

**REPUBLIC OF KENYA**

**COMPETENCY BASED MODULAR CURRICULUM**

**FOR**

**LIVESTOCK FEED PRODUCTION**

**KNQF LEVEL 4**

**PROGRAMME ISCED CODE: 0811 354A**

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social and economic development. Quality education and training contribute to the achievement of Kenya’s development blueprint and sustainable development goals.

Reforms in the education sector are necessary to achieve Kenya Vision 2030 and meet the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution, and this resulted in the formulation of the Policy Framework for Reforming Education and Training in Kenya (Sessional Paper No. 14 of 2012). A key feature of this policy is the radical change in the design and delivery of TVET training. This policy document requires that training in TVET be competency-based, curriculum development be industry-led, certification be based on demonstration of competence, and the mode of delivery allow for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this curriculum has been developed. For trainees to build their skills on foundational hands-on activities of the occupation, units of learning are grouped in modules. This has eliminated duplication of content and streamlined exemptions based on skills acquired as a trainee progresses in the up-skilling process, while at the same time allowing trainees to be employable in the shortest time possible through the acquisition of part qualifications.

It is my conviction that this curriculum will play a great role in developing competent human resources for the Agriculture Sector’s growth and development.

**PRINCIPAL SECRETARY**

**STATE DEPARTMENT FOR TVET**

**MINISTRY OF EDUCATION**

**PREFACE**

Kenya Vision 2030 aims to transform Kenya into a newly industrializing middle-income country, providing high-quality life to all its citizens by the year 2030. Kenya intends to create globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through lifelong education and training. TVET has a responsibility to facilitate the process of inculcating knowledge, skills, and worker behaviour necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency-Based Education and Training (CBET).

TVET Act, CAP 210A and Sessional Paper No. 1 of 2019 on Reforming Education and Training in Kenya for Sustainable Development emphasized the need to reform curriculum development, assessment, and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry, as well as increase the global competitiveness of the Kenyan labour force.

This curriculum has been developed in adherence to the Kenya National Qualifications Framework and CBETA standards and guidelines. The curriculum is designed and organized into Units of Learning with Learning Outcomes, suggested delivery methods, learning resources, and methods of assessing the trainee’s achievement. In addition, the units of learning have been grouped in modules to concretize the skills acquisition process and streamline upskilling.

I am grateful to all expert trainers and everyone who played a role in translating the Occupational Standards into this competency-based modular curriculum.

# ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support were received from expert trainers, institutions and organizations.

I recognize with appreciation the role of the Agriculture National Sector Skills Committee (NSSC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Agriculture sector for their valuable input and everyone who participated in developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that individuals aspiring to work in the Agriculture Sector acquire competencies to perform their work more efficiently and effectively.

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**ABBREVIATIONS AND ACRONYMS**

**ISCED** International Standard Classification of Education

**CV** Curriculum Vitae

**DVI** Digital Visual Interface

**EC** Electrical Conductivity

**GAP** Good Agricultural Practices

**ICT** Information and Communications Technology

**OS** Occupational Standards

**PPE** Personal Protective Equipment

**TVET** Technical, Vocational Education and Training

**UPS** Universal Polar Stereographic

**KEY TO ISCED UNIT CODE**



**COURSE OVERVIEW**

Livestock feed production level 4 qualification consists of competencies required by an individual to produce livestock feed**.** It includes producing livestock, processing livestock feed, operating feed processing equipment and conserving farm water.

**Units of Learning**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit Category** | **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factor** |
|  | **MODULE I** | | | |
| Common | 0811 341 01A | Principles of Livestock Nutrition | 100 | 10 |
| Core | 0811 341 05A | Livestock Forage production | 240 | 24 |
|  | **TOTAL HOURS** | | **340** | **34** |
|  | **MODULE II** | | | |
| Core | 0721 351 03A | Livestock Feed Processing | 240 | 24 |
| Core | 0716 351 04A | Feed Processing Equipment Operation | 180 | 18 |
| Core | 0811 341 02A | Farm water conservation | 100 | 10 |
|  | **Sub Total** | | **520** | **52** |
|  | **Industrial Attachment** | | 320 | 32 |
|  | **GRAND TOTAL** | | **1180** | **118** |

**Entry Requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Secondary Education (KCSE)

**Or**

1. Equivalent qualifications as determined by relevant regulatory body

**Trainer Qualification**

Qualifications of a trainer for this course include:

1. Possession of at least Livestock Feed Production level 5 or in related trade area;
2. License by TVETA; and

**Industry Training**

An individual enrolled in this course will be required to undergo Industry training for a minimum period of 320 hours in Agricultural and related sector. The industrial training may be taken after completion of all units for those pursuing the full qualification or be distributed equally in each unit for those pursuing part qualification. In the case of dual training model, industrial training shall be as guided by the dual training policy.

