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Original article**The Milk Economy: Why Your Glass of Milk Might Be Costing More Than You Think****Sayantan De¹, Ayush Dewangan¹, Arti thakur², Bitan Mondol² Subrata Gorain² and Bidhan Chandra Roy³**¹M.Sc. research scholar, ²Assistant Professor and ³Professor & Head

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Introduction: the Everyday Staple We Take for Granted

Milk has been a cornerstone of India's agricultural economy for decades. For millions of Indians, milk is an essential part of their daily diet, used in everything from morning tea to sweets, and it holds cultural significance in many rituals and celebrations. The dairy sector contributes over 4% of India's GDP and is a livelihood for 80 million dairy farmers, most of whom operate on a small scale (National Dairy Development Board, 2023). Despite its importance, milk production is facing growing challenges. As India's dairy industry continues to expand, there are increasing concerns about the economic sustainability of milk farming and its ripple effects on the broader economy.

The dairy industry's complexities are often hidden behind the simplicity of a glass of milk, but behind that simple product are multiple layers involving farming practices, middlemen, market dynamics, and government policies. As prices fluctuate, consumers often wonder why milk prices are rising even when milk production appears to be sufficient. For farmers, the costs of production have been steadily climbing, yet they don't always see a corresponding increase in the price they receive for their milk. This article delves into the economic factors that influence milk prices, the challenges faced by farmers, and the role that innovation and government policies play in shaping the future of India's dairy industry.

The Dairy Supply Chain: From Farm to Your Fridge

The journey of milk from farm to consumer is a complex process that involves multiple steps and players. In India, the majority of dairy farms are small-scale operations, often run by rural families. These farmers primarily rely on traditional methods of milking, often without the benefit of advanced technology or infrastructure (Indian Dairy Association, 2024). Once the milk is produced, it must be transported to processing plants where it is cleaned, standardized, and packaged before being sent to retail outlets.

The cooperative model, introduced by the White Revolution in the 1970s, has played a pivotal role in organizing dairy farmers and improving milk distribution. Organizations like Amul and Mother Dairy have helped streamline the supply chain, ensuring that farmers get a fair price for their milk while providing consumers with a steady supply (Sampath, 2021). However, despite these improvements, challenges persist. Small farmers often lack direct access to processing facilities and must rely on local middlemen to sell their milk, which can lead to price discrepancies and unfair profit distribution.

The supply chain also involves several intermediaries, such as wholesalers, transporters, and retailers, each of whom adds a markup to the price. By the time milk reaches consumers, its price has increased significantly from what the farmer receives. A study by the National Dairy Development Board (2023) found that farmers typically receive only 50-60% of the retail price of milk, while the remaining portion is absorbed by middlemen and processing costs.

This complex supply chain structure raises important questions about efficiency, fairness, and sustainability in India's dairy economy. As demand for milk continues to rise in urban areas, addressing these supply chain challenges will be crucial for ensuring that dairy farming remains economically viable for small farmers while keeping prices affordable for consumers.

Rising Costs: The Challenges Faced by Farmers

Dairy farming, while a cornerstone of India's agricultural landscape, is becoming increasingly difficult for many small-scale farmers due to rising production costs. The primary factor contributing to these rising costs is the price of fodder, which is the main feed for dairy animals. As urbanization expands, agricultural land is increasingly being used for non-farming purposes, reducing the availability of fodder and driving up prices. A report by the Indian Council of Agricultural Research (ICAR) (2023) noted that the cost of fodder has increased by over 20% in the last five years, putting immense pressure on farmers.

Additionally, dairy farmers often face challenges with animal healthcare. The cost of veterinary services, medicines, and vaccinations continues to rise, further inflating production costs. In some rural areas, access to quality veterinary care is limited, which can lead to diseases affecting milk production, resulting in both lost revenue and additional costs for treatment. According to a study by the National Dairy Research Institute (NDRI) (2022), the average cost of maintaining a dairy cow has increased by 15-20% annually over the past decade.

Labour costs are another significant factor. While many dairy farms rely on family labour, the younger generation is increasingly moving away from rural areas in search of better opportunities in cities, leading to a shortage of available labour. This shortage often forces farmers to hire workers at higher wages, further raising their operational costs.

