

Crop Production

LEVEL – II



CURRICULUM

Based on April, 2022 (IV- I) Occupational standard
(OS)

April, 2022

Addis Ababa, Ethiopia

Preface

The reformed TVET-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for TVET delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking as occupational standards (OS).

In the reformed TVET-System, curricula and curriculum development play an important role with regard to quality driven comparable TVET-Delivery. The Curricula help to facilitate the training process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the occupational standards (OS).

This curriculum has been developed by a group of professional experts from different Regional TVET Bureaus, colleges, Industries, Institutes and universities based on the occupational standard for crop production Level II.

The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills**

TVET-Program Design

1.1 TVET-Program Title: Crop Production Level II

1.2 TVET-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupation. The contents of this program are in line with the occupational standard. The Trainees who successfully completed the Program will be qualified to work as a **Crop Production Assistance** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **agriculture** sector in the field of **Crop Production**.

The prime objective of this training program is to equip the Trainees with the identified competences specified in the OS. Graduates are therefore expected to Field Crop Establishment and Maintenance, Perform Nursery Establishment and Management, Horticultural, Stimulants and Spice Crops Establishment and Maintenance, Determine crop pests and disorders, Operate Gravity Fed and Pressurized Irrigation Systems, Collect and Compile Crop Production data, Apply Interpreted weather Data and Minimize crop production risks, Perform post-harvest handling of stimulants and spices crops, Apply Agricultural Extension service for rural development and Prevent and Eliminate MUDA in accordance with the performance criteria and evidence guide described in the OS.

1.3 TVET-Program Training Outcomes

The expected outputs of this program are the acquisition and implementation of the following units of competences:

AGR CRP2 01 0322 Field Crop Establishment and Maintenance

AGR CRP2 02 0322 Perform Nursery Establishment and Management

AGR CRP2 03 0322 Horticultural, Stimulants and Spice Crops Establishment and Maintenance

AGR CRP2 04 0322 Determine crop pests and disorders

AGR CRP2 05 0322 Operate Gravity Fed and Pressurized Irrigation Systems

AGR CRP2 06 0322 Collect and Compile Crop Production data

AGR CRP2 07 0322 Apply Interpreted weather Data and Minimize crop production risks

AGR CRP2 08 0322 Perform post-harvest handling of stimulants and spices crops

AGR CRP2 09 0322 Apply Agricultural Extension service for rural development

AGR CRP2 10 0322 Prevent and Eliminate MUDA

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1.4 Duration of the TVET-Program

The Program will have duration of **547 hours** including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the TVET institution, and other factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

s.no	Unit competency	TVET Institution training		Cooperative training	Total hours	Remarks
		Theory	Practical			
1.	Field Crop Establishment and Maintenance	12	12	35	59	
2.	Perform Nursery Establishment and Management	8	12	48	68	
3.	Horticultural, Stimulants and Spice Crops Establishment and Maintenance	12	12	35	59	
4.	Determine crop pests and disorders	8	12	42	62	
5.	Operate Gravity Fed and Pressurized Irrigation Systems	8	12	35	55	
6.	Collect and Compile Crop Production data	8	12	14	34	
7.	Apply Interpreted weather Data and Minimize crop production risks	12	12	35	59	
8.	Perform post-harvest handling of stimulants and spices crops	8	12	48	68	
9	Apply Agricultural	12	12	21	45	

	Extension service for rural development					
10	Prevent and Eliminate MUDA	12	12	14	38	

1.5 Qualification Level and Certification

Based on the descriptors elaborated on the Ethiopian National TVET Qualification Framework (NTQF) the qualification of this specific TVET Program is Level II.

The trainee can exit after successfully completing the modules in one level and will be awarded the equivalent institutional certificate on the level completed. However, only institutional certificate of training accomplishment will be awarded.

1.6 Target Groups

Any citizen who meets the entry requirements under items 1.7 and capable of participating in the training activities is entitled to take part in the Program.

1.7 Entry Requirements

The prospective participants of this program are required to possess the requirements or directive of the **Ministry of Labor and Skills**.

1.8 Mode of Delivery

This TVET-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is co-operative training. The time spent by the trainees in the real work place/ industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The co-operative approach will be supported with school-based lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment.

Hence based on the nature of the occupation, location of the TVET institutions, and interest of the industry alternative mode of cooperative training such as apprenticeships, internship and traineeship will be employed. In addition, in the areas where industry is not sufficiently available the established production and service center/learning factories in TVET institutions

will be used as cooperative training places. The Training Institution and identified companies have forged an agreement to co-operate with regard to the implementation of this program.

1.9 TVET-Program Structure

Unit of Competence		Module Code & Title		Training Outcomes	Duration (In Hours)
AGR CRP2 01 0322	Establishment and Maintenance Field Crop	AGR CRP2 M01 0422	Establishing and maintaining Field Crop	<ul style="list-style-type: none"> • Prepare field crop establishment operations • Prepare the site for crop establishment • Carry out filed crop establishment operations • Complete filed crop establishment operations • Prepare for field crop maintenance Operations • Undertake crop maintenance operations • Complete maintenance operations 	59
AGR CRP2 02 0322	Perform Nursery Establishment and Management	AGR CRP2 M02 0422	Performing Nursery Establishment and Management	<ul style="list-style-type: none"> • Select nursery site • Establish nursery site • Prepare nursery inputs • Maintain the nursery environment and infrastructures • Complete nursery plant maintenance operations 	68

<p>AGR CRP2 03 0322 Horticultural, Stimulants and Spice Crops Establishment and Maintenance</p>	<p>AGR CRP2 M03 0422 Establishing and Maintaining Horticultural, Stimulants and Spice Crops</p>	<ul style="list-style-type: none"> • Prepare for horticultural, stimulants and spice crops establishment operations • Prepare the site for crop establishment • Prepare horticulture crop Planting material • Carry out planting operations • Complete planting and care for young plants 	<p>59</p>
<p>AGR CRP2 04 0322 Determine crop pests and disorders</p>	<p>AGR CRP2 M04 0422 Determining crop pests and disorders</p>	<ul style="list-style-type: none"> • Understand the main agriculturally important crop biotic and a biotic factor • Identify the major agriculturally crop pest and disorders • Assess pests and take sample • Record and Report pest occurrence 	<p>62</p>
<p>AGR CRP2 05 0322 Operate Gravity Fed and Pressurized Irrigation Systems</p>	<p>AGR CRP2 M05 0422 Operating Gravity Fed and Pressurized Irrigation Systems</p>	<ul style="list-style-type: none"> • Set up of movable irrigation components • Set up field for gravity fed irrigation • Carry out gravity fed irrigation operations • Carry out pressurized irrigation 	<p>55</p>

			<p>operations</p> <ul style="list-style-type: none"> • Carry out routine maintenance activities on gravity fed irrigation delivery systems • Carry out routine maintenance activities on drainage systems 		
AGR CRP2 06 0322	Collect and Compile Crop Production data	AGR CRP2 M06 0422	Collecting and Compiling Crop Production data	<ul style="list-style-type: none"> • Identify data to be collected • Collect and organize production data • Compile and interpret data • Present and document production data 	34
AGR CRP2 07 0322	Apply Interpreted weather Data and Minimize crop production risks	AGR CRP2 M07 0422	Applying Interpreted weather Data and Minimize crop production risks	<ul style="list-style-type: none"> • Assess weather and production data • Identify weather and crop production data risk and opportunities • Prepare weather and crop production risk management 	59
AGR CRP2 08 0322	Perform post harvest handling of stimulants and spices crops	AGR CRP2 M08 0422	Performing post harvest handling of stimulants and spices crops	<ul style="list-style-type: none"> • Dry the harvested product • Process spice crops • Prepare dry coffee • Perform hulling • Prepare washed/semi-washed coffee • Store stimulant & spice products 	68

<p>AGR CRP2 09 0322 Apply Agricultural Extension service for rural development</p>	<p>AGR CRP2 M09 0422 Applying Agricultural Extension service for rural development</p>	<ul style="list-style-type: none"> • Promote the use of digital technology in Agricultural extension • Understand adult learning • Integrate gender in agricultural extension • Recognize indigenous knowledge 	<p>45</p>
<p>AGR CRP2 10 0322 Prevent and Eliminate MUDA</p>	<p>AGR CRP2 M10 0422 Preventing and Eliminating MUDA</p>	<ul style="list-style-type: none"> • Prepare for work • Identify MUDA and problem • Analyze causes of a problem • Eliminate MUDA and Assess effectiveness of the solution • Prevent occurrence of wastes and sustain operation 	<p>38</p>

*The time duration (Hours) indicated for the module should include all activities in and out of the TVET institution.

1.10 Institutional Assessment

Two types of evaluation will be used in determining the extent to which training outcomes are achieved. The specific training outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The **formative assessment** is incorporated in the training modules and form part of the training process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining training outcomes. It identifies the specific training errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the program have been accomplished. It determines the extent to which competence has been achieved and the result of this assessment decision shall be expressed in the term of Institutional Assessment implementation guidelines.

Techniques or tools for obtaining information about trainees' achievement include oral or written test, demonstration and on-site observation.

