

# Growth and Trends of Milk Procurement in Mysuru District: A Trend Analysis

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## ABSTRACT

The present study entitled “Growth and Trends of Milk Procurement in Mysuru District: A Trend Analysis” examines the growth pattern and trend behaviour of milk procurement over the period from 2012–13 to 2020–21. The study is based on secondary time series data collected on milk procurement and primary data gathered from 140 sample respondents in the study area. Various statistical tools such as trend analysis, regression analysis, percentage analysis, Compound Annual Growth Rate (CAGR), and Garrett’s ranking technique were employed for meaningful interpretation of the data. The results of the study reveal that milk procurement in Mysuru District has shown a consistent upward trend, increasing from 324,622 litres in 2012–13 to 611,156 litres in 2020–21. The regression analysis indicates a strong linear growth pattern with a high coefficient of determination ( $R^2 = 0.9478$ ), suggesting that time is a significant factor influencing milk procurement. The estimated Compound Annual Growth Rate (CAGR) of 8.23 percent further confirms a steady and sustainable growth in procurement over the study period.

**Keywords:** Dairy farming; Milk procurement; Trend analysis; Linear Regression analysis; Dairy development; Compound Annual Growth Rate.

## Introduction

The Dairy Development Programmes (DDPs) are among the important socio-economic development initiatives aimed at generating income and employment opportunities, improving the welfare and livelihoods of milk producers, and reducing poverty in Karnataka, particularly in Mysore Taluk of Mysuru District. These programmes play a significant role in promoting dairy farming and enhancing the economic well-being of rural households. DDPs are considered an effective means of addressing rural unemployment by creating income-generating opportunities and strengthening the socio-economic conditions of milk-producing families. The programmes also contribute to improving the standard of living of beneficiaries and support investments in children’s education and other household needs, especially in rural areas. Milk producers play a crucial role in dairy farming activities. Their responsibilities include ensuring a regular supply of milk to district milk unions, maintaining milk quality and hygiene, providing separate cattle sheds, cultivating green fodder, and ensuring proper healthcare and management of cattle and buffaloes. Through their active participation, milk producers contribute significantly to the growth and sustainability of the dairy sector.

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**Research Objectives**

The objectives of the present study are as follows:

1. To study the performance of dairy development programmes in Karnataka.
2. To examine the trends in the growth of milk procurement in Mysuru district.

**Hypothesis**

1. There is a significant difference between the actual milk procurement values and the predicted trendline values during the study period.

**Material and Methods**

The study is mainly based on secondary sources of information. The secondary data has been collected from various annual reports like Government of India - Dairy Development Programmes, Karnataka Milk Federation (KMF), Mysuru Milk Union Limited (MYMUL), reports published by the Directorate of Economics and Statistics, and office records of Milk Producers' Cooperative Societies. The secondary data covered the study period from 2012 to 2020–21. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Various statistical tools, such as Mean, Annual Growth Rate (AGR), Compound Annual Growth Rate (CAGR), and Linear Regression Model.

**An Overview of Karnataka Milk Federation in Karnataka**

The Karnataka Milk Federation (KMF) is India's second-largest dairy cooperative, owned by the state's dairy farmers. Operating under the popular Nandini brand, KMF procures and markets massive volumes of milk and value-added dairy products across South India, focusing on rural economic development and fair returns for its members. KMF is the largest Co-operative Dairy Federation in South India. It is maintained and achieved by milk producers of Karnataka State. KMF procures roughly 85 Lakh (8.5 million) kg of milk daily from around 24,000 villages in 2024. At present, within the KMF network, there are a total of 27.19 lakh milk producer members, of whom 9.06 lakh are active members. During the current year, the organisation procures an average of 1.00 crore litres of milk per day and makes daily payments of approximately Rs. 35.36 crore to milk producers through direct bank transfer (Direct Benefit Transfer – DBT).

The Federation has achieved second position at the national level and first position among the Southern States in the co-operative dairy sector. The mission of the federation is to usher rural prosperity through dairy development programmes. Milk procurement activities within the jurisdiction of KMF Milk Unions are carried out through 12,985 AMCU units at the society level. The infrastructure also includes 2,324 Bulk Milk Coolers (BMCs), 30 Chilling Centres, and 45 Milk Processing Plants, with a combined milk processing capacity of 1.37 crore litres per day.

