

Routine Management Practices for Sustainable Dairy Production

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Abstract

India is the largest producer of milk in the world, holding a top rank in global milk production. In the 2021-22 period, India contributed approximately 24.64% to global milk production. Over the past nine years, from 2014-15 to 2022-23, milk production in the country has increased by about 58%, reaching 230.58 million tons (MT) in 2022-23. Dairy farming plays a crucial role in ensuring livelihood security, food and nutritional security, social welfare, and the overall health and welfare of both humans and animals. It also provides farmers with a stable income, even during extreme conditions like floods, droughts, and pandemics. In rural India, dairy farming is a vital source of livelihood and helps maintain nutritional security for rural populations. The primary goal of good dairy farming practices is to produce safe, high-quality milk from healthy animals under acceptable conditions. Routine dairy farm management practices include supervision of the farm, grooming, exercising, bathing, cleaning, and disinfecting barns, sheds, and milking equipment. Additionally, personal hygiene and sanitation, regular feeding, fodder cultivation, chaffing and harvesting, milking operations, record keeping, animal identification, clipping, bedding, deworming, vaccination, castration, and weighing are all essential components of dairy farm management. By adopting these practices systematically, farmers can maximize the health, growth, production, and reproductive efficiency of their dairy animals, leading to better overall outcomes for both the animals and the farmers.

Keywords: Deworming, Estrus, Fodder, Grooming, Pandemics.

INTRODUCTION

Dairying plays a significant role in India's economy, contributing to the sustainable livelihoods, food, and nutritional security of millions. The White Revolution, a major milestone in the Indian dairy sector, was instrumental in

boosting milk production, ensuring animal protein security, and combating malnutrition in the country (Singh *et al.*, 2017). Since independence, India has rapidly expanded its dairy industry and is now the world's largest producer of milk, reaching 236.35 million tonnes in 2023-24, according to the FAO Dairy Market Review (2023). This represents a 2.5% growth from the previous year, surpassing

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the global average growth rate in dairy production. India currently contributes about 24% of the world's total milk supply. Additionally, dairy farming provides farmers with a steady income, even during extreme conditions such as floods, droughts, and pandemics. It is a vital enterprise for maintaining the livelihoods of rural populations and ensuring their nutritional security. India is also home to a rich biodiversity, with 53 indigenous cattle breeds and 20 buffalo breeds, each suited to local environmental conditions.

Effective dairy farm management is crucial to improving lactation efficiency and ensuring high productivity. As Banerjee (2019) explains, farm management is both an art and a science that integrates ideas, facilities, processes, materials, and labor to produce and market quality products. Regular and systematic management practices are essential for sustainable milk production. Below are key dairy farm operations that should be part of the daily routine:

1. Daily Farm Supervision: A good dairy farm manager should visit the herd regularly, especially in the morning, to closely observe the animals' activities and behaviors. This includes monitoring the animals for signs of estrus and promptly performing artificial insemination if necessary, typically 12-15 hours after the onset of estrus. If any animal shows sign of illness or abnormalities, it should be isolated and examined by a veterinarian for diagnosis and treatment, with preventive measures taken as required. After grazing, farmers should observe the animals closely for any injuries, the amount of forage consumed, and any unusual behaviors (Banerjee, 2019).

The primary goal of health management programs is to ensure optimal care for the animals, minimize productivity losses due to disease or management errors, and address animal welfare concerns (Thomas & Sastry, 2021). These programs often include regular veterinary visits, routine physical examinations, and periodic reviews of herd performance data to make informed management decisions.

2. Grooming: Grooming is an essential practice that helps maintain the health, growth, and reproductive efficiency of dairy animals. It is also vital for their thermoregulatory functions and overall well-being. While animals engage in natural grooming behaviors like rubbing against each other or licking their bodies, human intervention is necessary to ensure that these practices are done thoroughly and systematically. In cattle, the mouth, nose, and lips serve as primary sensory organs

for grooming, while humans use their hands to perceive and manage grooming activities.

Grooming plays a crucial role in maintaining social hierarchy and reducing stress among cattle. As herd animals, cows feel safer when they stay in close contact with one another, and grooming helps reinforce these social bonds. If grooming facilities are lacking, animals may exhibit abnormal behaviors (Ewing *et al.*, 1999). Grooming also contributes to the health and appearance of the animal's skin, helping to prevent issues like skin irritations and parasitic infestations.