**Assessment**

The course shall be assessed formatively and summatively:

1. During formative assessment all performance criteria shall be assessed based on performance criteria weighting.
2. Number of formative assessments shall minimally be equal to the number of elements in a unit of competency
3. Assessment of basic and common competencies shall be integrated in the core units
4. Theoretical assessment shall be integrated in practical assessment and conducted orally in both formative and summative assessments.
5. Theoretical and practical weight shall be 10:90 respectively for each unit of learning.
6. Formative and summative assessments shall be weighted at 60% and 40% respectively in the overall unit of learning score
7. Assessment performance rating for each unit of competency shall be as follows:

|  |  |
| --- | --- |
| **MARKS** | **COMPETENCE RATING** |
| 80 -100 | Attained Mastery |
| 65 - 79 | Proficient |
| 50 - 64 | Competent |
| 49 and below | Not Yet Competent |
| Y | Assessment Malpractice/irregularities |

1. Assessment for Recognition of Prior Learning (RPL) may lead to award of part and/or full qualification.

**Certification**

A candidate will be issued with a Certificate of Competency upon demonstration of competence in a core Unit of Competency. To be issued with the KenyaNational TVET Certificate in livestock feed production level 4 the candidate must demonstrate competence in all the Units of Competency as given in the qualification pack. Statement of Attainment Certificate may be issued upon demonstration of competence in a certifiable element within a unit.

The certificates will be issued by the Qualification Awarding Institution

# 

# MODULE I

**PRINCIPLES OF LIVESTOCK NUTRITION**

**UNIT CODE:** 0811 341 01A

**UNIT DURATION:** 100 Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply principles of livestock nutrition

**Unit Description**

This unit equips trainees with competencies required to apply principles of livestock nutrition. It involves demonstrating knowledge of livestock digestive processes and systems, nutritional knowledge, feed types, and evaluating livestock dietary needs.

**Summary of Learning Outcomes**

By the end of this unit, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **SN** | **Learning Outcome** | **Duration (Hours)** |
|  | Apply knowledge of livestock digestive processes and systems | 25 |
|  | Apply knowledge of nutritional principles | 25 |
|  | Apply knowledge of livestock feed types | 25 |
|  | Evaluate livestock dietary needs | 25 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| * + - 1. Apply knowledge of livestock digestive processes and systems | * 1. Livestock identification      1. Sheep      2. Cattle      3. Poultry      4. Goats      5. Pigs      6. Rabbits      7. Fish   2. Parts of the digestive tract of livestock identification.   3. Livestock digestive processes and systems      1. Terms definition      2. Digestion      3. Ingestion      4. Excretion      5. Eructation      6. Assimilation      7. Mastication   4. Types of digestive systems      1. Ruminant digestive system         1. Rumen         2. Reticulum         3. Omasum         4. Abomasum.      2. Non ruminant digestive system         1. Mouth         2. Oesophagus         3. Stomach         4. Duodenum         5. Ileum         6. Colon         7. Caecum   5. Digestion process      1. Ingestion      2. Mastication      3. Digestion      4. Absorption      5. Excretion.   6. Digestive structural disorders      1. Displaced abomasum      2. Traumatic reticulo-peritonitis      3. Gizzard impaction | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. 2. Apply knowledge of nutritional principles | 1. Nutritional principles    * 1. Definition of terms         1. Nutrients         2. Dry matter         3. Fodder         4. Feedstuff         5. Roughages         6. Concentrates    1. Feed composition       1. Energy       2. Protein       3. Lipids       4. Vitamins       5. Minerals       6. Water.    2. Golden triangle principle       1. Housing       2. Feed       3. Livestock    3. Feed conversion efficiency | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Apply knowledge of livestock feed types | * 1. Sources of ***feed nutrients***      1. Plant-Based Sources      2. Animal-Based Sources      3. Mineral-Based Sources   2. Livestock feed types      1. Roughages      2. Concentrates      3. Feed additives   3. Functions of Feed nutrients.      1. .1 Water      2. 4.2 Carbohydrates      3. 4.3 Fats      4. 4.4 Vitamins      5. 4.5 Mineral      6. Proteins   4. Livestock feeds classification.      1. Concentrates      2. Roughages   5. Effects of feed deficiencies and toxicities.      1. Mineral deficiencies      2. Carbohydrates deficiencies      3. Vitamins deficiencies      4. Hypervitaminosis      5. Mineral toxicities | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Evaluate livestock dietary needs | * 1. Livestock dietary needs      1. Factors influencing feed intake         1. Age         2. Level of production         3. Physiological status         4. Ambient temperature         5. Type of feed   4.2.1. Livestock feed requirement   * + - 1. Kenya Agricultural and Livestock Research Organization (KALRO) feeding standards       2. National feeding standards   4.3.1. Animal performance | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |

**Suggested Methods of Instruction**

* Practical
* Role playing
* Demonstration
* Group discussion
* Case studies

**Recommended Resources for 25 trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | Charts | Livestock digestive parts | Per identified animals | - |
|  | Power point presentations | For trainer’s use |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
|  | Workshop |  | 1 | 1:25 |
|  | Laboratory |  | 1 | 1:25 |
|  | Site |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Khaki bags |  | 25 pcs | 1:1 |
| **D** | **Tools and Equipment** |  |  |  |
|  | Soil Auger |  | 25 pcs | 1:1 |
|  | Buckets |  | 25 pcs | 1:1 |
|  | Hoes |  | 25 pcs | 1:1 |
|  | Machetes |  | 25 pcs | 1:1 |
|  | Secateurs |  | 25 pcs | 1:1 |
|  | Shovels |  | 5 pcs | 1:5 |
|  | Digestion block |  | 5 pcs | 1:5 |
|  | Kjeldahl apparatus |  | 5 pcs | 1:5 |
|  | UV-VIS Spectrophotometer |  | 1 | 1:25 |
|  | Atomic absorption spectrophotometer (AAS) |  | 1 | 1:25 |
|  | Flame photometer |  | 1 | 1:25 |

**LIVESTOCK FORAGE PRODUCTION**

**UNIT CODE:** 0811 341 05A

**UNIT DURATION:** 240 Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce livestock forage

**Unit Description**

This unit covers the competencies required in produce livestock forage. It involves preparing forage land, establishing forage crops, managing forage crops, utilizing forage crops and conserving forage crops.

**Summary of Learning Outcomes**

By the end of this unit, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **SNO** | **Learning Outcome** | **Duration (Hours)** |
|  | Prepare forage land | 30 |
|  | Establish forage crops | 50 |
|  | Manage forage crops | 60 |
|  | Utilize forage crops | 40 |
|  | Conserve forage crops | 60 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning outcomes** | **Content** | **Suggested assessment methods** | |
| 1. Prepare forage land | * 1. Personal protective equipment      1. Gumboots      2. Overall      3. Goggles      4. Helmet      5. Nose masks      6. Gloves   2. Land preparation tools and equipment      1. Jembes /hoe      2. Slashers      3. Mowers      4. Ploughs      5. Harrows…   3. Forage land clearance   4. Forage land tillage | | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Establish forage crops | * 1. Tools and equipment      1. Jembes /hoe      2. Slashers      3. Mowers      4. Ploughs      5. Harrows   2. Forage propagation materials      1. Cuttings      2. Seeds      3. Seeds      4. Seedlings      5. Splits      6. Crowns      7. Slips      8. Cuttings      9. Suckers      10. Tissue culture   3. Forage propagation   4. Types Forage propagated      1. Nandi setaria      2. Star grass      3. Guinea grass      4. Rye grass      5. Kale      6. Sweet potato vine      7. Lucerne      8. Desmodium      9. Clovers      10. Napier grass      11. Bana grass.      12. Sesbania      13. Alfalfa      14. Rhodes      15. Leucaena      16. Oats   5. Forage establishment records   6. Waste is managed according to environmental protection regulations | | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Manage forage crops | * 1. Good Agricultural Practices (GAP)      1. Field hygiene      2. Selection of clean planting materials      3. Safe use of agro-chemicals and maximum Residual Levels of agro-chemicals used      4. Environmental sustainability      5. Integrated pest management (IPM)      6. Minimum, tillage   2. Forage management      1. Forage pests and diseases control      2. Forage weeds control      3. Fertilizers application.      4. Forage watering      5. Forage management records | |  |
| 1. Utilize forage crops | * 1. Forage crop utilization      1. Forage harvesting tools and equipment      2. Forages harvesting      3. Forage production records      4. Forage waste management | | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Conserve forage crops | * 1. Forage crops conservation   2. Forage conservation tools and equipment      1. Balers      2. Forage harvesters      3. Mowers      4. Manual balers   3. Forage storage facilities   4. Forage conservation methods   5. Forage conservation records   6. Waste management | | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |

**Suggested Methods of Instruction**

* Practical
* Role playing
* Discussion
* Direct instruction

**Recommended Resources for 25 trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | Charts |  | 5 pcs | 1:5 |
|  | Power point presentations | For trainer’s use |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
|  | Workshop |  | 1 | 1:25 |
|  | Laboratory |  | 1 | 1:25 |
|  | Site |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Forage propagating materials |  | 25 pcs | 1:1 |
|  | Farm inputs |  | 25 pcs | 1:1 |
| **D** | **Tools and Equipment** |  |  |  |
|  | Jembes /hoe |  | 25 pcs | 1:1 |
|  | Slashers |  | 25 pcs | 1:1 |
|  | Tractor |  | 1 | 1:25 |
|  | Mowers |  | 1 pc | 1:25 |
|  | Ploughs - disc |  | 1 pc | 1:25 |
|  | Harrows - disc |  | 1 pc | 1:25 |
|  | Balers |  | 1 pc | 1:25 |
|  | forage harvesters |  | 1 pc | 1:25 |
|  | Manual balers |  | 1 pc | 1:25 |

**MODULE II**

**ANIMAL FEED PROCESSING**

**UNIT CODE:** 0721 351 03A

**UNIT DURATION:** 240 Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process animal feed

**Unit Description**

This unit covers the competencies required in processing animal feed. It involves sourcing feedstuffs, processing feed ingredients, mixing feed batches, packaging processed feeds and storing processed feeds.

**Summary of Learning Outcomes**

By the end of this unit, trainee should be able to:

|  |  |  |
| --- | --- | --- |
| **SNO** | **Learning Outcomes** | **Duration (Hours)** |
|  | Source feedstuff | 30 |
|  | Process Feed Ingredients | 50 |
|  | Mix feed batches | 60 |
|  | Package processed feeds | 60 |
|  | Store processed feeds | 40 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning outcomes** | **Content** | **Suggested assessment methods** |
| * + - 1. Source of feedstuff | * 1. Personal protective equipment      1. Gumboots      2. Overall      3. Goggles      4. Helmet      5. Nose masks      6. Gloves   2. Feedstuffs      1. Roughages      2. Concentrates      3. Additives.      4. Feed ingredients      5. Proteins      6. Carbohydrates      7. Fats and oils      8. Vitamins;      9. Minerals;      10. Additives   3. Feedstuff records   4. Feed waste management | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Process Feed Ingredients | * 1. Personal protective equipment      1. Eye protection equipment      2. Hearing protection equipment      3. Feet protection equipment      4. Respiratory protection equipment      5. Gloves      6. Full body suits   2. Feed processing tools, equipment and materials      1. Grinders      2. Crushers      3. Hammer mills      4. Shovels   3. Feedstuff treatment methods      1. Drying      2. Flaking      3. Pelleting      4. Grinding      5. Mixing      6. Crushing      7. Roasting      8. Cooling      9. Dry rolling      10. Pressure cooking      11. Exploding      12. Reconstitution      13. Extrusion      14. Gelatinization      15. Popping      16. Micronizing      17. Crumbling   4. Quality control measures   5. Waste management | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Mix feed batches | * 1. Personal protective equipment      1. Eye protection equipment      2. Hearing protection equipment      3. Feet protection equipment      4. Respiratory protection equipment      5. Gloves      6. Full body suits   2. Feed mixing tools and equipment   3. Feed ingredients      1. Proteins      2. carbohydrates      3. fats and oils      4. Vitamins      5. Minerals   4. Additives and supplements      1. Antibiotics      2. Chemical preservatives      3. Fermentation products      4. Probiotics      5. Flavors      6. Sweeteners      7. Any other additives   5. Feed ingredient weighing and recording   6. Feed ingredient mixing   7. Feed sample analysis   8. Feed records   9. Feed waste management | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Package processed feeds | * 1. Packaging materials      1. Plastic material      2. Biodegradable Paper bags      3. Bins /containers      4. Pallet shrinks wrap   2. Feed packaging   3. Feed labelling      1. Product name      2. Net weight      3. Ingredients list      4. Guaranteed analysis      5. Feeding instructions      6. Manufacturer instructions      7. Expiration date.   4. Packaged feed records | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Store processed feeds | * 1. Storage tools and equipment   5.1.1Racking system  5.1.2 pallets  5.1.3 cartons and boxes  5.1.4 filing cabinets…   * 1. Feed store preparation   5.2.1Cleaning  5.2.2Dusting/fumigation…   * 1. Feed Storage records   2. Feeds quality      1. Feed composition analysis      2. Moisture content testing      3. Microbial quality control      4. Storage condition monitoring      5. Chemical analysis | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |

**Suggested Methods of Instruction**

* Practical
* Role playing
* Discussion
* Direct instruction

**Recommended Resources for 25 Trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks | Animal nutrition textbooks | 5 pcs | 1:5 |
|  | Feed processing manuals | KALRO feed processing manual | 1 | 1:25 |
|  | Charts | feed | 5 | 1:5 |
|  | PowerPoint presentations | For trainer’s use |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
|  | Workshop |  | 1 | 1:25 |
|  | Laboratory |  | 1 | 1:25 |
|  | Site |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Packaging materials sacks |  | 25 pcs | 1:1 |
|  | Labels printed |  | 25 pcs | 1:1 |
|  | Feed |  | 25 pcs | 1:1 |
| **D** | **Tools and Equipment** |  |  |  |
|  | Grinders |  | 25 pcs | 1:1 |
|  | Crushers |  | 25 pcs | 1:1 |
|  | Hammer mills |  | 25 pcs | 1:1 |
|  | Shovels |  | 25 pcs | 1:1 |

**FEED PROCESSING EQUIPMENT**

**UNIT CODE:** 0716 351 04A

**UNIT DURATION:** 180Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Operate Feed Processing Equipment

**Unit Description**

This unit covers the competencies required in operate feed processing equipment. it involves preparing feed processing equipment, controlling feed processing equipment and maintaining feed processing equipment.

**Summary of Learning Outcomes**

By the end of this unit, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **SNO** | **Learning Outcomes** | **Duration (Hours)** |
|  | Prepare feed processing equipment | 60 |
|  | Control feed processing equipment | 60 |
|  | Maintain feed processing equipment | 60 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Content** | **Suggested Assessment Methods** |
| 1. Prepare Feed Processing Equipment | * 1. Personal protective equipment      1. Gumboots      2. Overall      3. Goggles      4. Helmet      5. Nose masks      6. Gloves   2. Feed processing tools and equipment      1. Pelletizers      2. Mills      3. Dryers      4. Grinder      5. Packaging equipment      6. Labelling equipment   3. Feed processing equipment and facility cleaning.   4. Waste management | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Control feed processing equipment | * 1. Personal Protective Equipment (PPEs)   2. Feed ingredients assembling   3. Feed processing equipment is operation      1. Pelletizers      2. Mills      3. Dryers      4. Grinders   4. Waste management | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Maintain feed processing equipment | * 1. Maintenance tools      1. Greasing gun      2. Spanners      3. Pliers   2. Feed processing service and repair   3. Feed processing equipment maintenance records | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |

**Suggested Methods of Instruction**

* Practical
* Role playing
* Discussion
* Direct instruction

**Recommended Resources for 25 trainees**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks | Animal nutrition textbooks | 5 pcs | 1:5 |
|  | Feed processing manuals | KALRO feed processing manual | 1 | 1:25 |
|  | Charts | feed | 5 | 1:5 |
|  | PowerPoint presentations | For trainer’s use |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
|  | Workshop |  | 1 | 1:25 |
|  | Laboratory |  | 1 | 1:25 |
|  | Site |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Packaging materials sacks |  | 25 pcs | 1:1 |
|  | Labels printed |  | 25 pcs | 1:1 |
|  | Feed |  | 25 pcs | 1:1 |
| **D** | **Tools and Equipment** |  |  |  |
|  | Pelletizers |  | 25 pcs | 1:1 |
|  | Mills |  | 25 pcs | 1:1 |
|  | Dryers |  | 25 pcs | 1:1 |
|  | Grinders |  | 25 pcs | 1:1 |
|  | Greasing gun |  | 25 pcs | 1:1 |
|  | Spanners |  | 25 pcs | 1:1 |

# FARM WATER CONSERVATION

**UNIT CODE:** 0721 351 02A

**UNIT DURATION:** 100 Hours

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Conserve farm water

**Unit Description**

This unit equips trainees with knowledge and skills required to conserve water in the farm. It entails selecting sustainable water supply technologies, harvesting water in the farm, irrigating crop farm and maintaining farm irrigation system.

