Logbooks 2.6. Irrigation system and parts 2.7. References (NSIC catalogue, GAP, OSHS, HACCP manuals, etc.) 2.8. Tools and farm implements use in clearing and land preparation 2.9. PPE 2.10. Planting materials 2.11. Fertilizers/other chemicals 2.12. Polybags
3 Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Direct Observation and questioning 3.2 Demonstration 3.3 Oral interview and written test 3.4 Third party report
4 Context of Assessment	Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center in a simulated workplace setting.

UNIT OF COMPETENCY : **PLANT SUGARCANE CROP**

UNIT CODE : **AFF 611311**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to conduct activities related to land preparation and planting of sugarcane. These include soil sampling, land preparation, liming, furrowing, preparation and handling of planting materials, field lay-out, basal fertilization, planting and replanting and use of tools and equipment.

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Select planting site	1.1 ***Site inspection*** is conducted based on established farm practices. 1.2 Soil samples are gathered for laboratory analysis in accordance with standard procedures. 1.3 Site is selected based on result of ***area suitability*** 1.4 Selected site is secured based on farm requirements. 1.5 Limitation of the area is assessed based on standards procedures	• Site inspection procedure and techniques. • Use of Global Positioning System (GPS) • Agroclimatic requirements of sugarcane • Land area measurements • Preparation of site inspection report • OSHS practices • Soil sampling procedures and techniques • Importance of soil sampling • Number of sampling sites and soil samples • Instructional manual in soil sampling • Record keeping of soil sample and historical data • Selection of sites based on area suitability Drainage ○ Topography	• Measuring site area using staking methods • Conducting site inspections • Preparing inspection report • Calibrating and using of GPS • Collecting soil samples • Packing and labeling soil samples • Bringing soil samples to the laboratory • Estimating cost of securing farm sites • Reporting the estimated cost • Securing selected sites • Assessing the limitation of the area

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		○ Water source ○ Soil type ○ Soil productivity ○ Peace and order ownership/land tenure Limitation of the area ○ Peace and order accessibility grazing animals • Estimation of distance from mill and water source • Accomplishing checklist for area suitability • Procedures in securing selected sites • Cost estimate for securing farm sites • Report on cost estimate for securing farm sites warning signs	
2. Prepare tools, farm implements and equipment	2.1 ***Tools, farm implements and equipment*** for planting operations are prepared according to work requirements. 2.2 Basic pre-operative checking of tools and farm implements is performed in accordance with manufacturer's manual and GAP standard.	• Uses and functions of tools, farm implements, and equipment • Types of tools, farm implements and equipment • List of materials, tools, farm implements and equipment • Inspection report • Basic pre-operative checking of tools, farm implements and equipment	• Selecting tools, farm implements and equipment • Practicing OSHS • Checking tools, farm implements and equipment and • Calibrating weighing scale • Preparing inspection report • Segregating worn out and corroded tools and farm implements • Wearing PPE

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	2.3 Tools with wear and corrosions are segregated and treated according to maintenance plan and procedures.	calibration of weighing scale • Segregation and treatment procedures • Causes of corrosion on tools and farm implements • Inventory of defective tools and farm implements • Proper disposal of worn out tools and farm implements • OSHS	• Treating corroded tools and farm implements • Preparing inventory reports
3. Acquire planting materials	3.1 Planting materials are obtained from reliable sources. 3.2 Planting materials are handled following prescribed procedure. 3.3 Planting materials are treated following standard protocol. 3.4 Planting materials are determined according to established criteria. 3.5 Quality planting materials are selected according to prescribed characteristics.	• Variety and varietal characterization • Kinds of planting materials • List of sugarcane varieties • Variety and agro climatic conditions • Absence of reliable sources • Availability of planting materials • List of reliable sources Negotiation skills • Estimation of quantity and cost of planting materials • Procedures in obtaining planting materials • Proper handling procedures and techniques. • Sugarcane Physiology on post-harvest deterioration • Prevailing weather condition • Deterioration of planting materials	• Determining planting materials • Obtaining planting materials • Performing proper handling procedures • Selecting quality planting materials • Treating planting materials • Wearing PPE • Disposing treatment materials

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		due to delayed transport • Proper selection of quality planting materials • Characteristics of quality planting materials. • Guidelines for quality planting materials • Planting materials treatment procedures and techniques • Pests and diseases management • Sugarcane physiology (effects of treatment to the planting materials) • Dosage of treatment • Manufacturer's guide • Disposal of treatment materials • OSHS	
4. Prepare land for planting	4.1 ***Site improvement program*** is implemented based on the result of the assessment. 4.2 Machinery and implements are prepared for land preparation according to prescribed methods 4.3 ***Debris*** are removed and disposed according to waste management standards. 4.4 ***Land preparation*** is conducted according to crop requirement. 4.5 ***Lime*** is applied based on crop requirement	• Soil fertility • Soil erosion • Soil nutrition • Water holding capacity • Sugarcane agronomy (crop requirements) • Estimate cost of site improvement • Site improvement program assessment report • OSHS practices • Uses and functions of machineries and farm implements • Specifications of machineries and	• Implementing site improvement program • Preparing site improvement program report • Sourcing farm machinery and implements services • Demonstrating debris management • Carrying out land preparation operations • Preparing monitoring and satisfaction report • Applying liming materials • Wearing PPEs

ELEMENT	PERFORMANCE CRITERIA *Italicized terms* are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	and prescribed procedure during land preparation 4.6 Drainage canals are constructed and maintained according to procedures and plan 4.7 Safety procedures for fertilizer application is followed according to OSHS	farm implements for land preparations • Number of equipment to be used • Computation for costing of different land preparation operations per hectare • Operating manual • Job request and order • Safety precautions • Procedures for debris removal & disposal • Waste management • Effect of debris • Solid waste management act • 3Rs • Land preparation procedures and techniques • Monitoring procedures • Sugarcane agronomy on land preparations • Farm Plan • Job satisfaction report • Safety precautions according to OSHS • Lime application technique • Soil acidity • Amount and costing of liming materials and application • Follow instructions and recommendations of soil analysis	• Handling construction and maintenance of drainage canal • Applying fertilizer • Negotiations skills

ELEMENT	PERFORMANCE CRITERIA ***Italicized terms*** are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
		• Drainage construction techniques • Types of drainage system • Measurement and cost of construction • Drainage plan	
5. Conduct planting activities	5.1 ***Fertilizers*** applied based on recommended rate and prescribed procedure. 5.2 Cane points are ***planted*** based on recommended methods 5.3 ***Safety procedures*** are followed according to Occupational Safety and Health Standards (OSHS) and Good Agricultural Practices (GAP)	• Fertilizer application technique • Nutrient requirements of sugarcane • Rate of fertilizer application (frequency and concentration) • Cost of fertilizer and its application • Program of fertilizer application • Safety precautions according to OSHS • Planting procedures and techniques • Sugarcane agronomy (planting) • Rate of planting & quantity of planting materials • Farm Plan • Procedures in monitoring mechanized planting and fertilization Uses and functions of farm machineries and implements • Types of farm machineries and implements • Cost of mechanized planting and fertilization • Farm Plan Operator's Manual	• Applying fertilizer • Demonstrating planting of cane points • Wearing PPEs • Monitoring mechanized planting and fertilization activities

RANGE OF VARIABLES

VARIABLE	RANGE
1. Site inspection	**Site inspection includes:** 1.1 Site visitation 1.2 Verifying size of the area 1.3 Verify area suitability
2. Area suitability	**Area suitability includes:** 2.1 Drainage 2.2 Accessibility 2.3 Topography 2.4 Water source 2.5 Distance from the sugar mill 2.6 Labor supply 2.7 Soil type 2.8 Peace and order 2.9 Soil productivity
3. Tools, materials equipment and machinery	**Tools, materials, equipment and machinery include but are not limited to the following:** 3.1 Cane knife 3.2 Bolo/Scythe 3.3 Spade or shovel or soil auger 3.4 Hoe 3.5 Rake 3.6 Plastic pail 3.7 Soaking tank 3.8 Mixing container 3.9 Sacks 3.10 Weighing scale 3.11 Plastic bags 3.12 Measuring instruments 3.13 Writing materials 3.14 Planting materials 3.14.1 Canepoints 3.14.2 Micropropagated plantlets 3.15 Tractor and implements 3.16 Draft animals
4. Established criteria	**Established criteria include:** 4.1 Kinds of planting materials 4.2 Varieties of planting materials 4.3 Adaptability of planting materials in the district.
5. Site improvement program	**Site improvement program includes:** 5.1. Reconditioning of the soil 5.2. Sloping agricultural land technology (SALT)
6. Debris	**Include but are not limited to the following:**

VARIABLE	RANGE
	6.1. Rocks 6.2. Old stubbles 6.3. Unwanted vegetation 6.4. Other debris
7. Land preparation	**Land preparation include but not limited to the following:** 7.1. Clearing 7.2. Sub-soiling/ 7.3. Plowing 7.4. Harrowing 7.5. Leveling 7.6. Furrowing
8. Lime	**Lime include the following:** 8.1. Calcitic 8.2. Dolomitic
9. Fertilizers	**Fertilizers include the following:** 9.1. Organic 9.2. Inorganic
10. Planting methods	**Planting methods include:** 10.1. Open Field Methods - Single row/Double row 10.2. Mechanized/Manual 10.3. Position of planting
11. Safety procedures	**Safety procedures includes:** 11.1. Wearing of PPE 11.2. Handling of tools 11.3. Following instructions of manual in equipment operation 11.4. Awareness and control of various hazards of the operation

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate**: 1.1 Selected planting site 1.2 Prepared tools, farm implements and equipment 1.3 Prepared land for planting 1.4 Planted sugarcane
2. Resource Implications	**The following resources should be provided:** 2.1 Tool room, farm house and animal shed 2.2 Farm tools/ implements/ equipment 2.3 Writing device 2.4 Farm supplies 2.5 Logbooks 2.6 References (fertilizer and pesticide manual/ catalogue, protocols, field guides, OHSP and GAP manuals) 2.7 Production guide 2.8 PPE
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1 Direct Observation 3.2 Demonstration 3.3 Oral interview and/or written test 3.4 Third party report
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center in a simulated workplace setting.

UNIT OF COMPETENCY : **CARE FOR AND MAINTAIN SUGARCANE PLANT AND RATOON CROPS**

UNIT CODE : **AFF 611312**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to manage the growth and development of sugarcane in the plant crop. It also includes competencies to perform cultivation, apply pest control measure, apply fertilizer, carry out irrigation and drainage activities and manage ratoon.

ELEMENT	PERFORMANCE CRITERIA Italicized terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform soil cultivation	1.1 Machinery services are sourced out based on work requirement 1.2 Tools and implements are prepared according to specific cultivation practices 1.3 ***Cultivation*** is conducted based on recommended ***cultural practices*** 1.4 Workplace safety measures are applied based on OSHS.	• Efficient land preparation machineries and service providers • Appropriate cultivation tools and implements • Cultivation procedures • Soil type and condition • Frequency of cultivation • Knowledge and information on land preparation machineries • Handling of cultivation tools & implements • Cultural practices for cultivation of sugarcane • Number of farm machinery available • Cost of services • Number of tools and implements needed • Size of the area	• Demonstrating negotiation with service provider and supplier • Estimating the number of tools and implements needed • Operating cultivation tools and implements • Measuring the size of the area that will be cultivated • Estimating the cost of cultivation Demonstrating cultivation practices

		• Cost of cultivation • List of land preparation machineries available and name of service provider. • Schedule of cultivation • Safety signage • Safety precautions • OSHS	
2. Apply pest control measure	2.1. ***Pests'*** incidence is monitored based on prescribed procedure. 2.2. ***Tools and materials*** are prepared according to specific pest control measures. 2.3. ***Pest control measures*** are followed based on GAP and Fertilizer Pesticide Authority (FPA) guidelines 2.4. Safety measures are observed and practiced according to Occupational Health and Safety (OHS) procedures.	• Pest identification techniques • Pest monitoring techniques • Uses and functions of tools and equipment • Preparations of materials, tools and equipment • Pests management strategies • Types of pests management strategies • GAP • OSHS procedures • Signs and symptoms of major diseases and damages due to pests • Types of pests • Assessment of pest infestation/infection and incidence • Determination of number of tools/equipment to be used Calibration of sprayer • Assessment of infestation and degree of damage • Computation of rates, dosages and	• Illustrating major pests Assessing infestation/infection/crop damage due to pest • Preparing the materials, tools and equipment for pesticide application • Estimating the number of tool/equipment to be used • Demonstrating the calibration of sprayer • Operating sprayers • Employing pesticide application • Preparing report on infestation/disease incidence of selected fields • Demonstrating storage, handling, and disposal of pesticides and used containers • Practicing personal hygiene and safety measures related to pesticide application

		amount of pesticides • Record/Report pest monitoring • Labels and directions for use of chemicals • Report on infestation and degree of damage, control measures and results • Mode of spread • Follow prescribe monitoring procedures • Safety precautions • Hazards to human, environment and non-target organisms due to pesticides • OSHS, FPA & GAP relating to pest's management strategies	
3. Apply fertilizer	3.1 Tools and materials are prepared according to prescribed user's manual 3.2 Fertilizer rate is determined based on the result of soil analysis. 3.3 ***Fertilizers*** are selected based on costing and availability in the market 3.4 ***Method of fertilizer application*** is employed based on crop requirements. 3.5 ***Precautionary measures*** are applied to avoid cross contamination based on GAP.	• Fertilizer recommendation • Selection procedures of fertilizers • Uses of tools and equipment • Fertilizer application methods • GAP • Monitoring procedures • Nutrient analysis of fertilizer material Types and grades of fertilizers • Types of tools and equipment used in fertilizer application • Soil Science on effect of fertilizer application • Sugarcane agronomy	• Estimating fertilizer application rate • Selecting the cheapest fertilizer combination that will satisfy the recommended rate Recording fertilizer expenditures • Demonstrating pre-operation procedure for Farm Animal-Drawn applicator • Estimating the number of tools and equipment needed for fertilizer application • Preparing tools and other equipment • Operating animal-drawn fertilizer applicator • Demonstrating manual fertilizer application • Demonstrating operation of a fertigation system

