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Role of Dairy Farming in Enhancing Farm Income: Experiences from Punjab and Haryana

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Abstract

Despite extensive policy debates in Punjab and Haryana advocating crop diversification away from the wheat-paddy cycle to overcome the limitations of monocropping, tangible success remained elusive. Neither diversification within agriculture nor farm and non-farm activities have helped in increasing farm household's incomes in both the states, with farmer earnings showing signs of both decline and stagnation. Against this backdrop, the adoption of dairy farming emerges as a promising alternative. Drawing upon evidence from a large-scale study conducted by the authors in increasing farmers income in Punjab and Haryana, it was found that dairy farming contributed significantly in increasing farmers income across all categories of farmers in both Punjab and Haryana. In addition, dairy farming helps strengthen the rural economy through allied activities such as fodder cultivation, cooperative marketing, which in turn generate non-farm employment and strengthen local value chains. Thus, the paper examines how dairy farming can be positioned not merely as an income increasing activity but as a pathway toward more sustainable and resilient rural livelihoods in Punjab and Haryana.

Keywords: *Dairy Farming, Farm Income, Rural Economy, Agricultural Sustainability*

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1 Introduction

In Punjab and Haryana, there has been a long-standing debate on the necessity of crop diversification to break the entrenched wheat-paddy monocropping cycle as a means of increasing farmers' income. However, despite sustained policy emphasis and various state-led initiatives, the outcomes of such diversification strategies have been limited, with little measurable success achieved till date. Farmers' incomes in the region continue to show signs of stagnation and, in some cases, decline after adjusting the year-on-year rate of inflation. Furthermore, both farm and non-farm income diversification strategies have thus far failed to generate significant improvements in household earnings.

Table 1: Gross Area under Rice and Wheat in Punjab (Area in 000 hectare)

Crops	Punjab		Haryana	
	2014-15	2023-24	2014-15	2023-24
Rice	2820	3179	1206	1778
Wheat	3470	3515	2497	2509

Source: Compiled from various reports of Economic Survey of Punjab and Haryana, 2014-15,2024-25.

Table 2: Average Monthly Income of Agricultural Households (in Punjab and Haryana)

States	Income (in Rs.)
Punjab	31433
Haryana	25655
All India	13661

Source: NABARD's All India Rural Financial Inclusion Survey (2021-22)

The table 1 shows that over the past decade, the area under rice and wheat cultivation in both Punjab and Haryana has remained largely unchanged, underscoring the persistence of the wheat-paddy monocropping system.

According to NABARD'S All India Rural Financial Inclusion Survey (2021-22), the average monthly income of agricultural households in Punjab increased from Rs. 18059 in 2012-13 to Rs. 31433 in 2021-22, reflecting an increase of over Rs 13374 per month. Whereas, the average monthly income in Haryana increased from Rs

14434 to Rs 25655 during the same period, an increase of Rs. 11231 (The Hindu Business Line, November 05, 2024).

Despite having one of the highest absolute farm incomes among all states, Punjab's growth rate in farm income is slower than that of some poorer states. Between 2013-14 and 2018-19, farm income in Punjab grew at an average of 6.73 per cent per annum, whereas states like Bihar and Uttarakhand registered much higher rates of 13.3 per cent and 19.3 per cent in the same period. While Punjab's farm incomes have increased in absolute terms, the growth remains moderate as compared to other states. In addition, high levels of indebtedness among farmers continue to reduce the real benefits of increased income (Hindustan Times, October 04, 2021)[3]. These facts point towards a lack of structural change in income levels and cropping patterns despite sustained policy efforts for promoting crop diversification.

Against this backdrop, dairy farming presents itself as a viable and supplementary source to address these persistent challenges. Drawing upon a comprehensive empirical study on "Quest for Increasing Farmers Income: A Study of Agri-Business Potential and Prospects in Punjab and Haryana' sponsored by the Indian Council of Social Science Research (ICSSR), New Delhi, the authors found that the dairy farming contributed positively to household income across all categories of farmers in both the states. The findings suggested that dairy farming not only supplements crop-based revenue but also provides a more stable and regular source of income, thereby mitigating the risks associated with seasonal crop cycles and market fluctuations. Moreover, dairy production strengthens rural economies by stimulating allied sectors such as fodder cultivation, veterinary services and cooperative marketing, creating forward and backward linkages that extent beyond the farm household. Thus, the integration of dairy farming into agricultural livelihoods can be understood as a practical pathway towards income stabilization, risk reduction, and long-term rural resilience in Punjab and Haryana.

There has been a significant growth in the value of output from the livestock sector – the contribution of livestock in total agriculture and allied sector rose from 25.6 per cent in 2011-12 to 31.2 per cent 2021-22 (as per the gross value of output at current prices), (Jose, S., et.al., 2024). During the period from 2012-13

[3] Income of farmers growing at slower pace in Punjab | Latest News India - Hindustan Times

to 2021-22, the output value of the livestock sector experienced an average annual growth rate of 5.6 per cent, while the crop sector recorded a growth rate of 2.1 per cent (at constant prices). Further, milk production followed with a growth rate of 5.5 per cent (as shown in the table 1).

Table 3: Average Growth Rate of Livestock vis-à-vis Crop Sector during 2012-13 to 2021-22

Sectors	Growth rate (in %)
Crop	2.1
Livestock	5.6
Milk	5.5
Poultry meat	10.1
Egg	6.2

Source: RBI working paper series, 2024. Department of Economic and Policy Research.

