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Ministry of Labor and Skills

# Crop Production
# LEVEL – IV

## CURRICULUM
## Based on April, 2022 Version- 1 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 IV.

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 IV**

**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 **Manager** 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 manage integrated soil fertility management technologies and practices, develop production plans for field crops, develop production plans for horticultural crops, plan and implement organic farm production, plan horticultural crops propagation program, plan and implement crop pest management practices, manage and implement quality standards in storage, demonstrate improved crop technologies and practices, seed multiplication and quality control and develop value chain analysis 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 CRP4 01 0322** Manage Integrated Soil Fertility Management Technologies and Practices

**AGR CRP4 02 0322** Develop Production Plans for Field Crops

**AGR CRP4 03 0322** Develop Production Plans for Horticultural Crops

**AGR CRP4 04 0322** Plan and implement organic farm production

**AGR CRP4 05 0322** Plan Horticultural Crops Propagation Program

**AGR CRP4 06 0322** Plan and Implement Crop Pest Management Practices

**AGR CRP4 07 0322** Manage and implement quality standards in storage

**AGR CRP4 08 0322** Demonstrate Improved Crop Technologies and Practices

**AGR CRP2 09 0322** Seed multiplication and quality control

**AGR CRP2 10 0322** Develop value chain analysis

### 1.4 Duration of the TVET-Program

The Program will have duration of **575 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. | Manage Integrated Soil Fertility Management Technologies and Practices | 12 | 16 | 35 | 63 | |
| 2. | Develop Production Plans for Field Crops | 12 | 12 | 35 | 59 | |
| 3. | Develop Production Plans for Horticultural Crops | 12 | 12 | 35 | 59 | |
| 4. | Plan and implement organic farm production | 12 | 12 | 49 | 66 | |
| 5. | Plan Horticultural Crops Propagation Program | 12 | 12 | 21 | 45 | |
| 6. | Plan and Implement Crop Pest Management Practices | 12 | 12 | 42 | 66 | |
| 7. | Manage and implement quality standards in storage | 12 | 12 | 21 | 45 | |
| 8. | Demonstrate Improved Crop Technologies and Practices | 12 | 12 | 49 | 73 | |
| 9 | Seed multiplication and quality control | 12 | 16 | 35 | 63 | |
| 10 | Develop value chain analysis | 9 | 9 | 21 | 39 | |

### 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 IV**.**

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 centre/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 CRP4 01 0322** | Manage Integrated Soil Fertility Management Technologies and Practices | **AGR CRP2 M01 0422** | Managing Integrated Soil Fertility Management Technologies and Practices | • Select appropriate integrated Soil Fertility Management (ISFM) strategy<br>• Determine relevant soil health and fertility management technologies for crop production<br>• Determine the requirements for soil health and fertility improvement for crop production<br>• Implement agro ecology principles and elements in production systems<br>• Document the soil health and plant nutrition program and specifications<br>• Monitor and evaluate soil health, fertility and crop production program | 63 |
| **AGR CRP3 02 0322** | Develop Production | **AGR CRP3 M02 0422** | Developing Production Plans for | • Select crop type and variety<br>• Determine crop yield potential | 59 |

| | | | | | |
|---|---|---|---|---|---|
| | Plans for Field Crops | | Field Crops | • Prepare production plan for individual crop and the whole farm<br>• Implementing Production Plan<br>• Monitor, evaluate and learning of crop production plan | |
| **AGR CRP4 03 0322** | Develop Production Plans for Horticultural Crops | **AGR CRP4 M03 0422** | Developing Production Plans for Horticultural Crops | • Select horticultural crop type and variety<br>• Determine yield potential for horticultural crop<br>• Greenhouse management<br>• Prepare production plan for individual horticultural crop and whole farm<br>• Implementing production plan<br>• Monitor, evaluate and learning of crop production plan | 59 |
| **AGR CRP4 04 0322** | Plan and implement organic farm production | **AGR CRP4 M04 0422** | Planning and implement organic farm production | • Assess soil-related factors for organic farming<br>• Assess soil health and fertility indicators<br>• Select and implement allowable techniques and inputs for organic | 66 |

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|---|---|---|---|---|---|
| | | | | farming<br>• Implement, monitor and evaluate organic farming activities<br>• Maintain quality standard of the products of organic farming<br>• Document organic farming program | |
| **AGR CRP4 05 0322** | Plan Horticultural Crops Propagation Program | **AGR CRP4 M05 0422** | Planning Horticultural Crops Propagation Program | • Carry out preliminary planning activities for Horticultural crop propagation program<br>• Develop the propagation plan<br>• Implement propagation plan and monitor success of propagation | 45 |
| **AGR CRP4 06 0322** | Plan and Implement Crop Pest Management Practices | **AGR CRP4 M06 0422** | Planning and Implement Crop Pest Management Practices | • Plan to perform field surveillance for a specific pest<br>• Identify pest management options and prepare action plan<br>• Apply cultural and biological crop pest management methods<br>• Implement chemical use program<br>• Ensure the correct selection and application of chemicals<br>• Coordinate contingency plan and | 66 |

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|---|---|---|---|---|---|
| | | | | document reports | |
| **AGR CRP4 07 0322** | Manage and implement quality standards in storage | **AGR CRP4 M07 0422** | Managing and implement quality standards in storage | • Maintain hygiene in storage areas<br>• Monitor crop produce arrival and dispatch<br>• Monitor and maintain crop produce conditions in storage<br>• Control storage pests | 42 |
| **AGR CRP4 08 0322** | Demonstrate Improved Crop Technologies and Practices | **AGR CRP4 M08 0422** | Demonstrating Improved Crop Technologies and Practices | • Prepare for demonstration<br>• Demonstrate Crop Technologies and practices<br>• Monitor and evaluating crop demonstration | 73 |
| **AGR CRP4 09 0322** | Seed multiplication and quality control | **AGR CRP4 M09 0422** | Seeding multiplication and quality control | • Select quality seed/ planting materials<br>• Plan and prepare land for seed multiplication<br>• Seed production Establishment<br>• Maintain the field<br>• Control weeds, pests and diseases<br>• Harvest the crop<br>• Seed Processing and treatments<br>• Store seeds and evaluate the stored | 63 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | seed | |
| **AGRCRP4 M10 0322** | Develop value chain analysis | **AGR CRP4 M10 0422** | Developing value chain analysis | • Understand concepts of value chain<br>• Identify Value chain analysis<br>• Develop value chain<br>• Upgrade value addition | 39 |

**LEARNING MODULE 01**

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

**MODULE TITLE : Managing integrated soil fertility management technologies and practices**

**MODULE CODE : AGR CRP4 M010422**

**NOMINAL DURATION : 63 Hours**

MODULE DESCRIPTION: This module specifies the knowledge, skills and attitude required to Select appropriate integrated soil fertility management (ISFM) strategy, determine relevant soil health and fertility management technologies for crop production, determine the requirements for soil health and fertility improvement for crop production, implement agro ecology principles and elements in production systems, document the soil health and plant nutrition program and specifications and monitor and evaluate soil health, fertility and crop production program

LEARNING OUTCOMES

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

LO1. Select appropriate integrated Soil Fertility Management (ISFM) strategy

LO2. Determine relevant soil health and fertility management technologies for crop production

LO3. Determine the requirements for soil health and fertility improvement for crop production

LO4. Implement agro ecology principles and elements in production systems

LO5. Document the soil health and plant nutrition program and specifications

LO6. Monitor and evaluate soil health, fertility and crop production program

**MODULE CONTENTS:**

**LO1. Selecting of appropriate integrated Soil Fertility Management (ISFM) strategy**

1.1 Site specification and profitable ISFM practices

1.2 Socio-economic and biophysical challenges

1.3 Local adaptation of requiring ISFM practices

**LO2. Determining relevant soil health and fertility management technologies**

2.1. Definition of Goals and target site

2.2. Accessing and reviewing relevant data

2.3. Determining, implementing and monitoring soil, plant and water tests

2.4. Characteristics and nutritional status of soils and plant species

2.5. Integrated soil fertility technologies

**LO3. Determining the requirements for soil health and fertility improvement for crop production**

3.1. Principles of integrated soil fertility management

3.2. Understanding soil fertility and productivity concepts

3.3. Application of improved agronomic practices

3.4. Calculating Agronomic efficiency

3.5. Effects of nutrient deficiency and toxicity

3.6. Cost effective approach of soil amendment practices

3.7. Environmental implications program of ISFM

3.8. OHS hazards and risks

3.9. Coasting resources, tools, equipment and machinery

**LO4. Implementing agro ecology, principles and elements in production systems**

4.1. Diversity of agro ecology

4.2. Knowledge of agro ecological practices

4.3. Selection of synergy components for climate change

4.4. Implementation of resource-use efficiency

4.5. Recycling of nutrients, biomass and water

4.6. Understanding organic matter, pest and disease

4.7. Principles and element of agro ecology

**LO5. Documenting the soil health and plant nutrition program and specifications**

5.1. Detailed plan, objectives, specifications and associated costs

5.2. Recording, documenting and reporting agronomic and soil data

**LO6. Monitoring and evaluating soil health, fertility and crop production program**

6.1 Monitoring soil health, crop production and productivity

6.2 Identifying non-compliance of soil fertility management

6.3 Complying with legislative requirements and codes of practice

6.4 Taking remedial action to improve soil health, fertility and plant nutrition

6.5 Incorporation of feed backs and changes

**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 appropriate integrated Soil Fertility Management (ISFM) strategy**

- Site specific and profitable ISFM practices are determined
- Key socio-economic and biophysical contexts affecting ISFM approaches are identified
- Main socio-economic and biophysical challenges are recognized
- Local adaptation is required to effectively adapt ISFM practices.

**LO2. Determine relevant soil health and fertility management technologies for crop production**

- Goals and target site for assessment and development of program are defined following a review of organization production plan and in consultation with owner.
- Relevant soil, agronomic, climate, environmental contexts and site data are accessed and reviewed.
- Appropriate soil, plant and water tests are determined based on laboratory results according to plant species, climatic conditions, prevailing growth media, industry best practice and enterprise guidelines.
- Testing tasks are implemented and monitored, liaison procedures with outside testing agencies are supervised, and remedial action is undertaken where necessary.
- Characteristics, condition and nutritional status of soils and plant species under production are determined by analyzing collected data and comparing to accepted standards.
- Appropriate Integrated soil fertility technologies are identified and determined based on agro ecological principles

**LO3. Determine the requirements for soil health and fertility improvement for crop production**

- Integrated soil fertility management principles are identified and included in the production system
- Improved Agronomic practices employed to achieve the maximum return to investments
- Program is developed to achieve appropriate soil conditions and nutrient availability for plant production based on crop production plan.
- Soil amendment management practices are determined and implemented.
- Agronomic efficiency (AE) calculated to measure the amount of additional yield obtained per kilogram of nutrient applied
- Cost-effective approach to soil management, soil amendment, and provision of plant nutrients is determined.
- Environmental implications of program are identified and documented in plant nutrition

program.

- OHS hazards associated with program are identified, risks are assessed, and controls are developed and documented.
- Resources, tools, equipment and machinery required for program are identified and coasted, and availability is confirmed with suppliers and appropriate personnel.
- Propagated plants are assessed for health, quality and viability according quality standards and principles
- Remedial procedures are planned to meet marketing objectives and business imperatives.

