Original Research Article

Physical and financial performance of Vijayapura and Bagalkot Milk Union Limited (VIMUL), Karnataka.

ABSTRACT:

Livestock plays a crucial role in sustaining rural livelihoods in India, with dairying alone supporting millions of farm families. The livestock sector has witnessed significant growth, contributing to both rural income and the country's Gross Domestic Product (GDP). In Karnataka, dairy cooperatives play a pivotal role in milk production, with the Karnataka Milk Federation (KMF) being a prominent player. One such entity within KMF is the Vijayapura and Bagalkot Milk Union Limited (VIMUL), operating in the districts of Vijayapura and Bagalkot. This research paper conducts a comprehensive analysis of VIMUL's physical and financial performance over a thirty-six-year period from 1986-87 to 2021-22. Utilizing secondary data, various analytical tools including growth rate analysis, ratio analysis, and financial performance indicators were employed to assess VIMUL's performance. The findings reveal a positive trend in VIMUL's physical and financial performance indicators over the study period. VIMUL demonstrated consistent growth in milk procurement, membership, and operational efficiency, reflecting its effective management and cooperative principles. Financial ratio analysis indicates satisfactory liquidity, solvency, efficiency, and profitability of VIMUL, although certain areas may require attention for further improvement. Overall, VIMUL emerges as a model for cooperative dairy enterprises, contributing significantly to rural development and economic growth in Karnataka. The insights provided in this research paper offer valuable implications for policymakers, practitioners, and stakeholders, emphasizing the importance of continued support and investment in dairy cooperatives for sustainable agricultural development and rural prosperity.

Keywords: Livestock sector, dairy cooperatives, Karnataka Milk Federation, Vijayapura and Bagalkot Milk Union Limited (VIMUL), rural livelihoods, financial performance, sustainability, cooperative principles, rural development, agricultural growth

INTRODUCTION

Livestock provides livelihood to two-third of rural masses and employs about 8.8 per cent population of India. While dairying alone ensures the livelihood of 70 million farm families. Livestock contributed 16 per cent to the income of small farm households as against 14 per cent for all rural households. The economic survey 2022-23 also highlighted another important trend of increasing contribution of the livestock sector. The livestock sector grew at a compound annual growth rate of 7.9 per cent during 2014-15 to 2020- 21 (at constant prices). The livestock

sector contributes 5.1 per cent to Indian Gross Domestic Product (GDP) and shares 28 per cent of the total agriculture GDP.

Indian states have state milk federations, and several co-operative dairy milk unions, private dairy plants, primary milk co-operative societies which play an important role in promoting production of milk in the state. There are 22 state milk federations with 170 district-level unions, more than 76,000 village-level co-operative societies, and 11 million milk producer members. These co-operatives collects an average of 15 million litres of milk every day. Karnataka is the 11th largest milk-producing state (5.5 metric tonnes) constitute 5 per cent of the country's total milk production. Karnataka Milk Federation has 14 milk unions involving various parameters of dairy activity, *i.e.*, organization of dairy co-operatives, milk routes, veterinary services, procurement of milk in two shifts of the day, chilling, processing of milk, distribution of milk and also establishment of cattle feed plants, along with sperm station, liquid nitrogen supply, training centres, as its mainstay. KMF sells products such as raw milk, curd, fermented products, milk powder, ghee and butter, ice cream and frozen desserts, milk sweets, chocolates, and flexi pack milk. KMF works on the co-operative principles. More than 75 per cent of the consumer rupee is transferred to the producers who strive hard for the development of the federation. Presently, 97 per cent of the dairy co-operative societies are working under the profit. The majority of the beneficiaries of co-operative dairy development programmes in the state belongs to the poor section in villages.

The Karnataka districts of Vijayapura and Bagalkot are home to the Vijayapura and Bagalkot Milk Union Limited (VIMUL). Vijayapura and Bagalkot Milk Union is sixth in milk procurement among the State's 14 milk unions. The districts of Vijayapura and Bagalkot are part of its milk-shed region. In 1986, the Karnataka government built the Vijayapura and Bagalkot union, which has a 60 TLPD capacity (Thousand litres Per Day). It became a part of the region in which the operation flood was carried out after joining the KMF in 1986. As a part of this programmeme, a chilling centre with a 1-LLPD (Lakh Litres Per Day) capacity and a farm cooler with a 60-TLPD capacity were also created in 1995.