Further, the sharp drop in spending on cereals has enabled families to diversify their diets, leading to more spending on milk, fruits, and eggs, fish, and meat. This decline can be linked to various factors such as government food security programs and changing dietary preferences. Changing consumer preferences and rising middle income class have transformed domestic demand for agricultural commodities in India. Moreover, globalisation has facilitated greater access to international markets for Indian farmers. As a result, the demand for dairy products, is rapidly increasing and is expected to grow in the future (Niti Aayog, 2023).

According to the report titled “Changes in India’s Food Consumption and Policy Implications: A Comprehensive Analysis of Household Consumption Expenditure Survey 2022-23 and 2011-12”, it was observed that there was an increase in the proportion of households consuming milk & milk products from 80.1 per cent to 92.2 per cent for rural households and 90.6 per cent to 95.9 per cent for urban households from 2011–12 to 2022–23. However, regional variation was observed in milk and milk products consumption. Northern states like Punjab, Haryana and Uttar Pradesh had significant higher rate of consumption than that of states like Chhattisgarh and Odisha.

1.1 Global Milk Demand

In 2023, global milk production increased by 2.2 per cent, nearing the ten-year average growth rate (2012-2022). This positive outcome signifies a recovery following the sluggish milk production growth observed in 2022.

However, world trade in dairy products continued to decline, primarily due to stronger local production in several regions and reduced demand for key importing countries (IFCN Dairy Report, 2024). Farm profitability in 2023 remained average, primarily due to reduction in input costs. The global milk price also experienced a decline, falling by 25 per cent with an average of 39.8 USD per 100 kg of milk for the year.

India remained the largest producer of milk in 2023, with a growth rate of 5 per cent, returning to its ten-year growth rate of 5.2 percent. In contrast the EU-27, if considered as single entity, would rank second, but milk production in the region stagnated, primarily due to stringent environmental regulations and high input costs faced by farmers. The United States saw a modest increase of only 0.9 per cent influenced by weather challenges and a reduced herd size. New Zealand experienced a 1.7 per cent rise in milk production, largely attributed to a base-year effect following poor output in 2022. Meanwhile, Latin America experienced a more modest growth of 0.8 per cent driven by unfavourable weather events, currency devaluation, and rising input costs.

Further if we look at global dairy demand which had been weak throughout 2022, despite regional variations. In 2023, however, demand rebounded primarily driven by higher per capita consumption, increased availability of dairy products, and a moderate recovery in milk production. Similar to the growth in milk production, global dairy demand increased by 2.4 per cent in 2023. A closer analysis revealed that milk demand rose by 0.9 per cent due to population growth and by 1.4 per cent as a result of increased per capita consumption.

Most of the uncertainties surrounding demand in 2023 were driven by an unstable macroeconomic environment and high inflation rates, which negatively affected consumer purchasing power. Per capita consumption was particularly impacted by high inflation in regions such as Southeast Asia, Africa and Latin America. While global exports declined in 2023, with the EU reducing its exports by 23 per cent, major importers also scaled back their purchases, contributing to down ward

pressure on prices. China the leading importer, focused on increasing domestic production, converting surplus milk into powder and reducing its import volumes.

As global population and income levels rise, dairy consumption is expected to increase worldwide. Projections indicate that by 2031, per capita milk consumption (measured in milk equivalent) will experience the highest growth in low-middle-income countries, with an annual increase of 2 per cent (equivalent to 21.2 kg). In low-income countries, per capita consumption is anticipated to grow at a rate of 1.5 per cent annually (5.4 kg). In contrast, high-income countries are expected to see a slower rate of growth, with per capita consumption increasing by only 0.4 per cent per year (2.9 kg) by 2031.

In low-middle-income countries, fresh dairy products account for approximately two-thirds of the average per capita dairy consumption (in terms of milk solids). In contrast, consumers in high-income countries typically consume a greater proportion of processed dairy products. Overall, for countries across all income levels, per capita dairy consumption is projected to grow at an annual rate of 0.8 per cent, reaching 15.7 kg (milk solids equivalent, excluding the water content of milk or dairy products) by 2032 (MOFPI, 2024).

1.2 Milk Production in India

India remains the leading global producer of milk. Globally, India is ranked 1st in milk production i.e. 25 per cent of world production of milk followed by USA. The milk production for the years 2021-22 and 2022-23 were recorded at 222.07 million tonnes and 230.58 million tonnes, respectively, indicating an annual growth rate of 3.83 per cent. In the year 2022-23, the per capita availability of milk was 459 grams per day. During 2023-24 total milk production in the country reached 239.30 million tonnes and recorded an annual growth rate of 3.78 per cent. The per capita availability of milk was 471 grams per day (BAHS, 2023-24). The major role in increasing milk production in India was played by the National Dairy Development Board (NDDB). It was founded in 1965 with the objective of leading the development of India's dairy industry. Under the guidance of Dr. Verghese Kurien, often referred as the Father of the White Revolution, NDDB launched Operation Flood in 1970, which became the largest dairy development initiative globally.

Operation Flood aimed to establish a network of village level dairy cooperatives societies connected to district level unions and state level federations.

The implementation of Operation Flood, which occurred in three phases from 1970 to 1996, significantly enhanced the network of dairy cooperatives and facilitated the growth of organised private dairies. This combined with government initiatives aimed at boosting milk production has resulted in an increase in milk production from 127 million metric tonnes (MMTs) in 2011-12 to 231 MMTs in 2022-23. Consequently, the per capita milk availability of milk has risen from 281 grams per day to 459 grams per day. Further it has reached 471 gram per day in 2023-24. In terms of contribution to total milk production, cows account for 52 per cent, followed by buffaloes 45 per cent and goats for the remaining 3 per cent.

