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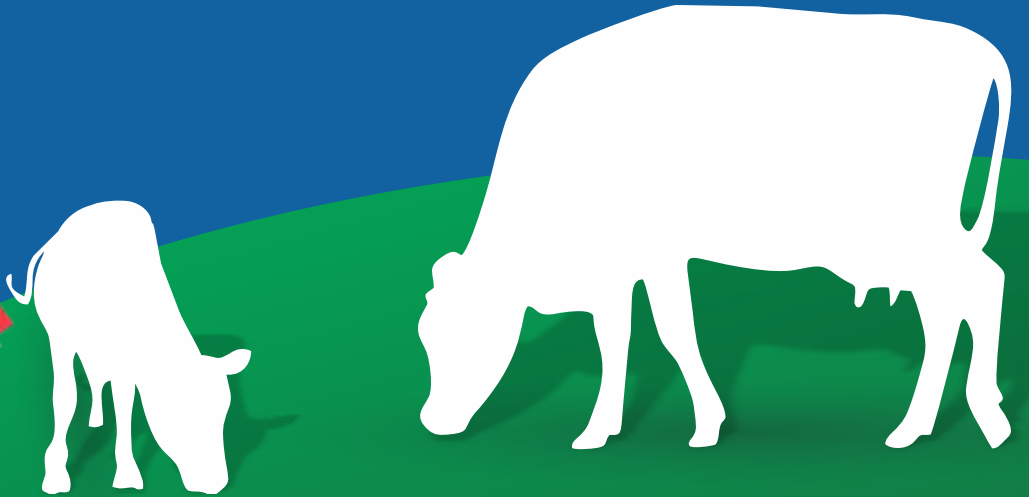
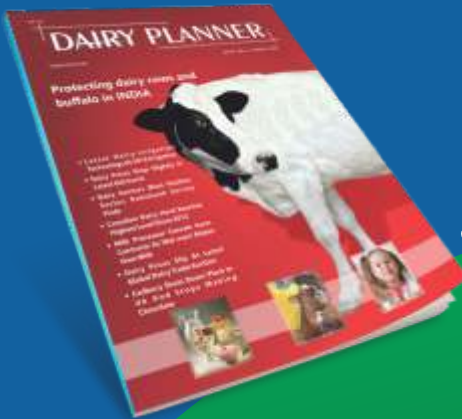
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From the Pen of Chief Editor



Dairy calf & Heifer- Future of Dairy Industry

All dairy farms' future success depends greatly on healthy dairy calves and heifers. A good calf & heifer management programme is critical to overall reproductive management and breeding herd performance.

Dairy heifer calves are the second-largest annual expense for dairy farms, accounting for approximately 20% of total production costs. This investment must be safeguarded by managing and feeding these heifers in order for them to grow economically and at the optimal rate in order to calve at 24 months of age.

There is no such thing as a right or wrong way to raise calves. The goal of calf raising, on the other hand, is to find the best way to raise a healthy calf so that she will grow into a productive cow. Farmers must find the most efficient method to ensure that it is financially beneficial in the long run due to the high cost of raising calves.

Water, energy, and protein are the three most important nutrients for calf growth and development. Fibre, minerals, and vitamins are also required, but to a lesser extent. The majority of a young animal's body weight is made up of water. Water quality and availability to all animals are also critical. Limiting good quality water to dairy calves and heifers may limit growth and negatively impact their health.

Colostrum, the first milk of a cow, provides newborn calves with immunity against many diseases as well as certain minerals and vitamins. If they are of high quality, milk substitutes can be used. Rumen development is stimulated by concentrates and water, so starting the calf on calf starter and drinking water from day one is critical.

Calves can die from under feeding or overfeeding, as well as diseases like pneumonia, calf scours, navel infections, and worm infestations (Ascariasis). Calf mortality due to these ailments can be reduced to less than 10% with proper management.

Heifers do not produce income until their first lactation and, in many cases, do not produce profit until their second lactation. If well managed, they will repay the investment in rearing costs with increased milk production and a longer productive life. All dairy operations must take animal comfort into account. Antibiotic-treated calves produce less milk in their first lactation than untreated calves.

This, combined with increased public concern about antibiotic use, should encourage producers to focus on disease prevention rather than heifer calves treatment.

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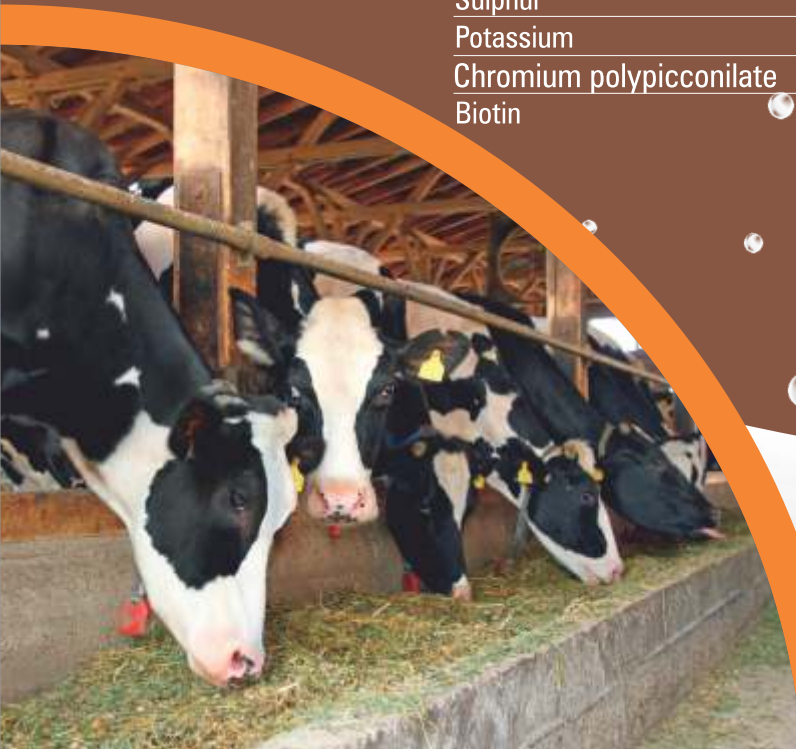
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Sahiwal cattle: Pride of the Indigenous Cattle Breed



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Introduction

Sahiwal is considered to be one of the best milch cattle breeds of India. The breed derives its name from Sahiwal area in the Montgomery district of Punjab in Pakistan. These animals are also known as "Lambi Bar", "Lola", "Montgomery", "Multani" and "Teli". The animals are very good for the specialized dairy purposes. The breeding tract of the breed is the Ferozpur and Amritsar districts of Punjab and Sri Ganganagar, Hanumangarh district of Rajasthan. A few herds of pure Sahiwal cattle are available around the Fazilka and Abohar towns of the Ferozepur district.

It is the best dairy breed in India. It is a heavy breed, parasite-resistant and heat-tolerant. Due to their heat tolerance and their good milk production, they have been exported to many countries.

Sahiwal is one of the best dairy breeds of zebu cattle. It is being utilized for the improvement of local stock. Based on the breed survey 2013, the Sahiwal populations were pure 10,92,459 and 37,89,835 graded. The percentage share

and tail. This breed is also known for drooping ears. The hump is very big, but in the female it is nominal.

- They are very high and long in size.
- Surrounded skin of the umbilicus becomes slack and thick.
- Forehead of this Sahiwal is elevated and head is shot size.
- Horns are thick in strength and small in size.
- Udder is big sized and hanging.
- Sahiwal's tail is very long around a touch to the ground level.
- It takes about 3-3.5 years to produce calf for the first time.

General physical parameters

Category	Male	Female
Height (Avg. cm)	170	124
Body Length (Avg. cm)	150	131
Heart Girth (Avg. cm)	190	164
Weight (Avg. Kg)	540	327
Birth Weight (Avg. Kg)	22.4	20.7

Performance

Category	Average	Minimum	Maximum
Age at first Parturition (Avg. Months)	41.7	30	50
Parturition Interval (Months)	15.6	13	18
Milk yield per lactation (kg)	2325	1600	2750
Milk Fat (%)	4.9	4.8	5.1

concerning the total cattle population is 3.23%.

Physical characteristics of Sahiwal Cattle

Sahiwal has a color range of reddish-brown to red, with varying amounts of white on the neck, and the underline. Coming to the male breeds, the color darkens towards the head, neck, legs,

Sahiwal Cattle Cost in India

Usually, Sahiwal cow price depends on milk production, age and health condition. On an average price are Rs. 60,000 to Rs.80,000.

Sexual maturity

Heifers should be mated when they reach 2.5 to 3 years of age or when they attain at least 270 kg live weight.



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Selection of breeding cattle

Breed/genetic improvement is important to Sahiwal farmers as it can enhance the performance of their herds, therefore, benefiting individual farmers due to increased productivity and profitability. Breed improvement occurs when the breed value of a Sahiwal herd is improved through selection. The improvement has the potential to;

- Improve specific traits/values of a herd including milk, carcass, growth, fertility, coat color and resilience.
- Improve overall productivity and profitability.
- Assist in meeting market requirements.

Fig.:- Sahiwal cattle breed (Picture- Dr. Sudesh Kumar)



Selection of Sahiwal breeding stock

Breeding stock is a group of Sahiwal males and females. Selection is the process of preferring certain Sahiwal

cattle to be parents of future calves while removing others. Selection is an important tool for improving preferred Sahiwal cattle traits. Preferred Sahiwal traits;

- Coat color (reddish-brown)
- High milk yield
- Fast growth rate
- High fertility
- Large body size
- Tolerance to diseases and drought

Tips on good Sahiwal breeding practices

- Chose the best cows and bulls to be parents of the next generation.
- Mate only chooses parents when they are healthy and properly fed.

- Replace or exchange bulls every two-three years.
- Avoid mating related individuals.



- Use appropriate reproductive technology.
- Monitor and maintain breeding records.

Global distribution

Sahiwal is considered the best dairy breed in the Indian subcontinent. It is being utilized widely in many warm humid countries of the world for improvement of local stock or initial crossbreeding of indigenous stock before undertaking to upgrade with European breeds. The Sahiwal breed arrived in Australia via New Guinea in the early 1950s where it was initially used as a dual-purpose breed. It played a valuable role in the development of two Australian tropical dairy breeds, the 'Australian Milking Zebu (AMZ)' and the 'Australian Friesian Sahiwal (AFS)'. Sahiwal cattle are now predominantly used in Australia for beef production, as crossing high-grade Sahiwal sires with European breeds produced a carcass of lean quality with desirable fat cover.

The contribution and adaptability of Sahiwal in rural development are well documented in Kenya, Sri Lanka, Jamaica, Guyana, Burundi, Somalia, Sierra Leone, Nigeria and several ecological zones of Africa, the West Indies, and many Latin American countries. A new breed called 'Jamaica Hope' has evolved using Sahiwal x Jersey crossbreds.

Conclusions

Nowadays governments prefer to increase indigenous cattle stock, so the Sahiwal breed may be useful for grading up stock with high scorer Sahiwal germplasm.



