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Dairy Farming in India: An Overview

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ABSTRACT: Dairy farming is a crucial pillar of India's agricultural economy, contributing approximately 4.5percentage to the national GDP and employing over 8 crore farmers, the majority of whom are women. As the world's largest milk producer, India has seen remarkable growth in dairy production, driven by technological advancements, cooperative movements like AMUL, and government initiatives. The study examines the economic significance of dairy farming in India, analyzing its contributions to rural livelihoods, employment, food security, and national income. The Compound Annual Growth Rate (CAGR) of milk production highlights key transformations in the sector, from the modest growth of 1.64percentage (1951-61) to a peak of 5.60percentage (2011-21), with fluctuations influenced by policy changes, economic liberalization, and the impact of the COVID-19 pandemic. Despite challenges such as low productivity, climate change, and supply chain inefficiencies, the sector continues to expand through breed improvement, cold chain logistics, and increasing global demand for dairy products. With India's per capita milk availability surpassing global averages, dairy farming remains a key driver of inclusive economic growth and rural development. The study underscores the need for sustainable dairy farming practices, policy support, and investment in modern technology to enhance productivity and global competitiveness.

KEYWORDS: Dairy farming, Economic contribution, rural livelihoods, Employment generation, Milk production, Compound Annual Growth rate (CAGR) Food security

INTRODUCTION: Dairy farming is an essential pillar of India's agricultural sector, deeply integrated into the socio-economic fabric of the country. India has a rich history of dairy production, with traditional practices evolving into a modern, organized industry. The sector not only ensures food security but also acts as a major source of income for millions of small and marginal farmers. Milk and its by-products constitute an indispensable part of the Indian diet, further emphasizing the sector's importance. The Indian dairy industry is the largest in the world, contributing approximately 4.5percent to the national GDP. With an increasing demand for dairy products, the industry continues to expand, providing employment opportunities, supporting allied industries, and enhancing rural development. Dairy cooperatives such as AMUL have played a transformative role in empowering farmers by ensuring fair prices and facilitating access to markets. Despite its remarkable growth, the sector faces challenges such as low productivity, supply chain inefficiencies, and climate change impacts. This paper aims to analyze the economic significance of dairy farming in India, highlighting its contributions, challenges, and future prospects.

OBJECTIVES: The present study is amide with following objectives

- To assess the Dairy Farming in India.
- To evaluate the Economic Contribution of Dairy Farming in India.
- To analyze the Present status of Dairy Farming in India.

METHODOLOGY: This study is based on secondary data only data will collected From Various sources like 21st Livestock Censes, Department of Animal Husbandry Statics. And FAOSTAT published by the Food and Agricultural Organization (FAO) of the United Nations. It uses descriptive statistics obtained from secondary sources as well as own calculations for the empirical analysis. It calculates the growth rate using the following formula $r = \left(\frac{Ending\ Value}{Beginning\ Vale}\right)^{\frac{1}{t}} - 1$ where r is the CAGR, $Ending\ Value$ is the quantity of milk production at the end of time period, $Beginning\ Value$ is the quantity of milk production at the beginning of time period and t denotes the number of years.

DISCUSSION AND ANALYSIS'S: This paper is focused on year wise compound annual growth rate of milk production in India (for the year from 1951 to 2024) and for the world (1961 to 2023). The time period covered in this analysis is subject to the data

available from secondary sources. The CAGR values for India are directly taken from the Government of India sources whereas the CAGR for the world were calculated by the authors using Microsoft Excel. This paper analyzes economic contribution of dairy farming in India and including of present status of dairy farming in India.

REVIEW OF LITERATUREG

M. Ganesan(2013) The study evaluated the economic contribution of dairy farming in India, highlighting that milk, valued at ₹6.5 lakh crore, surpasses the combined worth of paddy and wheat. Dairy farming provides a stable year-round income, with 60-65percent of small farmers' earnings now coming from it. Over time, it has evolved into a full-fledged industry, driving significant socio-economic changes. Livestock plays a crucial role in rural economies, with many unorganized players shifting to the organized sector, increasing competition and employment opportunities. The study suggests adopting new technologies, improving processing and packaging, and implementing supportive government policies to accelerate growth in the dairy sector

Santosh Kumar and Priyanka Kumari (2021) The study highlights the crucial role of dairy farming in supporting weaker rural segments, including small landholders, laborers, and women. For many, it serves as the primary livelihood, providing a steady year-round income, unlike seasonal crops or irregular labor wages. Over time, dairying has evolved into a full-fledged industry, significantly improving livelihoods. The sector benefits 150 million farm households by offering nutritious food, supplementary income, and employment, especially for women. With crossbred cattle and high-yielding buffaloes, dairy farming has become a profitable venture. To remain competitive globally, the industry must focus on increasing milk yield, reducing production costs, and improving quality through advanced processing and packaging.