Table 4: Milk Production with Annual Growth Rate (%) from 2011-12 to 2022-23 (All India)

Year	Milk Production (in million tonnes)	Annual Growth Rate (%)
2011-12	127.90	5.01
2012-13	132.43	3.54
2013-14	137.69	3.97
2014-15	146.31	6.27
2015-16	155.49	6.27
2016-17	165.40	6.38
2017-18	176.35	6.62
2018-19	187.75	6.47
2019-20	198.44	5.69
2020-21	209.96	5.81
2021-22	222.07	5.77
2022-23	230.58	3.83
2023-24	239.30	3.78

Source: Annual Report 2023-2024. Department of Animal Husbandry and Dairying. Ministry of Fisheries, Animal Husbandry and Dairying. Government of India.

Table 5: Indian Milk Production in Relation to World's Milk Production

Parameters	Year 2021-22	Year 2022-23	% Growth
India milk production (MMT)	222.07	230.58	3.83
World's milk production (MMT)	951.60	965.47	1.4

Source: FAO Market Review Report, 2023.

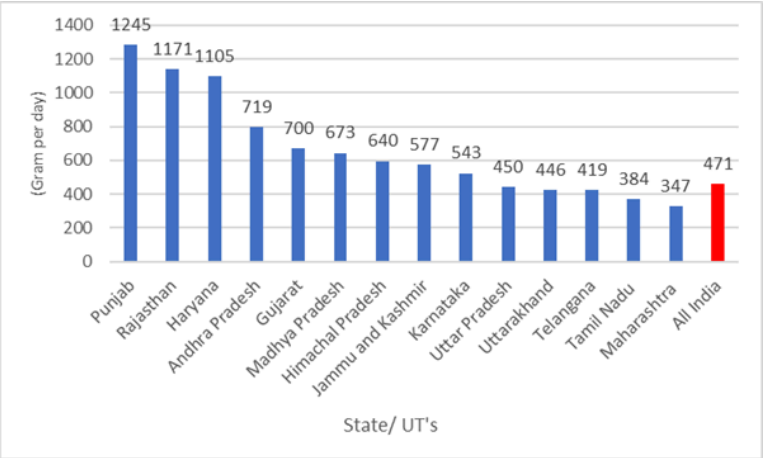
Table 6: Per capita Availability of milk in India

Year	Per capita Availability
2009-10	273
2010-11	281
2011-12	290
2012-13	299
2013-14	307
2014-15	319
2015-16	333
2016-17	351
2017-18	370
2018-19	390
2019-20	406
2020-21	427
2021-22	446
2022-23	459
2023-24	471

Source: Annual Report 2023-2024. Department of Animal Husbandry and Dairying. Ministry of Fisheries, Animal Husbandry and Dairying and Basic Animal Husbandry Statistics Government of India

In 2022-23 India's per capita milk availability reached a daily average of 459 grams, surpassing the global average, which was around 323 grams per day in 2022 (FAO, 2023). Further it has reached 471 grams per day in 2023-24.

Figure 1: State-wise Per Capita Availability of Milk for the year 2023-24



Source: Basic Animal Husbandry Statistics, 2024. Department of Animal Husbandry and Dairying. Government of India.

As seen from the above figure, nine states demonstrate per capita milk availability that surpasses the national average, with Punjab (1245) showing the highest level of per capita milk availability followed by Rajasthan (1171) and Haryana (1105). According to the latest NSSO report on Income, Expenditure, Productive Assets, and Debt of Agricultural Households in India (2012-13), Punjab recorded the second-highest average monthly income of Rs. 5,303 from animal farming, following only Haryana (Rs. 6,089). The primary source of income generation was milk production, contributing 91.6 per cent to the total average monthly earnings from animal farming (Economic Census of Punjab 2023-2024). According to the 20th Livestock Census-2019, Punjab accounts for 1.3 per cent of India's overall livestock population. The majority share within the total livestock population was held by buffaloes at 57.4 per cent, followed by cross-breed cattle and indigenous cattle. In the year 2020-21, Punjab emerged as the region with the greatest per capita milk availability in the nation, reaching an impressive amount of 1271 grams per day.

Table 7: Per capita availability of milk from 2019-20 to 2023-24 in Punjab and Haryana (in Gram/day)

State	2019-20	2020-21	2021-22	2022-23	2023-24
Punjab	1221	1219	1271	1283	1245
Haryana	1118	1063	1081	1098	1105
All India	406	427	446	459	471

Source: Department of Animal Husbandry and dairying. Government of India.

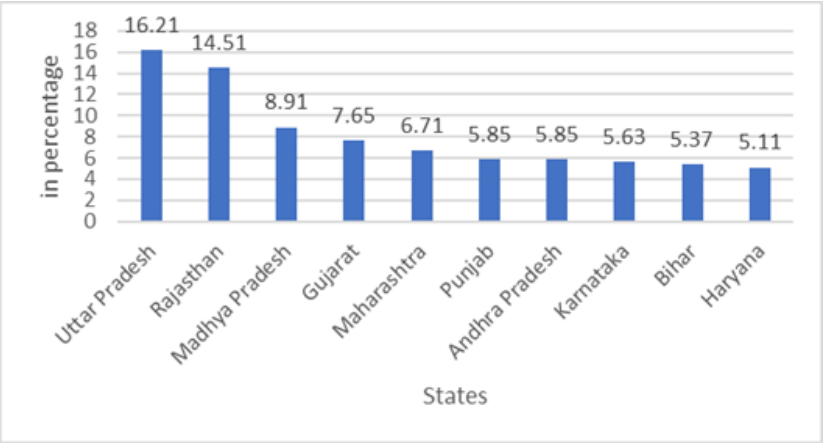
The Per capita availability of milk in Punjab and Haryana has showed an upward trend from 2019-20 to 2023-24, with both states consistently reporting levels that surpass the national average during the same period.