	3.6 Safety procedures are followed according to Occupational Safety and Health Standards	• (soil and plant nutrition) • Rate of fertilizer • Cost of fertilizers • Number of tools and equipment required • Cost of fertilizer application • Records of fertilizer costs • Instruction on proper fertilizer application • OSHS, FPA & GAP relating to fertilizer application • Relevant local laws and regulations • Availability in the market • Health hazards due to chemical fertilizer • Environmental effect due to chemical fertilizer (contamination)	• Estimating the cost of fertilizer application • Recording fertilizer application cost • Monitoring fertilizer application • Demonstrating proper wearing of PPE
4. Carry out irrigation and drainage activities	4.1. Soil moisture content is determined based on soil field capacity 4.2. ***Watering/irrigation*** is performed following the Good Agricultural Practices (GAP). 4.3. Watering/irrigation facilities are maintained based on industry standard 4.4. Drainage canal is constructed and maintained based on established procedures.	• Soil sample collection techniques • Soil moisture indicators • Irrigation techniques and procedures • Procedures in maintaining irrigation facilities • Procedures in construction and maintenance of drainage canals • Monitoring procedures • Soil moisture content • Weather data • Soil, water and plant relationship	• Demonstrating the manual method of determining soil moisture • Using soil moisture tester • Illustrating a layout of an irrigation system • Layouting an irrigation system • Demonstrating proper operation of an irrigation system • Estimating cost of irrigation • Preparing schedules for irrigation • Demonstrating maintenance of irrigation facilities • Estimating the cost of irrigation system, repair and maintenance Recording the cost of

		• Time and frequency of irrigation • Types of irrigation • Importance of maintenance of Irrigation facilities • Importance of drainage • Types of drainage systems • Cost estimation of irrigation • Frequency and duration of irrigation • Cost of irrigation system repair and maintenance • Measurements of size and depth of drainage canals based on amount of water to be drained • Cost of drainage system, repair and maintenance • Soil condition and crop appearance • Weather forecast report • Preparation of schedules for irrigation • Disruption of water source • Scheduling and sharing of water source • GAP on watering/irrigation of crop	irrigation system, repair and maintenance • Handling construction and maintenance of drainage canal • Estimating the cost of drainage system construction, repair and maintenance • Recording the cost of drainage system construction and maintenance • Preparing schedules for drainage
5. Manage ratoon	5.1 Cane stubbles are shaved based on recommended methods 5.2 The harvested field is cleared of cane trashes following farm established procedures	• Stubble shaving methods • Methods of trash farming • Procedures for replanting • Replanting techniques	• Demonstrating harvesting and stubble shaving methods • Estimating the cost of different stubble shaving methods • Recording the cost of different stubble shaving methods

	5.3 Cane trashes are incorporated with the soil or used as mulch based on Good Agricultural Practices (GAP). 5.4 Trash is managed according to GAP 5.5 Trash is managed according to GAP. 5.6 Ratoon replanting is done according to prescribed practices.	• Proper stubble shaving • Trash utilization and decomposition • Types of replanting materials • Cost of stubble shaving • Cost of trash farming • Cost of replanting • Clean Air Act • Solid Waste Management Act • Information dissemination on trash farming • Schedule of replanting • Improper harvesting practices • No burning • Difficulty in replanting due to dry soil condition	• Estimating trash farming cost • Recording trash farming cost • Preparing the field for trash farming • Demonstrating proper replanting methods and procedures • Estimating replanting cost • Recording replanting cost

RANGE OF VARIABLES

VARIABLE	RANGE
1. Cultivation	**Cultivation includes:** 1.1 Manual 1.2 Mechanical
2. Cultural practices	**Cultural practices include:** 2.1 Off barring 2.2 Hilling up 2.3 Ridge busting 2.4 Spike tooth harrowing (pakalas)
3. Pests	**Pests include but not limited to:** 3.1 Weeds 3.2 Insects 3.3 Diseases 3.4 Rodents 3.5 Stray animals/Vertebrate pests 3.6 Nematodes
4. Pest control measures	**Pest control measures include but not limited to:** 4.1. Physical 4.2. Mechanical 4.3. Biological 4.4. Cultural 4.5. Chemical (biopesticide, synthetic) 4.6. IPM 4.7. Sanitation
5. Tools and materials	**Tools and materials include:** 5.1 Knapsack/ power sprayers 5.2 Fertilizer 5.3 Measuring cup
6. Fertilizers	**Fertilizers include the following:** 6.1 Organic 6.2 Inorganic
7. Method of fertilizer application	**Methods of fertilizer application include but are not limited to the following:** 7.1 Basal 7.2 Sidedress 7.3 Topdress 7.4 Localized 7.5 Band 7.6 Foliar/Spray 7.7 Broadcast 7.8 Spot 7.9 Drill (tama)
8. Watering/irrigation	**Watering/irrigation include but not limited to:** 8.1. Drip 8.2. Furrow

VARIABLE	RANGE
	8.3. Sprinkler 8.4. Fertigation (fertilizer application along with irrigation)
9. Precautionary measures	**Precautionary measures include:** 9.1. Wearing of PPE 9.2. Handling of tools 9.3. Following instructions of manual in equipment operation 9.4. Awareness and control of various hazards of the operation

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1. Performed cultivation 1.2. Applied pest control measures 1.3. Applied fertilizer 1.4. Carried-out irrigation and drainage activities 1.5. Managed ratoon 1.6. Followed Occupational Health and Safety Standards
2. Resource Implications	**The following resources should be provided:** 2.1. Farm or sugarcane plantation area 2.2. Storage shed 2.3. Farm tools/ implements/ equipment/services 2.4. Farm supplies 2.5. PPE 2.6. Layout plan 2.7. Logbooks 2.8. Irrigation system and parts 2.9. References (fertilizer and pesticide manual/ catalogue, protocols, field guides, etc.)
3. Methods of Assessment	**Competency in this unit may be assessed through:** 3.1. Direct Observation 3.2. Demonstration 3.3. Oral interview and/or written test 3.4. Third party report
4.Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center in a simulated workplace setting.

UNIT OF COMPETENCY : **CARRY-OUT HARVEST AND POST-HARVEST OPERATIONS FOR PLANT AND RATOON CROPS**

UNIT CODE : **AFF 611313**

UNIT DESCRIPTOR : This unit covers the knowledge, skills and attitudes required to perform manual harvest operations and postharvest handling of canes. This unit also includes proper use of tools and equipment required to perform the activities.

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
1. Perform pre – harvest operations	1.1 Cane samples are gathered and analyzed using refractometer. 1.2 Crop maturity is identified according to parameters affecting ***physiological growth*** and ***physical indicators***. 1.3 Records of crop ***agronomic history*** are verified and referenced for maturity. 1.4 ***Harvesting tools, materials, and machines and equipment*** are prepared according to work requirements 1.5 Harvesting machinery services are sourced out	• Methods of determining crop maturity • Procedures in gathering stalk samples • Procedure in using the brix refractometer • Appropriate harvesting tools and equipment • Uses and functions of harvesting tools and equipment • Mechanical harvesting • Type and uses of harvesting machineries • Cane sampling • Physiologic and morphological indicators of maturity • Sugarcane agronomy (cane maturity) • Laboratory analysis of supplies • Maintenance of harvesting tools and equipment • Requirement for mechanized harvesting • Chronological age of sugarcane	• Examining the morphological characteristics of a mature sugarcane plan • Demonstrating proper juice extraction and determination of brix by using hand refractometer • Demonstrating proper maintenance and repair of harvesting tools • Estimating cost of acquisition, rent, repair and maintenance of tools, materials and machineries • Estimating quantity of harvest relating to capacity of harvesting machinery • Demonstrating negotiation with

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	following farm plan. 1.6 Cane cutters are sourced out following farm plan. 1.7 ***Records*** regarding crops to be harvested are checked according to farm procedures	• Brix readings from hand refractometer • Costing of acquisition, rent, repair and maintenance of tools, materials and equipment • Quantity of harvest relating to capacity of harvesting equipment • Cost estimation of mechanized and manual harvesting • Estimation of cane tonnage • Brix data recording • Specifications of harvesting equipment and tools • Canvass report • Production record • Mill reports • Farm record • Safety in using harvesting tools and juice extractor • OSH standards	service provider and supplier • Preparing a canvass report • Estimating harvesting capacity • Conducting crop estimation • Preparing a service contract • Writing a cost estimation for manual harvesting Writing a canvass report • Negotiating with cane cutter service provider • Preparing a systematic farm record on harvest of crop Securing and accomplishing mill/trip ticket • Checking records on harvesting of crops
2. Perform harvesting activity	2.1 Harvesting operation is implemented based on recommended cultural ***practices*** for sugarcane. 2.2 Harvesting is performed while observing GAP principles and OSHS. 2.3 Harvesting technique is	• Monitoring procedures • Recommended harvesting practices based on GAP and OSHS • Cutting technique • Cultural practices for harvesting operation • Harvesting tools • Sugarcane agronomy (harvesting) • Inventory of work performance • Safety of harvesting tools	• Monitoring harvesting operation • Demonstrating proper harvesting operations • Employing proper cutting technique • Practicing OSHS and GAP

ELEMENT	PERFORMANCE CRITERIA ***Italicized*** terms are elaborated in the Range of Variables	REQUIRED KNOWLEDGE	REQUIRED SKILLS
	employed following standard procedures.	• Exposure to snake and insect bites • Burning canes • OSHS relating to harvesting • GAP relating to harvesting • Exposure to health and hazards	
3. Perform postharvest operation	3.1 Canes are handled according to prescribed ***postharvest practices*** 3.2 Delivery of canes is Monitoring the performed following industry standards. 3.3 Record keeping is done according to industry procedures.	• Prescribed post -harvest handling practices • Monitoring procedures of delivery • Post-harvest practices • Sugarcane physiology relating to post-harvest • Total daily cane delivery • Computation of farm productivity • Record keeping • Report writing • Mill reports • Record of farm productivity • Overloading of hauling trucks (vertical and horizontal clearance) • LTO regulations on cane transport - low lying electrical lines • Right of way • Milling schedules • 7S of good Housekeeping • OSHS & GAP relating to post harvesting operation	• Demonstrating proper post-harvest handling practices • Monitoring schedules of farm harvesting activities based on number and duration of trips • Preparing a systematic farm record on harvest of crop • Computing farm productivity based on mill reports • Securing and accomplishing mill/trip ticket • Demonstrating proper wearing of PPE

RANGE OF VARIABLES

VARIABLE	RANGE
1. Physiological growth	**Physiological growth includes the following:** 1.1 Uniform brix reading from the base, middle and top portions of sugarcane stalks 1.2 Age of canes (date planted and expected date of harvest)
2. Physical indicators	**Physical indicators include the following:** 2.1. Uniform yellowing of leaves 2.2. Shortening of top internodes 2.3. Decreasing number of leaves (10 and less) 2.4. Emergence of tassel (flowering) 2.5. Shiny stalk
3. Agronomic history	**Agronomic history includes the following:** 3.1 Nursery source 3.2 Variety of plant 3.3 Planting calendar 3.3.1 Months after planting 3.3.2 Age at flower induction 3.3.3 Environmental condition before scheduled harvesting 3.3.4 Date of last fertilization (fertilizer application) 3.3.5 Date of last replanting
4. Harvesting tools, materials, and machines and equipment	**Harvesting tools, materials, and machines and equipment may include the following:** 4.1 Tools 4.1.1 Cane knives (espading, tabas) 4.1.2 Sharpening stone 4.1.3 Ladder 4.2 Machines and equipment 4.2.1 Mechanical harvester 4.2.2 Trailers 4.2.3 Hauling trucks 4.2.4 Bull carts and carabao 4.2.5 Cane loader 4.3 Materials 4.3.1 Binding materials 4.3.2 Sling
5. Records	**Records include the following:** 5.1 Crop history 5.2 Farm calendar 5.3 Farm records 5.4 Production reports (tons cane, bags sugar, subsidies, molasses, planter share) 5.5 Quedan 5.6 Trucking allowance
6. Cultural practices	**Cultural practices include the following:** 6.1 No burning

VARIABLE	RANGE
	6.2 Cutting close to the ground 6.3 No trash (trash: part of cane with low and no sugar content) 6.4 No pre-harvest topping
7 Post-harvest practices	**Post-harvest practices include the following:** 7.1 Transporting harvested canes to the mill within 48 hours 7.2 Delivery fresh and clean canes to the mill

EVIDENCE GUIDE

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Performed pre – harvest operations 1.2 Performed harvesting activity 1.3 Performed postharvest operation 1.4 Employed proper cutting techniques
2. Resource Implications	**The following resources should be provided:** 2.1 Tools and equipment appropriate for cane harvesting and postharvest handling of canes 2.2 Writing instruments 2.3 Logbooks 2.4 References (catalogue, protocols, field guides, GAP, OHSS manuals)
3. Method of Assessment	**Competency in this unit may be assessed through:** 3.1 Direct observation and questioning 3.2 Demonstration (simulated) 3.3 Oral interview and written test 3.4 Third party report
4. Context of Assessment	4.1 Competency may be assessed in actual workplace or at the designated TESDA Accredited Assessment Center in a simulated workplace setting.