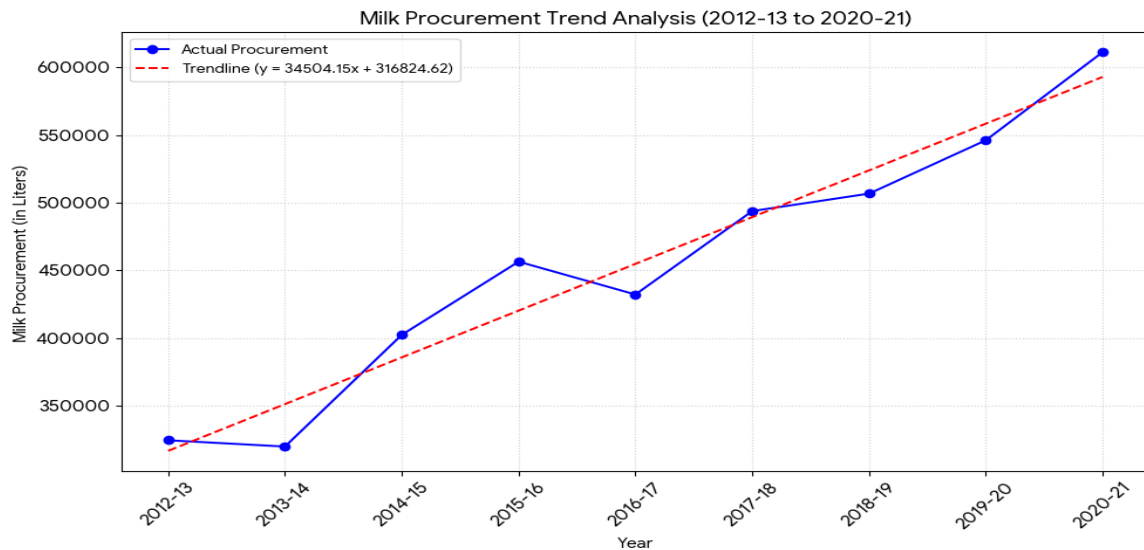
**Growth and Development of MYMUL**

The MYMUL is one of the leading milk production and milk producers in the state. It plays a key role of the supporting to rural members of peoples, milk producers and women farmers, and its impact on socio-economic status of the milk producers in rural areas. In 2024, the Mysuru Milk Union (MYMUL) experienced significant infrastructure and production expansion. Daily Milk Procurement was rose from roughly 6.9 lakh liters per day (LLPD) to a peak of 7.7 LLPD, driven by state government incentives for dairy farmers in 2024.

**Table-1 Growth Trends of Milk Procurement in Mysuru District (2012 to 2020)**

Year	Milk Procurement (in Liters)
2012-13	324,622
2013-14	319,997
2014-15	402,466
2015-16	456,474
2016-17	432,245
2017-18	493,815
2018-19	506,693
2019-20	546,103
2020-21	611,156

**Source:** Various Reports of MYMUL, Mysuru – 2012 to 2020.



The trend analysis of milk procurement from 2012-13 to 2020-21 reveals a positive growth pattern. Milk procurement increased from 324,622 litres in 2012-13 to 611,156 litres in 2020-21, registering an overall growth of 88.3 percent. Although minor fluctuations were observed during 2013-14 and 2016-17, the general trend remained upward throughout the period. The increasing trend indicates the effectiveness of dairy development programmes, expansion of cooperative activities, improved productivity, and greater participation of milk producers in the dairy sector.

**Trendline Analysis of Milk Procurement (2012–13 to 2020–21):** A linear regression analysis was performed on the milk procurement data to establish the long-term growth pattern. To do this, the time periods are converted into a numerical index (x), starting with x = 0 for the year 2012-13 through to x = 8 for the year 2020-21.

**Linear Regression Model:**

The trendline follows the standard linear equation:

$$y = mx + c$$

Where, y-represents the estimated Milk Procurement (in Liters), x- represents the sequential Year Index (0, 1, 2,..... 8), m - is the slope of the line (average volume change per year), c is the y-intercept (the baseline value at x = 0).

Based on the statistical computations: Slope (m): 34,504.15 liters per year Intercept (c): 316,824.62 liters Coefficient of Determination ( $R^2$ ): 0.9478. Thus, the exact trendline equation is:

$$y = 34,504.15x + 316,824.62$$

The  $R^2$  value of 0.9478 implies that approximately 94.78% of the year-over-year variation in milk procurement is explained by a steady linear progression over time. This shows a remarkably strong and predictable growth trajectory.

The slope reveals that milk procurement expanded by an average of 34,504.15 liters annually. The substantial Growth of total procurement rose from 324,622 liters in 2012-13 to 611,156 liters in 2020-21. This marks an absolute increase of 286,534 liters, resulting in an overall expansion of 88.27% across the observed time frame. The Compound Annual Growth Rate (CAGR) for the annualized growth rate over this 8-year span is calculated at 8.23%. While the general movement is solidly upward, minor downward fluctuations occurred in 2013-14 (a drop of 1.42%) and 2016-17 (a drop of 5.31%), followed by robust subsequent recoveries.