1.3 State wise Share of Milk Production 2023-24

Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat and Maharashtra are the leading states in percentage share of milk production for the year 2023-24 they together contribute 53.99 per cent of total milk production in India (Basic Animal Husbandry Statistics, 2024) followed by Punjab, Andhra Pradesh, Karnataka, Bihar, Haryana. Punjab, contributing 5.85 percent, and Haryana, with a share of 5.11

percent, rank among the top ten states in India for milk production for the year 2023-24 (as shown in figure below).

Figure 2: Percentage share of milk production of 10 major milk producing states (2023-24)



Source: Basic Animal Husbandry Statistics, 2024. Department of Animal Husbandry and Dairying. Government of India.

1.4 Dairy Exports

India has established itself as a top producer of high-quality milk, meat and eggs. These exports include milk and milk products as India is the largest producer of milk in the world (FAO Statistics,2023), buffalo meat, poultry products, animal casings, and sheep/goat meat.

Table 8: Exports of Animal Products in 2023-24

Particulars	Export FY 24 (USD Mil)
Buffalo meat	3740.53
Sheep/Goat meat	77.68
Other meat	0.82
Poultry products	184.58
Dairy products	272.64
Animal casing	48.12
Processed meat	2.48
Casein	18.22
Albumin (Eggs and Milk)	20.93
Natural honey	177.52

Source: APEDA, 2023-24.

Against the above background, this paper tries to assess the socio-economic status of farmers involved in dairy farming in Punjab and Haryana, as also to identify specific possibilities of integrating agriculture and allied sectors especially in the dairy sector. The study also attempted to analyse challenges faced by farmers and other stakeholders in adopting dairy farming in the selected states of Punjab and Haryana.

It is important to mention here that this paper is an abridged version of the original study and only specific data are presented here.

2 Framework, Scope, Sample selection and Methods of Data Collection

This study has used both primary as well as secondary data. An extensive field survey was undertaken in the states of Punjab and Haryana.

Two districts from each state (Punjab and Haryana) were selected based on the highest cattle population a per Livestock Census of 2019. To ensure a wide representation, 100 respondents of different farm holdings in the dairy sector from each selected state were interviewed- 50 each from two districts of Punjab and 50 each from two district of Haryana. Making a total of 200 respondents overall.

For the primary data collection from the field, a total of 200 dairy farmers were selected as sample respondents for the study, with an equal distribution of 100 farmers from each of the states of Punjab and Haryana. Within Punjab, 50 farmers each were selected from Ludhiana and Sangrur districts. While in Haryana, the sample comprised 50 farmers each from Hisar and Jind districts. Fieldwork was conducted for collecting primary data for dairy farming across 35 villages in Punjab and Haryana. This diverse village-level representation ensured a comprehensive understanding of dairy farming practices across varying regional and agro-economic contexts, especially agro-business and its potential, prospects and challenges.

3 Socio-Economic Profile of the Respondents

The study shows that dairy farming in Punjab and Haryana was mainly practiced by farmers from the General category, with comparatively lower participation from the Scheduled caste and Other Backward Class (OBC). This disparity reflected broader socio-economic patterns including access to resources, land ownership,

and institutional support which tend to be more favourable for the general category.

Educational Status: A large portion of dairy farmers in both the states possess at least a moderate level of formal education, which may positively influence their ability to adopt improved dairy management practices, take benefits of government schemes, and engage with extension service. However, the relatively low percentage of graduates and post graduates indicates a need for targeted training and capacity building programmes to improve knowledge and productivity in the sector.

Occupational Status: The rural economy in the study area remains heavily dependent on agriculture as the principal source of livelihood. The relatively low representation in the formal employment sectors highlights limited diversification of income sources.

Land Ownership: The study found that the majority of farmers in both Haryana and Punjab were cultivating their own land. It was found that farmers across both Haryana and Punjab were engaged in the cultivation of staple crops such as rice, wheat and cotton. In Haryana a small number of farmers also reported cultivating millets, although this practice was limited. In addition to these staple crops many farmers also cultivated vegetables, indicating a growing interest in horticultural produce. Furthermore, the cultivation of fodder crops was reported by many farmers, reflecting the importance of livestock rearing. Promoting mixed farming systems that combine crop production with livestock and horticulture can help in overall farm productivity, improve income stability, and can contribute to more sustainable and resilient agricultural practices in the region.

Land Holding Pattern: Overall, 25 per cent of farmers were categorised as small, and an equal proportion (25 per cent) as semi-medium. Marginal farmers made up 24 per cent of the total, while large farmers accounted for 6 per cent, and medium farmers constituted 5 per cent. These figures highlight a dominance of small and semi-medium landholders in both Haryana and Punjab, reflecting the broader trend of land fragmentation in Indian agriculture. The relatively lower presence of large landholders underscores the structural limitations faced by many farmers in terms of land access, which has direct implications for productivity, mechanization, and income levels.

Land Taken on Rent/Lease: Among farmers cultivating land taken on rent or lease, the majority belonged to the marginal category, comprising a combined total of 16 per cent equally divided between Haryana (8 per cent) and Punjab (8 per cent). In contrast, a very small proportion of farmers fell into the small and large categories, each representing only 1 per cent, and both reported in Haryana. Notably, no small or large category farmers were found leasing land in Punjab.

3.1 Annual Income of farmers from agriculture

Out of the total 200 farmers interviewed, only 8 farmers (4 per cent) reported earning income from non-farm activities. Among them 2 per cent had an annual income of less than Rs 2 lakh, while the other 2 per cent earned between Rs 5 lakh and Rs 8 lakh. The type of non-farm activities reported included government jobs, private jobs, shopkeeping and driving.

