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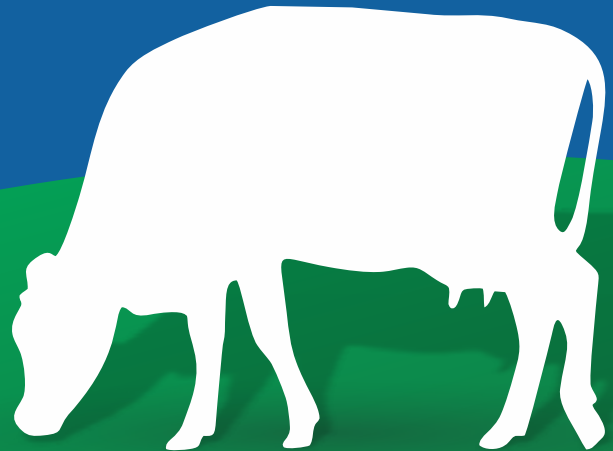
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A close-up photograph of a glass of iced coffee. A stream of white milk is being poured from a carton into the glass, which is filled with ice cubes. The coffee is a light brown color. In the background, a coffee filter filled with dark coffee grounds is visible on a wooden surface. The lighting is warm and focused on the glass.

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Photo: Mizuno



From the Pen of Chief Editor



Sustainable Dairy Farming – Booster for Rural Economies

Sustainable dairy farming has the potential to serve as a booster for the rural economy by creating jobs, generating income, and promoting economic growth. The practice of sustainable dairy farming involves adopting environmentally friendly practices, optimizing the use of natural resources, and promoting animal welfare and health. These practices can help to enhance the profitability and sustainability of dairy farms while also providing benefits to the wider community.

One way that sustainable dairy farming can benefit the rural economy is by creating jobs. Dairy farming requires a wide range of skills, from animal care and nutrition to equipment maintenance and management. As farmers adopt more sustainable practices, they may need to hire additional staff to help with tasks such as planting cover crops, implementing conservation tillage, and managing pasture rotations. These jobs can provide a source of income for local residents and help to strengthen the local economy.

Sustainable dairy farming can also generate income for farmers and their communities. By adopting practices that promote soil health, reduce waste, and conserve water, farmers can enhance the productivity and profitability of their operations. For example, using conservation tillage and crop rotation can help to improve soil fertility and reduce the need for fertilizers and pesticides. This can lead to higher yields and lower input costs, increasing the income generated by the farm. In addition, farmers can generate income by selling surplus produce and animal products, such as compost, manure, and milk.

Promoting sustainable dairy farming can also promote economic growth in rural areas. As farms become more sustainable and profitable, they may be able to invest in new equipment and technologies, expand their operations, and hire additional staff. This can create a multiplier effect, as the increased economic activity generates additional income and jobs for the local community. Moreover, promoting sustainable dairy farming can attract visitors and tourists who are interested in learning about sustainable agriculture and supporting local farmers. This can help to boost local businesses such as hotels, restaurants, and gift shops.

In conclusion, sustainable dairy farming has the potential to serve as a booster for the rural economy by creating jobs, generating income, and promoting economic growth. By adopting environmentally friendly practices, optimizing the use of natural resources, and promoting animal welfare and health, farmers can enhance the productivity and profitability of their operations while also contributing to the well-being of their communities. As such, policymakers, farmers, and other stakeholders should work together to promote sustainable dairy farming as a means of supporting the rural economy and building more sustainable and resilient communities.

Vishal

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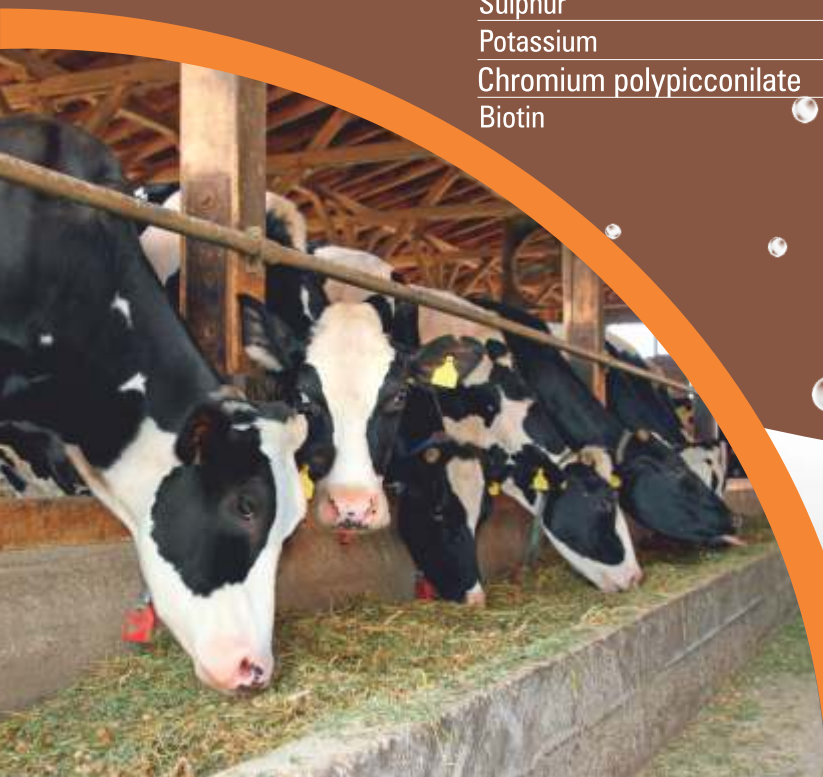
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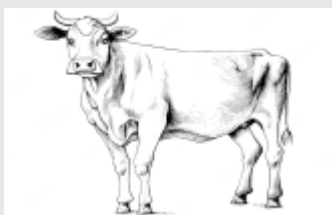
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Improving Sustainability in Dairy Farming – Small Changes, Big Impact

Bhavana Gupta
Editor-in-Chief

Farmers can adopt practices such as using crop rotations, integrating livestock and crop production systems, and minimizing the use of pesticides and synthetic fertilizers to improve sustainability.

Photo: Vickor Lundberg

Sustainability in dairy farming involves practices and systems that enable the production of milk and other dairy products while minimizing negative impacts on the environment, society, and the economy. Some key practices that can enhance sustainability in dairy farming are:

Land management: Effective land management practices such as crop rotation, conservation tillage, and the use of cover crops can improve soil health, reduce soil erosion, and enhance biodiversity. Farmers can also implement practices that reduce greenhouse gas emissions such as planting trees and grasses to sequester carbon and using manure for energy production.

Animal welfare: Providing optimal animal care and comfort is essential in dairy farming. This includes providing proper nutrition, access to clean water, clean and comfortable housing, and proper healthcare. Proper management of manure and other waste products is also important for animal health and environmental sustainability.

Water management: Water is a precious resource, and dairy farmers can improve sustainability by reducing water use and minimizing water pollution. This can be achieved by using efficient irrigation systems, implementing manure management practices that minimize runoff, and monitoring water quality in streams and rivers.



Sustainable feed production: Dairy farming relies on the production of animal feed, which can have a significant environmental impact. To improve sustainability, farmers can adopt practices such as using crop rotations, integrating livestock and crop production systems, and minimizing the use of pesticides and synthetic fertilizers.

Efficient resource use: Farmers can optimize resource use by improving feed efficiency, reducing water use, and minimizing energy consumption. This can be achieved through practices such as optimizing feed composition, improving cow genetics, and adopting precision farming techniques.

Biodiversity conservation: Dairy farms can also contribute to the conservation of biodiversity by maintaining and enhancing natural habitats, planting native vegetation, and minimizing disturbance to wildlife.

Community engagement: Sustainable dairy farming also involves working with and engaging local communities, including consumers, other farmers, and local organizations. Farmers can engage in community outreach and education to increase awareness of sustainable practices and promote a positive image of the dairy industry.

Technology adoption: Technology can play a critical role in enhancing sustainability in dairy farming. For example, precision agriculture technologies can help farmers optimize resource use, improve animal health, and reduce environmental impacts.

Waste management: Proper management of waste products such as manure and silage can help enhance sustainability. This can be achieved through practices such as composting, anaerobic digestion, and land application of manure at appropriate rates and times.

Renewable energy: Renewable energy sources such as solar, wind, and biogas can be used to power dairy farm operations. By using renewable energy, farmers can reduce their dependence on fossil fuels and lower greenhouse gas emissions.

Economic viability: Finally, sustainability in dairy farming also requires economic viability. Farmers need to adopt practices that ensure profitability and financial sustainability. This includes monitoring and managing production costs, exploring new markets for their products, and identifying and mitigating financial risks.

Dairy farming can also generate carbon credits through a range of practices that reduce greenhouse gas emissions from the sector. Some of the most common practices that can generate carbon credits in dairy farming include:

Methane capture: Livestock, including dairy cows, produce methane as a byproduct of digestion. Methane is a potent greenhouse gas, so capturing it and using it as a fuel source can significantly reduce emissions.

Methane can be captured from dairy farm manure and used as a renewable energy source to power on-farm operations or sold to the grid.

Improved herd management: Practices that reduce enteric fermentation, the digestive process that produces methane, can reduce emissions. These practices can include improved animal nutrition, breeding for lower methane emissions, and reducing herd size.

Manure management: Methane can also be captured from dairy farm manure by anaerobic digestion, which converts manure into biogas that can be used as a fuel source. Additionally, separating solids from liquid manure can reduce methane emissions, as can composting or spreading manure at optimal times to reduce its decomposition.

Reduced energy consumption: Dairy farms can also generate carbon credits by reducing their energy consumption, for example, by improving energy efficiency in their buildings, equipment, and lighting systems or by using renewable energy sources such as solar or wind.



Providing optimal animal care and comfort is essential in dairy farming. This includes providing proper nutrition, access to clean water, clean and comfortable housing, and proper healthcare.

Photo: Michael Gane

The Indian government has taken several steps to promote sustainability in the dairy sector. These initiatives focus on improving productivity, promoting sustainable practices, providing technical and financial assistance to farmers, and promoting exports. The government has also set up research institutions and capacity building programs to promote sustainable dairy farming practices in the country.

The Indian government launched the DIDF with a corpus of INR 15,000 crore (approximately USD 2 billion) to provide affordable credit to dairy farmers and entrepreneurs for modernizing dairy infrastructure, increasing milk production, and improving milk quality. The DIDF is expected to promote sustainable dairy farming practices in the country.

Sustainability in dairy farming requires a holistic approach with a combination of small changes in the practices and systems that enhance environmental, economic, and social sustainability. By adopting sustainable practices and systems, dairy farmers can make a big impact towards a more sustainable future for the dairy industry and the planet.



Herbal Galactagogues are Here to Boost Your Cow's Output!

Dr. Kaushendra Narayan Dwivedi
 Technical Manager
 Carus Laboratories, Karnal

The Livestock sector is super important for the economy, especially in rural areas where it provides income for families and creates jobs. Did you know that India is the biggest milk-producing country in the world? That's amazing! Livestock contributes 4.11% to the total GDP and 25.6% to the total agriculture GDP. This means that we produce around 210 million tonnes of milk every year, which is a lot!

In fact, there's enough milk for everyone - every day we get about 427 gm of milk per person. All of this milk production is really helping out more than 9 crores dairy farmers. India has been doing really well in the dairy sector and has become the world leader in the last 20 years. (Uegaki et al., 2001).

