Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

1 - VEGETABLE GROWING

AGRVG302

Grow Vegetable

Competence

RQF Level: 3

Learning Hours 80

Credits: 8

Sector: Agriculture and food processing

Trade: Agriculture

Module Type: Specific

Curriculum: AFPAGR3001- TVET Certificate 3 in Agriculture

Issue Date: May 2022

Purpose statement	This module describes the skills, knowledge and attitude required to grow vegetables. It is designed for learners who have successfully completed nine years' basic education and level II in agriculture or any other related fields and pursuing TVET level III in Agriculture. At the end of this module, learners will be able to prepare for vegetables crops establishment operations, prepare the site for vegetables growing, carry out planting, and post planting operations and harvest vegetables. Qualified learners deemed competent may work in various places including Site/field, Office, Nursery and Vegetable Garden performing a range of tasks related to crop growing. She/he can work alone or with others under supervision.
Learning assumed to be in place	Applied biology, nursery establishment, fertilizer application, applied chemistry

Delivery modality

Training delivery		**100%**	**Assessment**		**Total 100%**
Theoretical content		30%	Formative assessment	30%	50%
Practical work:		70%		70%	
Group project and presentation	20%				
Individual project /Work	50%				
			Summative Assessment		50%

Elements of Competency and Performance Criteria

Elements of competency	**Performance criteria**
1. Prepare for vegetables crops establishment operations	1.1. Tools and equipment are adequately selected referring to vegetable species
	1.2. Occupational Health and Safety (OHS) hazards and risks are properly assessed referring to Food and Environmental standards.
	1.3. PPE are well selected according to the desired operation.
	1.4. Environmental implications of vegetable growing are properly Identified according to regulations.
2. Prepare the site for vegetables growing	2.1. vegetables species are properly selected based on type of enterprise's purpose and quality standards
	2.2. Field is properly identified according to vegetables requirements and marked standards
	2.3. Land is adequately cleared according to the site selected
	2.4. Tillage is adequately carried out for vegetables growing according to their requirements
	2.5. Soil amendments and fertilisers are properly applied according to vegetables requirements

	2.6. Planting pattern is appropriately made out according to vegetables production
	2.7. Records are properly kept as required by supervisor
3. Carry out planting and post planting operations	3.1. vegetable planting materials are effectively prepared as per vegetables species
	3.2. vegetables are appropriately planted referring to vegetable species and market standards
	3.3. vegetable plantation is properly maintained according to market requirements.
	3.4. Records are properly kept as required by supervisor
4. Harvest vegetables	4.1. Maturity stages are properly identified according to specific market requirements
	4.1. Harvesting techniques specific to vegetables species and market requirements are properly applied
	4.2. Handling techniques specific to vegetable species and market requirements are effectively applied.
	4.3. Records are properly kept as required by supervisor

Course content	
Learning outcomes	**At the end of the module the learner will be able to:** 1. Prepare for vegetables crops establishment operations 2. Prepare the site for vegetables growing 3. Carry out planting and post planting operations 4. Harvest vegetables

Learning outcome 1: Prepare for vegetable crops establishment operations	**Learning hours: 5**
Indicative content	
• **Select tools and equipment referring to vegetable species** ✓ Types of tools and equipment for vegetables growing ✓ Tools and equipment selection criteria • **Assess occupational Health and Safety (OHS) hazards and risks.** ✓ Types of hazards associated with vegetables growing ✓ Hazard risks • **Select PPE according to the desired operation** ✓ Types/categories of PPE used in vegetable growing ✓ Criteria of PPE selection • **Identify environmental implications of vegetable growing.** ✓ Definition of environmental impact assessment ✓ Negative and positive impact of vegetable growing on the environment	
Resources required for the learning outcome	
Equipment	-Wheelbarrow, Watering can, PPE, First aid kit, Computer, Blackboard, Ear protector
Materials	-Gloves,Footwear,Facemasks,Antiseptic gel,Water,Flipchart,Chalks,Books,Newspapers,Reports, Ropes, Pegs, Buckets, Baskets, Sacs, Measuring tape, Spade, Shovel, Internet connection Books, Newspapers, Reports, Scientific papers, Gloves,Facemasks,Repirators,High visibility clothes, Flipchart, Chalks, books,
Tools	-Hand hoe, Forked hoe, Rake maker, Sickles, Manure fork, Boots
Facilitation techniques	Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided and Group discussion
Formative assessment methods	Written assessment, Oral presentation, and Performance assessment