Satish Belhekar and Soumyakant Dash (2016) The study critically reviewed the role of the dairy industry in India's rural development. Dairying has been a boon for small landholders, landless laborers, and women, providing a stable year-round income and driving socio-economic progress. It has evolved into a full-fledged industry, significantly improving livelihoods. The study suggests improving rural infrastructure, such as village roads, libraries, educational institutions, health centers, and communication facilities. Additionally, cooperative dairying has played a crucial role in enhancing rural living standards, including contributions to drinking water supply systems

Significance of the Study: Dairy farming plays a vital role in the Indian economy, contributing significantly to rural livelihoods, food security, and national GDP. This study on the economic contribution of dairy farming in India is significant for several reasons the dairy sector provides direct and indirect employment to millions, particularly in rural areas. Small-scale farmers, landless laborers, and women are major beneficiaries, making it an essential driver of inclusive growth. India is the largest producer of milk globally, and the dairy industry contributes around 4.5percentage to the national GDP. It also accounts for over one-fourth of the agricultural GDP, making it a key pillar of India's agrarian economy. Dairy farming provides a stable source of income to small and marginal farmers, reducing income disparities and helping in poverty reduction. It also promotes cooperative models, such as AMUL, which empower rural communities. Dairy products are a crucial source of protein, calcium, and essential nutrients; helping to address malnutrition and improve public health outcomes in India. The Indian dairy industry has significant export potential, with increasing global demand for milk and dairy products. Strengthening dairy farming can enhance India's position in international markets and boost foreign exchange earnings .Understanding the economic impact of dairy farming can encourage investment in modern technologies such as breed improvement, automated milking, and cold chain logistics, leading to higher productivity and efficiency. This study provides insights that can help policymakers design better support mechanisms.

STATUS OF DAIRY FARMING

In India, dairy farming is still conducted by small and marginal farmers whereas in advanced economies in the West dairy farming is done on a commercial scale. Data from the Government of India shows Dairy is the single largest agricultural commodity contributing 5 per cent of the national economy and employing more than 8 crore farmers directly. India is ranked 1st in milk production contributing 23 percent of global milk production. Milk production has increased by 51.05% over the past 8 years from 146.3 million tonnes during 2014-15 to 221.06 million tonnes during 2021-22. Milk production is growing at the annual growth rate of 6.4% over the past 8 years whereas world milk production is growing at 1.2% per annum. The per capita availability of milk is 444 gram per day in 2021-22 as against the world average of 394 grams per day during 2021.

Table: 1 Compound Annual growth Rate of Total Milk Production in India.

Years	Total Milk Production Growth rate (percent)
1950-51 to 1960-61	1.64
1960-61 to 1973-74	1.15
1973-74 to 1980-81	4.51
1980-81 to 1990-91	5.48

1990-91 to 2000-01	4.11
2000-01 to 2010-11	4.22
2010-11to 2020-21	5.60
2020-21 to 2023-24	4.46

Data source: Basic Animal Husbandry Statistics 2024, Ministry of Fisheries, Animal Husbandry and Dairy, Government of India.

TABLE EXPLANATION: The table highlights the Compound Annual Growth Rate (CAGR) of milk production in India, showcasing its transformation into a major economic contributor. From 1951-61, growth was modest at 1.64 percentage due to traditional farming methods. It declined further to 1.15percentage (1961-74) amid food shortages and import reliance. The White Revolution (1974-81) boosted growth to 4.51 percentages, with cooperatives and breed improvements playing key roles. The peak of 5.48 percentage (1981-91) was driven by Operation Flood and commercialization. Growth slowed to 4.11percentge (1991-2001) due to economic liberalization but stabilized at 4.22percentage (2001-11) with technological advancements. The highest recent CAGR of 5.60percentage (2011-21) was fueled by rising demand and innovations, though post-2021, it dipped to 4.46percentage due to COVID-19 and supply chain issues. Despite challenges, strong policies and technology continue to drive India's dairy sector.

Table: 2. Compound Annual Growth Rate of Total Milk Production in the World.

Years	Total Milk production Growth rate (percent)
1961-1969	1.43
1970-1979	1.61
1980-1989	1.42
1990-1999	0.50
2000-2009	2.04
2010-2019	2.09
2020-2023	1.28

Data source: FAOSTAT published by the Food and Agricultural Organization (FAO) of the United Nations https://www.fao.org/faostat/en/#home . Calculations done by the author base on the FAOSTAT data.