1.11 TVET Teachers Profile

The teachers conducting this particular TVET Program are **B** Level and above who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01	
TVET-PROGRAMME TITLE: Crop Production Level II	
MODULE TITLE : Establishing and Maintaining Field Crop	
MODULE CODE : AGR CRP2 M01 0422	
NOMINAL DURATION : 59 Hours	
<p>MODULE DESCRIPTION : This module covers the knowledge, skills and attitude required to establish and manage field crops. Establishment operations include prepare the site, carry out establishment operations and complete establishment operations. In addition, this unit covers purpose, methods and implementing of field crop maintenances operations.</p>	
<p>LEARNING OUTCOMES</p> <p>At the end of the module the trainee will be able to:</p> <p>LO1. Prepare field crop establishment operations</p> <p>LO2. Prepare the site for crop establishment</p> <p>LO3. Carry out filed crop establishment operations</p> <p>LO4. Complete filed crop establishment operations</p> <p>LO5. Prepare for field crop maintenance operations</p> <p>LO6. Undertake crop maintenance operations</p> <p>LO7. Complete maintenance operations</p>	
<p>MODULE CONTENTS:</p> <p>LO1. Preparing field crop establishment operations</p> <p>1.1 Identifying and collecting inputs for field crop establishment</p> <p>1.2 Selecting and preparing tools, equipment and machinery</p> <p>1.3 Identifying, assessing and reporting OHS hazards and risks</p> <p>1.4 Identifying environmental implication of crop production plan</p> <p>1.5 Selecting, using and maintaining suitable personal protective equipment</p> <p>LO2. Preparing site for crop establishment</p> <p>2.1 Removing plant debris, waste materials and pre-treat the soil</p> <p>2.2 Applying soil treatment and amendments</p> <p>2.3 Working the site according to crop production plan</p> <p>2.4 Implementing appropriate plant spacing</p> <p>2.5 Marking out planting pattern</p> <p>2.6 Operating and checking tools, equipment and machinery</p>	

LO3. Carrying out filed crop establishment operations

- 3.1 Selecting planting material
- 3.2 Treating planting material
- 3.3 Handling and transporting planting material
- 3.4 Carrying out planting

LO4. Completing filed crop establishment operations

- 4.1 Cleaning and sterilizing tools and equipment
- 4.2 Disposing off wastes and debris

LO5. Preparing for field crop maintenance operations

- 5.1 Identifying crop fields maintenance
- 5.2 Determining and clarifying purpose and method of maintenances
- 5.3 Identifying environmental implication of field crop maintenance plan
- 5.4 Identification and collection of pest control measures
- 5.5 Identifying and reporting PPE and OHS hazards
- 5.6 Selecting and preparing tools, equipment and machinery
- 5.7 Carrying out pre operational and safety checks on equipment and machinery

LO6. Undertaking crop maintenance operations

- 6.1 Applying agronomic practice
- 6.2 Understanding pre and post harvesting handling
- 6.3 Undertaking field crop maintenance operations
- 6.4 Identifying and applying crop pest management
- 6.5 Operating crop regulation tools, equipment and machinery

LO7. Completing maintenance operations

- 7.1 Disposing off waste material
- 7.2 Using correct manual handling techniques of heavy loads
- 7.3 Cleaning, maintaining, sterilizing and storing tools and equipment
- 7.4 Maintaining clean and safe work area
- 7.5 Recording and reporting work activity

LEARNING METHODS:

- Lecture and Discussion
- Braine storming
- Practical demonstration
- Practical exercise
- Audio visual

- Role playing

ASSESSMENT METHODS:

- Written test
- Oral questioning
- Practical
- Assignment
- Presentation

ASSESSMENT CRITERIA:

LO1. Prepare field crop establishment operations

- Identify and collect inputs for field crop establishment
- Machinery, equipment and tools are selected and prepared for the task being undertaken
- OHS hazards are identified, risks assessed and reported
- The environmental implications of the crop production plan is identified
- Suitable personal protective equipment is selected, used and maintained

LO2. Prepare the site for crop establishment

- Plant debris and other waste materials are removed Pre-treated the soil before crop establishment.
- Soil treatment/amendments are applied according to soil test results
- Site is worked according to the crop production plan
- Appropriate plant spacing is implemented according to the crop type
- The planting pattern is marked out according to the crop Production plan.
- Machinery, equipment and tools are operated and checked according to guidelines

LO3. Carry out filed crop establishment operations

- Planting material is selected according to the type of crop and seed quality standards
- Planting material is treated according to the crop type
- Planting material is handled and transported to the site
- Planting is carried out according to the planting plan

LO4. Complete filed crop establishment operations

- Tools and equipment are cleaned and sterilized according to the manufacturer's specifications, enterprise procedures and regulations
- All containers, leftover fluids, waste and debris are disposed of safely and appropriately
- All required workplace records are completed accurately and promptly in accordance with enterprise requirements

LO5. Prepare for field crop maintenance operations

- Crop fields that require maintenance are identified according to organization work procedures and the crop regulation program
- The purpose and methods of maintenances are determined and clarified according to organization work procedures
- The environmental implications of the field crop maintenance plan are identified
- Pest control measures are identified and collected
- Suitable personal protective equipment and OHS hazards are identified, risks assessed

and reported

- Machinery, equipment and tools are selected and prepared for the task being undertaken
- Pre-operational and safety checks are carried out on equipment and machinery according to manufacturer's specifications and organization work procedures

LO6. Undertake crop maintenance operations

- Agronomic practice and Instructions about field crop maintenance activities are applied
- The crop maintenance operations are undertaken according to principles and OHS requirements
- Crop pest management activities are identified and applied
- Crop regulation tools, equipment and machinery are operated safely and effectively
- Suitable personal protective equipment used and maintained

LO7. Complete maintenance operations

- Waste material removed from the site is disposed of in an environmentally aware and safe manner according to procedures.
- Correct manual handling techniques are used when lifting or moving heavy loads.
- Tools and equipment are cleaned, maintained, sterilized and stored according to the manufacturer's specifications, procedures and regulations.
- A clean and safe work area is maintained throughout and on completion of work
- All required workplace records are completed accurately and promptly, and reported

Annex: Resource Requirements

AGR CRP2 M01 0422 Establishing and maintaining field crop				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	prepared by the trainer	25pcs	1:1
2	Operation sheet	Prepared by teachers	25pcs	1:1
3.	Reference Books			
2.1	Crop production Guide Agriculture	Tamil Nadu Agricultural University pub. date,2020	5pcs	1:5
2.2	Farm crop production technology: Field and forage crop and fruit and vine production options. (A Suggested 2-year Post High School Curriculum.)	U.S. Departement of health, education and welfare. Office of Education. Pub. date 1969	5pcs	1:5
2.3	Field crop production in tropical Africa. Netherlands: CTA, Wageningen, pp. 1-14	Onwueme, I.C. and Sinha, T.D. Pub. date 1999	5pcs	1:5
3	Website			
	http://www.newagepublishers.com/samlechapter/001757.pdf,	October 2015.		
4.	Journals/Publication/Magazines			
B.	Learning Facilities & Infrastructure			
1.	Class room	1.2m ²	30m ²	30:25

2.	Arm chair	Standard	25pcs	1:1
3.	Teachers chair	Standard	1pcs	1:1
4.	Black /white board	Standard	1pcs	1:25
5.	Computer	Desktop	1pcs	1:25
6.	LCD Projector	sony	1pcs	1:25
C.	Consumable Materials			
1.	Duster (white/black board)	Standard	1pcs	1:25
2	Chalk	Standard	1 packet	1:25
5	Marker	Standard	1 packet	1:25
6	Paper	A4	2 Ream	2:25
7	Pen	Ballpoint	2 Pcs	2:25
8	Seeds/planting materials	>85% viability	5 Kg	1:5
9	Fertilizers	Standard	50 Kg	2:1
10	Lime	Standard	50 Kg	2:1
11	Gypsum	Standard	50 Kg	2:1
12	Insecticide (each formulation)	1 From each formulation	5Litter/ kg	1:5
13	Fungicide dips	Standard	1 Litter	1:25
14	Fungicide dusts for seeds	Standard	1 Kg	1:25
15	Round up	Standard	1 Litter	1:25
16	Glyphosate	Standard	1 Litter	1:25
D.	Tools and Equipment			
1.	Tractors	90hp	1pcs	1:25
2	Cultivators	Standard	1pcs	1:25
3	Fertilizer spreaders	standard	1pcs	1:25
4	Sowing machinery	standard	1pcs	1:25
5	planting machinery bagged/bulk seed	standard	1pcs	1:25
6	Field tool box	Standard	5pcs	1:5
7	Planter	Standard	1pcs	1:25
8	Spade	Standard	10pcs	10:25
9	Mattock/Pickaxe	Standard	10pcs	10:25
10	Machetes	Standard	10pcs	10:25
11	Meter	50m	5pcs	1:5

12	Pegs	1m length	140pcs	4:1
13	Nylon Rope	1.5mm	5roll	1:5
14	Sensitive balance	500gm capacity	1pcs	1:25
15	Bin balance	5kg capacity	1pcs	1:25
16	Broad bed maker (BBM)	Standard	1pcs	1:25
17	Tie Ridger	Standard	1pcs	1:25
18	Hat	Water proof	25pcs	1:1
19	Boots	plastic	25pair	1:1
20	Gloves	Nitrile	25pair	1:1
21	Overalls	Nylon	25pcs	1;1
22	Goggles/ face mask	Chemical resistant	25pcs	1;1
23	Respirator	Chemical resistant	25pcs	1;1
24	Sunscreen lotion	bottle	25pcs	1;1

LEARNING MODULE 02	
TVET-PROGRAMME TITLE: CROP PRODUCTION LEVEL II	
MODULE TITLE: Performing Nursery Establishment and Management	
MODULE CODE: AGR CRP2 M02 0422	
NOMINAL DURATION: .68 Hours	
MODULE DESCRIPTION: This module covers the knowledge, skills and attitude required to Select nursery site, prepare nursery beds, establish nursery, Maintain the nursery environment& plants and Complete nursery plant maintenance operations	
LEARNING OUTCOMES	
At the end of the module the trainee will be able to:	
LO1. Select nursery site	
LO2. Establish nursery site	
LO3. Prepare nursery inputs	
LO4. Maintain the nursery environment and infrastructures	
LO5. Complete nursery plant maintenance operations	
MODULE CONTENTS:	
LO1. Selecting nursery site	
1.1 Selection of nursery site	
1.2 Conducting, surveying, designing and locating nursery site	
1.3 Clearing nursery site	
1.4 Ploughing organic waste into the soil	
LO2. Establishing nursery site	
2.1. Establishing nursery site	
2.2. Developing area closure for nursery site	
2.3. Facilitating infrastructures	
2.4. mulching or composting of plant material	
2.5. Establishing clonal garden in the nursery	
LO3. Preparing nursery inputs	
3.1. Preparing, testing planting media and material	
3.2. Performing sowing or planting	
LO4 Maintaining nursery environment and infrastructures	