SECTION 3 TRAINING ARRANGEMENTS

These standards are set to provide technical and vocational education and training (TVET) providers with information and other important requirements to consider when designing training programs for **SUAGARCANE PRODUCTION NCII.**

They include information on curriculum design; training delivery; trainee entry requirements; tools and equipment; training facilities; and trainer's qualification.

3.1 CURRICULUM DESIGN

TESDA shall provide the training on the development of competency-based curricula to enable training providers develop their own curricula with the components mentioned below.

Delivery of knowledge requirements for the basic, common and core units of competency specifically in the areas of mathematics, science/technology, communication/language and other academic subjects shall be contextualized. To this end, TVET providers shall develop a Contextual Learning Matrix (CLM) to include Technology, Science, Math, English/Communication, and Environmental Awareness and Safety. The curriculum design should also incorporate green technology, issues on health, drugs and gender and concerns relating to people with disabilities (PWDs).

Course Title: **SUGARCANE PRODUCTION** **NC Level** **NC II**

Nominal Training Duration:

20 hrs	**Basic Competencies**
72 hrs	**Common Competencies**
511 hrs	**Core Competencies**
Total 603 hrs	

Course Description:

This course is designed to develop and enhance the knowledge, desirable attitudes and skills of a sugarcane planter to establish sugarcane nursery, plant sugarcane, care and maintain sugarcane and ratoon crops, and carry-out harvest and post-harvest operations. It covers skills sugarcane planting focusing on manual operations; while for mechanized operations, the farmer has to have competencies in sourcing out services from farm machinery service providers.

To accomplish the above, all units prescribed for this qualification must be achieved.

BASIC COMPETENCIES
20 HRS

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Participate in workplace communication	1.1 Obtain and convey workplace information	• Describe Organizational policies	• Group discussion	• Oral evaluation	4 Hours
		• Read: o Effective communication	• Lecture	• Written examination	
		o Written communication			
		o Communication procedures and systems			
		• Identify: o Different modes of communication			
		o Medium of communication			
		o Flow of communication			
		o Available technology relevant to the enterprise and the individual's work responsibilities			
		• Prepare different Types of question	• Demonstration	• Observation	
		• Gather different sources of information			
		• Apply storage system in establishing workplace information			
		• Demonstrate Telephone courtesy			

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	1.2 Complete relevant work related documents	• Describe Communication procedures and systems	• Group discussion	• Oral evaluation	
		• Read: ○ Meeting protocols	• Lecture	• Written examination	
		○ Nature of workplace meetings	• Lecture	• Written examination	
		○ Workplace interactions			
		○ Barriers of communication			
		• Complete work related documents	• Demonstration	• Observation	
		• Read instructions on work related forms/documents	• Lecture	• Written examination	
		• Practice:			
		○ Estimate, calculate and record routine workplace measures	• Demonstration	• Observation	
		○ Basic mathematical processes of addition, subtraction, division and multiplication			
		• Demonstrate office activities in: ○ workplace meetings and discussions scenario	• Role play	• Oral evaluation • Observation	
		• Perform workplace duties scenario following simple written notices	• Role play	• Oral evaluation • Observation	

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Follow simple spoken language	• Demonstration	• Observation	
		• Identify the different Non-verbal communication	• Lecture	• Written examination	
		• Demonstrate ability to relate to people of social range in the workplace	• Demonstration	• Observation	
		• Gather and provide information in response to workplace requirements			
	1.3 Participate in workplace meeting and discussion	• Identify: o types of workplace documents and forms	• Lecture	• Written examination	
		o kinds of workplace report			
		o Available technology relevant to the enterprise and the individual's work responsibilities			
		• Read and follow instructions in applying basic mathematical concepts	•	•	
		• Follow simple spoken language	• Demonstration	• Observation	
		• Gather and provide information in response to workplace requirements	•	•	

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
2. Work in a team environment	2.1 Describe and identify team role and responsibility in a team.	• Describe the team role and scope	• Group discussion	• Oral evaluation	4 Hours
		• Read o Definition of Team	• Lecture	• Written examination	
		o Difference between team and group			
		o Objectives and goals of team			
		• Identify different sources of information	•	•	
	2.2 Describe work as a team	• Describe team goals and objectives	• Group discussion	• Oral evaluation	
		• Perform in setting team goals and expectations scenario	• Role play	• Oral evaluation • Observation	
		• Identify o individual role and responsibility	• Lecture	• Written examination	
		• Practice Interacting effectively with others	• Group discussion	• Oral evaluation	
		• Read:	• Lecture	• Written examination	
		o Fundamental rights at work including gender sensitivity			
		o Understanding individual competencies relative to teamwork			
		o Types of individuals			
		o Role of leaders			

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
3. Practice career professionalism	3.1 Integrate personal objectives with organizational goals	• Describe performance evaluation	• Group discussion	• Oral evaluation	6 Hours
		• Read:	• Lecture	• Written examination	
		○ Work values and ethics (Code of Conduct, Code of Ethics, etc.)	•	•	
		○ Understanding personal objectives	•	•	
		○ Understanding organizational goals	•	•	
		• Demonstrate Intra and Interpersonal skills at work	• Demonstration	• Observation	
		• Demonstrate personal commitment in work	•	•	
	3.2 Set and meet work priorities	• Describe company policies, operations, procedures and standards	• Group discussion	• Oral evaluation	
		• Read:	• Lecture	• Written examination	
		○ Time Management			
		○ Basic strategic planning concepts			
		○ Resource utilization and management			
		• Apply managing goals and time	• Demonstration	• Observation	

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Practice: o economic use of resources and facilities	• Demonstration	• Observation	
		o time management			
	3.3 Maintain professional growth and development	• Describe company recognition and incentives	• Group discussion	• Oral evaluation	
		• Read:	• Lecture	• Written examination	
		o Career development opportunities			
		o Information on relevant licenses and or certifications			
		o personal career development needs			
		• Determine personal career development needs	• Group discussion	• Oral evaluation	
4. Practice occupational health and safety	4.1 Identify hazard and risks	• Describe OHS procedures, practices and regulations	• Group discussion	• Oral evaluation	6 Hours
		• Read	• Lecture	• Written examination	
		o OHS indicators			
		o Organizational contingency practices			
		• Practice hazards/risks identification and control			
	4.2 Evaluate hazard and risks	• Describe effects of safety hazards	• Group discussion	• Oral evaluation	

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Read ○ Threshold Limit Value – TLV	• Lecture	• Written examination	
		• Practice reporting safety hazards	• Role play	• Observation	
		• Demonstrate evaluating hazards and risks using communication equipment	• Demonstration	• Observation	

	4.3 Control hazards and risks	• Describe:
		  ○ Organization safety and health protocol
		  ○ Company emergency procedure practices
			• Group discussion	• Oral evaluation	

		• Practice personal hygiene	• Demonstration	• Observation	
		• Practice drills on responding to emergency	• Demonstration • Simulation	• Observation	
	4.4 Maintain occupational health and safety awareness	• Identify emergency-related drills information	• Lecture	• Written examination	
		• Practice occupational safety and health standards on personal records in the workplace	• Role play	• Observation	
		• Practice emergency related drills in the workplace	• Demonstration • Simulation	• Observation	

COMMON COMPETENCIES
72 HRS

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
1.Apply safety measures in farm operations	1.1 Determine areas of concern for safety measures	• Identify work tasks in farm operations	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning • Demonstration	**(Total-7 hrs)** **1 hr**
		• Discuss safety measures in a workplace during farm operations	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation • Role playing	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Explain farm operations situations and period when to observe safety	• Lecture • Discussion • Incomplete worksheet • Power point presentation • Video presentation • Role playing	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Identify appropriate tools	• Lecture	• Written	**2 hrs**
		• materials and outfits to be used	• Discussion • Incomplete worksheet	• examination • Interview	

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
			• Power point presentation • Video presentation	• Oral questioning • Demonstration	
		• Prepare tools, materials and outfits for the farm operation	• Lecture • Discussion • Power point presentation • Video presentation • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**2 hrs**
	1.2 Apply appropriate safety measures	• Enumerate uses and functions of tools and materials	• Discussion • Power point presentation • Video presentation • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**(Total -11 hrs.)** **1 hr**
		• Explain procedures of wearing personal protective equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Discuss topics on effectivity, shelf life and expirations of materials to be used.	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Identify the emergency procedures	• Discussion • Power point presentation	• Written examination • Interview	**2 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
			• Video presentation • Incomplete worksheet	• Oral questioning •	
		• Identify hazards in a farm workplace	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	**2 hrs**
		• Use tools and materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**2 hrs**
		• Wear personal protective equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**0.5 hr**
		• Prepare report on hazards in the workplace	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Report on hazards in the workplace	• Discussion	• Written examination	**0.5 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
			• Power point presentation • Video presentation • Incomplete worksheet • Role playing	• Interview • Oral questioning • Demonstration	
	1.3 Safekeep/ dispose of tools, materials and outfit	• Explain cleaning and storing procedures of the used tools and outfit	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	**(Total – 6 hrs) 1 hr**
		• State labelling and storing	• Discussion	• Written	**1 hr**
		• procedures for unused materials	• Power point presentation • Video presentation • Incomplete worksheet	• examination • Interview • Oral questioning	
		• Explain proper wastes disposal	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning	**1 hr**
		• Clean and store used tools and outfit	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
			• Incomplete worksheet • Demonstration • Hands-on	• Demonstration	
		• Label and store unused materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Dispose waste materials	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
2.Use farm tools	2.1 Select and use farm tools	• Identify farm tools	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**(Total -6 hrs)** **1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
		• Describe faults and defective tools	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Discuss using of tools and equipment relating to manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Check farm tools for faults and defects	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Use tools and equipment relating to manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**2 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
	2.2 Select and operate farm equipment	• Identify farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**(Total -19 hrs)** **1 hr**
		• Explain importance of reading manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Discuss pre-operation check and its importance	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Identify different types of faults in farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Enumerate reporting procedures	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Role playing	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
		• Enumerate procedures in using farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Discuss safety procedures for farm operation	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Read manufacturer's manual	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Conduct pre-operation check-up	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Report identified faults	• Discussion • Power point presentation • Video presentation	• Written examination • Interview • Oral questioning	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
			• Incomplete worksheet • Demonstration • Hands-on	• Demonstration	
		• Operate farm equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on • Field visit	• Written examination • Interview • Oral questioning • Demonstration	**8 hrs**
		• Follow safety procedures	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
	2.3Perform preventive maintenance	• Enumerate cleaning procedures for tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	**(Total -7 hrs)** **1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
		• Discuss significance of routine check-up and maintenance	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
		• Explain procedures in storing tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet	• Written examination • Interview • Oral questioning •	**1 hr**
		• Clean tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**2 hrs**
		• Perform routine check –up and maintenance	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
		• Store tools and equipment	• Discussion • Power point presentation • Video presentation • Incomplete worksheet • Demonstration • Hands-on	• Written examination • Interview • Oral questioning • Demonstration	**1 hr**
3.Perform estimation and basic calculation	3.1Perform estimation	• Identify job requirements and work task/activity	• Lecture • Discussion	• Written exam • Oral questioning	**(Total -8 hrs)** **1 hr**
		• Identify materials and resources of job requirements	• Lecture • Discussion	• Written exam • Oral questioning	**1 hr**
		• Estimate time to complete work task/activity	• Lecture • Discussion • Demonstration • Video presentation	• Written exam • Oral questioning	**2 hrs**
		• Estimate quantities of materials and resources	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning	**2 hrs**
		• Prepare and submit bill of materials	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning • Demonstration	**2 hrs**
	3.2 Perform basic workplace calculation	• Describe different types of calculation	• Lecture • Discussion	• Written exam • Oral questioning	**(Total -8 hrs)** **1 hr**
		• Discuss different methods of calculation	• Lecture • Discussion	• Written exam • Oral questioning	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Method	Nominal Duration
		• Describe system and unit of measurement	• Lecture • Discussion	• Written exam • Oral questioning	**2 hrs**
		• Compute quantity of feeds, amount of fertilizer and amount of medicines using methods of calculation, system of measurement and units of measurement	• Lecture • Discussion • Demonstration	• Written exam • Oral questioning	**4 hrs**