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Water Footprint- A Tool For Sustainable Development of Indian Dairy Industry



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Introduction

In order to manage more efficiently the control over human fresh water expenditure so one Dutch professor Arjen Hoekstra in 2002 coined the concept of water footprint. It is essential that dairy cattle consume adequate quantities of water each day to meet their requirements as water is required for digestion and metabolism of energy and nutrients, maintenance of proper ion, fluid and heat balance. Natural resources depletion is causing a significant threat to the sustainability of consumption. With transition in the nutrition, people are shifting towards more affluent food consumption patterns with more animal products. There has been a gradual shift of animal husbandry from subsistence to commercial nature. Incidents of groundwater depletion, soil loss, land degradation, rivers running dry and increasing levels of pollution form an

indication of the growing water scarcity. Dairy farming which is an integrated component of Indian farming system, involves not only direct consumptive water use as drinking and cleaning water for animals, but also indirect water embedded in feed. The food production today is by far the largest user of fresh water resources with 70 % compared with only 10 % for household use and 10 % for industry. Annually 70% of the used freshwater (not the total freshwater) goes to agriculture (FAO, 2014). In India about 64 per cent of irrigated area relies on groundwater resources.

Water Footprint

Water footprint is the total volume of freshwater used to produce the goods and services consumed by the individual, business or nation is known as the water footprint of an individual, business or nation (Chapagain 2007). Water footprint is indicator of water use that looks at

$$\text{Water footprint of milk (m}^3\text{/ton)} = \text{Total CWU} / \text{Daily milk yield}$$



both direct and indirect water use by a consumer or producer (Hoekstra, 2003). The global WF of animal production constitutes almost one third of the WF of total agricultural production. WF of milk in India is 1369 L/Kg while the world average is 990 L/kg (Hoekstra and Chapagain, 2007). The water footprint of milk can be calculated as: Water footprint of milk (m³/ton) = Total CWU / Daily milk yield

The overall demand for water in livestock production is influenced by several factors such as type of animal, its activity, feed intake and diet, quality of available water, temperature of water and ambient temperature. What kind of animal is used for production, where the animal is kept, what the animal diet constitutes of, where the feed is produced etc. will have an impact on the water requirement of the product. Livestock in itself contains between 5 and 20 times more virtual water per kg product than crop products. The increase in the consumption of animal products is likely to put further pressure on the world's freshwater resources. Water footprint analysis can play an important role in ensuring sustainable agriculture and livestock products. The per capita water use in India will increase from current level of 99 lit/day to 167 lit/day in 2050. 10% increase in cultivated land and a 20% increase in agricultural water demand will occur, even if we use optimum technology and productivity.

Components of Water Footprint

A water footprint is composed of three components:

1. **Green water footprint-** Green WF is nothing but the precipitation on land that does not run off or it simply recharge the ground water and stored in

the soil or temporary stay on top of the soil. Green water footprint includes precipitation and soil water absorbed by crop.

2. **Grey water footprint-** The grey WF of a product is an indicator of freshwater pollution. It can be calculated as the volume of

Water footprint of milk production includes two components namely

1. Direct
2. Indirect

$$WF_{Milk} = WF_{Direct} + WF_{Indirect}$$

$$WF_{Direct} \text{ or } DWU = DW \text{ (in Litres)} + \text{Bathing (in Litres)} + \text{Servicing (in Litres)}$$

water that is required to dilute the pollutants to such an extent that the quality of water remains above agreed water quality standard.

3. **Blue water footprint-** In case of agriculture and animal production system Blue WF is basically the volume of water irrigated from various sources like groundwater, river, pond etc. Blue WF is formed of Direct water, irrigation, groundwater and surface water.

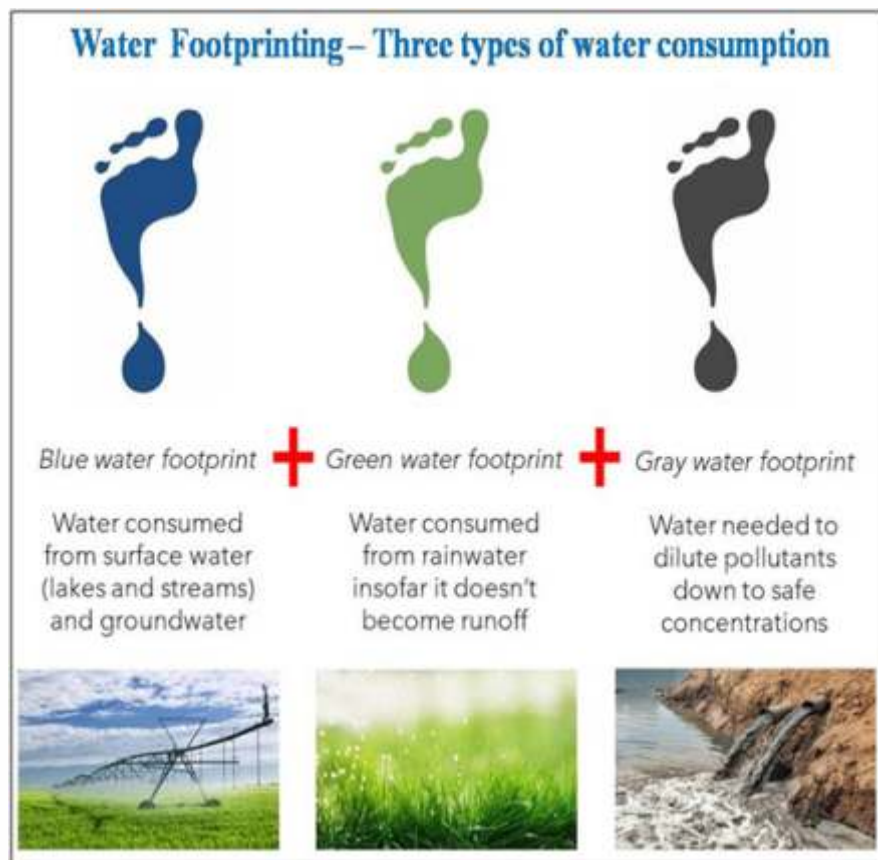
Where DWU is direct water use, DW is drinking water

$$WF_{Indirect} = (WF_{DF} + WF_{GF} + WF_{Conc.})$$

Where DF is dry fodder, GF is green fodder, conc is concentrate

Water Footprint of Milk Production in India

India ranks 1st in milk production and contributes 22% of the total world milk production with a growth of 6.65%. While in 2020 India will be 64.21% and 24.81% deficit in Green



and dry respectively (IGFRI vision 2030). Singh and Avinash (2004) in the Gujarat dairy study of India have shown that the water productivity was as low as 0.3 L of milk per 1 m³ of water. The global water requirement for milk production is reported to be 1.1 per m³ of water, which is three times as high as in Gujarat. The total consumptive water uses for milk production in Karan fries, Murrah and Tharparker is 1212, 1269 and 1583 m³/ton. This is the inverse of their milk production (Karan Fries 9.0, Murrah 7.4 and Tharparker 7.2 kg/day). Murrah is less adaptive to climatic change because of high water footprint per ton of milk production. Milk productivity and water footprint per unit milk yield is inversely correlated. Therefore, water consumed per kg of milk is relatively lesser in case of crossbred cow than buffalo and indigenous cattle due to their higher productivity. Higher the milk productivity of an animal the less will be its contribution to water footprint.

The direct water footprint or blue water footprint in milk production varied from 9 m³ /ton to 11 m³ /ton in organized sector and from 7.95 m³ /ton to 14.64 m³ /ton in unorganized sector at Karnal. The total water footprints in organized sector varied from around 1200-1600 m³/ton of milk production and in unorganized sector it varied from 1550-2000 m³ /ton of milk production

Factors Affecting Water Footprints of Animal Products

From total water used for milk production from buffalo, crossbred cow and indigenous cow, the share of drinking water is less than 1 %, while embedded water accounts for the rest (Singh et al., 2004). Main factors involved in WF of milk are:

- 1. Feed conversion efficiencies-** FCE is the total amount of feed required to produce one unit of animal product and it strongly affect the WF. Cattle relatively have low conversion efficiency that's why it has large WF. In case of chicken and pig they have large fraction of cereals and oils meals in their feed which result in relatively larger WF.
- 2. Feed composition and Feed origin-** Feed constitute 98%, drinking 1.1%, service water 0.8% and feed mixing water 0.03% of the total WF. In general, concentrates have a larger WF than roughage. The total mixture of roughages (grass, crop residues and fodder crops) has a WF of around 200 m³/tonne (global average); this is about 1000 m³/tonne for the package of ingredients contained in concentrates.

Conclusion

Water footprint can act as a tool for sustainable dairy farming which can be used to calculate water in milk production. It can be mainly reduced by reducing water use for crop production as it is the major indirect component. High crop productivity (irrigation method like drip and sprinkler, precision land leveling, mulches), low water consuming high nutrition value feed crops, suitable feeding patterns, water saving techniques (water budget, using waste wash water for collecting yards wash down, roof water collection) and increasing milk productivity by shifting to greater-volume producing cows may allow the production of milk in a more water sustainable way, reducing its water footprint. Proper management strategies are highly essential for sustaining the livestock production systems.

Therapeutic Management of Clinical Mastitis in Dairy cattle

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Introduction

Clinical mastitis remains the most economically important disease of milking animals. It causes significant economic losses through decreased milk production and has become the economic burden for dairy farmers. Clinical mastitis is an inflammatory response to infections causing visible abnormal milk (e.g. Color, milk clots). As the extent of infection increases, changes in the udder (swelling, heat, pain, redness) may also be apparent. Clinical cases that include only local signs are referred as mild or moderate. If the inflammatory response includes systemic involvement (fever, anorexia, shock), the case is termed as severe. If the onset is very rapid, as often occurs with severe clinical cases, it is termed as acute or severe mastitis.

Etiology

Various microorganisms have been identified from bovine mastitis. The most common bovine mastitis pathogens are classified as contagious and environmental mastitis pathogens (Bradley et al).

(1) Environmental mastitis pathogens

(A) Streptococcus uberis mastitis

Streptococcus uberis is one of the environmental mastitis pathogens that accounts for a significant proportion of subclinical and clinical mastitis in lactating and non-lactating cows and heifers (Smith et al.)

(A) Coagulase-negative Staphylococcus species (CNS)

More recently, coagulase-negative Staphylococcus species (CNS) such as *S. chromogenes*, *S. simulans*, *S. xylosum*, *S. haemolyticus*, *S. hyicus*, and *S. epidermidis* are increasingly isolated from bovine milk with *S. chromogenes* being the most increasingly diagnosed species as a cause of subclinical mastitis (Vlieghe et al).

Coliform mastitis

Coliform bacteria such as *Escherichia*, *Klebsiella*, and *Enterobacter* are a common cause of mastitis in dairy cows. The most common species, isolated in more than 80% of cases of coliform mastitis, is *Escherichia coli*.

(2) Contagious mastitis pathogens primarily exist in the infected mammary glands or on the cow's teat skin and transmit from infected to non-infected mammary glands during milking by milker's hand or milking machine liners. *Mycoplasma* spp. may spread from cow to cow through aerosol transmission and invade the udder subsequent to bacteremia. The most frequent contagious mastitis pathogens are coagulase-positive *Staphylococcus aureus*, *Streptococcus agalactiae*, *Mycoplasma bovis*, and *Corynebacterium bovis* (Bobbo et al.)