**LO4. Implement agro ecology principles and elements in production systems**

- Agro ecological diversity for sustainability is identified
- Knowledge of agro ecological practices that are tailored to fit the environmental, social, economic, cultural and political context are identified
- Diversified systems that selectively combine all components to enhance synergies in the context of an increasingly changing climate
- Biological, socio-economic and institutional diversity are aligned in time and space to support greater efficiency.
- Resource-use efficiency is implemented to reduce costs and the negative environmental impacts
- Recycling of nutrients, biomass and water within production systems, is implemented to increase resource use efficiency and minimize waste and pollution.
- Identify and implement agro ecology principles and elements

**LO5. Document the soil health and plant nutrition program and specifications**

- Detailed plan, objectives, specifications and associated costs are established based on program requirements.
- Detailed on-site procedures and schedules required for program are developed and documented.
- Agronomic and soil data are recorded for future planning and intervention

**LO6. Monitor and evaluate soil health, fertility and crop production program**

- Program implementation and results are monitored by soil health and fertility improvement, crop production and productivity increment.
- Program is reviewed and refined to ensure its responsiveness to changing conditions
- Non-compliance with documented objectives and specifications is identified
- Remedial action to improve soil health, fertility and plant nutrition is taken, documented

and reported to appropriate personnel according to enterprise plan

- Incorporation feed backs into a detailed plan

Annex: Resource Requirements

| AGR CRP4 M01 0422:- Managing Integrated Soil Fertility Management Technologies and Practices | | | | |
|---|---|---|---|---|
| Item No. | Category/Item | Description/ Specifications | Quantity | Recommended Ratio (Item: Trainee) |
| A. | **Learning Materials** | | | |
| 1. | TTLM | prepared by the trainer | 25 | 1:1 |
| 3 | Practical manual/operation sheet | prepared by the trainer | 25 | 1:1 |
| 3 | **Reference Books** | | | |
| 4 | Introduction to Agronomy Food, Crops, and Environment | Second edition Craig C. et al. 2012 | 5 | 1:5 |
| 5 | Handbook for Integrated Soil Fertility Management | Thomas Fairhurst CAB International 2012 | 5 | 1:5 |
| 6 | Agronomy text | B.Chandrasekaran et al. © 2010, | 25 | 1:5 |
| 7 | Integrated Soil Fertility Management (ISFM) in Sub-Saharan Africa: Concepts and practice | Bernard Vanlauwe 2010 | 6 | 6:25 |
| 8. | Journals/Publication/Magazines | | | |
| B. | **Learning Facilities & Infrastructure** | | | |
| 1. | Class room | 6x5sqm | 1 | 1:25 |
| 2. | Arm chair | 1x1.2sqm | 25 | 1:1 |
| 3. | Teachers chair | 1x1.2sqm | 1 | 1:1 |
| 4. | Teachers table | 1.5x1sqm | 1 | 1:1 |
| 5. | Black /white board | Standard | 1 | 1:25 |

| | | | | |
|---|---|---|---|---|
| 6. | Computer/lap top | Desktop | 1 | 1:25 |
| 7. | LCD Projector | Standard | 1 | 1:25 |
| 8 | Teachers uniform | White gawon | 1 | 1:25 |
| 9 | Laptop bag | ELCO | 1 | 1:25 |
| C. | **Consumable Materials** | | | |
| 1. | Duster | Silk/sponge | 1 | 1:25 |
| 2 | Chalk | | 1 packet | 1:25 |
| 3 | Marker | Erasable and dot type | 1 packet | 1:25 |
| 4 | Paper | A4 | 2 Ream | 2:25 |
| 5 | Flip chart | Sinner line | 1set | 1:1 |
| 6 | Pen | Lex | 2 Piece | 2:25 |
| 7 | Stapler | | 1pices | 1:25 |
| 8 | Steeple | | 1packet | 1:25 |
| D. | **Tools and Equipment** | | | |
| 1. | Rake | | 7 | 1:5 |
| 2 | Machetes | Crocodile | 5 | 1:7 |
| 3 | Sickles | China | 7 | 1:5 |
| 4 | Tape meter , | 10m | 7 | 1:5 |
| 5 | Hoes | | 5 | 1:7 |
| 6 | Cart | Plastic | 25 | 1:1 |
| 7 | Water can | Plastic | 5 | 1:7 |
| 8 | Knives | Steen lines steel | 5 | 1:7 |
| 9 | Dust bins | Basket | 1 | 1:25 |
| 10 | Secateurs | Steeliness steel | 25 | 1:1 |
| 11 | Dibblers | Stick | 5 | 1:7 |
| 12 | Sprayers | Plastic | 3 | 3:25 |
| 13 | Forks | | 5 | 1:7 |
| 14 | wheelbarrow | Metal | 3 | 3:25 |
| 15 | Soil Auger | t-shape | 5 | 1:7 |
| 16 | Soil Tensiometer | Ceramic at end | 5 | 1:7 |
| 17 | Oven | | 1 | 1:25 |
| 18 | Sample ring or core | Set | 1 | 1;25 |

| | | | | |
|---|---|---|---|---|
| 19 | Aerial photographs, | Standard | 1 | 1:25 |
| 20 | charts and tables of soil | USDA | 2 | 2:25 |
| 21 | air blowers | | 4 | 4:25 |
| 22 | Pumps | Pvc | 1 set | 1:25 |
| 23 | pump fittings | Pvc | 1set | 1:25 |
| 24 | Seeders | Ntfam | 1 | 1:25 |
| 25 | Seed | Kg | 20 | 20:25 |
| 26 | Compost | Cube | 1 | 1:25 |
| 27 | Urea | Kg | 20 | 20:25 |
| 26 | DAP | Kg | 20 | 20:25 |
| 27 | Lime | Kg | 20 | 20:25 |
| 28 | Steel capped boots/shoes | Rubber | 25 | 1:1 |
| 29 | safety goggles, | Glass | 25 | 1:1 |
| 30 | face mask | Glass | 25 | 1:1 |
| 31 | Ear protectors | Sponge | 25 | 1:1 |
| 32 | Overalls | Nylon | 25 | 1:1 |
| 33 | Gloves | Rubber | 25 | 1:1 |
| 34 | sun hat | Net | 25 | 1:1 |

**LEARNING MODULE 02**

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

**MODULE TITLE : Developing Production Plans for Field Crops**

**MODULE CODE : AGR CRP4 M02 0422**

**NOMINAL DURATION : 59 Hours**

**MODULE DESCRIPTION**: This module covers the knowledge, skills and attitude required to Select field crop type and variety, determine yield potential, Prepare individual field and a whole farm crop production plan and Review production plan. In addition, this unit covers monitoring, evaluation and learning of field crop production plan

**LEARNING OUTCOMES**

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

LO1.Select crop type and variety

LO2. Determine crop yield potential

LO3. Production plan for individual crop and whole farm

LO4. Implementing Production Plan

LO5. Monitor, evaluate and learning of crop production plan

**MODULE CONTENTS:**

**LO1. Selecting crop type and variety**

1.1.Selecting crop types and varieties for small-scale processors

1.2.Selection of profitable cultural practices

1.3.Crop production risks

1.4.Developing strategy for environmental risks

**LO2. Determining crop yield potential**

2.1.Sourcing relevant benchmark for yield

2.2. Analyzing past production records

2.3.Available models for calculating water, nutrients and agronomic use efficiency

2.4.Establishment of quality specifications and target yields

**LO3. Preparing production plan for individual crop and the whole farm**

3.1.Assessing crop field before selecting crop type and variety

3.2.Selection of crop variety and applying agronomic practices

3.3. Using chemical records to assist planning

3.4.Pest management for relevant crops

3.5. Planning and applying cropping calendar

3.6. Resources and budget planning

3.7.Gross margins of profit market prices and cash flow budget

3.8.Market oriented crop production

**LO4. Implementing production plan**

4.1. Logistical arrangement of production plan

4.2. Preparation of agricultural inputs

4.3 Crops establishment and management based on cropping calendar

4.4. Establishing physical and financial record keeping system

4.5. Reviewing and amending production plan

**LO5.Monitoring, evaluating and learning of crop production plan**

5.1.Monitoring, evaluation, and learning techniques of production plan

5.2.Implementation of monitoring and evaluation

5.3.Preparing and submitting feedbacks

5.4.Record keeping and documentation

**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 and Presentation

**Assessment criteria**

**LO1. Select crop type and variety**

- Crop types and varieties are assessed and selected for their market potential and gross margin returns for the farm environment.
- Most profitable cultural practices and rotations are selected consistent with pest management strategies, available machinery resources, and management for sustainability of resources.
- Production risks are identified for each crop and strategies to address these are determined.
- Environmental risks are identified and strategies developed as appropriate.
- Crop types and varieties are selected based on their potential for import substitution, raw material for agro industry and small-scale processors

**LO2. Determine crop yield potential**

- Relevant benchmark for yield are sourced, where available, to assist setting target yields.
- Past production records are analyzed to determine the key determinants of yield.
- Available models for calculating water, nutrients and agronomic use efficiency or other key determinants of yield are used, as appropriate; to assist in setting targeted yields.
- Quality specifications and target yields are established for the selected field crop.

**LO3. Prepare production plan for individual crop and the whole farm**

- Crop fields are assessed for their nutrient, pest status, water reserves, tillage requirements, and other factors before selecting crop type and variety.
- Records of chemical use are used as appropriate to assist planning to reduce chemical residue
- Crop variety is selected and Crop field preparation, planting, fertilizing and other treatments are planned.
- Optimum timing of planting, applications of input is determined and operational calendar is prepared.
- Labour, Machinery and equipment requirements are identified and planned
- Resources and budget for the cropping program is determined.

**LO4. Implementing Production Plan**

- Logistical arrangement related to production, harvesting, transportation,

marketing and other key operations are prepared based on the production plan.

- Seed, fertilizer, pest treatments and other input requirements are prepared.
- Crops establishment and management is implemented based on the cropping calendar
- Physical and financial record keeping system is established to provide data for the analysis of crop performance, and to meet other statutory requirements including records of chemical use.
- Production plan is reviewed and amended where required.

**LO5. Monitor, evaluate and learning of crop production plan**

- Monitoring and evaluation standards are determined
- Appropriate monitoring, evaluation and learning techniques are selected
- Monitoring and evaluation is implemented at every production stage as indicated in the production plan
- Feedbacks and reporting are prepared and submitted for appropriate personal.
- Modify or amend production plan, when necessary, based on the monitoring and evaluation feedbacks and reports.
- Record keeping and documentation is implemented for future use

| AGR CRP4 M02 0422:-Developing Production Plans for Field Crops | | | | |
|---|---|---|---|---|
| **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** | | | |
| 3.1 | Production and operation management | 2nd ed. S.Anil Kumar et al. 2008 | 5 | 1:5 |
| 3.2 | Encyclopedia of plant and crop science | Robert M. Good man et al. | 5 | 1:5 |
| 3.3 | Agronomy text | B.Chandrasekaran et al. 2010, | 5 | 1:5 |
| 3.4 | Crop Planning | Lee stivers 2016 | 5 | 1:5 |
| 4. | Journals/Publication/Magazines | | | |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Class room | 6x5sqm | 1 | 1:25 |
| 2. | Arm chair | 1x1.2sqm | 25 | 1:1 |
| 3. | Teachers chair | 1x1.2sqm | 1 | 1:1 |
| 4. | Teachers table | 1.5x1sqm | 1 | 1:1 |
| 5. | Black /white board | Standard | 1 | 1:25 |
| 6. | Computer/lap top | Desk top/HP | 1 | 1:25 |
| 7. | LCD Projector | Standard | 1 | 1:25 |
| 8 | Teachers uniform | White gown | 1 | 1:25 |
| 9 | Laptop bag | ELCO | 1 | 1:25 |

| | | | | |
|---|---|---|---|---|
| **C.** | **Consumable Materials** | | | |
| 1. | Duster | Hair/sponge | 1 | 1:25 |
| 2. | Chalk | Dubai | 1 packet | 1:25 |
| 3 | Marker | Dot and erasable | 1 packet | 1:25 |
| 4 | Paper | A4 | 2 Ream | 2:25 |
| 5. | Flip chart | Sinner line | 1set | 1:1 |
| 6. | Pen | Fine pen | 2 Piece | 2:25 |
| 7. | Stapler | Standard | 1pices | 1:25 |
| 8. | Steeple | Standard | 1packet | 1:25 |
| **D.** | **Tools and equipment** | | | |
| 1. | Rake | Standard | 7 | 1:5 |
| 2. | Machetes | Crocodile | 5 | 1:5 |
| 3. | Sickles | China | 7 | 7:25 |
| 4. | Tape meter | 10m | 7 | 7:25 |
| 5. | Secateurs | Stainless steel | 5 | 1:5 |
| 6. | Forks | Standard | 5 | 1:5 |
| 7. | Cart | Plastic | 25 | 1:1 |
| 8. | Water can | Plastic | 5 | 1:5 |
| 9. | Knives | Stainless steel | 5 | 1:5 |
| 10. | Dust bins | Basket | 1 | 1:5 |
| 11. | Sprayers | Plastic | 3 | 3:25 |
| 12. | wheelbarrow | Metal | 3 | 3:25 |
| 13. | Aerial photographs /camera | Standard | 1 | 1:25 |
| 14. | boots/shoes | Rubber | 25 | 1:1 |
| 15. | safety goggles, | Glass | 25 | 1:1 |
| 16. | ace mask | Plastic | 25 | 1:1 |
| 17. | Ear protectors | Sponge | 25 | 1:1 |
| 18. | Overalls | Nylon | 25 | 1:1 |
| 19. | Gloves | Rubber | 25 | 1:1 |
| 20. | sun hat | Water proof | 25 | 1:1 |

