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Housing Management for Dairy Animals under Indian Tropical Type of Climatic Conditions

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Abstract

Dairy cows are exposed to hot, humid circumstances in a tropical climate, which has a negative impact on their welfare, productivity, and health. It becomes vital to provide dairy cows with appropriate housing in order to mitigate the negative impacts of the tropical climate. The Earth's average temperature is steadily increasing, particularly in tropical areas. When it comes to housing animals, especially in these regions, the Thermal Humidity Index (THI) can often reach levels of mild to severe heat stress. Dairy animals experiencing extreme stress may undergo noticeable declines in their physical condition. Achieving the optimal health, productivity, and well-being of dairy animals relies on appropriate animal housing. This entails not only providing shelter but also considering factors such as the choice of roofing material, roof angle, bedding, ventilation, microenvironment, manger and watering facility design, control of gaseous and microbial levels, temperature regulation, and construction materials. Various animal housing arrangements can be tailored to suit different climatic conditions, with open housing being a recommended choice for tropical climates. The purpose of this essay is to educate readers on the essential housing management techniques required to ensure dairy cows have the best possible health, production, and welfare.

Keywords: Dairy animals, Housing, Management, Tropical climate.

Introduction

The climate of India is tropical. The high THI (thermal humidity index), which ranges from 75 to 85, causes moderate to high stress in more than 85% of Indian locations in April, May, and June. Crossbred cows and buffaloes have demonstrated that a high THI has a detrimental effect on milk production. Cattle breeds that are relatively native are heat resistant. Buffaloes lose roughly 20 kg of milk per animal per year, whereas crossbred cows lose about 100 kg per animal per year. Improved management techniques are required to combat the harmful consequences of the forced heat stress. A necessary component of such management components is optimal housing management. Maintaining good udder health and milk production in tropical climates is a difficult undertaking (Singh *et al*., 2020; Kumari *et al*., 2019; Kumari *et al*., 2020). There could be a variety of animal housing arrangements that are suited to various climatic situations. High rainfall and temperate climate conditions are good for closed barn housing systems. Open dwelling facilities, on the other hand, are advised for tropical climates. In addition to providing shelter, suitable roofing, roof angles, bedding, ventilation, micro environments, and structures for proper manger and watering facilities should also be provided. The construction of a decent animal home that takes into account and effectively puts into practice the aforementioned factors will contribute to dairy animals having the best possible health, production, and welfare.

Key Elements of Optimum Housing Conditions at Tropical Climate

Excessive temperatures and excessive humidity in a tropical climate can prevent dairy cows from performing at their best. These circumstances can cause heat stress if they are not under control. Dairy cows may experience two different forms of heat stress effects, primarily apparent and invisible. Heat stress can cause increased somatic cell counts as well as visible symptoms as rising body temperature, decreased dry matter intake, decreased rumination behaviour, increased respiration rate, and reduced milk output. Invisible symptoms of heat stress may include lowered immunity, an increased risk of mastitis and other metabolic disorders, impaired rumen function, an increase in maintenance energy, and an increase in lameness instances in high-yielding cows (Kansal *et al*., 2020).Physiological, behavioral, and physical condition estimation should be encouraged in dairy housing in addition to this (Bhatt *et al*., 2020). Animals living in tropical climates prefer loose housing systems than traditional ones. In a loose housing arrangement, the animals are mostly left untethered and are only attached when being milked in a milking parlour or when receiving medication.

Adequate air space and floor space

Weight class (kg)	Minimum unit building volume
Up to 60	7 m^3
61-100	10 m^3
101-200	15 m^3
>201	20 m^3

Floor space per animal under loose housing system

Types of animals	Floor Space per animal (sq. ft)		Manger length / animal (inch)
	Covered area	Open area	
Cow	20-30	80-100	20-24
Buffaloes	25-35	80-100	24-30
Young stock	15-20	50-60	15-20
Pregnant cow	100-120	180-200	24-30
Bull pen	120-140	200-250	24-30

Orientation of Animal House

Dairy animals benefit from a house's east to west orientation in tropical climates. It provides the animals with adequate shade, shielding them from the blazing sun's tiring beams.

Proper Provision of Shelter

Animal shelters should aid with automation, labor-saving measures, feeding, milking, and efficient waste management in addition to providing a safe place for animals to live. They should also consider the comfort of the animals, their health and cleanliness, as well as the operator's ease and comfort.