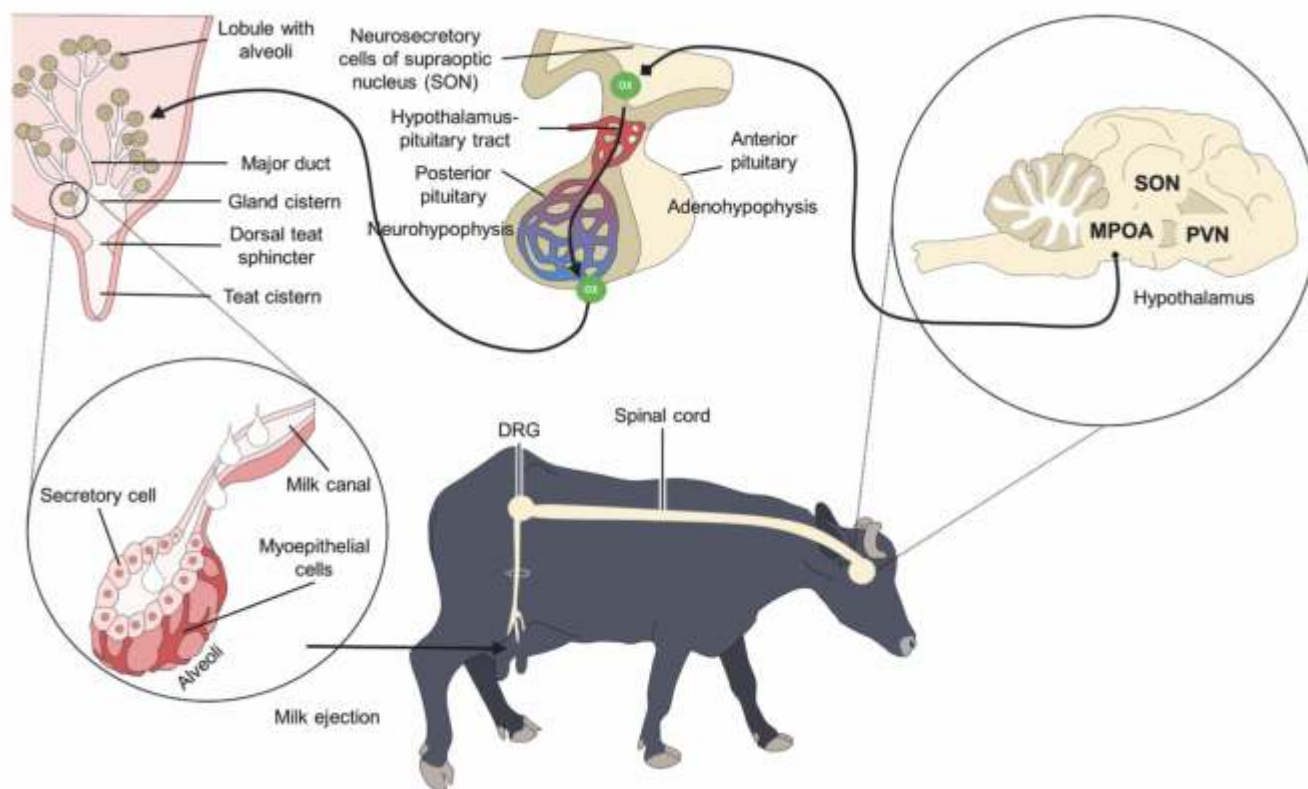
But with more people looking for organic food, and some antibiotics being banned, we need to find new and

better ways to feed livestock. A galactagogue is one solution - it's a special substance that helps dairy animals produce more milk. Some medicinal herbs are also really helpful in improving digestion and fighting bacteria and viruses. Plus, they can even help with preventing worm infections and have lots of antioxidants. So let's keep looking for new and innovative ways to help our dairy animals produce more milk!

Factors for augmenting milk production:

1. Herbal Galactagogue:

The production of animals can be enhanced by using different herbals as a component of animal feed. Galactagogues stimulate the activity of alveolar tissue and raise the secretory activity and thereby restoring and regulating milk yield (Ravikumar and



Bhagwat, 2008). They act by exerting an influence on an adreno-hypothalamohypophyseal-gonadal axis by inhibiting hypothalamic dopaminergic receptors or by inhibiting dopamine-producing neurons. These medications increase prolactin secretion by antagonizing dopamine receptors (Gabay, 2002). According to Bakshi et al. (2004), now a day's herbal plants are broadly used as animal feed additives, having galactagogue properties like Shatavari (*Asparagus racemosus*), Jivanti (*Leptadenia reticulata*), Methi (*Trigonella foenum*) and Masha parni (*Teramnus labialis*).

1.1 Shatavari (*Asparagus racemosus*)

The name Shatavari means curer of a hundred diseases (shat means hundred and vari means curer) and it is also known as Shatavar and Shatmul. It is a common species of asparagus under the family Liliaceae. *Asparagus racemosus* is one of the most commonly used herbs from the ancient era due to the presence of steroidal saponins and sapogenins in various parts of a plant (Krishana et al., 2005). Traditionally it is used as a health tonic and a common Indian home remedy used as a rejuvenator, promoter of strength, milk and semen. It is also used for cough, aphrodisiac, antispasmodic, and diarrhoea. It enhances the blood prolactin level and stimulates the cellular division of the mammary gland. Thus shatavari has galactagogue and mammogenic property, so it is being used for enhancing milk production in freshly parturient and lactating animals.

1.2 Jivanti (*Leptadenia reticulata*)

Jivanti (*Leptadenia reticulata*) is named after it because it corrects the metabolism, digestive system and has nourishing properties for every part of the body. Jivanti belongs to the family Asclepiadaceae & found in Gujarat, Punjab, Himalayan ranges, South India, Sikkim, Deccan and Karnataka. *Leptadenia reticulata* contain α -amyrin, β -amyrin, ferulic acid, luteolin, diosmetin, rutin, β -sitosterol, stigmasterol and hentriacontanol. Jivanti plant possess the vigorous lactogenic, anabolic and galactagogue effect (Ravishankar and Shukla, 2007).

1.3 Methi (*Trigonella foenum-*

graecum)

Methi (*Trigonella foenum-graecum*) belongs to the family Fabaceae cultivated in a semi-arid region of the world predominantly in India. The leaves and seeds have anti-diabetic, anti-cancer, anti-microbial, anti-parasitic and procholesterolaemic effects (Al-Habori and Raman, 2002). Methi is being used traditionally to increase the production of milk and quicken milk letdown while nursing. Also, this herb has been shown to significant effect on the lactation performance in ruminants (Alamer and Basiouni 2005). Methi seed contains phytoestrogens, which are plant chemicals similar to the female sex hormone estrogen, a key compound, diosgenin, has been shown experimentally to upsurge milk flow.

1.4 Masha parni (*Teramnus labialis*)

Teramnus labialis belongs to the family Fabaceae, is an annual herbaceous plant and is described as mashaparni in Sanskrit. Its roots possess antioxidant, anti-inflammatory, antihyperglycemic and hypolipidemic activity which is important for udder health. *Teramnus labialis* naturally increases the prolactin and cortisol levels & utilized protein and glycogen content of the mammary gland shows a significant increase in milk production.

2. Rumen Protected Choline:

Unprotected choline degraded 85-90 % in the rumen. Choline encapsulated with hydrogenated vegetable oil having a high melting point of 400C by spray freezing technology, this allows choline to bypass the rumen as the temperature within the rumen is 390C. Vegetable oil coating is digested by enzymes in the intestine so choline is exposed and finally absorbed in the intestine. Choline enhances hepatic fatty acid oxidation to produce glucose and VLDL. Glucose is used as a building block of lactose by the udder and VLDL are transported to the mammary gland & used to synthesize milk fat Rumen protected choline metabolizes the NEFA to milk yield and milk fat.

3. Live yeast:

Live yeast works as an oxygen scavenger in the rumen which maintains the anaerobic environment and favors the growth of microflora. Live yeast balances the ruminal pH to promote the

population of beneficial microbes which helps in efficient fiber digestion and increases the Dry matter intake and appetite of animals.

Conclusion:

The production & productivity of dairy animals in India is very low because of various factors like underfeeding, malnutrition, various diseases, stress, etc. is a major concern for the economy of the dairy industry. Herbal feed additives either affects feeding pattern or affects the growth of favorable microorganism in the rumen, helps to stimulate the secretion of different digestive enzymes, which in turn may improve the efficiency of nutrients utilization & stimulate the milk-secreting tissue in the mammary glands, resulting in improved productive performance of dairy animals.

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Moo-naging Your Herd: The Art of Dairy Farming in the 21st Century

Archit Sharma
Assistant Editor

Precision feeding programs typically use a combination of sensors, data analytics, and automation to monitor and control feed intake.

Photo: Vinicius Pontes

Herd management is a critical aspect of modern dairy farming, and involves a range of practices aimed at maximising the productivity and health of a herd of dairy cows. Effective herd management requires a deep understanding of animal behaviour, nutrition, genetics,

and disease prevention, and is essential for ensuring the long-term sustainability of a dairy operation.

There are many examples of successful herd management practices that have led to significant improvements in milk production, animal welfare, and overall



profitability. For instance, some dairy

farmers have implemented precision feeding programs that use computerised systems to monitor the nutritional needs of individual cows and adjust their diets accordingly. This can lead to better health outcomes and higher milk yields, as cows receive the right balance of nutrients to support their needs.

Other farmers have invested in innovative technologies such as automated milking systems that can significantly reduce labour costs and improve milk quality. These systems use sensors to monitor cow behaviour and health, and can detect issues such as mastitis early, allowing for prompt treatment and prevention of further spread of the disease.

Additionally, some dairy operations have implemented advanced genetic selection programs that focus on breeding cows with desirable traits such as high milk yield, strong immune systems, and docile temperaments. By selectively breeding the best cows, farmers can improve the overall productivity and health of their herds.

Overall, effective herd management is a crucial element of modern dairy farming, and the success stories of farmers who have implemented innovative practices provide inspiration for others in the industry to continue to seek out new ways to optimise their herds and

improve the sustainability of their operations.

When we look at it closely, herd management is a complex branch with hordes of things to discuss about. We can give thought to fertility, breeding and reproduction under this. It also covers nutritions and milking techniques at some level. This can all day long if we dive deep down into the details. I would like to tell you about a few things that have caught my attention.

Precision feeding programs in the dairy sector are an innovative approach to animal nutrition that aim to improve the efficiency and sustainability of dairy farming. These programs involve the use of advanced technologies to monitor and manage the nutritional needs of individual cows and adjust their diets accordingly.

The goal of precision feeding is to optimise the balance between feed intake, milk production, and animal health, while minimising feed waste and environmental impact. By tailoring the diet of each cow to their specific needs, farmers can reduce feed costs, increase milk yields, and improve animal welfare.

Precision feeding programs typically use a combination of sensors, data analytics, and automation to monitor and control feed intake. These tools can include rumen sensors that measure the pH and temperature of the cow's

digestive system, milk sensors that analyse the composition of the milk, and activity monitors that track the cow's movement and behaviour.

Based on this data, computer algorithms can calculate the optimal feed ration for each cow, taking into account factors such as age, weight, milk production, and health status. Feed dispensers can then distribute the precise amount of feed to each cow at the right time, reducing waste and ensuring that each animal receives the nutrients they need.

Precision feeding programs have the potential to improve the profitability, efficiency, and sustainability of dairy farming by reducing feed costs, increasing milk yields, and minimising environmental impact. However, these programs require significant investment in technology and training, and may not be suitable for all types of dairy operations.

The other thing that caught my attention is the Automated milking system (AMS). Instead of traditional milking methods, which require manual labour and close supervision, AMS uses advanced technology to automatically milk cows without human intervention.

AMS typically involve a series of robotic milkers that are installed in a milking parlour or barn. The milking process is initiated when a cow enters the milking stall, and the system identifies the animal using a variety of

sensors, such as a transponder on the cow's collar.

The robot then cleans the cow's udder and teats, and begins the milking process. AMS uses a variety of techniques to simulate the natural sucking action of a calf, including pulsation, vacuum, and massage. The milk is then transported via a series of pipes to a bulk tank, where it is stored until it can be collected and processed.

First, they can reduce the need for manual labour, as the milking process can be fully automated. This can lead to significant cost savings for farmers, who no longer need to pay for labour or spend time milking cows themselves.

In addition, AMS can increase the efficiency and productivity of a dairy operation. By milking cows more frequently, and at more regular intervals, AMS can increase milk production and improve the health of cows, as the milking process can be customised to meet the individual needs of each animal.