As a result of these rising costs, many dairy farmers find themselves in a tight spot. They struggle to keep up with inflation while not receiving a fair share of the retail price, ultimately making it difficult to sustain their livelihoods. Despite these challenges, the dairy sector remains a key source of income for millions, and addressing these cost-related issues is essential for ensuring the long-term viability of the industry.

How Milk Prices Are Set: The Role of Middlemen

Milk prices in India are influenced by a combination of factors, including production costs, market demand, and the role of intermediaries, or middlemen, who act as the link between farmers and consumers. While dairy cooperatives and large processing companies, such as Amul and Mother Dairy, play an important role in regulating prices, many small farmers still rely on local middlemen to sell their milk. These intermediaries purchase milk directly from farmers and sell it to processing plants or retail outlets at a marked-up price.

The presence of middlemen in the supply chain adds layers of cost that contribute to higher retail prices. According to the Indian Dairy Association (2024), middlemen can absorb as much as 30% of the final retail price, leaving the farmer with a significantly smaller portion of the profit. In many cases, farmers are paid far less than what consumers ultimately pay for milk in urban markets, despite facing rising production costs themselves.

The role of middlemen also introduces issues related to market transparency. Farmers often have little bargaining power when selling their milk, and many are at the mercy of fluctuating prices dictated by intermediaries, who may offer low prices in times of oversupply and push prices higher during shortages. The absence of direct market access or organized cooperatives in some regions exacerbates this problem.

While cooperatives like Amul have worked to address these issues by reducing the dependency on middlemen and offering farmers a more reliable income, the system still exists in many parts of India, particularly in smaller rural areas. The challenge lies in finding a balance between the efficiency of middlemen and the need for fairer prices for farmers.

Consumer Perspective: What Influences the Price You Pay?

The price consumers pay for milk is influenced by a range of factors, many of which are far removed from the farm gate. Urbanization, changes in consumer preferences, and fluctuations in supply all contribute to the rising costs of milk. For consumers, milk is often a basic necessity, and any price increases can significantly affect household budgets, particularly for lower-income families.

One of the most visible factors driving up the cost of milk is transportation. As more consumers in urban areas demand higher-quality milk and processed dairy products, dairy producers must transport milk over long distances, often requiring refrigerated trucks. This adds additional costs to the final price, especially as fuel prices rise. A study by the National Dairy Development Board (2023) showed that transportation costs for dairy products have risen by 15-20% in the past five years, contributing significantly to the final retail price.

Another major factor is demand. As the Indian population grows and urbanizes, the demand for milk and dairy products continues to increase, putting pressure on supply chains. While India remains the world's largest milk producer, demand growth often outpaces supply, leading to price hikes. Additionally, seasonality plays a role, with milk prices typically rising during the lean months when milk production is lower due to adverse weather conditions or feed shortages.

For urban consumers, the increasing price of milk may be seen as a reflection of broader economic challenges. However, for rural consumers, who may also be involved in dairy farming, these rising

prices present a more complex challenge—while they benefit from selling milk at higher prices, they also face increased costs for purchasing milk from the market, especially in areas where they are not producing enough milk themselves.

In this context, milk prices are a reflection of supply-demand dynamics, production costs, and market forces, which can sometimes be difficult for consumers to understand, leading to questions about the fairness of pricing mechanisms in the dairy industry.

Government Support and Policies: What's Being Done?

The Indian government plays a critical role in the dairy industry, particularly in terms of supporting dairy farmers and stabilizing milk prices. Various policies and programs have been implemented over the years to ensure that dairy farming remains sustainable and that farmers receive a fair price for their milk.

One of the key initiatives is the Minimum Support Price (MSP) for milk, which aims to guarantee a baseline price that ensures farmers are not forced to sell milk at a loss during periods of low demand. However, the effectiveness of MSP has been questioned. While it helps stabilize prices during times of crisis, the MSP for milk is often not sufficient to cover the rising costs of production, such as fodder and healthcare. A report by the Indian Ministry of Agriculture (2023) noted that only 30% of milk producers benefit directly from MSP, with the rest relying on local markets where prices can be volatile.