Proper Roofing Material

A quality roofing material becomes a necessity for homes. A poor choice of roofing material can result in significant losses in both animal performance and health, as well as financial losses. Lightweight, robust, weatherproof, poor heat conductor, and devoid of an interior moisture condensation tendency. Thatch, clay tiles, wood, reinforced concrete cement, PVC sheets, galvanized sheets, asbestos, and other locally accessible materials are only a few examples of roofing materials. Thatch material is the best roofing material for animal housing, according to the Rural Structure in the Tropics, followed by clay tiles, wood, reinforced concrete cement, galvanized sheets, PVC sheets, and asbestos sheets.The ideal height for the roof is 12 feet for flat roofs and 20 feet at the centre with 12 feet at the eaves for gable roofs. A prominent type of roofing material used by villagers for their own homes is insulated roofing sheet/false ceiling, which is now becoming popular for sheltering animals. When building an animal housing, attention should be made to ensure that the roof angle is no greater than 45 degrees. Roof angles

made of thatch are limited to 30-35 degrees, those made of clay tiles to 25 degrees, and those made of galvanized sheets to 15 degrees.

Ventilation

The fundamental principle of ventilation is that fresh air enters the space, interacts with any moisture, dust, or microorganisms that may be present, adds heat and gases, and then pushes stale air outside through openings like windows, furrows, or holes. Natural ventilation and forced ventilation are the two possible types of ventilation. Natural ventilation greatly facilitates loose housing;thus, we will now look at several types of natural ventilation. Large continuous sidewall openings, continuous eave openings, and continuous ridge openings are examples of natural ventilation types. Large continuous sidewall apertures, however, are the form of natural ventilation that is best suited for Indian conditions since they allow a lot of fresh air to enter and effectively finish the ventilation process.

Bedding/Floor Materials

a) The bedding should be comfortable, conducive to rest, affordable, low in microorganism burdens, and it should improve the health and productivity of dairy animals. Dairy cows have been found to have a partial preference for an optional outdoor area, albeit they preferred pasture to an outdoor sand pack at night due to the pasture's greater space availability or perhaps because they could graze there. The primary goal of bedding is to make the animals as comfortable as possible. It ought to encourage animal wellbeing and productivity.

b) Dependent on the kind of bedding material is particle size. It ranges from 0.1 to 2mm for sand, andfor woodshavings it is 2-4cm. Large sand particles can irritate and even hurt animals, whereas very small particles, such as sawdust, can adhere to the skin and teats of an animal, causing itching and perhaps contaminating them with infections.

c) It is best to keep bedding materials as dry as possible. Wet materials might serve as a breeding ground for bacteria that are harmful to animals.

d) It should be affordable, simple, and local to obtain bedding materials.

e) Organic material, such as wood shavings, straw, and paper remnants, should not promote bacterial growth in bedding. Animals shouldn't be able to eat them. It is advised to change the bedding frequently if organic materials are used. For dairy cows to produce their best milk, they need to drink the recommended amount of water.

Dimensions of mangers and water troughs (BIS: 1223-1987)

Type of animal	Dimensions of manger (cm)		
	Width	Depth	Height of wall
Adult cattle and buffalo	60	40	50
Calves	40	15	20

Conclusion and Recommendations

It can be said that dairy animals thrive in hot, humid conditions that have a negative impact on the animals' health, productivity, and welfare. It becomes vital to provide dairy cows with appropriate housing in order to mitigate the negative impacts of the tropical climate. In tropical climates, open dwelling amenities are advised. optimal shelter provision, appropriate roofing material, roof angle, bedding material, ventilation, structure for optimal manger and watering facilities, microorganism load, temperature, and building materials are some of the essential components of ideal housing in tropical climates. The automation of dairy operations should be made easier by modern animal housing, which should also be labor-friendly. Tropical dairy animal productivity depends heavily on the optimal construction and upkeep of adequate shelter.For the best welfare, health, and productivity of dairy cows,

it is recommended to take into account the essential elements of adequate housing as described in this article.

References

Bhatt N, Kumar S, Singh K, Chandra R, Singh AK, Debbarma A, Rajneesh, Bipate M and Adbhai A (2020). Behavioural investigation of Sahiwal calves under Azolla pinnata feeding in early morning hours during cold season. *Journal of Entomology and Zoology Studies*, 8(2): 310-313.

Kansal G, Yadav DK, Singh AK and Rajput MS (2020). Advances in the management of bovine mastitis. *International Journal of Advances in Agricultural Science and Technology*, 7(2): 10-22.

Kumari T, Bhakat C and Singh AK (2020). Adoption of management practices by the farmers to control sub clinical mastitis in dairy animals. *Journal of Entomology and Zoology Studies*, 8(2): 924-927.

Kumari T, Bhakat C, Singh AK, Sahu J, Mandal DK and Choudhary RK (2019). Low-cost management practices to detect and control sub-clinical mastitis in dairy cattle. *International Journal of Current Microbiology and Applied Sciences*, 8(05): 1958-1964.

Singh AK, Bhakat C, Yadav DK, Kumari T, Mandal DK, Rajput MS and Bhatt N (2020). Effect of pre and postpartum Alpha tocopherol supplementation on body measurements and its relationship with body condition, milk yield, and udder health of Jersey crossbred cows at tropical lower Gangetic region. *Journal of Entomology and Zoology Studies*, 8(1): 1499-1502.