In extensive production systems, animals often use environmental objects like trees, fences, or posts to scratch and groom areas of their bodies that are difficult to reach with their mouths or feet (DeVries *et al.*, 2007). Self-grooming, through behaviors like licking, scratching, and swatting with the tail, also helps to keep the animals clean and comfortable. In intensive housing systems, grooming should be performed about one hour before milking to allow fine dust particles to settle.

Grooming generally begins with the head, followed by the back and sides, and ends at the tail (Prasad, 2005). The benefits of grooming include:

- Cleaning, conditioning, and shining the coat
- Stimulating blood circulation
- Removing dead skin and hair
- Preventing parasitic infestations
- Enhancing physical fitness and activity levels
- Improving breeding efficiency
- Contributing to clean milk production

Farmers should aim to groom cattle at least three times a day, spending 1-1.5 minutes per session, especially if mechanical grooming tools like barn brushes are available. Regular grooming helps keep the animals healthy, active, and productive, while also promoting their overall well-being.

3. Exercise for Livestock: Regular exercise is crucial for maintaining the health, fitness, and activity levels of animals, including humans. It supports normal metabolic processes, strengthens muscles, and enhances both physical and mental well-being. Outdoor exercise, particularly exposure to sunlight, aids in vitamin D production, which is vital for strong bones.

Breeding bulls should have a dedicated loafing area of approximately 120 square meters to maintain their condition and libido. In large livestock farms and semen banks, using a bull exerciser to manage multiple bulls simultaneously can prevent obesity

and reduce the risk of injury to handlers.

4. Bathing and Cooling: While farm animals aren't bathed daily except for buffaloes, they should be washed when dirty or during warm weather. Routine bathing of dairy animals before milking is important for hygiene and to reduce heat stress in summer. Buffaloes, in particular, are more susceptible to heat stress and often seek wallowing. In tropical climates, spraying cool water on animals or using sprinklers in their shelters helps maintain comfort and prevent heat stress. Although these methods may enhance milk production, they can be costly for small-scale dairy farmers. A proper balance of bathing and grooming can alleviate environmental stress, contributing to better productivity.

5. Cleaning and Dis-infection of Barns & Sheds: Maintaining cleanliness and disinfecting animal housing is essential for the health of high-producing animals, such as dairy cattle. This is especially necessary in intensive housing systems, where high animal density increases the risk of infection. Cleaning involves removing manure, used bedding, and liquid waste, ensuring proper drainage and regularly cleaning water troughs to prevent bacterial contamination. Disinfectants commonly used include quaternary ammonium compounds, sodium hypochlorite, and slaked lime. Routine cleaning minimizes pathogen levels, reducing the risk of disease outbreaks.

6. Hygiene of Milking Utensils & Equipment: Maintaining good hygiene is vital for both animal and human welfare on dairy farms. Proper cleaning of milking parlors, utensils, and equipment ensures clean milk production and reduces the risk of contamination. Teat hygiene, the cleanliness of milking personnel, and sanitizing milking machines are key factors. Regular disinfection of milking equipment, including teat cups, buckets, and feeding tools, is crucial to prevent cross-contamination and maintain milk quality. The milking parlor should be cleaned at least twice daily, and milking machines should be sanitized after each use.

- a. **Milking Parlor Hygiene:** The milking parlor, being a high-traffic area, should be disinfected after every milking. This includes cleaning surfaces and ensuring that the milking machine, including automatic systems, is thoroughly washed and sanitized.
- b. **Calf and Calving Box Hygiene:** Since calves and post-calving cows are particularly vulnerable to infections, their housing must be cleaned and disinfected after each use.

This helps minimize the spread of pathogens and ensures healthy growth and lactation.

- c. **People Hygiene:** Farm workers should regularly sanitize their hands and boots before handling animals to prevent the transmission of pathogens. Disinfecting footwear, especially when moving between different animal groups, helps control disease spread.
- d. **Milking Machine Hygiene:** Regular cleaning of milking machines with appropriate detergents is necessary to prevent infections such as mastitis. A strict cleaning protocol, using acidic or alkaline solutions, is essential to maintain hygiene.
- e. **Teat Hygiene:** Teat care is critical to prevent mastitis. Teats should be cleaned and disinfected before milking, and the milker's hands should be sanitized. Reusable cloth towels should be laundered with hot water to reduce bacterial contamination.

7. Feeding Dairy Animals: Feeding dairy animals at regular intervals is crucial for their growth, reproduction, and productivity. A balanced diet tailored to the animal's physiological needs at various life stages ensures optimal health and milk production.

General Feeding Guidelines:

Provide a balanced ration containing proteins, carbohydrates, fats, minerals, and vitamins. Ensure the feed is digestible, palatable, and free from toxins. Offer fresh feed regularly and avoid sudden changes in their diet. Supplement vitamins and minerals as needed.

