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Research Article

Dairy Sector Development in Haryana: A Decadal Analysis (2013-14 to 2023-24)

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Abstract

The present study analysis the growth and development of dairy sector in Haryana state from 2013-14 to 2023-24. It examines the trends in milk production, the availability of milk per capita, cattle and buffalo population per District, and Gross Value Added (GVA) milk group. The study uses secondary data and descriptive analysis, annual growth rate, compound annual growth rate (CAGR), trend analysis, and SWOT analysis. The results showed that the milk production rose by 64.20% from 7442 to 12220 thousand tonnes with a CAGR of 5.08%. The availability of milk per capita rose by 38.13%, from 800 to 1105 grams per day, at a CAGR of 3.29% over the past year. Likewise, average annual growth for GVA in the milk group was also positive at 5.00% (62.70% on average) but there were fluctuations during the period studied. Buffaloes comprised 69% of the combined cattle and buffaloes' population as against 31% for cattle, according to the district-wise analysis. The SWOT analysis points to the growth opportunities in the sector and challenges associated with livestock productivity, feed cost, infrastructure, and climate change. The study recommends that to achieve sustainable dairy development in the state of Haryana, it is important to have better management of livestock, efficient dairy infrastructure and better market linkages.

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1. INTRODUCTION

The dairy industry plays a vital role in Indian agriculture and is an important source of employment, livelihoods, food security, and socio-economic development in rural areas. Dairying is an important segment of the livestock industry, offers a steady income to the farmers, especially small and marginal farmers and contributes to livelihood diversification in the rural areas. In addition, milk and milk products are also a key source of protein, calcium, fats, vitamins and other nutrients, and the dairy industry is important in terms of nutrition improvement. It supports household livelihoods, and provides economic activity in milk collection, processing, transport; marketing and value-added dairy products.

Production and per capita milk availability per person is an important indicator for the performance and development of the dairy industry. The quantity of milk produced increased, whereas the availability of milk per capita gives an idea about the quantity of milk available per person per day. Such indicators however, are a reflection of various aspects of sectoral development and are best read in combination. Gross Value Added (GVA) is also used to look at the contribution of the milk group to economic activity, and is similar in that it looks at the value added by that group. Trends in these indicators over time can show trends, fluctuations and policy room for intervention.

The state of Haryana is a vital state for the development of dairy industry in India because of its livestock resources, established dairy practices and involvement in Milk production and milk marketing activities. Dairy contributes to the economy of rural people by generating income and employment and contributing to the livelihoods of farmers. The key livestock groups in the state related to milk production are cattle and buffaloes. However, the significance of the various types depends on the different districts, due to different proportions of livestock and different farming methods, as well as resource availability and local production systems. Thus, it is useful to analyse the cattle and buffalo population by districts to get insights into the spatial distribution of livestock resources and to identify districts that have relatively higher livestock population.

The economic performance of the dairy sector also is influenced by changes in productivity, production costs, access to markets, processing capacity and efficiency of the milk supply chain. Milk production and availability growth can be an indicator of the productive capacity improvement of the sector, but does not necessarily reflect proportionate increase in farmers' income and/or real economic value. Adjustments of GVA, especially, should be considered in relation to the price base applied in its computation. An increase in GVA could be due to price changes as well as production changes if the value of GVA is measured at current prices. Therefore, there is a need to include production, availability, livestock distribution and economic performance in a comprehensive assessment.

Although dairy industry is an important sector, there are a number of constraints such as livestock productivity, availability and cost of feed and fodder, animal health issues,

climatic conditions, and modern dairy infrastructure that can limit the development of this industry. Moreover, the variation between the distribution of cattle and buffaloes of different districts can also lead to district-wise different needs for livestock development and investment in dairy products. These issues must be understood to create effective strategies to enhance productivity, dairy marketing systems and sustainable dairy development.

2. REVIEW OF LITERATURE

Rachna, Gautam and Malik (2018) studied the constraints in Milk Production among 60 farmers of Hisar, Haryana. The constraints they found were management challenges, high feed costs, land fragmentation, animal diseases, and animal reproductive issues. The study suggested better veterinary assistance, better access to feeds, insurance, and market linkages.