**LEARNING MODULE 03**

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

**MODULE TITLE : Developing Production Plans for Horticultural Crops**

**MODULE CODE : AGR CRP4 M03 0422**

**NOMINAL DURATION : 66 Hours**

**MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude required to select horticultural crop type and variety, determine yield potential, prepare individual crop and a whole farm production plan. In addition, the unit covers major points on greenhouse establishment and maintenance; and reviewing whole farm production plan.

**LEARNING OUTCOMES**

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

LO 1. Select horticultural crop type and variety

LO2. Determine yield potential for horticultural crop

LO3. Greenhouse management

LO4. Prepare production plan for individual horticultural crop and whole farm

LO5. Implementing production plan

LO6 Monitor, evaluate and learning of crop production plan

**MODULE CONTENTS:**

**LO1. Selecting horticultural crop type and variety**

1.1 Assessing and selecting horticultural crop types and varieties

1.2 Selecting profitable cultural practices

1.3 Identification of production risks

1.4 Identifying and developing strategies of environmental risks

1.5 Selecting horticultural crop types and varieties

1.5.1 Potential for Import substitution,

1.5.2 Export potential,

1.5.3 Raw material for agro industry

1.5.4 Small-scale processors

**LO2. Determining yield potential for horticultural crop**

2.1 Sourcing relevant benchmark for yield

2.2. Analyzing past production records

2.3. Available models for calculating water, nutrients and agronomic use efficiency

2.4 Prepare budgets and gross margins of profit

2.5 Market prices and cash flow budgets

2.6. Establishing quality specifications and target yields

**LO3. Greenhouse management**

3.1 Specific criteria and materials for greenhouse establishment

3.2 . Site selection and green house establishment

3.3 Preparing greenhouse management plan

3.4 Determining proper planting methods

3.5 Selecting and confirming equipment and tools against work plan

3.6 Selecting fertilizer and amendments based on growth stage

3.7 Identifying and preparing growing media

3.8 Applying agronomic management practices

3.9 Identifying and applying pest management practices

3.10 Identifying existing and potential OHS hazards and risks

3.11 Reporting and documenting greenhouse activities

**LO4. Preparing production plan for individual horticultural crop and whole farm**

4.1 Assessing field factors before selecting crop type and variety

4.2 Chemical use records and planning to reduce residue

4.3 Selecting and field preparation horticultural crop variety

4.4 Determining optimum timing of planting and applications of input

4.5 Identifying and planning labour, Machinery and equipment

4.6 Preparing production plan

**LO5 Implementing production plan**

5.1 Preparing logistical arrangement

5.2 Preparing seed, fertilizer, pest treatments and other input requirements

5.3 Planning and checking machinery, equipment and tools

5.4 Implementing crops establishment and management cropping calendar

5.5 Establishing physical and financial record keeping system

5.6 Reviewing and amending production plan

**LO6. Monitoring, evaluating and learning of crop production plan**

6.1 Determining monitoring and evaluation standards

6.2 Selecting appropriate monitoring, evaluation and learning techniques

6.3 Implementing monitoring and evaluation production plan

6.4 Preparing and submitting feedbacks and reporting

6.5 Modify or amend production plan

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| 6.6 Implementing record keeping and documentation |
| **LEARNING METHODS:** |
| • Lecture and discussion<br>• Braine storming<br>• Practical démonstration<br>• Practical exercice<br>• Audio Visual |
| **ASSESSMENT METHODS:** |
| • Written test<br>• Oral questioning<br>• Practical<br>• Assignment<br>• Presentation |

**ASSESSMENT CRITERIA:**

**LO1. Select horticultural crop type and variety**

- Horticultural crop types and varieties are assessed and selected for their market potential and gross margin returns for the farm environment.
- Most profitable cultural practices and rotations are selected consistent with pest management strategies, available machinery resources, and management for sustainability of resources.
- Production risks are identified for each crop and strategies to address these are determined.
- Environmental risks are identified and strategies developed as appropriate.
- Horticultural crop types and varieties are selected based on their potential for Import substitution, export potential, raw material for agro industry and small-scale processors

**LO2. Determine yield potential for horticultural crop**

- Relevant benchmark for yield are sourced, where available, to assist setting target yields.
- Past production records are analyzed to determine the key determinants of yield.
- Available models for calculating water, nutrients and agronomic use efficiency or other key determinants of yield are used, as appropriate; to assist in setting targeted yields.
- Quality specifications and target yields are established for the selected horticultural crop.

**LO3. Greenhouse management**

- Specific criteria and materials for greenhouse establishment are identified.
- Site selection and green house establishment is performed based on the identified criteria
- Green house management plan is prepared
- Proper planting methods are determined based on the crop type
- Basic equipment and tools are selected and confirmed against the work plan and prepared to manufacturer's specifications.
- Fertilizer and amendments are selected based on greenhouse standard for growth stages.
- Identified and prepared growing media in accordance with production requirements.
- Apply agronomic management practices according to the requirements and greenhouse management procedures
- Pest management practices are identified and applied in line with crop type and level of infestation
- Existing and potential OHS hazards in the workplace are identified, risks assessed and controlled in line with organization requirements
- Greenhouse activities are reported and documented

**LO4. Prepare production plan for individual horticultural crop and whole farm**

- Fields are assessed for their nutrient, pest status, water reserves, tillage requirements, and other

factors before selecting crop type and variety.

- Records of chemical use are used as appropriate to assist planning to reduce chemical residue
- Horticultural crop variety is selected and field preparation, planting; fertilizing and other treatments are planned.
- Optimum timing of planting, applications of input is determined and operational calendar is prepared.
- Labour, Machinery and equipment requirements are identified and planned
- Production plan is prepared

**LO5. Implementing production plan**

- Logistical arrangement related to production, harvesting, transportation, marketing and other key operations are prepared based on the production plan
- Seed, fertilizer, pest treatments and other input requirements are prepared.
- Machinery, equipment and tools requirements are planned and checked for the horticultural crop production cycle.
- Crops establishment and management is implemented based on the cropping calendar
- Physical and financial record keeping system is established to provide data for the analysis of crop performance, and to meet other statutory requirements including records of chemical use.
- Production plan is reviewed and amended where required.

**LO6. Monitor, evaluate and learning of crop production plan**

- Monitoring and evaluation standards are determined
- Appropriate monitoring, evaluation and learning techniques are selected
- Monitoring and evaluation is implemented at every production stage as indicated in the production plan
- Feedbacks and reporting are prepared and submitted for appropriate personal.
- Modify or amend production plan, when necessary, based on the monitoring and evaluation feedbacks and reports.
- Record keeping and documentation is implemented for future use

**Annex: Resource Requirements**

| AGR CRP4 M03 0422 Developing Production Plans for Horticultural Crops | | | | |
|---|---|---|---|---|
| **Item No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| **A.** | **Learning Materials** | | | |
| 1. | **TTLM** | prepared by the trainer | 25 | 1:25 |
| 2 | Practical manual/operation sheet | prepared by the trainer | 25 | |
| 3. | **Reference Books** | | | |
| 3.1 | horticulture development | government of india planning commission 2001 | 5 | 1:5 |
| 4. | Journals/Publication/Magazines | | | |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Lecture room / work shop | $1.2m^2$ | 1 | 1:25 |
| 2. | Library | $1.7m^2$ | 1 | 1:25 |
| 3. | Electricity | Standard | 1 | 1:25 |
| **C.** | **Consumable Materials** | | | |
| 1. | Copy paper | A4 size | 5 rim | 1:5 |
| 2 | Flip chart | Rim | 5 rim | 1:5 |
| 3 | White board | Standard | 1 | 1:25 |
| 4 | White board marker | No | 25 | 1:1 |
| 5 | Marker | Permanent | 25 | 1:1 |
| **D.** | **Tools and Equipments** | | | |
| 1 | Galvanized steel | Standard | 1 | 1:25 |
| 2 | Iron and aluminium | Standard | 1 | 1:25 |
| 3 | Concrete | Standard | 1 | 1:25 |
| 4 | Plastic Films | Standard | 1 | 1:25 |
| 5 | Rigid plastics | Standard | 1 | 1:25 |
| 6 | Seed driller | Single row manually | 1 | 1:25 |

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|---|---|---|---|---|
| | | operated seed drill: forl large-size vegetable and grain seeds large grain seed | | |
| 7 | Plough | chisel ploughs | | 1:25 |
| 8 | Harrower | Heavy Grass, 7'-6", 1/2" dia. x 2 1/2", -, 160 ; Chain and Spike, 7'-6", 1/2" dia. x 3 1/2", -, 195 ... | 1 | 1:25 |
| 9 | Augers and bins | tractor mounted spring loaded cultivators | 1 | 1:25 |
| 10 | Row planters | 6, 8 and 10” diameter augers fit bins from 18 to 60' in diameter | 1 | 1:25 |
| 11 | Row maker | Pull-Type Planter, 8-row Rigid, 12-row, 16-row, or 24-row Centerflex ... cylinders and NG Plus 2 row units with seed hopper and lid | 1 | 1:25 |
| 12 | Ditcher, ridge maker | Standard | 1 | 1:25 |
| 13 | Motorized knapsack power sprayer | 15-25 kg/cm², output: 6-8 Ltr/min; equipped with brass metal pump | 1 | 1:25 |
| 14 | Fertilizer applicator or spreader | Standard | 1 | 1:25 |

**LEARNING MODULE 04**

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

**MODULE TITLE : Plan and implement organic farm production**

**MODULE CODE : AGR CRP3 M04 0422**

**NOMINAL DURATION : 45 Hours**

**MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude required to assess soil-related factors for organic farming, assess soil health and fertility indicators, select and implement allowable techniques and inputs for organic farming, implement, monitor and evaluate organic farming activities, maintain quality standard of the products of organic farming and document organic farming program