8. Fodder Cultivation, Harvesting & Chaffing: Green fodder is vital for livestock health. Fodder crops are either harvested manually or using mechanical equipment like reapers. After harvesting, fodder is chopped using chaff cutters for easier storage and digestion. These cutters can be hand-operated, animal-powered, or powered by machinery, depending on the farm's scale.

9. Milking Operations: Effective milking methods are essential for high-quality milk production. Milking should be done carefully to avoid udder injuries and to maximize milk yield. Milking should occur in a clean, separate area like a milking parlor, and it should be performed at least twice a day. Disturbances during milking, such as loud noises or movements, should be avoided to reduce stress in cows.

10. Record Keeping: Proper record-keeping is

critical for managing a dairy farm effectively. It helps track animal performance, feeding practices, and health histories, aiding in decision-making and farm management. Accurate records can also support financial management, including calculating milk production costs, making breeding decisions, and analyzing herd health.

Key Records to Maintain:

- a. *Herd Inventory*: Includes animal identification, birth date, sire and dam information, and any sales or culling.
- b. *Animal History*: Tracks lactation yields, breeding, and health treatments.
- c. *Daily Milk Yield*: Records the milk production of each cow.
- d. *Feeding Log*: Tracks the daily intake of concentrates, fodder, and supplements.
- e. *Health Records*: Documents disease occurrences, treatments, and veterinary interventions.

11. Identification of Dairy Animals: Proper identification is essential for managing dairy animals. It allows farmers to track production, health, and breeding history. Methods include tagging, tattooing, branding, and ear notching. Tagging is most common for young animals, while tattooing is often preferred for calves.

Other Dairy Farm Operations

12. Clipping of Hair: Hair clipping helps prevent loose hair from contaminating milk. In breeding bulls, periodic clipping of the prepuccial hair improves semen quality and reduces infection risks.

13. Bedding: In cold climates, providing bedding for young calves is essential for warmth. In tropical regions, bedding is less critical but is still used to keep animals clean and improve manure management.

14. Dehorning/Disbudding: Dehorning, or removing horns, is important for safety, preventing injuries to other animals. It's typically done when the calf is 4-10 days old. The process is less stressful when done early and is typically performed during cooler seasons.

15. Castration: Castration is done to make male animals more manageable and docile. It is usually performed during the cold season to avoid complications from flies. Burdizzo castrators are commonly used in India for this purpose.

16. Weighing of Animals: Weighing livestock helps track growth rates and determine feed

and medication dosages. It is also important for managing the overall health and welfare of the herd.

Approximate Time for Daily Operational Works on a Dairy Farm

3:30-4:00a.m.

1. **Bringing the cows from paddock to milking barns**
 - ◆ Transport cows from grazing areas or paddocks to milking barns.
2. **Cleaning/Bathing/Brushing of Dairy Animals**
 - ◆ Clean animals to ensure hygiene before milking.
 - ◆ Bathing and brushing to ensure cleanliness and comfort for milking.

4:00-5:30 a.m.

1. **Feeding Half of the Daily Concentrate (Just Before Milking)**
 - ◆ Provide the first half of the concentrate feed to cows before milking.
2. **Milking of Cows & Buffaloes**
 - ◆ Milking operations for cows and buffaloes begin.

5:30-6:00 a.m.

1. **Delivery of Raw Milk by Vendors**
 - ◆ Receive raw milk from farm workers or vendors for collection.
2. **Washing and Disinfection of Milking Barns**
 - ◆ After milking, the barns are cleaned and disinfected to maintain hygiene.

6:00-8:00 a.m.

3. **Cleaning of Milk Cow Sheds**
 - ◆ Clean and prepare the sheds for the cows after milking.
4. **Feeding of Dry/Green Fodder to the Milking Cows**
 - ◆ Provide the second portion of feed (dry and green fodder) to milking cows.
5. **Cleaning of Farm Premises**
 - ◆ General farm cleaning and waste management (manure removal, tidying up).
6. **Isolation of Sick Animals**
 - ◆ Separate and isolate any sick animals to

prevent the spread of diseases.

7. **Separation of Heated Cows for Artificial Insemination (AI)**

- ◆ Identify cows in heat and separate them for AI services.

8. **Breeding of Cows & Buffaloes in Heat**

- ◆ Perform AI or natural breeding for cows and buffaloes that are in heat.

9. **Animal Taken for Grazing in Summer, if Practice**

- ◆ In warmer months, animals may be taken for grazing to ensure they get fresh pasture.