Loura et al. (2021) studied the constraints of 200 dairy farmers of Haryana. Financial constraints, lack of skilled labour, high feed prices, inadequate dairy training and inadequate marketing facilities were found to be the key challenges in the study. It called for greater ease of credit, farmer training, and marketing assistance in bolstering the development of the dairy industry.

Sardar (2025) examined the agricultural and allied sector of Haryana for the year 2011-12 to 2021-22. Productivity improvement and sustainable agricultural policies were found to be important for the wheat, rice and oilseed sectors, as significant relationships between these sectors and their sectoral value added were found.

Jaiswal et. al. (2024) examined dairy sector in Haryana is growing through value addition practices with the problems of scientific knowledge, economic expenses and infrastructure being overcome. Training, financial support and investments in infrastructure are important strategic interventions for sustainable development and competitiveness.

Mohapatra & Pabba (2022) studied Haryana has huge growth potential in the dairy sector with organized co-operative and private dairies. Strengthening value chain management with modern technology and training can bring farmers together, making the value chain more efficient and contribute to the overall development of the sector.

Akin et. al. (2022) Turkey's milk and dairy business is important and the backbone of it is the raw cow milk. Based on the network analysis, products are closely interconnected, especially the interconnection between ayran and yogurt, which shows that there are significant preferences and production processes among products between 2010 and 2020.

Vico et al. (2011) there are various problems in the dairy sector in Bosnia and Herzegovina, including low milk production (around 2,500 kg/cow), milk quality, and limited diversity of dairy products. There is also a high level of foreign trade deficit in the sector, which is dependent mainly on imports from Croatia.

Berthiller (2024) analysed milk production is the process of gathering raw milk from the animals such as cows, goats and sheep, and processing it into different products. The dairy

industry is a key player in nutrition, economic development and food security throughout the world.

Shingh et. al. (2020) studied the total milk production in Nepal is about 2.05 million metric tons, accounting for 8% of agricultural GDP. Some problems in the sector are low per capita availability (158.9 grams/day) and high dependence on unorganized channels, which needs to be addressed to achieve future growth in the sector.

Kolangath et. al. (2025) examined the India is the largest milk producer in the world accounting for almost 24% of the total milk production. Since Independence, the dairy industry has undergone significant changes in policy, cooperative movements and technological advancement, leading to improved rural livelihood and nutritional security for millions.

3. RESEARCH GAP OF THE STUDY

Dairy sector studies have been mainly based on production, dairy farm economics, livestock management and production constraints. However, there is hardly any effort to study the milk production, per capita milk availability, district-wise cattle/buffalo population and GVA in the milk group during common period in Haryana. Hence, the present study aims to fill this gap by carrying out growth-rate analysis, trend analysis, district-wise analysis and SWOT analysis of these indicators and provide a detailed picture of the performance of the dairy sector and its prospects for future growth in Haryana during 2013-14 to 2023-24.

4. SIGNIFICANCE OF THE STUDY

The current study is important as part of the evaluation of growth and development of the dairy industry in the state of Haryana from 2013-14 to 2023-24. It gives an idea about the trend in milk production, availability of milk at per capita level, the cattle and buffalo population in the districts and GVA in milk group. These findings enable some patterns of growth and

variations in livestock distribution by region to be identified, as well as shifts in the economic importance of the dairy industry. In addition, the SWOT analysis identifies potential opportunities and challenges for development that will serve as a valuable foundation for policy makers, researchers, and stakeholders in the dairy sector to develop strategies for improving livestock productivity, dairy infrastructure, livelihoods of farmers and sustainable dairy development in Haryana.