**LEARNING OUTCOMES**

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

LO1. Assess soil-related factors for organic farming

LO2. Assess soil health and fertility indicators

LO3. Select and implement allowable techniques and inputs for organic farming

LO4. Implement, monitor and evaluate organic farming activities

LO5. Maintain quality standard of the products of organic farming

LO6. Document organic farming program

**MODULE CONTENTS:**

**LO1. Assessing soil-related factors for organic farming**

1.1. Crop types and nutritional requirements

1.2. Selection of soil analysis and testing facilities

1.3. Conducting sample collection of soil and plant tissue

1.4. Analyzing results of soil and plant tissue testing

1.5. Assessing soil condition for drainage

1.6. Identifying and evaluating soil biological activity

1.7. Identify and operate equipment safely

**LO2. Assessing soil health and fertility indicators**

2.1. Principles of organic agriculture

2.2. Assessing soil health

2.3. Soil biology, chemical and physical conditions

**LO3. Selecting and implement allowable techniques and inputs for organic farming**

3.1. Identification of allowable inputs based on national standard

3.2. Nutrient cycling techniques

3.3. Calculating appropriate inputs

3.4. Selection and managing cover crop and pasture systems

3.5. Organic soil fertility improvement and cultural practices

3.6. Cropping systems

**LO4. Implementing, monitoring and evaluating organic farming activities**

4.1. Principles of organic farming

4.2. Essential characteristics of organic farming

4.3. Monitoring soil biodiversity

4.4. Taking remedial action to improve organic farming production

**LO5. Maintaining quality standard of the products of organic farming**

5.1. Confirm organic farming principles

5.2. Maintaining ensure soil biodiversity

5.3. labeling correct design specifications for products

5.4. Archiving documentation of operation, and accredited certification

**LO6. Documenting organic farming program**

6.1. Establishing plan, objectives, specifications and associated costs

6.2. Developing and documenting on-site procedures and schedules

6.3 Recording production and soil data for future planning

**LEARNING METHODS:**

- Lecture
- Discussion
- Demonstration
- Role playing

**ASSESSMENT METHODS:**

- Written test with Oral questioning
- Practical demonstration

**ASSESSMENT CRITERIA:**

LO1. Assess soil-related factors for organic farming

- Nutritional requirements for selected crop types are identified.
- Soil analysis and suitable testing facilities are selected.
- Soil and plant tissue sample collection is conducted according to organization procedures and requirements of testing facility.
- Results of soil and tissue testing are analyzed in relation to requirements of the farming system.
- Soil condition is assessed for drainage, compaction, aeration, water infiltration and moisture conservation techniques in relation to requirements for desired crop growth for selected crop type
- Soil biological activity is assessed by identifying and evaluating presence of organisms

**LO2. Assess soil health and fertility indicators**

- Work is undertaken in an environmentally appropriate manner and according to workplace information, principles of organic agriculture, occupational health and safety requirements.
- Soil health is assessed by identifying and evaluating plant species present.
- Soil acidity or alkalinity (pH), mineral balances, organic matter levels, and plant performances are assessed and recorded.
- Soil texture, structure, color, salinity and sodicity are assessed and recorded.
- Results are analyzed to identify trends and areas for improvement

**LO3. Select and implement allowable techniques and inputs for organic farming**

- Range of allowable inputs are identified according to requirements of the National Standard for Organic and Biodynamic Produce.
- Suitable nutrient cycling techniques are identified, evaluated and implemented.
- Appropriate inputs are calculated based on soil/plant analyses, crop removal and plant/animal observations.
- Cover crop and pasture systems are selected and managed.
- Organic Soil fertility improvement practices and cultural practices are developed, applied and monitored.
- Cropping systems are designed and implemented to improve soil fertility.

**LO4. Implement, monitor and evaluate organic farming activities**

- Principles of organic farming required for the program are developed and implemented

- Essential characteristics of organic farming identified and implemented
- Program implementation and results are monitored in terms of soil biodiversity according to industry practice.
- Organic farming program is reviewed and refined to ensure it is responsive to changing conditions
- Remedial action to improve organic farming production is taken, documented and reported to appropriate personnel according to organization plan

**LO5. Maintain quality standard of the products of organic farming**

- Confirm organic farming principles are implemented according to the organization guideline
- Ensure soil biodiversity is maintained throughout the production processes
- Ensure that products are properly labelled and have the correct design specifications
- Ensure that adequate documentation of operation, and accredited certification are archived.

**LO6. Document organic farming program**

- Detailed plan, objectives, specifications and associated costs are established based on program requirements and presented to appropriate body/personnel.
- Detailed on-site procedures and schedules required for program are developed and documented
- Production and soil data are recorded for future planning and intervention

**Annex: Resource Requirements**

| AGR CRP2 M04 0422: Plan and implement organic farm production | | | | |
|---|---|---|---|---|
| **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 | prepared by the trainer | 25 | 1:25 |
| 3 | **Reference Books** | | | |
| 3.1 | https://permaculturenews.org/2016/01/19/what-are-effective-microorganisms, | | 1 | 1:25 |
| 3.2 | http://www.agritech.tnau.ac.in/org_farm/orgfarm_effective%20microorganism.html.. | | 1 | 1:25 |
| 3.3 | https://www.smilinggardener.com/soil-food-web/how-to-make-effective-microorganisms/Accessed . | | 1 | 1:25 |
| 3.4 | https://www.biotechnologyforums.com/thread-1664.html/Accessed on Thuesday, October22, 2019. | | 1 | 1:25 |
| 3.5 | Manures – types, composition and value sources http://www.eagri.org/eagri50/ | | 1 | 1:25 |

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| 3.6 | Methods of fertilization application/ https://cststudy.blogspot.com/2018/02/methods-of-fertilizer-application.html | | 1 | 1:25 |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Lecture room / work shop | 1.2$m^2$ | 1 | 1:25 |
| 2. | Library | 1.7$m^2$ | 1 | 1:25 |
| 3. | Electricity | Standard | 1 | |
| **C.** | **Consumable Materials** | | | |
| 1. | Copy paper | A4 size | 5 rim | 1:5 |
| 2 | Flip chart | Rim | 5 rim | 1:5 |
| 3 | White board | Standard | 1 | 1:25 |
| 4 | White board marker | No | 25 | 1:1 |
| 5 | Marker | Permanent | 25 | 1:1 |

| LEARNING MODULE 05 |
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| TVET-PROGRAMME TITLE: **Crop Production Level IV** |
| MODULE TITLE : **Planning horticultural crops propagation program** |
| MODULE CODE : **AGR CRP4 M05 0422** |
| NOMINAL DURATION : **45** Hours |
| **MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude of Carry out preliminary planning activities for horticultural crop propagation program, Develop the propagation plan, Implement propagation plan and monitor success of propagation. |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to:<br>LO1. Carry out preliminary planning activities for horticultural crop propagation program<br>LO2. Develop the propagation plan<br>LO3. Implement propagation plan and monitor success of propagation |
| **MODULE CONTENTS**:<br>**LO1. Carrying out preliminary planning activities for horticultural crop propagation program**<br>1.1. Management activities and marketing requirements<br>1.2. Monitoring and forecast weather and climate information<br>1.3. Area requirements for propagation<br>1.4. Propagation techniques for horticultural crop<br>1.5. OHS hazards and risks assessment<br>**LO2. Developing the propagation plan**<br>2.1. Identifying input requirement<br>2.2. Sterilize propagation equipment and tools<br>2.3. Propagation media requirements for horticultural crop<br>2.4. Determining strategies to modify environmental conditions<br>2.5. Selection criteria for propagation material<br>2.6. Determining budget for propagation program<br>2.7. Hygiene requirements for propagation activities<br>2.8. Preparing propagation plan and schedule |

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| **LO3. Implementing propagation plan and monitor success of propagation**<br>3.1. Accurate time of propagations<br>3.2. Implement propagation plan<br>3.3. Identify parent materials (Scion and rootstock)<br>3.4. Identifying and recording plan and schedule activities<br>3.5.Assessing propagated plants<br>3.6. Performance and success of propagation<br>3.7. Acclimatization/hardening of propagated seedlings<br>3.8. Planning remedial procedures for marketing objectives and business imperatives |
| **LEARNING METHODS:** |
| • Lecture and discussion<br>• Braine storming<br>• Practical demonstration<br>• Practical exercise<br>• Audio visual<br>• Role playing |
| **ASSESSMENT METHODS:** |
| • Written test<br>• Oral questioning<br>• Practical<br>• Assignment<br>• Presentation |

**ASSESSMENT CRITERIA:**

**LO1.Carry out preliminary planning activities for Horticultural crop propagation program**

- Management activities and marketing requirements are confirmed and understood
- Weather and climate information and forecast are regularly monitored to determine likely conditions.
- Area requirements for propagation program are evaluated
- Propagation techniques are determined according to horticultural crop type and sound practice
- OHS hazards associated with the propagation program are identified and risks assessed

**LO2. Develop the propagation plan**

- Labour, materials, equipment and machinery needs are identified
- Propagation media requirements are determined according to the propagation method and needs of the horticultural crops
- Strategies to modify environmental conditions are determined according to the type of horticultural crops and propagation method used
- Selection criteria for propagation material are determined according to the type of horticultural crops and propagation method
- Budget for the propagation programs is determined
- Hygiene requirements for propagation activities are determined
- Propagation plan and schedule of activities are prepared and communicated clearly to staff.

**LO3. Implement propagation plan and monitor success of propagation**

- Propagation is implemented based on propagation plan and following standard procedures and principles
- Variances from plan and scheduled activities are identified and recorded
- Propagated plants are assessed for health, quality and viability according quality standards and principles
- Remedial procedures are planned to meet marketing objectives and business imperatives.

**Annex: Resource Requirements**

| AGR CRP4 M05 0422 Plan horticultural crops propagation program | | | | |
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| **Item No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| **A.** | **Learning Materials** | | | |
| 1. | TTLM | prepared by the trainer | 25 | 1:1 |
| 2 | Operation sheet | Prepared by teachers | 25 | 1:1 |
| 3. | Reference Books | | | |
| 3.1 | Fruit Crops Production and Management | Module 12 Student's Practical Guidebook 2019 | 5pcs | 1:5 |
| 3.2 | Horticulture Nursery Management | Developed under Indian Council of Agricultural Research, New Delhi - 110012 | 5pcs | 1:5 |
| 4. | Journals/Publication/Magazines | | | |
| 4.1 | | | | |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Class room | 1.2$m^2$ | 1 | 1:25 |
| 2. | Arm chair | Length 82cmx47cmx42cm | 25 | 1:1 |
| 3 | Workshop | 6 | 1 | 1:25 |
| 4 | Library | 1.7 $m^2$ | 1 | 1:25 |
| 5 | Teachers chair | Length 82cmx47cmx42cm | 1 | 1:1 |

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|---|---|---|---|---|
| 6 | Teachers table | | 1 | 1:1 |
| 7 | Black /white board | | 1 | 1:25 |
| 8 | Computer | Desktop | 5 | 1:5 |
| 9 | LCD Projector | Sony | 1 | 1:25 |
| **C.** | **Consumable Materials** | | | |
| 1. | Duster ( white/black board) | | 1 | 1:25 |
| 2 | Chalk | | 1 packet | 1:25 |
| 3 | Marker | | 1 packet | 1:25 |
| 4 | Paper | A4 | 2 Ream | 2:25 |
| 5 | Flip chart | 23”32” | 25 | 1:1 |
| 6 | Pen | | 2 Piece | 2:25 |
| 7 | Labels | | 10 | 10:25 |
| 8 | Grafting wrap or tape | Polyolefin plastic | 1 roll | 1:25 |
| 9 | Grafting wax | ASTM D-938 | 1ltr | 1:25 |
| 10 | Fertilizers<br>NPS<br>Urea<br>DAP | kg | <br>4<br>2<br>4 | <br>4:25<br>4:25<br>4:25 |
| **D.** | **Tools and Equipment** | | | |
| 1. | Meter tape | 50 m | 5 | 1:5 |
| 2 | Heaters | 2000W Electric | 1 | 1:25 |
| 3 | Coolers | Mini 3-speed<br>Portable | 5 | 1:5 |
| 4 | Backpack spray/Knapsack sprayer | Diaphragm<br>Piston | 5<br>5 | 1:5<br>1:5 |
| 5 | Secateurs | Hardened steel length 230 mm, weight 250gm | 10 | 10:25 |
| 6 | Razor blades | | 10 | 10:25 |

