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Cost Management Accounting Practices & Their Impact On Profitability & Performance In The Dairy Co-operative

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असतोमा सद्गमय	From ignorance, lead me to truth
तमसोमा ज्योतिर् गमय	From darkness, lead me to light
मृत्योर्मामृतं गमय	From death, lead me to immortality
ॐ शान्ति शान्ति शान्तिः	Peace, Peace, Peace

Behind every successful business decision, there is always a CMA

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President's Message, ICMAI

It is a matter of great pleasure for the Institute of Cost Accountants of India (ICMAI) to release this important publication, a Research Study on the Dairy Cooperative Sector of Tamil Nadu. The study focuses on the need, utility, relevance and application of cost management practices in the sector. The decision of the Cooperative Development Board, ICMAI, to undertake this initiative is truly commendable, as it highlights the indispensable role of Cost Accountants in ensuring resource optimization and process efficiency within the dairy cooperatives of Tamil Nadu, a model that can well be replicated across other cooperative sectors and regions.

India's dairy cooperative movement stands as a remarkable example of inclusive growth, driving rural prosperity and making the nation the world's largest milk producer. This inspiring journey is built on the collective strength, resilience and empowerment of millions of farmers. The research study presents a comprehensive analysis of the dairy cooperative ecosystem, its achievements, challenges and opportunities for future advancement. It delves into critical aspects such as value chain efficiency, sustainability, digital integration and governance frameworks, all of which are vital for enhancing productivity and farmer welfare.

Cost and Management accounting professionals firmly believe that cost optimization and transparency are pivotal to unlocking the next phase of growth in the cooperative landscape. The insights from this study are expected to serve as valuable guidance for policymakers, cooperative leaders and stakeholders in shaping strategies that further strengthen farmer empowerment and sectoral sustainability.

Heartfelt appreciation is extended to the author and the Cooperative Development Board of ICMAI for their dedicated efforts in bringing out this insightful and impactful publication. The initiative reinforces the Institute's commitment to advancing India's cooperative ecosystem through knowledge dissemination, professional excellence and strategic cost management practices.
Jai Hind!

CMA TCA Srinivasa Prasad
President

Message by the Chairman, Cooperative Development Board

I am delighted on the **release of the Research Study on the Dairy Cooperative Sector**, a major initiative by the Cooperative Development Board of the Institute of Cost Accountants of India (ICMAI).

I would like to express our sincere appreciation to **Dr. U. Homiga, Faculty, NICM, Chennai**, for her invaluable contribution to this research study. Her dedication, expertise, and thoughtful insights greatly enriched the quality of the work. We are grateful for the time and effort she devoted to this research study, ensuring that the study achieved its objectives with rigor and excellence.

The **Dairy Cooperative Sector** has been one of India's most successful and transformative cooperative movements. The sector has had a profound socio-economic impact: improving rural incomes, promoting gender empowerment, and strengthening local economies. Despite its successes, dairy cooperatives face challenges such as infrastructure gaps, pricing volatility, and the need for modernization and digital integration.
Union Home Minister Amit Shah recently inaugurated Sabar Dairy Plant at Rohtak, Haryana. In a recent press release it has been mentioned that the dairy sector in India has become the fastest-growing sector in the world, advancing at a rate of 70 per cent, 8 crore farmers in the country have joined the dairy sector.

Mr. Shah said, Sabar Dairy has completed the construction of the largest plant in the entire country with an investment of 350 crore rupees. He said, this will prove beneficial for the farmers who produce milk and it will fulfil the needs of the entire NCR region.
Today, the country's milk processing capacity is 66 million litres per day, which is targeted to reach 100 million litres per day by 2028-29

The government is moving towards self-reliance in the dairy sector by accelerating dairy plant construction and R&D by three times.

Keeping in view of the above, a need was felt to come out with a publication for the support of Cooperative Dairy Sector. I strongly believe that this publication will be of immense value if

shared widely among **practicing CMAs, cooperative leaders, and financial managers** across India. Disseminating these insights to the leadership of Cooperative Milk Producers' Unions nationwide will help prevent financial strain arising from inadequate cost control, and promote a culture of **efficiency, accountability, and continuous improvement**.

The paper focuses on key **cost control tools**—including **Cost Control, Budgeting, Activity-Based Costing, Target Costing, Variance Analysis, and Standard Costing**—offers a structured and evidence-based assessment of how effectively these cooperatives are managing resources.

Once again, I take this opportunity to thank Dr. U Homiga and every contributor who contributed to this important work.
Let us reaffirm our commitment to advancing the cooperative movement — one that combines economic efficiency with social responsibility, and tradition with innovation.

Best Regards,

CMA Navneet Kumar Jain,
Chairman, CDB

SUBHASH A. SHIRODKAR
Minister for Water Resources,
Co-operation and Provedoria

International Year of Cooperatives 2025
Cooperatives Build a Better World

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Date: 21/10/2025

MESSAGE

It is with great pleasure that I extend my best wishes on the release of the research studies conducted by the Co-operative Development Board of the Institute of Cost Accountants of India (ICMAI). Focusing on dairy co-operatives and urban co-operative banks, these studies are a significant contribution to understanding key segments of India's co-operative sector and provide valuable insights to guide its future growth, efficiency, and sustainability.

Co-operatives have long been a cornerstone of India's socio-economic development, fostering inclusive growth and empowering communities at the grassroots. In Goa, they play a crucial role in strengthening rural livelihoods, promoting entrepreneurship, and enhancing the State's economic resilience. Research initiatives of this nature help deepen our understanding of sectoral dynamics, identify challenges, and formulate strategies for better governance and professional management.

I commend the Co-operative Development Board of ICAI for undertaking this important initiative and for its dedication to advancing knowledge, capacity-building, and professionalism within the co-operative movement. The Department of Co-operation, Government of Goa, looks forward to collaborate with ICMAI and other stakeholders in nurturing a transparent, robust, and self-reliant co-operative ecosystem.

I extend my heartiest wishes to everyone involved in the preparation of these studies and wish this initiative every success in strengthening the co-operative spirit and realizing the vision of "Sahakar Se Samriddhi."

SUBHASH A. SHIRODKAR
Hon'ble Minister for Co-operation

पंकज कुमार बंसल, आई.ए.एस.
अपर सचिव
PANKAJ KUMAR BANSAL, I.A.S.
Additional Secretary

सत्यमेव जयते

भारत सरकार
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2025
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Message For Dairy Cooperatives

It gives me great pleasure to extend my warm greetings to all distinguished dignitaries, members of the Institute of Cost Accountants of India, cooperative leaders, and professionals who have come together for the release of this insightful research study.

The topic ***"Cost Management Accounting Practices and their Impact on Profitability and Performance in the Dairy Co-operative Sector of Tamil Nadu"*** is of immense relevance to the evolving cooperative landscape in India. Tamil Nadu's dairy cooperatives have a long and proud tradition of empowering rural communities, enhancing farmers' incomes, and contributing significantly to food security. This study, therefore, provides timely insights into how modern cost management tools can further strengthen their operational efficiency and long-term sustainability.

The Ministry of Cooperation, under the visionary guidance of the Hon'ble Minister Shri Amit Shah ji, has been taking several initiatives to promote **professionalization, transparency, and technological integration** across cooperative institutions. Effective cost management and performance evaluation are vital pillars in achieving these objectives.

This research, undertaken by the **Cooperative Development Board of the Institute of Cost Accountants of India**, highlights how the application of systematic accounting practices can optimize resource utilization, control input costs, and improve profitability — while ensuring that cooperatives continue to serve their members equitably. The study not only contributes to academic understanding but also offers actionable recommendations for cooperative managers and policymakers.

I would like to commend the Institute for its sustained commitment to knowledge-based development in the cooperative sector. Initiatives like this reflect the spirit of partnership between professional institutions and government in building a robust, data-driven cooperative ecosystem.

As we move forward, I encourage greater collaboration between research bodies, state cooperative departments, and apex institutions to replicate such studies across other sectors — so that evidence-based decision-making becomes an integral part of cooperative governance.

My congratulations to the research team, the Cooperative Development Board of ICMAI, and the dairy cooperatives of Tamil Nadu for their contribution to this meaningful initiative. I am confident that this study will serve as a valuable resource for strengthening the cooperative movement not only in Tamil Nadu but across the country.

Regards.

(PANKAJ KUMAR BANSAL)

Acknowledgement

I extend my heartfelt gratitude to all those who contributed to the successful completion of this research project.

I am deeply thankful to our esteemed council, the National Council for Cooperative Training (NCCT), New Delhi, and the Ministry of Cooperation, Government of India, for their continuous encouragement and institutional support.

I also wish to express my sincere appreciation to the Institute of Cost Accountants of India (ICMAI) for awarding me this study and providing the opportunity to contribute to the advancement of cost management practices in the cooperative dairy sector. Their support and trust in my capabilities were instrumental in the execution of this work.

My special thanks go to the management, staff, and members of dairy cooperatives and district milk unions in Tamil Nadu who provided valuable data, insights, and cooperation during the field study.

I am equally grateful to the Natesan Institute of Cooperative Management (NICM), Chennai, for the constant encouragement, institutional support, and for providing the necessary infrastructure and academic environment to carry out this research successfully.

Last but not least, I am indebted to my family for their constant support, patience, and motivation, which enabled me to complete this research with dedication and focus.

Dr. U. Homiga
Faculty, NICM, Chennai

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Executive Summary

Background and Scope

This comprehensive study examines the relationship between Cost Management Accounting (CMA) practices and financial performance across six District Cooperative Milk Producers' Unions in Tamil Nadu during 2020-21 to 2022-23. The research addresses critical challenges facing the dairy cooperative sector, including rising operational costs, increasing competition from private players, and the urgent need for effective financial control mechanisms to ensure sustainability and growth.

Research Methodology

The study employed a mixed-method research design combining quantitative financial analysis with qualitative operational assessments. The performance of all 27 district unions was assessed using a composite KPI score derived from three core metrics: daily Milk Procurement Volume (indicating farmer engagement), Sales Volume (reflecting market reach and distribution efficiency), and Profit/Loss (demonstrating financial sustainability and operational efficiency). Each indicator was normalized and equally weighted to produce a single KPI score for every union, which then determined their categorization as High, Medium, or Low performers in the study.

- High Performers (KPI scores 0.615-0.806): Erode (0.806), Kancheepuram– Tiruvallur (0.749), Tiruvannamalai (0.615)
- Medium Performers (KPI scores 0.400-0.591): Salem (0.549), Villupuram (0.400), and others
- Low Performers (KPI scores 0.223-0.376): Tiruchirappalli (0.376), Madurai (0.259), and others

From each category, two unions were randomly selected for detailed analysis, ensuring the study captured diverse operational practices and challenges across the performance spectrum.