However, AMS also requires significant investment in technology and infrastructure, and may not be suitable for all types of dairy operations. They also require regular maintenance and calibration to ensure that they are functioning properly, and may not be as effective for cows with certain health issues, such as mastitis or other udder infections

Let me give you an example of a company that has a tremendous market presence and has

successfully used herd management to optimal levels.

Amul has successfully implemented herd management practices to improve the productivity and health of its cows. With over 3.6 million members and 18,500 village-level milk collection centres across the country, Amul is the largest milk producer in India and the world's largest cooperative.

One of the key ways in which Amul has implemented herd management practices is through its use of advanced breeding techniques. The company has established its own research and development centre, which works to develop new breeds of cows that are better suited to the Indian climate and are more resistant to diseases. By selectively breeding cows with desirable traits, such as high milk yield and strong immune systems, Amul has been able to improve the overall productivity and health of its herds.

In addition to breeding, Amul also uses precision feeding and health monitoring systems to optimise the nutrition and health of its cows. The company has developed a computerised system that tracks the nutritional requirements of individual cows and adjusts their diets accordingly, ensuring that they receive the right balance of nutrients to support their needs. This has led to improved milk yields and better overall health outcomes for the cows.

Amul has also invested in innovative technologies such as automated milking systems and cooling systems that help to improve milk quality and reduce labour costs. By using sensors to monitor cow behaviour and health, Amul can detect issues such as mastitis early, allowing for prompt treatment and prevention of further spread of the disease.

Amul's success in the Indian dairy sector is a testament to the importance of effective herd management practices in modern dairy farming. By implementing innovative techniques to improve the health and productivity of its cows, Amul has been able to maintain its position as a leading producer of high-quality milk and dairy products in India and around the world.

Before parting with you dear reader, let me emphasise that effective herd management is essential for the success and sustainability of a dairy operation. By using advanced technologies and data-driven insights, farmers can optimise the health and productivity of their cows, reduce costs, and minimise environmental impact. By investing in herd management strategies that prioritise animal welfare and operational efficiency, dairy farmers can improve their bottom line while also meeting the demands of consumers for high-quality and sustainable dairy products.



दूध की आकर्षक यात्रा: खेत से हमारे घरों तक

दूध हमारे आहार का एक अनिवार्य हिस्सा है, और यह दुनिया भर में स्थित डेयरी फार्मों से आता है। खेत से हमारे घरों तक दूध की यात्रा एक आकर्षक प्रक्रिया है, जिसमें कई चरण शामिल हैं।

पहला कदम गायों को दुहना है। किसान गायों को दुहने के लिए विशेष उपकरणों का उपयोग करते हैं, जिन्हें दिन में दो से तीन बार दुहा जाता है। दूध को बड़े कंटेनरों में एकत्र किया जाता है, जिन्हें बाद में कूलिंग फैसिलिटी में ले जाया जाता है।

एक बार जब दूध ठंडा करने की सुविधा में पहुंच जाता है, तो उसे बैक्टीरिया के विकास को रोकने के लिए तुरंत 4 डिग्री सेल्सियस या उससे कम तापमान पर ठंडा कर दिया जाता है। ठंडा दूध फिर एक प्रसंस्करण संयंत्र में ले जाया जाता है।

प्रसंस्करण संयंत्र में, दूध की गुणवत्ता के लिए परीक्षण किया जाता है, और जो दूध आवश्यक मानकों को पूरा नहीं करता है उसे फेंक दिया जाता है। इसके बाद दूध को पाश्चुरीकृत किया जाता है, जिसमें किसी भी हानिकारक बैक्टीरिया को मारने के लिए इसे एक विशिष्ट समय के लिए उच्च तापमान पर गर्म करना शामिल होता है। पाश्चुरीकरण के बाद, दूध को समरूप बनाया जाता है, जो दूध को चिकना और पीने में आसान बनाने के लिए दूध में वसा के ग्लोब्यूलस को तोड़ देता है।

एक बार दूध को पाश्चुरीकृत और समरूप बनाने के बाद, इसे बोतलबंद या डिब्बों या प्लास्टिक के जग में पैक किया जाता है। पैकेजिंग स्वच्छ

परिस्थितियों में की जाती है ताकि यह सुनिश्चित किया जा सके कि दूध खपत के लिए सुरक्षित रहे। इसके बाद दूध को प्रशीतित ट्रकों में वितरण केंद्रों तक ले जाने के लिए रखा जाता है।

वितरण केंद्रों से, दूध को स्थानीय किराना स्टोर और सुपरमार्केट में पहुंचाया जाता है, जहां यह खरीद के लिए उपलब्ध होता है। उपभोक्ता विभिन्न रूपों में दूध खरीद सकते हैं, जिसमें होल मिल्क, लो-फैट मिल्क, स्किम्ड मिल्क और फ्लेवर्ड मिल्क

शामिल हैं।

खेत से हमारे घरों तक दूध की यात्रा में कई चरण शामिल हैं, जिसमें गायों का दूध निकालना, दूध को ठंडा करना, इसे प्रसंस्करण संयंत्र में ले जाना, दूध को पाश्चुरीकृत और होमोजिनाइज करना, इसकी पैकेजिंग करना और इसे किराने की दुकानों और सुपरमार्केट में पहुंचाना शामिल है। यह प्रक्रिया सुनिश्चित करती है कि दूध उपभोग के लिए सुरक्षित और स्वस्थ है और हम तक ताजा और स्वच्छ स्थिति में पहुंचता है।



दूध डेयरी फार्मों से प्रसंस्करण संयंत्रों तक जाता है, जहां उपभोक्ताओं द्वारा खरीद के लिए स्थानीय किराना स्टोर और सुपरमार्केट में पहुंचाने से पहले यह पाश्चुराइजेशन, होमोजेनाइजेशन और पैकेजिंग से गुजरता है।



Happy Hooves, Happy Farmers: Housing Hacks for Brilliant Sheep and Goat Production

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With minimal investment, you can maximise your small ruminant production. Our expert advice? All you need is basic shelter to protect your flock from the elements. Whether it's gunny bags, thatched material, or steel, it's easy to provide the bare minimum housing your flock needs to thrive. Don't break the bank on fancy shelters - keep it simple, keep it affordable, and watch your flock's yield soar! After all, even goats know the importance of a cosy home sweet home

Optimal Environmental Conditions

A climatic condition with an air temperature of 13-27 °C, relative humidity of 60-70%, wind speed of 5-8 km/h, and a medium quantity of solar radiation may be considered the zone of thermoneutrality for sheep and goats. Except for areas with heavy rainfall, most of the country may use sheds with mud floors.

Type of shed

- It is determined by the raising

The summer and winter wind directions at any location have a significant impact on ventilation efficiency



system.

- An open-plan home that includes a covered area and a run space is usually sufficient.
- Chain links should be used to enclose the run space.
- Animals are housed in the covered area during the night and in poor weather.

Orientation of sheds

- Sheds with long axes that run east to west keep the area below cooler than sheds that face north to south.
- The latter, however, maintains the shed's dryness and encourages sanitation (because of the sun's prolonged illumination of the shed), albeit this orientation may put more stress on the animals if they are kept inside the shed during the day in a hot, arid area.
- In a hot, dry atmosphere, a north-east to south-west orientation is expected to provide the most comfort.

Ventilation

- The summer and winter wind directions at any location have a significant impact on ventilation efficiency.
- In order to avoid the drought, air inlets should be installed while goat breeds are at their peak. The attempt to completely enclose sheds in order to shield animals from cold air temperatures may raise humidity levels to 90% and increase ammonia concentrations to 20 ppm.
- In hot, dry, and warm-humid climates, adequate ventilation in the shed is crucial to promoting heat loss from animals through increased convection and radiation.
- In tropical climates, the goat shed's long sides shouldn't have solid walls higher than 1 m off the ground.
- When the surrounding weather is warm-humid or hot-humid, the open space should remain uncovered, and when it is hot and dry, it should be partially covered.
- In the hot-arid zone, protection from hot winds requires special thought.

On either side of the shed, a sheep night pasture can be provided with a chain link fence or a thorny bush enclosure



- The sides may be covered during the winter in erratic climates and for the majority of the year in the temperate zone, but cross ventilation room is left at the roof height.
- It is quite affordable and practical to change the ventilation at will from two long sides using panels of thatch or fireproof thatch manufactured from locally available grasses.

Height and Shape of roof

- It is recommended that the height in the centre of an "A"-shaped roof range between 3 and 3.5 m. A height of less than 3 m hinders effective ventilation, which reduces animal convective heat loss.
- A height of 3 m is seen to be sufficient in moderate and hot-humid climates, while higher height does not offer any further benefits.
- Low-roof barns reduce heat loss from goats through radiation to the chilly sky. Because one side of a "A"-shaped roof protects the opposite side from direct sunlight by forming a shadow, it is better for hot climates.
- There is no restriction on the length of the shelter, but the shed's width shouldn't be greater than 12 metres, and the ideal width is 8 metres.
- The ridge height should be 3.5 metres and the eave height should be 2.5 metres.
- The chain link utilised in open areas should not be higher than 4 feet. The overhang should be 0.75 to 1 metre long.
- This aids in reducing heat gain from the shelter's roof. Heat can be effectively reduced by double roofs, whether the materials are the same or different.

Roofing Materials and Pattern

- For Indian climate conditions, thatched roofs are ideal due to their lower cost and durability.
- Nevertheless, organised farms can also utilise corrugated asbestos sheets to reduce recurring expenses and increase durability.
- Most people favour gable roofs. It's

best to use lean-to roofing for tiny sheds.

Floor type and Space

- Except for areas with heavy rainfall, most of the country may use sheds with mud floors.
- The surface an animal is lying on could potentially be a cause of damage, infectious infections, and physical and temperature discomfort.
- A healthy bed must be dry, sturdy, and reasonably temperature resistant.
- For weaners and growers, a deep, clean, dry bed of straw can be perfect throughout the cool season; but, during warm or hot weather, a light coating of straw is likely to be more appropriate.
- In hot weather conditions compared to cool weather, the floor area for various age groups should be slightly larger.
- This aids in the convective removal

of heat and water from the animal's body as well as radiative heat losses.

- Huddling is harmful to an animal's health and productivity in tropical conditions.
- Exotic animals should have 0.9-1.1 m² of space, whereas native and indigenous cross breed sheep should have 0.8-0.9 m² of floor area each.
- On either side of the shed, a sheep night pasture can be provided with a chain link fence or a thorny bush enclosure.

Floor Space

- For animals to grow as well as possible, ideal floor area must be provided, including both closed and open space.
- The covered space will suffice if the animals are taken for daytime grazing and only protected at night.
- The pen and run technique of housing is excellent when the animals are housed intensively.

Minimum Floor Space Requirement per Animal (BIS Standard)

Sr. No.	Type of animals	Minimum floor space per animal (m ²)
1.	Ram or buck in groups	1.8
2.	Ram or buck individual	3.4
3.	Lamb or kids in group	0.4
4.	Weaner in groups	0.8
5.	Yearling or goatlings	0.9
6.	Ewe or doe in groups	1.0
7.	Ewe/doe with lamb	1.5

Space requirements for stall feeding

Age Groups	Covered space (m ²)	Open space (m ²)
3 months to 6 months	0.5-0.75	1.0-1.5
6 months to 12 months	0.75-1.0	1.5-2.0
Adult animal	1.5	3.0
Male, Pregnant or lactating ewe/doe	1.5-2.0	3.0- 4.0



Role of Nutrients (Vitamins, B- complex & Phosphorus) In Dairy Animals to overcome Nutritional Deficiency Effects

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Nutrition plays a key role in the maintenance of animal productivity & reproductive performance. Reduced production & reproductive efficiency can decrease the profitability of dairy production by increasing, calving interval, the number of services per conception, culling rate, milk production and veterinary services. Nutritional requirements increase rapidly with milk production after calving, but an improper diet plan

could result in a negative energy balance (NEB).

Modern breeds of dairy animals are able to produce huge amount of milk. In attempt to consume, digest and metabolize enough nutrients to satisfy lactation needs, those animals are exposed to serious stress conditions that can affect their health.