Table 9: Annual Income of farmers from agriculture

Annual Income (Agriculture)	Respondents	Percent
Less than 2 lakhs	42	21.0
2-5 lakhs	54	27.0
5-8 lakhs	42	21.0
8-12 lakhs	30	15.0
More than 12 lakhs	24	12.0
Total	192	96.0

The above figure Indicate that a majority of dairy farmers earned moderate income from agriculture. Around 21 per cent earned less than a Rs 2 lakh. Therefore, including dairy activities in supplementing household income becomes important especially for marginal and small farmers, as including dairy farming provides a regular and relatively stable source of income, helps reduce dependence on seasonal crops and ensures better livelihood security throughout the year.

Dairy farming remains a traditional livelihood activity, often passed down within families, reinforcing its cultural and economic importance in rural communities. In contrast only 15 per cent of the respondents had independently established their farms, reflecting a smaller but notable segment of first-generation dairy entrepreneurs. These farmers may represent individuals driven by factors such as

diversification of income sources, growing demand for dairy products, or government incentives promoting livestock-based livelihoods.

Dairy farming in the study area practiced on limited landholdings, often integrated within existing agricultural plots or homestead areas. The relatively low land allocation may reflect spatial constraints, prioritisation of land for crop cultivation, or the adaptability of dairy activities to compact spaces because as indicated above majority of the respondents were small farmers. This trend of small-scale land use underscores the importance of efficient resource management and infrastructure planning in sustaining dairy operations within limited spatial environment.

3.2 Nature of occupation

The data of the occupational nature of dairy farming among farmers showed that 88 per cent of the farmers considered dairy farming as an ancillary or supplementary occupation, while only 12 per cent identified as their primary occupation. This suggests that for the majority of farmers, dairy farming functions as a secondary or additional source of income, likely integrated alongside crop cultivation or other livelihood activities. This was also found in another study (Singh and Datta, 2010) which has noted that dairy farming in rural India often complements primary agricultural activities contributing to income diversification and risk mitigation.

3.3 Value Addition

The study found that a majority of dairy farmers 91 per cent did not engage in the production of value-added dairy products such as ghee, curd and paneer. These farmers reported that they exclusively sold milk, indicating a limited diversification of dairy related activities. In contrast, only 9 per cent of the farmers reported producing value-added products, primarily ghee and paneer, either for household use or for local market sale.

This trend highlights a predominant focus on primary milk production, with minimal participation in post-production processing. Similar patterns have been observed in earlier studies, where small scale dairy farmers often lack the necessary infrastructure, knowledge, or access to markets to engage in value

addition (Birthal et al., 2006; Kumar et al., 2011). The limited involvement in value-addition production may also be linked to storage constraints, perishability, and fluctuating market demand (Chatterjee and Ghosh, 2018). However, those engaging in value-addition may benefit from higher margins and better price realisation, pointing to potential opportunities for improving and supplementing farm income.

3.4 Marketing of Dairy Products

The study found that the majority of farmers i.e. 98 per cent sold their milk and value-added-products in the local market indicating a strong dependence on informal channels. Only 1 per cent of the farmers reported selling their produce to wholesale buyers, while another 1 per cent engaged in dual channels, selling both in local markets and directly to consumers through offline methods such as door-to-door delivery or community-based sales.

Regarding milk pricing, 7 per cent of the farmers reported selling their milk at a rate between Rs. 40-50 per litre, 40 per cent sold it between Rs. 50-60 per litre, and the majority 53 per cent reported selling it at Rs. 60-70 per litre. This variation in price reflects differences in milk quality, fat content, and location specific demand, consistent with previous research on dairy marketing in India (Patel et al., 2015). The selling of milk in the local market may be attributed to lower transportation cost, immediate cash returns, although it suggests limited integration into more formal and more profitable value chains.

3.5 Dairy By-Products

All the farmers interviewed across Punjab and Haryana reported that livestock dung was a key by-product of their dairy farming activities. In terms of utilisation, farmers reported using dung for making dung cakes (traditionally used as cooking fuel) and also used it as organic fertilizer for their agricultural fields. Moreover, beyond subsistence, a number of farmers reported economic gains from selling dung, indicating its potential as an economic by product. The sale way typically done on trolley-load basis, with farmers stating that one trolley of dung fetched between Rs. 1000-1200. Further, studies have shown that in addition to contributing soil fertility and energy needs, dung also holds market value,

especially in areas where organic farming practices are expanding (Singh et al., 2013). The commercialisation of dung reflects the growing awareness among farmers of resource recycling and income diversification within an integrated farming system.

Herd Size and Annual Feed Cost: The analysis of herd size in relation to feed expenditure offers important insights into the economics of dairy farming, especially regarding scale of operation and input intensity. Feed cost is a direct function of herd size, but variations also emerge based on management practices, access to fodder resources, and market dependency for feed procurement.

3.6 The Labour Dynamics

Out of a total 200 farmers surveyed, 190 farmers reported involving family members as primary source of labour in dairy farming activities. Among these 91 per cent relied on 1-2 family members, while 4 per cent reported employing 2-4 family members as labourers.

The estimated annual economic contribution of family labour ranged between Rs. 1-2 lakh for 82 per cent of the farmer, and Rs. 2-4 lakh for 13 per cent, highlighting the important yet often undervalued role of unpaid or semi-paid family labour in sustaining rural livelihood.