Additionally, the National Dairy Development Board (NDDB) runs several initiatives to support dairy farmers. Programs aimed at improving dairy productivity, enhancing animal health, and promoting cooperative models have had a positive impact on the industry. The Operation Flood Program, which was a part of the White Revolution, transformed India into the world's largest milk producer by establishing a robust dairy cooperative network (Sampath, 2021). Through cooperatives like Amul, farmers are given better access to markets and more control over the prices they receive.

The government has also focused on dairy infrastructure development, including the creation of processing units and cold storage facilities, to reduce waste and ensure a more reliable milk supply, particularly in rural areas. However, challenges such as inadequate access to credit and the lack of modern technology in many regions still persist, limiting the effectiveness of these policies in reaching all farmers.

Despite these efforts, much work remains to be done to ensure that dairy farming remains economically viable for small-scale farmers. Policymakers must continue to address the concerns of dairy producers while keeping consumer prices stable.

Innovation and Technology: Shaping the Future of Dairy

As India's dairy industry faces mounting challenges, technological innovations are emerging as a key driver for change and growth. From precision farming techniques to automated milking systems, advancements in technology are helping dairy farmers increase productivity, improve animal welfare, and reduce operational costs.

One of the most significant innovations in the dairy sector has been the adoption of smart farming technologies. These include Internet of Things (IoT) devices that monitor the health and productivity

of cows in real-time. By collecting data on factors such as milk yield, feed intake, and body temperature, these systems allow farmers to make data-driven decisions that optimize production. A study by NDRI (2022) found that farms utilizing smart technologies saw an average increase in milk production of 12-15% and a 20% reduction in feed costs.

Additionally, automated milking systems are becoming increasingly popular in large-scale dairy farms. These systems allow cows to be milked with minimal human intervention, improving efficiency and reducing labour costs. According to the Indian Dairy Association (2024), farms that have integrated automated milking machines have reported improved milk quality and reduced incidences of mastitis, a common infection in dairy cows.

Sustainability is also a key focus in the adoption of new technologies. For example, biogas plants that convert animal waste into energy are being installed on dairy farms to reduce reliance on external energy sources while simultaneously addressing waste management issues. These renewable energy solutions not only lower costs but also contribute to environmental sustainability, which is increasingly important in today's agricultural landscape.

Despite the promise of these innovations, there are still significant barriers to widespread adoption. The high capital costs of advanced technologies can be prohibitive, especially for small-scale farmers who lack access to affordable financing. Furthermore, there is a need for greater training and awareness to help farmers understand and implement these technologies effectively.

In the coming years, innovation will play a crucial role in transforming the dairy industry, improving efficiency, sustainability, and the livelihoods of farmers. However, widespread adoption will require continued investment, policy support, and collaboration between the public and private sectors.

Conclusion: A Sustainable Future for India's Dairy Industry

The dairy sector in India holds immense potential, but it faces a multitude of challenges, from rising production costs to price volatility, which affects both farmers and consumers. Despite these obstacles, India's dairy industry remains an essential part of the economy, providing livelihoods for millions of farmers and essential nutrients to the population.

To ensure the future sustainability of dairy farming in India, several measures must be taken. First, there is a need to enhance the economic viability of small-scale farmers by improving access to financial services, technology, and market information. Government policies must continue to support the dairy sector, particularly through direct interventions such as subsidies on feed and improved veterinary care, which will help lower the cost of production. Furthermore, infrastructure improvements, such as better cold storage facilities and more efficient transportation networks, will be essential for reducing wastage and improving milk supply chains.

At the same time, the role of innovation and technology cannot be overstated. The adoption of smart farming techniques, automated milking systems, and sustainable energy solutions can help increase milk production, reduce costs, and improve environmental sustainability. However, for these innovations to benefit all farmers, especially small-scale producers, policies should focus on providing affordable financing and training programs that make these technologies accessible to all.

Ultimately, the dairy industry's success lies in a balance between fair pricing for both producers and consumers, support from the government, and the continuous embrace of technology. With the right policies and innovations, India's dairy sector can remain not only a key pillar of its economy but also a model for sustainable agricultural practices.

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