

Introduction to Dairy Farming

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Key concepts, main components, and essential practices

1. What Is Dairy Farming?

- **Definition:** Commercial or subsistence production of milk and milk-derived products from domesticated dairy cattle (and occasionally other dairy species such as goats, sheep, or buffalo).
 - **Primary Goal:** Generate a consistent supply of high-quality milk for processing, sale, or personal consumption.
 - **Scale Spectrum:**
 - *Smallholder:* 1–5 milking cows, often family-run.
 - *Medium:* 20–200 cows, may use semi-automated milking.
 - *Large/Industrial:* >500 cows, fully mechanized, integrated with processing plants.
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2. Core Components of a Dairy Operation

Component	Purpose	Typical Practices
Housing	Protect animals, ensure comfort, control environment	Free-stall barns, tie-stall barns, open-air paddocks, climate-controlled barns
Nutrition	Provide energy, protein, minerals, vitamins for milk synthesis	Total Mixed Ration (TMR), pasture grazing, concentrate supplements, mineral blocks
Milking System	Extract milk efficiently while maintaining hygiene	Hand milking, bucket milking, pipeline systems, robotic milking parlors
Health Management	Prevent disease, maintain fertility, reduce losses	Vaccination programs, parasite control, mastitis monitoring, reproductive checks
Reproduction	Maintain herd replacement and genetic improvement	Artificial insemination (AI), natural service, estrus detection, pregnancy testing
Waste Management	Handle manure, wastewater, and by-products responsibly	Manure lagoons, composting, anaerobic digesters, slurry spreading
Record Keeping	Track performance, economics, and compliance	Milk yield logs, breeding records, health events, feed inventory, financial statements

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3. Basic Biology of Milk Production

1. Lactation Cycle

- **Dry Period:** ~60 days (no milking) ? mammary gland regeneration.
- **Early Lactation:** Highest milk yield, high energy demand.
- **Mid?Lactation:** Yield stabilizes, feed efficiency improves.
- **Late Lactation:** Yield declines, body condition may be restored.

2. Key Hormones

- **Prolactin:** Initiates and sustains milk synthesis.
- **Oxytocin:** Causes milk ejection (“let?down”) by contracting myoepithelial cells.
- **Growth Hormone & IGF?1:** Influence nutrient partitioning toward milk.

3. Nutrient Requirements

- **Energy:** ~3.0–3.5 Mcal NEL/kg dry matter (DM) for a 30?kg milk cow.
- **Protein:** ~16–18% crude protein in the diet; ~1.2–1.4?lb of true protein per 100?lb of milk.
- **Minerals/Vitamins:** Calcium, phosphorus, magnesium, vitamin A, D, E are critical for milk quality and cow health.

4. Milking Management

Step	Description	Critical Points
Pre?milking preparation	Clean teats, check for lesions	Use warm water, disinfectant dip; avoid harsh chemicals.
Milking	Attach milking units, collect milk	Maintain suction < 0.5?atm; monitor flow rate (??0.5?L/min).
Post?milking	Apply post	