Sign and symptoms

- Gross abnormalities in milk (discoloration, clots, flakes, pus)
- Physical abnormalities of udder:

Abstract

In India, subclinical mastitis is found more prevalent (varying from 10-50% in cows and 5-20% in buffaloes) than clinical mastitis (1-10%). Bovine mastitis is one of the most important bacterial diseases of dairy cattle throughout the world. Mastitis is responsible for great economic losses to the dairy farmers and to the milk processing industry resulting from reduced milk production, alterations in composition of milk, rise milk discard, increased replacement costs, extra labor, treatment costs, and veterinary services. The economic losses due to mastitis have been estimated to be Rs 7165.51 crores per year in India (Bansal and Gupta et al. 2009). Inflammation of the mammary gland is usually a consequence of adhesion, invasion, and colonization of the mammary gland by one or more mastitis pathogens such as *Staphylococcus aureus*, *Streptococcus uberis* and *Escherichia coli*.

acute - diffuse swelling, warmth, pain, gangrene in severe cases; chronic - local fibrosis and atrophy.

- Systemic response: may be normal or mild, moderate, acute, per-acute with varying degrees of anorexia, toxemia, dehydration, fever, tachycardia, ruminal stasis, recumbency and death.
- Detection at the herd level: Bulk tank milk somatic cell count (SCC). Culture of bulk tank milk
- Detection at the individual cow level: abnormal looking milk, culture of composite or quarter milk samples
- Indirect tests include SCC of composite or quarter milk samples, California Mastitis Test (CMT) of quarter milk samples, inline milk conductivity tests of quarter milk samples
- Use of selective media to differentiate Gram-positive and Gram-negative pathogens in cases of clinical mastitis

in controlling contagious mastitis pathogens.

These five points are:

- i) Identify and treat clinical cases
- ii) Post milking teat disinfection
- iii) Dry cow treatment (DCT)
- iv) Cull chronic cases
- v) Routine maintenance of milking machine.

Unfortunately, the five-point plan is not very effective against the environmental pathogens and hence, is coupled with other appropriate strategies to control mastitis infections.

Antimicrobial therapy

The main strategy to treat mastitis is by the use of antibiotics, such as penicillin, ampicillin, tetracycline, gentamycin, etc., which can be given by intramammary infusion, intramuscular or intravenous injections. The DCT is one of the best choices to control and

immediately after the last milking of lactation and is an important component of an effective mastitis control program. Intra-mammary infusion of long-acting antimicrobial agents at drying off provides the best treatment for subclinical mastitis due to contagious pathogens, decrease the number of existing infections and prevent new infections during the early weeks of the dry period. Dry cow therapy should be routinely administered and remains one of the cornerstones of an effective mastitis control program.

Blanket dry cow therapy: It is treatment of all four quarters at drying off

Selective dry cow therapy: It is based on treatment of only those quarters that are infected.

Vaccination

Vaccinating cows can be deemed as a preventive mastitis treatment in herds. Most vaccines are designed to target Staph. aureus, Strep. agalactiae, and E. coli. Vaccines targeting Staph. aureus and Strep. agalactiae are made up of either the whole organism (inactivated, high encapsulated or unencapsulated cells and attenuated vaccines) or subunits (toxins, bacterial surface extract, and crude extract of polysaccharides); while for E. coli, the mutant core antigen J5 was used widely. However, vaccines are yet to provide reliable protection.

Conclusion

Prevention is more important than treatments for Effective control of mastitis in dairy animals. Vaccination against mastitis causing microbes one of the most important prevention method. Now a days, antimicrobial therapy is still an established component in mastitis control programs. Antibiotics are often coupled together with others therapies; yet the effectiveness is still not satisfying. Therefore, searching for new therapeutic alternatives is necessary. A wide variety of natural products derived from plants, animals, and bacteria were investigated and reported to have potential in controlling bovine mastitis.



Fig-2 Modified California mastitis test for indirect detection of subclinical mastitis in CMT paddle observed with 30 sec. of mixing equal volume of milk and modified CMT reagent (Kumar et al., 2021)

Control and management of clinical mastitis

Five-point plan was introduced by National Institute for Research in Dairying (NIRD) since 1960s is effective

inhibit progression of mastitis.

Non steroid anti-inflammatory drugs

Acute and per-acute mastitis cases also require supportive therapy (fluid and electrolytes) and non-steroidal anti-inflammatory agents (NSAIDs).

Dry cow therapy

Dry cow therapy is the use of intramammary antimicrobial therapy

Seasonal Influences and Management Practices to Enhance Sheep Reproduction

Abstract

Sheep, unlike most domestic livestock species, is well-known for having a distinct season of breeding activity. The annual cycle of daily photoperiod has been identified as the determinant factor, whereas environmental temperature, nutritional status, social interactions, lambing date, and lactation period have been identified as modulators. The purpose of this paper is to summarize what is currently known about sheep reproductive seasonality. The paper covers the symptoms of seasonality in both the ram and the ewe after discussing the necessity of seasonal breeding as a reproductive strategy for the survival of species. The neuroendocrine basis of photoperiodic regulation of seasonal breeding is studied in-depth, with a focus on determining and modifying elements.

Introduction

Natural selection pressure has favored the dissemination of genes that link birth time to the most appropriate period of the yearly climatic and food availability cycles, i.e., early spring (Jewell et al., 1974; Ortavant et al., 1985; Short 1985). Sheep are generally known as animals with marked seasonality in breeding activity, unlike most domestic livestock species. This phenomenon's determining factor has been discovered as the daily photoperiod's annual cycle, while environmental temperature, dietary status, and social interactions may influence it.

Normal breeding habits of Sheep:

- 1. Age of Puberty-** Typically, ewes reach puberty at 5 to 12 months, depending on breed, nutrition, and date of birth.
- 2. Anestrus Period-** This is the

time of year when ewes do not generally show signs of estrus (heat). In ewes, there are three types of anestrus: seasonal (affected by the length of the day), lactation (affected by the sucking stimulus of lambs), and postpartum. The normal duration for ewes is approximately 17 days between heat periods. However, it can vary from 14 to 19 days. The heat period usually lasts 30 to 35 h, with a range of 20 to 42 hours with the ovulation late in the period.

- 3. Gestation Period-** Ewes have a usual gestation length of 147 days, with a range of 144 to 152 days. The gestation period of medium-wool breeds and meat-type breeds is usually shorter than that of fine-wool breeds. High temperatures and a lack of nutrients can cut the

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gestation time by two or three days. Ewes bred to white-faced wool-breed rams may have a somewhat longer gestation time than ewes bred to meat-type rams.

4. **Breeding ewe lambs-** Ewe lambs that breed and lamb as yearlings have a higher lifetime production than ewe lambs who have their first lamb when they are two years old. Because the beginning of puberty is mostly determined by body weight, ewe lambs should be fed enough to reach at least two-thirds of maturity weight before breeding. Separate yearling sheep from mature ewes and feed them separately so that the yearling ewes can reach their full potential size.

2. Fertility, embryo survival, and fetal growth are all affected negatively by high temperature. This is the most powerful barrier to fall lamb production. High temperature during breeding can limit the rate of conception. Heat stress during pregnancy affects fetal growth resulting in smaller lambs at birth.

Managemental methods to optimize breeding

1. **Estrus stimulation-** It is the practice of putting vasectomized male with females about 10 to 2 weeks before the start of breeding to stimulate and synchronize breeding. As a result, a significant number of ewes will ovulate and conceive during the

and allowing for higher prices.

3. **Ram effect** - Sudden introduction of ram in the ewes flock after prolonged separation bring more number of ewes into estrous.
4. **Telescoping-** After a separation of two-to-three-month, the ram is re-introduced to the flock. In the first estrous cycle, 70 to 80 percent of ewes will be in heat due to the sudden introduction of a ram into the sheep flock.
5. **Hormonal method** - Progesterone hormones or analogs are administered through feed, implant, or impregnated vaginal sponges. The hormone is removed after 14 days of treatment. Within three days, the animal comes in heat. All of the animals come in heat within 72 to 96 h after receiving two intramuscular injections of prostaglandin F2 alpha or its synthetic analogs at 10-days interval.

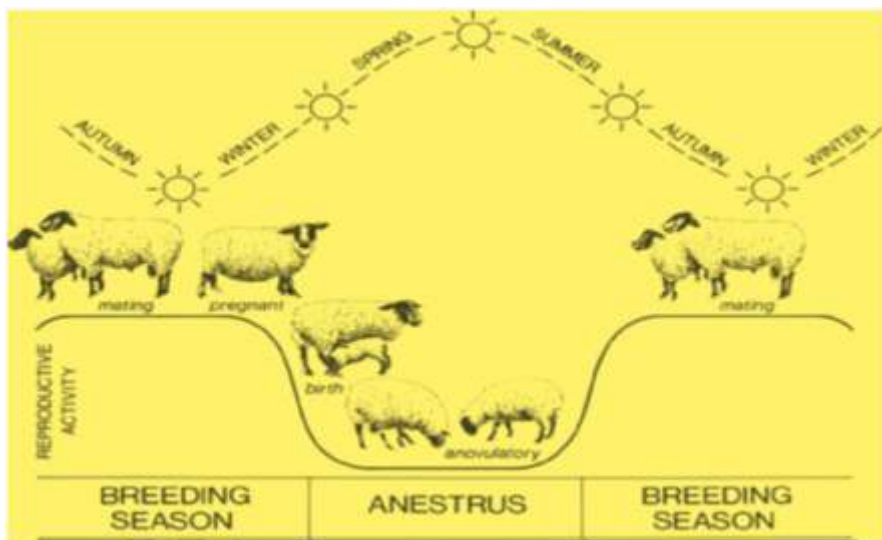


Fig.1. Determinants of puberty in sheep (Douglaset al., 1986)

Effect of environment

1. Sheep's sexual activity is mostly influenced by the light-to-dark ratio. As the days get shorter, estrus becomes more common. In general, ewes bred in September, October, or November have the highest fertility and efficiency; ewes bred at this time have the highest percentage of multiple births.

early part of the breeding season.

2. **Oestroussynchronization-** The estrous cycle in ewes is synchronized so that a significant number of them are in heat at the same time. This would help to lower the expense of artificial insemination or natural breeding, as well as the associated lambing care. It produces consistent flocks of lambs, making disposal easier

Conclusion:

The seasonal anestrus is a phenomenon affecting the normal reproductive life of the animal mainly the farm animals which ultimately costs the livelihood of the farmers. The seasonal anestrus in the sheep rearing is a common problem faced by low-income farmers' groups that costs them a lot affecting their livelihood. This problem can be managed by the managemental as well as therapeutic aspects. The managemental aspect includes several practices such as estrus stimulation, estrus synchronization, ram effect, etc. that are cost-effective as well as effective also. The hormonal approach is slightly costly but more effective than the natural behavioral effect. The sheep owners should have to follow the above practices to get the benefit from them.

Types of Stress and Their Impact on Growth and Production in Dairy Animals

Abstract

Stress is the inability of animals to cope with the changes in the surrounding environment. There are different types of stress social stress, transportation stress, managerial stress, pathological stress, and environmental stress. Stress has severe effects on milk production and milk composition in dairy animals. There is a decrease in lactose, SNF, and fat, and an increase in stearic acid, and palmitic acid. There is less supply of glucose to the mammary gland which negatively affects the synthesis of lactose and therefore milk production in animals is decreased.