The analysis focused on six core CMA tools: Cost Control, Budgeting, Activity- Based Costing, Target Costing, Variance Analysis, and Standard Costing, evaluated against key financial metrics including ROI, gross profit margins, liquidity ratios, and operational efficiency indicators.

Key Findings

Financial Performance Transformation

The study revealed dramatic performance variations and notable turnaround stories:

- Tiruchirappalli achieved the most significant transformation, improving ROI from -46.19% to +33.42% over three years
- Villupuram demonstrated strong recovery, moving from -57.61% to +21.70% ROI
- Salem maintained steady positive performance at 9.46% ROI
- Madurai struggled with persistent losses (-14.26% ROI in 2022-23)

CMA Practices Impact

Strong positive correlations were established between structured CMA implementation and profitability:

- Cost Control emerged as the most influential predictor across multiple unions (correlation coefficients up to 0.983)
- Activity-Based Costing showed significant impact in high-performing unions
- Variance Analysis demonstrated strong predictive power ($\beta = 0.964$ in Salem)
- Regression models explained 96.5% to 100% of ROI variance, confirming the critical role of CMA practices

Operational Efficiency Insights

- Inventory turnover ratios consistently high (30-50+ across unions), indicating efficient stock management
- Cost per litre varied significantly from ₹42.49 (Erode) to ₹48.80 (Kancheepuram-Tiruvallur)
- Liquidity management emerged as a critical challenge, with several unions operating below optimal current ratio benchmarks

Critical Challenges Identified

The research uncovered systemic operational constraints:

- **Human Resource Gaps**: Severe shortage of trained cost management professionals across all unions
- **Technology Integration**: Over-reliance on manual systems despite IOMS software availability
- **Implementation Inconsistency**: Significant variations in CMA tool adoption and application effectiveness
- **Cost Pressures**: Rising procurement and processing costs outpacing efficiency gains
- **Data Management**: Inadequate centre-wise expense tracking and delayed data acquisition

Strategic Recommendations

Immediate Actions

- Capacity Building: Implement comprehensive CMA training programs for staff at all levels
- System Integration: Enhance digital accounting capabilities with centre- wise expense tracking
- Performance Monitoring: Establish regular financial review mechanisms with standardized metrics

Medium-term Strategies

- Advanced CMA Implementation: Roll out Activity-Based Costing systems for accurate cost allocation
- Procurement Optimization: Develop strategic sourcing initiatives to control raw material costs
- Variance Analysis Enhancement: Transform from reactive to proactive variance management

Long-term Vision

- Digital Transformation: Integrate AI and IoT technologies for real-time cost monitoring
- Best Practice Sharing: Create knowledge transfer mechanisms between high and low-performing unions

- Sustainability Framework: Develop comprehensive cost management models aligned with cooperative principles
-

Research Significance

This study provides empirical evidence that effective CMA implementation significantly enhances dairy cooperative profitability and operational efficiency. The findings validate that structured cost management approaches can drive substantial financial turnarounds, as demonstrated by Tiruchirappalli and Villupuram's remarkable recoveries.
The research contributes to the limited literature on cost accounting in cooperative enterprises and offers practical frameworks for policy makers, cooperative managers, and development agencies working to strengthen India's dairy sector.

Future Research Directions
The study recommends expanding research to include longitudinal studies with extended data periods, qualitative case studies exploring implementation contexts, cross-state comparisons for best practice identification, and investigation of digital transformation impacts on CMA effectiveness.

Conclusion
The study found that initial KPI rankings did not always predict which dairy unions would improve financially; some unions classified as "low performers" achieved dramatic turnarounds through focused cost management, while certain "high performers" continued to struggle with profitability. The unions that made the greatest profit gains were those that rigorously applied cost control, budgeting, activity-based costing, and variance analysis, with tighter expense monitoring (“cost control”) showing the biggest impact across all categories. However, across the board, all unions—regardless of their starting KPI ranking—faced persistent challenges including limited trained staff, heavy reliance on manual processes, inconsistent use of accounting tools, and rising procurement costs. The overall findings prove that with proper cost management practices, even cooperatives that initially lag behind can achieve sustainable growth, regardless of starting performance. The results clearly demonstrate that the dairy cooperative sector in Tamil Nadu has significant potential for improved financial performance if structured cost management accounting (CMA) practices are adopted. Realizing this potential requires coordinated efforts in building staff capacity, integrating technology, and systematically implementing advanced cost management frameworks. The dramatic improvements seen in leading unions highlight that, with the right CMA approach, even those cooperatives facing challenges can achieve sustainable profitability while fulfilling their crucial social and economic roles in rural communities.

1 CHAPTER Introduction

The cooperative sector plays a crucial role in fostering economic development and community empowerment. Unlike traditional business models, cooperatives are member-owned enterprises that prioritize social and economic benefits for their members and communities. This introductory section will provide an overview of the economic significance of the cooperative sector and highlight the importance of effective cost management in ensuring its financial sustainability and growth.

1.1 Background of the Study

The dairy sector plays a vital role in the Indian rural economy by serving as a key source of livelihood, particularly for small and marginal farmers. Tamil Nadu has a well-established dairy cooperative framework functioning under the three-tier structure consisting of village-level Primary Milk Producers' Societies, District Cooperative Milk Producers' Unions, and the apex body, the Tamil Nadu Cooperative Milk Producers' Federation Limited (Aavin). This system not only ensures organized milk procurement and distribution but also strengthens rural employment and food security.

Despite this structured model, the sector faces increasing challenges in cost management, process efficiency, and financial sustainability. Rising input costs, infrastructural constraints, market competition from private players, and inefficient operational practices have led to performance disparities among different unions. As cooperatives operate on minimal profit margins while aiming to offer fair returns to producers, it becomes imperative to adopt structured cost management accounting (CMA) practices to remain viable and competitive.

With the growing demand for milk and value-added dairy products, the need for effective financial control, efficient resource utilization, and strategic planning has become more significant. Understanding how various cost control strategies influence performance indicators such as profit margins, return on investment, inventory turnover, and cost per litre processed is essential. This study aims to explore these relationships and provide insights for enhancing the effectiveness and sustainability of dairy cooperatives in Tamil Nadu.

1.2 Statement of the Problem

Dairy cooperatives in Tamil Nadu play a vital role in rural livelihoods and nutritional security by providing a sustainable source of income to small and marginal farmers. Despite a robust three-tier structure and government support through institutions like Aavin, many cooperatives face significant challenges in maintaining financial sustainability and operational efficiency. Rising input costs, delays in payments to farmers, outdated infrastructure, and lack of structured cost management practices have led to wide disparities in performance across different unions.

While some unions demonstrate profitability and growth through efficient resource use and process optimization, others struggle with high processing costs, low inventory turnover, and inadequate return

on investment. There is a pressing need to identify and evaluate the cost control measures adopted by various unions and analyze their impact on key financial and operational performance indicators.
This study seeks to address the gap by examining the relationship between cost management accounting (CMA) practices and cooperative performance, using both financial analysis and statistical tools. The findings aim to provide actionable insights for policy-makers, cooperative managers, and stakeholders to improve profitability, ensure timely payments to producers, and enhance the long-term sustainability of the dairy cooperative sector in Tamil Nadu.

1.3 Need and Scope of the Study

- **Examination of Cost Management Practices:** The necessity to scrutinize existing cost management practices within dairy cooperative sector is vital for identifying areas where efficiencies can be improved. Cooperative Milk Producers Unions operate in a highly competitive market where margins are often thin and financial sustainability hinges on meticulous cost control. By thoroughly examining current cost management practices, cooperatives can uncover inefficiencies, redundancies, and potential areas for cost savings.
  The competitive pressures faced by dairy cooperatives in Tamil Nadu stem from various sources, including large-scale commercial dairies, fluctuating market prices for milk and dairy products, and the need to comply with stringent quality and safety standards. Additionally, financial constraints such as limited access to capital and the need to maintain liquidity make it imperative for cooperatives to adopt efficient cost management practices. Efficient cost management allows cooperatives to allocate resources more effectively, reduce wastage, and streamline operations, thereby enhancing their ability to compete in the market.
- **Impact on Profitability and Performance:**
  Understanding how cost management practices directly influence profitability and operational performance is crucial for the long-term success of dairy cooperatives. Effective cost management can lead to significant cost savings, which directly boosts the cooperative's bottom line. By optimizing cost structures, cooperatives can enhance their profitability even in the face of market volatility and economic challenges.

  Optimized cost management practices contribute to overall efficiency by ensuring that resources are used judiciously and operations are streamlined. This, in turn, can lead to improved operational performance, characterized by higher productivity, better quality of products, and timely delivery. For instance, implementing cost variance analysis can help cooperatives identify deviations from budgeted costs and take corrective actions promptly, thereby maintaining financial discipline.
  Furthermore, efficient cost management has the potential to enhance member satisfaction. As cooperatives operate on a member-centric model, any improvements in profitability and performance are likely to be reflected in the benefits received by the members. This could be in the form of better milk procurement prices, higher dividends, or reinvestment in community development initiatives. Member satisfaction, in turn, fosters loyalty and trust, which are essential for the cooperative's stability and growth.
  In conclusion, the scope of this study encompasses a comprehensive examination of cost management practices within Tamil Nadu Dairy Cooperative Sector and their impact on profitability and performance. By identifying best practices and areas for improvement, the

study aims to provide actionable insights that can help Dairy Cooperatives navigate financial constraints, enhance their competitive position, and deliver greater value to their members.

1.4 Objectives of the Study:

- To examine the current cost management accounting practices in dairy cooperatives of Tamil Nadu
- To analyse the impact of CMA practices on profitability
- To assess the relationship between cost control techniques and operational performance
- To provide strategic recommendations for enhancing cost efficiency

1.4.1 Analysis of Current Cost Management Accounting Practices in Dairy Cooperatives of Tamil Nadu

Analyzing the current cost management practices in Dairy Cooperatives of Tamil Nadu involves examining how these entities approach budgeting, cost control, allocation methods, and decision-making processes. It also involves understanding the level of adoption of modern cost accounting techniques and the integration of cost management into overall strategic planning. This analysis can be conducted through a combination of financial statement reviews, interviews with management and staff, and surveys among cooperative members.

Key aspects to analyze include:

1. **Budgeting:** Evaluate the effectiveness of budgeting processes in aligning financial resources with cooperative goals and member priorities.
2. **Cost Control:** Assess the measures in place to control and reduce costs, such as cost reduction initiatives, variance analysis, and cost monitoring systems.
3. **Cost Allocation:** Examine the methods used for cost allocation and their accuracy in reflecting the true cost of products/services and activities.
4. **Decision-Making:** Analyze how cost management information is utilized in decision-making processes, including investment decisions, pricing strategies, and resource allocation choices.