- 4.1 Identifying OHS hazards, assessing and minimizing risks (EG)
- 4.2 Selecting and using tools and equipment for plant maintenance
- 4.3 Clarifying plant growth and health requirements.
- 4.4 Undertaking nursery operations
- 4.5 Maintaining and preparing irrigation system components
- 4.6 Principle and operation of irrigation system (EG)
- 4.7 Calibration and application of treatments to assist plant growth (EG)
- 4.8 Undertaking seedling hardening off practice

LO5 Completing nursery plant maintenance operations

- 5.1. Recording workplace information
- 5.2. Collecting and disposing off waste or recycle to minimize external environmental impact
- 5.3. Cleaning and storing tools and equipment
- 5.4. Nursery hygiene practices and quality control

LEARNING METHODS:

- Lecture and Discussion
- Braine storming
- Practical demonstration
- Practical exercise
- Audio Visual
- Role playing

ASSESSMENT METHODS:

- Written test
- Oral questioning
- Practical (group work)
- Assignment
- Presentation

ASSESSMENT CRITERIA:

LO1. Select nursery site

- Select nursery site
- Survey, design and Locate nursery site
- Clear nursery site is selected according to site selection criteria and nursery guidelines
- Design the nursery site location and conducted survey
- Land is cleared from any vegetation according to nursery guidelines

LO2. Establish nursery site

- Nursery Site is established according to nursery site establishment criteria and nursery guidelines
- Area closure for the established nursery site
- Infrastructures are facilitated in the nursery site
- Nursery is established according to market requirements and enterprise guidelines
- Clonal garden is established in the nursery

LO3. Prepare nursery inputs

- Planting media is prepared according to the climatic condition
- Planting material is prepared according to the requirement
- Sowing/Planting is done according to the requirement

LO4 Maintain nursery environment and infrastructures

- OHS hazards in the nursery environment are identified, risks assessed.
- Tools and equipment are selected and used for plant maintenance
- Plant growth and health requirements are clarified
- Nursery operations are undertaken according to OHS requirements
- Irrigation system components are serviced and faulty parts are repaired or replaced.
- Treatments are applied to assist plant growth as directed by the supervisor
- Seedling hardening off practice is undertaken at the required time

LO5 Complete nursery operations

- Workplace information is recorded in the appropriate format
- Waste is collected and disposed of or recycled to minimize damage to the external environment
- Tools and equipment are cleaned and stored
- Nursery hygiene practices are followed to minimize risk of contamination.

Annex: Resource Requirements

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AGR CRP2 M02 0422 Performing Nursery Establishment and Management				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	prepared by the trainer	25	1:1
2	Practical manual/operation sheet	prepared by the trainer	25	1:1
3	Reference Books			
	Training Manual for Nursery Establishment and management	National local government finance committee Pub. date, 2018.	5	1:5
	Good tree nursery Practices: Practical guide for community nurseries	ICRAF Pub. date, 1999 Nairobi, Kenya.	5	1:5
4.	Journals/Publication/Magazines			
B.	Learning Facilities & Infrastructure			
1.	Class room	1.2m ² /student	30m ²	1:25
2.	Arm chair	Standard	25pcs	1:1
3.	Teachers chair	Standard	1pcs	1:1
4.	Teachers table	Standard	1pcs	1:1
5.	Black /white board	Standard	1pcs	1:25
6.	Computer/lap top	Standard	1pcs	1:25
7.	LCD Projector	Standard	1pcs	1:25
8	Teachers uniform	Standard	1pcs	1:25
9	Laptop bag	Standard	1pcs	1:25
C.	Consumable Materials			
1.	Duster (white/black board)	Standard	1pcs	1:25
2	Chalk	Standard	1packet	1:25

5	Marker	Standard	1packet	1:25
6	Paper	A4	2 Ream	2:25
8	Pen	Ballpoint	2 Piece	2:25
9	Stapler	Standard	1pieces	1:25
10	Steeple	Standard	1packet	1:25
D.	Tools and Equipment			
1.	Rake	Standard	5pcs	1:5
2	Machetes	Standard	5pcs	1:5
3	Sickles	Standard	5pcs	1:5
4	Tape meter,	50m length	5pcs	1:5
5	Secateurs,	Standard	5pcs	1:5
6	Spades,	Standard	5pcs	1:5
7	Forks,	Standard	5pcs	1:5
8	Hoes,	Standard	5pcs	1:5
9	cart,	Standard	25pcs	1:1
10	Water can	Plastic	5pcs	1:5
11	Knives	Stainless steel	5pcs	1:5
12	Dust bins	Standard	1pcs	1:25
13	Dibblers	Standard	5pcs	1:5
14	Sprayers	Diaphragm/piston operated	3pcs	3:25
15	plant supports	Standard	5pcs	1:7
16	Forks	Standard	5pcs	1:7
17	wheelbarrow	Standard	3pcs	3:25
18	Pickaxe	Standard	5pcs	1:5
19	Back sow	Standard	5pcs	1:5
20	Safety shoes	Steel capped boots	25pair	1:1
21	safety goggles,	Chemical resistance	25pcs	1:1
22	face mask	Chemical resistance	25pcs	1:1
23	Ear protectors	standard	25pcs	1:1
24	Overalls	Nylon	25pcs	1:1

25	Gloves	Chemical resistance	25pcs	1:1
26	sun hat	Water resistant	25pcs	1:1

LEARNING MODULE 03

TVET-PROGRAMME TITLE: CROP PRODUCTION **LEVEL II**

MODULE TITLE : **Establishing and Maintaining horticultural, stimulant and spices crop**

MODULE CODE : **AGR CRP2 M03 0422**

NOMINAL DURATION : **.59**. Hours

MODULE DESCRIPTION : This module covers the Knowledge, Skills and attitude required for Stimulants and Spice crop establishment operations. Includes site selection, prepare the site for planting, carry out planting operations, care for young plants, complete crop establishment and management operations.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

- LO1.** Prepare Horticultural crops establishment operation
- LO2.** Prepare the site for crop establishment
- LO3.** Prepare horticulture crop Planting material
- LO4.** Carry out planting operations
- LO5.** Completing planting and care for young plants

MODULE CONTENTS:

LO1. Preparing horticultural crops establishment operation

- 1.1. Collection of horticultural, stimulants and Spice crops Inputs
- 1.2. Selection and preparation of machinery, equipment and tools
- 1.3. Identification, assessing, and reporting OHS hazards and risk
- 1.4. Identifying environmental implications
- 1.5. Selection, using and maintain PPE pre-planting soil treatments and their importance

LO2. Prepare the site for crop establishment

- 2.1. Removing and disposing old crops and other waste materials
- 2.2. Clearing and watering site prior transplanting or sowing
- 2.3. Preparation of growing media
- 2.4. Working site for horticultural, stimulants and Spice crops
- 2.5. Understanding principles of horticultural crop establishment and maintenance (CA)
- 2.6. Principles and operations of irrigation systems (CA)
- 2.7. Implementing horticultural, stimulants and Spice crops protection.
- 2.8. Operation of machinery equipment and tools

- 2.9. Removing and disposing old crops and other waste materials
- 2.10. Clearing and watering site prior transplanting or sowing
- 2.11. Preparation of growing media
- 2.12. Working site for horticultural, stimulants and Spice crops
- 2.13. Understanding principles of horticultural crop establishment and maintenance
- 2.14. Principles and operations of irrigation systems
- 2.15. Implementing horticultural, stimulants and Spice crops protection.
- 2.16. Operation of machinery equipment and tools

LO3. Preparing horticulture crop planting material

- 3.1 Obtaining and confirming transplanting plans or instructions
- 3.2 Selection of planting material
- 3.3 Storing, handling and transporting planting materials
- 3.4 Applying instructions of sowing and seedling preparation
- 3.5 Pre-planting soil treatments
- 3.6 Importance of correct planting timing
- 3.7 Preparation and using of tools and equipment
- 3.8 Calibration of spray equipment and determining quantities and application rates
- 3.9 Collecting and organizing information

LO4 Caring out planting operations

- 4.1. Treating planting material based on crop nature and identified problem
- 4.2. Confirming transplanting depth and caring out Planting
- 4.3. Watering plant before any planting treatment
- 4.4. Incorporation of appropriate drainage
- 4.5. Installation of plant supporting devices

LO5. Completing planting and care for young plants

- 5.1 Regular maintenance of transplanted plant
- 5.2 Application of treatments for young plant
- 5.3 Water application or operation irrigation schedule
- 5.4 Training young plants
- 5.5 Importance of field hygiene and quality control (CA)
- 5.6 Collecting, disposing and recycling wastes
- 5.7 Cleaning, maintaining and storing tools and equipment
- 5.8 Maintaining records and documentation (EG)

LEARNING METHODS:

- Lecture and Discussion
- Braine storming
- Practical demonstration
- Practical exercise
- Audio visual
- Roleplaying

ASSESSMENT METHODS:

- Written test
- Oral questioning
- Practical (group work)
- Assignment
- Presentation

ASSESSMENT CRITERIA:

LO1. Prepare horticultural crops establishment

- Inputs are collected for horticultural, Stimulants and Spice crops establishment.
- Machinery, equipment and tools are selected and prepared for the task being undertaken.
- OHS hazards are identified, risks assessed and reported.
- The environmental implications of the horticultural, Stimulants and spice crop establishment program are identified
- Suitable personal protective equipment (PPE) is selected, used and maintained.

LO2. Prepare Site for horticultural crop establishment

- Old crops and other waste materials are removed and disposition in full consideration of environmental implications.
- Site is cleared and watered prior to transplanting/sowing
- Growing media is prepared according to the establishment plan.
- Site is worked according to the Horticultural, Stimulants and Spice crop production plan
- Horticultural, Stimulants and Spice crops protection is implemented according to organization guidelines.
- Machinery, equipment and tools are operated according to organization guidelines.