Table 10: Economic value of family members (labour)

Economic value	Frequency	Percent
1-2 lakh	164	82.0
2-4 lakh	26	13.0
Total	190	95.0

The labour costs appear to be influenced by regional economic structures and the availability of alternative livelihood options. Areas with better infrastructure and market connectivity often show higher labour rates due to increased opportunity cost (Chand et al.,2019).

Out of the total farmers interviewed, 35 per cent reported employing hired labour (along with self and family members) for dairy operations. Among these farmers, 16 per cent incurred an annual labour cost of less than Rs. 2 lakhs, while 10 per

cent spent between Rs. 2–4 lakhs, and 9 per cent reported labour expenses in the range of Rs. 4–6 lakhs per annum.

Table 11: Labour cost per annum

	Frequency	Percent
Less than 2 lakhs	32	16.0
2-4 lakh	20	10.0
4-6 lakh	18	9.0
Total	70	35.0

In addition to family labour, a number of farmers interviewed also employed hired labour to manage their dairy operations. Specifically, 16 per cent of the farmers reported employing 1-2 hired labourers, while 3 per cent has 2-4 hired labourers. The annual expenditure ranged from Rs. 1-2 lakh for 17 per cent of the farmers, and Rs. 2-4 lakh for 2 per cent, indicating a relatively limited yet economically significant reliance on external labour sources. The average monthly labour costs reported remained consistent with earlier district level findings.

This indicates that the majority of dairy farmers either self-manage operations or through family labour or opt for minimal external labour due to financial constraints. The relatively low proportion of farmers incurring higher labour costs also reflects the small and medium scale of most dairy enterprises in the region.

The heavy dependence on family labour serves as a cost saving mechanism but also reflects broader socio-cultural dynamics, including gender based and generational roles within rural households. It was also found in the study of (Kaur and Sharma,2020) that smallholder dairy farms in India heavily depend on intra-household labour, often without formal remuneration.

3.7 Transport Cost

Nearly, 79 farmers reported to have incurred transport costs at some or the other in dairy activities. Among them, 25 per cent incurred transport expenses exceeding Rs. 8,000 annually. Additionally, 7 per cent of the farmers reported costs between Rs. 4,000–6,000, while 6 per cent spent between Rs. 6,000–8,000. A very small fraction, only 0.6 per cent, had transport expenses below Rs. 4,000. These figures suggest that transportation is a significant operational cost for a majority of dairy

farmers, potentially influenced by factors such as distance to markets, frequency of deliveries, and the lack of cooperative or government-supported logistics infrastructure.

3.8 Medical expenses

Among the total farmers interviewed, 98 per cent reported incurring medical expenses related to dairy farming. Of these, 48 per cent spent less than Rs. 10,000 annually on animal healthcare. This was followed by 24 per cent who incurred costs between Rs. 10,000–15,000, while 7 per cent and 5 per cent reported expenses in the range of Rs. 15,000–20,000 and Rs. 20,000–25,000 respectively. Notably, 14 per cent of the farmers spent more than Rs. 25,000 on medical treatments.

These expenditures were primarily attributed to common livestock diseases such as Foot and Mouth Disease (locally known as Mukhor) and Mastitis. The high prevalence of such illnesses underscores the need for improved veterinary services and preventive health measures in the dairy sector. In the year 2023-24 livestock sector in Punjab faced negative growth of 5.42 per cent, mainly due to diseases like Foot and Mouth and Lumpy Skin disease, which affected milk yield in cattle and buffaloes (Economic Survey of Punjab, 2024-25).

The Animal Husbandry and Dairying Department of Haryana provides prophylactic vaccination to the livestock that is free of cost at the doorstep of the livestock owner. It covers vaccination to diseases such as Foot and Mouth (FMD), which was found to be most prevalent in our study. Other vaccination to diseases includes Haemorrhagic Septicemia (HS), Swine fever etc (Economic Survey of Haryana,2024-25).

3.9 Annual Income and Profitability in Dairy Farming

After calculating various types of input costs, the annual income was calculated based on the actual price realisations by the dairy farmers in both the states.

Table 12: Annual Income from dairy farming

		Respondents	Percent
Annual Income	Less than 5 lakhs	104	52.0
	5 lakh - 10 lakh	56	28.0
	10 lakh - 15 lakh	30	15.0
	15 lakh - 20 lakh	6	3.0
	More than 20 lakhs	4	2.0
	Total	200	100.0

The relationship between herd size and annual income reveals important patterns in dairy farming livelihoods. Based on the data collected, income levels generally increase with the number of lactating animals, although variations exist due to multiple influencing factors.

Table: Annual Income according to herd size (Lactating Animals)

		Annual income					Total
		less than 5 lakhs	5 lakh - 10 lakh	10 lakh - 15 lakh	15 lakh - 20 lakh	More than 20 lakhs	
Number of mature animals (lactating)	1-5	118(59.0)	20(10.0)	0	0	0	138(69.0)
	5-10	4(2.0)	20(10.0)	16(8.0)	4(2.0)	2(1.0)	46(23.0)
	10-15	2(1.0)	0	4(2.0)	0	0	6(3.0)
	15-20	0	0	0	0	2(1.0)	2(1.0)
	More than 20	0	0	4(2.0)	4(2.0)	0	8(4.0)
Total		124(62)	40(20)	24(12)	8(4)	4(2)	200(100.0)

Note: Figures in () parentheses illustrate percentage

Overall, across all herd sizes:

- 62 per cent earned less than Rs 5 lakh,
- 20 per cent earned Rs 5–10 lakh,
- 12 per cent earned Rs 10–15 lakh,
- 4 per cent earned Rs 15–20 lakh, and
- 2 per cent earned more than Rs 20 lakh annually.