#### Actual Procurement vs. Trendline Data

The table below shows a side-by-side comparison of the actual collected numbers against the statistical projections derived from the trendline:

Year	Year Index (x)	Actual Procurement (Liters)	Trendline Prediction (Liters)	Deviation (Actual - Trendline)
2012-13	0	324,622	316,825	+7,797
2013-14	1	319,997	351,329	-31,332
2014-15	2	402,466	385,833	+16,633
2015-16	3	456,474	420,337	+36,137
2016-17	4	432,245	454,841	-22,596
2017-18	5	493,815	489,345	+4,470
2018-19	6	506,693	523,850	-17,157
2019-20	7	546,103	558,354	-12,251
2020-21	8	611,156	592,858	+18,298

**Source:** Research Compiled Work

The above table presents the actual procurement of milk, trend line prediction, and deviations for the period from 2012–13 to 2020–21. The year index (x) is used to estimate the trend values and compare them with actual procurement to understand fluctuations over time. The results indicate that milk procurement shows an overall increasing trend during the study period, rising from 324,622 litres in 2012–13 to 611,156 litres in 2020–21. However, the actual procurement values fluctuate around the trend line rather than following a smooth pattern. In the initial year (2012–13), actual procurement was slightly higher than the trend value, showing a positive deviation of 7,797 litres. In 2013–14, a negative deviation of 31,332 litres was observed, indicating a fall below the expected trend. In the subsequent years, both positive and negative deviations were recorded. Notably, 2015–16 (+36,137 litres) and 2014–15 (+16,633 litres) show higher-than-trend procurement, suggesting strong performance during these years. Conversely, 2016–17 and 2018–19 recorded negative deviations of -22,596 litres and -17,157 litres respectively, indicating temporary declines in procurement compared to expected levels. In the final year (2020–21), actual procurement exceeded the trend line by 18,298 litres, reflecting a strong recovery and improved performance.

### Testing Hypothesis

H0: There is no significant difference between the actual milk procurement values and the predicted trendline values during the study period.

H1: There is a significant difference between actual milk procurement and trend line values during the study period.

**Table 2: Model Summary and Growth Estimates**

Statistical Parameter	Value / Output Metric	Research Interpretation
<b>Trendline Regression Equation</b>	$y = 34,504.15x + 316,824.62$	Base value of 316,825 liters with fixed linear growth.
<b>Model Slope (m)</b>	34,504.15 Liters / Year	Average annual volume increase in procurement.
<b>Coefficient of Determination (R<sup>2</sup>)</b>	0.9478	94.78% of data variance is explained by time trend.
<b>Standard Error of Regression (Se)</b>	23,709.04 Liters	Average distance that data points fall from the trendline.
<b>Total Absolute Growth</b>	286,534 Liters	Absolute volume change from baseline to final year.
<b>Percentage Increase</b>	88.27%	Total relative growth during the study period.
<b>Compound Annual Growth Rate (CAGR)</b>	8.23%	The smoothed, annualized compounding growth rate.

The above statistical results clearly explain the trend and growth pattern of milk procurement during the study period. The estimated trend line regression equation,  $y = 34,504.15x + 316,824.62$ , indicates that the base level of milk procurement in the initial year was approximately 316,825 litres, with a steady linear increase over time. The positive slope value of 34,504.15 litres per year confirms that milk procurement has been increasing consistently at an average rate of about 34,500 litres annually. The coefficient of determination ( $R^2 = 0.9478$ ) shows a very strong goodness of fit, implying that 94.78 percent of the variation in milk procurement is explained by the time trend. This indicates that time is a highly significant factor influencing procurement levels. The standard error of regression (23,709.04 litres) suggests that the actual values deviate moderately from the trend line, but the deviations remain within an acceptable range, confirming a reliable model fit.

The total absolute growth of 286,534 litres highlights a substantial increase in milk procurement over the study period. Similarly, the percentage increase of 88.27 percent indicates strong overall expansion in procurement activity. The compound annual growth rate (CAGR) of 8.23 percent further confirms that milk procurement has grown at a stable and healthy annual rate when compounded over time. Overall, the findings suggest that milk procurement in the study area has exhibited a strong, positive, and statistically reliable upward growth trend, supported by both linear and compound growth measures.

### Conclusion

The present study on milk procurement and dairy development performance reveals a clear and positive growth trend over the study period. The analysis of actual procurement data along with trend line estimation shows that milk procurement has increased substantially from 2012–13 to 2020–21, despite minor year-to-year fluctuations. The overall upward movement indicates strengthening of dairy activities in the study area. The statistical analysis further confirms this growth pattern. The regression results ( $R^2 = 0.9478$ ) indicate a strong and reliable relationship between time and milk procurement, with time explaining nearly 95 percent of the variation in procurement levels. The positive

slope value demonstrates consistent annual growth, while the CAGR of 8.23 percent reflects steady and sustainable long-term expansion. Garrett's ranking analysis of training programmes and socio-economic impacts also highlights that respondents prioritized cattle health services, subsidies, and SHG-based support systems, which contributed significantly to improving dairy productivity and livelihoods. The findings suggest that institutional support, training facilities, and financial assistance have played a crucial role in enhancing dairy development in the study area. Overall, it can be concluded that dairy farming has emerged as an important and growing source of income and socio-economic development. Strengthening training programmes, improving veterinary services, and expanding financial and institutional support systems will further enhance milk production and procurement in the future.

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