LO3. Prepare horticulture crop planting material

- Transplanting plans/instructions are obtained and confirmed with the supervisor
- Planting material is selected according to the type of crop and organization quality standards.
- Planting materials are stored, handled and transported to the site.
- Instructions about sowing and seedling preparation for transplanting of the crop are applied
- Tools and equipment appropriate to the task being undertaken are prepared and used according to supervisors' instructions and manufacturers' guidelines

LO4. Carry out planting operations

- Planting material is treated according to the horticultural crop nature and identified problems.
- Planting is carried out according to the planting plan.
- Transplanting depth is confirmed according to the needs of the crop type
- Plants are watered in and any post planting treatments applied.
- Appropriate drainage is incorporated to ensure root system survival according to the needs of the crop and conditions of the planting site.
- Plant support devices are installed according to the supervisor's instructions plan.

LO5.Complete planting and care for young plants

- Transplanted plant is maintained with regular aftercare activities appropriate to the requirements of the species.
- Treatments are applied to plants according to the nature of the horticultural crops.
- Water is applied to plantings according to the irrigation schedule and established sustainable farming practices.
- Plantings are trained according to the nature of the horticultural, Stimulants and Spice crops.
- Waste is collected and disposed of or recycled to minimize damage to the external environment.
- Tools and equipment are cleaned, maintained and stored according to enterprise guidelines.
- All containers, leftover fluids, waste and debris are disposed of safely and appropriately in accordance with organization requirements.
- Records of transplant are maintained in the appropriate format.

Annex: Resource Requirements

AGR CRP2 M03 0422 Establishing and Maintaining horticultural, stimulant and spices crop				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM	prepared by the trainer	25pcs	1:1
	Practical manual /operation sheet	prepared by the trainer	25pcs	1:1
2.	Reference Books			
2.1	Crop production manual A guide to fruit and vegetable production in the Federated States of Micronesia	Food and Agriculture Organization of the United Nations Apia, 2020	5pcs	1:5
2.2	Smallholder Horticultural Production and Business: Trainer's Manual	SNV Zimbabwe, 2016	5pcs	1:5
2.3	The horticulture handbook : A reference guide for establishing horticulture enterprises in Western Australia	Western Australian Agriculture Authority, 2014	5pcs	1:5
3.	Journals/Publication/Magazines			
B. Learning Facilities & Infrastructure				
1.	Class room	30m ²	1	1:25
2.	Arm chair	standard	25pcs	1:1
3.	Teachers chair	standard	1pcs	1:1
4.	Teachers table	standard	1pcs	1:1

5.	Black /white board	standard	1pcs	1:25
6.	Computer/laptop	standard	1pcs	1:25
7.	LCD Projector	standard	1pcs	1:25
C.	Consumable Materials			
1.	Duster (white/black board)	standard	1pcs	1:25
2	Chalk	standard	1 packet	1:25
3	Marker	Temporary	1 packet	1:25
4	Paper	A4	2 Ream	2:25
5	Pen	Ballpoint	2 Piece	2:25
6	Stapler	standard	1pieces	1:25
7	Steeple	standard	1packet	1:25
8	Teachers uniform	standard	1pcs	1:25
9	Laptop bag	standard	1pcs	1:25
D.	Tools and Equipment			
1	Rake	standard	5pcs	1:5
2	Machetes	standard	5pcs	1:5
3	Sickles	standard	5pcs	1:5
4	Tape meter	50m length	5 n ^o	1:5
5	Spades,	standard	5pcs	1:5
6	Forks	standard	5pcs	1:5
7	Cart	standard	5pcs	1:5
8	Box	standard	2pcs	2:25
9	Water can	Plastic	5pcs	1:5
10	Knives	standard	5pcs	1:5
11	Dust bins	standard	2pcs	2:25
12	buckets,	standard	5pcs	1:5
13	Secateurs,	standard	5pcs	1:5
14	Drip pipe	standard	1 set	1:25
15	Sprinklers	standard	1set	1:25
16	Hoses	standard	100m	100:25
17	hose fittings	standard	1set	1:25
18	Wheelbarrows,	standard	5pcs	1:5

19	Scissors	Stainless steel	5pcs	1:5
20	nylon rope,	Standard	5 (roll)	1:5
21	pegs,	1m length	25pcs	1:1
22	Hand Saw	standard	5pcs	1:5
23	Hammer	standard	5pcs	1:5
24	Tractors	standard	1pcs	1:25
25	Rotary hoes	standard	25pcs	1:1
26	Cultivators	standard	1pcs	1:25
27	Seeding planter	standard	1pcs	1:25
28	Safety shoes	Steel capped boots	25pair	1:1
29	safety goggles,	Chemical resistant	25pcs	1:1
30	face mask	Chemical resistant	25pcs	1:1
31	Ear protectors	standard	25pcs	1:1
32	Overalls	Chemical resistant	25pcs	1:1
33	Boots	Chemical resistant	25pcs	1:1
34	Hearing protection	standard	25pcs	1:1
35	Sunscreen lotion	bottle	25pcs	1:1
36	Teachers uniform	standard	25pcs	1:1
37	Lap top bag	standard	5pcs	1:5
38	Gloves	Chemical resistant	25pair	1:1
39	sun hat	Water proof	25pair	1:1

LEARNING MODULE 04

TVET-PROGRAMME TITLE: Crop Production **Level II**

MODULE TITLE : **Determining crop pests and disorders**

MODULE CODE : **AGR CRP2 M04 0422**

NOMINAL DURATION : **62Hours**

MODULE DESCRIPTION : This module covers the knowledge, skills and attitude to understand the main agriculturally important crop biotic and a biotic factors, identify the major agriculturally crop pest and disorders, assess pest occurrence and take sample. Furthermore, able to record and report pest occurrence to the organization

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Understand the main agriculturally important crop biotic and a biotic factor

LO2. Identify the major agriculturally crop pest and disorders

LO3. Assess pests and take sample

LO4 Record and Report pest occurrence

MODULE CONTENTS:

LO1. Understanding the main agriculturally important crop biotic and abiotic factors

- 1.1. Understanding classification of biotic and abiotic factors
- 1.2. Identification of biotic factors causes
- 1.3. Identifying means of biotic factors disseminations and sources of infections
- 1.4. Understanding biotic factors favourable environmental condition and crop preference
- 1.5. Understanding biotic factors of over wintering

LO2. Identifying the major agriculturally crop pest and disorders

- 2.1 Identifying common names of disorders and crop pests
- 2.2 Identifying agriculturally important crop pest behavior
- 2.3 Understanding major insect pests' favorable environmental condition & crop preference
- 2.4. Recording and reporting details of the plant pests and disorder
- 2.5. Checking, selecting and preparing equipment's
- 2.6. Selecting and checking prior to use suitable personal protective equipment (PPE)
- 2.7. Identifying Occupational Health and Safety hazards and reporting risks

LO3. Assessing pests and take sample

- 3.1. Differentiating scouting techniques
- 3.2. Understanding sampling methods
- 3.3. Taking sample of different crop pests

LO4 Recording and Reporting pest occurrence

- 4.1 Preparing materials and format for pest occurrence record
- 4.2. Recording and documenting identified pest
- 4.3 Reporting the pest occurrence

LEARNING METHODS:

- Lecture and discussion
- Braine storming
- Practical demonstration
- Role playing

ASSESSMENT METHODS:

- Written test
- Move exam
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Understand the main agriculturally important crop biotic and a biotic factor

- Understand classification of biotic and a biotic factor
- Identify causes of biotic factors
- Identify means of biotic factors disseminations and sources of infections
- Understand biotic factors favorable environmental condition and crop preference
- Understand biotic factors means of over wintering.

LO2. Identify the major agriculturally crop pest and disorders

- Identify common names of disorders and crop pests which impact on Agricultural crops.
- Identify agriculturally important crop pest behavior
- Understand agriculturally important insect pests' favorable environmental condition & crop preference
- Details of the plant pests and disorder occurrence are recorded and reported
- Equipment's are checked, selected and prepared for use according to the guidelines and manufacturers specifications
- Suitable personal protective equipment (PPE) is selected, checked prior to use, maintained (if any), utilized, cleaned and stored appropriately
- Occupational Health and Safety hazards are identified, Risk assessed and reported

LO3. Assess pests and take sample

- Differentiate assessment/scouting techniques/methods
- Understand sampling methods
- Take sample of different crop pests.
- Occupational Health and Safety hazards are identified, risk assessed and reported

LO4 Record and Report pest occurrence

- Materials and format Prepared for record pest occurrence
- Record and document the identified pest based on procedures
- Reported the pest occurrence to the organizations

Annex: Resource Requirements

AGR CRP2 M04 0422 Determining crop pests and disorders				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM Learning Guide	Prepared by the trainer	1 pcs	1:25
	Operation sheet	Prepared by the trainer	1 pcs	1:1
	Learning guide	Prepared by the trainer	25 pcs	1:1
2.				
3.	Reference books			
	Insect identification	Scott Schell & Dr. Alex L. University of Wyoming Pub. date, 2007	5pcs	1:5
	Insect identification guide	Skaku Nair, Kris Braman & Ellen Bauske Pub. date 2009	5pcs	1:5
	Exotic pest identification & Surveillance Guide for tropical horticulture	Plant health Australia Ltd. Pub. date, 2021 http://www: plant health australia.com.au	5pcs	1:5
	Insect and plant disease control manual	http://www: eppserver.ag.utk.edu	5pcs	1:5
B. Learning Facilities and Infrastructure				
5.	Lecture room	1.2m ² /student (30m ²)	1pcs	1:25
6.	Laboratory	42.5m ²	1pcs	1:25
7.	Standard farm (plots)	10mx10m	1 plot	1:25
8.	Class room	42.5m ²	1pcs	1:25
9.	Library	42.5m ²	1pcs	1:25