Introduction

Walter Cannon was the first to use the term stress, it is defined as a reflex action that involves the inability of the animal to adjust to its surroundings leading to discomfort and death. The basic mechanism of stress is a release of ACTH from the anterior pituitary that acts on the adrenal gland to produce cortisol and epinephrine, in chronic stress, will result in detrimental metabolic and immunological effects.

There are different types of stress social stress, transportation stress, managerial stress, pathological stress, and environmental stress.

Social stress; is a situation that threatens the relationship or sense of belonging in the group of animals (Gellman et al., 2013).

- Social isolation; Social stress can cause stress in cattle, sheep, and goat when dairy cattle were socially isolated they showed an increase in defecation, urination, heart rate, and cortisol level
- Social instability; When cows were moved into a new pen there was a decrease in feed intake, and higher cortisol levels.
- Crowding (reduced space

allowance); Nowadays challenge for producers is the growth of animals without an increase in facilities like space allowance. For cattle increase in animal number in lesser space resulted in decreased feed intake thus growth and production of animals are affected (Proudfoot et al., 2008).

Effects of social stress; Growth and production performances of animals are severely affected by social stressors. Stressors cause an increase in glucocorticoid levels and therefore increase in somatostatin levels and inhibit growth hormone production from the anterior pituitary. Animals that were suffering from social stress had a high mortality rate. The weaning of calves resulted in higher mortality of calves (Hodgson et al., 2012). In cattle, social isolation affects negatively immune function like alterations in lymphocyte concentration and lower ratios of CD4 and CD8 lymphocytes.

Transportation stress; Transportation of cattle is a necessary part of the production cycle like processing, sorting, weaning, and slaughter.



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Management of transportation stress

- 1) For a long duration of transport, floor conditions should be taken into consideration.
- 2) Vehicle design and quality of driving are also important.
- 3) The rest period of at least 6 hours when traveled for 12 hours is recommended for cattle.
- 4) Chromium and vitamin E are given as pre-transportation treatment to prevent shrinking because of transportation.
- 5) Non-steroidal anti-inflammatory drugs such as meloxicam prevent animals from the negative effect of long-duration transportation.

Pathological stress; Diseases can cause direct losses like death, stunted growth, and indirect losses like expenses of drugs and vaccines, and labor costs. Castration of calves, docking, when done at an inappropriate time also cause pathological stress on calves. Diseases like mastitis and metritis are associated with the productivity of animals and are responsible for huge losses economically,

Managemental stress; can be because of insufficient feeding; it will also result in cold stress as heat which is produced by the digestion of food is important for thermoregulation. When the animal is in early lactation there is an imbalance of nutrient supply and need therefore there are chances of various metabolic diseases like ketosis and fatty liver and milk production of animal is decreased.

Environmental stress; is of two types heat stress and cold stress.

Heat stress; Thermoneutral zone(TNZ) in animals

HF 5-210C

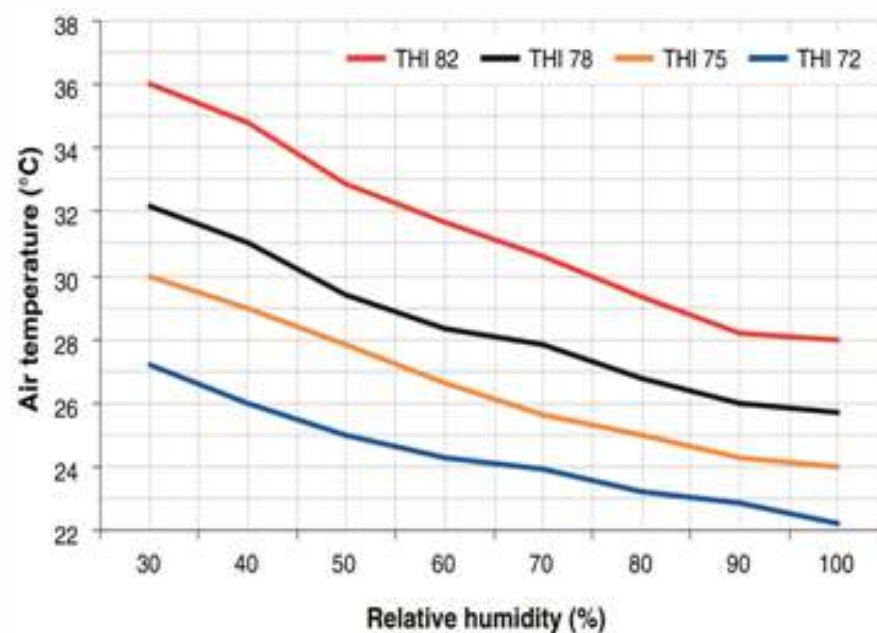
Jersey and Brown Swiss 5-240C

crossbred cow of India 15-250C

Indian cattle 15-290C

Indian buffalo 15-240C

In temperate areas when the temperature is above 20-25°C and in tropical areas causes heat gain rather than heat loss therefore animal comes under heat stress. The extent of heat stress is determined by length of heat stress period, cooling at night, improper ventilation and high humidity in shed, temperature humidity index (THI). THI is an indicator of thermal climatic conditions $THI = 0.72(W + D) + 40.6$ W is wet bulb temperature and D is dry bulb temperature.



(Upadhyay et al., 2009)

Effects of heat stress on milk production

Heat stress has severe effects on milk production and milk composition in dairy animals (Upadhyay et al., 2009). Environmental temperature above 35°C activates stress conditions in lactating dairy cows. Total milk production of the animal was higher in the spring season as compared to the summer season. Dry matter intake of animals is reduced by 0.85 kg with every 10°C rise in temperature above cow's TNZ. Milk production of animals is decreased by 36% (Rhoads et al., 2008). Heat stress can cause mastitis in dairy animals as animals are already immunocompromised, mammary

gland involution occurs, apoptosis of the mammary gland occurs, and milk production of animals is decreased (Pragnaet al., 2016).

Effects of heat stress on milk composition;

There is a decrease in lactose, SNF, and fat, and an increase in stearic acid, and palmitic acid. There is less supply of glucose to the mammary gland which negatively affects the synthesis of lactose and therefore milk production in animals is decreased.

Cold stress;

Cold stress occurs when the temperature falls below normal body temperature. There are chances of frostbite. In severe conditions heart rate, respiration rate and the animal will die. It will also decrease the absorption of colostrum in calves.

Conclusion

Different types of stress affect growth performance as well as the production of dairy animals. Stress is inversely related to growth and production. Nutritional stress will directly affect growth rate, as well as milk production, which will be declined. Similarly, both heat and cold stress severely alter the overall growth and productivity of the dairy animal.



Heat Stress and Strategies to Mitigate Heat Stress in Dairy Cattle



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What is heat stress?

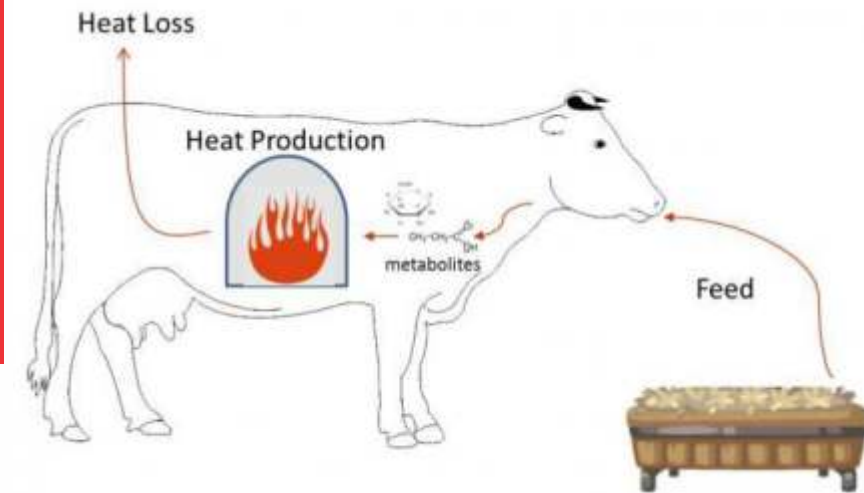
Cows generate heat by digesting feed and producing milk. They absorb solar heat when out in the sun. Heat stress occurs when cows generate and absorb more heat than they can easily get rid of by respiration, sweating and air blowing by them (wind or fans). Heat stress leads to increased respiration rates, body temperatures, sweating and time standing.

Why is heat stress an important issue?

Heat stress costs heavy loss to the farmers.

- Heat-stressed lactating cows have reduced dry matter intake, milk production and pregnancy rates.
- Heat stress also leads to increased lameness, disease incidence, days open and death rates.
- Heat-stressed late gestation cows have shorter gestation periods, calves with lower birth





weights, reduced milk production and impaired immune function.

- Heifer calves from heat-stressed cows produce less milk for the first 30 weeks of lactation after freshening.

When do cows start to become heat-stressed?

- Cows begin to experience heat stress at much lower temperatures than humans. In general, mild heat stress starts around 72°F with 50% humidity.
- High-producing cows eat more and generate more heat. They can begin to experience heat stress in well-ventilated barns at air temperatures as low as 65°F.
- The temperature-humidity index (THI) takes into account both temperature and humidity to estimate the level of heat stress cows will experience based on environmental conditions.

Heat stress levels and effects on the body:

S.No.	Heat stress level	Temperature humidity index (THI)	Respiration (breaths per minute)	Body temperature (degrees Fahrenheit)
1.	No heat stress	Less than 68	40-60	101.5-102.5
2.	Mild	68-71	60-75	102.5-103
3.	Mild to moderate	72-79	75-85	103-104
4.	Moderate to severe	80-90	85-100	104-105
5.	Severe	90-99	100-104	Over 105

How do we know if a cow is heat-stressed?

1. Respiration and Body Temperature:

- Respiration rates and body temperature are both good ways to assess how well cows are managing their heat production and losses in warm weather.
- Individual cow responses will vary and conditions change throughout the day. We can observe and record respiration rates or measure body temperatures at different times of the day to assess how well the cows are coping with the weather conditions.
- We also can monitor daily milk production, but declines in milk production are commonly delayed two or more days after cows begin to experience heat stress.

2. Physical Appearance:

- Cows experiencing mild heat

stress may not show clinical signs at all.

- Cows experiencing severe heat stress usually breathe with their mouths open and pant with their necks extended. They are lethargic and may appear unsteady.

3. Respiration rates:

- Respiration rates are the recommended measure of heat stress because there is little to no lag time compared to body temperatures and milk production.
- Normal respiratory rates for adult dairy cattle range from 40 to 60 breaths per minute (bpm).
- If more than 10% of cows have a respiratory rate exceeding 100 bpm, the situation is considered an emergency, and immediate action should be taken.

4. Body temperature:

- Body temperature gives a direct measure of an individual cow's heat stress level.
- Normal body temperature for an adult cow is 101.5 to 102.5 degrees F.
- If more than 5-10% of cows have a body temperature above 105 degrees F, the situation is considered an emergency and immediate action should be taken.

5. Milk Production:

- Milk production decreases as the level of heat stress increases.
- Mild heat stress results in a production decrease of about 2.5 lbs. per head per day.
- Mild to moderate heat stress results in a production decrease of about 6 lbs./head/day.
- Moderate to severe heat stress results in a production decrease of about 9 lbs./head/day.

- Severe heat stress is a life-threatening condition and production decreases exceed 10 lbs./head/day.