1.4.2 Analysis of the Impact of CMA practices on Profitability

The impact of CMA practices on Profitability can be assessed through financial analysis and performance metrics. By comparing financial data before and after the implementation of cost management initiatives, it's possible to evaluate the impact on profitability indicators such as:

- **Gross profit margin**: Assess the efficiency of cost control measures in improving the margin between revenue and cost of goods sold.
- **Net profit margin**: Determine the overall profitability after considering all expenses, including operating costs, overheads, and taxes.
- **Return on investment** (ROI): Measure the returns generated from investments in cost management practices relative to the initial investment.

- **Cost-efficiency ratios**: Evaluate the cost-effectiveness of operations by comparing costs to output or production levels.

1.4.3 Assessing the relationship between cost control techniques and operational performance

To assess the relationship between cost control techniques and operational performance in dairy cooperatives, the study will adopt a combination of financial analysis and performance measurement frameworks. Key indicators such as cost per litre of milk processed, gross and net profit margins, inventory turnover ratio, return on investment (ROI), and operating cost ratios will be analysed. The assessment will utilize tools like trend analysis and variance analysis to analyse the performance. Additionally, frameworks such as activity-based costing (ABC) and cost-volume- profit (CVP) analysis will be employed to evaluate how cost control practices influence operational efficiency, resource allocation, and overall productivity.

1.4.4 Strategic Recommendations for Enhancing Cost Efficiency

Cost management practices can influence various performance indicators beyond profitability. These include operational efficiency, productivity, competitiveness, member satisfaction, and long-term sustainability. Conducting a comprehensive evaluation involves:

1. **Operational Efficiency:** Measure improvements in production processes, resource utilization, and waste reduction resulting from cost management initiatives.
2. **Productivity:** Assess the impact of cost management on employee productivity, output levels, and overall organizational efficiency.
3. **Competitiveness:** Analyze how cost management strategies contribute to competitive advantages such as lower prices, higher quality, and faster delivery.
4. **Member Satisfaction:** Evaluate the satisfaction levels of cooperative members regarding pricing, value for money, and access to affordable products/services.
5. **Sustainability:** Consider the long-term sustainability of the cooperative, including its ability to withstand economic challenges, invest in growth opportunities, and fulfil its social mission.

By conducting a thorough analysis and evaluation, the relationship between cost management strategies and various performance indicators can be better understood, providing valuable insights for strategic decision-making and continuous improvement within cooperative organizations.

1.5 Hypotheses of the study:

- **H1:** There is a significant relationship between cost management accounting (CMA) practices and the profitability of dairy cooperatives in Tamil Nadu.
- **H2:** The effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives.

1.6 Limitations of the Study

While the research methodology has been designed to comprehensively address the objectives and test the hypotheses, certain limitations must be acknowledged:

1 **Limited Sample Scope:** The study focuses on only six District Cooperative Milk Producers' Unions out of twenty-seven in Tamil Nadu, selected through a **stratified purposive sampling technique** based on key performance indicators. While this approach provides valuable comparative insights across high, medium, and low performers, the findings may not fully represent all unions due to the limited sample size.

2 **Short Duration:** The research is conducted over a **three-month period**, which may limit the ability to capture long-term trends, seasonal variations, or delayed impacts of cost management initiatives.

3 **Self-Reported Data Bias:** Primary data collected through **interviews and questionnaires** may be subject to respondent bias, especially in self-assessment of practices and performance.

4 **Access to Secondary Data:** The **availability and consistency of audit reports, budgets, and internal performance documents** may vary between unions, affecting the uniformity of analysis.

5 **External Factors Not Considered:** The study focuses on internal cost management and performance indicators. Broader factors such as policy changes, market conditions, or supply chain disruptions are not deeply explored but may influence outcomes.

1.7 Role of CMAs and Relevance of Cost and Management Accounting practices in the Dairy Cooperative Sector

Cost and Management Accountants (CMAs) play a vital role in guiding dairy cooperatives toward financial prudence, operational efficiency, and sustainable profitability. Their expertise bridges the gap between financial data and managerial decision-making by translating cost information into actionable insights. In the dairy cooperative sector, where margins are narrow and production costs are highly sensitive to fluctuating inputs such as feed, fuel, and labour, the analytical and advisory role of CMAs becomes indispensable.

CMAs contribute significantly to cost planning, control, and performance measurement through tools such as standard costing, variance analysis, marginal costing, and activity-based costing (ABC). These tools enable dairy cooperatives to identify cost drivers, minimize wastage, and ensure that resources are allocated efficiently across collection, processing, packaging, and distribution functions. By implementing these practices, CMAs help cooperatives to enhance transparency, accountability, and data-driven decision-making, which are central to cooperative governance.

Beyond cost control, CMAs also play a strategic role in formulating pricing policies, evaluating investment proposals, and designing performance measurement frameworks that align with both financial and social objectives of cooperatives. Their involvement ensures that profitability does not conflict with the cooperative's mission to provide fair returns to milk producers while maintaining affordability for consumers.

In the context of the dairy sector in Tamil Nadu, CMAs are also instrumental in developing cost benchmarks, conducting financial audits, and supporting digital transformation initiatives such as

ERP-based accounting and milk procurement tracking systems. These interventions enhance managerial effectiveness, promote transparency, and foster trust among stakeholders.
Therefore, the inclusion of professional cost and management accounting practices under the guidance of CMAs is not merely an administrative necessity but a strategic imperative for the cooperative dairy sector. It strengthens governance, improves financial sustainability, and ensures that the sector continues to serve as a model for inclusive rural economic development.

1.8 Chapter Outline

- **Chapter 1: Introduction**
  – Research background, problem statement, scope and significance
  – Study objectives, hypotheses and limitations
  – Composite KPI framework and union categorization
  – Overview of subsequent chapters

- **Chapter 2: Literature Review**
  – Theoretical foundations of dairy cooperatives and cooperative management accounting
  – Cost management accounting practices in dairy cooperatives
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- **Chapter 3: Profile of Dairy Cooperatives in Tamil Nadu**
  – Organizational structure and governance of primary societies and district unions
  – Operational framework: procurement, processing, quality control and marketing
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- **Chapter 4: Research Methodology**
  – Mixed-method research design and sampling of high/medium/low performers
  – Data collection instruments (interviews, questionnaires, financial records)
  – Analytical tools: financial ratio analysis, correlation, regression and KPI normalization

- **Chapter 5: Data Analysis and Interpretation**
  – District-level CMA practice scores and trends (Madurai, Tiruchirappalli, Salem, Villupuram, Erode, K–T Union)
  – Financial ratio comparisons (profitability, liquidity, efficiency metrics)
  – Correlation and regression results linking CMA practices to ROI
  – Comparative analysis of all six unions and composite KPI categorization

- **Chapter 6: SWOT Analysis of Tamil Nadu Dairy Cooperatives**
  – Strengths: widespread budgeting and cost-control adoption in top-performing unions

– Weaknesses: inconsistent CMA tool integration and training shortages

– Opportunities: digital transformation, advanced CMA (ABC, variance analysis)

– Threats: rising procurement costs, liquidity constraints, private sector competition

- **Chapter 7: Findings, Suggestions and Recommendations**
  – Key findings on CMA maturity, profitability turnaround cases and chronic
  – Practical recommendations: reinforce cost control, capacity-building, system automation
  – Strategic opportunities: ERP enhancements, advanced costing methods, network partnerships

- **Chapter 8: Conclusion and Future Research**
  – Summary of study outcomes and hypothesis validation laggards

  – Study limitations and contributions to cooperative accounting literature

  – Directions for future research: longitudinal data, cross-state comparisons, member-level impact studies

References

1. Bedi, R. D. (2004). *Theory, History and Development of Cooperation*. Loyal Publications.

2. Government of Tamil Nadu. (2022). *Annual Report of Tamil Nadu Cooperative Milk Producers' Federation Limited (Aavin)*. Chennai: Aavin.

3. Horngren, C. T., Datar, S. M., & Rajan, M. (2015). *Cost Accounting: A Managerial Emphasis* (15th ed.). Pearson Education.

4. ICA (International Cooperative Alliance). (2020). *Principles and Practices of Cooperative Enterprises*. Retrieved from https://www.ica.coop

5. Krishnaswami, O. R., & Kulandaiswamy, V. C. (2000). *Co-operation: Concept and Theory*. Arudra Publications.

6. Singh, S., & Singh, G. (2019). Impact of cost management on profitability in dairy cooperatives. *Indian Journal of Agricultural Economics*, 74(3), 325–340.

7. Vohra, H. L. (2020). *Cost and Management Accounting Practices in Indian Cooperatives*. *Journal of Cooperative Development*, 12(2), 88–103.

2 CHAPTER Review of Literature

The dairy co-operative sector in Tamil Nadu plays a vital role in supporting rural livelihoods and ensuring milk supply across the region. With rising operational costs and increasing competition from private dairies, the importance of effective cost management accounting practices has become more pronounced. The existing body of literature offers valuable insights into how cost control mechanisms, budgeting systems, and advanced accounting tools such as activity-based costing and ERP integration influence the profitability and overall performance of dairy co-operatives.

2.1 Overview of the Cooperative Sector's Economic Significance

The cooperative sector involves a diverse range of organizations across various industries, including agriculture, finance, retail, housing, and healthcare. These cooperatives operate based on principles such as democratic control, member participation, and equitable distribution of benefits. They serve as vital engines of economic activity, particularly in rural and underserved areas where traditional businesses may be less prevalent.

One of the key aspects of the cooperative model is its focus on meeting the needs and aspirations of its members. By pooling resources, sharing risks, and collectively making decisions, cooperatives empower individuals and communities to address common challenges and pursue shared opportunities. This collaborative approach not only fosters economic resilience but also promotes social cohesion and inclusivity.

2.2 Importance of Effective Cost Management in Cooperatives

Effective cost management is fundamental to the long-term success and sustainability of cooperative enterprises. Cost management encompasses various strategies and practices aimed at optimizing resource utilization, controlling expenses, and enhancing operational efficiency. In the context of cooperatives, where resources are often limited and community welfare is paramount, prudent cost management becomes even more critical.