10. **Feeding of Milk to Weaned Calves**

- ◆ Provide milk or milk replacer to weaned calves.

11. **Exercising of Bulls**

- ◆ Bulls are exercised for fitness and libido maintenance.

8:00-10:30 a.m.

1. **Workers Come on Duty, Milkers Go Off Duty**

- ◆ Workers begin their shifts while milkers finish their morning milking duties.

2. **Harvesting and Hauling of Green Fodders**

- ◆ Cut and collect fresh fodder for feeding animals later in the day.

3. **Chaffing and Distribution of Fodder to All Animals**

- ◆ Fodder is cut into smaller pieces (chaffed) and distributed among all the animals.

4. **Visit of Farm Manager**

- ◆ The farm manager inspects the operations, checks on animal health, and oversees farm activities.

10:30-1:00 p.m.

1. **Treatment of Sick Animals**

- ◆ Veterinary treatment for sick or injured animals.

2. **Supply of Full Amount of Daily Concentrate Mixtures to Bulls, Calves, Dry, and Pregnant Cows and Buffaloes**

- ◆ Full concentrate ration is given to non-milking animals (e.g., bulls, calves, dry or pregnant cows).

3. **Entries in Records Book**

- ◆ Record keeping for various activities (breeding, health treatments, feeding,

etc.).

1:00-2:00 p.m.

1. **Rest & Lunch Break for Workers**

- ◆ Lunch break for the farm workers to rest.

2:00-2:30 p.m.

1. **Marking & Dehorning of Animals**

- ◆ Identification marking of animals and dehorning of young stock as needed.

2. **Making Hay & Silage**

- ◆ Prepare and store fodder for future use, such as hay and silage.

3. **Preparation of Concentrates Mixtures**

- ◆ Mix and prepare feed concentrates for the evening feed.

2:30-3:00 p.m.

1. **Milkers Come on Duty**

- ◆ Milkers return to the farm for the evening milking shift.

2. **Supply of Half of Daily Allowances of Concentrate Mixtures to Cows**

- ◆ Provide the second half of the concentrate ration to milking cows.

3. **Cleaning and Brushing of Milch Dairy Animals**

- ◆ Ensure milking cows are clean and comfortable before milking.

3:00-4:30 p.m.

1. **Milking of Cows & Buffaloes**

- ◆ Milking operations for cows and buffaloes are carried out again.

2. **Deworming & Vaccination of Animals as per Suggestions**

- ◆ Deworming and vaccination schedules are followed as recommended.

3. **Trimming of Hooves**

- ◆ Hoof trimming to prevent lameness and ensure the animals' mobility.

4. **Feeding Milk to Weaned Calves**

- ◆ Milk or milk replacer provided to the calves that have been weaned.

4:30-6:30 p.m.

1. **Clipping Hairs on Belly & Hind Quarters of Cows**

- ◆ Trim hair around the belly and hindquarters to maintain cleanliness and prevent contamination in milk.

2. **Sale & Purchase of Animals**

- ◆ Buying and selling of animals as required.

3. **Entries in Respective Record/Register**
 - ◆ Updating farm records regarding animals sold or purchased.
4. **Disposal of Milk Through Vendors**
 - ◆ Raw milk is delivered to vendors or dairy processors.
5. **Cleaning of Bull Pen, Calf Shed, Maternity Pens, Dry & Pregnant Animals Shed**
 - ◆ Ensure cleanliness in all pens and areas where non-milking or expectant animals are housed.

6:30 p.m.

1. **Workers Go Off Duty**
 - ◆ End of regular shift for farm workers.

6:30 p.m. - 2:30 a.m.

2. **Night Watchmen Come on Duty**
 - ◆ Night watchmen take over responsibilities for animal care and farm security.
3. **Night Watchmen Perform Extra Duty on Advanced Pregnant Cows**
 - ◆ Special care for pregnant cows, especially those close to calving. Regular checks for signs of calving are made.

CONCLUSION

Dairy farming is one of the most intensive systems for improving the socio-economic condition of farming community. Effective business management for farm production and financial information should be well planned and necessary to chalk-out a routine dairy work plan for optimization of growth, production & reproduction as well as judicious utilization of labours and other technical staffs as per our need and requirement. The routine farm management practices in a proper way is also related with animal welfare issues *viz.* freedom from hunger, thirst & malnutrition, freedom from dis-comfort due to environment, freedom from fear and distress, freedom from injury, pain & diseases, freedom to express their normal behaviours. Adoption of Proper routine management activities will be helpful in taking initiatives for better improvement & Income generation.

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