How to prevent heat stress in dairy cows?

Many dairy farmers use multiple practices to help their cows manage their body temperature in hot, humid and sunny weather.

1. Shade:

- Shade can help reduce the solar heat load and remains one of the first recommendations to help lactating cows and dry cows manage their heat load in hot weather.
- Well ventilated barns and pole sheds are good options for providing shade. There are numerous shade structure options available from building suppliers.
- When providing shade, it is important to provide plenty of shade for all of the animals at the same time without crowding. Around 40 square feet per animal is recommended.



Livestock crowd together in the shade of a lone tree and artificial shade

2. Ventilation:

Air exchange:

- Barn ventilation cools cows by providing air exchange between inside and outside. Ventilation can be by either natural or mechanical means.
- In hot weather, we should provide as much air exchange as possible. Usually, this is between 60 and 90 air exchanges per hour.
- Tunnel ventilation brings air in at one end of a barn and exhausts it out the other.
- We should optimize the size of fans and inlets correctly and we should make sure the fans are well maintained and inlets are open to get the desired air velocity.
- Cross ventilation brings air in on the side of the barn and exhausts it out the other side.
- Cross-vent barns often use a series of baffles to try to keep the air at cow level and increase the air velocity at cow level.
- Size of fans and inlets should be kept correctly. We should make sure the fans are well maintained and inlets are open to get the desired air velocity.
- Natural ventilation depends mainly on wind in hot weather.
- Open ridges allow some hot air to escape out the ridge.
- Fresh air enters through the open sides of the barn.



Installation of fans/coolers in the shade reduces heat stress

Air velocity

- Increasing the air velocity flowing past a cow can help her get rid of heat. Tunnel ventilation, cross-ventilation with baffles and high-speed mixing fans are ways to increase the air velocity past a cow.
- Mixing fans can be mounted above free stalls and feed alleys where cows stand to eat.
- Many fans generate air velocities over ten mph past the cows.
- Mixing fans need to be mounted high enough to not be a hazard to people, cows or equipment moving underneath the fans.
- Point high-speed fans slightly downward (20 degrees) so the air blows past the cows.



Cross ventilation reduces heat stress

3. Cooling with Water:

- Sprinklers and misters help cows get rid of body heat.

- Sprinklers wet the cow's skin, and her body heat is used to evaporate the liquid water on the skin.
- Misting systems cool the air by evaporating water droplets using heat in the air.
- Both methods increase the air's relative humidity, but if the barn is well ventilated, the humidity levels should not become excessive.
- Sprinklers and misters are more effective in drier weather with lower dew-point temperatures.



Mist cooling system to reduce heat stress

- Sprinklers need to cycle on and off to allow time for water evaporation.
- Avoid excessive sprinkling that causes water to run down and wet the udder because this can lead to an increased risk of mastitis.
- With high-pressure misters, the droplets need to evaporate before they hit the stalls or bedding.
- Misters should be placed near the

inlets.

- Misters are not as effective when ventilation blows the mist out of the barn before the air cools.

4. Drinking water:

Hydration is incredibly important for a cow to regulate body temperature, both during times of heat stress and cold stress. Adequate drinking water should be supplied at all times.

- In hot weather (90-95 degrees F for a high daytime temperature), a lactating cow producing 80-100 lbs of milk drinks 25-35 gallons of water per day.
- The recommended amount of space is two linear inches of water space per cow. Consider increasing water space during hot weather.
- Water troughs should be at least three inches deep to allow cows to submerge their muzzle when drinking.
- Cows consume up to 50% of their daily water intake following milking.
- We should make sure that the water flow to the trough and water capacity is adequate to account for large quantities needed at all at once.



Summer hydration minimize heat stress and dehydration

Summer hydration minimize heat stress and dehydration

5. Holding area cooling:

- Milking center holding areas need special attention paid to ventilation and cooling in warm weather to avoid heat stress.
- Cows can be crowded in the holding area for up to an hour. A crowded pen reduces the airflow around a cow and can make it more difficult for her to avoid heat stress.

Conclusions

At high temperatures, evaporative cooling is the principal mechanism for heat dissipation in cattle. It is influenced by humidity and wind speed and by physiological factors such as respiration rate, and density and activity of sweat glands. In hot weather, cattle actively seek shade, which may reduce the radiant heat load by 30% or more. Under conditions of extreme heat load, shading and other strategic heat reduction system may maintain the milk production of the animals and reduce deaths from heat stroke. Therefore, effective cooling system should definitely be implemented

during summer to prevent the animals from summer heat stress.

Effects of Mastitis on Milk Production



The Dairy sector is an important sector of any economy. The quality of dairy products largely depends upon the purity of the milk produced and the health of the dairy animals. With the growing demand of milk, humans are getting involved in many unnatural ways of increasing milk yield and animal breeding. The artificial methods used for better results are not only affecting the health of the animals but the composition and quantity of the milk produced by them are also decreasing. Various diseases are caused to dairy animals, especially cows, because of unnatural treatments. One of those diseases is Mastitis.

What is Mastitis in cows?

Mastitis is the most costly disease found in cows worldwide. It is inflammation of the mammary gland of the cow caused due to intramammary infection. The various causes of Mastitis are bacteria, fungal species, viruses, and microscopic algae. This disease may continue for long time and cause decrease in milk yield.

Effect of Mastitis on milk production

Most researchers say that Mastitis in cows is a costly disease as it badly affects the dairy farms and, consequently, the dairy sector. The reason behind this is that it causes heavy economic losses due to low milk production. This disease sometimes has a long-lasting impact on milk yield. It reported that a cow affected by Mastitis never reaches the milk yield level as they were earlier. The milk production level decreases even for the

rest of the lactation time. The effect of Mastitis gets influenced from various other factors like the level of cows and environmental factors. A complete analysis is essential over a fixed time to know to what extent Mastitis affects the cows and the farms. Cows of the different breeds can be kept for the examination of which suffered Mastitis and can note the changes in the milk production.

Mastitis not only affects the level of milk production but also negatively affects the composition of the milk produced. Many studies show reduced protein, fat, lactose, and nutrient content. The milk produced from the farms infected with Mastitis has low nutrient contents; therefore, they are not enough to meet the health requirements.

It can be seen that Mastitis not only has a negative impact on the milk level production and the composition of milk nutrients, but it also affects the reproductive performance and health of the cows. Proper disease management and studies on the environmental impacts on dairy farms will control Mastitis. Spreading awareness and information about the disease are essential to prevent the farms from getting affected by such conditions. It needs to be recognized so that it can cure early. The experts can frame different models to know the milk loss caused by Mastitis, and an effective support system can be developed to reduce the impact of Mastitis in the future.



Monsoon Management of Livestock



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Monsoon is the most important season for the livelihood of the people of an agriculture based country like India. India generally follows South-West monsoon. The period between June to September is considered as monsoon period in India. Seasonal moderate rain is a much needed boon for India. During rain, humidity rises due to this increase the expired air, heat and wastes of animals leading to worsening of microclimate which not comfortable for livestock and lead to various problems. However, following are some issues to taken care of in the short- and long-term to save the animal lives.

Basic care tips-

- Make adequate arrangements to protect the animals from slush and floods.
- Protect the animals from diseases caused due to excessive rainy conditions and remember to deworm them at this time.
- Vaccination of animals before the onset of rainy season for certain diseases was important. Cattle were vaccinated for HS and BQ before the arrival of monsoon, particularly in endemic areas. Small ruminants were also vaccinated for PPR and HS before the arrival of monsoon. Sanitation and hygiene were critical during the rainy season. Eliminate

standing water and all mosquito habitats to control mosquitoes. Spray insecticides at regular intervals, especially during the rainy season (fly season).

- After the birth of the calf/kid/lamb, the new born must be fed with colostrum within the first two hours.
- Animals in milk are susceptible to getting 'Milk Fever' 7-8 days after giving birth. To protect the animal from this disease, they should get adequate exposure to sunlight during pregnancy. Also, in the last month of pregnancy, the animal should be given injections of Vitamin E and Selenium, to protect them from problems which may occur at the time of giving birth such as placenta not falling out. Alternatively, 5 – 10 grams of lime or 70 – 100 ml of a mixture of calcium and phosphorus can be given to the animals daily.
- Do not let animals graze in irrigated fodder fields, since after the long summer, the sudden growth in the fodder due to the onset of monsoons, leads to the presence of poisonous cyanide in it. This is especially so in the Jowar crop. These fodder crops should, therefore, not be harvested before time or fed to animals.
- Perennial fodder grasses should be transplanted at this time and shall be ready for cutting in 40 – 50 days. For a balanced animal feed, maize, Jowar and bajra should be sown along with cluster beans and black-eyed peas.
- 21 days after shearing sheep, their bodies should be drenched with disinfectant.
- Concentrate feed must be stored in moisture-proof stores to avoid



contamination, especially with aflatoxins. Improved ventilation was needed which can be met through exhaust fans, draft fans or other outlet ventilators.

Other factors

- **Infrastructure development:**

Infrastructure is likely to get damaged after heavy rainfall and need of the new facilities may arise. Fencing of the boundaries of the farm / livestock premises should be the first priority. Portable and flexible facilities should be shared with neighbors if available. Unwanted mixing of cattle and other livestock should be avoided to check herd health and breeding related issues. Livestock owners, who have access to pakka wall and polywire fencing can use these for a quick and temporary fix. One should avoid overcrowding of animals in small areas for extended periods of time. Dry cows and growing cattle need 30 ft²/head of pen space. Cow-calf pairs need 150 ft²/unit of pen space.

- **Grass feeding:**

Feeding your livestock purely on this young grass will cause diarrhoea which can further worsen the body condition. To avoid this, mix the green pasture with hay and gradually introduce the animal to green lush. Sudden introduction of the animal to large quantities of lush pastures should be avoided at this initial stages. Just as rains awaken long dried pastures so does it bring to life disease causing micro-organisms and vectors. The moisture and warmth that comes with rainfall offers the much needed conditions for their multiplication.

- **Bacterial growth:**

The moisture on the ground produces a lot of bacteria that can cause disease. The most common of them being worms. During the wet season, therefore, farmers must stock a broad spectrum of de-wormers. Worms, if not treated, affect the animals general performance. De-worming must be done at the beginning of the rainy season and throughout the season because worms multiply more during this period.

- **Ticks management:**

There are some flies which are deadly, for example, tsetse flies. Tsetse flies do not only suck blood from the cows, but their bite is too painful too. In addition, they spread a disease called nagana to the cows, which if not treated early leads to death. Farmers should make sure that they spray their animals regularly and cut all bushes near their shades.

- **Udder care:**

The disease of the udder also becomes more prevalent during this season. Note that when the udder is diseased, then you have lost the animal. This disease is called udder mastitis. The udder swells and stops producing milk. The good thing is that it can be treated using general antibiotics. Also make sure that there are disinfectants to disinfect the farm all the time.

- **Carcass disposal:**

If heavy rain-related livestock losses are experienced, those carcasses should be disposed of within 24 hours of death. Burial is the most often utilized method of disposal of dead animals. There are



some best management practices which are recommended when using this method. Composting is using the natural decomposition process and accelerating it by the addition of organic waste materials to generate heat. In the states of India, permits are not required for on-farm composting operations where the compost is considered to be part of normal farming operations and used on the same farm as part of agronomic or horticultural operations. Incineration is another method of disposal of a dead animal which can be very energy intensive. Heavy rain is the situation which normally occurs in many parts of the country every year. Along with the human life, livestock should also be taken care for their needs pertaining to water, feed, healthcare related issues. The right action at the right time can save the farmer from loss which may arise due to natural disaster like heavy rain.