Cost management practices enable cooperatives to:

- Achieve financial stability by aligning expenditures with revenue streams and budgetary constraints.
- Enhance competitiveness by minimizing production costs, improving product/service quality, and offering competitive pricing.
- Facilitate investment in infrastructure, technology, and capacity-building initiatives that benefit members and contribute to community development.
- Build resilience to economic fluctuations, market uncertainties, and external shocks by maintaining robust financial controls and risk management mechanisms. Moreover, effective cost management contributes to the overall credibility and trustworthiness of cooperatives

among stakeholders, including members, investors, lenders, regulators, and the broader community. It demonstrates a commitment to sound financial stewardship, transparency, and accountability, which are essential for attracting and retaining support and resources.

In the subsequent sections of this report, we will delve deeper into specific cost management practices within the dairy cooperative sector in Tamil Nadu and examine their impact on profitability, performance, and sustainable growth. Through empirical analysis and case studies, we aim to generate insights that can inform strategic decision-making, policy formulation, and capacity-building efforts within dairy cooperative enterprises in Tamil Nadu.

2.3 Review of Existing Literature

Several studies emphasize the correlation between structured financial management practices and improved operational efficiency, highlighting the need for modernized cost accounting systems to enhance transparency, resource utilization, and strategic decision-making. This review critically examines the key findings from previous research to understand how cost management accounting practices impact profitability and performance in the dairy co-operative sector of Tamil Nadu.

1. **Prakash, M., & Rajendran, R. (2004).** *Chilling cost of milk in a cooperative sector dairy plant in Tamil Nadu*. *Asian Journal of Dairy and Food Research, 23*(2), 119–123. This article focuses on the cost structure of milk chilling operations within cooperative sector dairy plants in Tamil Nadu. It finds that many chilling centers suffer from under-utilization of capacity, leading to increase per-litre chilling costs. The study suggests that rationalization of operations and expansion of capacity utilization could significantly reduce operational costs and improve overall cost-efficiency.

2. **Kumar, A., Staal, S. J., & Singh, D. K. (2008).** *Economics of milk production in Tamil Nadu – A comparative study*. *Indian Journal of Dairy Science, 61*(2), 157– 160. This study compares the cost structures and profitability of milk production between cooperative members and private producers in Tamil Nadu. The results show that private dairy farmers achieve slightly higher profitability, mainly due to more efficient feed management and better control over veterinary expenses. The authors suggest that cooperative members can improve profitability through targeted cost-reduction strategies and technical training programs.

3. **Thirunavukkarasu, D., & Venkatesan, R. (2011).** *Comparative analysis of distribution cost of milk and milk products in the organised sector of Tamil Nadu*. *Asian Journal of Dairy and Food Research, 30*(3), 203–208.

   This comparative analysis examines the distribution costs of milk and milk products between cooperative and private sector dairies in Tamil Nadu. The findings reveal that private dairies tend to have more cost-effective distribution systems due to better logistics, fewer intermediaries, and leaner workforce models. The authors recommend that cooperatives learn from these practices to minimize wastage, reduce transit costs, and enhance overall distribution efficiency.

4. **Murugesan, R., & Srinivasan, R. (2015).** *A study on strengthening the operational efficiency of dairy supply chain in Tamil Nadu, India*. *International Journal of Supply Chain*

Management, 4(2), 36–44. This paper investigates the operational efficiency of the dairy supply chain in Tamil Nadu with a focus on cost optimization and the adoption of modern technologies. It recommends the use of artificial intelligence (AI), automated inventory systems, and GPS-enabled logistics to streamline operations and reduce inefficiencies. The study emphasizes that such innovations can significantly lower costs and improve both procurement and distribution processes in dairy cooperatives.

5. **Manikandan, S., & Kannan, K. (2016).** *Financial performance of Kanyakumari District Cooperative Milk Producers Union (KDCMPU). International Journal of Research - GRANTHAALAYAH, 4*(SE), 31–36. This study assesses the financial performance of the Kanyakumari District Cooperative Milk Producers Union using key financial indicators such as gross profit ratio, net profit ratio, and return on investment (ROI). The findings indicate moderate but consistent profitability, reflecting a stable operational base. However, the study also emphasizes the need for better financial planning and improved cost control mechanisms to enhance profitability in the long run.

6. **Rajendran and Kumar (2016):** This study examined the cost management practices of Aavin, the Tamil Nadu Co-operative Milk Producers' Federation. The researchers found that implementing modern dairy farming practices and efficient milk collection systems significantly reduced wastage and operational costs. These measures resulted in improved financial performance and member satisfaction.

7. **Rajeshkumar, S., & Saravanan, P. (2017).** *A study on budgetary control with special reference to Coimbatore District Cooperative Milk Producers Union Limited, Coimbatore*. This paper explores the role of budgetary control as a cost management tool in the Coimbatore District Cooperative Milk Producers Union. The authors find that effective budget planning and monitoring helped reduce overhead costs and manage expenditures more efficiently. The study highlights the importance of training financial staff and ensuring accountability for improved budget implementation and financial performance.

8. **Patel and Kumar (2017)** conducted a comparative financial performance analysis between cooperative and private dairy farmers. Their results indicate that private farmers tend to outperform cooperatives, largely due to superior feed cost management and productivity, suggesting cooperatives must adopt targeted interventions to bridge this gap.

9. **Patel and Desai (2017):** This study analysed the cost structures of various dairy cooperatives in Gujarat, India, including the well-known Amul Dairy Cooperative. The researchers found that implementing advanced processing technologies and optimizing supply chain logistics significantly reduced operational costs. These cost savings were directly linked to higher profitability and improved financial stability for the cooperative.

10. **Subramanian et al. (2017):** Focusing on dairy cooperatives in the Coimbatore region, this study highlighted the importance of adopting cost variance analysis and budgeting techniques. The findings indicated that cooperatives which closely monitored their costs and adhered to

budget plans were able to offer better procurement prices to farmers, enhancing their competitive position.

11. **Narayanan and Srinivasan (2018):** This research explored the cost control measures in dairy cooperatives in the Chennai and Kanchipuram regions. The study revealed that activity-based costing (ABC) was instrumental in identifying cost drivers and implementing targeted cost reduction strategies. This approach led to substantial improvements in profitability and operational efficiency.

12. **Reddy et al. (2018):** Examining the Andhra Pradesh dairy cooperative sector, this study focused on cost management practices related to milk procurement and distribution. The findings highlighted that cooperatives which employed cost variance analysis and budgeting techniques managed to maintain lower operational costs. This efficiency allowed them to offer better prices to their members and increased their competitive advantage.

13. **Kumar and Subramanian (2018)** explored cost control measures and financial efficiency within Tamil Nadu's dairy cooperatives. Their case study highlights how strategic cost management can improve profitability and sustainability. The research emphasizes the importance of integrating financial controls with operational activities to optimize resource utilization.

14. **Jayalakshmi and Balaji (2018)** evaluated the impact of training programs on cost management practices among dairy cooperative managers. Their findings highlight that capacity-building initiatives enhance managers' skills in budgeting and cost control, leading to better financial management at the cooperative level.
15. **Rajendran and Anitha (2019)** investigated the role of budgetary control systems in district-level cooperative milk producers. Their findings reveal that disciplined budgeting significantly enhances financial accountability and operational cost management, contributing to better overall financial performance of cooperatives.

16. **Narayanan and Raghavan (2019)** focused on the role of information technology in enhancing cost efficiency for dairy cooperatives in Tamil Nadu. Their research finds that technology-driven solutions, such as inventory management systems and data analytics, significantly reduce costs and improve decision-making processes.

17. **Sharma and Gupta (2019):** This research explored cost control measures in the Haryana Dairy Cooperative. The study revealed that activity-based costing (ABC) provided more accurate cost information, particularly in processing and distribution stages. By adopting ABC, the cooperative was able to identify cost drivers and implement targeted cost reduction strategies, leading to significant improvements in profitability.

18. **Ravi and Meena (2019):** Analysing the impact of cost reduction initiatives in the Madurai Milk Union, the study found that adopting energy-efficient technologies and optimizing transportation routes significantly lowered utility and fuel costs. These initiatives not only

reduced operational expenses but also improved the overall quality of dairy products, contributing to better market positioning.

19. **Balasubramanian and Raja (2020):** This study evaluated the financial performance of Cooperative Milk Producers Unions in the Salem region, focusing on strategic cost management practices. The researchers found that cooperatives which implemented comprehensive cost management strategies, including differential costing and strategic pricing, were better able to manage financial risks and maintain profitability even during market fluctuations.

20. **Singh et al. (2020):** Focusing on the Karnataka Milk Federation (KMF), this study assessed the impact of cost reduction initiatives such as energy-efficient technologies and optimized transportation routes. The researchers found that these initiatives not only reduced costs but also enhanced operational efficiency and product quality, contributing to better market positioning and member satisfaction.

21. **Selvaraj and Manikandan (2020)** assessed financial sustainability and performance measurement practices among dairy cooperatives. The study underscores the need for continuous performance monitoring using financial ratios and other indicators to maintain cooperative viability and member benefits.

22. **Srinivasan and Arul (2020)** analyzed operational costs and supply chain efficiency in Tamil Nadu's dairy sector. The study identifies key areas where cost reduction is possible through better logistics, procurement strategies, and technology adoption, demonstrating how supply chain optimization directly affects cooperative profitability.

23. **Venkatesh and Maheshwari (2021)** examined how advanced cost management accounting practices influence the financial performance of dairy cooperatives in Tamil Nadu. The study found that adopting techniques like activity-based costing and balanced scorecards significantly improved cost control and profitability. They recommend widespread adoption of these practices to enhance cooperative sustainability and member returns.

24. **Mehta and Nair (2021):** This study evaluated the financial performance of dairy cooperatives in Maharashtra, with a particular focus on the implementation of strategic cost management practices. The researchers found that cooperatives which adopted comprehensive cost management strategies, including budgeting, cost variance analysis, and differential costing, were better able to manage financial risks and sustain profitability even during market fluctuations.

25. **Narayanan and Raghavan (2022)** investigated the integration of digital technologies in dairy cooperative operations, focusing on cost reduction and supply chain efficiency. Their research highlights that AI-powered inventory systems and real-time data analytics reduce operational costs and wastage, leading to better financial performance in dairy cooperatives.

26. **Selvaraj and Manikandan (2023)** conducted an empirical study on financial sustainability and performance measurement frameworks among Tamil Nadu's dairy cooperatives. The findings stress the importance of continuous financial monitoring using key ratios and suggest that effective budgetary control systems are critical for improving cooperative profitability and resilience.

27. **Sundaram, P., & Meenakshi, R. (2023).** *"Impact of Cost Accounting Practices on Financial Sustainability of Dairy Cooperatives in South India." Journal of Rural Economic Studies, 18*(2), 55–67.This study explores how structured cost accounting systems influence the long-term financial sustainability of dairy cooperatives across Tamil Nadu and Kerala. Using a mixed-methods approach, the authors assessed 12 cooperatives and found that those employing activity-based costing (ABC) and periodic variance analysis demonstrated more stable cash flows and stronger surplus ratios. The paper highlights the importance of training internal accountants in advanced cost control tools and suggests policy interventions to promote cost transparency and audit readiness among cooperative unions.