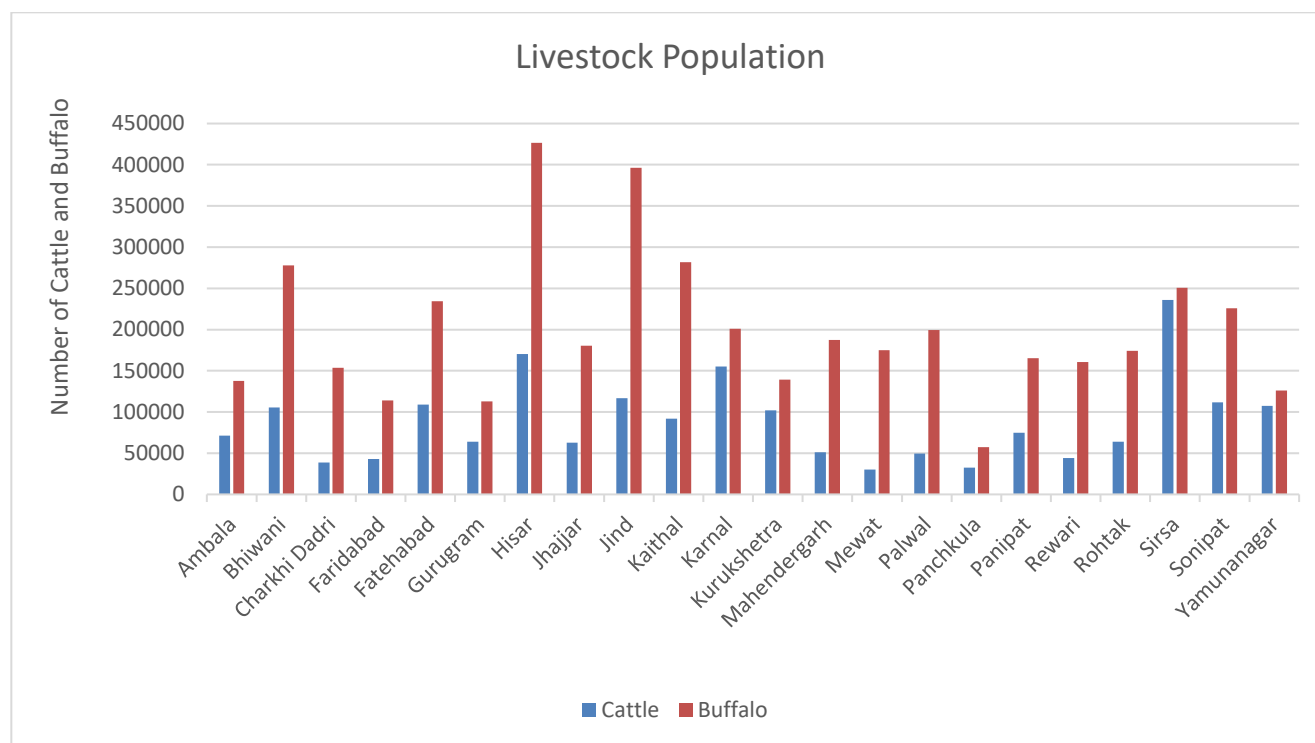
5. OBJECTIVES OF THE STUDY

1. To analyse cattle and buffalo population of the district level in Haryana.
2. To study the growth and trends of milk production and gross value added of milk group
3. To evaluate and analyze the main strength, weakness, opportunities, and threats (SWOT) of the dairy sector in Haryana.

6. RESEARCH METHODOLOGY

The present study employs a quantitative and descriptive-analytical research design to explore the dairy sector in Haryana for the year 2013-14 to 2023-24. The secondary data related to milk production, per capita available milk, cattle and buffalo population in the districts and Gross Value Added (GVA) in milk group has been studied. Descriptive statistics, annual growth rate, compound annual growth rate (CAGR), linear trend analysis are used to analyse the data. Livestock population is compared district-wise in terms of numbers and percentage values. Lastly, SWOT analysis is used to identify the strengths, weaknesses, opportunities, and threats in the dairy sector. Data on the various sectors is displayed in tabular, graphical and chart form to evaluate their growth and possible path for sustainable development.