- **Use of footbaths:**

Wet and muddy cow shades also predispose lactating animals to mastitis. The cold conditions also predispose animals to pneumonia. To prevent this, provide your animals with good shelter and don't leave them exposed to rain storm. Calves are especially prone to pneumonia during this time. Poor drainage can also lead to dampening of feeds stored on the farm. Moulding of hay is common with the wet conditions and it reduces the nutritive value of feeds and makes them less palatable. Never feed your animals on rotting or mouldy feeds as they can cause fatal poisoning. Finally, keep your local vet close during this rainy weather.





Humpy Farms - Championing the Change The Organic Way

Jaywant Patil a BE Electronics and MBA in E-Business had been practicing organic agriculture since 2010 and for Malvika Gaekwad a BE Information Technology it started as a hobby in 2013. A common passion led to their teaming up. Soon came the realization that awareness about organic produce was dismally low and this led them to work on their own marketplace to directly reach out to consumers. Thus came in to being the Humpy Farms in 2017.

Humpy Farms headquartered in

Pune, is a direct-to-consumer organic farming startup, which consistently practices climate-friendly renewable digital organic farming to reduce carbon dioxide emissions with the goal of becoming a one-stop shop for everyday grocery needs.

Humpy Farms flagship product is A2 milk. They also sell products such as paneer and ghee and a range of staples like breads, flavoured honey, cold-pressed oils, spices, dals, and millets. Two variants of A2 milk- desi cow A2 milk and desi



buffalo A2 milk and frozen food are sold only in Pune while non-perishable products are delivered across India and can be ordered via its mobile app and website.

They are served either raw which is just chilled and delivered with a shelf life of one to two days or pasteurized with a shelf life to two or three days. They claim that the milk is delivered within 12 hours of collection from the farmers. They follow a rigorous process of DNA testing of cows and milk quality to meet the criteria of A2 milk. The milk is also tested for 16 different adulterants and a range of antibiotics.

Humpy Farms participation in Shark Tank India's first season earned them Rs 1 crore in funding from Peyush Bansal, Co-founder, Lenskart, Vineeta Singh, CEO Sugar Cosmetics and GazalAlagh Co-founder Mamaearth in return for 15% of their business, at a 6,67 crore valuation. In the Angel investing Round DBS Bank's Shailesh Ligade, IIFL's Abhay Amrute, Bain & Company's Prattyush Shahane, Wiggles' Yogash Lahoti and Anushka Iyer also participated and Humpy Farms got 5 crores including the first round during Shark Tank. These funds will be used to invest in technology and strengthening the brand's D2C strategy. Client acquisition and identifying and hiring new talent is also on agenda.

Why choose A2?

Indian breed cows produce milk that has A2 protein that resembles the A2 protein in human mother's milk. Most people are not lactose intolerant but allergic to A1 Beta Casein Protein and Indian cows milk has A1 Beta Casein Protein hence it is a healthier option for humans.

At Humpy cows, bulls, and calves grow together as a family and cows naturally produce 3-9 litres of milk per day. The cows are milked by hand and the raw milk is instantly cooled to 4 degree celcius and dispatched to the plant where the raw milk is tested to meet high-quality standards. Milk is then pasteurized at low temperatures to preserve its goodness. Raw & pasteurized milk are stored separately in food-grade glass bottles and is delivered to families from refrigerated vans.

Humpy, is not a corporation, but a community of people that want to change the world for the better. Who are committed to taking the organic way with their farming practices because they believe that is the best way.



They believe that harmful chemicals have no business in our food. Their little herds are given lots of love and treated ethically too. They also ensure that their farmers are given fair pay, and work towards uplifting their living conditions.

Importance of Colostrum in Calf Management



Pushpa Lamba^{1*} and Vivek Saharan²,

¹ Department of Livestock Production Management, College of Veterinary and Animal Sciences, RAJUVAS, Bikaner

² Department of Animal Nutrition, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, Haryana

Calves are future herd replacement stock of dairy industry therefore calf management is crucial for sustenance and development of livestock sector. Calf management is essential for preserving and maintaining good quality germplasm. Research indicates that 57% of mortality is seen in the first 24 hr and 75% within 7 days of birth. The most common cause of calf morbidity in the neonatal period is diarrhea. Ideally calf mortality should be < 5% with growth rate of 0.5-0.7 kg/d.

Colostrum, is first milk produced by the mother after birth which is vital to the newborn calf because it contains antibodies (also known as immunoglobulins, or IgG), which provide immunity. It is also rich in energy and nutrients that are essential for growth

A newborn calf lack immunity because antibodies do not pass across the cow's placenta to the fetus' circulatory system. The syndesmochorial structure of the bovine fetal membrane prevents passage of immunoglobulins from maternal circulation into fetal circulation. Antibodies in colostrum provide calves with their initial protection.

Colostrums is having 7 times the protein and twice the total solids of normal milk, thus it gives an early boost in portion and solid intake. It contains higher amount of minerals and vitamin A which are essential to fight against disease. Colostrums give a laxative effect which is helpful in expulsion of muconium (first faeces). The cows should be vaccinated against contagious and infectious diseases which help to increase the quantity and quality of gama globulins in colostrums.




Calves need colostrums within four hours of birth – ideally within 30 minutes .Time is imperative because a newborn calf's digestive tract allows antibodies to pass directly into the blood. After 24 hours, the calf's intestines cannot absorb antibodies intact. The absorptive cells lining the small intestine are immature at birth. In this stage they indiscriminately take up large molecules like immunoglobins. As the calf grows older hour by hour, there is a change of epithelia cells of small intestine from

immature type to mature type which cannot allow large protein molecules. This phenomenon is called 'gut closure' The absorbed antibodies protect against systemic invasion by pathogens while antibodies that are not absorbed play an important role in protection against intestinal disease.

Quantity of colostrums to be fed is 1/10th of body weight.

- 15-30 minutes of life - 5-8 % of body weight
- 10-12 hours of life - 5-8 % of body weight
- 2nd day - 10% of body weight
- 3rd day - 10% of body weight

Methods of feeding colostrums

- 1 .  Natural suckling: Traditional method, amount of colostrum can not be measured and colostrum disease transmission may occur.
- 2 .  Pail feeding: Requires training of calves, once trained easy to manage, weighed quantity of colostrum can be fed to calves and chances of contamination are more.
- 3 .  Bottle Feeding : Provides natural suckling satisfaction to the calf and buffalo calves fed colostrum with bottle and reared separately had better growth rate.

Substitute of colostrums: Mixture of-

1. 1 raw eggs +
2. 3ml castor oil +
3. 10000IU vitamin A +
4. 80 mg Aureomycine add water make 1000ml volume warm at 40°C and feed it.



Cargill– Education for Enriching Community

Cargill's belief in extending responsibility beyond their own operations in creating resilient communities, empowering individuals to be their own leaders and adopt sustainable and responsible measures for their own success led to the Nourishing India program. Cargill is committed to making a difference through interventions in food security & nutrition, sustainability and enriching communities.

Cargill collaborates with a local partner who shares a similar vision, has the experience of working in these focus areas and understands the local community and has an expertise in the subject matter. Cargill is the primary funding partner for Agrasar's Society maker program and it is also funding one of their Bachpan centres in Gurugram.

Societymaker program was incubated to rekindle the entrepreneurial spirit in women from disadvantaged backgrounds. The aim is to make them self-aware, confident and self-reliant socially and financially. To earn a livelihood and lead a more meaningful personal and professional life.

Bachpan supports out of school children to attain age appropriate learning levels, nutrition and then main streaming them to formal schools and enhancing the quality of education in those schools.

Awareness is created through home visits, one to one counseling sessions, community meetings, street plays, etc. Children in the age group of 5 to 12, who do not go to schools due to various reasons, with a household income of less than certain threshold are enrolled into the program.

A child stays at the centre for about a year (depending on the learning capability of the child), the curriculum helps them reach their age- appropriate learning levels. Life skills like – personal hygiene, self awareness, social expression, cognitive ability, creative thinking, co-exist in collaboration, problem solving, managing emotions are also taught.

Parents are engaged at various stages through parent-teacher meeting, inviting them in the classrooms, participation in festivals and other events held at the centre to maintain the consistency of education in future.



Union Agriculture Minister visits National Mithun Research Center, ICAR Institute and Farm in Nagaland



The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar visited the Indian Council of Agricultural Research, ICAR's National Research Center on Mithun and a pineapple farm on the first day of his visit to Nagaland. Shri Tomar said that the Government of India is continuously working on the theme of 'Vocal for Local' in the AatmaNirbhar Bharat campaign. "During the Covid-19 pandemic, Prime Minister Shri Narendra Modi took the initiative for this, special emphasis was given on it and it has been taken on Mission Mode for the economic development of the country," he said.

Shri Tomar said that the National Research Center on Mithun is a unique biological resource of Northeast India and it is everyone's responsibility to preserve it.

"Earlier mithun was reared in free-range system, but now as agriculture is increasing, forest area is decreasing, so farmers should adopt alternate

practices for mithun rearing under semi-intensive system developed by the ICAR-NRC," he said.

Shri Tomar appreciated the success of the institute in developing technologies that have benefitted the Mithun farmers in their economic uplift, as well as the efforts of the Center to improve the standard of living of farmers by generating interest and increasing their incomes. He also called for further research on the use of Mithun (a breed of cow) for maximum benefit of the farmers. Shri Tomar urged the institute to conduct research to find out the nutritional and therapeutic properties of milk and develop a business model and said that the fertilizer potential of Mithun dung and urine should be explored as an alternative model for natural farming. Shri Tomar also visited the Mithun farm and exhibition stalls showcasing various technologies and products developed by the Centre. He discussed the technologies developed by the Centre, such as feed blocks,

mineral block dispensers and region-specific mineral mixtures. Shri Tomar also planted a sapling on the occasion. Delivering the welcome address, NRC Director Dr. M.H. Khan highlighted the major achievements of the Institute during the last 33 years.

Shri Tomar also visited the Nagaland Center of ICAR, which was established in the year 1975. The center is carrying out various activities for Nagaland by promoting research, extension and human resource development activities in agriculture and allied sectors. The dissemination of the developed technologies is facilitated by the Central Government's strong network of 5 Krishi Vigyan Kendras at Dimapur, Peren, Wokha, Kiphire and

Longleng districts. The Central Government plays a major role in enhancing tribal livelihoods through various schemes, research and extension activities. This ICAR Center has developed 5 location specific integrated farming system models for different agro-climatic conditions for small and medium farmers of Nagaland, while the dual purpose breeds – Vanraj and Srinidhi birds have been promoted among more than 5,000 tribal farmers. This center has developed and disseminated the technique of artificial insemination in pigs, which is very popular among the tribal farmers of Nagaland. Thousands of tribal farmers benefit from the KVKs under the Central Government.

Appreciating the efforts of the ICAR Center, the Union Minister asked them to work with dynamism.