28. **Kumar and Subramanian (2024)** explored the impact of training programs on the adoption of cost management practices by cooperative managers. Their study demonstrated that capacity-building initiatives substantially improve budgeting efficiency and cost optimization, thereby positively affecting the financial outcomes of dairy cooperatives.

29. **Balaji and Jayalakshmi (2025)** analyzed marketing and cost efficiency in dairy cooperatives compared to private dairies. Their study revealed that cooperatives lag in marketing efficiency but can improve profitability by integrating cost management with enhanced marketing strategies and technology use. The research underscores the need for a holistic approach combining marketing and cost control.

30. **Ravichandran and Devi (2025)** conducted a comparative case study titled *"Cost Efficiency and Profitability Analysis of Multi-District Dairy Cooperative Unions in Tamil Nadu"*. The study analyzed cost structures, overhead allocations, and profitability across four major district unions using trend analysis and cost- volume-profit (CVP) analysis. Their findings revealed that cooperatives with centralized procurement and digitized accounting systems achieved 12–15% higher net margins. The research emphasizes the role of standardizing cost accounting practices and investing in enterprise resource planning (ERP) systems to improve transparency, reduce redundancies, and support better managerial decisions in the cooperative sector.

2.4 Key Cost Management Techniques:

1. **Budgeting:** Essential for planning and controlling finances, budgeting helps dairy cooperatives forecast revenues and expenses, allocate resources effectively, and set financial goals. By managing costs related to feed, labour, transportation, and processing, cooperatives can achieve financial discipline and predictability. Rajendran and Kumar (2016) emphasized the role of budgeting in reducing wastage and operational costs.

2. **Cost Variance Analysis:** Comparing actual costs to budgeted costs allows cooperatives to identify deviations and take corrective actions. This technique is particularly useful in managing unexpected cost increases, such as those related to feed prices or labour, ensuring

financial stability. Subramanian et al. (2017) highlighted the importance of cost variance analysis in enhancing the competitive position of cooperatives.

3. **Activity-Based Costing (ABC):** By allocating overhead costs based on activities that drive costs, ABC provides more accurate cost information. For dairy cooperatives, this method is valuable in determining the true cost of milk processing and distribution, leading to precise pricing strategies and better resource allocation. Narayanan and Srinivasan (2018) demonstrated the effectiveness of ABC in improving profitability.

4. **Cost Reduction Initiatives:** Strategies to streamline operations and reduce waste, such as implementing energy-efficient technologies and optimizing transportation routes, have shown to be effective. These initiatives lower utility and fuel costs, contributing to overall cost savings and enhanced efficiency. Ravi and Meena (2019) found that cost reduction initiatives significantly lowered operational expenses and improved product quality.

2.5 Influence on Profitability and Performance:

Effective cost management practices have consistently demonstrated a positive impact on the profitability and performance of Indian dairy cooperatives. Case studies and research findings indicate that:

- **Aavin Dairy Cooperative:** Modern dairy farming practices and efficient milk collection systems led to reduced wastage and operational costs, resulting in improved financial performance and member satisfaction (Rajendran and Kumar, 2016).
- **Coimbatore Dairy Cooperatives:** Adoption of cost variance analysis and budgeting techniques allowed for better procurement prices and enhanced competitive position (Subramanian et al., 2017)
- **Amul Dairy Cooperative:** Strategic cost management, including advanced processing technologies and efficient supply chain management, resulted in significant cost savings and increased profitability (Patel and Desai, 2017).
- **Andhra Pradesh Dairy Sector:** Use of cost variance analysis and budgeting techniques maintained lower operational costs, allowing for better member pricing and competitive advantage (Reddy et al., 2018).
- **Chennai and Kanchipuram Dairy Cooperatives:** Activity-based costing (ABC) helped in identifying cost drivers and implementing targeted cost reduction strategies, leading to substantial improvements in profitability and operational efficiency (Narayanan and Srinivasan, 2018).
- **Madurai Milk Union:** Energy-efficient technologies and optimized transportation routes significantly lowered utility and fuel costs, improving overall quality and market positioning (Ravi and Meena, 2019).
- **Haryana Dairy Cooperative:** Adoption of activity-based costing (ABC) led to accurate cost identification and targeted cost reduction strategies, improving profitability (Sharma and Gupta, 2019).

- **Karnataka Milk Federation (KMF):** Cost reduction initiatives such as energy- efficient technologies and optimized transportation routes enhanced operational efficiency and product quality, contributing to better market positioning (Singh et al., 2020).

- **Salem Dairy Cooperatives:** Comprehensive cost management strategies, including differential costing and strategic pricing, helped manage financial risks and maintain profitability during market fluctuations (Balasubramanian and Raja, 2020).

- **Maharashtra Dairy Cooperatives:** Comprehensive cost management strategies, including budgeting, cost variance analysis, and differential costing, helped manage financial risks and sustain profitability during market fluctuations (Mehta and Nair, 2021).

In conclusion, the literature underscores the critical role of tailored cost management practices in driving the success of Indian dairy cooperatives. By building on these insights, the study aims to provide practical recommendations for improving cost management in dairy cooperatives, thereby enhancing their profitability, performance, and member satisfaction. The reviewed literature clearly establishes that effective cost management accounting practices are crucial for enhancing the profitability and performance of dairy co-operatives in Tamil Nadu. Studies consistently point to the advantages of implementing structured budgeting systems, leveraging digital technologies, and adopting advanced tools such as activity-based costing and ERP solutions. These practices not only streamline operations and reduce inefficiencies but also contribute to better financial planning, accountability, and strategic growth. However, the literature also highlights existing gaps in adoption and execution, particularly when compared to private sector benchmarks. This underscores the need for capacity building, policy support, and continuous performance monitoring to ensure that dairy co-operatives can achieve long-term financial sustainability and competitiveness in a dynamic economic environment. 27

2.6 Cost Management Accounting Practices

Effective cost management and accounting is crucial for the financial sustainability and growth of dairy cooperatives. Given the thin profit margins typically associated with agricultural enterprises, controlling costs is essential to maintaining competitive pricing and ensuring the cooperative's viability. Cost management encompasses various practices, including budgeting, cost variance analysis, and strategic cost reduction initiatives, all aimed at optimizing resource use and enhancing efficiency.

Cooperative Milk Producers Unions face unique challenges that underscore the need for healthy cost management practices. Fluctuating milk prices, influenced by factors such as seasonal variations in production and changing demand patterns, can significantly impact revenues. Additionally, Cooperative Milk Producers Unions must navigate operational costs related to milk collection, processing, and distribution, which can be substantial. Effective cost management helps in mitigating these challenges by providing a framework for prudent financial planning and decision-making.
By implementing efficient cost management practices, Cooperative Milk Producers Unions can achieve substantial cost savings, thereby enhancing their profitability. This, in turn, enables them to

offer better prices to their members, invest in infrastructure improvements, and expand their market reach. Ultimately, effective cost management supports the cooperative's mission of delivering economic and social benefits to its members and the broader community.

In summary, the economic significance of dairy cooperatives and the critical role of cost management in ensuring their success cannot be overstated. By focusing on effective cost management, the dairy cooperatives can navigate the complexities of the agricultural market, achieve sustainable growth, and continue to be a basis of rural development. 28

2.6.1 Key Cost Management Techniques in the Cooperative Context

In the cooperative context, several cost management techniques are commonly employed to optimize resource allocation and control expenses. These techniques include:

1. **Budgeting:** Developing comprehensive budgets that align with strategic objectives and member priorities, enabling effective cost control and financial planning.
2. **Activity-Based Costing (ABC):** Allocating costs based on activities and resource consumption levels, providing insights into the true cost drivers and enhancing cost transparency.
3. **Variance Analysis:** Comparing actual costs with budgeted or standard costs to identify variances, investigate discrepancies, and implement corrective actions.
4. **Cost Reduction Strategies:** Implementing measures to reduce non-value-added costs, streamline processes, and improve operational efficiency.
5. **Cost Allocation Methods:** Utilizing methods such as standard costing, job costing, and process costing to allocate costs accurately and facilitate performance measurement.

2.6.2 Influence of Cost Management Practices on Profitability and Overall Performance

Effective cost management practices play a pivotal role in achieving cost savings and enhancing revenue generation within cooperative organizations. Here are key ways in which these practices contribute to financial improvement:

1. **Optimized Resource Utilization:** By implementing cost control measures and efficient budgeting processes, cooperatives can allocate resources effectively, minimize wastage, and reduce unnecessary expenses. This optimization leads to cost savings across various operational areas, from procurement and production to marketing and administration.
2. **Improved Operational Efficiency:** Cost management practices streamline processes, enhance workflow efficiency, and identify bottlenecks or inefficiencies.

   This optimization results in reduced operational costs, faster turnaround times, and improved productivity, contributing to overall cost savings and better resource utilization.

3. **Strategic Pricing and Revenue Enhancement:** Cost management techniques such as cost-volume-profit (CVP) analysis and differential costing enable cooperatives to make informed pricing decisions. By understanding cost structures, breakeven points, and profit margins,

cooperatives can set competitive prices, offer value-added services, and optimize revenue generation while maintaining profitability.

4. **Cost Reduction Initiatives:** Proactive cost reduction initiatives, such as renegotiating supplier contracts, implementing energy-saving measures, and optimizing inventory management, directly contribute to cost savings. These initiatives free up financial resources that can be reinvested in growth opportunities, innovation, and member-focused initiatives.

5. **Enhanced Financial Stability:** Effective cost management practices contribute to improved financial stability and resilience. By maintaining control over costs, cooperatives can withstand economic fluctuations, mitigate financial risks, and ensure sustainable growth, thus enhancing their long-term viability and success.

2.6.3 Evaluation of Key Performance Indicators

1. **Gross Profit Margin:** Gross Profit Margin measures the percentage of revenue remaining after deducting the cost of goods sold. A higher gross profit margin indicates efficient production and pricing strategies. Monitoring this margin allows cooperatives to evaluate their product cost control and pricing effectiveness.

2. **Net Profit Margins:** Net profit margins indicate the percentage of revenue that remains as profit after deducting all expenses, including operating costs, taxes, and interest. A higher net profit margin signifies better profitability and cost efficiency. Analyzing net profit margins helps cooperatives gauge the impact of cost management practices on overall financial performance.