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| 7 | Sharpening stone | Diamond coating length 10cm, weight 100g | 1 | 1:25 |
| 8 | Strop | | 5 | 1:5 |
| 9 | grafting machine | Carbon Steel | 5 | 1:5 |
| 10 | plastic containers | | 5 | 1:5 |
| 11 | Trays | | 5 | 1:5 |
| 12 | vermiculite boxes | | 5 | 1:5 |
| 13 | Wheelbarrow | Weight 150kg dimension 1200x700x800mm | 1 | 1:25 |
| 14 | Trolley | | 5 | 1:5 |
| 15 | Shovel | | 5 | 1:5 |
| 16 | Dibblers | Stainless steel | 1 | 1:25 |
| 17 | rubbish bins | | 5 | 1:5 |
| 18 | budding knife | Rubber strips | 5 | 1:5 |
| 19 | Grafting knife | Stainless steel of length max 13cm | 5 | 1:5 |
| 20 | Pruning saw | Length 420 mm, blade 240 mm | 5 | 1:5 |
| 21 | Chisel | | 5 | 1:5 |
| 22 | Hat | | 25 | 1:1 |
| 23 | Boots | Steel-toe boots | 25 | 1:1 |
| 24 | Gloves | Leather gloves | 25 | 1:1 |
| 25 | Overalls | Khaki | 25 | 1;1 |
| 26 | Goggles | Plastic | 25 | 1;1 |
| 27 | respirator/face mask | Crew mask | 25 | 1;1 |
| 28 | Sunscreen lotion | | 25 | 1;1 |
| 29 | First aid Kits | Gym first aid kit | 5 | 5:25 |

| LEARNING MODULE 06 |
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| TVET-PROGRAMME TITLE: **Crop Production Level IV** |
| MODULE TITLE : **Planning and implement crop pest management practices** |
| MODULE CODE : **AGR CRP4 06 0422** |
| NOMINAL DURATION : 66 Hours |
| **MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude of Plan to perform field surveillance for a specific pest, Identify pest management options and prepare action plan, Apply cultural and biological crop pest management methods, Implement chemical use program, Ensure the correct selection and application of chemicals and Coordinate contingency plan and document reports. |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to:<br>LO1. Plan to perform field surveillance for a specific pest<br>LO2. Identify pest management options and prepare action plan<br>LO3. Apply cultural and biological crop pest management methods<br>LO4. Implement chemical use program<br>LO5. Ensure the correct selection and application of chemicals<br>LO6. Coordinate contingency plan and document reports |
| **MODULE CONTENTS**:<br>**LO1. Planning to perform field surveillance for a specific pest**<br>1.1. Signs and symptoms of crop pests<br>1.2. Collecting, handling, packaging and dispatching of diagnostic samples<br>1.3. Managing pest outbreak<br>1.4. Collecting and reporting of pest outbreak<br>**LO2. Identifying pest management options and prepare action plan**<br>2.1. Identifying resources to crop pest management activities<br>2.2. Identifying crop pest managemental options<br>2.3. Consulting relevant stakeholders<br>2.4. Scheduling and planning pest management with legislations and regulations<br>2.5. Checking materials and PPE with OHS standards |

2.6. Selecting, scheduling, monitoring and measurement activities

**LO3. Applying cultural and biological crop pest management methods**

3.1. Type of pest occurrence

3.2. Identifying cultural and biological control methods

3.3. Resources for crop pest management

3.4. Implementing and evaluating biological pest control methods

**LO4. Implementing chemical use program**

4.1 Chemical requirements for pest managements

4.2 Types of chemical and modes of action

4.3 Safety hazards of transport and storage

4.4 Identifying risk control measures for chemical use

4.5 Determining threshold level for chemical applications

4.6 Emergency plant pest control procedures

4.7 Life cycle of pests and target stages

4.8 Applying chemical for infestation field

4.9 Pest resistance to chemicals

4.10 Implementing a maintenance program

4.11 Implementing recording systems for chemical storage and use

4.12 Precautions during handling and disposal of pesticides

**LO5. Ensuring the correct selection and application of chemicals**

5.1. Identifying, reading and interpreting chemicals for application

5.2. Selection of application equipment

5.3. Implementing calibration of equipment

5.4. Implementing pre-operative checks and maintenance procedures

5.5. Assessing meteorological conditions for chemical application

5.6. Considering ecological systems

5.7. Conducting chemical application

5.8. Dealt chemical spills or accidents

5.9. First aid and emergency procedures

**LO6. Coordinate contingency plan and document reports**

6.1. Identifying potential risks

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| 6.2. Coordinating contingency plans<br>6.3. Reporting contingency plan problem and status<br>6.4. Documenting relevant information<br>6.5 Applying disposal of packaging materials, left over chemicals and washing of equipments |
| **LEARNING METHODS:** |
| • Lecture and discussion<br>• Braine storming<br>• Practical demonstration<br>• Practical exercise<br>• Audio visual<br>• Role playing |
| **ASSESSMENT METHODS:** |
| • Written test<br>• Oral questioning<br>• Practical<br>• Assignment<br>• Presentation |

**ASSESSMENT CRITERIA:**

**LO1. Plan to perform field surveillance for a specific pest**

- Recognize signs or symptoms for crop pests
- Diagnostic samples are collected, handled, packaged and dispatched according to relevant standards and protocols
- Appropriate measures are identified to manage pest outbreak
- Information relevant to management of plant pest outbreak is collected and reported to surveillance coordinator

**LO2. Identify pest management options and prepare action plan**

- Identify resources, personals, machineries, materials and tools to carry out crop pest management's activities
- Crop pest manage mental options are identified
- Relevant stakeholders are consulted regarding the scheduling of activities
- Schedule and planning pest management activities in consideration with pest management strategy, community attitudes, and in accordance with relevant legislations and regulations
- Materials and Personal protective equipment are checked for compliance with OHS standards
- Monitoring and measurement activities are selected and scheduled to comply with the crop pests

**LO3. Apply cultural and biological crop pest management methods**

- Identify the type of pest occurred
- Identify the suitable cultural, and biological pest control methods
- Available resources are mobilized for crop pest management
- Biological crop pest control methods are implemented and evaluated

**LO4. Implement chemical use program**

- Chemical requirements are identified for pest managements
- Safety hazards in the transport, storage and application of the chemicals are identified
- Risk control measures are identified to minimize risk involved in chemical use
- Chemical is applied to the infested field by considering appropriate time, safety pre-questions and environmental conditions.

- Implement a maintenance program for application and personal protective equipment
- Implement recording systems for chemical storage and use
- Take appropriate precautions during handling and disposal of pesticides.

**LO5. Ensure the correct selection and application of chemicals**

- Suitable chemicals are identified, and procedures for preparation, application and risk controls are read and interpreted.
- Application equipments are selected in accordance with procedures.
- Ensure calibration of equipment is implemented according to directions and standards.
- Pre-operative checks and maintenance procedures are implemented.
- Meteorological conditions are assessed as appropriate to application prior to and during chemical application.
- Chemical application is conducted safely in accordance with hazards associated with the chemicals concerned.
- Chemical spills or accidents are dealt with according to procedures.

**LO6. Coordinate contingency plan and document reports**

- potential risks are Identified
- Prefer contingency plans are coordinated
- Contingency plan problem and status are reported
- Relevant information is documented for continual analysis and effective planning management

**Annex: Resource Requirements**

| AGR CRP4 M06 0422 Planning and implement crop pest management practices | | | | |
|---|---|---|---|---|
| **Item No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| **A.** | **Learning Materials** | | | |
| 1. | TTLM | prepared by the trainer | 25 | 1:1 |
| 2 | Operation sheet | Prepared by teachers | 25 | 1:1 |
| 3. | Reference Books | | | |
| 3.1 | Insect Pest Management | 2nd Edited | 5 | 1:5 |
| 3.2 | Pest and Disease Management Handbook | Edited by David V Alford | 5 | 1:5 |
| 4. | Journals/Publication/Magazines | | | |
| 4.1 | | | | |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Class room | 1.2m$^2$ | 1 | 1:25 |
| 2. | Arm chair | | 25 | 1:1 |
| 3 | Workshop | 6 | 1 | 1:25 |
| 4 | Library | 1.7 m$^2$ | 1 | 1:25 |
| 5 | Teachers chair | | 1 | 1:1 |
| 6 | Teachers table | | 1 | 1:1 |
| 7 | Black /white board | | 1 | 1:25 |
| 8 | Computer | Desktop | 5 | 1:5 |
| 9 | LCD Projector | | 1 | 1:25 |
| **C.** | **Consumable Materials** | | | |
| 1. | Duster ( white/black board) | | 1 | 1:25 |
| 2 | Chalk | | 1 packet | 1:25 |

| | | | | |
|---|---|---|---|---|
| 3 | Marker | | 1 packet | 1:25 |
| 4 | Paper | A4 | 2 Ream | 2:25 |
| 5 | Flip chart | 23”32” | 25 | 1:1 |
| 6 | Pen | | 2 Pcs | 2:25 |
| 7 | Labels | | 10 pcs | 10:25 |
| 8 | Pesticide | Herbicide, insecticide, fungicide | 3 each | 3:25 |
| **D.** | **Tools and Equipments** | | | |
| 1. | Meter tape | 50 meter length | 5 pcs | 1:5 |
| 2 | Drench guns | | 1 | 1:25 |
| 3 | Boom sprays | SLBS200 | 5 | 1:5 |
| 4 | pressure wand | | 5 | 1:5 |
| 5 | air blast sprayer | N160 | 5 | 1:5 |
| 6 | Backpack spray/Knapsack sprayer | Diaphragm<br>Piston | 5<br>5 | 1:5<br>1:5 |
| 7 | Jetting race, | | 1 | 1:25 |
| 8 | Hand jetting | | 1 | 1:25 |
| 9 | Shower/plunge dips | | 1 | 1:25 |
| 10 | String rope | Nylon | 5 | 1:5 |
| 11 | Bucket | Plastic | 5 | 1:5 |
| 12 | Graduated cylinder | 200ML | 5 | 1:5 |
| 13 | Sensitive balance | Bench scales | 1 | 1:25 |
| 14 | Container | plastic | 5 | 1:5 |
| 15 | Hat | Water proof | 25 | 1:1 |
| 16 | Boots | Rubber | 25 | 1:1 |
| 17 | Gloves | Rubber | 25 | 1:1 |
| 18 | Overalls | kaki | 25 | 1:1 |
| 19 | Goggles | | 25 | 1:1 |
| 20 | respirator/face mask | Crew mask | 25 | 1:1 |

| | | | | |
|---|---|---|---|---|
| 21 | Sunscreen lotion | | 25 | 1:1 |
| 22 | First aid Kits | | 5 | 1:5 |

| LEARNING MODULE 07 |
|---|
| TVET-PROGRAMME TITLE: **Crop Production Level IV** |
| MODULE TITLE : **Managing and implementing quality standards in storage** |
| MODULE CODE : **AGR CRP4 07 0422** |
| NOMINAL DURATION : **42** Hours |
| **MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude of assessing and maintaining hygiene in the storage areas, monitor produce from arrival to dispatch, monitor and maintain produce conditions in storage as well as control pests in storage area. |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to:<br>**LO1.** Maintain hygiene in storage areas<br>**LO2.** Monitor crop produce arrival and dispatch<br>**LO3**. Monitor and maintain crop produce conditions in storage<br>**LO.4.** Control storage pests |
| **MODULE CONTENTS:**<br>**LO1. Maintaining hygiene in storage areas**<br>1.1.Selection of storage facilities<br>1.2.Identification of problems of storage facility<br>1.3.Insect life cycles and optimum conditions for development<br>1.4.Assessment of Storage conditions<br>1.5.Identification and implementation of storage systems and purpose of storages<br>1.6. Identifying the need for repairs and maintenance<br>1.7.Applying treatments to storage facilities<br>1.8.Preparing storage plan<br>1.9.Recording the application of all treatments used is in storage program.<br>**LO2. Monitoring crop produce arrival and dispatch**<br>2.1. Taking samples before storing crop produce.<br>2.2. Calculate mass and volumes of grain and horticultural produce<br>2.3. Checking quality of the produce at dispatch.<br>2.4. Taking, preparing and forwarding test samples for analysis. |

