

DAIRY PRODUCTION PRINCIPLES

ISCED UNIT CODE: 0721 451 07A

TVET CDACC UNIT CODE: DA/CU/PM/CC/03/5/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: **Apply Dairy Production Principles**

Duration of Unit: 120 Hours

Unit Description

This unit specifies the competencies required to apply dairy production principles. It involves breeding dairy cattle, applying principles of animal nutrition, applying hygienic milk production practices and performing dairy practices

Summary of Learning Outcomes

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

S/No	Learning Outcomes	Duration (Hours)
1.	Apply breeding principles	20
2	Apply dairy animal structures principles	30
3.	Apply animal nutrition principles	30
4.	Apply hygienic milk production practices	20
5.	Perform dairy routine practices	20
Total		120

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Breed dairy cattle	Theory 1.1 Dairy Animal Breeds 1.1.1 Definition of terms	<ul style="list-style-type: none">• Written tests• Third party report• Interviews/ Oral questions

	<p>1.1.1.1 Breeding</p> <p>1.1.1.2 Inbreeding</p> <p>1.1.1.3 Cross breeding</p> <p>1.1.1.4 Out crossing</p> <p>1.1.1.5 Insemination</p> <p>1.1.2 Importance of dairy breeding</p> <p>1.1.3 Types of animal breeds</p> <ul style="list-style-type: none"> 1.1.3.1 Friesian 1.1.3.2 Ayrshire 1.1.3.3 Guernsey 1.1.3.4 Jersey 1.1.3.5 Red poll 1.1.3.6 Sahiwal 1.1.3.7 Fleckvieh <p>1.1.4 Characteristics of animal breeds</p> <ul style="list-style-type: none"> 1.1.4.1 Colour 1.1.4.2 Shape 1.1.4.3 Productivity 1.1.4.4 lactation period 1.1.4.5 vigour <p>1.4 Breeding management tools, equipment and materials</p> <p>1.2.1 Types of dairy breeding tools equipment and materials</p> <ul style="list-style-type: none"> 1.2.1.1 Animal identification methods 1.2.1.2 Animal pregnancy testing kits 	<ul style="list-style-type: none"> • Practical • Individual/group assignments • Case Studies
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	<p>1.2.1.3 Semen collection kits</p> <p>1.2.1.4 Artificial insemination kit</p> <p>1.2.2 Uses of dairy tools, equipment and Materials</p> <p>1.2.3 Maintenance of tools, equipment and machinery</p> <p>1.2.3.1 Regular Cleaning</p> <p>1.2.3.2 Routine Maintenance</p> <p>1.3 Breeding</p> <p>1.3.1 Types of breeding</p> <p>1.3.2 Breeding procedures</p> <p>1.4 Record keeping</p> <p>1.4.1 Breeding records</p> <p>1.5 Artificial Intelligence</p> <p>1.5.1 Internet of things</p>	
2.0 Apply Principles of Animal Nutrition	<p>2.1 Principles of Animal Nutrition</p> <p>2.1.1 Definition of terms</p> <p>2.1.1.1 Nutrients</p> <p>2.1.1.2 Nutrition</p> <p>2.1.1.3 Feedstuff</p> <p>2.1.1.4 Fodder</p> <p>2.1.1.5 Concentrates</p> <p>2.1.1.6 Roughage</p> <p>2.1.1.7 Feed additives</p> <p>2.1.2 Carbohydrates</p>	<ul style="list-style-type: none"> • Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies • Third party report

	<p>2.1.3 Proteins</p> <p>2.1.4 Lipids</p> <p>2.1.5 Vitamins</p> <p>2.1.6 Minerals</p> <p>2.1.7 Water</p> <p>2.2 Feed formulation tools, equipment and Materials</p> <p>2.2.1 PPES</p> <p>2.2.2 Feed mixers</p> <p>2.2.3 Calculators</p> <p>2.2.4 Computers</p> <p>2.2.5 Grinders</p> <p>2.2.6 Pelleting machines</p> <p>2.2.7 Feed analysis equipment</p> <p>2.2.8 Molasses</p> <p>2.2.9 Pollard</p> <p>2.2.10 Maize bran</p> <p>2.2.11 Cotton seed cake</p> <p>2.2.12 Sunflower seed cake</p> <p>2.2.13 Dairy premix</p> <p>2.2.14 Dicalcium phosphate (DCP)</p> <p>2.2.15 Artificial Intelligent</p> <p>2.3 Dairy Animal Rations</p> <p>2.3.1 Maintenance rations</p> <p>2.3.2 Production rations</p> <p>2.3.3 Weaning rations</p> <p>2.3.4 Balanced rations</p>	
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	<p>2.4 Animal feed conservation</p> <p> 2.4.1 Silage</p> <p> 2.4.2 Hay</p> <p> 2.4.3 Standing hay</p> <p>2.5 Feed waste management</p> <p> 2.5.1 Bio- gas</p> <p> 2.5.2 Composting</p> <p> 2.5.3 Waste water treatment</p> <p> 2.5.4 Recycling</p> <p>2.6 Smart and Sustainable Systems</p> <p> 2.6.1 AI application</p> <p> 2.6.2 Sustainable waste disposal</p>	
3.0 Apply Hygienic Milk Production Practices	<p>3.1 Tools and Equipment and Materials</p> <p> 3.1.1 Milking churn</p> <p> 3.1.2 Milking bucket</p> <p> 3.1.3 Lactometer test</p> <p> 3.1.4 Udder towel</p> <p> 3.1.5 Milking salve</p> <p> 3.1.6 California Mastitis test</p> <p> 3.1.7 Weighing scale</p> <p> 3.1.8 Teat dip</p> <p> 3.1.9 Milk strainer</p> <p> 3.1.10 Milking Parlour</p> <p> 3.1.11 A.I</p> <p>3.2 Hygiene Practices</p> <p> 3.2.1 Handwashing</p>	<ul style="list-style-type: none"> • Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies • Third party reports