7. RESULTS AND DISCUSSION



Source: Author's computation based on livestock census, 2019

Figure 1. District-wise number of Cattle and Buffalo in Haryana

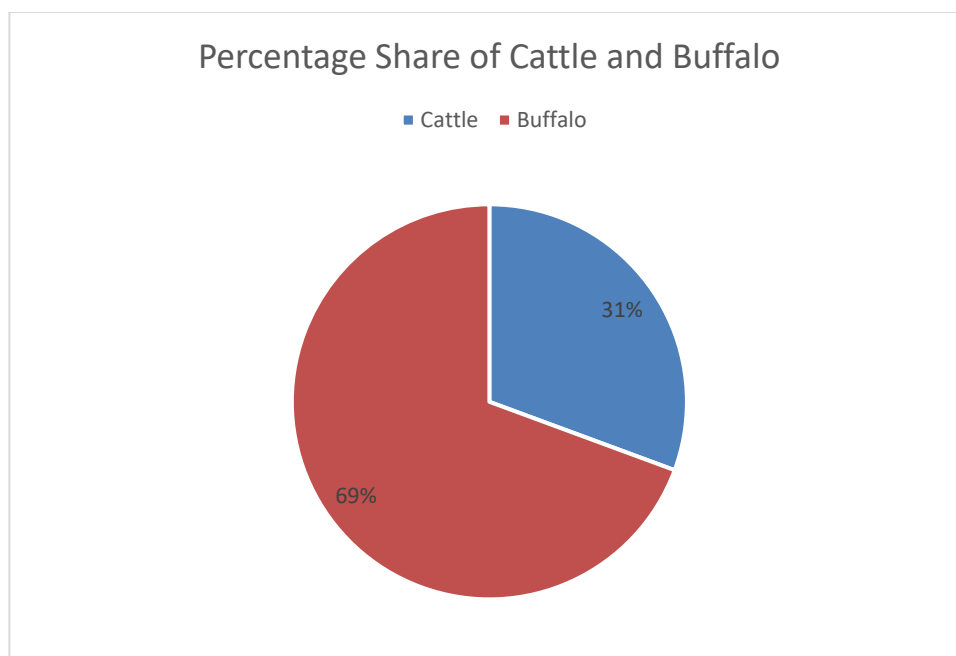
The district-wise data shows variation in the distribution of cattle and buffaloes in Haryana. In all 22 districts there are more buffalo than cattle, but there is large variation among districts. Hisar records the highest buffalo population, at 426486, followed by Jind (396305), Kaithal (281888) and Bhiwani (277739). The numbers of cattle are as high as 235775 in Sirsa, 170440 in Hisar and 155294 in Karnal, respectively. These statistics demonstrate the significance of Hisar, Jind, Bhiwani and Sirsa in the livestock business of the State.

There are also significant differences between the two groups of livestock. In Hisar, buffalo is over two times higher than cattle and in Jind and Kaithal, buffalo is also higher in number. On the other hand, the distribution of cattle and buffaloes in Sirsa is comparatively balanced, as there are 235775 cattle and 250809 buffaloes in the area. There is also a relatively small

difference between the numbers of cattle and buffaloes in Yamunanagar.

It is observed that at the bottom of the distribution, the population of cattle (32576) is the lowest and of buffaloes (57242) in Panchkula. The district of Mewat has the second lowest number of cattle (30088) while it has 174,867 buffaloes. The differences in district-level livestock composition illustrate the wide variation between the different districts of Haryana.

Overall, it may be inferred from the data that buffalo rearing is important activity of livestock sector in Haryana and in some districts like Sirsa and Karnal, cattle is also important. Such regional variations have implications on district-specific dairy development strategies such as veterinary services, feed and fodder management, milk procurement and processing infrastructure.