About 331 functional primary dairy co-operative societies are affiliated to the union. In all around 41,256 milk producer families supplying milk to the union through primary milk producers co-operative societies. Around 76,699 families are depending on dairy activities for their livelihood of which many are land less labourers and belong to weaker section. The major

objective of the union is to carry out activities conducive to the economic and socio-economic development of the milk producers by organization effectively. The present study is an attempt to document the physical and financial performance of Vijayapura and Bagalkot Milk Union in Karnataka state.

METHODOLOGY

For the analysis of the objectives of the study, secondary data are utilized. The secondary data on several aspects of the activities (balance sheet, procurement and profit and loss account etc) of the KMF selected data were collected from different sources since its inception depending on the availability of the required information for the study. The data related to the financial aspects of the federation/union such as balance sheets, profits and loss account, receipts and payment statements and trading accounts were abstracted from the annual reports and audit reports of KMF. The Vijayapura and Bagalkot union has been purposively selected for the study. The Period of the study considered in the present research work was thirty six years from 1986-87- 2021-22 for analysis.

ANALYTICAL TOOLS AND TECHNIQUES EMPLOYED

- Growth rate analysis
- Ratio analysis
- **Growth rate analysis**
- For computing the growth in area, quantity of milk procured and amount of milk and milk products marketed in Vijayapura and Bagalkot district of Karnataka state, the compound growth rate analysis was carried out. The compound growth function was specified in the following form.
- Yt = ABt Ut ……..(1)
- Where,
- Yt = Area/production/productivity in the year t
- A = Intercept indicating Y in the base Period (t=0)

- B = 1 + g
- ti = Time Period (i = 1 to 9)
- Ut = Error term
- g = Average annual compound growth rate
- Equation (1) was converted into the logarithmic form in order to facilitate the use of linear regression. Taking logarithms on both sides,
- LnYt = LnA + t (Ln B) + Ln Ut …….(2)
- or
- Qt = a + bt + ut
- Where,
- Qt = Ln Yt
- a = Ln A
- b = Ln B
- t = Time
- Ut = Ln Ut
- The district wise and area wise linear regression of the above form was specified separately for area, procurement and marketing of selected Dairy Co-operative Societies. The values of ‘a’ and ‘b’ were estimated by using Ordinary Least Square estimation technique. Later, the original ‘A’ and ‘B’ parameters in equation (1) were obtained by taking anti-logarithms
- of ‘a’ and ‘b’ values as;
- A = Anti Ln a
- B = Anti Ln b

- Average annual compound growth rate was calculated as;
- $B = 1 + g$
- $g = B - 1$

Financial ratio analysis

In order to know the financial performance of the Vijayapura and Bagalkot Milk Union, the financial ratio analysis, an effective tool providing the summary of the performance of a business organization relied. The ratio relating to solvency, liquidity, profitability, turnover of the Vijayapura and Bagalkot Milk Union have been analyzed.

The secondary data drawn from the audited annual statements of the Balance sheet, Trading account, Profit and Loss (P&L) account of the Vijayapura and Bagalkot Milk Union for a Period of thirty six years from 1986-87 to 2021-22 were subjected to rigorous financial ratio analysis. The financial ratios used for the analysis are described below.

1. Liquidity ratios

Liquidity ratios are used to measure the ability of a firm to cover its expenses. The two most common liquidity ratios used are the current ratio and the quick ratio. Both are based on balance sheet items.

a. Current ratio

The current ratio measures the firms short term solvency that is, its ability to meet short term obligations. It mainly used to give an idea of an organisation ability to pay short term liabilities (debt and payables) with its current assets. This is computed as the ratio of total current assets to total current liabilities.