C. Consumable Materials				
8.	Printing paper	A4	2ream	2:25
9.	log book	Standard	1pcs	1:1
10.	Pencil	HB	2 pcs	2:25
11.	Marker	White board	1packet	1:25
12	Duster (white/black board)	Standard	1pcs	1:25
13	Chalk	Standard	1 packet	1:25
D. Tools, Equipment and Materials				
12.	Sprayer	Diaphragm /Piston type	1 pcs	1:25
13	Pesticides	Based on formulations	5L/kg	1:5
14	Pheromone traps	Standard	1pcs	1:25
15.	Baits	standard	5pcs	1:5
16.	Sweep trap	standard	5 pcs	1:5
17.	Aspirator	standard	5pcs	1:5
18	Yellow board,	1mx1m	2pcs	1:25
19.	Light trap	standard	5 pcs	1:5
20.	Insect killing jar,	Glass with 1lit. capacity	5pcs	1:5
21.	pressing board	Hard and strong with timber support	25pcs	2:25
22.	Hand lenses	20X magnification	5pcs	1:5
E. Personal protective equipment (PPEs)				
19.	Boots	Rubber	25 pcs	1:1
20.	Overalls	Chemical resistance	25 pcs	1:1
21.	Gloves	Chemical resistance	25 pcs	1:1
22.	Respirator	Chemical resistance	25 pcs	1:1
23.	Face mask (guard)	Chemical resistance	25 pcs	1:1
24.	Sunscreen lotion	bottle	25 pcs	1:1
25.	Hat	Water proof	25 pcs	1:1
26	Goggles	Chemical resistance	25pcs	1:1

LEARNING MODULE 05	
TVET-PROGRAMME TITLE: Crop Production Level II	
MODULE TITLE : Operating Gravity Fed and Pressurized Irrigation Systems	
MODULE CODE : AGR CRP2 05 0422	
NOMINAL DURATION : 55Hours	
<p>MODULE DESCRIPTION : This module covers the knowledge, skills and attitude required to set up of movable irrigation components and field for gravity fed irrigation, carry out gravity fed irrigation operations, carry out pressurized irrigation operations, monitor and control weed growth on drainage systems and clean and store irrigation equipments.</p>	
<p>LO1.Set up of movable irrigation components</p> <p>LO2. Set up field for gravity fed irrigation</p> <p>LO3. Carry out gravity fed irrigation operations</p> <p>LO4 .Carry out pressurized irrigation operations</p> <p>LO5. Carry out routine maintenance activities on gravity fed irrigation delivery systems</p> <p>LO6. Carry out routine maintenance activities on drainage systems</p> <p>LO7. Monitor and controlling weed growth on drainage systems</p>	
<p>MODULE CONTENTS:</p> <p>LO1.Setting up of movable irrigation components</p> <p>1.1. Handling irrigation equipment safely</p> <p>1.2. Identifying OHS hazard and selecting relevant PPE (RV)</p> <p>1.3. Positioning irrigation equipment</p> <p>1.4. Checking irrigation components</p> <p>1.5. Assembling irrigation system components</p> <p>1.6. Checking water outlets</p> <p>LO2. Setting up field for gravity fed irrigation</p> <p>2.1 Checking water source area for irrigation set up</p> <p>2.2 Checking pumps, bores and other water delivery mechanisms</p> <p>2.3 Positioning and securing tarpaulins or other water control devices</p> <p>2.4 Basic operation of gravity fed irrigation system (EG)</p> <p>LO3. Carrying out gravity fed irrigation operations</p>	

- 3.1 Irrigation schedule
- 3.2 Soil, plant and water relationships
- 3.3 Critical measures for moisture availability
- 3.4 Opening and shutting get valves
- 3.5 Achieving and maintaining required head and water level in head ditch
- 3.6 Opening required number of siphons
- 3.7 Monitoring progress of water flow in furrows
- 3.8 Lifting siphons where irrigation completed
- 3.9 Carrying out and marking irrigation change

LO4. Carrying out pressurized irrigation operations

- 4.1. Achieving and maintaining required pressure and water flow
- 4.2. Relocating equipment's
- 4.3. checking water flow from outlets

LO5. Carry out routine maintenance activities on gravity fed irrigation delivery systems

- 5.1. Carrying out all maintenance activities
- 5.2. Servicing mechanical equipment
- 5.3. Flushing and cleaning supply and distribution system
- 5.4. Maintaining system inlets, outlets, structures and fittings
- 5.5. Checking system for smooth running and free of damage
- 5.6. Clearing silt
- 5.7. Identifying and reporting adverse environmental impacts of the irrigation system
- 5.8. Using appropriate materials for backfilling and repairing banks

LO6. Carrying out routine maintenance activities on drainage systems

- 6.1 Carrying out all maintenance activities
- 6.2 Flushing and cleaning drainage system
- 6.3 Inspecting and recording drainage system

LO7. Monitoring and controlling weed growth on drainage systems

- 7.1. Checking system to ensure weed free and unobstructed water flow from outlets
- 7.2. Minimizing damage to plants, structures and fittings
- 7.3. Maintaining operation area

LEARNING METHODS:

- Lecture and Discussion
- Braine storming
- Practical demonstration
- Rôle playing

ASSESSMENT METHODS:

- Written test
- Move exam
- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Set up of movable irrigation components

- Irrigation equipment's are handled safely in accordance with OHS practices.
- Irrigation equipment's are positioned, if necessary, in accordance with organization requirements.
- Irrigation components are checked and action taken, as required, in accordance with enterprise policy and procedures.
- Irrigation system components are assembled and joined, where required.
- Water outlets are checked in accordance with organization practices.

LO2. Set up field for gravity fed irrigation

- Irrigation equipment's are handled safely in accordance with OHS practices.
- Irrigation equipment's are positioned in accordance with enterprise requirements.
- Water source area is checked for irrigation set up and action taken as required in accordance with enterprise policy and procedures.
- Pumps, bores and other water delivery mechanisms are checked for irrigation set up and action taken, as required in accordance with enterprise policy and procedures.
- Tarpaulins or other water control devices are positioned and secured as required in accordance with enterprise procedures.

LO3. Carry out gravity fed irrigation operations

- Gates and/or valves are opened and shut as necessary in accordance with enterprise procedures.
- Required head and water levels in head ditch are achieved and maintained to ensure sufficient water flow and availability to crops.
- Required number of siphons is started/opened in accordance with enterprise procedures.
- Progress of water flow in furrows is monitored in accordance with enterprise procedures.
- Siphons are lifted where irrigation is complete in accordance with enterprise procedures.
- Irrigation change is carried out and marked, as required.
- Irrigation equipment's are shifted, as required.

- Water flow from outlets is checked, as necessary, to verify freedom from blockage.

LO4. Carry out pressurized irrigation operations

- Valves are opened and shut, as necessary, in accordance with enterprise procedures.
- Required pressures and water flows are achieved and maintained to ensure sufficient water availability.
- Equipment's are relocated, if necessary, in accordance with working procedures and guidelines.
- Water flow from outlets is checked, as necessary, to verify freedom from blockage.

LO5. Carry out routine maintenance activities on gravity fed irrigation delivery systems

- All maintenance activities are carried out according to the maintenance program, based on requirements and the manufacturers' specifications.
- Mechanical equipment is serviced in accordance with the operators' manual or as directed.
- Supply and distribution system is flushed and cleaned as directed.
- System inlets, outlets, structures and fittings are maintained as directed.
- System is checked for smooth running and is free of damage, leaks and blockages in channels, drains and outlets, as necessary, in accordance with design specifications and enterprise procedures.
- Silt is cleared from channels, drains, sumps and crossings with no disruption to gradients and levels, as necessary.
- Adverse environmental impacts of the irrigation system are identified and reported.
- Appropriate materials are used for backfilling and building/ repairing banks in accordance with standards.

LO6. Carry out routine maintenance activities on drainage systems

- All maintenance activities are carried out according to the maintenance program
- Drainage system is flushed and cleaned with simple components replaced as directed.
- Drainage system is visually inspected for leaks and operating faults, and observations are recorded in the maintenance book.

LO7. Monitor and control weed growth on drainage systems

- System checks ensure a weed free and unobstructed water flow from outlets as

necessary.

- Damage to plants, structures and fittings is minimized through the use of recognized mechanical and chemical methods of weed control
- Operation area is maintained in a clean and safe condition.

Annex: Resource Requirements

AGR CRP2 M05 0422 Operating Gravity Fed and Pressurized Irrigation Systems				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TTLM/Learning guide	Prepared by the trainer	25 pcs	1:1
2	Operation sheet	Prepared by trainer	25pcs	1:1
B	Reference books			
2.	Irrigation theory and practices	A.M. Michael, 2003	5pcs	1:5
	Irrigation drainage, International and National practices	R.Hooja, S.N. Mundara & Sewa Ram, 2000	5pcs	1:5
3.	Low-cost methods of rain water storage. Results from field trials in Ethiopia and Kenya	Hune Nega & Paul M.Kimew, 2002	5pcs	1:5
B. Learning Facilities and Infrastructure				
1.	Lecture room	1.2m ² /student= 30m ²	1pcs	1:25
2.	Laboratory	42.5m ²	1pcs	1:25
3	Standard farm (plots)	10mX10m	1 plot	1:25
4	Library	42.5m ²	1pcs	1:25
C. Consumable Materials				
8.	• Printing paper	A4	2ream	2:25
9.	• log book	Standard	1pcs	1:25
10.	• Pencil	HB	2 pcs	2:25
11.	• Marker	White board	1 packet	1:25

12	• Duster (white/black board)	standard	1pcs	1:25
13	• Chalk	standard	1 packet	1:25
D. Tools, Equipment and Materials				
12.	• Pivots	Diaphragm type	1 pcs	1:25
13	• Linear	standard	1pcs	1:25
14	• Pumps	2inches	1set	1:25
15.	• Engines	standard	5pcs	1:5
16.	• Generators	standard	5pcs	1:5
17.	• Pipes	2inches / 6m long	5pcs	1:5
18	• Wheelies	standard	2pcs	1:25
19.	• Hose reel	Standard	5pcs	1:5
20.	• Travelers	Standard	5pcs	1:5
21.	•			
22.	• Jets	Standard	5pcs	1: 5
	• Microjets	Standard	1pcs	1:25
	• Laterals	standard	1pcs	1:25
	• Tubes	Standard	1pcs	1:25
	• Outlets	Standard	1pcs	1:25
	• Pumps	Standard	1pcs	1:25
	• Probe	Standard	1pcs	1:25
	• Tensiometers	Standard	1pcs	1:25
	• Water pump	Standard	1set	1:25
	• Rakes	Standard	5pcs	1:5
	• Shovel	Standard	5pcs	1:5
	• Spade	Standard	5pcs	1:5
	• Hoe (small)	Standard	5pcs	1:5
	• Hoe (large)	Standard	5pcs	1:5
	• Watering can	Plastic	5 pcs	1:5
	• Rope	1mm	5roll	1:5