According to the study by Birthal and Jha (2005) also highlights that herd size is a significant determinant of dairy farm profitability. Larger herds typically allow for

economies of scale, better use of fixed assets, and higher total milk production. However, income disparities within similar herd sizes may be influenced by breed quality, feeding regimes, veterinary care, disease occurrence, and geographical market access (Chatterjee et al., 2016).

The variation in income levels can be attributed to multiple factors, including the herd size, number of lactating (milking) animals, breed quality, access to markets, availability of veterinary services, and overall farm management practices. These elements significantly influence productivity, milk yield, and ultimately profitability.

4 Issues and Challenges Faced by Farmers in Dairy Sector

Around 99 per cent of the farmers interviewed reported encountering various challenges in dairy farming, including low productivity, inadequate access to veterinary medicines and vaccines, deficiencies in storage and packaging infrastructure, as well as financial constraints, and difficulties related to marketing and transportation. These multifaceted issues highlight the structural and logistical barriers that continue to affect the efficiency and profitability of small and medium-scale dairy enterprise.

4.1 Productivity Issues

In relation to productivity challenges in dairy farming, the high cost of feed emerged as a universally reported issue. However, many respondents also highlighted additional overlapping constraints, indicating the complex interplay of economic, environmental, and operational challenges impacting dairy productivity. These included a combination of high feed cost and non-availability of labour, high feed cost coupled with high production costs, high feed cost, climate change, labour scarcity, and high labour wages, high feed cost, frequent disease outbreaks, and climate variability as core productivity barriers, of high feed and production costs, disease occurrence, climate-related changes, and labour-related difficulties

4.2 Issues of Medication and Vaccination

With regard to bovine health, medicine and vaccine-related challenges, majority of the farmers mentioned issues affecting livestock health management. The existing literature supports these observations, noting that access to affordable

and effective animal health services is a cornerstone of successful dairy operations, especially for smallholder farmers (Kumar, Dey, and Singh, 2018). Strengthening the veterinary supply chain, ensuring regulatory oversight for quality control, and providing subsidised healthcare inputs could significantly improve the health and productivity of dairy animals. In Punjab, a multi-speciality Veterinary Hospital and Regional Research Centre are being established in Fazilka district, which is aimed at providing specialized veterinary care of animals in the region. In fiscal year 2023-24 Rs 4.28 crore budget had been allocated and the the projected will be completed in 2026-27 (Economic Survey of Punjab, 2024-25).

4.3 Issues of Storage and packaging

In relation to storage and packaging challenges in dairy farming, majority of the farmers 198 (99 per cent), reported infrastructure and logistical barriers that hindered efficient milk handling and distribution. Majority of the farmers cited the lack of adequate storage facilities at milk collection points as a key issue. While other farmers reported a combination of inadequate storage and long distances to the collection centres as problematic, high cost of packaging materials as a burden, and the perishable nature of milk as a core concern, especially in the absence of timely processing or refrigeration.

4.4 Financial Challenges Faced by Farmers

Farmers reported a combination of high initial investment requirements, non-availability of institutional credit, and the absence of government subsidies as the major financial hurdles, high capital costs as the sole barrier, high initial investment, unavailability of formal loans, lack of subsidies, and the exploitative interest rates charged by informal moneylenders, the absence of government subsidies as a key impediment, high capital requirements, inadequate working capital, loan unavailability, delays in loan sanctioning by banks, and lack of subsidy support, delays in bank procedures and working capital shortages, dual burden of high investment needs and limited state assistance.

These findings align with existing literature on agricultural financing in India. Scholars such as (Chand et al., 2011) and (Mahajan and Ramola, 2015) have emphasised that inadequate access to formal credit, combined with high input

costs, limits farmers' ability to invest in productive technologies or diversify into high-value agriculture. Furthermore, the dependency on informal credit sources, which often come with exorbitant interest rates, exacerbates the financial burden (Basu and Srivastava, 2005). The lack of timely and accessible credit from formal banking institutions not only delays crucial investments in seeds, fertilizers, and machinery but also pushes many small and marginal farmers into cycles of debt (RBI, 2020). Moreover, studies have consistently pointed out the ineffectiveness or inaccessibility of subsidy schemes, especially for farmers with limited landholding or weak institutional linkages.

The cumulative evidence from this study and the literature underscores the urgent need for structural reforms in agricultural credit delivery systems, enhanced transparency in loan processing, and broader outreach of subsidy and support programmes, especially for resource-poor and first-generation farmers.

4.5 Marketing and Transportation Issues

The data highlights that a wide range of marketing and transportation challenges are experienced by the surveyed dairy farmers, with 99 per cent of respondents indicating at least one or in combination of marketing-related difficulty.

The most frequently reported challenge was a combination of low market price, price fluctuations, non-availability of buyers, lack of proper marketing channels, and inadequate government support. Other challenges included low market price, price volatility, non-availability of buyers, lack of certification (e.g., quality grading or safety standards), poor marketing infrastructure, absence of government support, and high diesel costs when using personal vehicles for milk transportation. The inclusion of transportation cost, specifically diesel prices, illustrates how logistical expenses can erode profit margins, especially for smallholder dairy producers who must transport milk daily and rely on self-transport due to limited cooperative or private chilling infrastructure.

According to Birthal et al. (2007), dairy markets in India are often fragmented, with producers heavily dependent on local collectors or informal vendors due to poor access to formal cooperatives or milk federations. Moreover, price discovery mechanisms remain weak, and contract-based dairy farming is still limited, leaving small and marginal dairy farmers particularly vulnerable to market fluctuations

and delayed payments (Chand, 2012). The lack of formal certification systems for milk quality also restricts farmers from accessing premium markets or higher-value urban consumers.