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

b. Acid – test ratio or Quick ratio

The quick ratio is also called “acid test” ratio. That is because the quick ratio looks only

at organization most liquid assets and compares them to current liabilities. The quick ratio tests whether a business can meet its obligations even if adverse conditions occur. Following is the formula for computing the quick ratio.

$$\text{Quick Ratio} = \frac{\text{Total Current Assets - Total Inventory}}{\text{Total Current Liabilities}}$$

2. Solvency ratios

Solvency ratios measure the stability of an organisation and its ability to repay debt. These ratios are of particular interest to a bank loan. The solvency ratios give a strong indication of the financial health and viability of any business.

a. Debt-Equity ratio

The Debt-Equity (D/E) ratio is calculated by dividing the organisation total liabilities by its shareholder equity. These numbers are available on the balance sheet of an organization's financial statements. The ratio is used to evaluate an organization financial leverage. The D/E ratio is an important measure used in corporate finance. It is a measure of the degree to which an organisation is financing its operations through debt versus wholly owned funds. More specifically, it reflects the ability of shareholder equity to cover all outstanding debts in the event of a business downturn.

$$\text{Debt – Equity Ratio} = \frac{\text{Long term Borrowings}}{\text{Share Capital + Reserves}}$$

b.Total debt ratio

The Total debt ratio is a financial ratio that measures the extent of an organisation leverage. The total debt ratio is defined as the ratio of total debt to total assets, which is expressed as a decimal or percentage. It can be understood as the proportion of an organisation assets that are financed by debt.

$$\text{Total debt ratio} = \frac{\text{Total liabilities}}{\text{Total Assets}}$$

3. Tests of turnover

The turnover ratios point out the effectiveness with which different assets were exploited

in the business. Turnover means the number of times an asset flows through a firm's operations into its total sales. The important turnover ratios considered in the present study are described below.

a. Inventory turnover ratio

This ratio measures the effectiveness of the firm (Vijayapura and Bagalkot Milk Union) in its sales efforts. Higher the turnover ratio better would be the performance.

$$\text{Inventory Turnover Ratio} = \frac{\text{Annual sales}}{\text{Average inventory}}$$

b.Total assets turnover ratio

Total assets turnover ratio was computed by dividing total sales by the total assets of the Vijayapura and Bagalkot Milk Union in a given Period of time. A higher ratio indicates that the composition of total assets is weak and a lower ratio indicates the accumulation of fixed assets.

$$\text{Total Assets Turnover Ratio} = \frac{\text{Total Sales}}{\text{Total assets}}$$

c. Working capital turnover ratio

This was considered useful in assessing the efficiency of the total working capital employed in the business by the firm. Higher the turnover ratio, greater would be the efficiency and more will be the rate of profitability of an organization.

$$\text{Working Capital Turnover Ratio} = \frac{\text{Total Sales}}{\text{Total Working Capital}}$$

4. Tests of Efficiency and Profitability

The tests of efficiency indicate the usage of capital and income, whereas the profitability tests are meaningful measures which can be used to analyze the financial status and the overall productiveness of business organisation. The efficiency and profitability of the Vijayapura and Bagalkot Milk Union were deliberated by employing the following ratios.

a. Gross profit ratio (GP ratio)

This is a profitability ratio that shows the relationship between gross profit and total net sales revenue. It is a popular tool to evaluate the operational performance of the business. The ratio is computed by dividing the gross profit by net sales.

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}}$$

b. Net profit to Total sales ratio

Net profits to total sales ratio, also known as net profit margin, illustrates an organisation ability to earn profits after meeting all direct and indirect cost of business. This ratio was enumerated by dividing the net profits by total sales.

$$\text{Net Profits to Total Sales Ratio} = \frac{\text{Net Profits}}{\text{Total Sales}}$$

c.Net profits to Total assets ratio

Net profits to total asset ratio, also known as net profit margin, indicates an organisation ability to earn profits after meeting all direct and indirect cost of business. This ratio was calculated by dividing the net profits by total asset. A higher ratio revealed a higher overall efficiency of the business and fuller utilization of the resources and vice – versa.

$$\text{Net Profits to Total Assets Ratio} = \frac{\text{Net Profits}}{\text{Total Assets}}$$

5.Tests of Financial Strength

These measures were employed to assess the real worth of the Milk Union and are described below.

a. Net worth

Net worth is a measure of the excess of assets over the liabilities. Wider the positive difference, sounder would be the financial performance of the organisation.

Net Worth = Total Assets – Total Liabilities

b. Net capital ratio

Net capital ratio of not more than 15:1 between indebtedness and the liquid asset is considered adequate. Indebtedness includes money owed to the firm, margin loans, and commitments to purchase securities. Liquid assets include cash and assets which are easily converted to cash.