Metabolic diseases (like: Fatty liver, Ketosis, Rumen acidosis, Laminitis etc.) have become a common problem on



Modern breeds of dairy animals are able to produce huge amount of milk. In attempt to consume, digest and metabolize enough nutrients to satisfy lactation needs, those animals are exposed to serious stress conditions that can affect their health

dairy farms, they still require a serious attention to be controlled. The incidences of these disorders can be reduced by proper nutrition of animals.

Nutrients like Vitamin A, D3, & E, B-complex, Phosphorus & Choline chloride play a vital role to overcome Nutritional Deficiency Effects & proper utilization of metabolites. A number of Vitamins and trace minerals have important roles in immune function and may improve health in transition dairy cows.

Vitamin A: Vitamin A is the most important vitamin in cattle nutrition. It is the only one that normally must be added to cattle diets. It is necessary for bone development, sight, and maintenance of healthy epithelial tissues. The liver stores vitamin A for release during periods of insufficient dietary intake, making liver the ideal tissue for nutritional assessment.

In adult cattle, vitamin A deficiency is associated with retained placentas and impaired fertility. It is required for maintaining healthy tissue in the reproductive tract. Vitamin A is an important factor in improving immune function and attenuating oxidative stress.

Vitamin D3: Vitamin D3 supplementation reduced the severity of mastitis in dairy cows and improved the growth of calves. The function of vitamin D3 is in calcium homeostasis in dairy cows. In dairy cattle it is known for preventing milk fever. The vitamin D3 in feed can either be plant- / fungi- based ergocalciferol or animal-based cholecalciferol. Its role is not limited just to Ca homeostasis and bone metabolism but is also associated with immunity. Cows can acquire vitamin D3 in many ways for example through feed, parenteral injections or through UVB irradiation from the sun or artificial lighting.

Vitamin D3 is necessary for the absorption and metabolism of calcium and phosphorus. Vitamin D3 may also be necessary for immune cell function.

Vitamin E: Vitamin E has its potential role as an antioxidant that is able to

prevent free-radical mediated tissue damage. Vitamin E seems to be crucially involved in immune system function, so that supplementation with supra-nutritional levels of the vitamin, in some instances, results in improved immune responses.

Vitamin E functions to protect cellular membranes from oxidative damage. Clinical manifestations of deficiency include nutritional myopathy (white muscle disease) in young calves and diseases in older cattle including retained placenta and increased susceptibility to environmental mastitis.

B- Complex: The B vitamins are a group of water-soluble vitamins that have key functions as enzymatic cofactors or intermediate components in major metabolic reactions (as given in table).

B Vitamins and their functions		
Vitamins	NICK NAME	FUNCTION
B1	THIAMINE	<ul style="list-style-type: none"> Carbohydrate & fat metabolism. Improves Nerve function.
B2	RIBOFLAVINE	<ul style="list-style-type: none"> Energy Metabolism. Involves with growth of cells.
B3	NIACIN	<ul style="list-style-type: none"> Energy metabolism. Vasodilator (aid during time of heat stress).
B5	PANTOTHENIC ACID	<ul style="list-style-type: none"> Involved in the metabolism of fats & carbohydrates.
B6	PYRIDOXINE	<ul style="list-style-type: none"> Metabolism of AA & lipids. Synthesis of hemoglobin.
B7	BIOTIN	<ul style="list-style-type: none"> Hoof health (keratin production). Carbohydrate, fat & protein metabolism. Helps with milk production, Udder Health & overall improvement in milk quality.
B9	FOLIC ACID	<ul style="list-style-type: none"> Nucleic acid and protein metabolism.
B12	CYANOCOBALAMINE	<ul style="list-style-type: none"> Coenzyme in methionine production. Propionate metabolism. Synthesized by rumen bacteria if cobalt supply is adequate.
CHOLINE		<ul style="list-style-type: none"> Fat metabolism & transport. Rumen protected choline improves milk yield & milk fat & reduce

Phosphorus (Sodium Acid Phosphate):

Phosphorus is one of the most important minerals in animal nutrition. It is the second most abundant element in an animal body after calcium, with 80% of phosphorus found in the bones and teeth, and the remainder located in the body fluids and soft tissue. In dairy applications, phosphates are used for a number of functions. Phosphates stabilize milk proteins against coagulation from extreme heat & maintain PH level; support emulsification by interacting

with proteins; and bind calcium in milk gels.

An adequate supply of phosphorus, in a form that can be absorbed by the animal and is available for storage or use to support these physiological processes, is essential if optimal livestock health and productivity are to be achieved. This is often referred to as biologically “digestible” or “available” phosphorus.

In addition, an animal's phosphorus requirement cannot be looked at in isolation, since both calcium and vitamin D are closely linked with it in many of the metabolic processes. For example, accretion of phosphorus in the animal's bones is also affected by the presence of calcium and vitamin D.

Without an adequate supply of

phosphorus, an animal will suffer from a phosphorus deficiency, the consequences of which are varied, but in all cases affect the animal's physical wellbeing, as well as its economic performance. The initial effect is a fall in blood plasma phosphate levels, followed by the response mechanism of calcium and phosphorus being withdrawn from the animal's bones. Apart from a generally lower resistance to infection, this often results in a loss of appetite and a reduction in live weight gain due to impaired feed efficiency.



पशुपालन की वार्षिक माहवार सारणी

अनुज कुमार

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पशु चिकित्सा एवं पशु विज्ञान महाविद्यालय, सरदार वल्लभभाई पटेल कृषि एवं प्रौद्योगिकी विश्वविद्यालय, मेरठ

पशु प्रबंधन एक ऐसी प्रक्रिया है जो किसानों को अपने पशुओं की देखभाल इस तरह से करने में मदद करती है जो उनके लिए सबसे अच्छा हो। उचित पशु प्रबंधन का पालन कर पशुपालक पशुओं में बीमारी और उत्पादन में कमी जैसी समस्याओं से बच सकते हैं। यह जानकारी एक कैलेंडर में व्यवस्थित की गई थी ताकि पशु पालकों को यह जानने में मदद मिल सके कि हर महीने अपने पशु के लिए क्या करना है।

जनवरी/पौष

सर्दियों में अपने पशुओं को ठंड से बचाव के लिए कुछ बदलाव करने पड़ेंगे। सबसे पहले, सुनिश्चित करें कि उनका आवास व बिछावन साफ और सूखा रहे। पशुओं के लिए ताजा व स्वच्छ पीने का पानी उपलब्ध हो। यदि कोई ठंड या अन्य बीमारी से पशु ग्रसित है, तो पशु चिकित्सक से संपर्क कर उपचार कराए। पशु के आवास में धूप का आगमन भी होना चाहिए।



फरवरी/माघ

तापमान परिवर्तन के प्रभाव से पशुओं का बचाव करें। चारा-फसल की अच्छे पैदावार के लिए समयानुसार सिंचाई करें। चारे की फसलों जैसे बरसीम, जई आदि की उचित अवस्था पर कटाई करें। पशुओं को रात्रि में भूसा/तूड़ी अवश्य दे जिससे शारीरिक तापमान नियंत्रण में मदद मिलती है। पशुशाला में हवा का आगमन सुचारु रूप से होना चाहिए।

मार्च/फाल्गुन

अपने पशुओं के आवास को कीचड़ और नमी से बचाए। खरीफ के मौसम में हरा चारा प्राप्त करने के लिए फसलों की बुवाई करें। अपने चारे की फसलों से अधिकतम लाभ प्राप्त करने के लिए केवल अच्छी गुणवत्ता वाले बीजों का ही उपयोग करें।

अप्रैल/चैत्र

पशुओं को तेज धूप से बचाए। खुरपका-मुंहपका रोग का टीका लगवाना चाहिए। गेहूं की पराली को यूरिया से उपचारित कर उसकी पौष्टिकता बढ़ाई जा सकती है। हरे चारे की कमी होने पर हरे चारे (घास, साइलेज) का संरक्षण किया जा सकता है।

मई/वैशाख

पशुओं में बीमारियों को रोकने में मदद के लिए टीकाकरण महत्वपूर्ण है। गलघोटू रोग का टीकाकरण अवश्य कराए। पशु गर्मी में लू से बीमार हो सकते हैं, इसीलिए उन्हें ठंडा और छायादार स्थान पर रखने की आवश्यकता होती है। पशु को स्वस्थ रखने व दुग्ध उत्पादन क्षमता बढ़ाने के लिए उन्हें एक अच्छे संतुलित आहार और भरपूर खनिजों की भी आवश्यकता होती है। पशुशाला में हल्के ठंडे पानी का छिड़काव पशु पर करते रहे।

जून/जेठ

पशु के तापक्रम को नियंत्रण रखने के लिए उसे बार-बार नहलाना चाहिए। पशु को चारा सुबह-सुबह या रात को ही देना चाहिए। ताजा व ठंडा पानी दे। पशुशाला खुली व हवादार होनी चाहिए। गर्मियों में मादा-भैंसों को सुबह-शाम गर्मी (मद) के लिए जरूर देखना चाहिए।

जुलाई/आषाढ़

पशुशाला में कीटाणुनाशक दवा का प्रयोग करें। ब्याने वाले पशुओं का विशेष ध्यान रखें। पशुओं को एवं उनके नवजात बच्चों को आंतरिक और बाहरी परजीवियों से बचाएं। ब्याने के बाद पशुओं को दुग्ध ज्वर, कीटोसिस और अन्य समस्याओं से बचाएं।

अगस्त/श्रावण

बरसात के मौसम में पशुशाला की साफ-सफाई पर विशेष ध्यान देना चाहिए। सुनिश्चित करें कि पशुओं के पीने का पानी साफ हो। पशु के खुरों की बार-बार जांच करें और हर 5-7 दिन में लाल दवा से साफ करें। मक्खियों, मच्छरों और अन्य परजीवियों के लिए उपचार और छिड़काव पशु चिकित्सक की सलाह से समय-समय पर करते रहना चाहिए।

सितंबर/भाद्रपद

पशुओं में गर्मी के लक्षणों पर ध्यान देना चाहिए ताकि उचित समय पर गाभिन कर सके। एक सप्ताह से अधिक समय तक पशुओं को तैयार और नम चारे को खिलाने से बचना चाहिए। नवजात पशुओं के खान-पान पर विशेष ध्यान देना चाहिए और पशु चिकित्सक की देखरेख में उनका इलाज कराना चाहिए।

अक्तूबर/आश्विन

सुनिश्चित करें कि पशुओं का टीकाकरण किया गया है ताकि वे गलघोटू को होने से रोक सकें। जलवायु परिवर्तन के कारण बीमारी या बिगड़ते स्वास्थ्य के किसी भी लक्षण के लिए उनकी प्रतिदिन जांच करें। सर्दियों के आने से पहले उनके स्वास्थ्य प्रबन्धन, पोषक व्यवस्था, खाद्य-सामग्री आदि का प्रबंध करे।

नवंबर/कार्तिक

खुरपका-मुंहपका रोग से बचाव के लिए पशुओं को टीका लगवाना चाहिए। हवा, बारिश या ठंड की स्थिति में भूसे को बिछावन के रूप में इस्तेमाल किया जा सकता है। गीले स्थान में बछड़े-बछड़ियां/कटड़े-कटड़ियां ठंड के तनाव से प्रभावित हो सकते हैं।

दिसंबर/मार्गशीर्ष

पशुओं को ठंड से बचाने की उचित व्यवस्था करें। पशुशाला के तापमान को नियंत्रित करें। पशु के शरीर को कंबल या बोरी से ढका जा सकता है। ठंड के मौसम में पैदा होने वाले नवजात पशुओं का विशेष ध्यान रखना चाहिए।