Shri Tomar later visited a pineapple field in Volvam village and interacted with the members of the Farmers' Producer Organization (FPO). On this occasion, Agriculture Minister of Nagaland, Shri G. Kaito, Central Horticulture Commissioner Dr. Prabhat Kumar, Nagaland Adviser on Horticulture and Border Affairs, Shri Mathung Yanthan, Vice Chancellor of Central Agricultural University, Dr. Anupam Mishra, Director of ICAR Research Complex for North Eastern Region, Dr. V.K. Mishra along with other officials, scientists and farmers were present.



DAHD launches One Health Pilot Project in Karnataka



Shri Atul Chaturvedi, Secretary, Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, launched the 'Orientation & Launch of One Health Pilot in Karnataka' on June 28th in Bengaluru. In addition, the capacity building plan in English and Kannada, as well as the One Health brochure, were launched in Kannada.

One-Health is a multi-sectoral approach that considers human, animal, and environmental health, as well as their interconnectivity and interdependence. After the COVID pandemic, it is especially important to take a holistic approach.

Shri Atul Chaturvedi, Secretary, Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying,

Government of India, said at the launch of the pilot project, "The One Health India programme initiated by the Department will work to improve livestock health, human health, wildlife health, and environmental health by institutionalising coordination among animal, human, and wildlife departments, improving disease diagnosis and surveillance."

This pilot project will help to institutionalise coordination among various sectors, making data sharing and disease outbreak reporting procedures feasible. It will make it easier to connect, strengthen, and integrate laboratories in a network. The project's goal is to assist in the development of a targeted surveillance plan and to integrate data with the National Digital Livestock Mission's digital architecture (NDLM). The Karnataka pilot will serve as the foundation for the development of India's One Health Framework."

Dr. Praveen Malik, the Animal Husbandry Commissioner for the Government of India, Shri Alkesh Wadhvani, the Director of the Poverty Alleviation Bill & Melinda Gates Foundation (BMGF), Smt. Salma K. Fahim, the Secretary of the Department of Animal Husbandry and Fisheries for the Government of Karnataka, Dr. Pushpalatha, the Incharge Director-Health for the Department of Health and Family Welfare for the Government of Karnataka, as well as Dr. Manjunath S. Palegar, Director, Animal Health, Government of Karnataka, and Shri Vijaykumar Gogi, Principal Chief

Conservator of Forest (WL), Forest, Ecology, and Environment Department, among other significant players from the animal, human, and wildlife sectors.

Animal husbandry commissioner Dr. Praveen Malik stated, "We look forward to integrating human, environmental, and animal health with the launch of the One Health Framework pilot in Karnataka. Six planned interventions for the pilot will improve coordination between various relevant sectors and build the capacity of various teams. We anticipate the successful execution of the pilot with the assistance of the state departments and all stakeholders.

"We are happy that Karnataka is putting the One Health pilot project into practise. According to Ms. Salma K. Fahim, secretary for the government of Karnataka's department of animal husbandry and fisheries, "this pilot will go a long way in helping us improve facilities and infrastructure in our state."

With financial assistance from the Bill & Melinda Gates Foundation (BMGF) and The Confederation of Indian Industry (CII) as the implementing partner, the Department of Animal Husbandry & Dairying (DAHD), Government of India, is launching this project. An institutionalisation mechanism has been established through an apex inter-ministerial governance committee, chaired by the Principal Scientific Adviser to the Government of India, in order to support the One Health initiative of the Department of Animal Husbandry and Dairy, Government of India. Shri Atul Chaturvedi, Secretary, Department of Animal Husbandry & Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, launched the 'Orientation & Launch of One Health Pilot in Karnataka' on June 28th in Bengaluru. In addition, the capacity

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Krimanshi Technologies Signs an MOU with SGVU for the Exchange of Knowledge and Information in the Areas of Agri-Livestock



Krimanshi Technologies Pvt. Ltd. Jodhpur (Raj.) as a First Party and Suresh Gyan Vihar University Jaipur (Raj.) as a Second Party agreed for exchange of knowledge & information pertaining to the areas of Agri-Livestock and Startup Entrepreneurship.

There will be exchange of students by the parties for academic, research, training and allied purposes from time to time and it would be a major benefit to the student community to enhance their skills and knowledge.

The parties discussed and agreed that it would be expedient and beneficial to form a long-term collaboration to carry out joint activities and to assist and support each other in their respective individual activities and programmes.

As a result, the parties have executed and signed this MOU, settling the terms and conditions of this collaboration, which will be in effect for 5 years.

About Krimanshi

Krimanshi Technologies Pvt Ltd, founded in 2015, develops sustainable and novel feed systems for animals by converting food waste and surplus into highly nutritious feeds with the goal of improving the nutrition of farm animals.

Its products are marketed to the dairy, poultry, and fishing industries.

Protect
your
assets

protection



Perfect combination for combating heat stress

Monovet® 200

Excellent Feed Additive For Ruminants

HOSTAZYM® DAIRY

Enzyme Complex Exclusively for Dairy

Prevent Coccidiosis

Enhance Heat stress resistance

Control Ketosis
Bloat
SARA

Strengthen Immune system
Rumen and intestinal tract

Improve Feed conversion efficiency
Weight gain
Herd economics
Reproductive performance

Improve Growth performance of heifers
Feed efficiency
Quality and dung scoring
Profitability, better milk fat, SNF

CJ Feed & Care introduces a feed that can reduce methane emissions from dairy cattle.



CJ Feed & Care, a feed livestock corporation affiliated with CJ Cheil Jedang, has introduced an environmentally friendly feed that can reduce the amount of methane emitted by dairy cattle when they burp or fart. Methane is a greenhouse gas that has an impact on the planet's temperature and climate system.

Cows expel large amounts of heat-trapping methane. Several solutions have been investigated to reduce the carbon footprint of beef and dairy cattle. Methane emissions from milk cows exceed those of beef cattle. CJ Feed & Care announced that it has obtained a patent for feed additives that suppress methane-producing bacteria in cow stomachs and has applied it to its methane-reducing solution.

According to a survey conducted by Konkuk University in Seoul, methane generation by milk cows fed CJ Feed & Care's methane solution for two weeks decreased by 36.6 percent when compared to general feed, but milk production did not change.

"The introduction of methane-reducing feed will result in an eco-friendly paradigm shift in the feed and livestock sectors," an unnamed CJ Feed & Care official said in a statement on June 21. Before looking for clients abroad, the company would first target the domestic market.

According to Jeonbuk National University, the amount of greenhouse gas produced by South Korea's livestock sector increased from 5.8 million tonnes in 1990 to 9.4 million tonnes in 2018. CJ Feed & Care anticipated rising demand for environmentally friendly feed, including methane reduction feed, as the world's carbon trading system expanded to include the livestock industry.

UP dairy industry secures Rs 500 crore investment

Uttar Pradesh's dairy industry has attracted Rs 500 crore in investment, with the potential to boost the state's industrial development.

The new investment proposals are expected to shape the lives of rural people as a major source of employment and income generation.

During the third groundbreaking ceremony (GBC-3) on June 3 in Lucknow, projects worth Rs 482 crore were presented in this sector.

According to the pioneer, these projects include Duss Bareilly (Rs 80.3 crore) in Bareilly, Creamy Foods Limited (Rs 60 crore) in Bulandshahr, CP Milk and Food Products Private Limited (Rs 118 crore) in Gorakhpur, and two projects — CP Milk and Food Products Private Limited worth Rs 100 crore and DUSS Lucknow worth Rs 124 crore — in Lucknow.

A government spokesman said on Monday that a thriving dairy sector in UP would help the state become self-sufficient and contribute to doubling farmers' income.

He emphasised the cooperative system's goal of providing employment and services in society through the participation of workers and markets, and he stated that the sector plays an important role in achieving food security, reducing poverty, creating employment opportunities for women, and providing a consistent source of income for rural households.

The dairy industry offers alternative employment opportunities 365 days a year, whereas crop production employs the rural workforce for 90 to 120 days.

SUMUL Dairy in Surat plans to expand its ice cream manufacturing facility

State BJP president C R Paatil laid the groundwork for Sumul Dairy's ice cream manufacturing unit in Kamrej taluka of Surat district, which will be expanded from 50,000 to 1 lakh litres daily at a cost of Rs 125 crore.

SUMUL Dairy is also establishing the first ice cream cone manufacturing plant in Gujarat at Navi Pardi village in Kamrej taluka, with a daily production capacity of 3 lakh cones.

"The BJP has become an undefeated party due to the leadership and guidance of cooperative sector leaders like Bhikhubhai Patel (Surat Sahkari Sewa Sangh) and Raman Patel (Surat district Kharid Vechan sangh)," Paatil said. There are over 360 cooperative societies in Gujarat, with the BJP controlling 310 as of yesterday. We won with a landslide victory without forming a coalition with Congress."

Mansinh Patel, Chairman of Sumul Dairy, stated, "We have fulfilled Prime Minister Narendra Modi's dream of doubling farmer income." Dairy farmers' total income was around Rs. 3.50 crore in 2013-14, but it has now increased to Rs 7.50 crore. The money is deposited directly into the bank accounts of dairy farmers in Surat and Tapi."

Farmers are "satisfied," according to the state BJP chief, with the compensation amount given for acquiring their agricultural lands for the bullet train project.

"The Surat district farmers received Rs 2,700 crore, while those from Navsari, Valsad, and Bharuch also received crores of rupees." Farmers received Rs. 1.03 crore per bigah. Only a few areas remain, and they will be covered. Farmers in Surat and Navsari are pleased with the compensation and are willing to give

more land. "Even the Congress employees are pleased," Paatil said.

Meanwhile, R S Sodhi, Managing Director of Gujarat Cooperative Milk Marketing Federation Limited (GCMMF), stated, "In the milk sector, we are top in the world with 210 million metric tonnes of production and we are still progressing." Sumul Dairy collects 18 lakh litres of milk per day and pays fair prices to dairy farmers. The main reason for dairy farming's success is that it is linked to cooperative societies, which act as a bridge between dairy farmers and end customers..."

In the fiscal year 21-22, Dudhsagar Dairy announces a profit of Rs 321 crore, which is a new high.



During its Annual General Meeting (AGM) on Tuesday, the Mehsana District Cooperative Milk Producers' Union Limited (MDCMPU), which operates the Dudhsagar Dairy in Mehsana, North Gujarat, declared a record profit of Rs 321 crore "for the first time in its 60 years of existence."

This profit, which is distributed to milk producers, is roughly three times higher than the previous year.

"We have made a profit of Rs 321 crore for the first time in the 60-year history of Dudhsagar dairy," says the company. The previous year, the company made a profit of Rs 105 crore, according to Ashok

Chaudhari, chairman of Dudhsagar Dairy.

The MDCMPU was founded in 1960 and markets milk and milk products under the Amul, Sagar, and Dudhsagar brands. It is one of 18 milk cooperative unions in Gujarat.

"Our business grew in 2021-22 as well. Our revenue grew by over Rs 1,000 crore to Rs 6,028 crore," Chaudhari said.

In the districts of Mehsana, Patan, and Gandhinagar, the dairy collects milk from 6.5 lakh cattle rearers who are connected to 1200 village-level milk cooperatives. Rajasthan and Haryana milk are also collected.