CORE COMPETENCIES
511 HRS

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
1. Establish sugarcane nursery	1.1 Select nursery site	• Discuss topography • Identify nursery site requirements • Explain site inspection procedures • Compute area • Enumerate the parts of the inspection report • Measure area using staking method • Conduct site inspection • Prepare inspection report	• Lecture Discussion • PowerPoint presentation • Video presentation • Field visit • Incomplete worksheet • Actual Demonstration	• Written Exam • Oral interview • Demonstration	**(Total-16 hrs)** **9 hrs**
		• Explain the importance of soil sampling • Discuss the proper timing in collecting soil samples • List the steps in their proper order involved in collecting soil samples • Explain the proper handling of soil samples	• Lecture Discussion • PowerPoint presentation • Field visit • Actual Demonstration	• Written Exam • Oral interview • Demonstration	**2 hrs**

		• Discuss soil nutrients • Collect soil samples • Pack and label soil samples • Transport soil samples to the laboratory			
		• State the importance of securing the nursery • Enumerate and discuss the procedures in securing nursery • Identify materials in securing nursery site • Compute costs of securing nursery • Prepare securing materials • Prepare bill of materials • Secure nursery site	• Lecture Discussion • PowerPoint presentation • Field visit • Actual Demonstration	• Written Exam • Oral interview • Demonstration	**5hrs**
	1.2 Prepare nursery tools and farm implements	• Identify the tools/ implements and their functions • Select tools and implements	• Lecture Discussion • PowerPoint presentation • Field visit Actual • Demonstration • Actual Demonstration	• Oral interview • Demonstration • Written exam	**Total -24 hrs) 8 hrs**

		• State the importance of preoperative checking of tools and farm implements • Enumerate procedure for preoperative checking • Discuss GAP standards on basic preoperative checking of tools & farm implements • Discuss OSH standards • Check and calibrate tools and equipment • Prepare checklist report • Wear PPEs	• Lecture Discussion • PowerPoint presentation • Actual Demonstration	• Oral interview • Demonstration • Written exam	**6 hrs**
		• Enumerate procedures in determining worn out and corroded tools • Describe worn out and corroded tools • Discuss segregation and treatment procedures	• Lecture Discussion • PowerPoint presentation • Actual Demonstration	• Actual demonstration • Written exam • Oral interview	**10 hrs**

		• Compute cost estimate for treatment and maintenance of worn out and corroded tools • Discuss waste management • Describe OSHS relating to risk and hazard in segregating and treating worn out and corroded tools • Explain maintenance plan • Segregate worn out and corroded tools • Perform preventive maintenance/minor repairs/trouble shooting • Prepare inspection report and recommendation			
	1.3 Secure planting materials	• Discuss the importance of good planting materials • Identify kinds of planting materials • Enumerate different high yielding varieties and their characteristics and	• Lecture Discussion • PowerPoint presentation • Actual Demonstration • Field Visit • Demonstration • Role Playing	• Oral questioning • Demonstration • Written exam	**(Total-25 hrs) 4hrs**

		adaptability in the districts • Source information of adaptable varieties from research stations and print materials	• Video Presentation • Hands- on		
		• Discuss protocol in obtaining planting materials • Compute quantity and cost of planting materials • Prepare simple letter of request • Estimate quantity and costing planting materials to be obtained • Obtain planting materials • Fill-up client satisfaction report	• Lecture • Discussion • Field Visit • Demonstration • Role playing	• Oral questioning • Written exam • Demonstration	**8 hrs**
		• List and discuss the guidelines for the proper handling of planting materials • Discuss OSH for handling planting materials • Handle planting materials from receipt to nursery site	• Video presentation • Discussion • Lecture • Demonstration • Hands-on	• Oral interview Actual • Demonstration • Written exam	**4 hrs**

		• Identify quality parameters of planting materials • Describe a good quality planting materials • Discuss OSH • Explain GAP • Select good quality planting materials	• Video presentation • Discussion • Lecture • Actual demonstration	• Oral interview • Actual demonstration • Written exam	**5.5 hrs**
		• Discuss protocol on treatment of planting materials • Compute costs and concentration of treating materials • Discuss OSH in handling chemicals • Measure and prepare treating solution • Handle chemicals • Treat planting materials	• Video presentation • Discussion • Lecture • Actual demonstration • Hands-on	• Oral interview • Actual demonstration • Written exam	**3.5 hrs**
	1..4 Set-up nursery	• Interpret lay-out plan • Explain procedure on lay-outing • Compute area • Perform lay-outing activities • Measure area	• Video presentation • Lecture Discussion • Actual demonstration • Field visit • Power Point Presentation • Demonstration	• Oral interview • Actual demonstration • Written exam	**(Total- 26 hrs) 7.5 hrs**

			• Incomplete Worksheet • Problem Solving • Actual Survey • Role Playing		
		• Discuss proper land preparation based on GAP • Compute cost of land preparation and liming • Compare manual and mechanical land preparation • Apply required materials (lime, organic amendments) based on soil analysis • Prepare land	• Video presentation • Discussion • Lecture • Actual demonstration	• Video presentation • Discussion • Lecture • Actual demonstration	**5.5 hrs**
		• Discuss recommended practices for planting (methods, distance, density) • Estimate costs of fertilizer requirement • Demonstrate the basal application of fertilizer • Explain how the farm plan affects planting	• Lecture • Power point presentation • Demonstration • Incomplete worksheet	• Oral interview • Demonstration • Written	**8 hrs**

		• Demonstrate proper planting of cane points using different recommended planting practices. • Apply properly basal fertilizer			
		• Determine work requirement needing mechanized services • Compute cost of farm mechanization services • Discus clean air act • Canvass or survey mechanized service providers and their costs • Source mechanized farm services	• Lecture • Problem Solving • Actual Survey • Role playing	• Written Exam • Oral interview • Demonstration	**5 hrs**
	1.5 Maintain nursery	• Compute percentage of missing hills to determine need for replanting • Compute quantity of needed planting materials for replanting purposes • Compute/estimate cost of irrigation for replanted materials	• Lecture Discussion • Problem Sets • Incomplete Worksheet • Field visit • PowerPoint presentation • Demonstration • Field Work • Film Viewing	• Written Exam • Oral interview • Demonstration • Identification	**(Total- 45 hrs) 11hrs**

		• Perform replanting of missing hills • Perform irrigation			
		• Discuss procedures of different cultural practices • Compute fertilizer requirements • Calculate duration and frequency of irrigation • Compute cost of nursery maintenance • Explain environmental laws (air, water, & soil) • Perform cultural practices for nursery maintenance • Estimate cost of nursery maintenance	• Lecture • Discussion Problem Sets • Incomplete Worksheet • demonstration • Field visit • PowerPoint presentation	• Written Exam • Oral interview • Demonstration	**16 hrs**
		• Identify pests and diseases of sugarcane • Compute the level of the pests present in the field by their damage and level of infection and infestation	• Lecture • Demonstration • Field Work • Power Point Presentation	• Written Exam • Oral interview • Demonstration (Live & preserve Specimen) • Identification	**6.5 hrs**

		• Conduct damage assessment and monitoring			
		• Identify proper control measures for specific pests and diseases • Compute quantity of chemicals and bio control agents based on area and level of infestation • Compute for the cost of the chemicals and bio control agents • Discuss disposal of used containers and storage of pesticides-0 • Explain GAP in controlling pests and diseases • Perform control measures • Wear PPEs • Dispose wastes • Estimate chemical dosages	• Lecture • Power Point Presentation • Demonstration • Field Work • Incomplete worksheet	• Written Exam • Demonstration • Oral questioning	**8.5 hrs**
		• Identify OSHS relating to nursery maintenance	• Lecture • Discussion Demonstration • Film viewing	• Written Exam • Problem Sets • Demonstration • Oral questioning	**3 hrs**

		• Explain each safety precautionary procedure • Practice safety precautionary measures relating to nursery maintenance			
		• Identify tools and their uses • Enumerate the steps of harvesting planting materials according to GAP • Compute for the volume of planting material to be produced • Fill up production data form • Prepare harvesting tools.	• Lecture • Field Demonstration • Power Point Presentation • Video Clip/ Presentation • Farm visit	• Written Exam • Demonstration • Problem Sets • Incomplete Worksheet	**(Total -21.5 hrs)** **15 hrs**
		• Determine the age of canes from planting to cut back • Compute the average number of cane points from the cane to be cut back • Check the appearance of the canes for cut back visually	• Lecture Field • Demonstration • Video Clip • Power Point Presentation	• Demonstration • Oral questioning • Written exam	**5.5 hrs**

		• Estimate the average number of cane points per ha			
		• Enumerate the characteristics of a good planting material • Perform the appropriate cutting method	• Farm visit • Demonstration • Lecture • Video presentation	• Demonstration • Oral questioning • Written exam	**1 hr**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
2. Plant sugarcane	2.1 Select planting materials	• Explain site inspection procedures and techniques • Discuss agro-climatic requirements of sugarcane, such as topography, soil type and soil texture • Describe different techniques for measuring area • Measure site area using staking methods • Conduct site inspections • Prepare inspection report • Calibrate and use of GPS	• Lecture • Discussion • Power point presentation • Video presentation • Field visit • Demonstration • Incomplete worksheet • Hands-on	• Written exam • Interview • Demonstration • Oral questioning	**(Total 35.5 hrs)** **16 hrs**
		• Discuss soil sampling procedures and techniques • Explain the importance of proper soil sampling • Discuss record keeping procedures • Discuss OSHS practices in soil sampling • collect soil samples • pack and label soil samples • bring soil samples to the laboratory • Explain site selection procedures • Discuss area suitability • Describe procedures in accomplishing checklist for areas suitability	• Lecture • Discussion • PowerPoint presentation • Actual Demonstration	• Written Exam • Interview • Demonstration • Oral Questioning	**6 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Explain the site selection procedures • Discuss area suitability • Describe procedures in accomplishing checklist for areas suitability • Identify limitations of the area • Select site • Accomplish checklist	• Lecture Discussion • PowerPoint presentation • Field visit • hands-on • Survey • Role Playing	• Written Exam • Interview • Demonstration • Oral Questioning	**5.5hrs**
		• Discuss procedures in securing selected sites • Explain the importance of securing selected sites • Compute for the cost of securing farm sites • State reporting procedures • Estimate cost of securing farm sites • Report the estimated cost Secure selected sites	• Lecture • Discussion • PowerPoint presentation • Field visit • Hands-on • Video Presentation	• Written Exam • Interview • Demonstration • Oral Questioning	**6 hrs**
		• Discuss the limiting factors for crop production • Farm Survey	• Lecture Discussion • PowerPoint presentation • Demonstration • Field visit hands on • Video Presentation	• Written Exam • Interview • Demonstration • Oral Questioning	**2 hrs.**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	2.2 Prepare materials, tools, farm implements and equipment	• Identify the tools, farm implements and equipment including their functions • Select tools, farm implements and equipment • State the importance of pre-operative checking of tools, farm implements and equipment	• Lecture Discussion • PowerPoint presentation • Actual Demonstration	• Written Exam Interview • Demonstration • Oral Questioning	**(Total - 11.5 hrs) 2hr**
		• State the importance of pre-operative checking of tools, farm implements and equipment • Enumerate procedure for pre-operative checking • Discuss OSHS • Practice OSHS • Check tools, farm implements and equipment and calibrate weighing scale • Prepare inspection report	• Lecture Discussion • PowerPoint presentation • Demonstration	• Written Exam • Interview • Demonstration • Oral Questioning	**3hrs.**
		• Identify worn out and corroded tools and farm implements • Explain proper disposal of worn out tools and farm implements • Discuss inventory procedures • Explain treatment procedures including OSHS • Segregate worn out and corroded tools and farm implements • Wear PPE • Treat corroded tools and farm implements • Prepare inventory reports	• Lecture • Discussion • PowerPoint presentation • Demonstration	• Written Exam • Interview • Demonstration • Oral Questioning	**6.5 hrs.**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	2.3 Acquire planting materials	• Identify planting materials according to variety and kind • Discuss importance of varietal characterization • Relate variety and agro climatic conditions • Determine planting materials	• Lecture • Discussion • PowerPoint presentation • Field visit • Demonstration	• Written Exam • Interview • Demonstration • Oral Questioning	**(Total - 18.5 hrs) 5hrs**
		• Identify reliable sources of planting materials • Explain procedures of obtaining planting materials • Compute for quantity and cost of planting materials • Obtain planting materials	• Lecture • Discussion • PowerPoint presentation • Field visit • Survey • Role playing	• Written Exam • Interview • Demonstration • Oral Questioning	**4 hrs**
		• Discuss different handling techniques • Explain post-harvest deterioration • Perform proper handling procedures	• Lecture • Discussion • PowerPoint presentation • Field visit	• Written Exam • Interview • Demonstration • Oral Questioning	**1.5 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Identify and discuss quality planting materials • Explain selection procedures of quality planting materials • Select quality planting materials • Explain the benefits of treating planting materials • Discuss procedures of treating planting materials	• Lecture • Discussion • PowerPoint presentation • Field visit hands-on	• Written Exam • Interview • Demonstration • Oral Questioning	**3hrs**
		• Elaborate OSHS relating to treating planting materials • Discuss proper disposal of treatment materials • Treat planting materials • Wear PPE • Dispose treatment materials	• Lecture • Discussion • PowerPoint presentation • Hands-on	• Written Exam • Interview • Demonstration • Oral Questioning	**5 hrs**
	2.4 Prepare land for planting	• Discuss advantages of site improvement • Discuss different types of site improvements • Compute for cost of site improvement • Implement site improvement program • Prepare site improvement program report	• Lecture • Discussion • PowerPoint presentation • Field visit hands-on	• Written Exam • Interview • Demonstration • Oral Questioning	**(Total - 43;.5 hrs) 13 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Describe the specification of farm machineries and implements including uses and functions • Compute for costing of different land preparation operations per hectare • Explain procedures in sourcing machinery services • Source farm machinery and implements services	• Lecture • Discussion • PowerPoint presentation	• Written Exam • Interview • Demonstration • Oral Questioning	**7 hrs**
		• Discuss the procedures of debris management before land preparation • Explain environmental rules and regulations and OSHS • Demonstrate debris management	• Lecture • Discussion • PowerPoint presentation • Demonstration field visit	• Written Exam • Interview • Demonstration • Oral Questioning	**6hrs.**
		• Discuss procedures in land preparations • Explain the monitoring procedures • Describe satisfaction report • Carry out land preparation operations • Prepare monitoring and satisfaction report	• Demonstration • Lecture • discussion • Video presentation • Field visit	• Written Exam • Interview • Demonstration • Oral Questioning	**6 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss the importance of liming and its proper application including OSHS • Enumerate different kinds of liming materials • Compute for the amount and costing of liming materials • Apply liming materials • Wear PPEs	• Lecture Discussion • PowerPoint presentation • Demonstration field visit	• Written Exam • Interview • Demonstration • Oral Questioning	**7.5 hr**
		• Identify the different types of drainage system and their importance • Explain drainage plan • Enumerate safety precautions • Discuss procedures in handling construction and maintenance of drainage canal • Handle construction and maintenance of drainage canal	• Lecture Discussion • PowerPoint presentation • Demonstration field visit	• Written Exam • Interview • Demonstration • Oral Questioning	**4 hrs.**
	2.5 Conduct planting operation	• Explain fertilizer application technique including safety precautions • Discuss fertilizer requirement of sugarcane	• Lecture discussion • PowerPoint presentation • Demonstration • Field visit • Hands on	• Written exam • Interview • Demonstration • Oral questioning	**(Total-18.5) 5 hrs**