	• Measuring tape	50 and 100 m	5pcs	1:5
• E. Personal protective equipment (PPEs)				
19.	• Boots	Rubber	25 pcs	1:1
20.	• Overalls	Chemical resistant	25 pcs	1:1
21.	• Gloves	Chemical resistant	25 pcs	1:1
22.	• Respirator	Chemical resistant	25 pcs	1:1
23.	• Face mask (guard)	Chemical resistant	25 pcs	1:1
24.	• Sunscreen lotion	Bottle	25 pcs	1:1
25.	• Hat	Water proof	25 pcs	1:1
26	• Goggles	Chemical resistant	25pcs	1:1

LEARNING MODULE 06	
TVET-PROGRAMME TITLE: Crop Production Level II	
MODULE TITLE : Collecting and Compiling Crop Production Data	
MODULE CODE : AGR CRP2 M06 0422	
NOMINAL DURATION : 34Hours	
MODULE DESCRIPTION : This modules covers the knowledge, skills and attitude required to identify data to be collected and organize production data, compile and interpret data, present and documented production data.	
<p>LEARNING OUTCOMES</p> <p>At the end of the module the trainee will be able to:</p> <p>LO1. Identify data to be collected</p> <p>LO2. Collect and organize production data</p> <p>LO3. Compile and interpret data</p> <p>LO4. Present and document production data</p>	
<p>MODULE CONTENTS:</p> <p>LO1. Identifying data to be collected</p> <ul style="list-style-type: none"> 1.1 Determining specific data requirements to be collected 1.2 Obtaining materials or tools required for data collection and calibration 1.3 Identifying difficulties encounter in collecting the data 1.4 Communicating a dice about proposed data collection 1.5 Selecting, using and maintaining suitable personal protective equipment 1.6 Making checks to determine whether notices related to site quarantine <p>LO2. Collecting and organizing production data</p> <ul style="list-style-type: none"> 2.1 Collecting and organizing information for interpretation 2.2 Assessing accuracy and relevance information 2.3 Reliable methods of data collection and making efficient use of crop management practice 2.4 Using basic equipment to access, organize and monitor data 2.5 Updating, modifying, maintaining and storing information <p>LO3. Compiling and interpreting data</p> <ul style="list-style-type: none"> 3.1 defining clearly and consistently objectives of data compilations 	

3.2 Reliable and suitable methods of data compilation

3.3 Clearing and justifying assumptions used in compilations of plant parameter

3.4 Supporting conclusions by evidence

LO4. Presenting and documenting production data

4.1 Preparing data in appropriate format, style and structure

4.2 Using software programs for recording or storing data (EG)

4.3 Clearing and conforming structure and format of report

4.4 Reporting and distributing findings

4.5 Obtaining feedback and comments

LEARNING METHODS:

- Lecture and discussion
- Braine storming
- Practical demonstration
- Practical exercise
- Audio visual
- Role playing

ASSESSMENT METHODS:

- Written test
- Oral questioning
- Practical
- Assignment
- Presentation

ASSESSMENT CRITERIA:

LO1. Identify data to be collected.

- Specific requirements of the data to be collected are determined by discussion with the supervisor or by reading work instructions
- Materials or tools required for data collected are- obtained, and where necessary calibrated.
- Difficulties that may be encountered in collecting the data are identified and advice sought from the supervisor if needed
- A dice about proposed data collection is communicated to others as required.
- Suitable personal protective equipment (PPE) is selected, used and maintained where required
- Checks are made to determine whether notices relating to site quarantine are in effect and, where required, site quarantine procedures are followed

LO2. Collect and organize production data

- Information is collected and organized in a format suitable for compile and interpretation in accordance with sector requirements
- Information held by the production unit is assessed for accuracy and relevance in line with requirements
- Methods of collecting data are reliable and make efficient use of crop management practice
- Basic equipment is used to access, organize and monitor data in accordance with crop production requirements
- Information is updated, modified, maintained and stored in accordance with crop production requirements

LO3. Compile and interpret data

- Objectives of data compilations are clearly defined and consistent with enterprise requirements.
- Methods of data compilation are reliable and suitable to research and other purposes.
- Assumptions used in compilations are clear, justified and consistent with plant parameters.

- Conclusions are supported by evidence and contribute to the achievement of sector objectives.

LO4. Present and document production data

- Data are prepared in an appropriate format, style and structure using suitable technology.
- Structure and format of reports are clear and conform to sector requirements.
- Findings are reported and distributed in accordance with sector requirements
- Feedback and comments on suitability and sufficiency of findings is obtained in accordance with sector requirements.

Annex: Resource Requirements

AGR CRP2 M06 0422 Collect and Compile Crop Production data				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	prepared by the trainer	25pcs	1:1
2	Operation sheet	Prepared by teachers	25pcs	1:1
3.	Reference Books			
2.1	Hand book on: Agricultural cost of production statistics: Guidelines for data collection, compilation and dissemination.	FAO, 2016	5pcs	1:5
2.2	Module3: Sampling methods for crop-cutting surveys.	FAO, 2018. Suva, Fiji.	5pcs	1:5
4.	Journals/Publication/Magazines			
B.	Learning Facilities & Infrastructure			
1.	Class room	1.2m ² /student= 30m ²	1pcs	1:25
2.	Arm chair	standard	25pcs	1:1
3.	Teachers chair	standard	1pcs	1:1
4.	Teachers table	standard	1pcs	1:1
5.	Black /white board	standard	1pcs	1:25
6.	Computer	standard	1pcs	1:25
7.	LCD Projector	standard	1pcs	1:25
C.	Consumable Materials			
1.	Duster (white/black board)	standard	1pcs	1:25
2	Chalk	standard	1 packet	1:25

5	Marker	White board	1packet	1:25
6	Paper	A4	2 Ream	2:25
8	Pen	Ballpoint	2 Piece	2:25

LEARNING MODULE 07	
TVET-PROGRAMME TITLE: Crop Production Level II	
MODULE TITLE: Applying interpreted weather data and minimize crop production risks	
MODULE CODE: AGR CRP2 M07 0422	
NOMINAL DURATION: Hours	
MODULE DESCRIPTION: This module covers the knowledge, skills and attitude required to assess weather and production data, identify weather and crop production data risk and opportunities.	
LEARNING OUTCOMES	
At the end of the module the trainee will be able to:	
LO1. Assess weather and production data	
LO2. Identify weather and crop production data risk and opportunities	
LO3. Prepare weather and crop production risk	
MODULE CONTENTS:	
LO1. Assessing weather and production data	
1.1 Obtaining and interpreting historical weather data	
1.2 Identifying weather and crop production risk factors	
1.3 Collecting information on normal and significant weather events and their impact	
1.4 Detailing current and historical property and crop production situation	
1.5 Reviewing short- and long-term sector goals	
1.6 Sourcing, presenting and updating weather and production data	
LO2. Identifying weather and crop production data, risk and opportunities	
2.1 Collecting and forecasting of seasonal weather data	
2.2 Identifying weather opportunity risks	
2.3 Determining Impact on production of different weather and risk factors	
2.4 Identifying and developing qualitative and quantitative risk and opportunities	
2.5 Evaluating importance of weather variability and significant production events	
2.6 Outlining tactics to address a range of different weather variability, production risks and opportunities	
2.7 Identification of contingency options for production and the risk factors	
LO3. Preparing weather and crop production risk management	

- 3.1 Collection of weather variability and seasonal weather forecasts
- 3.2 Identifying impact of weather and climate phenomena on rainfall, plant growth and yields
- 3.3 Calculating financial returns for different strategic options
- 3.4 Addressing insurance and other options
- 3.5 Addressing major weather risk factors
- 3.6 Prediction of impacts on the environment, property value and equity
- 3.7 Reviewing preferred crop production, weather risks or alternative solution
- 3.8 Presentation of planned solution to crop with variable weather and crop production risk management
- 3.9 Principles of decision-making based on the variable weather and seasonal climate forecasts

LEARNING METHODS:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

ASSESSMENT METHODS:

- Written test with Oral questioning
- Practical demonstration

ASSESSMENT CRITERIA:

LO.1 Assess weather and production data

- Historical weather data is obtained and interpreted from a range of sources.
- Weather and crop production risk factors are identified.
- Information on normal and significant weather events and their impact on natural and rural system are collected.
- Current and historical property and crop production situation is detailed according to sector guidelines.
- Short- and long-term sector goals are reviewed.
- Weather and production data is sourced, presented and updated according to sector requirements.

LO.2 Identify weather and crop production data risk and opportunities

- Forecasted chances of seasonal weather data are collected and feedback given.
- Weather opportunity risks are identified.
- Impact on production of different weather and production risk factors are determined according to sector requirements.
- Qualitative and quantitative risk and opportunity factors are identified and developed.
- Importance of weather variability and significant production events is evaluated.
- Tactics to address a range of different weather variability and production risks and opportunities are outlined according to sector requirements
- Contingency options for production and the risk factors are identified.