Dudhsagar's milk procurement has also increased over the last year. "Last winter, our peak milk procurement was 45.5 lakh litres per day. This includes both Gujarat and Rajasthan procurement. The peak milk procurement in 2020-21 was 32 lakh litres per day," Chaudhari added.

MDCMPU also operates the Dudhmansagar Dairy in Manesar and the Dudhmotisagar Dairy in Dharuhera, in addition to the plant in Mehsana. Haryana is home to both dairies. At Boriyavi, Ubkhal, and Jagudan, the union has cattle feed factories with a total capacity of 1,900 metric tonnes per day.

Nutreco receives a \$4.8 million grant to establish feed mills in difficult-to-reach African communities.

Nutreco, a Dutch producer of animal nutrition, fish feed, and processed meat products, has received a US\$4.8 million grant to establish feed mills in hard-to-reach communities in Africa.

The Bill & Melinda Gates Foundation grant is one of the foundation's first investments in the animal feed space, and it will be used to accelerate the implementation of localised, sustainable complete feed production in Sub-Saharan Africa.

Due to inefficiencies and infrastructure challenges, compound feed production in Africa is limited, and feed production facilities are expensive to install.

As a result, according to Nutreco, small-scale livestock farmers face reduced margins and uncertain futures unless they gain access to quality animal feed.

The \$4.8 million grant will directly fund 21 Hendrix4U complete feed production projects in Ghana, Ivory Coast, Nigeria, and Uganda at first.

According to Nutreco, Hendrix4U is a "factory-in-a-box" for rural areas that ensures access to quality compound feed production for small-scale producers in a financially sustainable manner.

In addition to the facilities themselves, feed-producing distributors gain access to training and education in those markets.

They will learn how to evaluate raw materials in terms of quality and nutritional value in order to validate the use of local crops for specific animal nutrition applications.

They will also be taught how to reduce the risk of mycotoxin contamination in compound feed components, as well as feed mill management, finance, and business acumen, among other things.

Union Agriculture Minister inaugurates NDRI's centenary celebrations



The Union Minister for Agriculture and Farmers Welfare, Shri Narendra Singh



Tomar, today inaugurated the centenary year celebrations of the National Dairy Research Institute (NDRI), Karnal (Haryana). Speaking on the occasion, Shri Tomar said that India ranks first in the world in terms of most agricultural products, and in this situation it is even more necessary to maintain the quality of products.

“India is also in the leading position in the world in terms of milk production, but we need to keep working continuously. In this big achievement, the hard work of farmers and research of scientists have contributed unprecedentedly. Today all kinds of resources and scientific knowledge is available in our country. In such a situation progress should be made quickly, a target of ten years should be set and problems should be solved continuously,” he said.

Addressing the faculty, employees, students and farmers in the auditorium of NDRI, the Chief Guest, Union Minister Shri Tomar said that in the field of agriculture, not only crops, but also animal husbandry will have to be looked at with equal importance, which has been a part of our culture.

“The importance of research in the field of animal husbandry is as much as agriculture, that is why NDRI was established. Just as our scientists doing research in agriculture have tried their best, in the same way scientists related to animal husbandry have also done many researches, which has benefitted the country today,” he said.

Shri Tomar said that the NDRI, established in the year 1923, has become a leading institution in teaching, research and extension education. He said that the NDRI is such a unique institution due

to its many achievements. Shri Tomar called upon the ICAR to extend full cooperation during the centenary year of NDRI. He said that in its hundredth year, the NDRI should adopt 100 villages of the country and develop animal husbandry, then these villages will take it further to nearby villages.

On the occasion, Shri Tomar released books on the achievements of NDRI and the centenary logo. He also presented awards to the Best Employees of the Research Division, Support Section, Administration and Finance Section. Secretary, DARE and Director General of ICAR, Dr. Trilochan Mohapatra virtually joined the programme and congratulated the NDRI team. Director, NDRI, Dr. MS Chauhan and other senior officers, students and farmers attended the programme.

Earlier, Shri Tomar, along with the dignitaries, planted saplings and inaugurated the Oxygen Park. He also visited the Livestock Research Centre, Animal Biotechnology Center and Referral Laboratory and inaugurated the Centenary Commemorative Pillar based on 100 years of achievements of the Institute.

DSM acquires Brazil's leading animal nutrition technology company to boost precision services offering

Royal DSM, a global purpose-led science-based company, announces it has reached an agreement to acquire Prodap, a Brazilian animal nutrition and technology company that combines technology offerings, consulting services, and customized nutritional solutions to drive efficiency and

sustainability in animal farming.

Precision farming is growing rapidly, driven by the increasing demand for sustainability, efficiency, traceability, and animal welfare in food systems under pressure to provide the world's rising population with animal protein. DSM's precision nutrition solutions for animal nutrition and health include Verax™, a unique and innovative integrated animal management system that leverages data to provide a deeper understanding of the health, productivity, and welfare of animals, and Sustell™, an intelligent sustainability service designed to enhance the environmental sustainability of animal protein production.

Based in Belo-Horizonte, Prodap is at the forefront of the market for digital solutions, which is growing particularly quickly in Brazil. Prodap combines nutrition, consultancy, and technology services to optimize ruminant farming operations. Through its portfolio of digital solutions, it collects data and develops insights in real time, which are then translated into tailored nutritional solutions for customers, with remote or in-person support provided by its experienced consultants. Prodap has operations in the states of Mato Grosso and Minas Gerais and employs 330 employees, serving more than 5,000 farms across Brazil with impressive customer loyalty rates.

By harnessing the power of Prodap's digital solutions, DSM will take another step forward in its Precision & Personalization journey. DSM will strengthen and further develop its digital solutions to reach more markets globally and species, enabling smarter nutritional decision-making thanks to artificial intelligence and other tools. Prodap will complement DSM's deep animal nutrition knowledge and advisory capabilities with its extensive consultancy experience, facilitating an even higher level of customer experience. Additionally, by supporting more efficient farming, the acquisition contributes to DSM's commitment to enabling a double-digit reduction in on-farm livestock emissions by 2030 as part of its 2021 food system commitments.

August 2022

- 1. ILDEX Vietnam 2022**
Dates: August 3-5, 2022
Venue: SECC, HCM
City: Ho Chi Minh City
Country: Vietnam
Email: panadda@vnusiapacific.com
Website: www.ildexvietnam.com
- 2. Livestock Malaysia**
Dates: August 10 - 12, 2022
Venue: MITC Complex
City: Melaka
Country: Malaysia
Email: livestockmalaysiamy@informa.com
Website: www.livestockmalaysia.com
- 3. Livestock Philippines 2022**
Dates: August 24 - 26, 2022
Venue: World Trade Center
City: Pasay city
Country: Philippines
Email: rita.lau@informa.com
Website: www.livestockphilippines.com

September 2022

- 1. Victam Asia 2022**
Dates: September 7 - 9, 2022
Venue: IMPACT Exhibition Center
City: Bangkok
Country: Thailand
Website: www.victamasias.com

October 2022

- 1. World Dairy Expo**
Dates: October 2 - 7, 2022
Venue: Alliant Energy Center
City: Madison, Wisconsin
Country: United States
Website: www.worlddairyexpo.com

- 2. Sommet-elevage, France**
Dates: October 4 - 7, 2022
Venue: Grande Halle Showgrounds
City: Ferrand
Country: France
Website: www.sommet-elevage.fr
- 3. VIETSTOCK 2022**
Dates: October 12 - 14, 2022
Venue: Saigon Exhibition & Convention Center (SECC)
City: Ho Chi Minh City
Country: Vietnam
Website: www.vietstock.org
- 4. The Dairy Expo @ The Livestock & Agri Expo**
Dates: October 28-30, 2022
Venue: India Expo Center & Mart
City: Greater Noida - Delhi
Country: India
Email: info@thedairyexpo.in
Website: www.thedairyexpo.in

November 2022

- 1. EuroTier**
Dates: November 15 - 18, 2022
Venue: Deutsche Messe AG
City: Hannover
Country: Germany
Website: www.eurotier.com

December 2022

- 1. Agri Livestock 2022**
Dates: December 2 - 4, 2022
Venue: Myanmar Expo Hall
City: Yangon
Country: Myanmar
Website: www.agrilivestock.net

Editorial Calendar 2022

Publishing Month: January Article Deadline : 30th, Dec. 2021 Advertising Deadline : 3rd, Jan. 2022 Focus : Disease Prevention	Publishing Month: February Article Deadline : 30th, Jan. 2022 Advertising Deadline : 3rd, Feb. 2022 Focus : Herd Management	Publishing Month: March Article Deadline : 28th, Feb. 2022 Advertising Deadline : 3rd, March 2022 Focus : Heat Stress	Publishing Month: April Article Deadline : 30th, March 2022 Advertising Deadline : 3rd, April 2022 Focus : Cold Chain Mgmt.
Publishing Month: May Article Deadline : 30th, April 2022 Advertising Deadline : 3rd, May 2022 Focus : Nutrition	Publishing Month: June Article Deadline : 30th, May 2022 Advertising Deadline : 3rd, June 2022 Focus : Environmental Control	Publishing Month: July Article Deadline : 30th, June 2022 Advertising Deadline : 3rd, July 2022 Focus : Calf & Heifer Mgmt.	Publishing Month: August Article Deadline : 30th, July 2022 Advertising Deadline : 3rd, August 2022 Focus : Processing
Publishing Month: September Article Deadline : 30th, August 2022 Advertising Deadline : 3rd, September 2022 Focus : Milking Practices	Publishing Month: October Article Deadline : 30th, September 2022 Advertising Deadline : 3rd, October 2022 Focus : Feed & Fodder	Publishing Month: November Article Deadline : 30th, October 2022 Advertising Deadline : 3rd, November 2022 Focus : Winter Management	Publishing Month: December Article Deadline : 30th, November 2022 Advertising Deadline : 3rd, December 2022 Focus : Methane Emission

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Front Title Inside	30000	Back Title Inside	25000
Front Title Opening	25000	Back Title Opening	20000
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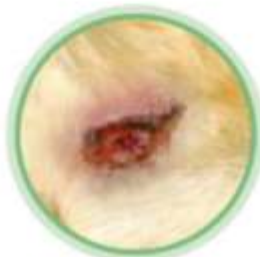
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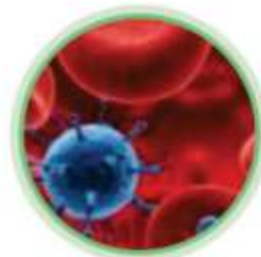
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Antimicrobial

Uniformly & Deeply
penetrated in Wound

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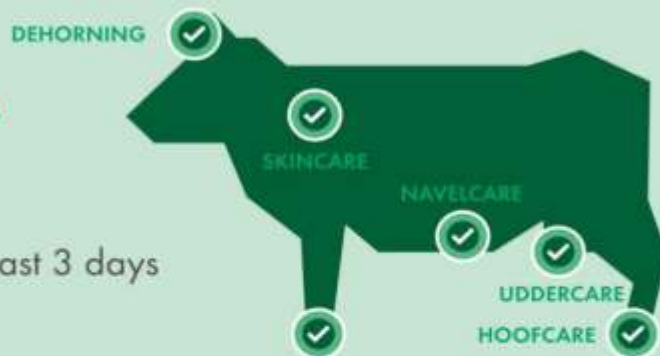
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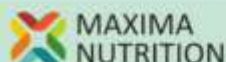
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