अन्य महत्वपूर्ण ध्यान देने योग्य बातें

पशुओं की देखभाल और चारा पशुपालन का एक महत्वपूर्ण हिस्सा है। उनके स्वास्थ्य और कल्याण के लिए एक संतुलित आहार और नियमित पशु चिकित्सा देखभाल आवश्यक है। हमें अपने दुधारू पशुओं को घातक थनेला रोग से बचाने के उपाय भी करने चाहिए। हमें आंतरिक और बाह्य परजीवियों को रोकने के लिए दवा का नियमित अंतराल पर उपयोग करना चाहिए। गर्मी से संबंधित समस्याओं को रोकने के लिए पशु के गर्मी के लक्षणों पर ध्यान देना और समय पर प्राकृतिक अथवा कृत्रिम गर्भाधान कराना जरूरी है। पशुओं को खनिज मिश्रण भी प्रदान करना चाहिए और जो पशु गर्भवती हैं उनका विशेष ध्यान रखना चाहिए। दूध दोहने के लिए पूर्ण-हस्त विधि का ही प्रयोग करें। नवजात पशु के जन्म के बाद गर्भनाल को 1.5 से 2.0 इंच की दूरी पर काटकर बांध देना चाहिए और संक्रमण से बचाने के लिए टिक्चर आयोडिन का प्रयोग किया जाना चाहिए। नवजात पशु को जन्म के 1-2 घंटे के भीतर खीस अवश्य पिलायें। पशुशाला में महीने में एक बार कीटनाशक का छिड़काव करना चाहिए, पानी की टंकी/होद को प्रतिदिन साफ करना चाहिए और सप्ताह में एक बार चूना डालना चाहिए। रोग होने पर प्रभावित पशुओं को स्वस्थ पशुओं से अलग रखना चाहिए। दूध दुहने से पहले थनों को जीवाणुनाशक औषधि जैसे लाल दवा से धोकर साफ कपड़े से पोंछ लेना चाहिए। जब तक आवश्यक न हो पशु के आहार और आहार में परिवर्तन नहीं करना चाहिए और यदि आवश्यक हो तो धीरे-धीरे परिवर्तन करें। किसी भी आपात स्थिति से निपटने के लिए पशु-चिकित्सक या पशु वैज्ञानिक से संपर्क करें।



Comedy is no Joke

Ah, the dairy industry! Where cows reign supreme and milk flows like...well, milk.

It's a wild world where the cows are in charge and the humans are just along for the ride. You may think cows are just docile creatures that spend their days grazing and mooing, but in reality, they're the ones calling the shots.

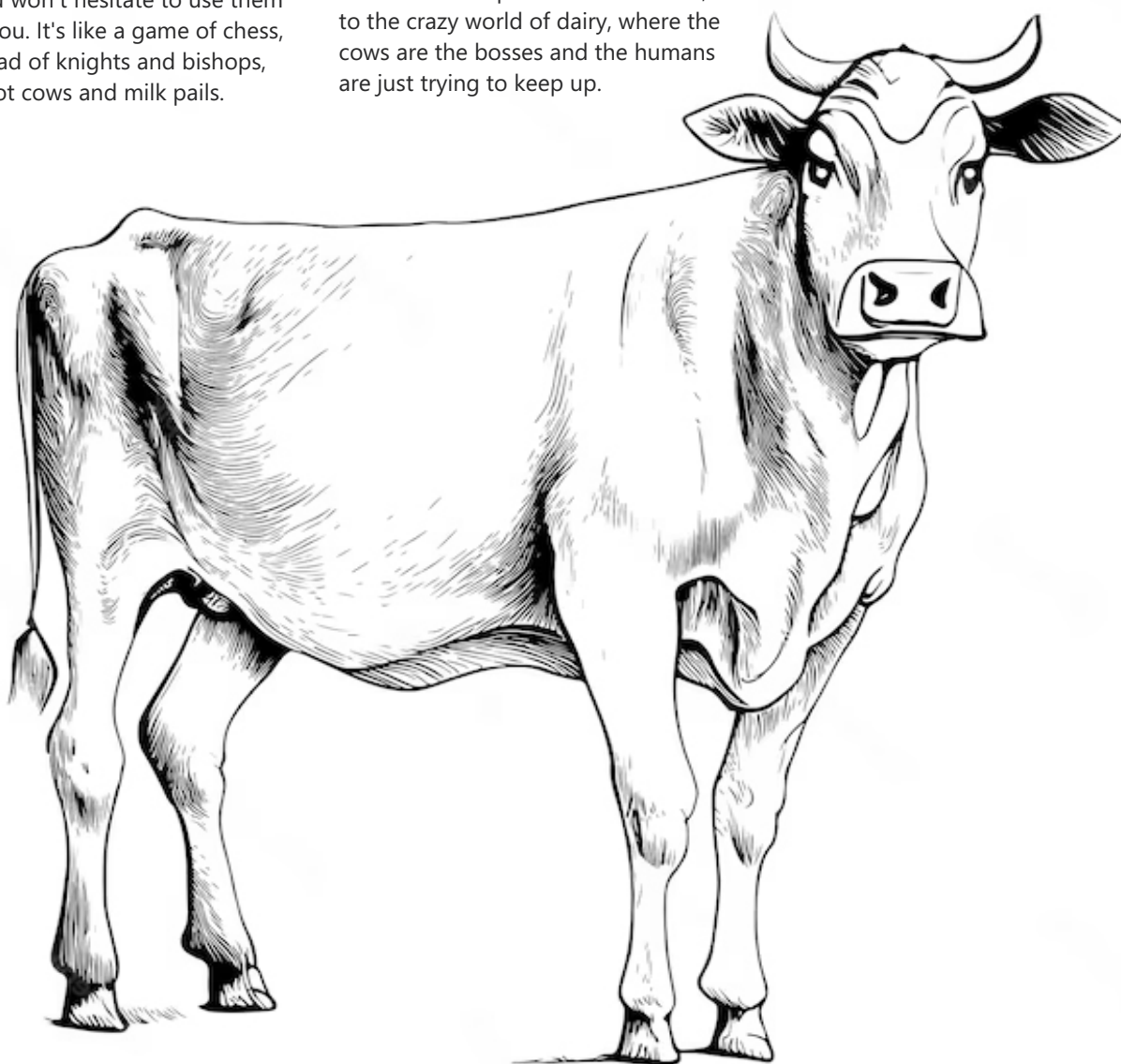
You want to milk them? Good luck. You'll have to navigate through their intricate hierarchy and politics just to get a drop of that liquid gold. Don't even think about trying to outsmart them. They know every trick in the book and won't hesitate to use them against you. It's like a game of chess, but instead of knights and bishops, you've got cows and milk pails.

And let's talk about the smells. If you think you know stinky, you haven't smelled a dairy farm on a hot summer day. It's like a mix of sweaty socks, rotten eggs, and cow manure all rolled into one. But you get used to it after a while. Or, maybe, you develop a sudden craving for the scent of cow poop. Who knows, it could happen.

Despite all the chaos, there's a certain charm to the dairy industry. There's something satisfying about working with cows and being part of the cycle of milk production. And at the end of the day, when you finally get that milk in the pail, you can't help but feel a sense of accomplishment. So here's, to the crazy world of dairy, where the cows are the bosses and the humans are just trying to keep up.

“ I invite readers to send a humorous paragraph on the dairy sector like the above one.

Best ones will be featured in the magazine and will receive consolation prizes. ”



Milking the Issues

Milk, milk, everywhere, but is it safe to drink? That's the question on everyone's minds as the dairy industry faces some major challenges. We conducted a poll on LinkedIn to find out what the biggest problem is, and the results are in!

According to the poll, the majority of respondents believe that milk quality and safety is the top priority. And who can blame them? Nobody wants to drink milk that's gone bad or contaminated with harmful bacteria. So, what can the dairy industry do to address this issue?

First and foremost, they need to implement rigorous quality control measures. This includes testing milk for bacteria, pathogens, and other contaminants, as well as ensuring that it's stored and transported properly to prevent spoilage. Investing in new technology, such as advanced testing equipment and improved refrigeration systems, can also help improve milk safety and quality.

Another issue facing the dairy industry is labour shortages. Without enough workers, it's difficult to keep up with demand and maintain high levels of quality and safety. To address this problem, the industry needs to invest in training and education programs to attract and retain skilled workers. They could also consider offering incentives, such as higher wages or better benefits, to entice workers to join the industry.

Of course, milk quality and labour shortages aren't the only challenges facing the dairy industry. Milk and its byproduct prices can fluctuate wildly, making it difficult for farmers to make a living. And with the rise of plant-based alternatives, the industry is facing increasing competition. To address these challenges, the industry needs to adapt to changing market conditions and explore new opportunities for growth and innovation.

Next, labour shortages. Without



enough workers, it's difficult for the dairy industry to keep up with demand and maintain high levels of quality and safety. To address this problem, the industry needs to invest in training and education programs to attract and retain skilled workers. They could also consider offering incentives, such as



Dairy product manufactures need to implement rigorous quality control measures. This includes testing milk for bacteria, pathogens, and other contaminants, as well as ensuring that it's stored and transported properly to prevent spoilage.



higher wages or better benefits, to entice workers to join the industry.

One of the main reasons for the labour shortage in the dairy industry is that it's simply not seen as an attractive career choice for many young people. The work can be hard and physical, with long hours and little time off. And with

many young people opting for college degrees and office jobs, there's less interest in working in agriculture and other manual labour fields.

Another issue is that many of the workers in the dairy industry are immigrants, and changing immigration policies and attitudes are making it

harder for them to find work in the United States. Many of these workers have years of experience and skills that are essential to the industry, and without them, it's becoming increasingly difficult to find workers who can do the job.

So what can the dairy industry do to



Without enough workers, it's difficult for the dairy industry to keep up with demand and maintain high levels of quality and safety. To address this problem, the industry needs to invest in training and education programs to attract and retain skilled workers.

address this problem? One solution is to invest in education and training programs that can help attract and retain workers. By offering apprenticeships, internships, and other training opportunities, the industry can help young people learn the skills needed to work in the industry and provide a clear career path for advancement. They could also consider offering higher wages and better benefits, as well as flexible work schedules that can make the job more appealing to workers.

Another option is to work with local communities to promote the industry and its importance to the economy. By building stronger relationships with schools, colleges, and other organisations, the industry can help to raise awareness of the job opportunities available and the benefits of working in a dairy. They could also work to build stronger ties with immigrant communities, providing support and resources to help workers navigate the changing political landscape.

One of the main factors contributing to the fluctuating prices is the lack of a stable market for milk and its byproducts. India's dairy industry is largely unorganized, with a large number of small-scale producers who do not have access to organized

markets or proper storage facilities. This makes it difficult for them to negotiate fair prices for their products, and often results in them being forced to sell their milk at lower prices than they deserve.

Another factor is the rising cost of feed and fodder for dairy animals. This has a direct impact on the cost of milk production, which in turn affects the prices of milk and its byproducts. Additionally, transportation costs, storage costs, and other expenses associated with milk production and distribution also play a role in determining the final price of milk and its byproducts.

The fluctuating prices of milk and its byproducts have also had a direct impact on consumers. Many households in India rely on milk and its products as a major source of nutrition, and the rising prices have made it difficult for them to afford these essentials. This has led to a situation where many people are forced to compromise on the quality and quantity of milk and its products they consume.

But it's not just about ensuring that the milk is safe and that there are enough workers to produce it. The dairy industry also faces challenges when it comes to milk and its byproduct prices. These prices can fluctuate wildly, making it difficult for farmers to make a

living. To address this issue, the industry needs to explore new opportunities for growth and innovation, such as developing new dairy products or finding new markets for existing ones. They could also consider forming cooperatives or other partnerships to increase bargaining power and stabilise prices.

Finally, there's the issue of plant-based alternatives. As more and more consumers turn to non-dairy options, the dairy industry is facing increasing competition. To address this challenge, the industry needs to adapt to changing market conditions and explore new opportunities for innovation. They could consider developing their own plant-based products or finding ways to differentiate their dairy products from non-dairy alternatives, such as emphasising the nutritional benefits of milk.

In conclusion, the dairy industry has some big challenges to overcome, but with the right approach, they can ensure that milk remains a safe, healthy, and competitive choice for consumers. By investing in quality control, addressing labour shortages, stabilising prices, and innovating in the face of competition, the industry can remain a vital part of our food supply chain. So let's raise a glass of milk to the future of the dairy industry!