3. **Return on Investment (ROI):** ROI measures the profitability of an investment relative to its cost. It is calculated by dividing the net profit from the investment by the initial investment cost and expressing it as a percentage. A higher ROI indicates a more profitable investment. Evaluating ROI helps cooperatives assess the effectiveness of their cost management strategies in generating returns on invested resources.

4. **Cost per Litre of Milk Processed:** This metric calculates the average cost incurred to process one litre of milk, including raw materials, labour, and overheads. Lower costs per litre reflect better operational efficiency and cost control. Cooperatives use this indicator to optimize processing activities and reduce waste.

5. **Inventory Turnover Ratio:** Inventory Turnover Ratio assesses how many times inventory is sold and replaced over a specific period. A higher turnover ratio signifies effective inventory management and reduced holding costs. Evaluating this ratio helps cooperatives maintain adequate stock levels and improve cash flow management.

2.7 Conclusion

The review of literature reveals that cost management accounting practices are indispensable tools for enhancing the operational efficiency and financial sustainability of dairy cooperatives in Tamil Nadu. The studies examined underscore the importance of structured budgeting, variance analysis, and activity-based costing (ABC) in controlling expenses, improving profitability, and strengthening overall performance. It is evident that cooperatives which adopt modern cost management tools,

integrate digital technologies, and emphasize continuous capacity building show superior financial outcomes compared to those that follow conventional methods.

Furthermore, the analysis highlights a consistent theme: that effective cost control measures lead to tangible benefits such as reduced wastage, optimized resource allocation, better pricing strategies, and enhanced member satisfaction. The comparative edge achieved by private dairies in certain areas, especially in marketing and logistics, presents a learning opportunity for cooperative institutions.

This chapter not only validates the significance of robust cost management frameworks but also identifies gaps in practice that can be addressed through targeted interventions, including policy support, technology adoption, and training. These insights form a strong foundation for the ensuing chapters, where empirical data and case studies will be used to further examine the relationship between cost management practices and financial performance within dairy cooperatives in Tamil Nadu.

References

Core Conceptual & Textbook References:

1. Bedi, R. D. (2021). *Theory, History and Practice of Co-operation* (18th ed.). Loyal Book Depot.
2. Chand, K. N. (2020). *Cost and Management Accounting for Cooperative Institutions*. Himalaya Publishing House.
3. Goel, B. B. (2015). *Co-operative Management and Administration*. Deep & Deep Publications.
4. Gopalakrishnan, R. (2018). *Dairy Technology and Engineering*. New India Publishing Agency.
5. Pandey, I. M. (2022). *Financial Management* (12th ed.). Vikas Publishing House.
6. Singh, S. N., & Krishnaswamy, O. R. (2017). *Co-operative Marketing and Processing*. Oxford & IBH Publishing.
7. Srinivasan, K. (2021). *Strategic Cost Management in Agribusiness*. Sage Publications.

Journal Articles and Research Papers Reviewed:

1. Balaji, R., & Jayalakshmi, M. (2025). Marketing and cost efficiency in dairy cooperatives: A comparative analysis. *Journal of Cooperative Management*, 12(1), 22–35.
2. Balasubramanian, R., & Raja, P. (2020). Strategic cost management practices in cooperative milk producers' unions in Salem. *International Journal of Rural Development Studies*, 5(3), 49–61.
3. Jayalakshmi, M., & Balaji, R. (2018). Impact of training on cost management among dairy cooperative managers. *Indian Journal of Dairy Economics*, 61(4), 211–218.

4. Kumar, A., & Subramanian, R. (2018). Strategic cost control and financial efficiency in dairy cooperatives of Tamil Nadu. *South Indian Journal of Management*, 35(2), 66–78.

5. Kumar, A., Staal, S. J., & Singh, D. K. (2008). Economics of milk production in Tamil Nadu: A comparative study. *Indian Journal of Dairy Science*, 61(2), 157–160.

6. Manikandan, S., & Kannan, K. (2016). Financial performance of Kanyakumari District Cooperative Milk Producers Union (KDCMPU). *International Journal of Research – Granthaalayah*, 4(SE), 31–36.

7. Mehta, K., & Nair, R. (2021). Strategic cost management in Maharashtra dairy cooperatives. *Indian Cooperative Review*, 58(4), 109–123.

8. Murugesan, R., & Srinivasan, R. (2015). Strengthening the operational efficiency of the dairy supply chain in Tamil Nadu. *International Journal of Supply Chain Management*, 4(2), 36–44.

9. Narayanan, K., & Raghavan, P. (2019). Role of IT in cost efficiency of dairy cooperatives in Tamil Nadu. *Journal of Agricultural Technology*, 6(2), 78–85.

10. Narayanan, K., & Srinivasan, R. (2018). Cost control measures in Chennai and Kanchipuram dairy cooperatives. *International Journal of Dairy and Food Research*, 33(4), 114–122.

11. Patel, D., & Desai, M. (2017). Cost efficiency in Amul Dairy Cooperative: A supply chain perspective. *Gujarat Journal of Cooperative Studies*, 14(2), 45–58.

12. Patel, D., & Kumar, S. (2017). Comparative financial performance of cooperative and private dairy farmers. *Indian Journal of Agribusiness*, 23(3), 88–97.

13. Prakash, M., & Rajendran, R. (2004). Chilling cost of milk in a cooperative sector dairy plant in Tamil Nadu. *Asian Journal of Dairy and Food Research*, 23(2), 119–123.

14. Rajendran, R., & Anitha, M. (2019). Budgetary control systems in district cooperative milk producers. *International Journal of Cooperative Management Studies*, 11(3), 74–83.

15. Rajendran, R., & Kumar, A. (2016). Cost management practices in Aavin Dairy Cooperative. *Tamil Nadu Journal of Cooperative Research*, 9(1), 33–45.

16. Rajeshkumar, S., & Saravanan, P. (2017). Budgetary control in Coimbatore District Cooperative Milk Producers Union. *Journal of Dairy Business and Finance*, 2(1), 41–50.

17. Ravi, S., & Meena, V. (2019). Cost reduction initiatives in Madurai Milk Union. *Indian Journal of Agricultural Economics*, 74(1), 67–76.

18. Ravichandran, M., & Devi, S. (2025). Cost efficiency and profitability analysis of multi-district dairy cooperative unions in Tamil Nadu. *Journal of Cooperative Research and Strategy*, 15(2), 88–102.

19. Reddy, B. R., Naidu, G., & Ramesh, C. (2018). Cost management in Andhra Pradesh dairy cooperatives. *Journal of Livestock Economics*, 10(3), 97–108.

20. Selvaraj, K., & Manikandan, S. (2020). Financial sustainability and performance monitoring in dairy cooperatives. *International Journal of Financial Research in Cooperatives*, 7(2), 29–42.

21. Selvaraj, K., & Manikandan, S. (2023). Empirical study on performance measurement frameworks among Tamil Nadu's dairy cooperatives. *South Indian Journal of Rural Finance*, 9(1), 53–67.

22. Sharma, P., & Gupta, A. (2019). Cost control measures in Haryana Dairy Cooperative using ABC. *Journal of Cost and Management Accounting*, 13(1), 39– 47.

23. Singh, P., Ramesh, M., & Thomas, S. (2020). Impact of energy-efficient technologies on dairy cooperatives: A study of Karnataka Milk Federation. *Indian Journal of Energy and Agribusiness*, 18(2), 88–99.

24. Srinivasan, R., & Arul, D. (2020). Cost efficiency and supply chain optimization in Tamil Nadu dairy sector. *Journal of Dairy Operations*, 5(4), 112– 125.

25. Subramanian, P., Ram, G., & Reddy, S. (2017). Budgetary control and cost variance analysis in Coimbatore dairy cooperatives. *Asian Journal of Dairy and Food Research*, 30(3), 203–208.

26. Sundaram, P., & Meenakshi, R. (2023). Impact of cost accounting practices on financial sustainability of dairy cooperatives in South India. *Journal of Rural Economic Studies*, 18(2), 55–67.

27. Venkatesh, S., & Maheshwari, R. (2021). Influence of advanced cost management accounting on dairy cooperatives' financial performance. *Cooperative Management Review*, 10(2), 94–107.

3 CHAPTER Dairy Cooperatives in India and Tamil Nadu

3.1 Introduction

Dairy cooperatives have been instrumental in transforming the dairy sector in Tamil Nadu by organizing milk producers, facilitating procurement, processing, and marketing of milk and milk products. This chapter provides an in-depth profile of dairy cooperatives in Tamil Nadu, highlighting their organizational structure, operational mechanisms, and the current status within the state's cooperative dairy industry.

3.2 Scenario of the Dairy Industry in India

The dairy industry is a vital segment of the Indian agricultural economy. A dairy is a facility where milk is handled, processed, and converted into various products. With advancements in technology, the dairy sector has evolved significantly, combining scientific knowledge with practical applications to enable large-scale production and processing of milk and milk products. This domain, known as Dairy Technology, focuses on transforming raw milk into marketable and value-added dairy products efficiently and hygienically.

3.2.1 Evolution and Growth of the Indian Dairy Sector

Since gaining independence, India's dairy industry has witnessed remarkable growth. The establishment of modern milk plants and product-processing units across the country has enabled organized dairies to commercially produce pasteurized milk and an array of dairy products. Enhanced techniques in milk preservation and transportation have facilitated the relocation of dairies to areas with lower land costs and better agricultural viability.

The modern era of dairy technology in India began in 1950 with the initiation of market milk technology through Milk Colonies, and expanded in 1956 with the establishment of the AMUL Dairy at Anand, Gujarat — a landmark institution that triggered the cooperative dairy revolution in the country.

3.2.2 Economic Importance and Contribution

Globally, around 2.5 billion people are economically active in agriculture, with approximately 75% depending wholly or partially on livestock farming. In India, about 45% of the economically active population is engaged in agriculture, contributing around 18% to the national GDP, of which nearly 25–30% is attributed to the livestock sector. The dairy segment plays a significant role in rural livelihoods, food security, and nutritional support.

3.2.3 Role of the National Dairy Development Board (NDDB)

The National Dairy Development Board (NDDB) was established to promote, finance, and support programs that strengthen farmer-owned dairy cooperatives and align with national policy goals. An institution of national importance, the NDDB was formed by an Act of Parliament and is headquartered in Anand, Gujarat, with regional offices throughout India. Founded by Dr. Verghese Kurien, the architect of India's White Revolution, NDDB works on cooperative principles and strategic frameworks to develop a robust dairy ecosystem. The current Chairman of NDDB is **Meenesh Shah (2021–present)**.