Learning outcome 2: Prepare the site for vegetables growing	Learning hours: 15

Indicative content

- **Select vegetables species based on market and enterprise target**
  - ✓ Main vegetable species grown in Rwanda
  - ✓ Selection criteria
- **Field identification.**
  - ✓ Ecological requirements
  - ✓ Field background
  - ✓ Field accessibility
- **Land clearing**
  - ✓ Site obstacles
  - ✓ Methods/ways of land clearing
- **Carrying out tillage for vegetables growing**
  - ✓ Types of Tillage
  - ✓ Cultivation methods.
- **Application of soil amendments and fertilisers.**
  - ✓ Types of soil amendment
  - ✓ Criteria of soil amendments selection
  - ✓ Sources of soil amendment
  - ✓ Type of fertilisers to be applied
- **Making up planting pattern**
  - ✓ Different planting patterns for vegetables growing.
  - ✓ Criteria of field lay out
- **Keep records**
  - ✓ Records template
  - ✓ Method of recording

Resources required for the indicative content

Equipment	Projector, Wheelbarrow, Watering can, PPE
Materials	Flip chart, Related books, Newspapers, Reports, Scientific paper, Organic fertilizer, Lime, Dolomite, Gypsum
Tools	Thermometers, Rain gauge, pH meters, Clinometer, Hand hoe, Forked hoe, Buckets, Baskets, Sacs, Measuring tape, Spade,
Facilitation techniques	Lectures, Demonstration, simulation, Individual, group work, Practical exercise, Individualized, Trainer guided, Group discussion
Formative assessment methods	Written assessment, Oral presentation, and Performance assessment

Learning outcome 3: Carry out planting and post planting operations	Learning hours: 35
Indicative content	
• **Preparation of vegetable planting materials** ✓ Characteristics of good vegetable seeds ✓ Pre-treatments methods ✓ Seedbed types • **Planting of vegetables** ✓ Spacing/plant density of priority vegetables in Rwanda ✓ Method of sowing ✓ Transplanting ✓ Selecting seedling ✓ Seedling pre-treatment • **Maintain vegetable plantation** ✓ Vegetables maintenance practices ✓ Pests and diseases management • **Keeping the records.** ✓ Methods of recording ✓ Content of production practices card	
Resources required for the indicative content	
Equipment	Projector, Wheelbarrow, Transplanter, PPE, Computer, First aid Kit, motorised sprayer, power tillers.
Materials	Technical card on field, Related books, Markers, Chalks, Vegetables crops, Internets connection, Flip chart, Vegetable seeds, Vegetables seedling, Organic fertilizers, Inorganic fertilizers, Seeds, Inoculum, Sand, Fire source
Tools	Blackboard, Flipchart, Scientific paper, Watering can
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercises, Individualized, Trainer guided and Group discussion
Formative assessment methods	Written assessment, Oral presentation, Performance assessment and Product based assessment

Learning outcome 4: Carry out harvesting and post harvesting operations	Learning hours: 25

Indicative content

- **Identification of maturity stages**
  - ✓ Types and signs of maturity
  - ✓ Methods of maturity indices determination
- **Apply harvesting techniques specific to vegetables species and market requirements**
  - ✓ Part to be harvested (Economic part)
  - ✓ Harvesting techniques
- **Apply handling techniques specific to vegetable species and market requirements**
  - ✓ Practices of vegetables produce handling
- Records keeping
  - ✓ Records template
  - ✓ Methods of records keeping

Resources required for the indicative content

Equipment	Projector, Wheelbarrow, Cold store, Wheelbarrow, DVD player
Materials	Flip chart, Records keeping forms, Field notebook, Vegetables produces, Internet connection, Books, Newspapers, Scientific papers, Vegetables crops field, Internet connection, Related books, Scientific paper
Tools	Buckets, Balance, Panga, Basket, Sacs, Punnets
Facilitation techniques	Lectures, Demonstration and simulation, Individual and group work, Practical exercise, Individualized, Trainer guided and Group discussion
Formative assessment methods	Written assessment, Oral presentation, Performance assessment and Product based assessment

Integrated/Summative assessment (For specific module)

Integrated Situation

RWAKANA is a farmer at Rwamagana District, Karenge sector. He possesses five hectares of land where he grows vegetables for supplying the local market and two supermarkets in Kigali. Currently, he is not able to satisfy the market in terms of quality and quantity because the yield and quality of his vegetables particularly tomatoes are decreasing progressively due to the use of inappropriate farming practices. As a skilled agricultural worker, you are requested to perform a demonstration on farming practices (planting materials preparation, planting at a spacing of 80 cm x 30cm, plant maintenance activities and harvesting) on tomatoes, Roma variety. These activities must be performed on plot of $6m^2$(4m long and 1.5 m wide) and demonstrated to this farmer. The task should be performed and demonstrated in 3 hours.

This integrated situation is an example, however the indicators for evaluating the quality of process were developed to fit any other integrated situation .

1. TVET schools should install demonstration plots, this will allow trainees to demonstrate activities at various stages.
2. Trainees can be evaluated in form of project whereby they carry out growing activities on small piece of land from land preparation.
3. Trainers can design another integration situation adapted to the context.