Ayurvet's Endeavour for Environmental Sustainability



Water is one of the scarcest natural resources on earth. Apparently, water covers 70% of our planet that looks plentiful. But, in reality the fresh water that is used for domestic purpose, irrigation and manufacturing etc. is only 3%. Fresh water is further declining on alarming rate, the ground water and various water bodies are stressed due to overpopulation, pollution, and growing industrialization.

Power generation issue is another global concern. Thermal power plants contribute maximum percentage of global power mix.

However, the declining coal reserves is impacting the power generation. Moreover, the thermal power plants are one of the main contributors to the increased carbon dioxide levels throughout the world. Water scarcity and power issues can lead to geo-political instability which is imminent threat to human civilisation. We need pro-active and innovative solutions to overcome this challenge.

Mr. Pradip Burman, Chairman of the company strongly believes that it's the shared responsibility of People, Corporates and Governments to





take care of this planet and preserve its natural form for the future generations. Ayurvet has been keen on taking initiatives for environmental sustainability under its CSR focus area.

True to the vision of its chairman, the company has undertaken initiatives to conserve the natural resources and promote the use of renewable energy in areas where it operates. For conservation of water, company has initiated Rain Water Harvesting Project. It has installed a modular rainwater harvesting unit in one of the Govt. School at Baddi. This unit will collect the rain water from school building and open ground, store it in the modular underground pit 48000 litre

capacity and recharge the ground water table through bore. It is estimated that this unit can recharge more than 30 lacs litre of rainwater to ground annually. Over the years of operation, this initiative will increase the water table in nearby area of this school.

Creating this school, a model of environmental sustainability, company has also installed 9KwP on-grid Solar Power Plant in this School. This initiative will bring the electricity bill to zero. The monetary saving on electricity will be used for other development initiatives benefitting 1100 students of this school. It has high environmental value as it will reduce the stress on grids which uses coal for power generation

leading to less GHG emission.

The Solar Power Plant & Rainwater Harvesting Unit installed at Govt. Sr. Sec. School, Gullerwala, Baddi, Himachal Pradesh has been inaugurated by the COO, Ayurvet and Senior Mangment on 2nd February 2023 in presence of Studends, Teachers & members of School Management Committee.





A popular Indian dairy brand pays a tribute to The Elephant Whisperer's win at the Oscars; Guneet Monga Reacts



A popular dairy brand of India paid a sweet tribute to 'The Elephant Whisperer' bagging an Oscar in the Best Documentary Short Film category at the 95th Academy Awards.

NDDB plans to take over Mahanand Dairy

Mahanand Dairy, once a profitable undertaking of the Maharashtra government, may be taken over by the central government through the National Dairy Development Board (NDDB). Talks about the takeover are said to be in the advanced stage, and if successful, the NDDB will be responsible for managing the dairy's operations.

The fate of 590 out of 940 employees at Mahanand Dairy is currently uncertain. The NDDB has expressed its inability to accommodate all of the employees and has said that it can only accommodate 350 of them.

During a legislative council meeting, MLCS Vijay Girkar, Praveen Darekar, and Ekanath Khadse raised questions about the future of Mahanand Dairy and its employees. In response, Revenue Minister Radhakrishna Vikhe-Patil, who is in charge of the Dairy Development department, stated that the state government is committed to reviving the dairy and ensuring that it does not fall into private hands.

However, the minister also acknowledged that discussions with the NDDB are ongoing and that the issue of accommodating all of the employees is still being discussed. The state government hopes to finalize the takeover soon and ensure that the dairy continues to provide a reliable supply of milk across the city.



A popular dairy brand of India paid a sweet tribute to 'The Elephant Whisperer' bagging an Oscar in the Best Documentary Short Film category at the 95th Academy Awards.

Sharing a cartoon of Producer Guneet Monga and director Kartiki Gonsalves along with an elephant, they captioned it, 'Haathi Mere Saathi'.

Reacting to tribute, Guneet wrote 'BEST'. The tribute sketch shows Guneet and Kartiki holding the Oscar trophy in their hands and the elephant too is seen in a celebratory mood as he stands on its two feet. 'The Elephant Whisperers' won one of the two Oscars for India on Monday, with RRR song 'Naatu Naatu' winning in the Best Original Song category. 'The Elephant Whisperers' was competing against Haul Out, How Do You Measure A Year?, The Martha Mitchell Effect, and Stranger At The Gate.

The plot of the documentary revolves around a family who adopts two orphan baby elephants in Tamil Nadu's Mudumalai Tiger Reserve.

Interestingly, this is not the first time that Guneet Monga has brought the Oscar to India. In 2019, her

documentary 'Period. End of Sentence' bagged the Oscar in the Documentary Short Subject.

How lab-grown milk can potentially revolutionize the dairy industry

We've heard of almond milk and soy milk but now, milk is being produced in labs by using microbes. Several dairy companies have taken an interest toward develop milk proteins made by microbes such as yeast and algae. Dubbed "precision fermentation," this process can transform the dairy industry, and big names like Nestle and Starbucks have already started taking steps to adopt it.

Precision dairy products do not have cholesterol and lactose

Cattle, used for beef or dairy, is said to be the first agricultural source of production of greenhouse gases worldwide. Given the surging concern of climate change, just as how lab-grown meat is considered to be a game-



▲▲▲ **Milk is being produced in labs by using microbes.**

changer in the food industry, lab-grown milk can also emerge as a big disruptor considering precision dairy products do not contain cholesterol, lactose, growth hormones, or antibiotics.

What is precision fermentation?

In precision fermentation, genetically-engineered microbes are used to create specific products. It has been used for decades to produce drugs and food additives and has only recently been employed for producing consumables. The process can be compared to that which has been used in the brewing of beer, making insulin for diabetic patients, or producing rennet for cheese.

There is a tedious separation process involved

Once the microbes produce the proteins after feeding on sugars in fermentation tanks, there is a long process to segregate the milk protein from the medium, wash it, and dry it in a spray dryer so the powder can be used to make food.

Perfect Day developed the world's first animal-free milk protein



Perfect Day, a California-based start-up, developed the world's first, animal-free milk protein that's identical to that of cow's milk. The company also has a 90,000-square-foot production facility in Bengaluru, India. Their ingredients are used in Brave Robot ice cream and Modern Kitchen cream cheese in the US, and California Performance Co. protein powder in the US, Singapore, and Hong Kong.

Starbucks may soon offer cappuccino

made from lab-grown milk

General Mills, which produces brands like Pillsbury, released Bold Cultr cream cheeses using Perfect Day's products. Perfect Day is collaborating with Nestle, Starbucks, and other companies to provide milk protein for their products and with Mars to develop a more eco-friendly chocolate bar. The reason why mainstream food companies hail precision farming is that it can potentially bring down carbon footprint.

Perfect Day is expanding its footprint in India

Perfect Day recently acquired Sterling Biotech Limited for Rs. 638 crores, a move that could double its production capacity in the future. Notably, it has been approved by the FSSAI (Food Safety and Standard Authority of India) for marketing its products in the country. Their teams are currently based in Gujarat, Tamil Nadu, and Karnataka and could grow to other states as well.

FMCG, dairy firms betting on strong double-digit sales growth this summer season

Mother Dairy, one of the leading sellers of milk, dairy beverage products and Ice creams, said it is already "witnessing a surge in demand" with rising temperature and expects the trend to continue in the coming days.

Demand for ice creams and cold beverages like Cola have surged because of the onset of early summer and sales are likely to grow in strong double-digits this season, according to top executives of FMCG and dairy firms.

The summer season will also get a tailwind in the form of an abatement of the pandemic with increased consumer mobility. This will also help the out-of-home (OOH) segment, where the companies expect a sharp rise in sales after a slump of two years.

Companies are ready with new and innovative offerings anticipating strong



▲▲▲ ***Demand for ice creams have surged because of the onset of early summer and sales are likely to grow in strong double-digits this season.***

demand for their products this season and have started building inventory.

Mother Dairy, one of the leading sellers of milk, dairy beverage products and Ice creams, said it is already "witnessing a surge in demand" with rising temperature and expects the trend to continue in the coming days.

"In line with the same, we have already beefed up our value-chain to cater to any surge in demand across channels.

"For a category like ice creams, which is a highly infrastructure-led business, we have ramped up our production, cold-chain infrastructure, refer vehicles and have invested in asset deployment at our consumer touch points to ensure shelf strength," said Mother Dairy Managing Director Manish Bandlish.

In addition, Mother Dairy is also geared up to entice consumption with the launch of about 15 new variants and flavours this season and excite consumers to explore for more, he said.

"We expect our ice cream category to grow by about 25 per cent in the upcoming season," Bandlish added.

The organized branded ice cream market is around Rs 8,000 crore per annum. This year the market is expected to grow by 12 per cent on volume basis and value wise about 22 per cent, as price has increased by 10

per cent, Indian Dairy Association (IDA) President R S Sodhi told PTI.

Expecting a good season, companies have also increased their marketing spends on endorsements, brand campaigns etc targeting the consumers.

Beverage maker PepsiCo said it is "excited" about an early onset of summer and this could signify for the beverage sector in 2023.

The company is "optimistic" that its portfolio of beverage brands will be able to meet consumer demand and to help them beat the heat, said PepsiCo India Senior Vice President, Beverages George Kovoov.

"Most of our high-octane, brand summer campaigns are being launched in February itself, and they feature celebrities with mass appeal to further strengthen the connect with consumers and ensure brand love.

"We look forward to a great summer while remaining committed to providing consumers the right products at the right occasions across the beverage portfolio," said Kovoov.

Similarly, home-grown FMCG major Dabur India said a warmer and longer summer would be good for its summer-centric products, particularly its beverages and glucose portfolio.

"We are already witnessing good demand for these products and have started building inventory for the same, both at the retail and stockist end," said Dabur India Chief Operating Officer Adarsh Sharma.

According to Nuvama Group Executive Director, Institutional Equities Abneesh Roy this year, summer would be positive for summer categories like ice cream, cola, fruit juices, beer, cooling hair oil. He expects "strong double-digit sales growth" in these categories.

Gujarat to host India's biggest dairy industry conference after 27 years

The Indian Dairy Association's (IDA) 49th Dairy Industry Conference and Expo, which will bring together dairy experts and professionals from India and overseas, dairy cooperatives, milk producers, government officials, scientists, policymakers and planners, academicians and other stakeholders, will take place in Gandhinagar from March 16 to 18.

The theme of the 49th Dairy Industry Conference is "India Dairy to the world: Opportunities & Challenges". It is being organised physically after a gap of three years due to the Covid-19 pandemic by IDA in collaboration with its Gujarat State chapter.

The conference will be a platform for dairy industry professionals to come together and discuss the global dairy trends, farm innovations, sustainability within the sector, climate change, nutrition, and health in India with the singular objective of making India a thriving hub of dairy innovations and solutions.

The latest technologies in milk production, storage, processing, and packaging solutions will also be on display during the three-day conference and exhibition. Awards will also be given in various categories to individuals and organisations for their contribution to the growth of the dairy industry.

The inauguration ceremony of the Dairy Industry Conference & Expo will be held at 10:00 am on March 16. Union Minister of Fisheries, Animal Husbandry and Dairying Parshottam Rupala will be the chief guest at the inauguration. Union Minister of state of Fisheries, Animal Husbandry and Dairying Dr Sanjeev Kumar Balyan, NITI Aayog member Prof Ramesh Chand, Gujarat's Co-operation Minister Jagdish Vishwakarma, International Dairy Federation President Piercristiano Brazzale, and IDF Director General Caroline Emond will be the guests of honour at the inauguration. Meenesh Shah, Chairman, National Dairy Development Board (NDDDB) will deliver the keynote address.

Union Home and Cooperation Minister Amit Shah will be the chief guest at the Indian Dairy Summit at 10:30 am on March 18. Chief Minister Bhupendra Patel, Union Minister Parshottam Rupala, State Minister Jagdish Vishwakarma, Animal Husbandry & Dairying Secretary Rajesh Kumar Singh, NDDDB Chairman Meenesh Shah and IDF President Piercristiano Brazzale will be the guests of honour.