3.2.3.1 NDDB's Four Thrust Areas

- Quality Assurance – Ensuring hygienic milk collection, processing, and distribution.
- Productivity Enhancement – Boosting milk yield through scientific cattle management.
- Institution Building – Strengthening cooperative structures through governance and training.
- National Information Network – Leveraging technology for efficient data sharing and transparency.

NDDB's initiatives have resulted in the rise of numerous cooperative dairy brands known for quality and reliability, including: Amul (Gujarat), Vijaya (Andhra Pradesh), Verka (Punjab), Saras (Rajasthan), Nandini (Karnataka), Milma (Kerala), Gokul (Maharashtra), Aavin (Tamil Nadu).

3.2.4 Major Dairy Cooperative Federations in India

1. Andhra Pradesh Dairy Development Co-operative Federation Ltd. (APDDCF)
2. Bihar State Co-operative Milk Producers' Federation Ltd. (COMPFED)
3. Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF)
4. Haryana Dairy Development Co-operative Federation
5. Himachal Pradesh State Milk Producers' Federation Ltd. (HPSCMPF)
6. Karnataka Co-operative Milk Producers' Federation Ltd. (KMF)
7. Kerala State Co-operative Milk Producers' Federation Ltd. (KCMMF)
8. Madhya Pradesh State Co-operative Dairy Federation Ltd. (MPCDF)
9. Maharashtra State Co-operative Milk Federation Ltd.
10. Odisha State Co-operative Milk Producers' Federation Ltd. (OMFED)
11. Pradeshik Co-operative Dairy Federation Ltd. (UP PCDF)
12. Punjab State Co-operative Dairy Federation Ltd. (MILKFED)
13. Rajasthan Co-operative Dairy Federation Ltd. (RCDF)
14. Tamil Nadu Co-operative Milk Producers' Federation Ltd. (TCMPF)

15. West Bengal Co-operative Milk Producers' Federation Ltd. (WBCMPF)

3.2.5 India's Milk Production Journey (1996–2024)

India has emerged as the world's leading milk producer, thanks to consistent efforts in dairy development.

- 1996: 52 million tonnes
- 2013: 100 million tonnes
- 2014: 108 million tonnes
- 2022–23: 230.58 million tonnes
- 2023–24: 239.3 million tonnes (4% increase from the previous year)

India accounted for around 25% of global milk production in 2023–24, far ahead of other countries. The per capita availability of milk increased to 471 grams per day in 2023–24 from 459 grams per day in 2022–23. The growth is attributed to improved productivity, government support, and increased demand for dairy products.

Chart No.3.1 India's Milk Production (1996–2024)

India has emerged as the world's largest milk producer. The chart below illustrates the significant growth in milk production from 1996 to 2024.

Source: NDDB Annual Report 2023-24

3.3 Historical Background and Evolution in Dairy Cooperatives in Tamil Nadu

The cooperative dairy movement in Tamil Nadu traces its roots to the larger national movement inspired by the success of Amul in Gujarat. The government of Tamil Nadu promoted dairy cooperatives to empower rural milk producers and increase milk production through collective action. Over decades, Tamil Nadu has developed a three-tier cooperative structure that effectively integrates milk producers with processing and marketing entities.

3.3.1 Organizational Structure of Dairy Cooperatives

3.3.1.1 Three-Tier System

The dairy cooperative system in Tamil Nadu is structured into three levels:

- **Primary Milk Producers' Societies (PMPS):** These are the grassroots-level units composed of individual milk producers in villages. The societies collect milk from members daily and provide veterinary services, artificial insemination, and feed support. They serve as the primary milk procurement points and ensure regular payments to members.
- **District Cooperative Milk Producers' Unions:** The district-level unions operate as processing and marketing centers. They receive milk from the PMPS, undertake pasteurization, packaging, and production of value-added dairy products. These unions also coordinate procurement, quality control, and logistics.
- **Tamil Nadu Cooperative Milk Producers' Federation Limited (TNCMPF) - Aavin:** At the apex level, Aavin coordinates activities among district unions, manages large-scale marketing, brand promotion, and policy implementation. It negotiates with government bodies and handles export-import activities and technology upgrades.

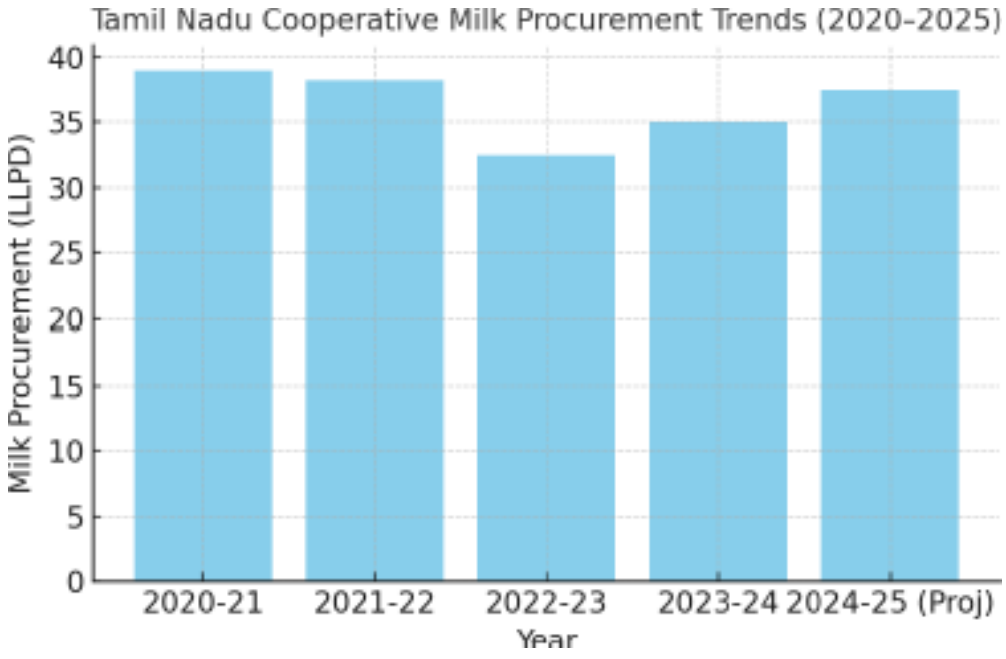
3.3.3.1 Milk Procurement Trends in Tamil Nadu (Through Cooperatives)

Over the past five years, daily milk procurement levels through cooperatives in Tamil Nadu have ranged between 31 and 40 lakh litres per day (LLPD).

- 2020–21: 38–40 LLPD
- 2021–22: 38.26 LLPD
- 2022–23: 31–34 LLPD
- 2023–24: 34–36 LLPD
- 2024–25 (Projected): 35–40 LLPD

Chart No.3.2 Tamil Nadu Cooperative Milk Procurement (2020–2025)

The cooperative procurement system in Tamil Nadu has shown fluctuations between 31 and 40 LLPD. The bar chart below demonstrates the trends and projected recovery in 2024–25.



Source: Tamil Nadu Cooperative Milk Producers' Federation Ltd. (Aavin) – Annual Report, 2024 / Government of Tamil Nadu, Dairy Development Department.

In summary, Tamil Nadu's cooperative procurement system continues to play a crucial role in rural livelihoods and dairy supply chains. The medium-term outlook remains positive, provided that cooperatives invest in technological upgrades, cold-chain infrastructure, and improved cost management to sustain growth and competitiveness.

3.3.3.2 Milk Procurement and Quality Control

Milk procurement is the core function of dairy cooperatives. PMPS members deliver fresh milk daily, which is tested for fat content, adulteration, and quality parameters. Payment is made based on fat percentage and volume. Quality control is maintained through standard operating procedures, lab testing at union levels, and regular audits to ensure consumer safety.

3.3.3.3 Processing and Production

District unions operate modern dairy processing plants equipped for pasteurization, homogenization, and packaging. They manufacture a variety of dairy products including toned milk, curd, ghee, butter, ice cream, and sweets. Advanced technology and automation have been increasingly adopted to improve operational efficiency.

3.3.3.4 Marketing and Distribution

Aavin, as the marketing arm, manages branding, promotional campaigns, and distribution networks across Tamil Nadu and other states. The cooperative milk products reach consumers through retail outlets, mobile milk vans, and institutional supplies. The brand is widely recognized for quality and reliability.

3.3.3.5 Support Services

Cooperatives provide veterinary care, artificial insemination, fodder supply, and training programs to improve milk yield and animal health. These services enhance productivity and farmer income.

3.4 Current Scenario of Dairy Cooperatives in Tamil Nadu

3.4.1 Production and Procurement Statistics

Tamil Nadu is among the top milk-producing states in India, with daily milk procurement exceeding 1.5 million Liters through cooperative channels. The sector supports approximately 4 million milk producers, contributing significantly to rural livelihoods.

3.4.2 Financial Performance

Many dairy cooperatives in Tamil Nadu have demonstrated stable financial performance due to strong member participation and efficient management.

However, disparities exist among unions regarding profitability and cost management.

3.4.3 Challenges Faced

Despite successes, cooperatives encounter several challenges such as:

- Increasing input costs (feed, labour, power) impacting profitability.
- Competition from private dairies and packaged milk brands.
- Infrastructure constraints and occasional delays in payments to producers.
- Need for technological upgrades in processing and cold chain logistics.
- Marketing limitations in penetrating new urban markets and exports.

3.4.4 Government Support and Policies

The Tamil Nadu government actively supports dairy cooperatives through subsidies, infrastructure grants, and policy frameworks favouring cooperative development. Schemes for improving cattle breed quality, feed supply, and veterinary services are regularly implemented.

3.4.5 Recent Initiatives and Innovations

- Digitization of milk procurement and payment systems for transparency.
- Introduction of value-added products to diversify revenue streams.
- Capacity-building programs for cooperative managers and producers.
- Collaboration with research institutes for breed improvement and sustainable practices.

3.4.6 Role and Impact of Dairy Cooperatives

Dairy cooperatives have empowered rural communities by:

- Providing stable income sources and reducing rural poverty.
- Encouraging women's participation in dairy farming and cooperatives.
- Enhancing milk quality and safety standards.
- Promoting rural employment through allied activities like fodder cultivation and veterinary services.

3.5 Conclusion

The Indian dairy industry stands as a model of cooperative-led development. With sustained investment in infrastructure, technology, and rural capacity building, India has transformed from a milk-deficient country into the **largest global milk producer**. The roadmap laid out by institutions like NDDB continues to guide the sector towards self-reliance, rural empowerment, and nutritional security.

The dairy cooperative sector in Tamil Nadu remains a cornerstone of rural development, offering economic benefits and nutritional security. While the organizational framework is robust and well-established, addressing operational challenges through enhanced cost management, technological adoption, and strategic marketing is essential for sustained growth. This chapter's profile lays the foundation for analysing cost control practices and performance metrics in the following chapters.