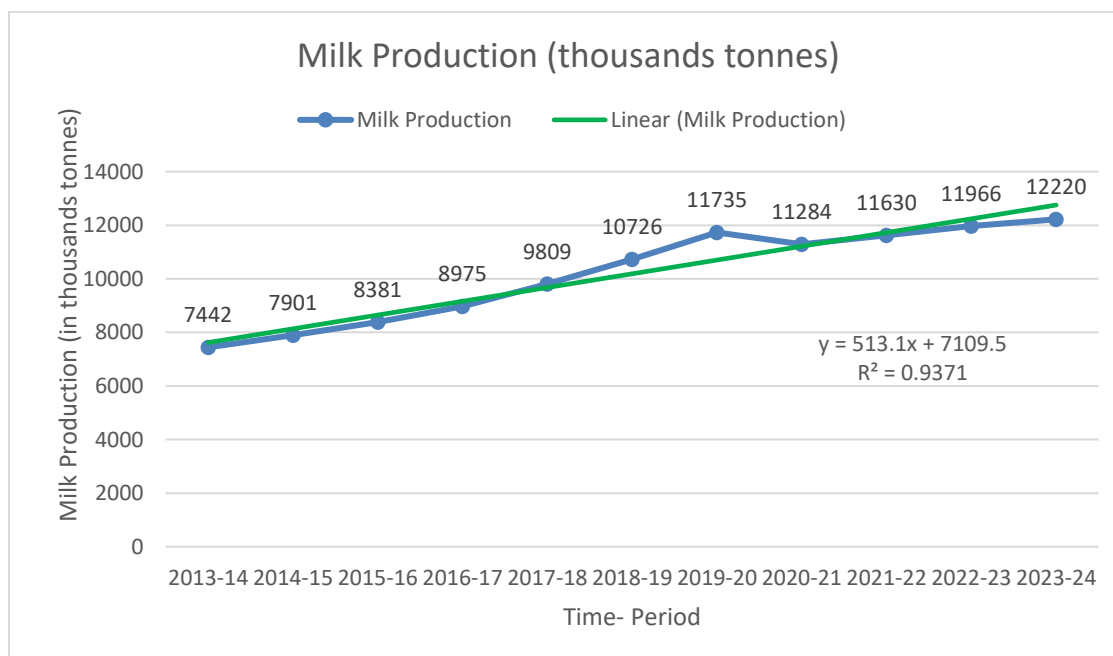


Source: Author's computation based on livestock census, 2019

Figure 2. Shows the percentage share of Cattle and Buffalo

The percentage distribution of cattle and buffalo shows that about 69% of the cattle and buffalo population is buffaloes and 31% is cattle. This distribution reveals that buffaloes play a major role in the livestock sector and are of paramount importance to the dairy industry in Haryana, India. The buffaloes reared as livestock are more in number thereby indicating that buffalo rearing is a significant enterprise in

Haryana. The buffalo is an important asset for the dairy farmers as it contributes significantly to the production of milk, as well as the rural livelihoods. Cattle also contribute to milk production and agricultural economy, albeit in a relatively small proportion of 31%. In general, the buffaloes' dominance indicates a significant impact on dairy development policies.



Source: Basic Animal Husbandry Statistics, Ministry of Fisheries, Animal Husbandry & Dairying, Government of India.

Figure 3. Trends of Milk Production in Haryana

The line graph shows the trend in milk production from 2013-14 to 2023-24, in thousand tonnes. The graph shows the actual milk production data as well as a linear trendline to analyze the general trend and direction of the milk production data over the period of study.

The data show that milk production has been increasing steadily since 2013-14, rising from 7442 thousand tonnes to 12220 thousand tonnes in 2023-24. This is an absolute increase of 4778 thousand tonnes or about 64.20% of the study period. The increase in production reflects a significant growth in milk production, which could be due to greater investment in dairy farming, better animal husbandry practices, improvements in animal husbandry, utilization of improved breeding technologies, and/or improved livestock productivity.

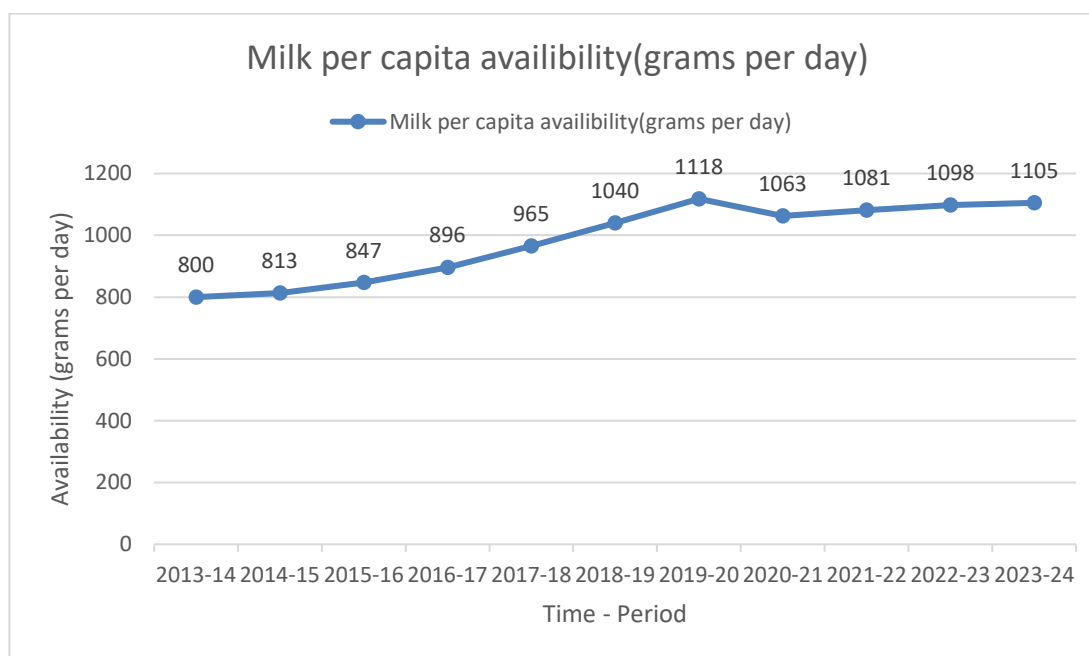
On closer examination of the trend the production of milk rose steadily from 2013-14 to 2018-19 at 10726 thousand tonnes. The production then increased to 11735 thousand tonnes in 2019-20 and then marginally decreased to 11284 thousand tonnes in 2020-21. This temporary decrease is a short-term deviation from the growing production trend. With the exception of this year, however, production picked up in the