		• Compute for rate and cost of fertilizer • Describe program of fertilizer application • Apply fertilizer	• Video presentation		
		• Explain farm plan • Discuss the different planting techniques including OSHS • Compute for rate of planting and quantity of planting materials • Demonstrate planting of cane points	• Lecture Discussion • PowerPoint presentation • Demonstration • Field visit • Hands on	• Written Exam • Interview • Demonstration • Oral Questioning	**4.5 hrs**
		• Discuss the importance mechanized planting and fertilization • Identify the types of farm machineries and implements • Explain the monitoring procedures • Compute for costing mechanized planting and fertilization • Explain farm plan, operator's manual and OSHS practices • Monitor mechanized planting and fertilization activities • Wear PPEs	• Lecture Discussion • PowerPoint presentation • Demonstration • Field visit • Hands on	• Written Exam • Interview • Demonstration • Oral Questioning	**9hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
3.Care for and maintain sugarcane plant and ratoon crops	3.1 Perform cultivation	• Identify different Land preparation machineries • List service providers and suppliers • Determine Land preparation machinery capacity, efficiency and cost • Demonstrate negotiation with service provider and supplier	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**(Total -23 hrs)** **4 hrs**
		• Discuss cultivation practices • Determine different cultivation tools and implements • Enumerate safety precautions in preparing cultivation tools and implements • List cultivation activities and schedules • Estimate the number of tools and implements needed • Operate cultivation tools and implements	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam & Interview • Demonstration with Oral Questioning	**8 hrs**

		• Describe different cultivation procedures and schedule • Relate soil types to cultivation • Measure the size of the area that will be cultivated • Estimate the cost of cultivation • Demonstrate cultivation practices	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam & Interview • Demonstration with Oral Questioning	8 hrs
		• Identify Personal Protective Equipment for cultivation • Explain the meaning of safety signage • Demonstrate proper wearing of PPE	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**3 hrs**
	3.2. Apply pest management strategies	• Explain pest identification techniques • Identify major pests and diseases • Describe signs and symptoms of major diseases, and mode of spread	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**(Total -44 hrs)** **5 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss assessment of infestation/infection, damage • Pest monitoring procedures • Illustrate major pests • Assess infestation/infection/crop damage due to pest • Prepare pest recording and monitoring report	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam & Interview • Demonstration with Oral Questioning	7 hrs
		• Identify different tools and equipment including their uses and functions • Discuss different pests management strategies • Explain different pesticide labels, and directions • Prepare the materials, tools and equipment for pesticide application • Estimate the number of tool/equipment to be used • Demonstrate the calibration of sprayer • Operate sprayers	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**8 hrs**

		• Discuss the types and procedures of pests management • Compute the rates of pesticides to be applied • Employ pesticide application • Assess infestation/disease incidence of selected fields • Prepare report on infestation/disease incidence of selected fields • Discuss GAP and OSHS • Explain pest resistance management • Explain pesticide and pesticide residue management • Describe proper handling and disposal of pesticide.	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam & Interview • Demonstration with Oral Questioning • Written Exam • Oral Questioning • Demonstration	**16 hrs**
		• Discuss GAP and OSHS • Explain pest resistance management • Explain pesticide and pesticide residue management • Describe proper handling and disposal of pesticide • Demonstrate storage, handling, and disposal of pesticides and used containers • Practice personal hygiene related to pesticide application	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit	• Written Exam • Oral Questioning • Demonstration	8 hrs

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.3 Apply fertilizer	• Explain the importance of fertilizer to sugarcane • Explain fertilizer recommendation and computation • Estimate fertilizer application rate	• Lecture • Discussion • Power point Presentation • Video Presentation • hands on	• Written Exam or Interview • Demonstration with Oral Questioning	**(Total -28 hrs)** **3 hrs**
		• Identify the different types and grades of fertilizers • Discuss procedures in selecting fertilizer • Compute for the cost of fertilizers • Select the cheapest fertilizer combination that will satisfy the recommended rate • Record fertilizer expenditures	• Lecture • Discussion • Power point Presentation • Video Presentation • Visit supplier	• Written Exam & Interview • Demonstration with Oral Questioning	**5 hrs**
		• Identify different tools and equipment used in fertilizer application • Discuss preparation of tool and equipment including OSHS • Demonstrate pre-operation procedure for Farm Animal-Drawn applicator • Estimate the number of tools and equipment needed for fertilizer application • Prepare tools and other equipment	• Lecture • Discussion • Power point Presentation • Video Presentation Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	4 hrs

		• Discuss different methods of fertilizer application • Compare manual and mechanical fertilizer application • Operate animal-drawn fertilizer applicator • Demonstrate manual fertilizer application • Demonstrate operation of a fertigation system • Estimate the cost of fertilizer application • Record fertilizer application cost • Monitor fertilizer application	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit hands on demonstration	• Written Exam or Interview • Demonstration with Oral Questioning	**12 hrs**
		• Identify Personal Protective Equipment for fertilizer application • Discuss the function of different PPEs for fertilizer application • Explain OSHS and GAP related to fertilizer application • Demonstrate proper wearing of PPE	• Lecture • Discussion • PowerPoint Presentation • Video Presentation	• Written Exam or Interview • Demonstration with Oral Questioning	4 hrs

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.4 Carry out irrigation and drainage activities	• Explain the importance of soil moisture to the growth and development of sugarcane • Discuss different soil moisture determination procedures • Discuss soil sample collection techniques • Relate soil moisture and crop appearance to irrigation and drainage requirements • Demonstrate the manual method of determining soil moisture • Use soil moisture tester	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Demonstration	• Written Exam or Interview • Demonstration with Oral Questioning	**(Total -31 hrs)** **6 hrs**
		• Discuss different types of irrigation • Relate soil moisture to frequency and duration of irrigation based on soil type and prevailing conditions • Illustrate a layout of an irrigation system • Layout an irrigation system • Demonstrate proper operation of an irrigation system • Estimate cost of irrigation • Prepare schedules for irrigation	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Demonstration • hands on	• Written Exam & Interview • Demonstration with Oral Questioning	9 hrs

		• Explain proper maintenance of irrigation facilities • Demonstrate maintenance of irrigation facilities • Estimate the cost of irrigation system, repair and maintenance • Record the cost of irrigation system, repair and maintenance	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Demonstration • hands on	• Written Exam or Interview • Demonstration with Oral Questioning	**7hrs**
		• Explain the importance of drainage in sugarcane production • Discuss the different types of drainage system • Relate soil moisture and topography to the construction of drainage system • Describe the procedures in drainage construction and maintenance • Handle construction and maintenance of drainage canal • Estimate the cost of drainage system construction, repair and maintenance • Record the cost of drainage system construction and maintenance • Prepare schedules for drainage	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Demonstration • hands on	• Written Exam or Interview • Demonstration with Oral Questioning	9 hrs

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
	3.5 Manage ratoon	• Discuss the different stubble shaving methods • Demonstrate harvesting and stubble shaving methods • Estimate the cost of different stubble shaving methods • Record the cost of different stubble shaving methods	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**(Total -19 hrs)** **5 hrs**
		• Explain trash farming in ratoon • Describe different methods of trash farming • Discuss the benefits of trash incorporation • Identify the advantages and disadvantages of using decomposer • Estimate trash farming cost • Record trash farming cost • Prepare the field for trash farming	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit	• Written Exam or Interview • Demonstration with Oral Questioning	**7 hrs**

		• Explain the importance of ratoon replanting • Discuss the types of replanting materials, methods and procedures • Demonstrate proper replanting methods and procedures • Estimate replanting cost • Record replanting cost	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit	• Written Exam & Interview • Demonstration with Oral Questioning	**7 hrs**
4.Carry – out Harvest and Post-harvest Operations for Plant and Ratoon Crops	4.1 Perform pre-harvest operations	• Discuss physiological and morphological characteristics of a mature sugarcane plant • Examine the morphological characteristics of a mature sugarcane plant	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit	• Written Exam • Oral Questioning • Demonstration	**(Total -44 hrs)** **5 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Describe procedures in gathering stalk samples • Discuss the use and function of brix refractometer • Explain the use of juice extractor • Relate Brix reading to sugar content • Demonstrate proper juice extraction and determination of brix by using hand refractometer	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Hands - on	• Written Exam • Oral Questioning • Demonstration • interview	**8 hrs**
		• Calculate quantity of harvest relating to capacity of harvesting machinery • Demonstrate proper maintenance and repair of harvesting tools • Estimate cost of acquisition, rent, repair and maintenance of tools, materials and machineries • Estimate quantity of harvest relating to capacity of harvesting machinery	• Lecture • Discussion • Power point Presentation • Video Presentation • Site visit • Demonstration	• Written Exam • Oral Questioning • Demonstration • Interview	**3 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• List service providers and suppliers • Describe mechanical harvesting • Determine Harvesting machinery capacity, efficiency and cost • Demonstrate negotiation with service provider and supplier • Prepare a canvass report • Estimate harvesting capacity • Conduct crop estimation	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • Role playing	• Written Exam • Oral Questioning • Demonstration	**7 hrs**
		• Identify cane cutter service provider • Explain the terms and conditions of a service contract • Prepare a service contract • Write a cost estimation for manual harvesting • Write a canvass report • Negotiate with cane cutter service provider	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • Role playing	• Written Exam • Oral Questioning • Demonstration	**6 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss systematic farm record keeping on harvest of crop • Explain contents of mill reports • Prepare a systematic farm record on harvest of crop • Secure and accomplish mill/trip ticket • Check records on harvesting of crops	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • Hands-on	• Written Exam • Oral Questioning • Demonstration • Interview	**10 hrs**
		• Discuss monitoring procedures skills • Monitor harvesting operation	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Hands-on	• Written Exam • Oral Questioning • Demonstration • Interview	**5hrs**
	4.2 Perform harvesting activity	• Explain cultural practices for harvesting sugarcane using suitable tools based on GAP and OSHS • Demonstrate proper harvesting operations	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Hands-on	• Written Exam • Oral Questioning • Demonstration • Interview	**(Total -13 hrs)** **3hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss monitoring procedures • Skills monitor harvesting operation	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • Hands-on	• Written Exam • Oral Questioning • Demonstration • Interview	**5hrs**
		• Discuss importance of proper cutting technique • Explain cutting technique • Employ cutting technique during harvesting	• Lecture Discussion • Video Presentation • Field visit • Demonstration • Hands-on	• interview • written examination • demonstration • oral questioning	**5 hrs**
	4.3 Perform post - harvest activities	• Explain post-harvest handling principles and practices • Demonstrate proper post-harvest handling practices	• Lecture • Discussion • PowerPoint Presentation • Video Presentation • Field Visit • hands -on	• Written Exam • Oral Questioning • Demonstration • Interview	**(Total -24 hrs)** **5 hrs**
		• Discuss scheduling of farm harvesting activities based on number and duration of trips • Monitor scheduling of farm harvesting activities based on number and duration of trips	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • Role Playing	• Written Exam • Oral Questioning • Demonstration • Interview	**5 hrs**