This ratio would give forth the financial strength of a business organization.

$$\text{Net Capital Ratio} = \frac{\text{Total Assets}}{\text{Total Liabilities}}$$

Results and discussion

1.Physical performance of VIMUL since its inception

Table 1. shows the physical performance of the union which was measured by using physical indicators like number of DCSs registered, DCS functioning, the number of employees, total milk procured, total members and total members per DCS. The trend in physical performance with respect to different indicators showed an improvement over time across the periods. The total number of DCS registered and total DCS membership were highest in Period I (6.05%) and Period III (8.31%) respectively. This is due to various activities taken up by the union to increase functioning DCSs to increase procurement of milk rather than concentrating on setting up of new DCSs. The total number of employees showed the highest growth rate in Period I, with a growth rate of 6.15 per cent over the ten years due to diversified activities which were taken up by the union needed more number of employees in the union to manage those activities, and the lowest growth rate was observed in Period III, with a growth rate of 2.53 per cent over the years. The total milk procurement was 2.28 lakh litres per year in Period I, which increased to 19.58 lakh litres in Period IV. The dairy farmers more opted to dairy co-operative societies for easy marketing of milk as well as to get the benefit of government subsidy and the total members per DCS had highest growth rate in fourth Period. The growth rate for total members was in Period I and lowest in Period III. This is because increase in milk production by the dairy farmers due to Ksheerabhagya yojana which came in 2014-15 as well as increase in urban population which increased the demand for milk. Rashtrarakshak, Jagrati B, Deshmanya, G M Hiremath, Prabhuling Tevari, Vijaya B Wali and Jagjiwan Ram, (2021) studied the physical performance of Kalaburgi, Bidar, and Yadagiri milk unions. The research's conclusions showed

that DCSs were actively operating and that members of DCSs enrolled in DCSs had a positive growth rate.

Table 1. Physical performance of VIMUL

Period		Total number of DCS Registered	Total DCS Membership	Total Number of Employees in the Union	Total Milk Procured (Lakh Liters)	Total Members	Total members per DCS
1986-87 to 1995-96 (Period-I)	AVERAGE	237	90	93	2.28	16,146	68
	CV(%)	17.65	17.74	17.65	17.28	20.25	4.11
	CAGR(%)	6.05**	6.12**	6.15***	3.34***	6.98**	0.87***
1996-97 to 2005-06 (Period-II)	AVERAGE	322	128.31	145	2.47	26,700	83
	CV(%)	6.88	11.17	11.80	24.15	14.64	8.68
	CAGR(%)	2.21***	3.6***	3.94**	1.37***	4.74**	2.48**
2006-07 to 2015-16 (Period-III)	AVERAGE	395	228.12	195	8.55	41,132	104
	CV(%)	9.11	23.42	7.58	48.46	12.41	6.42
	CAGR(%)	1.68**	8.31**	2.53***	15.84**	3.63***	1.91***
2016-17 to 2021-22 (Period-IV)	AVERAGE	435	328	240	19.58	59,829	137
	CV(%)	4.61	2.93	6.54	7.39	15.13	12.87
	CAGR(%)	0.43***	0.60***	3.45**	1.90***	6.92**	6.46**

***- significant at 1%, **- significant at 5% level of significance

Table 2. Liquidity ratios of VIMUL during the study Period.

Table 2 indicated the liquidity ratio of VIMUL in different Periods. The two common liquidity ratios are the current ratio and the acid test ratio. These are analysed by taking the data from the balance sheet. A current ratio is the ratio of current assets to current liabilities. The current ratio indicates the ability of an organisation to cover its expenses. The ideal current ratio of 1.5:1 to 2:1 shows satisfactory performance. From the table, we can observe that the current ratios are in an increasing over the different Periods. In the fourth Period, it has surpassed the standards (2.05) and was lowest in Period I (0.68) as it shows the union has a satisfactory liquidity position. Thus, the null hypothesis for the current ratio below the standard norm for the union is rejected. The acid test ratio, also known as the quick ratio, is a better measure than the current ratio. The quick ratio of 0.5 to 1 shows satisfactory performance. We can see from the results that the acid test ratios have been increasing over time, with the highest being in Period IV (1.21) indicating the union has sufficient liquid assets to meet the current obligations. Selvi (2016) studied on financial performance of kanyakumari district cooperative milk producers' union (KDCMPU), as the results revealed that average current ratio over the years under study has crossed the standard with 2.64. Hence it can be concluded that the Aavin Industry in Kanyakumari District is good at its liquidity position as far as the current ratios are concerned. Santhosha *et al.* (2020) evaluated the physical and financial performance of Shivamogga milk union ltd. According to the current ratio (>2) and quick ratio (>0.95), the union had enough liquid assets to cover its current liabilities.