following years to 11630 thousand tonnes in 2021-22, 11966 thousand tonnes in 2022-23, and 12220 thousand tonnes in 2023-24. The recovery indicates that the general trend has been that of growth although the level fell temporarily.

The trended line is an equation of a linear trend line.

$Y=513.1x+7109.5$, with a coefficient of determination (R^2) of 0.9371. The positive slope suggests a projected average growth rate of around 513.1 thousand tonnes per period. Furthermore, The linear trend line accounts for about 93.71% of the variance in milk production over the years, which suggests a strong linear relationship between the years and milk production.

Results overall show a significant and consistent growth in milk production over the study period. The long-term trend was upward, though there were some minor fluctuations, especially in 2020-21. The closer the coefficient of determination is to one, the more suitable a linear trend is, which the case here is. These findings also show how milk output has increased with time, and serve as a foundation for more research in the dairy industry to identify why milk output has increased.



Source: National Dairy Development Board, India

Table 4. Trends of Milk per capita availability (grams per day) in Haryana

The line graph shows the availability of milk per person per day from 2013-14 to 2023-24. The data reveal an overall increasing trend in milk availability during the study period, indicating an improvement in the average quantity of milk available per person per day.

The availability of milk was 800 grams per capita per day at the beginning of the study period in 2013-14. It increased gradually to 813 grams in 2014-15 and 847 grams in 2015-16, reaching 896 grams in 2016-17. This increase was sustained in the following years with availability increasing to 965 grams in

2017-18 and 1040 grams in 2018-19. This continued to increase with the highest amount of 1118 grams per day recorded in 2019-20, signifying a significant increase in milk availability in the early part of the study period.

In 2020-21, however, there was a temporary dip with milk availability per capita dropping to 1063 grams per day. This was followed by a recovery, with availability increasing to 1081 grams in 2021-22, 1098 grams in 2022-23, and 1105 grams in 2023-24. The recovery was slow, but the results

showed that the milk supply was reasonably high at the end of the study period.

The overall per capita milk availability in 2013-14 was 800 grams per day and in 2023-24, it was 1105 grams per day with absolute growth rate of 305 grams per day and percentage growth rate of around 38.13%. The upward trend indicates that

the mean availability of milk has increased during the decade. This growth can be linked to the expansion of milk production, improvement of dairy infrastructure, better animal husbandry, and the development of the milk collection and distribution system.

Table 1. Annual Growth Rate of GVA in the Milk Group

Year	GVA (Rs lakh)	Annual Growth Rate (%)
2013-14	2281274	-
2014-15	2424201	6.27
2015-16	2566664	5.88
2016-17	2749059	7.11
2017-18	3005558	9.33
2018-19	3287775	9.39
2019-20	3595822	9.37
2020-21	3448286	-4.10
2021-22	3541586	2.71
2022-23	3638910	2.75
2023-24	3711617	2.00

Source: Author's calculation

Table 1. Shows that the GVA of the Milk Group has generally risen during the period, with annual growth of 9.39% in 2018-19. Growth remained strong at 9.37% in 2019-20, followed by a contraction of -4.10% in 2020-21. The sector then bounced

back, with growth of 2.71% in 2021-22 and 2.75% in 2022-23. Real GVA increased at a slower pace in the most recent year of the series, with growth slowing to 2.00% in 2023-24.