Unit of Competency	Learning Outcome	Learning Activities	Methodology	Assessment Approach	Nominal Duration
		• Discuss systematic farm record keeping on harvest of crop • Explain contents of mill reports • Prepare a systematic farm record on harvest of crop • Compute farm productivity based on mill reports • Secure and accomplish mill/trip ticket	• Lecture • Discussion • Power point Presentation • Video Presentation • Field Visit • hands -on	• Written Exam • Oral Questioning • Demonstration • interview	**11 hrs**
		• Identify Personal Protective Equipment for post harvesting operation • Discuss the function of different PPEs for post harvesting operation • Demonstrate proper wearing of PPE	• Lecture • Discussion • Power point Presentation • Video Presentation • Hands-on	• Written Exam • Oral Questioning • Demonstration • Interview	**3 hrs**

3.2 TRAINING DELIVERY

1. The delivery of training shall adhere to the design of the curriculum. Delivery shall be guided by the principles of competency-based TVET.

    a. Course design is based on competency standards set by the industry or recognized industry sector; **(Learning system is driven by competencies written to industry standards)**

    b. Training delivery is learner-centered and should accommodate individualized and self-paced learning strategies;

    c. Training can be done on an actual workplace setting, simulation of a workplace and/or through adoption of modern technology.

    d. Assessment is based in the collection of evidence of the performance of work to the industry required standards;

    e. Assessment of competency takes the trainee's knowledge and attitude into account but requires evidence of actual performance of the competency as the primary source of evidence.

    f. Training program allows for recognition of prior learning (RPL) or current competencies;

    g. Training completion is based on satisfactory performance of all specified competencies.

2. The competency-based TVET system recognizes various types of delivery modes, both on-and off-the-job as long as the learning is driven by the competency standards specified by the industry. The following training modalities and their variations/components may be adopted singly or in combination with other modalities when designing and delivering training programs:

    School/Institution- Based:

    - **Dual Training System (DTS)/Dualized Training Program (DTP)** which contain both in-school and in-industry training or fieldwork components. Details can be referred to the Implementing Rules and Regulations of the DTS Law and the TESDA Guidelines on the DTP;

    - **Supervised Industry Training (SIT) or on-the-job training (OJT)** is an approach in training designed to enhance the knowledge and skills of the trainee through actual experience in the workplace to acquire specific

competencies as prescribed in the training regulations. It is imperative that the deployment of trainees in the workplace is adhered to training programs agreed by the institution and enterprise and status and progress of trainees are closely monitored by the training institutions to prevent opportunity for work exploitation. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

There would be no across-the-board SIT or OJT for all programs covered by the TRs. Whether SIT/OJT along a particular qualification will be mandatory or not shall be defined in the TR to be promulgated. A curriculum mix with dominant practicum component is preferred.

The SIT or OJT component **may** be considered optional for the trainees who have had previous relevant work experience in the qualification for a period of time considered as sufficient by the qualified trainer concerned as indicated in the Training regulations.

- **Project-based instruction** is an authentic instructional model or strategy in which students plan, implement and evaluate projects that have real world applications.

Enterprise-Based:

- **Formal Apprenticeship** – Training within employment involving a contract between an apprentice and an enterprise on an approved apprenticeable occupation.

- **Enterprise-based Training**- where training is implemented within the company in accordance with the requirements of the specific company. Specific guidelines on this mode shall be issued by the TESDA Secretariat.

Community-Based – Community-Based – short term programs conducted by non-government organizations (NGOs), LGUs, training centers and other TVET providers which are intended to address the specific needs of a community. Such programs can be conducted in informal settings such as barangay hall, basketball courts, etc. These programs can also be mobile training program (MTP).

Peer teaching/mentoring - is a training modality wherein fast learners are given the opportunity to assist the slow learners.

3.3 TRAINEE ENTRY REQUIREMENTS

Trainees or students who would like to enroll in this course should possess the following requirements:

- Able to read and write

- Able to communicate, both orally and in writing
- Able to perform simple computations

3.4 TOOLS AND EQUIPMENT

SUGARCANE PRODUCTION NC II

Recommended list of tools, equipment and materials for the training of 25 trainees for Sugarcane Production NC II.

A. School equipment, tools and materials

1 unit Digital light projection
1 unit System unit (computer)
1 unit White board
1 set White board marker and eraser
1 unit Audio system
1 unit Internet connection
References

- Books
- Charts
- Slides
- Manuals
- Codes and regulations

B. Farm tools, equipment and materials

FULL QUALIFICATION

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 pcs	40 Meter steel tape	1 unit	Camera with memory card	250 pcs	Bamboo sticks
5 pcs	Calculators	1 unit	Mobile phone	20 pcs	Bamboo poles
5 pcs	Tally Counter	5 units	GPS	50 pcs	Bamboo stake
5 pcs	Measuring Tape	1 unit	Water Pump	1 set	First Aid Kit
5 pcs	Digging tools	1 unit	Irrigation system and facilities	5 pcs	Sacks
5 pcs	Soil Auger	5 units	Knapsack Sprayer	10 pcs	Canvas/used sacks
10 pcs	Spade	1 unit	Standing manual rain gauge	5 pcs	1kg Capacity Plastic Bags
5 pcs	Shovel	5 units	10 Kg. capacity weighing scales	5 pcs	Trash bags
5 pcs	Trash Rake	1 unit	Bull Cart	45 pcs	Used sacks

		5 units	Carabao/Cattle/ Farm Animal	10 pcs	Pail
5 pcs	Hammer	5 units	Carabao Plow	10 pcs	Plastic Pails
5 pcs	Saw	2 units	Carabao Harrower	6 rolls	Plastic twine
5 pcs	Crow bar	5 units	Cattle or carabao drawn and implements	5 pcs	Container for fertilizer application
5 pcs	Cane cutting tools	1 unit	Hauling Vehicle	30 pcs	Labels/Tags
10 pcs	Cane knives	1 unit	Service vehicle	5 pcs	Pens
5 pcs	Cutting Tools	5 units	Weighing scale	5 pcs	Marking Pens
5 pcs	“Tama”	5 units	Fertilizer drill	5 pcs	Clipboard
5 pcs	Bolo/Scythe	1 unit	Mechanical stubble shaver	25 pcs	Pencil/ballpen
5 pcs	Whetstone	1 unit	Steel Cabinet	25 pcs	Record book
5 pcs	Bastard File	1 unit	Mega Phone	1 box	Rubber bond
10 pcs	Mixing Tools			200 pcs	Replanting materials
5 pcs	Sharpening Stones			60 sacks	Planting materials of different varieties
5 pcs	Soaking Container			4000 cane points	Planting Materials
5 pcs	Soaking Tank			20 pcs	Bagging Materials
10 pcs	Stirrer			25 pcs	Plastic Bags
1 pc	Drum			5 pcs	Mixing Container
10 pcs	Hoe			5 pcs	Carton Boxes
5 pcs	Rake			5 pcs	Tarpaulin
10pcs	Improvised rakes for farming			25 pcs	Sand paper
5 units	Moisture Tester			1 roll	Plastic twine
5 pcs	Fertilizer application tools			15 pcs	Stalk Samples
5 pcs	Steel Brush			1 liter	Used oil
5 pcs	Wooden Stirrer			10 liters	Fuel
10 pcs	Measuring container			1 liter	Lubricants
5 pcs	Measuring Spoon			5 bags	Treatment materials
5 pcs	Filtering materials			5 bags of 40kg/bag	Agricultural Lime

2 units	Hand Refractometer			5 bags of 40kg/bag	Soil Amendments
2 units	Juice Extractor				NPK Fertilizer
PPE				For 0.1 ha	Chemicals pesticides
25 pcs	Mask/facemask			200 liters	Water
25 pcs	Gloves			5 sets	Bioagent
25 pcs	Long Sleeves			1 liter	Surfactant
25 pcs	Googles			1 liter	Disinfectant (for cutting edges of tools)
25 pcs	Rubber Boots			1 liter	Anti- Rust Chemicals
25 pcs	Hats				
25 pcs	Cover All				
		Training materials			
		5 copies	Leaflets	5 copies	On-site inspection charts
		5 copies	Books/references	5 copies	Presentations
		5 copies	Checklist of tools	5 copies	Location Map
		5 copies	Manufacturer's Manual	25 copies	Checklist form
		5 copies	Manuals	5 copies	List of Sugarcane varieties
		5 copies	Brochures on high yielding varieties of sugarcane	5 copies	List of Reliable Sources of Planting Materials
		5 copies	Various forms (request, customer's satisfaction/ feedback)	5 copies	Guidelines of Quality Planting Materials
		5 copies	Pest and Disease Specimen	5 copies	Site Improvement Program
		5 copies	Module on types of soil	5 copies	Guide on Proper land preparation
		5 copies	Learning modules	5 copies	Proper Application Guide

		5 copies	Picture/Sample of different soil types	5 copies	Securing Materials (Lease Contract)
		5 copies	Charts	5 copies	Drainage Plan
		5 copies	Module on cultivation	25 copies	Farm Records and Mills Reports
		5 copies	Laboratory Manual	5 copies	Mill statements
		3 copies	Handbook on pests and diseases	5 copies	Farm plan and other documents
		5 copies	List of available fertilizers		
		5 sets	Pests Specimens		

COC 1 ESTABLISH SUGARCANE NURSERY

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 pcs	40 Meter steel tape	1 unit	LCD	250 pcs	Bamboo Sticks
5 pcs	Calculator	1 unit	Computer	20 pcs	Bamboo Poles
5 pcs	Tally Counter	1 unit	Audio Visual System	1 set	First Aid Kit
5 pcs	Measuring Tape	1 unit	Camera	5 pcs	Sacks
5 pcs	Digging tools	1 unit	Mobile phone	5 pcs	Canvas
5 pcs	Soil Auger	1 unit	Water Pump	5 pcs	1kg Capacity Plastic Bags
5 pcs	Spade	1 unit	Irrigation system and facilities	5 pcs	Trash bags
5 pcs	Shovel	5 units	Knapsack Sprayer	45 pcs	Used sacks
5 pcs	Trash Rake	1 unit	Standing manual rain gauge	10 pcs	Pail
5 pcs	Hammer	5 units	10 Kg. capacity weighing scales	10 pcs	Plastic Pails
5 pcs	Saw	1 unit	Bull Cart	6 rolls	Plastic twine

5 pcs	Crow bar	3 units	Carabao/Cattle/ Farm Animal	5 pcs	Container for fertilizer application
5 pcs	Cane cutting tools	2 units	Carabao Plow	5 pcs	Labels/Tags
5 pcs	Cane knives	2 units	Carabao Harrower	5 pcs	Pens
5 pcs	Cutting Tools	1 unit	Cattle or carabao drawn and implements	5 pcs	Marking Pens
5 pcs	“Tama”			5 pcs	Clipboard
5 pcs	Scythe			15 pcs	Label materials
5 pcs	Whetstone			5 pcs	Pencil/ballpen
5 pcs	Bastard File			5 pcs	Record book
5 pcs	Sharpening Stones			200 pcs	Replanting materials
5 pcs	Soaking Container			60 sacks	Planting Materials
10 pcs	Stirrer			4000 cane points	Planting Materials
1 pc	Drum			200 pcs	Cane points
25 pcs	Mask			20 pcs	Bagging Materials
25 pcs	Gloves			5 pcs	Carton Boxes
25 pcs	Long Sleeves			5 pcs	Tarpaulin
25 pcs	Googles			1 liter	Used 0il
25 pcs	Boots			10 liters	Fuel
25 pcs	Hats			1 liter	Lubricants
				5 bags of 40kg/bag	Agricultural Lime
				5 bags of 40kg/bag	Soil Amendments
				10 bags	NPK Fertilizer
				For 0.1 ha	Chemicals pesticides
				200 liters	Water
				5 sets	Bioagent
				1 liter	Surfactant
				1 liter	Disinfectant (for cutting edges of tools)