**Summary of Learning Outcomes**

By the end of this unit, the trainee will be able to:

|  |  |  |
| --- | --- | --- |
| **SNO** | **Learning Outcome** | **Duration (Hours)** |
|  | Select sustainable water supply | 20 |
|  | Harvest water in the farm | 30 |
|  | Irrigate crop farm | 30 |
|  | Maintain irrigation system | 20 |

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | Content | **Suggested Assessment Methods** |
| 1. Select sustainable water supply technologies | * 1. Water supply technologies      1. Water sources         1. Wells         2. Rainfall         3. Rivers         4. Boreholes   2. Water testing      1. Mineral tests      2. PH test      3. Basic water test   3. Water treatment.      1. Sedimentation      2. Filtration      3. Chemical treatment. | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Harvest water in the farm | * 1. Water harvesting structures      1. Farm ponds      2. Percolation tanks      3. Roof water harvesting tank      4. Wells      5. Sub surface dams      6. Field bunds   2. Personal protective equipment uses   3. Water harvesting structure design.   4. Water harvesting structure construction | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| 1. Irrigate crop farm | * 1. Water requirements   2. Irrigation system selection      1. Drip irrigation      2. Sprinkler irrigation      3. Sub surface irrigation      4. Surface irrigation   3. Irrigation system design   4. Irrigation system installation   5. Water application per crop requirement. | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |
| * Maintain irrigation system | * 1. Irrigation system maintenance   2. Faults identification   3. Faults repairing   4. Erosion control measures      1. Walk-over techniques      2. Minimal disturbance techniques      3. Crown and cross fall drainage      4. Cross bank drainage      5. Relief culverts on roads      6. Mitre and table drain on roads      7. Armouring/gravelling of roads      8. Crossing and draining surfaces      9. Batter stabilisation      10. Contour banks and channels      11. Gabions      12. Sediment basins      13. Riparian buffer zones      14. Outlet protection structures      15. Re-vegetation | * Practical * Third party report * Projects * Portfolio of evidence * Written tests * Oral questions |

**Suggested Methods of Instruction**

* Practical
* Role playing
* Discussion
* Direct instruction

**Recommended Resources for 25 trainees**

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| --- | --- | --- | --- | --- |
| **S/No.** | **Category/Item** | **Description/ Specifications** | **Quantity** | **Recommended Ratio**  (Item: Trainee) |
| **A** | **Learning Materials** |  |  |  |
|  | Textbooks |  | 5 pcs | 1:5 |
|  | Installation manuals |  | 5 pcs | 1:5 |
|  | Charts |  | 5 pcs | 1:5 |
|  | Power point presentations | For trainer’s use |  |  |
|  |  |  |  |  |
| **B** | **Learning Facilities & infrastructure** |  |  |  |
|  | Lecture/theory room |  | 1 | 1:25 |
|  | Workshop |  | 1 | 1:25 |
|  | Laboratory |  | 1 | 1:25 |
|  | Site |  | 1 | 1:25 |
| **C** | **Consumable materials** |  |  |  |
|  | Pipes |  | 5 rolls | 1:5 |
|  | Pipe fittings |  | 25 pcs | 1:1 |
| **D** | **Tools and Equipment** |  |  |  |
|  | Hacksaws |  | 25 pcs | 1:1 |
|  | Striping knives |  | 25 pcs | 1:1 |
|  | Side cutters |  | 25 pcs | 1:1 |
|  | Pliers |  | 25 pcs | 1:1 |
|  | Tape measure |  | 25 pcs | 1:1 |
|  | PPEs |  | 25 pcs | 1:1 |
|  | Stocks & dies |  | 5 pcs | 1:5 |
|  | Vices |  | 5 pcs | 1:5 |