2.5. Selecting transportation facilities

2.6. Undertaking all activities around the storage facilities based on OHS guidelines.

**LO3. Monitoring and maintaining crop produce conditions in storage**

3.1. Identifying options for maintaining or improving produce quality.

3.2. Conducting regular checks of storage to avoid contaminants and deterioration.

3.3. Conducting periodical checks of long-term storage for quality factors and viability

3.4. Creating, maintaining and keeping clear and accurate records of tests and inspections.

3.5. Monitoring condition of storage facilities using schedule and methods outlined.

3.6. Taking appropriate corrective action to maintain the quality of stored produce

3.7. Undertaking crop produce waste disposal

**LO.4. Controlling storage pests**

4.1. Identification of storage pest

4.2. Monitoring crop produce

4.3. Taking samples of stored produce to test for pest infestation.

4.4. Controlling storage pests

4.5. Fumigating enclosed storage area and following integrated pest management strategy.

4.6. Identifying the sources of any infestations and taking action to control them.

4.7. Undertaking pest control activities in line with the OHS hazard guidelines.

4.8. Chemical handing and dangerous goods requirements

4.9. Recording and reporting treatments made to the stored produce and storage facilities.

**LEARNING METHODS:**

- Lecture and discussion
- Demonstration
- Simulation
- Role playing

**ASSESSMENT METHODS:**

- Written test with Oral questioning
- Practical demonstration

**ASSESSMENT CRITERIA:**

**LO1 Maintain hygiene in storage areas**

- Storage facilities selected based on availability, cost and crop type
- Problems of storage facility condition are identified.

- Storage conditions are assessed to maintain the standards of hygiene in the stored crop produce.
- Storage systems and purpose of storages are identified and implemented.
- The need for repairs and maintenance is identified, and either carried out or a report of the need is made.
- Treatments are applied to storage facilities to maintain hygiene standards and in line with the storage program.
- Storage plan is prepared according to the organization objective and guidelines.
- The application of all treatments used is recorded in line with the storage program.

**LO2 Monitor crop produce arrival and dispatch**

- Before crop produce is stored samples are taken for testing to ensure a complete record of the quality standards.
- At dispatch, the produce is checked for quality and against the records taken at the point of storage.
- Test samples are taken, prepared and forwarded for analysis according to prescribed guidelines.
- Transportation facilities are selected based on the type of produce
- All activities around the storage facilities are undertaken according to the OHS guidelines detailed in the crop storage program.

**LO3 Monitor and maintain crop produce conditions in storage**

- Options for maintaining or improving produce quality are identified.
- Regular checks of storage are conducted to maintain continued freedom from contaminants and deterioration.
- Periodical checks of long-term storage are conducted for quality factors and viability according to organization requirements.
- Where test samples are required, they are taken, prepared and forwarded for analysis according to industry quality assurance and laboratory requirements.
- Clear and accurate records of tests and inspections are created, maintained and kept as described in the storage program.
- The condition of storage facilities is monitored using the schedule and methods outlined

in the storage program.

- Where it is required, appropriate corrective action is taken to maintain the quality of stored produce.
- Crop produce west disposal is undertaken
- All activities around the storage facilities are undertaken according to the OHS guidelines detailed in the storage program.

**LO4 Control storage pests**

- Storage pest are identified that affect crop produce quality.
- Crop produce is monitored according to the checklist, targets and methods outlined in the storage program.
- Samples of the stored produce are taken to test for pest infestation.
- storage pests are controlled according to the guidelines in the storage program.
- Enclosed storage area is fumigated, and the surrounding environment is kept clean according to the integrated pest management strategy in the storage program.
- The sources of any infestations are identified and steps are taken to control them in line with the integrated pest management strategy in the storage program.
- Pest control activities are undertaken in line with the OHS hazard guidelines detailed in the storage program.
- Clear and accurate records and reporting of treatments to the stored produce and storage facilities are created, maintained and kept as described in the storage program

**Annex: Resource Requirements**

| **AGR CRP4 07 0422 Managing and implementing quality standards in storage** | | | | |
|---|---|---|---|---|
| **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 trainer | 25pcs | 1:1 |
| **2.** | **Reference Books** | | | |
| 2.1 | Appropriate seed and grain storage systems for small scale farmers. | FAO, 2014 | 5pcs | 1:5 |
| 2.2 | Manual on Grain management & Equipment Maintenance in silos | M. Avung'ana Mushira, FAO Consultant | 5pcs | 1:5 |
| 4. | Journals/Publication/Magazines | | | |
| | International Journal of Sciences: Basic and Applied Research (IJSBAR) | **http://www gssrr.org/index.php?journal** =JournalOfBasicAndApplied | 5pcs | 1:5 |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Class Room | $30m^2$ | 1pcs | 1:25 |
| 2. | Library | $42.5m^2$ | 1pcs | 1:25 |
| 3. | | | | |
| **C.** | **Consumable Materials** | | | |
| 1. | paper | A4 | 2ream | 2:25 |
| 2 | Pen | ballpoint | 2pcs | 2:25 |
| 5 | Pencil | HB | 2pcs | 2:25 |
| 6 | Chalk | standard | 1packet | 1:25 |
| 8 | Board cleaners | standard | 1pcs | 1:25 |
| 9 | Gown | standard | 2pcs | 2:25 |
| 10 | Marker | standard | 1packet | 1:25 |
| 11 | Flip Chart | A3 | 1ream | 1:25 |

| | | | | |
|---|---|---|---|---|
| **D.** | **Tools and Equipment** | | | |
| 1. | Computer | | 1pcs | 1:25 |
| 2 | LCD | | 1pcs | 1:25 |
| 3 | Whiteboard | | 1pcs | 1:25 |
| 4 | Blackboard | | 1pcs | 1:25 |
| 5 | Flip Chart Stand | | 1pcs | 1:25 |
| 6 | Projection screen | | 1pcs | 1:25 |

| **LEARNING MODULE 08** |
|---|
| TVET-PROGRAMME TITLE: Crop Production **Level IV** |
| MODULE TITLE : **Demonstrating improved crop technologies and practices** |
| MODULE CODE : **AGR CRP4 M08 0422** |
| NOMINAL DURATION **73** Hours |
| **MODULE DESCRIPTION** : This module covers the knowledge, skills and attitudes required to prepare for demonstration, demonstrate crop technologies and practices and monitor and evaluating crop demonstration |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to: |

LO1. Prepare for demonstration

LO2. Demonstrate Crop Technologies and practices

LO3. Monitor and evaluating crop demonstration

**MODULE CONTENTS**:

**LO1. Preparing for demonstration**

1.1. Identification of new crop technologies and practices

1.2. Realizing participatory approaches of stakeholders

1.3. Problem identification and need assessments

1.4. Interpretation of technical manuals for new technology

1.5. Assessing of new crop technologies and practices

1.6. Selection of affordable and environmental sound technologies

1.7. Preparing detail plan and implementation of technology

1.8. Calculate resource requirements for new technology

1.9. Preparing required inputs

1.10. Conducting training and awareness creation activities

1.11. Preparing and recording demonstration data

**LO2. Demonstrating crop technologies and practices**

2.1. Selection and preparation of demonstration plots and best practice

2.2. Establishing new technology or practice

2.3. Undertaking required managemental practices

2.4. Solving problem and reporting

**LO3. Monitoring and evaluating crop demonstration**

3.1 Monitoring demonstration plots

3.2 Organizing field days and group extension

3.3 Pursuing feedback from participants

3.4 Recording, analyzing, interpreting and reporting data

3.5 Documentation and compilation of best practices (E.G)

**LEARNING METHODS:**

- Braine storming
- Lecture

| |
|---|
| • Discussion<br>• Practical demonstration |
| **ASSESSMENT METHODS:** |
| • Written test<br>• with Oral questioning<br>• Practical demonstration<br>• Assignment |

**ASSESSMENT CRITERIA:**

**LO.1. Prepare for demonstration**

- Situations are identified where existing knowledge can be used as the basis for demonstrating new crop technologies and practices
- Problem identification and need assessments is realized following participatory approaches of stockholders and organizational requirement.
- Sources of information and availability of new crop technologies and practices are assessed
- New technologies and practices are selected based on the need assessment, availability, environmental considerations, problem solving ability, growing season and organization affordability
- Detail plan of implementation is prepared by considering technology specification, growing season, organization goal and guidelines.
- Training and awareness creation activities about the selected new crop technology and practices are conducted in order to create common understanding and easy work flow among actors.
- All required inputs to implement the demonstration are prepared based on demonstration plan.
- Demonstration data recording sheet is prepared

**LO2. Demonstrate crop technologies and practices**

- A demonstration plots are selected based on the selection guidelines/requirement
- Demonstration plots are prepared and necessary amendments are conducted based on the standard guidelines
- The new technology or practice is established in the prepared plots according to the recommendations.
- All required manage mental practices/operations are undertaken based on the guidelines at the correct time.
- If the observed problems cannot be resolved it should be reported to the supervisor and/or technology owner.

**LO3. Monitor and evaluating crop demonstration**

- Demonstration plots monitored regularly based on the plan
- Field days and other group extension events are organized for participants at the demonstration site based on the plan
- Feedback is sought from participants where appropriate for further scaling out of the new technology or practice.
- Data is recorded, analyzed, interpreted and reported to the supervisor

**Annex: Resource Requirements**

**AGR CRP4 M08 0422 Demonstrating improved crop technologies and practices**

| Item No. | Category/Item | Description/ Specifications | Quantity | Recommended Ratio (Item: Trainee) |
|---|---|---|---|---|
| **A. Learning Materials** | | | | |
| 1. | TTLM | Preparing by trainers | 25 | 1:1 |
| 2. | Poster | Up to date | 5 | 1:5 |
| 3. | Reference books | | | |
| 3.1 | adoption of technologies for sustainable farming systems wageningen workshop proceedings | Subir Sen, Nabinananda Ghosh Kalyani Publishers, 2014 - 315 pages | 5 | 1:5 |
| 3.2 | Effectiveness of demonstration plots as extension method adopted by AKRSP for agricultural technology dissemination in District chitral | Khan, et al., 2009. Sarhad J. Agric. 25(2): 313-319. | 5 | 1:5 |
| 3.3 | Productivity enhancement and popularization of improved production technologies in wheat through front line demonstrations | https://journals.ansfoundation.org/index.php/jans/article/view/810 | 5 | 1:5 |
| **B. Learning Facilities and Infrastructure** | | | | |
| 1 | Lecture room | $30m^2$ | 1 | 1:25 |
| 2 | Laboratory | $42.5m^2$ | 1 | 1:25 |
| 3 | Library | $42.5m^2$ | 1 | 1:25 |
| 4 | Work shop | $150m^2$ | 1 | 1:25 |
| **C. Consumable Materials** | | | | |