	<p>3.2.2 Cleaning and drying of the udder</p> <p>3.2.3 Cleaning and sanitization of equipment</p> <p>3.2.4 Environmental hygiene</p> <p>3.2.4.1 Clean beddings</p> <p>3.3 Milking</p> <p>3.3.1 Milking procedure</p> <p>3.3.2 Milking techniques</p> <p>3.3.3 Hand milking</p> <p>3.3.4 Machine milking</p> <p>3.3.5 Milk tests</p> <p>3.3.5.1 Organoleptic</p> <p>3.3.5.2 Lactometer</p> <p>3.3.5.3 Alcohol</p> <p>3.3.5.4 Clot on boiling</p> <p>3.4 Milk storage</p> <p>3.4.1 Storage conditions</p> <p>3.4.2 Storage equipment</p> <p>3.5 Record keeping</p> <p>3.5.1 Health records</p> <p>3.5.2 Production records</p> <p>3.6 Smart and Sustainable Systems</p> <p>3.6.1 AI application</p> <p>3.6.2 Sustainable waste disposal</p>	
4.0 Perform Dairy Practices	4.1 Dairy Animal identification	<ul style="list-style-type: none"> • Written tests • Reflection papers

	<p>4.1.1 Ear tags</p> <p>4.1.2 Ear notching</p> <p>4.1.3 Tattooing</p> <p>4.1.4 Collar</p> <p>4.1.5 Branding</p> <p>4.2 Routine practices</p> <p>4.2.1 Culling</p> <p>4.2.2 Dehorning and disbudding</p> <p>4.2.3 Hooves trimming</p> <p>4.2.4 Feeding</p> <p>4.2.5 Cleaning</p> <p>4.3 Disease Control</p> <p>4.3.1 Quarantine and isolation</p> <p>4.3.2 Embargo</p> <p>4.3.3 Vaccination</p> <p>4.3.4 Spraying</p> <p>4.3.5 Deworming</p> <p>4.3.6 Fencing</p> <p>4.3.7 Disinfection</p> <p>4.3.8 Clean water</p> <p>4.3.9 Footbath</p> <p>4.4 Smart and Sustainable Systems</p> <p>4.4.1 AI application</p> <p>4.4.2 Sustainable waste disposal</p>	<ul style="list-style-type: none"> • Interviews/ Oral questions • Practical • Individual/group assignments • Third party reports • Case Studies
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5. Apply dairy animal structures principles	<p>5.1 Types of farm structures</p> <p>5.1.1 Milking parlour</p> <p>5.1.2 Cattle sheds</p> <p>5.1.3 Zero grazing unit</p> <p>5.1.4 Calf pens</p> <p>5.1.5 Hay barn</p> <p>5.1.6 Silos</p> <p>5.1.7 Holding crush</p> <p>5.1.8 Spray race</p> <p>5.1.9 Plunge dip</p> <p>5.1.10 Stores</p> <p>5.1.11 Watering troughs</p> <p>5.1.12 Feeding troughs</p> <p>5.1.13 Fences</p> <p>5.2 Factors considered in siting farm structure</p> <p>5.3 Factors considered in selection of tools & equipment</p> <p>5.4 Factors considered in selection of construction material & supplies</p> <p>5.5 Maintenance of Dairy animal structures</p> <p>5.6 Waste is management</p> <p>5.7 Documentation</p> <p>5.8 Farm records</p>	<ul style="list-style-type: none"> •
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Suggested Methods of Instruction

- Demonstrations
- Group discussion
- Direct instruction

- Role play

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning Materials			
1.	Textbooks		5 pcs	1:5
2.	Production Manuals		5	1;5
3.	PowerPoint presentations	For trainer's use		
4.	Projector		1	1;25
5.	Assorted Flash Cards		5	1;5
6.	Whiteboard		1	1;25
7.	Rolls flip charts		1	1;25
8.	Assorted color of whiteboard markers	For trainers Use		
B	Learning Facilities & infrastructure			
1.	Lecture/theory room		1	1:25
2.	Workshop		1	1:25
3.	Laboratory		1	1:25
4.	Site/industry		1	1:25
C	Consumable materials			
1.	Molasses		1ltr	1:5
2.	Pollard		2kgs	2:5
3.	Maize bran		2kgs	2;5
4.	Cotton seed cake		2kgs	2;5
5.	Sunflower seed cake		2kgs	2;5
6.	Milk /product samples		500ml	500mls:5
D	Tools and Equipment			
1.	Source of heat		5 pcs	1:5
2.	PPES		1pcs	1:1
3.	Feed mixers		1 pcs	1:25
4.	Calculators		1 pcs	1:25
5.	Computers		5 pcs	1:5
6.	Grinders		1pcs	1:25
7.	Pelleting machines		1 pcs	1:25
8.	Feed analysis equipment		1pcs	1:25
9.	Lactometer		5pcs	1:5
10.	Alcohol			

11.	Test tubes		10	10;5
12.	Animal pregnancy testing kits		1	1:5
13.	Semen collection kits		1	1:5
14.	Milking churn		1	1:5
15.	Milking bucket		1	1:5
16.	Udder towel		2	1:5
17.	Milking salve	10g	10g:5	
18.	California Mastitis test		1	1:5
19.	Hammer		1	1:5
20.	Nails		1	1:5
21.	Saw		1	1:5
22.	Poles		1	1:5
23.	Slasher		1	1:5