LO.3 Prepare weather and crop production risk

- Weather variability and seasonal weather forecasts are collected.
- Insurance and other options are addressed.
- Major weather risk factors are addressed.
- Impacts on the environment, property value and equity are predicted.
- Preferred crop production, weather risks or alternative solution are reviewed, and options selected
- A planned solution to cope with variable weather and crop production risk management is presented

AGR CRP2 M07 0422 Applying interpreted weather data and minimize crop production

risks				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A. Learning Materials				
1.	TLM	prepared by the trainer	25	1:1
2.	Reference Books	•		
3.1	Agricultural Risk Management Tools		5pcs	1:5
3.2	Advances in application of climate prediction in agriculture	Climate risk. Farming Ahead with Kondinin Group Pub. date, 2000	5pcs	1:5
	Anonymous		5pcs	1:5
	Agricultural and Forest Meteorology		5pcs	1:5
4.	Journals/Publication/Magazines			
B. Learning Facilities & Infrastructure				
1.	Lecture room	$30m^2=1.2m^2/student$	1pcs	1:1
2.	Library	$42.5m^2$	1	1:1
C. Consumable Materials				
1.	Copy paper	A4 size	5 ream	1:5
2.	Flip chart		5 ream	1:5
3.	White board		1pcs	1:25

4	White board marker	Temporary	1 packet	1:25
5	Marker	Permanent	1 packet	1:25
D.	Tools and Equipment			
1.	Anemometer	Standard	1pcs	1:25
2	Barometer	Standard	1pcs	1:25
3	Wind Vane	Standard	1pcs	1:25
4	Hygrometer	Standard	1pcs	1:25
5	Thermometer	Standard	1pcs	1:25
6	Rain-Gauge	Standard	1pcs	1:25

LEARNING MODULE 08	
TVET-PROGRAMME TITLE: Crop Production Level II	
MODULE TITLE: Performing post-harvest handling of stimulants and spices crops	
MODULE CODE: AGR CRP2 M08 0422	
NOMINAL DURATION: 68 Hours	
MODULE DESCRIPTION: This module covers the skill, knowledge & attitude to carry out harvesting, dry the harvested product, process spice crops, prepare dry coffee, Perform Hulling, Prepare Washed/semi-washed coffee, and store stimulant & spice products.	
LEARNING OUTCOMES At the end of the module the trainee will be able to: LO1. Dry the harvested product LO2. Process spice crops LO3. Prepare dry coffee LO4. Perform Hulling LO5. Prepare Washed/semi-washed Coffee LO6. Store stimulant & spice products	
MODULE CONTENTS: LO1. Drying the harvested product 1.1 Identifying drying place based on type of spice crop 1.2 Preparing suitable drying equipment's 1.3 Checking moisture content LO2. Processing spice crops 2.1 Identifying processing equipment's and machineries 2.2 performing processing seeds, fruits, leaves, bark and rhizomes 2.3 performing grading the processed spices LO3. Preparing dry coffee 3.1 Identification of drying place 3.2 Inspecting and maintaining appropriateness of the dry floor and table 3.3 Inspecting moisture condition for dry coffee 3.4 Drying by spreading and turning in thin layer 3.5 Carrying out storing of dry coffee	

LO4. Performing Hulling

- 4.1 Sorting out foreign materials for smooth run of hulling machine.
- 4.2 Performing minor machine adjustment of fill the hopper
- 4.3 Performing Hulling
- 4.4. Sorting out pea berries, elephant beans and break beans
- 4.5 Storing clean beans
- 4.6 Taking husk to appropriate place for reuse

LO5. Preparing Washed/semi-washed Coffee

- 5.1 Performing minor machine adjustment and calibration
- 5.2 Carrying out pulping operation to get parchment coffee
- 5.3 Inspecting fermentation process and checking fermentation time
- 5.4. Carrying out washing process for parchment coffee
- 5.5. Performing dry operation using solar radiation or artificial drier
- 5.6. Sorting out damage, immature and over ferment parchment coffee
- 5.7 Checking appropriate moisture content
- 5.8. Storing dried coffee

LO6. Storing stimulant & spice products

- 6.1 Identifying storage places, structures and time of storage
- 6.2 Understanding extraction of essential oils
- 6.3. Transporting processed stimulant & spice products
- 6.4. Storing stimulant & spice products
- 6.5. Identification of processing equipment's and machineries
- 6.6, Understanding processing techniques
- 6.7. Performing regular inspection spice products

LEARNING METHODS:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing

ASSESSMENT METHODS:

- Written test with Oral questioning

- Practical demonstration

ASSESSMENT CRITERIA:

LO1. Dry the harvested product

- Drying place is identified based on type of the spice crop
- Suitable drying equipment's are prepared as per the crop requirement.
- Moisture content is checked by using moisture tester

LO2. Process spice crops

- Processing equipment's and machineries are identified based on the type and purpose of processing.
- Processing seeds, fruits, leaves, bark and rhizomes is performed
- Grading the processed spices is performed based on size, quality and market demand

LO3. Prepare dry coffee

- Drying place is identified according to pre-set criteria.
- Appropriateness of the drying floor and table is inspected and maintained to fulfil the required standard.
- Moisture condition for dry coffee is inspected according to the required level.
- Drying should be spread in a thin layer according to the standard should be turned frequently to avoid fungus development.
- Storing dry coffee is carried out using sacks

LO4 .Perform Hulling

- Foreign materials are sorted out to keep the smooth running of hulling machine.
- Minor machine adjustment and filling the hopper is performed.
- Hulling is performed with the required standard.
- Pea berries, elephant beans and broken beans are sorted out.
- Clean beans are stored following the suitable storage procedure
- Husk is taken to appropriate place for reuse

LO5 .Prepare Washed/semi-washed Coffee

- Minor machine adjustment and calibration is performed.
- Pulping operation is carried out to get parchment coffee
- Fermentation process is inspected and time of fermentation is checked.
- Washing process is carried out in accordance with the standard for parchment coffee.
- Drying operation is performed using solar radiation or artificial drier.

- Damaged, immature and over fermented parchment coffee is sorted out.
- Appropriate moisture content is checked by using appropriate techniques.
- Dried coffee is stored according to coffee storage procedures

LO6 .Store stimulant & spice products

- Storage places and structures are identified based on the type and time of storage
- Processed stimulant & spice products are transported to the storage area.
- Stimulant & Spice products are stored with suitable temperature and relative humidity
- Regular inspection is performed to control the quality of the stored spice products.

Annex: Resource Requirements

AGR CRP2 M08 0422 Performing post-harvest handling of stimulants and spices crops				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	TTLM prepared by the trainer	25	1:1
2.	Reference Books		25	1:1
3.1	The Fundamentals of Horticulture Postharvest Management of Horticultural Crop		5	1:5
4.	Journals/Publication/Magazines			
B.	Learning Facilities & Infrastructure			
1.	Lecture room	30m ²	1	1:25
2.	Library	42.5m ²	1	1:25
C.	Consumable Materials			
1.	Copy paper	A4 size	5 ream	1:5
2	Flip chart	A3	5 ream	1:5
3	White board		1	1:25
4	White board marker		1 Packet	1:1
5	Marker	Permanent	1packet	1:1
D.	Tools and Equipment			
1.	fruit presses, and root crop cutters/graters	Standard	2	
2	knives,	Sharp	1pcs	1:25
3	sizing rings		5pcs	1:5
4	colour charts	Straight	2pcs	2:25
5	Refractometers	Clean and dry	1pcs	1:25

6	Penetrometers and produce firmness testers.		1pcs	1:25
7	Driers,		1pcs	1:25
8	storage containers	Clean and dry	1pcs	1:25
9	cleaners,		1pcs	1:25
10	hand mills		1pcs	1:25
11	power mills& Shellers		1pcs	1:25
12	decorticators (seed removers)		1pcs	1:25
13	oil processing equipment,		1pcs	1:25
E	Personal Protective Equipment			
	Overall	100% Cotton	25pcs	1:1
	Gloves	Leather Made	25pair	1:1
	Safety Shoes	Upper Rubber	25pair	1:1
	Goggles	Frame, flexible frame	25pcs	1:1
	Respirator	Full face piece with hard-coated	25pcs	1:1
	Hats	Wool felt	25pcs	1:1
	First aid kits	Standard	5set	1:5

LEARNING MODULE 09	
TVET-PROGRAMME TITLE: Apply Agricultural Extension for Rural Development Level II	
MODULE TITLE : Applying Agricultural Extension for Rural Development	
MODULE CODE : AGR CRP2 09 0422	
NOMINAL DURATION : .48... Hours	
MODULE DESCRIPTION : This unit covers the knowledge, skills and attitudes required to promote the use of digital technology in agricultural extension, understand adult learning, integrate gender in agricultural extension and recognize indigenous knowledge.	
LEARNING OUTCOMES At the end of the module the trainee will be able to: LO1. Promote the Use of Digital Technology in Agricultural Extension LO2. Understand Adult Learning LO3. Integrate Gender in Agricultural Extension LO4. Recognize Indigenous Knowledge	
MODULE CONTENTS: LO1. Promote the Use of Digital Technology in Agricultural Extension 1.1. Introduction of the use of Digital technology in Agricultural extension 1.2. Building Skills in using digital technology 1.3. The role of digital technologies in agricultural extension services LO2. Understand Adult Learning 2.1. The concept of adult learning 2. 2. Determining principles of adult learning 2.3. The importance of adult learning in Agricultural 2.4. Adult learning methods 2.5. Understanding the role of adult learning LO3. Integrate Gender in Agricultural Extension 3.1. The concept of gender 3.2. Creating gender awareness and sensitization 3.3. The role of gender in agriculture	

3.4. Implementation of gender mainstreaming

LO4. Recognize Indigenous Knowledge

- 4.1. The concept of indigenous knowledge
- 4.2. Understanding Characters of indigenous knowledge
- 4.3. Promoting Exchange of indigenous knowledge
- 4.4. The importance of indigenous knowledge
- 4.5. Studying the controversial issues of the debate on indigenous knowledge

LEARNING METHODS:

- Lecture and Discussion
- Demonstration
- Simulation
- Role playing
- Community Service

ASSESSMENT METHODS:

- Quiz, Written test, Oral questioning, Written exam (assessment)
- Individual and group assignment
- Practical demonstration

ASSESSMENT CRITERIA:

LO.1. Promote the use of digital technology in Agricultural Extension

- The use of Digital technology in Agricultural extension is introduced to familiarize its importance
- Skills in using digital technology is built to strengthen agricultural extension services
- The role of digital technologies in agricultural extension services is understood to enhance agricultural development.