| | | | | |
|---|---|---|---|---|
| 1 | Printing paper | A4 | 2rim | 2:25 |
| 2 | log book | | 25 | 1:1 |
| 3 | Pencil | HB | 25 pcs | 1:1 |
| 4 | Marker | Permanent | 5 pcs | 1:5 |
| 5 | Duster ( white/black board) | | 1 | 1:25 |
| 6 | Chalk | | 1 packet | 1:25 |
| **D. Tools, Equipment and Materials** | | | | |
| 1 | Sprayer | Diaphragm type/ piston | 1 | 1:25 |
| 2 | Pesticides | Based on labels | 1L | 1:25 |
| 3 | Seed | Hybrid seed | 10kg | 2:5 |
| 4 | Rakes | | 5 | 1:5 |
| 5 | Shovel | | 5 | 1:5 |
| 6 | Spade | | 5 | 1:5 |
| 7 | Hoe (small) | | 5 | 1:5 |
| 8 | Hoe (large) | | 10 | 2:5 |
| 9 | Watering can | 15 ltr | 10 | 2:5 |
| 10 | Rope | Nylon | 10 rolls | 2:5 |
| 11 | Measuring tape | 100m | 5 pcs | 1:5 |
| 12 | Wheel barrow | | 5 | 1:5 |
| 13 | Saws | | 2 | 2:25 |
| 14 | Standard farm plots) | | 1 | 1:25 |
| 15 | Fertilizers | Urea | 10kg | 2:5 |
| | | Dap | 5kg | 1:5 |
| | | NPS | 10kg | 2:5 |
| 16 | Chemicals | Insecticides | 5litter | 1:5 |
| | | Herbicides | 5litter | 1:5 |
| 17 | field tool boxes | Metal/ wood | 10pcs | 2:5 |
| 18 | Cultivators | planter | 1 | 1:25 |

| | | | | |
|---|---|---|---|---|
| 20 | Tractors | 4WD- 70HP diesel | 1 | 1:25 |
| 21 | Fertilize spreaders | Rotating type 9m diameter | 1 | 1:25 |
| 22 | Generator | | 1 | 1:25 |
| **E. Personal protective equipment (PPEs)** | | | | |
| 1 | Boots | Rubber | 25 pcs | 1:1 |
| 2 | Overalls | Cotton – long sleeve | 25 pcs | 1:1 |
| 3 | Gloves | Plastic | 25 pcs | 1:1 |
| 4 | Respirator | | 25 pcs | 1:1 |
| 5 | Face mask | Crew mask | 25 pcs | 1:1 |
| 6 | Sunscreen lotion | | 25 pcs | 1:1 |
| 7 | Hat | | 25 pcs | 1:1 |
| 8 | Goggles | Large, assorted colors, values pack of 10/12 | 25pcs | 1:1 |

| LEARNING MODULE 09 |
|---|
| TVET-PROGRAMME TITLE: Crop Production **Level IV** |
| MODULE TITLE : **Multiplying seed and quality control** |
| MODULE CODE : **AGR CRP4M09 0422** |
| NOMINAL DURATION : **63** Hours |
| **MODULE DESCRIPTION** : This module covers the knowledge, skills and attitude required in the selection of quality seed or planting materials, multiplication of improved crop seeds and other planting materials. It includes planning and preparing for seed multiplication, preparing land and sowing, maintaining the field, managing weeds and pests, harvesting, grading of seeds processing/post-harvest seed treatments of seeds and storage. |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to:<br>LO1. Select quality seed/ planting materials<br>LO2. Plan and prepare land for seed multiplication<br>LO3. Seed production establishment<br>LO4. Maintain the field<br>LO4. Control weeds, pests and diseases<br>LO5. Harvest the crop<br>LO6. Seed Processing and treatments<br>LO7. Store seeds and evaluate the stored seed<br>LO8. Store seeds and evaluate the stored seed |
| **MODULE CONTENTS**:<br>**LO1. Selecting quality seed/ planting materials**<br>1.1 Identification of crop types and seed class (E.G)<br>1.2 Quality seed assessments parameters<br>1.3 Causes of quality seed deterioration<br>1.4 Seed quality standards<br>1.5 Seed selection and measurement<br>1.6 Seed treatment application and detrimental environmental impacts<br>1.7 Relevant legislation and regulations relating to OHS (E.G)<br>**LO2. Planning and preparing land for seed multiplication**<br>2.1 Planting material requirements<br>2.2 Seed multiplication production scheduled<br>2.3 Employing proper seed multiplication site |

2.4 Selection, preparation and cultivation for crop establishment

2.5 Assessing nutrient deficiency and soil toxicity problems

2.6 Application of soil amendment practices.

2.7 Preparing machineries, equipment and other farm inputs

**LO3. Establishing seed production**

3.1 Monitoring soil and weather conditions

3.2 Calculation of seed/planting material

3.3 Identification of parental lines and their maintaining methods

3.4 Keeping certified seeds with appropriate isolation distance

3.5 Method of pollination

3.6 Conducting seeding and fertilizer applications

3.7 Cleaning machinery and equipment

**LO4. Maintaining the field**

4.1 Monitoring crop condition and growth

4.2 Ensuring field inspection of certified seeds

4.3 Application of agronomic practices

4.4 Environmental issues of ploughing soil for planting

4.5 Monitoring soil moisture content and irrigation

4.6 Monitoring and maintaining field drainage

**LO5. Controlling weeds, pests and diseases**

5.1 Weed infestation and crop pest occurrences

5.2 Implementing weed and pest control methods

5.3 Environmental thresholds for a range of weeds and pests

5.4 Identifying side effects of pest control methods

5.5 Assessing effectiveness of pest control methods

5.6 Monitoring and controlling late growing weeds

**LO6. Harvesting the crop**

6.1 Coordinating and conducting internal and external inspections

6.2 Evaluating and determining crop maturity

6.3 Taking and determining moisture content of standards samples

6.4 Preparing harvesting equipment, operations and transportation

6.5 Identifying hygiene standards

6.6 Maintaining quality seed

6.7 Seed storage principles and treatments

6.8 Field storage and laboratory standards of seed

**LO7. Processing seed and treatments**

7.1 Application of seed treatments

7.2 Grading, packaging and labeling seeds

7.3 Selection and application of post-harvest treatments

7.4 Collecting and forwarding seed samples

**LO8.Storing seeds and evaluating the stored seed**

8.1 Selecting and maintaining storage facilities

8.2 Maintaining quality and germination capacity storing seeds

8.3 Conducting periodic checks and laboratory testing of seeds

8.4 Maintaining and keeping seed storage program

8.5 Forwarding records keeping to the appropriate person

**LEARNING METHODS:**

- Braine storming
- Lecture
- Discussion
- Practical demonstration

**ASSESSMENT METHODS:**

- Written test with Oral questioning
- Practical demonstration

**ASSESSMENT CRITERIA:**

**LO.1. Select quality seed/ planting materials**

- Based on crop type quality parameters and seed quality assessments attributes are recognized
- Causes of seed quality deterioration determinants are identified
- Seed quality standards are used for seed/planting material selection
- A portion of the crop to be used as seed is selected based on its health, vigour, and grain size and measures are taken when required.
- Seed treatment application is identified and appropriate pre-seeding treatments are applied in full consideration of detrimental environmental impacts

**LO2. Plan and prepare land for seed multiplication**

- Production requirements for seed/planting material based on supply, quantity, quality, client preferences and demand is determined.
- Production scheduled for seed multiplication is prepared based on environmental conditions and market requirements
- Proper site selection for seed multiplication based on the minimum seed standards are employed
- Required tillage/ploughing equipment's are selected, prepared and the land cultivate according the crop requirement.
- Soil toxicity problems and common nutrient deficiency assessed and identified based on the crop type.
- Soil amendment practices are applied based on the guidelines.
- Machineries, equipment's and other farm inputs used for sowing are prepared.

**LO3. Seed production Establishment**

- The quantity of seed/planting material required to sow is calculated based on the size of area and required quantity of seed needed to produce.
- Soil and weather conditions are monitor for optimal seeding conditions.
- Keeping appropriate isolation distance based on available guidelines for cross and self-pollinated crops to produce certified seeds.
- Seeding and fertilizer applications are conducted in line with plant growing cycle and the

work plan.

- Clean machinery and equipment when seeding operation is completed

**LO4. Maintain the field**

- Crop condition and growth requirements are monitored and appropriate measures implement based on the requirement.
- Rouging, dates, selling and inspection of the field ensured for production of certified seeds based on the guidelines.
- Appropriate agronomic practices are applied
- Monitor soil moisture content and apply water/irrigation, if any deficiency as per the crop requirement and growth stage.
- Field drainage is monitored and maintained based on the guidelines

**LO5. Control weeds, pests and diseases**

- Weed infestation and other crop pest occurrences are assessed.
- Appropriate weed and other pest control methods are implemented following principles of integrated pest management standards or organization code of practice.
- Side effects of pest control methods to other plants, animals or external environment are identified.
- Effectiveness of control methods assessed in reference to specified organisational standards.
- Late growing weeds are carefully monitored and controlled to ensure the maximum purity of the seed during harvesting

**LO6. Harvest the crop**

- Internal and external inspections are coordinated and conducted before harvesting for seed certification.
- Crop maturity is evaluated based on the guidelines and determine appropriate time of harvesting.
- Based on the classification standards samples are taken and moisture content determined.
- Necessary harvesting equipment are prepared and harvesting operations and transportation undertaken
- Hygiene standards are identified for the crop and complete for each paddock based on

harvest strategy and plan.

- The quality of the seed is maintained by proper checking and adjusting harvester ancillary equipment, including their height and other settings.

**LO7. Seed Processing and treatments**

- Seed treatments are applied where appropriate and according to the organizations production and marketing requirements.
- Seeds are graded, packaged and labelled according to organization work procedures.
- Post-harvest treatments are selected and applied according to harvested produce requirements, the organization integrated pest management strategy and the marketing plan.
- Seed samples collected and forwarded to the analyzing body, according to the guidelines.

**LO8. Store seeds and evaluate the stored seed**

- Storage facilities are selected and maintained in proper hygiene before seeds are transfer according to the organizations OHS and hygiene guidelines.
- Seeds are stored under conditions that maintain its quality and germination capacity.
- Periodic checks and laboratory testing of seed in long-term storage are conducted for quality factors and viability according to organization requirements.
- Seed labelling and storage records, tests and inspections should be maintained and kept as described in the seed storage program in clear and accurate way and take appropriate corrective action when required
- Forward the records kept to the appropriate person for analysis and decision-making.

**Annex: Resource Requirements**

| AGR CRP4 M09 0422 Multiplying seed and quality control | | | | |
|---|---|---|---|---|
| **Item No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio (Item: Trainee)** |
| **A. Learning Materials** | | | | |
| 1. | TTLM | Preparing by trainers | 25 | 1:1 |

| | | | | |
|---|---|---|---|---|
| 2. | Poster | Up to date | 5 pcs | 1:5 |
| 3. | Reference books | | | |
| 3.1 | Seed Science and Technology | Subir Sen, Nabinananda Ghosh Kalyani Publishers, 2014 - 315 pages | 5 pcs | 1:5 |
| 3.2 | Principles of seed technology | P.K. Agrawal, 2019 – 107 pages | 5 pcs | 1:5 |
| 3.3 | Objective Seed Science and Technology | K.Vanangamudi S. Kavitha, K. Raja, 2017 | 5 pcs | 1:5 |
| **B. Learning Facilities and Infrastructure** | | | | |
| 1 | Lecture room | $30m^2$ | 1 | 1:25 |
| 2 | Laboratory | $42.5m^2$ | 1 | 1:25 |
| 3 | Standard farm (plots) | | 1 | 1:25 |
| 4 | Library | $42.5m^2$ | 1 | 1:25 |
| 5 | Work shop | $150m^2$ | 1 | 1:25 |
| **C. Consumable Materials** | | | | |
| 1 | Printing paper | A4 | 2rim | 2:25 |
| 2 | log book | | 25 | 1:1 |
| 3 | Pencil | HB | 25 pcs | 1:1 |
| 4 | Marker | Permanent | 5 pcs | 1:5 |
| 5 | Duster ( white/black board) | | 1 | 1:25 |
| 6 | Chalk | | 1 packet | 1:25 |
| **D. Tools, Equipment and Materials** | | | | |
| 1 | Sprayer | Diaphragm type/ piston | 1 | 1:25 |