Table 2. Liquidity ratios of VIMUL during study Period

Period	Current ratio	Acid test ratio
1986-87 to 1995-96 (Period-I)	0.68	0.93
1996-97 to 2005-06 (Period-II)	0.98	1.00
2006-07 to 2015-16 (Period-III)	0.99	1.09
2016-17 to 2021-22 (Period-IV)	2.05	1.21

3. Turnover Ratios of VIMUL During the Study Period

The turnover ratio is shown in Table 3. The important turnover ratios are inventory turnover ratio, total asset turnover ratio, and working capital turnover ratio. The turnover ratio indicates the effectiveness of different assets that are utilised in the business. Turnover means the number of times an asset flows through an organization's operations into its total sales. The inventory turnover ratio indicates the immediate sales of milk and milk products by the Vijayapura and Bagalkot milk union, and the union showed better liquidity in fourth Period as compared to other Periods (36.25) and it was least in Period I (22.57). The standard norm for the total assets to turnover ratio is 2:1, which has been surpassed by the union in various years. It shows that the union has the ability to use its assets to generate sales efficiency. The highest ratio was seen in Period III (4.15) and the lowest in Period I (3.39). The working capital turnover ratio was highest in Period IV (2.79) and lowest in Period III (2.42). From this table, we can conclude that the union has used its working capital efficiently. Rajaram and Geetha Rajaram (2011) studied on financial performance of Karnatak milk unions as the results revealed that the inventory inventory turnover (0.880) and Equity turnover (0.807) were showing satisfactory performance of milk unions in Karnataka.

Table 3. Turnover ratios of VIMUL during the study Period

Period	Inventory turnover ratio	Total assets to turnover ratio	Working capital turnover ratio
1986-87 to 1995-96 (Period-I)	22.57	3.39	2.57
1996-97 to 2005-06 (Period-II)	28.51	3.91	2.60
2006-07 to 2015-16 (Period-III)	31.55	4.15	2.42
2016-17 to 2021-22 (Period-IV)	36.25	4.03	2.79

4.Solvency ratios of VIMUL during the study Period.

Table 4 represents different solvency ratios like debt equity ratio and total debt ratio for VIMUL in different Periods. The liquidity ratio, which indicates the stability of the business and the ability to repay the debt. This is the primary indicator of the financial status of the business concern for creditors. The debt-to-equity ratio of 2 is considered satisfactory. In the initial three Periods, the ratio is below the standard norm. Hence, the union needs to strengthen its equity position by increasing share capital as it needs to increase its equity capital compared to borrowings. The standard norm for the total debt ratio is 0.5 to 1. We can see from the table that the total debt ratio was well within the standard norms in Period I, II, and III, so we can reject the null hypothesis that solvency is lower than the standard norm for above mentioned periods. It indicates that the union has fewer risks as it has more assets as compared to liabilities during these periods. However, Period IV which is the current time period has got a lower solvency (1.06) which means currently union has more liabilities as compared to assets. From the table, we can see that the total debt ratio was above the standard norms in all the Periods. Santhosha *et al.* (2020) evaluated the physical and financial performance of Shivamogga milk union ltd. Debt equity ratio was high during 2009-10 (2.07) and low during 2012-13 (1.68). the ratio was below the standard norm for some of the years hence needs to strengthen the equity position.