Resources

Tools	Hoe, Panga, Forked hoe, Spade, Watering can, Spring balance, Pots, Measuring tape, Pegs, Secateurs, Collection bags, Baskets,
Equipment	Sprayer, Wheelbarrow, motorised sprayer, Projector, Wheelbarrow, Cold store, Wheelbarrow, DVD player
Materials/ Consumables	Tomato seeds, Mineral fertilizers, Organic fertilizers, Mulching materials Water, chemicals.

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: Prepare for vegetables crops establishment operations **(20%)**	1.1. Tools and equipment are adequately selected referring on vegetable species	Tools and equipment selected.			2
		Correct selection criteria			3
	1.2. Occupational Health and Safety (OHS) hazards and risks are properly assessed for reporting to the supervisor	Hazards associated with vegetables growing identified.			2
		Hazards risks assessed			2

	1.3. PPE are well selected according to the desired operation.	Types/categories of PPE used in vegetable growing.			3
		Criteria for PPE selected.			3
	1.4. Proper Identification of environmental implications of vegetable growing are properly Identified for discussion with supervisor	Negative impact assessed.			3
		Positive impact assessed.			2
Learning outcome 2: Prepare the site for vegetables growing **(30%)**	2.1. vegetables species are properly selected based on type of enterprise quality standards	Vegetable species selected			3
	2.2. Field is properly identified according to vegetables requirements and marked standards	Status of field identified			4
	2.3. Land is adequately cleared according to the site selected	Status of land cleared			3
	2.4. Tillage is adequately carried out for vegetables growing according to their requirements	Status of tilled land			3
	2.5. Soil amendments are properly applied according to vegetables requirements	Types of amendments applied			2
		Dosage applied			2
		Methods used			2
		Criteria respected			2
		Types of fertilisers			2
	2.6. Planting pattern is made out appropriate according to vegetables production	Planting patterns made out.			2
	2.7. Records are properly kept as required by supervisor	Contents of record form			2
		Data collected			3
Learning outcome 3: Carry out planting and post planting operations	3.1. vegetable planting materials are effectively prepared of as required by vegetables species	Seeds prepared			2
		Plant materials pre-treated			3
		Seedbeds prepared			2
	3.2. vegetables are appropriately	Methods of sowing			2
		Methods of			2

(25%)	planted referring to vegetable species and market standards	transplanting			
		Seedlings selected			2
		Seedlings pre-treated			2
	3.3. Planted vegetables are properly maintained according to requirements and market quality standards.	Plant maintenance practices performed			2
		Methods applied for main pests and diseases control			3
	3.4 Records are properly kept as required by supervisor	Records template elaborated			2
		Data collected			2
Learning outcome 4: Carry out harvesting and post harvesting operations **(25%)**	4.1. Maturity stages are properly identified according to specific market requirements	Maturity indices determined			4
		Harvesting techniques identified			3
	4.2. Harvesting techniques specific to vegetables species and market requirements are properly applied	Harvesting techniques applied			5
	4.3. Handling techniques specific to vegetable species and market requirements are effectively applied.	Handling Practices performed			4
		Packaging materials selected			5
	4.4. Records are properly kept as required by supervisor	Records format developed			2
		Data collected			2
Total marks					**100**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

References:

1. Maynard, D.H. and G.J. Hochmuth. 1997. *Knott's Handbook for* Vegetable *Growers. 4th ed.* John Wiley and Sons, New York.
2. Cockshull, K.E. and L.C. Ho. 1995. Regulation of tomato fruit size by plant density and truss thinning. *J. Hortic. Sci*. 70: 395-407.
3. Grubben, G.J.H and Denton edits (2004). Plant Resources of Tropical Africa 2. Vegetables. PROTA foundation. Wageningen, Netherlands, Bockhuys publisher, Leiden Netherlands.

4. Schippers, R.R. (2002). African indigenous vegetables, an overview of cultivated species 2002 revised version on CD-ROM. Natural Resources International Limited, AYLESFORD, UK
5. Maynard, D.H. and G.J. Hochmuth. 1997. *Knott's Handbook for* V*egetable Growers. 4th ed.* John Wiley and Sons, New York.
6. Cockshull, K.E. and L.C. Ho. 1995. Regulation of tomato fruit size by plant density and truss thinning. *J. Hortic. Sci*. 70: 395-407.
7. Grubben, G.J.H and Denton edits (2004). Plant Resources of Tropical Africa 2. Vegetables. PROTA foundation. Wageningen, Netherlands, Bockhuys publisher, Leiden Netherlands.
8. Schippers, R.R. (2002). African indigenous vegetables, an overview of cultivated species 2002 revised version on CD-ROM. Natural Resources International Limited, AYLESFORD, UK