"The Dairy Industry Conference is the biggest conference of the \$10 billion Indian dairy industry. From being a milk-deficit nation, India has come a long way to become the largest milk-producing nation in the world. India has the potential to become the dairy to the world. The conference will discuss how India can make the most of the immense opportunities and the challenges it needs to overcome. What makes the conference even more special is that it is taking place in Gujarat after a gap of 27 years," said RS Sodhi, President of Indian Dairy Association, the apex body of the dairy industry in India.

Which PepsiCo, Mother Dairy, Adani items will sell the most in 2023; FMCG firms

confident of stellar sales

FMCG companies in the likes of Adani Wilmar, PepsiCo, Mother Dairy, Bikano, among others, are optimistic about at least 20 per cent growth in 2023, particularly in rural markets, with demand for packaged goods, ready-to-eat segments, and health and wellness products. Besides, health and wellness related products, packaged goods and ready-to-eat segments are expected to bring in most sales. For PepsiCo, its product portfolio of foods and beverages are in high demand and its new flavors and products like Pepsi Black, Quaker Oats Muesli and Lays Gourmet among others, are being sold. "We also continue to witness strong demand from rural India for some time now, for both our foods and beverage products. This is largely due to labour migration, increased digital penetration and enhanced distribution of our portfolio and rural India switching from unbranded loose products to branded ones," said Ahmed ElSheikh, President, PepsiCo India.

For BL Agro, edible oil will drive most growth 'even while there have been wide fluctuations in the oil market in 2022'. Ashish Khandelwal, Managing Director, BL Agro, added, "The consumers have become more conscious now when it comes to eating healthy. They want to consume hygienic, high quality and immunity boosting products even if they have to pay a premium for it."

Manish Bandlish, Managing Director, Mother Dairy Fruit & Vegetable Pvt Ltd, said, "The FMCG market is likely to continue with the same momentum in 2023 as it did in 2022 on account of increased demand for packaged products." NextG Apex's Amarnath Halember also said that the firm is betting on packaged goods and is 'betting on packaging aspects extensively by introducing LUP (Low Unit Packs)'.

For Adani Wilmar, which went public in January 2022, "wheat flour is expected to grow at more than 20 per cent in 2023, besan has grown by more than

30 per cent and will continue to grow, sugar will grow by 20 per cent plus, branded packed food have grown at 25-30 per cent and edible oil is growing at 8-10 per cent", which will continue in the year 2023, said Angshu Mallick, MD & CEO, Adani Wilmar Ltd.

In terms of the most preferred retail channels, e-commerce and modern trade are likely to work well for FMCG companies in urban markets. "E-commerce sales of FMCG players who adopted the omnichannel model jumped 50 per cent during and after COVID-19 pandemic and are likely to grow further," said Azaz Motiwala, Founder at IKON Marketing Consultants.

While the FMCG companies expect steady growth in 2023, it will be driven from the rural areas, which is one-third of the overall FMCG market in India. "The FMCG industry grew by 7-8 per cent in 2022 in terms of sales and is likely to grow at the same pace in 2023 if the growth trajectory remains the same. I expect the Food & Beverages sector may grow around 10-12 per cent whereas the Home and personal care segments are likely to grow 8-9 per cent in 2023," said Azaz Motiwala. BL Agro is expecting to witness an increase of 100 per cent in sales and has also set up a new manufacturing unit to double its production and fulfill the demand. On the price front, the players in the segment believe that the demand is good at the current prices and there will be no price change right now.

Milk prices to remain high till Diwali in October: Mother Dairy MD

Milk prices are likely to stay at elevated levels till Diwali in October this year due to rising cost of cattle feed, raw materials, and supply chain challenges, Mother Dairy's top boss said.

"There is no respite from high milk prices till Diwali this year because of a sharp spike in the feed and raw material cost," Manish Bandlish, MD,

Mother Dairy Fruit and Vegetables, a wholly owned subsidiary of National Dairy Development Board (NDDB), told the Financial Express.

Organised dairy players in Delhi-NCR, including Mother Dairy and Amul, have hiked milk prices multiple times since last year. The price hikes were induced by higher fodder costs, robust demand and some impact due to reports of lumpy skin.

As per industry estimates, out of the estimated 9 million litres of milk which is supplied daily by the organised dairy players in Delhi-NCR, the two companies, Mother Dairy and Amul have a share of around 40 percent each.

Last month, Amul (Gujarat Dairy Co-Operative) announced a hike of up to Rs 3/litre on fresh milk across the country.

This was followed by Mother Dairy which hiked milk prices in the Delhi-NCR region by Rs 2/ litre. This was the fifth round of increases by the firm since last year.

Both companies cited an increase in the overall cost of operation and production of milk and the hike in the price of cattle feed.

Fodder and feed costs have increased by 25 percent in the last year and there was some drop in milk production in a few regions because of the spread of lumpy skin disease among the livestock population, Meenesh C Shah, chairman of NDDB, had earlier stated.

As per the report, feed cost has a share of more than 65 percent in the cost of milk production. The cost of feed to cooperatives and dairies has increased to Rs 20/kg from Rs 8/kg a year ago.

"We have been witnessing a significant increase in demand for milk and milk products from both consumers and institutions, even after festivals. On the other hand, procurement of raw milk has not picked up after Diwali as was anticipated," a Mother Dairy statement said.

Milk inflation in January stood at 8.79 percent and prices have been rising since a 3.81 percent jump in February last year.

As per the all-India Wholesale Price Index, the annual rate of fodder inflation increased to 29.30 percent in January from 28.66 percent in December 2022.

Dairy feed – exploring costs, climate and local sourcing

The Netherlands is a leader in Europe in increasing the use of local crops and food industry by-products in dairy cattle diets. The local dairy industry is making more progress with this every month, and other countries such as Germany are watching closely.

But the situation is complex, explains Dr Wilfried van Straalen, a researcher at Schothorst Feed Research of Wageningen University.

What do dairy cattle currently eat in the Netherlands, and why?

"Cattle feed is mainly by-products from grain or oil seed processing, and a common ingredient is palm expeller meal imported from Indonesia and Malaysia," says Van Straalen. "From 5-25% of the concentrate feed can be palm expeller meal, because it's high in protein, the price is reasonable, and it's well evaluated as energy source within the Dutch feed industry."

However, using less of this feed source is generally considered desirable in Holland from a local use/transportation perspective and also with regard to concerns over burning rainforest to grow palm. In fact, this feed ingredient is not being used some other European countries like Scandinavia anymore, notes Van Straalen. This is due to environmental concerns, but perhaps also because of its high shipping costs and good availability of local crops such as barley and oats.

"Also, in the Netherlands, we feed dairy cows meadow grass, corn silage and grass silage, and also wet by-products like beet pulp, brewer's grains and potato byproducts," says Van Straalen. "These products fit well in ruminant diets. Brewer's grains contain high fibre

and bypass protein. Potato processing by-products have a relatively high percentage of by-pass starch. Beet pulp used to be dried and pelleted, but due to the costs, it's now being kept wet and ensiled. It has a high digestible fibre content, which is very good for dairy cattle."

Dutch dairy cows also receive corn gluten feed, wheat gluten feed, wheat middlings and corn DDGS from within the country or from across Europe. These materials also have high protein and fibre levels. Citrus pulp is also part of the usual diet but is currently less available. Wheat, barley and sunflower meal are also used.

More of these local feed sources are expected to be added to the dairy cattle diet in Holland, says Van Straalen, from more regions and more industries. "The dairy industry wants this," he says, "as does the consumer and government."

Legislative push

The push for more local feed is cost-driven but also due to increasing environmental concerns and legislation. Everywhere in the EU, farmers are under increasing restrictions in terms of greenhouse gas emissions (nitrous oxide, CO₂, methane, ammonia) – and in Holland, as anyone in agriculture is aware, the focus on nitrogen restrictions is very strong.

That is why there is a development towards maximum crude protein in diets, explains Van Straalen, which reduces nitrogen waste. "This will mean a focus on good quality protein sources," he says, "but also a much closer look at amino acid levels in diets to better match cattle needs. This will be more important in ruminant feeds in the future."

There also must be more research, he stresses, into how to use by-pass amino acids and protein in the diet. That is, there are different ways to protect amino acids from ruminal degradation, to ensure they stay intact until they are absorbed in the small intestine, such as changing the chemical structure or using a protective coating.

The good news is that amino acid products have improved significantly,

according to Van Straalen, in terms of possessing good by-pass protection but also digestibility in the intestine.

Good by-pass value has been achieved with rapeseed meal and soybean meal in the past by treating it with formaldehyde, but this treatment has been banned in other EU countries and will be abolished in the Netherlands this year. There will therefore be a rapid switch in the coming months in the Netherlands to other treatments, untreated meals or other sources of by-pass protein.

While lupins and peas have protein with good by-pass value, they must be toasted to achieve this. That's not an industry practice yet, says Van Straalen, but research into this at Schothorst Feed Research and at other institutes and companies continues.

One dairy feed component Van Straalen does not expect to change in Europe

over the years to come is soybean meal, hopefully certified against rainforest destruction. That's due to its relatively high protein quality.

Van Straalen points out that the Dutch Dairy Association (NZO) has made a general commitment that 65% of protein in the national ration will come from local sources (this includes grass) in the future. This is part of a broader food certification scheme called 'On the way to PlanetProof'.

With regard to milk production, PlanetProof notes "by having a minimum of 50% of the feed produced in-house, [farms] are encouraged to further close the cycle...by using self-produced raw materials, such as manure and cattle feed, and purchasing raw materials efficiently and limited, the dairy farmer can close the cycle."

In Van Straalen's view, the biggest challenge with increasing the amount

of local feed use among Dutch dairy farmers lies in the lack of knowledge of government officials.

"The government here, in order to reduce ammonia, has made a request for voluntary stops to milk production and plans to force buyouts of farms in 2024 if needed, but there are other solutions," he says.

"We have a lot of research on how to reduce protein, but there is more to be done to determine how low you can go without affecting cow performance. And if we use more grass, if grass is the main forage source and if farmers don't fertilise the fields, the nitrogen/protein content of the grass, and consequently ammonia emissions from cow waste, will be lower. This means we may have to accept lower production of milk to reduce ammonia. We need more discussion of these and other ideas."

Nearly a fifth of heifers fail to reach second lactation



Heifers feed more slowly, ruminate less, are lower in the pecking order, and can be easily chased away from feed space or lying areas, so need time to adjust. In-calf heifers also require extra care since the soft tissues of the sole inside the hoof is thinnest in younger animals, and around calving, increasing her risk of sole bruising.

Researchers at Reading University have found that 17% of milking heifers exit the herd before their second lactation due to a variety of reasons, which vary from farm to farm.

They found that decisions made around fertility, feed, health, housing and grouping had significant impacts on their longevity with the herd.

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The Agriculture and Horticulture Development Board (AHDB) argues that minimising issues caused by stress and disease gives heifers the best opportunity to calve down for a second time. As well as reducing costs – rearing heifers is the second-largest annual expense after feed – it will not only improve herd longevity but also boost the farm's carbon footprint and enhance consumer perception of dairy farming.

Top tips for transitioning heifers into the calving herd include:

- Train heifers to the parlour
- Make sure the calving pen is in a quiet place
- Give them pain relief after calving
- Monitor for clinical and sub-clinical milk fever, ketosis and displaced abomasum 21-30 days post-calving

- Maintain dry matter intake during transition
- Monitor body condition score and rumen fill
- Allow sufficient feed space and push up feed at least 4-6 times per day
- Allow adequate lying space of at least one cubicle per heifer/per 10 square metres in a loose yard
- Minimise group changes to reduce soil stress
- Make sure your heifers are not lame.

The AHDB is holding meetings around the country for farmers to enable them to learn how to increase a heifer's chances of calving down for a second time. The first meetings are in Preston, Lancashire and Denbighshire, Wales, on 21 March and run through until 31 March.