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|---|---|---|---|---|
| 2 | Pesticides | Based on labels | 1L | 1:25 |
| 3 | Seed | Hybrid seed | 10kg | 2:5 |
| 4 | Rakes | | 5 | 1:5 |
| 5 | Shovel | | 5 | 1:5 |
| 6 | Spade | | 5 | 1:5 |
| 7 | Hoe (small) | | 5 | 1:5 |
| 8 | Hoe (large) | | 10 | 2:5 |
| 9 | Watering can | | 10 | 2:5 |
| 10 | Rope | | 10 rolls | 2:5 |
| 11 | Measuring tape | 50 or 100m | 5 | 1:5 |
| 12 | Wheel barrow | | 5 | 1:5 |
| 13 | Saws | | 2 | 2:25 |
| 15 | Fertilizers | Urea | 10kg | 2:5 |
| | | Dap | 5kg | 1:5 |
| | | NPS | 10kg | 2:5 |
| 16 | Chemicals | Insecticides | 5litter | 1:5 |
| | | Herbicides | 5litter | 1:5 |
| 17 | field tool boxes | Metal/ wood | 10pcs | 2:5 |
| 18 | Cultivators | Planter | 1 | 1:25 |
| 19 | Tractors | 4WD- 70HP diesel | 1 | 1:25 |
| 20 | Fertilize spreaders | Rotating type 9m diameter | 1 | 1:25 |
| 21 | Generator | | 1 | 1:25 |
| **E. Personal protective equipment (PPEs)** | | | | |
| 1 | Boots | Rubber | 25 pcs | 1:1 |
| 2 | Overalls | Cotton – long sleeve | 25 pcs | 1:1 |
| 3 | Gloves | Plastic | 25 pcs | 1:1 |

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| 4 | Respirator | | 25 pcs | 1:1 |
| 5 | Face mask (guard) | | 25 pcs | 1:1 |
| 6 | Sunscreen lotion | | 25 pcs | 1:1 |
| 7 | Hat | | 25 pcs | 1:1 |
| 8 | Goggles | Large, assorted colors, values pack of 10/12 | 25pcs | 1:1 |

| LEARNING MODULE 10 |
|---|
| TVET-PROGRAMME TITLE: Develop value chain analysis |
| **MODULE TITLE:** Developing value chain analysis |
| MODULE CODE: **AGR CRP4 10 0422** |
| NOMINAL DURATION: **39** Hours |
| **MODULE DESCRIPTION**: This module covers the knowledge, skills, and attitude needed to Understand value chain, Identify concepts of value chain ideas Develop the value chain and Upgraded value addition |
| **LEARNING OUTCOMES**<br>At the end of the module the trainee will be able to:<br>**LO1.** Understand concepts of value chain<br>**LO2.** Identify Value chain analysis<br>**LO3**. Develop value chain<br>**LO4.** Upgrade value addition |
| **MODULE CONTENTS:**<br>**LO1.** Understand concepts of value chain<br>1.1. Concept of value chain<br>1.2. Scope of value chain<br>1.3. Principle of value chain<br>1.4. Characteristic of value chain<br>1.5. Importance Value chain<br>1.6. Concept of value addition<br>**LO2.** Identify Value chain analysis<br>2.1 . Dimension and structures of Value chain<br>2.2 . Value chain actors<br>2.3 . Value chain maps for different agricultural products<br>2.4 . Value chain techniques for value addition<br>2.5 . Contract farming system<br>**LO3**. Develop value chain<br>3.1. Value chain parameters |

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| 3.2.Procedures of identifying and ranking Constraints and gaps to develop value chain<br>3.2.1. Technology constraints in value chain development<br>3.3. Steps of value chain development<br>3.4.Value Chain selection techniques<br>3.5. Potential interventions for value chain development<br>LO4. Upgrade value addition<br>4.1 . Environmental considerations to upgrade value addition<br>4.2 . Identified Value chain actors for Value addition<br>4.3 . Value chain is upgraded for agricultural products<br>4.4 Determining value chain upgraded in value chain analysis/ to develop value chain<br>4.5 . Ways of collecting Customers feedbacks in value chain analysis |
| **LEARNING METHODS:** |
| • Lecture and Discussion<br>• Démonstration<br>• Simulation<br>• Role playing |
| **ASSESSMENT METHODS:** |
| • Written test with Oral questioning<br>• Practical demonstration<br>• Case analysis |

**ASSESSMENT CRITERIA:**

**LO.1.** Understand concepts of value chain

- Concepts of value chain are understood.
- Value chain scopes are understood and identified.
- Principle of value chain are understood and identified.
- Value chain characteristic are understood and identified.
- Value chain Importance are discussed and understood.
- Concept of value addition are understood and determined.

**LO.2.** Identify Value chain analysis

- Dimension and structures of Value chain are identified and interpreted
- Value chain actors are identified according to the objective and interest or need of chain actors
- Value chain maps are illustrated for different agricultural products
- Value chain techniques for value addition are identified and analyzed
- Contract farming system is established to promote value chain.

**LO.3.** Develop value chain

- Value chain parameters are analyzed to compare the gaps between the existing and the benchmark.
- Constraints and gaps are collected, analyzed and ranked according to the priority used to develop value chain
- Steps of value chain development are identified
- Value Chain selection techniques are identified to develop value chain
- Potential interventions for value chain development are identified

**Annex: Resource Requirements**

| **AGR CAA4 M08 0422 Performing Auditing and Reporting** | | | | |
|---|---|---|---|---|
| **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. | Supply chain management strategy, planning and operation | Sunil Chopra. (2018) Supply chain management strategy, planning and operation 6th ed. Pearlon. | 5 | 1:5 |
| 2.2. | Supply Chain Management: Warehousing, Logistics And Inventory Management | Chester Ward,(2018). Supply Chain Management: Warehousing, Logistics And Inventory Management. Clanrye International | 5 | 1:5 |
| 2.3. | Strategic Brand Management Building Measuring And Managing Brand Equity | Keller P.Jacob.(2019) Strategic Brand Management Building Measuring And Managing Brand Equity. Pearson | 5 | 1:5 |
| 2.4. | A rough guide to value chain development | Nadja N. & Merten S.(2015). A rough guide to value chain development | 5 | 1:5 |

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| 2.5. | Operations Mangement Process And Supply Chains 11th Ed | Krajewski Malhotra Ritzman Srivastava,(2017). Operations Mangement Process And Supply Chains 11th Ed. Pearosn | 5 | 1:5 |
| 2.6. | Managing Marketing: Marketing Success Through Good Management Practice | Palmer Roger et.al.(2008) Managing Marketing: Marketing Success Through Good Management Practice. Elsevier | 5 | 1:5 |
| | | | | |
| | | | | |
| 3. | Journals/Publication/Magazines | Published/unpublished | | |
| **B.** | **Learning Facilities & Infrastructure** | | | |
| 1. | Lecture room | 7*8m | | |
| 2. | Cooperative lab/ business incubation center | 105 – 180 m2 area Needed Per Trainee | | |
| 3. | Library | 105 – 180 m2 area Needed Per Trainee | 1 | 1:25 |
| 4. | Instructional Audio video | Library/classroom location | It depends | 1:1 |
| 5. | Visual training Media | LCD, Laptops | 1 Pcs | 1:25 |
| 6. | Teaching boards | White board ,Flip chart ,Smart board | 1 Pcs | 1:25 |
| 7. | Arm chair | 55 Cm *74 Cm *100Cm | 25 Pcs | 1:1 |
| 8. | Notice board | 120*100 Cm | 1 Pcs | 1:25 |

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| 9. | White board | 240 Cm *120 Cm | 1 Pcs | 1:25 |
| | **Consumable material** | | | |
| 1 | White board and permanent marker | Pc | 4 | 1:2 |
| 2 | Flip chart | | 5 Pcs | 1:5 |
| | **Tools and equipment** | | | |
| 1 | Computer | Desktop | 13Pcs | 1:2 |
| 2 | Printer | A4 sized | 1Pcs | 1:25 |
| 3 | Computer table | 1.5*0.75m | 13 Pcs | 1:2 |
| 4 | Shelves | 1.5*1m | 2 Pcs | 1:13 |

**APPENDEX-1**

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

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| | | ❖ Present the lecture in video format<br>❖ Summarize main points | | |
| **Demonstration** | ❖ Conduct close follow up<br>❖ Use verbal description<br>❖ Provide special attention in the process of guidance<br>❖ facilitate the support of peer trainees<br>❖ Prepare & use simulation | ❖ use Sign language interpreter<br>❖ Use video recorded material<br>❖ Ensure attention of the trainees<br>❖ Provide structured training<br>❖ Show clear and short method<br>❖ Use gesture<br>❖ Provide tutorial support (if necessary) | ❖ Illustrate in clear & short method<br>❖ Use Video recorded material<br>❖ Ensure the attention of the trainees<br>❖ Provide tutorial support (if necessary) | ❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines<br>❖ Assign peer trainees to assist<br>❖ Conduct close follow up<br>❖ Provide tutorial support (if necessary |
| **Group discussion** | ❖ Facilitate the integration of trainees with group members<br>❖ Conduct close follow up<br>❖ Introduce the trainees with other group member<br>❖ Brief the thematic issues of the work | ❖ Use sign language interpreters<br>❖ Facilitate the integration of trainees with group members<br>❖ Conduct close follow up<br>❖ Introduce the trainees with other group member | ❖ Facilitate the integration of trainees with group members<br>❖ Conduct close follow up<br>❖ Introduce the trainees with other | ❖ Introduce the trainees with their peers |

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| | | | group member<br>❖ Inform the group members to speak loudly | |
| **Exercise** | ❖ Conduct close follow up and guidance<br>❖ Provide tutorial support if necessary<br>❖ provide special attention in the process | ❖ Conduct close follow up and guidance<br>❖ Provide tutorial support if necessary<br>❖ provide special attention in the process/practical training<br>❖ Introduce new and relevant vocabularies | ❖ Conduct close follow up and guidance<br>❖ Provide tutorial support if necessary<br>❖ provide special attention in the process/ practical training | ❖ Assign peer trainees<br>❖ Use additional nominal hours if necessary |
| **Individual assignment** | ❖ prepare the assignment questions in large text<br>❖ Encourage the trainees to prepare and submit the assignment in large texts<br>❖ Make available recorded assignment questions<br>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy | ❖ Use sign language interpreter<br>❖ Provide briefing /orientation on the assignment<br>❖ Provide visual recorded material | ❖ Provide briefing /orientation on the assignment<br>❖ Provide visual recorded material | |

| ASSESSMENT METHODS: | | | | |
|---|---|---|---|---|
| **Interview** | | ❖ Use sign language interpreter<br>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter<br>❖ Use short and clear questioning<br>❖ Time extension | ❖ Speak loudly<br>❖ Using sign language interpreter if necessary | ❖ Use written response as an option for the trainees having speech challenges |
| **Written test** | ❖ Prepare the exam in large texts<br>❖ Use interview as an option if necessary<br>❖ Prepare the exam in audio format<br>❖ Assign human reader<br>❖ (if necessary)<br>❖ Time extension | ❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers<br>❖ Avoid essay writing<br>❖ Time extension | ❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary. | ❖ Use oral response as an option to give answer for trainees having severe upper limb impairment<br>❖ Time extension for trainees having severe upper limb impairment |
| **Demonstration/ Observation** | ❖ Brief the instruction or provide them in large text<br>❖ Time extension | ❖ Use sign language interpreter<br>❖ Brief on the instruction of the exam | ❖ Provide activity based assessment<br>❖ Brief on the instruction of | ❖ Provide activity based assessment<br>❖ Conduct close |

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| | | ❖ Provide activity-based/ practical assessment method<br>❖ Time extension | the exam<br>❖ Use loud voice<br>❖ Time extension | follow up<br>❖ Time extension |

**Acknowledgement**

The **Ministry of Labor and Skills wishes** to thank and extend its appreciation for the trainers who donated their effort and time to develop this outcome-based curriculum for the TVET program **Crop Production Level IV**

**The experts who developed the curriculum**

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