TABLE EXPLANATION: The table highlights fluctuations in the Compound Annual Growth Rate (CAGR) of global milk production from 1961 to 2023. Between 1961 and 1989, growth ranged from 1.42percent to 1.61percent, with a peak in the 1970s due to advancements in dairy farming. The rate declined to 1.42percent in the 1980s, indicating stabilization. From 1990 to 1999, growth dropped sharply to 0.50percent likely due to economic downturns, policy changes, and the post-Soviet transition. A strong rebound in 2000-2009 (2.04percent) was driven by rising demand in developing nations, technological progress, and commercial dairy expansion .The highest growth (2.09percent) occurred in 2010-2019, fueled by government support, population growth, urbanization, and improved dairy infrastructure. However, in 2020-2023, it fell to 1.28percent, impacted by COVID-19 disruptions, climate change, sustainability concerns, and rising production costs

ECONOMIC CONTRIBUTION OF DAIRY FARMING: Dairy farming plays a vital role in the Indian economy, contributing significantly to rural livelihoods, food security, and national GDP. Dairy is the single largest agricultural commodity, contributing 4.5 percent to the national economy and directly employing more than 8 crore farmers**,** the majority of whom are women. India is ranked 1st in milk production, contributing 24 percent of global milk production, with milk production reaching 230.58 million tonnes in 2022-23. And India's per capita milk availability stands at 459 grams per day in 2022-23, significantly higher than the world average of 323 grams per day in 2022. The country marches towards becoming the third largest economy in the world, India's dairy sector the strongest in the world. our dairy and animal husbandry sector contributes 4.5 percent to the country's GDP and the contribution of dairy sector to agriculture sector is 24 percent, which is valued around Rs 10 Lakh crore and it is highest in the world. Dairy is a strong part of our economy and in terms of employment, about 45 crore people from 9 crore rural households, especially marginal farmers and women, are directly associated with the dairy sector today. Contribution to employment the stage provides gainful employment to a vast majority of the rural households. It employs about 8.47 million people on yearly basis out of which 71percent are women. Jobs in Indian dairy industry are mainly in the fields of production and processing of dairy products.

SUGGESTIONS: This study focuses on the contribution of dairy farming to various sectors, including national GDP, employment, and rural development. However, the dairy sector faces several significant challenges. Therefore, this study suggests a few important measures for its improvement:

- **Improving the milk yield:** India's average annual milk productivity in 2019-20 was 1777/animal, whereas the FAO data show that the global average productivity was 2699 kg per animal in 2019.

- **Increasing Private Sector Participation:** The private sector has contributed to the growth of the dairy industry by improving supply chain efficiency, expanding cold chain infrastructure, and introducing advanced dairy farming technologies. It is estimated that over 3 percent or approximately 60 lakh tons of milk gets wasted annually due to inadequate electricity supply. Improved adoption of cold chains can help reduce wastage and loss of milk in the dairy sector.
- **Infrastructure & Cold Chain Development:** Strengthening rural milk collection, processing, and distribution networks
- **Technology Adoption:** Some of the major sources of inefficiency in milk production in India are: poor quality of feeds; inadequate quality and availability of veterinary services; and limited access to advanced technologies in breeding and genetics. Therefore, India must focus on improving the technology adopted along the various stages of the milk value chain. Apart These include increasing the availability of veterinary services, better feed prepared using sustainable ingredients, more emphasis on genetics nutrition and breeding, implementing digital tracking of milk production, and automation in processing.
- **Sustainable Practices:** Promoting environmentally friendly and resource-efficient dairy farming methods.
- **Market Linkages & Value Addition:** Encouraging cooperatives, private sector involvement, and diversification of dairy products.
- **Financial & Credit Support:** Ensuring easier access to low-interest loans, insurance schemes, and subsidies for small dairy farmers.

CONCLUSION: Dairy farming is a critical component of India's agricultural economy, contributing significantly to rural livelihoods, national income, and food security. With its substantial contribution of 4.5percent to the national GDP and employment generation for over 8 crore farmers, the sector plays a transformative role in enhancing rural prosperity. The Compound Annual Growth Rate (CAGR) of milk production highlights India's progress, from a modest 1.64percentage (1951-61) to a peak of 5.60percentage (2011-21), showcasing the impact of policy interventions, technological advancements, and cooperative movements like AMUL Despite its impressive growth, the dairy industry faces challenges such as low productivity, climate change, and supply chain inefficiencies. However, with continued government support, investments in modern technology, and sustainable dairy farming practices, the sector has the potential to further strengthen India’s position as a global leader in milk production. Increasing global demand for dairy products also presents opportunities for expansion in international markets going forward, strategic initiatives focused on breed improvement, cold chain logistics, and financial inclusion of small and marginal farmers will be crucial for sustaining growth. Strengthening cooperative models, ensuring quality standards, and fostering innovation will help India maintain its competitive edge in the global dairy sector. Ultimately, dairy farming will remain a key driver of inclusive economic growth, rural development, and nutritional security in the country.

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