Table 2. CAGR for all major indicators

Indicator	2013-14	2023-24	Total change (%)	CAGR (%)
Milk production (thousands of tonnes)	7442	12220	64.20	5.08
Per capita milk availability (grams/day)	800	1105	38.13	3.29
GVA in milk group (Rs lakh)	2281274	3711617	62.70	5.00

Source: Author's calculation

Table 2 shows compound annual growth rate (CAGR) for milk production, availability of milk per capita and gross value added (GVA) of milk group in Haryana during 2013-14 to 2023-24. The findings show an overall growth trend for all three indicators, but with different levels of growth.

The production of milk grew by 64.20% to reach 12,220 thousand tonnes in 2023-24 from 7442 thousand tonnes in 2013-14, yielding a CAGR of 5.08% per annum. Likewise, the milk group has witnessed a growth of GVA from Rs.2281274 lakh to Rs.3711617 lakh with an overall increment of 62.70% and CAGR of 5.00% per annum. The results suggest a continuing increase in milk production and the contribution of the milk group to the economic value created over the study period.

The per capita milk availability grew from 800 grams per capita per day to 1,105 grams, which was an increase of 38.13% with CAGR of 3.29% on an annual basis. The per capita availability grew significantly but at a lower rate than the growth rate for milk production and growth in GVA. This difference indicates that milk production growth is disproportionately higher than milk available per capita growth during this period.

In terms of the CAGR, milk production has the highest at 5.08%, followed closely by GVA at 5.00% while per capita milk availability has comparatively lower CAGR at 3.29%. The results indicate the growth of Haryana's dairy production and average availability, along with the economic benefits. If GVA is measured at current prices, however, its growth should not be confused with the growth of the economy without being adjusted by price changes.

Table 3. SWOT analysis of the Dairy Sector in Haryana

Strengths	Weaknesses
- Milk production increased by 64.20% during 2013–14 to 2023–24. - Per capita milk availability increased by 38.13% during the study period. - Buffaloes accounted for 69% of the combined cattle and buffalo population. - GVA in the milk group recorded a CAGR of 5.00%.	- Temporary fluctuations in milk production, including a decline in 2020–21. - Uneven district-wise distribution of cattle and buffalo populations. - GVA growth slowed to 2.00% in 2023–24. - The available aggregate data do not establish district-wise productivity or farmers' profitability.
Opportunities	Threats
- Adoption of improved breeding, feeding, and animal healthcare practices. - Expansion of milk processing and value-added dairy products. - Strengthening dairy infrastructure and market linkages. - District-specific livestock development programmes.	- Climate change, heat stress, and water scarcity. - Rising feed and fodder costs. - Livestock diseases and associated production risks. - Milk price fluctuations and supply-chain disruptions.

Source: Author's analysis based on the study's findings for 2013–14 to 2023–24 and relevant contextual considerations.

From the SWOT analysis (Table 3), it is seen that dairy industry has huge growth potential in Haryana. The key advantages are high milk production, and greater per capita milk availability, together with the preponderance of buffaloes. Nonetheless, there are some potential areas for concern, such as fluctuating production, uneven distribution of livestock, and a deceleration in growth of GVA. There is scope to adopt good breeding and feeding practices, develop more milk processing units, and build market linkages of milk producers and district-level development programmes. However, climate change, increased feed prices, animal health issues and milk price volatility could limit growth in the years to come. In conclusion, enhancing dairy infrastructure, boosting livestock productivity, and implementing sustainable farming practices are crucial for the long-term development of the dairy industry in Haryana.

8. CONCLUSION

The current study focused on the growth and development of the dairy industry in Haryana for the years 2013-14 to 2023-24. The production of milk experienced growth of 64.20% with a CAGR of 5.08% and per capita milk availability grew by 38.13% at CAGR 3.29% respectively. Likewise, GVA for milk group grew at 62.70% CAGR with annual growth rate varying between 3.00% and 7.00% over the study period.

District-wise analysis showed that buffaloes were more dominant than the cattle, which is 69% of the combined cattle and buffalo population as compared to 31% for cattle. The SWOT analysis identified the opportunities for improving dairy productivity, infrastructure and market efficiency and identified some potential challenges to be managed around feed costs, animal health and climate change.

The overall findings of the study suggest that the dairy industry was a major contributor to the growth in Haryana during the study period. To continue this improvement, it is essential that the management of the livestock is improved, modern infrastructure for the dairy industry is established, efficient marketing systems are in place, and appropriate policy interventions are made to develop the farmers' livelihood and sustainable development in the dairy sector.

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