5. Efficiency and profitability ratios of VIMUL during the study Period.

Table 5 shows the efficiency and profitability of VIMUL, which is measured by using various profitability ratios. The test of efficiency indicates the utilisation of income and capital and test of profitability indicates overall efficiency of the business organization. The gross profit ratio was adequate over the study Period, which indicates the union is running efficiently. This ratio represents profit for every rupee worth of goods sold by the Milk Union. In other words, the Milk Union was able to generate sufficient profits. The gross profit ratio, which was highest in Period IV (2.01) and lowest in Period I (1.50), The high gross profit ratio indicates better performance. Net profit to total asset ratio indicates profit earned per every rupee of assets. The highest net profit to total assets ratio was observed in Period IV (0.064) and the lowest in Period III (0.059). The union had a high net profit to total assets ratio, indicating that it was able to generate sufficient profits from its assets through improved performance. The union exhibited a net profit to total sales ratio highest and lowest in Period II (0.048) and Period IV (0.030) respectively. This ratio shows that the union was able to earn after meeting all its direct and indirect costs and hence it indicates that efficient performance of the union. Selvi (2016) studied on financial performance of kanyakumari district cooperative milk producers' union (KDCMPU),

as the results revealed that the Aavin of Kanyakumari district was able to earn net profit from the year 2008 to 2015 except during the year 2007 in which the industry has suffered loss. This may be due to the over expenditure and low price for the milk. Due to this there is lot of fluctuations in the net profit ratio too.

Table 4. Solvency ratios of VIMUL during the study Period

Period	Debt equity ratio	Total debt ratio
1986-87 to 1995-96 (Period-I)	1.79	0.54
1996-97 to 2005-06 (Period-II)	1.85	0.73
2006-07 to 2015-16 (Period-III)	1.92	0.93
2016-17 to 2021-22 (Period-IV)	2.04	1.06

Table 5. Efficiency and profitability ratios of VIMUL during the study Period

Period	Gross Profit ratio	Net profit to total assets ratio	Net profit total sales ratio
1986-87 to 1995-96 (Period-I)	1.50	0.060	0.033
1996-97 to 2005-06 (Period-II)	1.63	0.061	0.048
2006-07 to 2015-16 (Period-III)	1.89	0.059	0.037
2016-17 to 2021-22 (Period-IV)	2.01	0.064	0.030

6. Financial strength of VIMUL during the study Period.

The financial strength of Vijayapura and Bagalkot Milk Union Limited is measured by using net worth and net capital ratios are shown in Table 6. The net worth was lowest in Period I (17.72) because of less retained earnings and stakeholders' equity and highest in Period IV (65.75). The net capital ratio, which was increasing over the Periods. Any organisation must keep its asset-to-liability ratio under 15:1. The table shows that the highest net capital ratio

was seen in Period IV (10.43) and the lowest in Period I (4.93) which has shown an increasing trend over the study Period. Any organisation needs to maintain the ratio of assets to liabilities below 15:1. The highest ratio indicates the more liquid assets that were held by the union.

Table 6. Financial strength of VIMUL during the study Period

Period	Net worth (Rs in lakhs)	Net capital ratio
1986-87 to 1995-96 (Period-I)	17.72	4.93
1996-97 to 2005-06 (Period-II)	36.05	5.24
2006-07 to 2015-16 (Period-III)	24.87	8.34
2016-17 to 2021-22 (Period-IV)	65.75	10.43

Conclusion

In conclusion, the comprehensive analysis of Vijayapura and Bagalkot Milk Union Limited (VIMUL) presented in this research paper highlights its significant contributions to the dairy sector and rural economy of Karnataka. Over the span of thirty-six years, VIMUL has demonstrated remarkable physical, financial, and operational performance, reflecting its pivotal role in promoting dairy farming, enhancing livelihoods, and fostering economic growth in the region. Notably, VIMUL's success can be attributed to its proactive approach to farmer empowerment, community engagement, and technological advancements. By fostering strong partnerships with dairy cooperative societies, leveraging government schemes, and embracing modern practices, VIMUL has not only boosted milk procurement and processing but has also enhanced the socio-economic well-being of dairy farmers and rural communities. As the dairy industry continues to evolve and face new challenges, the findings of this research paper provide valuable insights for policymakers, practitioners, and stakeholders. By recognizing VIMUL's achievements and identifying areas for further improvement, stakeholders can collaboratively work towards ensuring the sustainability, inclusivity, and resilience of the dairy sector, thereby advancing the broader goals of agricultural development and rural prosperity. In conclusion, VIMUL serves as a beacon of success and a model for cooperative dairy enterprises, inspiring confidence in the transformative power of collective action and sustainable practices. Moving forward, continued support, investment, and innovation will be essential to furthering VIMUL's mission of empowering dairy farmers, strengthening rural livelihoods, and

fostering inclusive growth in Karnataka and beyond.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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