At the events, farmers will learn more about the economic benefits of achieving optimal performance of their milking heifers, the latest on the effects of social stress and monitoring the various transitions and the benefits of anti-inflammatories at calving. Case studies from several commercial farms will be available.

Fat nutrition in dairy diets – what are the latest findings?

Fat is a key macro-nutrient in animal nutrition and our understanding of the importance of fat in dairy cow rations has increased substantially over recent years, particularly in relation to the effects of individual fatty acids (the building blocks of fat).

The year that just passed saw a further tranche of fatty acid research data presented at scientific conferences such as the American Dairy Science Association and the International Symposium on Energy and Protein Metabolism and Nutrition, as well as published in scientific journals.

Considerable research effort has been directed toward the evaluation of the effects of palmitic (C16:0) and oleic

(C18:1) fatty acids on production attributes of dairy cows, parameters influencing digestibility of dietary fat and specific fat supplements, and the influence of fatty acids provided in the diet on milk processing parameters. It is clear that the focus of research has developed to not only include productivity effects at farm level, but also on the effect of the output from the dairy farm on the end uses of the milk produced. Individual highlights of some key research papers are summarised below.

The use of what are commonly referred to as 'high-C16' supplements (typically 80-90% C16:0) is common in the global dairy industry and our understanding of these rumen-inert products continues to increase with ongoing research.

- The effects of 'high-C16' supplements offered at 2% of diet dry matter (DM) and x2 or x3 milking per day were evaluated with early lactation dairy cows in a study by Laval University in Canada. Supplementing with C16:0 increased milk yield from 46.2 to 48.0 kg/d, and milk fat from 3.77 to 4.03%, with no effect on milk protein concentration (3.21%). Milking x3/d increased milk yield by 3 kg/d, though decreased milk fat by 0.12% without affecting milk protein concentration (3.21%). However, yields of both milk fat and protein were increased with the additional milking frequency. These data provide further support for the performance benefits of 'high-C16' supplements assessed in terms of milk and milk fat production.
- In other work, Michigan State University (USA) evaluated the effects of offering a 'high-C16' supplement to heifers from calving to 23 days in milk, reporting significant increases in milk fat in week 2 (+0.36%) and week 3 (+0.37%), but no effects recorded on DM intake or milk yield across the trial period. These are amongst the first data where the effects of 'high-C16' supplements have been evaluated in first parity animals and demonstrate that milk fat benefits can be achieved regardless of parity.

- Using in vitro studies, researchers from the University of Florida and the University of Utah reported that unsaturated fatty acids (non-rumen-protected) reduced fibre digestibility, acetate and total volatile fatty acid (VFA) concentrations. These data concur with established effects of non-rumen-protected fatty acids on fibre digestibility and support the use of rumen-protected fat supplements to increase fat supply without the negative effects on rumen function. Furthermore, the addition of C16 fatty acids increased both fibre digestibility and total VFA concentration, indicating beneficial effects on rumen fermentation by supplementation of this product type.

The effect of oleic acid on increasing the partitioning of nutrients toward body fat has been established only very recently.

- In a study at Michigan State University, researchers established supporting data demonstrating that the increased partitioning of energy to body fat due to increasing oleic acid supply is partly mediated through elevated plasma insulin. In a further study, data were presented indicating that oleic acid can reduce the mobilisation of body fat stores and stimulate lipogenesis. These results provide additional support for the benefits of supplementation with higher-oleic acid supplements in the early lactation period to minimise body fat loss and the associated negative effects on health and productivity.
- Further US data noted that oleic acid supplied in rumen-protected calcium salt form improved DM, fibre and total diet fat digestibility compared to oleic acid delivered to the rumen in a non-rumen-protected form. These results support the use of rumen-protected calcium salt supplements in the early lactation period to deliver essential oleic acid to the small intestine, avoiding the negative effects of unprotected oils in the rumen on fibre digestibility and feed efficiency. Calcium salt supplements

remain the most-effective method of delivering oleic acid through the rumen to the small intestine for digestion and subsequent use in biological processes.

The effect of fat supplementation on the properties of milk fat for the manufacture of dairy products has received considerable attention recently. Data were reported on the effects of milk fat on frothing qualities and factors affecting free fatty acid concentration of milk (which influences stability and quality). Effects of fat supplement type on the hardness of subsequent manufactured dairy products continued to receive primary focus.

- Studies on butter hardness as affected by fatty acid supplements were reported by researchers from the Ohio State University (USA). Supplementation of a 'high-C16' formulation increased hardness of butter, whereas the inclusion of a rumen-protected calcium salt product (containing lower-melting point oleic acid) reduced butter hardness.
- In a further study by the same group, increasing levels of a 'high-C16' supplement at intervals from 0 to 2% of diet DM resulted in linear increases in butter hardness.

These data indicate that type of fat supplement included in dairy rations should be considered to help ensure that the most appropriate functional and physical properties of milk fat are achieved as required by a particular milk processor for the manufacture of specific dairy products.

Energy supply and associated non-caloric benefits from fat supplementation of diets are only achievable if the nutrient is digested. With its very high energy density, even small improvements in digestibility may elicit marked increases in efficiency of use in diets and have driven the interest in the investigation of factors which may improve this parameter.

- Michigan State University evaluated data from published studies and reported that increased inclusions of whole cottonseed in the diet reduced digestibility of neutral

detergent fibre (NDF) and increased total diet fat digestibility. However, while no effect was observed on milk yield, yields (kg/d) of both milk fat and milk protein were increased with increasing cottonseed.

- In a further study at Penn State University (USA), increasing the concentration of whole cottonseed in the ration at intervals from 0 to 9.9% increased loss of intact seeds in the faeces, though losses as a proportion of intake were similar, averaging 2.3% of seeds consumed escaping digestion and appearing in the faeces.
- Several US studies evaluated the potential of a range of emulsifying compounds to improve fat digestibility. No significant effects of lecithin, lysophospholipids or soya phospholipids were reported across the studies, but beneficial effects of polysorbate-C18:1 were identified. Increasing fat digestibility is key to improving feed efficiency and energy supply, though data from these studies highlight the challenge of finding biological substances that can positively affect digestibility and be useful in practice.
- Fatty acid profile of fat supplements is a key determinant of the production effects when included in dairy diets. Penn State University reported no benefits to milk or milk fat yield by inclusion of a high (55%) stearic acid (C18:0) (with 36% C16:0) fat supplement at 0, 1, 2 or 3% of diet DM, though milk fat % increased up to the 2% inclusion rate. These findings agree with the well-established poor digestibility of C18:0 fatty acids when supplied in fat supplements, which can reduce energy available for production relative to fat supplements based on other more digestible fatty acid profiles.

The extensive number of research papers on fatty acid nutrition in dairy cows published through 2022 is a strong indicator of the knowledge still to be gained on this key nutrient. It is important we continue to monitor and act on new data to ensure we continue

to provide the most appropriate fatty acid formulations and advice to farmer customers.

Red seaweed replication to cut dairy methane

Australian startup Rumin8 is working on a dietary supplement synthetically replicated from red seaweed, which stops the creation of methane.

Rumin8 says it identifies naturally occurring compounds that have anti-methanogenic properties and reproduces them in a highly efficient, low-cost, scalable, and high-quality process to feed to livestock to reduce their emissions.

The startup, based in Perth, has the backing of investors such as Bill Gates. Rumin8 recently closed Phase 2 of its seed funding round, raising US\$12 million, led by Bill Gates-founded Breakthrough Energy Ventures (BEV) with participation from Andrew and Nicola Forrest's agri-food business Harvest Road Group.

The funding will be used to accelerate Rumin8's road to commercialisation. Rumin8 is the first Australian-based BEV portfolio company. Phase 2 seed round of funding of US\$12 million is to be spent on commercial trials in Australia, New Zealand, Brazil and the USA, product brand development, and pilot manufacturing plant development as Rumin8 moves towards commercialisation of its methane busting feed additives.

Rumin8 managing director, David Messina, emphasises that Rumin8's laboratory results continue to yield excellent results. "Our animal trials are reflecting the laboratory results, and the financial modelling we are undertaking is indicating we will be able to supply our products at a commercial price point. Prior to the Phase 2 seed funding round, we were progressing a number of key work streams sequentially. Now we have the resources to progress them in parallel, speeding up the road to commercialisation."



January 2023

1. Dairy Forum 2023 (IDFA)

Dates: January 22 - 25, 2023

City: Orlando

Country: Florida

Website: www.idfa.org/events

2. DairyTech

Dates: January 25 - 27, 2023

Venue: Crocus Expo International

City: Moscow

Country: Russia

Website: www.dairytech-expo.ru

3. IDEX 2023

Dates: January 28 - 29, 2023

Venue: Expo Center

City: Lahore

Country: Pakistan

Website: www.internationaldairyexpo.com

February 2023

1. Agroexpo

Dates: February 1 - 5, 2023

City: Izmir

Country: Turkey

Website: en.agroexpo.com.tr

2. Dairy and Poultry Expo

Dates: February 2 - 4, 2023

Venue: International Convention
City Bashundhara

City: Dhaka

Country: Bangladesh

Website: www.limraexpo.com

3. GulFood

Dates: February 20 - 24, 2023

Venue: Dubai World Trade Centre

Country: Dubai

Website: www.gulfood.com

April 2023

1. Canadian Dairy EXPO 2023

Animal husbandry

Dates: April 5-6, 2023

Venue: Stratford, Canada

City: Stratford

Website: <https://ifw-expo.de/en/exhib/canadian-dairy-xpo>

June 2023

**1. DLP EXPO Africa Dairy
LiveStock and Poultry Expo**

Dates: June 15-17, 2023

Venue: KICC, Nairobi, Kenya East Africa

City: Nairobi

Website: www.dlpexpo.com

August 2023

**1. The Dairy Expo
@ The Livestock Expo**

Dates: August 3-5, 2023

Venue: India Expo Center & Mart

City: Greater Noida - Delhi

Country: India

Email: info@thedairyexpo.in

Website: www.thedairyexpo.in

October 2023

1. World Dairy Expo

Dates: October 1 - 6, 2023

Venue: Madison

City: Wisconsin

Country: USA

Website: www.worlddairyexpo.com

Editorial Calendar 2023

Publishing Month: January Article Deadline : 30th, Dec. 2022 Advertising Deadline : 3rd, Jan. 2023 Focus : Climate Management	Publishing Month: February Article Deadline : 30th, Jan. 2023 Advertising Deadline : 3rd, Feb. 2023 Focus : Nutritional Deficiency Effects	Publishing Month: March Article Deadline : 28th, Feb. 2023 Advertising Deadline : 3rd, March 2023 Focus : Herd / Breed Management - Fertility, Breeding & Reproduction	Publishing Month: April Article Deadline : 30th, March 2023 Advertising Deadline : 3rd, April 2023 Focus : Disease Prevention/ Risk Assessment
Publishing Month: May Article Deadline : 30th, April 2023 Advertising Deadline : 3rd, May 2023 Focus : Small Ruminants Management (Sheep, Goat etc)	Publishing Month: June Article Deadline : 30th, May 2023 Advertising Deadline : 3rd, June 2023 Focus : Calf & Heifer Management	Publishing Month: July Article Deadline : 30th, June 2023 Advertising Deadline : 3rd, July 2023 Focus : Milk Production Management/ Milking Practices	Publishing Month: August Article Deadline : 30th, July 2023 Advertising Deadline : 3rd, August 2023 Focus : Feed & Fodder
Publishing Month: September Article Deadline : 30th, August 2023 Advertising Deadline : 3rd, September 2023 Focus : Vaccination Protocols/ Cattle Herd Immunization	Publishing Month: October Article Deadline : 30th, September 2023 Advertising Deadline : 3rd, October 2023 Focus : Dairy By-products	Publishing Month: November Article Deadline : 30th, October 2023 Advertising Deadline : 3rd, November 2023 Focus : Potential of Dairy Farming	Publishing Month: December Article Deadline : 30th, November 2023 Advertising Deadline : 3rd, December 2023 Focus : Calf Management

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