LO.2. Understand Adult Learning

- The concept of adult learning is understood to bring behavioural changes
- Principles of Adult learning is determined for the implementation of extension services
- The importance of Adult learning in Agricultural Extension is understood to enhance agricultural extension services
- Adult learning methods are understood to enhance the knowledge and skills of extension beneficiaries
- The role of adult learning is understood to allow farmers develop knowledge and skills

LO.3. Integrate Gender in Agricultural Extension

- The concept of gender is understood to provide inclusive agricultural extension services
- Gender awareness and sensitization is created to increase the contribution of gender in agricultural development
- The role of gender in agriculture is determined to enhance agricultural development.
- Gender mainstreaming is implemented for effective outcome of extension services

LO4. Recognize Indigenous Knowledge.

- The concept of indigenous knowledge is understood to strengthen the service of agricultural extension
- Characters of indigenous knowledge are understood to promote local experience
- Exchange of indigenous knowledge is promoted to enhance community development
- The importance of indigenous knowledge is understood to facilitate its contribution to the development processes.

- The controversial issues of the debate on indigenous knowledge are further studied to propose the urgent need, to document, learn, preserve, and exchange indigenous knowledge

Annex: Resource Requirements

AGR CRP2 M08 0422, Applying Agricultural Extension for Rural Development				
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	Learning Materials			
1.	TTLM	prepared by the trainer	25pcs	1:1
2.	Reference Books			
2.1	Rural Extension: Basic Issues and Concepts	Hoffman, V., et al. 2009. Vol. I 3 rd edition	5pcs	1:5
2.2	Rural Extension: Basic Issues and Concepts	Hoffman, V., et al. 2009. Vol. II 3 rd edition	5pcs	1:5
2.3	Rural Extension: Basic Issues and Concepts	Hoffman, V., et al. 2009. Vol. III 3 rd edition	5pcs	1:5
2.4	Communication for Rural Innovation	Lewis, C., 2004 3 rd edition	5pcs	1:5
2.5	Concepts and Practices in Agricultural Extension in Developing Countries: A Source Book	Ananadayasekeram, P., et al. 2008.	5pcs	1:5
2.6	Agricultural Extension in Developing Countries	Adams M. E., 1992	5pcs	1:5
2.7	Agricultural Extension	FAO, ...	5pcs	1:5
4.	Journals/Publication/Magazines			
4.1	Community Service Guideline		25pcs	1:1
4.2	Sustainable Agricultural Extension Manual for Eastern and Southern	IIRR, 1998	5pcs	1:5

	Africa			
B.	Learning Facilities & Infrastructure			
1.	Lecture Room	30m ²	1pcs	1:25
2.	Library	42.5m ²	1pcs	1:25
3.	Audio Visual Center		1pcs	1:25
4.	Smart Class* (At least 1 in each Department)		1pcs	1:25
C.	Consumable Materials			
1.	Paper	A4	2ream	2:25
2	Pen	ballpoint	2	2:25
5	Pencil	HB	2	2:25
6	Chalk	standard	1packet	1:25
8	Board cleaners	Standard	1pcs	1:25
9	Gown	standard	2pcs	2:25
10	Marker	White board	1packet	1:25
11.	Flip Chart	A3	1ream	1:25
D.	Tools and Equipment			
1.	Audio and Video recorder		1pcs	1:25
2	Computer		1pcs	1:25
3	LCD		1pcs	1:25
4	Whiteboard		1pcs	1:25
5	Blackboard		1pcs	1:25
6	Flip Chart Stand		1pcs	1:25
7	Projection screen		1pcs	1:25

LEARNING MODULE 10	
TVET-PROGRAMME TITLE: Cooperative Accounting and auditing	
MODULE TITLE : Preventing and Eliminating MUDA	
MODULE CODE: AGR CRP2 M10 0422	
NOMINAL DURATION:50Hours	
<p>MODULE DESCRIPTION: This module covers the knowledge, skills and attitude required by a worker to prevent and eliminate MUDA/wastes in his/her workplace by applying scientific problem-solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis It covers responsibility for the day-to-day operation of the work and ensures Kaizen Elements are continuously improved and institutionalized.</p>	
<p>LEARNING OUTCOMES</p> <p>At the end of the module the learner will be able to:</p> <p>LO1. Prepare for work</p> <p>LO2. Identify MUDA and problem</p> <p>LO3. Analyze causes of a problem</p> <p>LO4. Eliminate MUDA and Assess effectiveness of the solution.</p> <p>LO5. Prevent occurrence of wastes and sustain operation</p>	
<p>MODULE CONTENTS:</p> <p>LO1 Prepare for work</p> <ol style="list-style-type: none"> 1.1. Using work instructions 1.2. Reading and interpreting job specifications 1.3. Observing OHS requirements, 1.4. Selecting appropriate material 1.5. Identifying and checking safety equipment and tools. <p>LO2 Identify MUDA and problem</p> <ol style="list-style-type: none"> 2.1 Preparing plan of MUDA and implementing problem identification 2.2 Causes and effects of MUDA 2.3 Identifying and listing problems of kaizen process 2.4 Using tools and techniques 2.5 Identifying and measuring wastes/MUDA 2.6 Reporting identified and measured wastes <p>LO3. Analyze causes of a problem</p>	

- 3.1 Listing all possible causes of a problem
- 3.2 Analyzing cause relationships using 4m1e.
- 3.3 Identifying causes of the problems
- 3.4 Selecting the root cause directly related to the problem
- 3.5 Listing all possible ways using creative idea generation
- 3.6 Testing and evaluating The suggested solutions
- 3.7 Preparing detailed summaries of the action plan

LO4. Eliminate MUDA and Assess effectiveness of the solution.

- 4.1. Preparing and implementing Plan of MUDA elimination.
- 4.2. Adopting necessary attitude and ten basic principles for improvement
- 4.3. Using tools and techniques to eliminate wastes/MUDA
- 4.4. Reducing and eliminating Wastes/MUDA
- 4.5. Identifying tangible and intangible results are.
- 4.6. Comparing tangible results using various types of diagrams.
- 4.7. Reporting improvements

LO5. Prevent occurrence of wastes and sustain operation.

- 5.1. Preparing and implementing MUDA prevention Plan.
- 5.2. Preparing and discussing Standards for materials
- 5.3. Preventing occurrences of wastes/MUDA
- 5.4. Creating waste-free workplace using 5W and 1Hsheet.
- 5.5. Doing the completion of required operation
- 5.6. Facilitating the updating of standard procedures and practices
- 5.7. Training and ensuring capability of the work team on the new Standard Operating Procedures (SOPs).

Annex: Resource Requirements

AGR CRP2 M10 0422 Preventing and Eliminating MUDA				
Item No	Category/Item	Description/ Specifications	Qty.	Recommended Ratio (Item: Trainee)
A.	Learning Materials(Disability inclusive learning guide)			
1.	TTLM	TTLM	25 Pcs	1:1
2.	Reference Books			
2.1	Gemba KAIZEN	2nd Edition Masaaki Imai	5 Pcs	1:5
3.	Journals/Publication/Magazines	Published/unpublished	2 Pcs	1:12
B.	Learning Facilities & Infrastructure			
3.1.	Lecture room	1.2*25		
3.2.	Workshop	4*25		
3.3.	Store			
3.4.	Library	105 – 180 m2 area Needed Per Trainee	1	1:25
3.5.	Instructional Audio video	Library/classroom location	It depends	1:1
3.6.	Visual training Media	LCD, Laptops	1 Pcs	1:25
3.7.	Teaching boards	White board ,Flip chart ,Smart board	1 Pcs	1:25
3.8.	Arm chair	55 Cm *74 Cm *100Cm	25 Pcs	1:1
3.9.	Notice board	120*100 Cm	1 Pcs	1:25
3.10.	White board	240 Cm *120 Cm	1 Pcs	1:25
C.	Consumable material			
	Detergent	Liquid	10 Lt	1:2

2	Sweeper	Sponge	5 Pcs	1:5
D	Tools and equipment			
	Photo camera	Standard	5 Pcs	1:5
	5s Map	Per workshop	5 Pcs	1:5
	Shelves	Per workshop	5 Pcs	1:5
	Kaizen Board	Per workshop	1 Pcs	1:25

Learning Methods:				
For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	Deaf	Hard of hearing	Physical impairment
Lecture-discussion	<ul style="list-style-type: none"> ❖ Provide large print text ❖ Prepare the lecture in Audio/video ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points 	<ul style="list-style-type: none"> ❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees 	<ul style="list-style-type: none"> ❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

		format ❖ Summarize main points		
Demonstration	<ul style="list-style-type: none"> ❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation 	<ul style="list-style-type: none"> ❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary) 	<ul style="list-style-type: none"> ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary)
Group discussion	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work 	<ul style="list-style-type: none"> ❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member 	<ul style="list-style-type: none"> ❖ Introduce the trainees with their peers

			❖ Inform the group members to speak loudly	
Exercise	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies 	<ul style="list-style-type: none"> ❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training 	<ul style="list-style-type: none"> ❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	<ul style="list-style-type: none"> ❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	<ul style="list-style-type: none"> ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material 	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension 	<ul style="list-style-type: none"> ❖ Speak loudly ❖ Using sign language interpreter if necessary 	<ul style="list-style-type: none"> ❖ Use written response as an option for the trainees having speech challenges
Written test	<ul style="list-style-type: none"> ❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader (if necessary) ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension 	<ul style="list-style-type: none"> ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. 	<ul style="list-style-type: none"> ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	<ul style="list-style-type: none"> ❖ Brief the instruction or provide them in large text ❖ Time extension 	<ul style="list-style-type: none"> ❖ Use sign language interpreter ❖ Brief on the instruction of the exam 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Brief on the instruction of 	<ul style="list-style-type: none"> ❖ Provide activity based assessment ❖ Conduct close

		<ul style="list-style-type: none"> ❖ Provide activity-based/ practical assessment method ❖ Time extension 	<p>the exam</p> <ul style="list-style-type: none"> ❖ Use loud voice ❖ Time extension 	<p>follow up</p> <ul style="list-style-type: none"> ❖ Time extension
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