		Training materials			
		5 copies	Various forms (request, customer's satisfaction/ feedback)	5 copies	Leaflets
		5 copies	Pest and Disease Specimen	5 copies	Brochures
		5 copies	Module on types of soil	3 copies	Books/references
		5 copies	Picture/Sample of different soil types	5 copies	Checklist of tools
		5 copies	Charts	5 copies	Manufacturer's Manual
		5 copies	Farm plan	5 copies	Brochures on high yielding varieties of sugarcane

COC 2 PLANT, CARE AND MAINTAIN SUGARCANE AND RATOON CROPS

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 pcs	40-meter steel tape	5 units	GPS	50 pcs	Bamboo stake
5 pcs	Calculators	2 units	Cattle or carabao implements	1 set	First aid kit
5 pcs	Soil Auger	5 units	Cattle or carabao drawn implements	5 pcs	Plastic pails
10 pcs	Spade	1 unit	Vehicle	5 pcs	Canvas/ used sacks
5 pcs	Cutting tools	5 units	Plow	25 pcs	Plastic Bags
10 pcs	Cane knives	5 units	Fertilizer drill	5 pcs	Soaking Tank
		1 unit	Mechanical stubble shaver	5 pcs	Mixing Container

5 pcs	Bolo/ Scythe	5units	Weighing scale	5 pcs	Containers
10pcs	Shovel	1 unit	Irrigation System	25 pcs	Sand paper
5 pcs	Hoe	5 units	Moisture Tester	25 pcs	Labels/Tags
10 pcs	Rake			25	Pencil/ballpen
5 pcs	Fertilizer application tools			60 sacks	Planting materials of different varieties
5 pcs	Steel Brush			1 box	Rubber bond
5 pcs	Sharpening Stone			5 pcs	Record book
5 pcs	Wooden Stirrer			1 liter	Lubricant
10 pcs	Measuring container			1 liter	Pesticides surfactants
10 pcs	Mixing Tools			1 liter	Anti- Rust Chemicals
5 pcs	Measuring Spoon			5 bags of 40kg/ bag	Agricultural lime
5 pcs	Filtering materials			5 bags	Fertilizers
25 pcs	PPEs			5 bags	Treatment materials
	• Long sleeves			25 pcs	Record book
	• Gloves			25 pcs	Ballpen
	• Hat			5 pcs	Pail
	• Face			5 packs	Plastic Bags
	• Masks				
		Training materials			
		5 copies	List of Reliable Sources of Planting Materials	5 copies	Learning modules on planting
		5 copies	Guidelines of Quality Planting Materials	5 copies	On-site inspection charts
		5 copies	Site Improvement Program	5 copies	Manuals

		5 copies	Guide on Proper land preparation	5 copies	References
		5 copies	Proper Application Guide	3 copies	Books
		5 copies	Securing Materials (Lease Contract)	5 copies	Presentations
		5 copies	Drainage Plan	5 copies	Checklist of Tools
		25 copies	Module on cultivation	5 copies	Manufacturer's Manual
		5 copies	Laboratory Manual	5 copies	Leaflets
		3 copies	Handbook on pests and diseases	5 copies	Location Map
		5 copies	List of available fertilizers	25 copies	Checklist form
		5 sets	Pests Specimens	5 copies	List of Sugarcane varieties

COC 3 CARRY**-OUT HARVEST AND POST-HARVEST OPERATIONS**

TOOLS		EQUIPMENT		MATERIALS	
QTY	**Description**	**QTY**	**Description**	**QTY**	**Description**
5 pcs	Measuring Tape	1 unit	Steel Cabinet	25 pcs	Record Book
25 pcs	Cane knives	1 unit	Mega Phone	25 pcs	Pens
2 units	Hand Refractometer	1 unit	Camera with Memory Card	5 pcs	Bagging Materials
2 units	Juice Extractor	1 pc	Bull Cart	1 roll	Plastic Twine
3 pcs	Sharpening Stones	1 unit	Cattle or Carabao	3 pcs	Tag/Label
25 pcs	Calculator	1 pc	Mobile Phone	1 set	First Aid Kit
25 pcs	PPEs			15 pcs	Stalk Samples
	• Long sleeves			1 liter	Disinfectant
	• Gloves			**Training materials**	
	• Hat				
	• Rubber boots			5 copies	Brochures /Manufacturer's Manual
				25 copies	Farm Records and Mills Reports
				5 copies	Brochure
				5 copies	Mill statements
				5 copies	Farm plan and other documents

NOTE: Access to and use of equipment /facilities can be provided through cooperative arrangements or MOA with other partner- companies/institutions.

3.5 TRAINING FACILITIES

SUGARCANE PRODUCTION NC II

Based on a class size of 25 students/trainees

SPACE REQUIREMENT	SIZE IN METERS	AREA IN SQ. METERS	TOTAL AREA IN SQ. METERS	GRAND TOTAL AREA IN SQ. METERS
A. Building (permanent)				**165**
• Student/Trainee Working Space	2.00 x 1.00 per student/trainee	2.00 per student	50.00	
• Learning Resource Center	3.00 x 5.00	15.00	15.00	
• Activity Room (including facilities, wash room, and store room)	2.00x 3.00	6.00 per trainee	150.00	
B. Demo Farm				**5,000**
• Nursery area	10 x 10 per trainee	100 per trainee	2,500	
• Field Plot			2,500	
TOTAL				**5,165**

NOTE: Access to and use of equipment /facilities can be provided through cooperative arrangements or MOA with other partner- companies/institutions.

3.6 TRAINER'S QUALIFICATIONS FOR AGRICULTURE, FORESTRY AND FISHERY SECTOR -SUGARCANE PRODUCTION NC II

- Must be a holder of NTTC Level I in Sugarcane Production NC II
- Must have at least 2 years' job/industry experience for the last five (5) years

3.7 INSTITUTIONAL ASSESSMENT

Institutional Assessment is undertaken by trainees in a structured learning program to determine their achievement of units of competencies. It is administered by the trainer/assessor at end of each learning module.

The result of the institutional assessment may be considered as evidence for the assessment for national certification.

As a matter of policy, graduates of programs registered with TESDA under these training regulations are required to undergo mandatory national competency assessment upon completion of the program.

SECTION 4 ASSESSMENT AND CERTIFICATION ARRANGEMENT

Competency Assessment is the process of collecting evidence and making judgments whether competency has been achieved. The purpose of assessment is to confirm that an individual can perform to the standards expected at the workplace as expressed in relevant competency standards.

The assessment process is based on evidence or information gathered to prove achievement of competencies. The process may be applied to a full qualification or employable unit(s) of competency in partial fulfillment of the requirements of the national qualification.

4.1. NATIONAL ASSESSMENT AND CERTIFICATION ARRANGEMENTS

4.1.1 The Full National Qualification of **SUGARCANE PRODUCTION NC II** shall be acquired through the accumulation of Certificates of Competency in the following clusters/units of competencies:

COC 1 Establish sugarcane nursery

COC 2 Plant, care and maintain sugarcane and ratoon crops

- Plant Sugarcane
- Care and Maintain Sugarcane and Ratoon Crops

COC 3 Carry-out harvest and post-harvest operations

4.1.2 Upon accumulation and submission of all the above COCs acquired, an individual shall be issued the corresponding National Certificate signed by the TESDA Director General. Certificates of Competency (COCs) shall be issued to candidates who have been assessed as competent in any of the above COCs (COC 1, COC 2, COC 3).

4.1.3 Assessment shall focus on the core units of competency. The basic and common units shall be integrated or assessed concurrently with the core units.

4.1.4 Recognition of Prior Learning (RPL). Candidates who have gained competencies through education, informal training, work or life experiences may apply for recognition in a particular qualification through competency assessment.

4.1.5 The following are qualified to apply for assessment:

4.1.5.1 Graduating students/trainees of WTR-registered programs, graduates of NTR programs or graduates of formal/non-formal/informal including enterprise-based trainings related to sugarcane production

4.1.5.2 Industry workers in sugarcane production

4.1.6 Re-assessment shall be focused only on the specific area/s where the candidate has not satisfactorily achieved the required level of competence AND must be undertaken within two (2) years during the period of validity of the Training Regulations.

4.1.7 A candidate who fails the assessment for two (2) consecutive times shall be advised to go through a refresher course before taking another assessment.

4.2. COMPETENCY ASSESSMENT REQUISITE

4.2.1 **Self-Assessment Guide**. The self-assessment guide (SAG) is accomplished by the candidate prior to actual competency assessment. SAG is a pre-assessment tool to help the candidate and the assessor determine what evidence is available, where gaps exist, including readiness for assessment.

This document can:

a) Identify the candidate's skills and knowledge
b) Highlight gaps in candidate's skills and knowledge
c) Provide critical guidance to the assessor and candidate on the evidence that need to be presented
d) Assist the candidate to identify key areas in which practice is needed or additional information or skills that should be gained prior to assessment

4.2.2 **Accredited Assessment Center.** Only Assessment Center accredited by TESDA is authorized to conduct competency assessment. Assessment centers undergo a quality assured procedure for accreditation before they are authorized by TESDA to manage the assessment for National Certification.

4.2.3 **Accredited Competency Assessor**. Only accredited competency assessor is authorized to conduct assessment of competence. Competency assessors undergo a quality assured system of accreditation procedure before they are authorized by TESDA to assess the competencies of candidates for National Certification.

4.2.3.1 **Qualification of Competency Assessors**

For Trainer-Assessor

- Holder of National TVET Trainer Certificate Level I (NTTC) in Sugarcane Production NC II
- Have at least two (2) years relevant industry experience for the last five (5) years
- Have assisted in the actual conduct of assessment to at least two (2) candidates.

For Industry-Assessor

- Holder of National Certificate in Sugarcane Production NCII
- Holder of Certificate of Competency (COC) in Conduct Competency Assessment under the Trainers Methodology Level I (TM I)
- Have at least two (2) years relevant industry experience for the last five (5) years
- Have assisted in the actual conduct of assessment to at least two (2) candidates.

COMPETENCY MAP – AGRICULTURE, FORESTRY AND FISHERY SECTOR
SUGARCANE PRODUCTION NC II

ANNEX A

BASIC COMPETENCY

Receive and Respond to Workplace Communication	Participate in Workplace Communication	Lead Workplace Communication	Use relevant technologies	Develop Team and Individual	Work with Others	Work in a Team Environment	Lead Small Team	Solve problems related to work activities	Apply Problem Solving Techniques in the Workplace
Practice basic housekeeping procedures	Demonstrate work values	Develop and practice negotiation skills	Use mathematical concepts and techniques	Plan and Organize Work	Practice career professionalism	Practice occupational health and safety procedures			

COMMON COMPETENCY

Apply safety measures in farm operations	Use farm tools and equipment	Perform estimation and calculation	Apply basic first aid	Process farm wastes

CORE COMPETENCY

Supervise agronomic crop maintenance	Produce fruit bearing crops	Undertake agronomical crop maintenance activities	Implement vertebrate pest control program	Implement a plant establishment program	Maintain the workplace	Perform post harvest operations of major tropical fruits	Undertake agronomic crop harvesting activities	Monitor and operate water treatment processes	Transport, handle and store chemicals
Support agronomic crop work	Perform post harvest operation of major lowland and semi-temperate vegetable crops	Save, prepare and store agricultural seed	Collect samples for a rural production of horticulture monitoring program	Supervise agricultural crop establishment	Support horticultural crop work	Prepare land for agricultural crop production	Undertake field budding and grafting	Save, prepare and store agricultural seed	Implement and monitor quality assurance procedures
Support irrigation work	Prepare and apply chemicals	Coordinate a horticultural crop maintenance program	Undertake agronomic crop maintenance activities	Support and review business structures and relationships	Support nursery work	implement a plant nutrition program	Establish horticultural crops	Coordinate machinery and equipment maintenance and repair for agricultural crops	Promote plant health
Conduct pre-horticultural farm operations	Control weeds	Undertake a propagation program	Operate pertigation equipment	Implement and monitor a property improvement plan	Produce vegetables	Implement a post-harvest program	Coordinate horticultural crop harvesting	Operate within a budget framework	Supervise maintenance of machinery and equipment
Plan & implement a chemical use program	Establish agronomic crops	Supervise horticultural crop harvesting	Comply with industry quality assurance requirements	Keep records for a farm business	Apply basic first aid	Implement vertebrate pest control program	Control weeds, pests and /or diseases in crops	Supervise agronomic crop harvesting	Analyze and interpret production data
Conduct Variety and Seed Selection	Perform Land preparation	Carry-out Crop Establishment	Manage crop	Conduct of Harvest and Post-Harvest Operations	Establish sugarcane nursery	Plant sugarcane	Care and maintain sugarcane and ratoon crops		

GLOSSARY OF TERMS

1. **Brix-** percent solids in the cane juice which roughly estimates sweetness in the sugarcane as indicated by the refractometer.
2. **Bagasse**- the woody fiber residue obtained from crushing cane.
3. **Cane maturity** – a stage in sugarcane growth characterized by optimum tonnage and sucrose content.
4. **Crop calendar**- contains the month/s of crop planting and harvesting.
5. **Crop estimate**- the amount of sugarcane projected or expected to be harvested and to be milled from a specific area or district for a particular milling season. It is usually undertaken at the start of the crop year, every quarter and before milling.
6. **Crop year**- as used in the Philippine sugarcane industry, officially starts during September of each year and ends on August of the next year.
7. **Cutback canepoint** – planting material derived from 5-6 month old canes with 2-3 well developed viable buds and usually taken from nurseries.
8. **Drainage**- removal of excess surface and ground water from the land by artificial means to build up favourable conditions for plant growth.
9. **Fertilizer**- any substance or materials that can supply one or more of the essential nutrients needed by the plants for normal growth.
10. **Fertilizer (Inorganic)-** any chemical or synthetic materials applied to the soil to supply essential elements that are readily soluble and available to plants.
11. **Fertilizer (Organic)-** fertilizer originating from the remains of plants and animals and animal wastes.
12. **Green manure-** leguminous crops grown and plowed under while still green for the purpose of improving the physical condition and fertility of the soil.
13. **Harrow**- an implement used primarily for pulverizing and smoothing the soi.
14. **Hectare**- a land measurement unit equivalent to 10,000 square meters.
15. **Herbicide-** any chemical substance used to control unwanted plants.
16. **Insecticides-** any substance used to control insects.