5 Specific Recommendations

- The dairy farming in Punjab and Haryana was mainly practiced by farmers from the General category, with comparatively lower participation from the Scheduled caste and Other Backward Class (OBC). This disparity reflected broader socio-economic patterns including access to resources, land ownership, and institutional support which tend to be more favourable for the general category.
- The study found that a majority of dairy farmers did not engage in the production of value-added dairy products such as ghee, curd and paneer. These farmers reported that they exclusively sold milk, indicating a limited diversification of dairy related activities. This trend highlights a predominant focus on primary milk production, with minimal participation in post-production processing.
- Transportation was found to be an important operational cost for a majority of dairy farmers, potentially influenced by factors such as distance to markets, frequency of deliveries, and the lack of cooperative or government-supported logistics infrastructure.
- In the study it was found that only a small number of dairy farmers in both the states had have availed any government scheme which showed low participation in formal institution support mechanisms. The low uptake of government schemes underscores a persistent gap in policy outreach, awareness and accessibility for marginal and small holder dairy farmers. This highlights the need for targeted awareness campaigns and stronger local institutional support to ensure that the intended benefits of dairy schemes reach the grassroot level. Further it was found that no farmer from Haryana districts of Jind and Hisar reported having availed any government scheme related to dairy.
- Farmers in Punjab had expressed that government schemes often do not reach them. Many farmers mentioned that officials rarely visit villages to

inform them about available schemes, and even when they do find out, the application process is complicated and time consuming. Farmers suggested that if the government wants its schemes to benefit them, there should be awareness programmes at the village level to ensure they can access these opportunities.

- Participation in formal training, workshops, fairs, or awareness programmes related to dairy entrepreneurship was notably low among the farmers interviewed. The limited participation in training activities highlights a critical gap in knowledge dissemination and skill development within the dairy sector. Training programmes play a crucial role in improving farm management practices, herd health, feed efficiency, and overall profitability. The data suggest an urgent need to enhance outreach strategies, particularly targeting small and marginal farmers who may lack access to extension services or are unaware of available training opportunities (the above findings were also found in Singh, Devi, and Yadav, 2021; Kaur and Sharma, 2020).
- In relation to the issue of storage and packaging in dairy farming, majority of the farmers reported infrastructure and logistical barriers that hindered efficient milk handling and distribution. These findings indicate that many dairy farmers face critical gaps in post-harvest infrastructure, particularly cold chain facilities and storage access, which are essential for preserving milk quality and reducing spoilage. The perishable nature of milk necessitates efficient cold storage and timely transportation, and deficiencies in these areas often result in economic losses and discourage small-scale producers from expanding operations. Investing in village-level milk chilling units, cooperative storage infrastructure, and affordable packaging solutions could alleviate these challenges and support higher farmer incomes through reduced spoilage and improved product quality.
- The study found that the majority of farmers sold their milk and value-added-products (limited to ghee and cottage cheese i.e. paneer) in the local market indicating dependence on informal channels. The selling of milk in the local market may be attributed to lower transportation cost,

immediate cash returns, although it suggests limited integration into more formal and more profitable value chains.

- The majority of the farmers also mentioned that the big dairy companies like Verka and Vita often provide low prices for milk, due to which farmers receive minimal payment for their produce, while companies enjoy the majority of the profits. Further, many farmers also mentioned that timely payment is not also being done by the companies, they receive payment after 10-12 days. In Punjab few farmers reported that collection centres offer an incentive of Rs.50 per quintal if they deliver over 1 quintal of milk, but will not accept milk if it is less than 1 quintal. In such cases farmers are forced to sell their milk locally at lower prices. This issue, however, was not prevalent in Haryana.
- All the farmers interviewed across Punjab and Haryana reported that livestock dung was a key by-product of their dairy farming activities. Moreover, beyond subsistence, a number of farmers reported economic gains from selling dung, indicating its potential as an economic by-product.
- In relation to productivity challenges in dairy farming, the high cost of feed emerged as a universally reported issue, with 100 per cent of farmers in both the states identifying it as a major factor affecting their dairy operations.
- The majority of the farmers mentioned medicine and vaccine related challenges affecting livestock health management. Strengthening the veterinary supply chain, ensuring regulatory oversight for quality control, and providing subsidised healthcare inputs could significantly improve the health and productivity of dairy animals. In Punjab, a multi-speciality Veterinary Hospital and Regional Research Centre is being established in Fazilka district, which is aimed at providing specialized veterinary care of animals in the region. In fiscal year 2023-24 Rs 4.28 crore budget had been allocated and the project will be completed in 2026-27 (Economic Survey of Punjab, 2024-25).
- The majority of the respondents mentioned that training should happen regularly and should happen at village level. As they had to travel long distances for training which made it difficult for them.

6 Conclusion

The study found that in Punjab and Haryana, dairy farming proved beneficial across all categories of farmers, providing not only agricultural value but also a reliable means of supplementing farm income. The results of the study further highlight considerable untapped potential for value addition in the dairy sector, as the majority of farmers interviewed were engaged primarily in milk sales yet were able to generate profit. However, only a very small proportion of farmers were involved in value addition activities, highlighting the significant scope for diversification into processed dairy products. At the same time, the sector continues to face multiple challenges, such as productivity, financial, marketing and transportation, issues related to medicines and vaccines. Addressing these challenges through policy support, capacity building and institutional strengthening could help improve the viability of dairy farming. Despite these challenges, dairy farming emerged as a highly advantageous enterprise, offering considerable scope for increasing farmers' incomes in both the states. When integrated with traditional agriculture, dairy farming serves as an important and stable source of income for farmers, and the findings suggests that there exists a substantial untapped potential for further expansion and income augmentation in both states.

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