17. **Integrated Pest Management (IPM)-** the appropriate utilization of several pest and disease control measures as cultural, chemical and biological means resulting in productive and sustainable crop production.

18. **Integrated Soil Fertility Management (ISFM)-** the combined use of organic or natural and inorganic or chemical fertilizer aimed at reaching maximum economic yield through a productive, sustainable, economical and environment-friendly and socially acceptable production system,

19. **Intercropping/interplanting-** type of planting where one crop is planted more or less systematically in between rows of another crop. The interplanted crop, called minor crop does not in any way disturb the normal distance of planting of the major crop.

20. **Irrigation-** artificial application of water into the soil in order to provide sufficient moisture at the level of the root zone to sustain the requirements of plant during their growth period.

21. **Juice extractor** – pointed metallic pipe-like tool that is used to draw out juice from the stalk for use in a refractometer.

22. **Lacsa-** refers to 10,000 canepoints.

23. **LKg/Ha** - sugar yield equivalent to 50 kilogram bag raw sugar per hectare

24. **LKg/TC** – sugar yield equivalent to 50 kilogram bag raw sugar per ton of cane

25. **Manual harvesting** – cutting of stalks close to the ground and top portion using cane knives before piling and loading in cane cars or trucks.

26. **Molasses-** the thick, dark light brown syrup that is separated from raw sugar in sugar processing.

27. **Mechanical harvesting** – mechanical cutting of millable stalks where the lower blade of the harvester passes at the base while the upper blade cuts the top and cut stalks are elevated by a roller, chopped into pieces and dropped into a trailer or truck going with the harvester

28. **Micropropagated plantlets** – sugarcane planting materials developed from shoot tips cultured in an artificial medium and established in a germ-free environment in the laboratory and later hardened and transplanted in nurseries.

29. **Mudpress**- a mixture of sugarcane fibers, sucrose, coagulated colloids including canewash, albuminoids and phosphate of lime, plus sand and soil.

30. **Pests** – any of the following which inflicts harm/damage on sugarcane plants: diseases, insects, rats, nematodes and weeds.

31. **Planting density-** refers to the number of canepoints/micropropagated plantlets planted per unit area.

32. **Ratoon-** emerging sugarcane shoots from the base of a harvested plant.

33. **Ratooning** – the practice of regrowing of canes from stubbles of previously harvested sugarcane plants.

34. **Refractometer**- a device used in measuring the percent solids in the cane juice which roughly estimates sweetness in the sugarcane.

35. **Seed piece**- vegetative part of the sugarcane plant used as planting materials.

36. **Setts-** canepoints or cane planting materials.

37. **Soil pH**- a measure of the degree of acidity or alkalinity of soil.

38. **Stubble shaving**- when the exposed portion of the stubble or even a part of the underground portion is cut or removed.

39. **Sugar Central or Mill-** a factory manufacturing centrifugal sugar from sugarcane and does not include auxiliary factories such as refineries and distilleries.

40. **Sugar, Centrifugal-** any sugar, whether "A", "B", "C", or "D" manufactured in the centrifugal machines of a sugar mill, usually brown in color, which gives a polarization of not less than 80 sugar degrees. It is also called brown or raw sugar.

41. **Sugarcane HYV (High Yielding Varitety)-** varieties developed with characteristics and qualities, such as high in sucrose, resistance to pest and disease, time of ripening, resistance to drought and water-logged areas, milling and clarification qualities, and adaptability to soil and climatic conditions.

42. **Sugarcane** – a perennial tropical grass with tall short jointed stems from which sugar is extracted. Scientifically known as *Saccharum officinarum* L., belonging to the family Poaceae.

43. **Sugarcane nursery** – an area that is used for the multiplication of sugarcane varieties for the production of good quality cutbacks canepoints

44. **TC/Ha** – cane yield in tons of millable canes per hectare.

45. **Tonne-** unit of measurement equivalent to 1,000 kilograms.

46. **Topping** – removal of the terminal portion of stalks of standing canes for use as canepoints for planting

47. **Top point** –planting material obtained from the top portion of millable stalks

48. **Trashes** – all materials consisting of leaves, tops, dead stalks, diseased stalks, roots, soil and other extraneous materials that are not part of the millable stalks

49. **Trash mulching-** or “trash farming” is the piling of trash in alternate rows or applying them as a blanket cover.

50. **Trichogramma** – biocontrol agent that prevents the emergence of the larva or the destructive stage of the borer, by parasitizing the eggs of the pest

51. **Variety programming-** refers to the planting of different cane varieties with different characteristics to enable varieties to be harvested in the early and late milling periods.

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- **THE TECHNICAL EXPERT PANEL (TEP)**

MR. JOHN CZAR ALFONSO
Technical Expert
SCISM (Sweet Crystal), Pampanga

MS. MARY HOPE Q. AYSON
Technical Expert
La Carlota City College
La Carlota City

MS. JENIFER ARTATES
Technical Expert
SRA- Diliman, Quezon City

MR. JOSHUA BALAGTAS
Technical Expert
SCISM (Sweet Crystal), Pampanga

MR. ADEL V. CATUIRA
Technical Expert
S.R.A – Diliman, Quezon City

MR. FERNANDO H. CORPUZ
Technical Expert
RDE Luzon and Mindanao

RAUL EDMUNDO CAUSING, PhD
Technical Expert
University of St. La Salle
Bacolod City

MS. FE M. DELA CUEVA, PhD
Technical Expert
Institute of Plant Breeding (IPB)
UP Los Baños

MR. APOLONIO DACONES
Technical Expert
PMDDFI-Porac, Pampanga

MR. PERGELIO B. ELBANBUENA
Technical Expert
Kauswagan Multipurpose Cooperative
Negros Occidental

MR. JONATHAN V. FABULA
Technical Expert
Central Luzon State University
Munoz, Nueva Ecija

MARIETTA DINA P. FERNANDEZ, PhD
Technical Expert
Sugar Regulatory Administration
Diliman, Quezon City

MR. FERDINAND EMMANUEL Y. GAYOLES
Technical Expert
HDA LOUISIANA/D-64/CIBAY/MA-AO MDDC

MR. JOSEPH PETER GONZALEZ
Technical Expert
SRA- Diliman, Quezon City

MR. MARCELINO GUEVARRA
Technical Expert
SRA-Pampanga

MR. NESTOR C. GUIYAB
Technical Expert
Sugar Regulatory Administration
Diliman, Quezon City

MR. EFREN D. LANDOY
Technical Expert
Sugar Regulatory Administration
Bacolod City

MS. HELEN B. LOBATON
Technical Expert
Sugar Regulatory Administration

MS. EVELYN B. ESTANISLAO
Technical Expert
Sugar Regulatory Administration
Diliman, Quezon City

MS. JOCELYN N. MALAGA
Technical Expert
Sugar Regulatory Administration
La Carlota City, Negros Occidental

MR. BENJAMIN G. MANLAPAZ
Technical Expert
Sugar Regulatory Administration
Diliman, Quezon City

MS. NORA S. MENESES
Technical Expert
Sugar Regulatory Administration
La Carlota City

MR. RODOLFO N. NENA
Technical Expert
C.Y.T. Farms/PASON Member
Negros Occidental

MR. SANTOS REYES
Technical Expert
Calantas Farmers Association,
Pampanga

MR. JOEL RONARIO
Technical Expert
SRA-Tarlac Mill District Office

MR. FREDDIE SALGON
Technical Expert
General Malvar Arc
Brgy. Gen. Malvar, Pontevedra
Bacolod City

MS. MA. FLORENCIA LOGROÑO
Technical Expert
Sugar Regulatory Administration
La Carlota City

MR. PABLITO S. SANDOVAL
Technical Expert
P.S. Sandoval Farms
Alitagtag, Batangas

MS. DORETA A. DELOS SANTOS, PhD
Technical Expert
Sugar Regulatory Administration
Bacolod City

MS. MA. VINA A. SERRANO
Technical Expert
Sugar Regulatory Administration
Pampanga

MR. ALFREDO SIGUD
Technical Expert
Dizon Farm-Porac, Pampanga

MR. ROBERTO C. VELASCO JR
Technical Expert
Sugar Regulatory Administration
Bacolod City

MR. ENRIQUITO VILLANUEVA
Technical Expert
KITS Farm
San Antonio, Bacolor, Pampanga

MR. RICHARD TORNO
Technical Expert
Torno Agro and Enterprise
Guagua, Pampanga

- **THE PARTICIPANTS IN THE NATIONAL VALIDATION OF THIS TRAINING REGULATION:**

GERLIE CAMAN ADUG
COSUCECO
Matalam, Cotabato

MARLENDA T. GABUTERO
Bayawan United Small Planters Association
- (BUSPA)
Tinago, Bayawan City

THELMA RAMOS AGUILAR
Lumintao Farmers Multi-Purpose Cooperative
Lumintao, Quezon, Bukidnon

ROGELIO C. JEREZA
HDA – Bagi-as
Elenasubo, Silay City

MR. FELIX S. BEROU
Berou Farm
Bagontaas, Valencia, Bukidnon

FERMIN RAZO LASTIMOSA JR.
Samahan Sugarcane Planters (SSP-MPC)
Guihing Hagonaoy, Davao del Sur

MELANIE I. CABRAL
Lucban Multi-Purpose Coop
Lucban, Balan, Batangas

JOSE L. LLORENTE JR.
Davao Sugar Central Co. Inc.
Guihing Hagonoy, Davao del Sur

ELAN N. CADAYDAY
Farmer Manager
Pob. Mainway, Neg. Or.

MS. PRECIOSA T. MATURAN
Tolong Mill District Development Council
Santa Catalina, Neg. Or.

MARLON E. CAJENTA
GAWAD SAKA 2011
Tapi, Kabankalan City

HERMENEGILDO R. SERAFICA
Leyte Cane Planters Association, Inc.
Montello, Kananga, Leyte

RAUL T. CARRERAS
Pensumil MDDC – Bicol
Himaao, Pili, Camarines Sur

LOWELL P. SIGNAP
Farmer
Tadlong, Mabinay, Neg. Or.

BONIFACIO P. CERBO
Retired SRA employee
Manguna,Cabatuan, Iloilo

ZOSIMO DESTINADO SOROYSOROY
Bukidnon Farmers Carp Beneficiaries MPC
Maraymaray, Don Carlos, Bukidnon

The Members of the TESDA Board and Secretariat

The MANAGEMENT and STAFF of the TESDA Secretariat

- Qualifications and Standards Office (QSO)

TESDA – QSO Technical Facilitators

Competency Standards Development Division

MS. BERNADETTE N. SERVAZ- AUDIJE
MS. CHERRY L. TORALDE
MS. MELCHRIS A. ATIS

Competency Programs and Standards Development Division

MS. MERCEDES E. JAVIER
MS. FORTUNATA L. BACO

- National Institute for Technical Education and Skills development (NITESD)

TESDA-NITESD Technical Facilitator

Curriculum and Training Aids Development Division

MR. ROSENDO R. RAFAEL

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For more information, please contact:

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY (TESDA)
Telephone Nos.:817-4076 to 82 loc. 163 / 164 Tele Fax No.:818-7728
or visit our website: www.tesda.gov.ph