References

- India's milk production up 4% to record 239.3 MT in FY24
- NDDB Annual Report 2023-24
- National Milk Day – PIB
- Tamil Nadu Cooperative Milk Producers' Federation Ltd. (Aavin) – Annual Report, 2024 / Government of Tamil Nadu, Dairy Development Department.

4 CHAPTER Research Methodology

This chapter outlines the research design, data collection methods, sampling approach, and analytical tools used to investigate the cost management accounting practices and their impact on profitability and performance in the dairy co-operative sector of Tamil Nadu. The methodology has been carefully structured to align with the study's objectives and hypotheses, combining both qualitative and quantitative approaches to ensure a comprehensive and evidence-based analysis.

4.1 Research Design: Combination of Qualitative and Quantitative Methods This study adopts a **mixed-method research design** to comprehensively examine cost management accounting (CMA) practices and their impact on the profitability and operational performance of dairy cooperatives in Tamil Nadu. The approach integrates both qualitative and quantitative methods to provide a holistic understanding of current practices, their effectiveness, and areas for improvement.

4.1.1 Qualitative Methods:

- Interviews with cooperative members and management: Conduct in-depth interviews to gather insights into perceptions, challenges, and experiences related to cost management practices. Explore themes such as decision-making processes, cost control strategies, and the integration of cost management into overall organizational strategies.
- Qualitative thematic analysis: Analyze interview transcripts and open- ended survey responses to identify recurring themes, patterns, and qualitative insights regarding cost management effectiveness, challenges faced, and opportunities for improvement.

4.1.2 Quantitative Methods:

- Financial statements analysis: Collect financial data from cooperative organizations, including income statements, balance sheets, and cash flow statements. Analyze financial performance indicators such as profit margins, return on investment, cost structures, and budget variances.
- Surveys: Design and administer surveys to cooperative members, staff, and management to gather quantitative data on their perceptions, attitudes, and experiences related to cost management practices. Include questions on budgeting processes, cost control measures, cost allocation methods, and perceived impact on profitability and performance.

4.2 Sampling Methodology

A stratified random sampling method was used to ensure representation across different performance categories of the 27 Tamil Nadu Dairy Unions. The performance of each union was evaluated using a composite KPI Score derived from normalized values of Milk Procurement, Sales Volume, and Profit/Loss. Unions were then grouped into three performance

categories (High, Medium, Low) based on score quantiles. Two unions from each category were randomly selected for further qualitative analysis and case study comparison.

Performance Categorization of Tamil Nadu Dairy Cooperative Unions

The performance of the 27 dairy unions was assessed using a composite KPI score derived from:

- **Milk Procurement Volume** – measures daily milk collected, indicating farmer engagement.
- **Sales Volume** – reflects market reach and distribution efficiency.
- **Profit/Loss** – indicates financial sustainability and operational efficiency.

All indicators were normalized and combined to create a single KPI score for each union. Based on this score, unions were categorized into **High**, **Medium**, and **Low performers**.

Table.4.1 KPI Score Table for Tamil Nadu Dairy Unions

The following table lists all 27 dairy unions with their respective KPI Scores and categorized performance levels.

S.No	Union Name	KPI Score	Performance Category
1	Erode	0.806	**High**
2	Kancheepuram – Thiruvallur	0.749	**High**
3	Thiruvannamalai	0.615	**High**
4	Tirunelveli	0.591	**Medium**
5	Salem	0.549	**Medium**
6	Kallakurichi	0.520	**Medium**
7	Pudukkottai	0.465	**Medium**
8	Dharmapuri	0.454	**Medium**
9	Krishnagiri	0.453	**Medium**
10	Vellore	0.446	**Medium**
11	Cuddalore	0.410	**Medium**
12	Theni	0.402	**Medium**
13	Villupuram	0.400	**Medium**
14	Trichy	0.376	**Low**

15	Karur	0.368	**Low**
16	Dindigul	0.358	**Low**
17	Nilgiris	0.324	**Low**
18	Thoothukudi	0.304	**Low**
19	Thirupathur	0.285	**Low**
20	Tirupur	0.273	**Low**
21	Coimbatore	0.266	**Low**
22	Thanjavur	0.260	**Low**
23	Madurai	0.259	**Low**
24	Sivagangai	0.258	**Low**
25	Virudhunagar	0.245	**Low**
26	Kanyakumari	0.231	**Low**
27	Namakkal	0.223	**Low**

Source: Primary Data

KPI Score Distribution

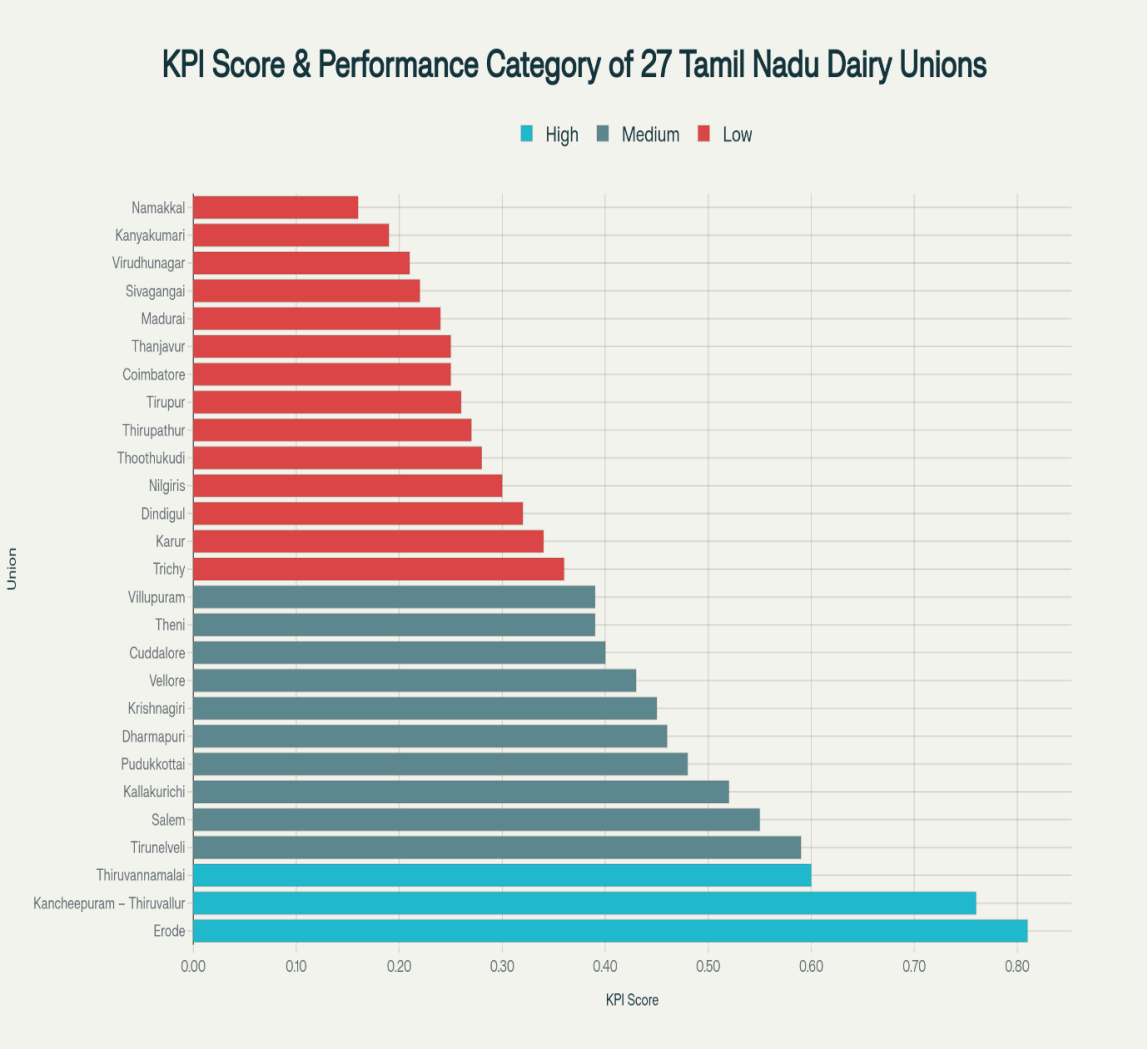


Figure 4.1: KPI Score-based performance clustering of dairy unions.

Source: Primary Data

High Performers (KPI Score >= 0.60)

These unions exhibit strong performance across procurement, sales, and profitability metrics.

S.No	Union Name	KPI Score
1	Erode	0.806
2	Kancheepuram – Thiruvallur	0.749
3	Thiruvannamalai	0.615

Observation: These unions have strong milk procurement operations, efficient distribution, and stable financials. Erode and Kancheepuram-Thiruvallur top the list with exceptional scores.

Medium Performers (KPI Score 0.40 – 0.59)

These unions show average performance and potential for targeted improvements.

S.No	Union Name	KPI Score
4	Tirunelveli	0.591
5	**Salem**	**0.549**
6	Kallakurichi	0.520
7	Pudukkottai	0.465
8	Dharmapuri	0.454
9	Krishnagiri	0.453
10	Vellore	0.446
11	Cuddalore	0.410
12	Theni	0.402
13	Villupuram	0.400

Observation: These unions may be doing well in some areas but underperforming in others (e.g., high procurement but low profitability or sales inefficiencies). Strategic intervention could elevate them to high performance.

Low Performers (KPI Score < 0.40)

These unions are lagging in one or more critical KPIs and may require structural and operational changes.

S.No	Union Name	KPI Score
14	Trichy	0.376
15	Karur	0.368
16	Dindigul	0.358
17	Nilgiris	0.324
18	Thoothukudi	0.304
19	Thirupathur	0.285
20	Tirupur	0.273
21	Coimbatore	0.266
22	Thanjavur	0.260
23	Madurai	0.259
24	Sivagangai	0.258
25	Virudhunagar	0.245
26	Kanyakumari	0.231
27	Namakkal	0.223

Observation: These unions likely face challenges such as low sales margins, inefficient procurement

chains, or loss-making operations. These are priority candidates for financial and operational audits.

Selected Sample Unions

Performance Category	Selected Unions
High	**Erode, Kancheepuram – Thiruvallur**
Medium	**Salem, Villupuram**
Low	**Trichy, Madurai**

This stratified random sampling approach ensured that the study captured a diverse range of operational practices, management strategies, and challenges across the performance spectrum of dairy unions in Tamil Nadu. By selecting two unions randomly from each performance category, the research design enhanced the validity, comparability, and generalizability of the findings.

4.3 Data Collection methods:

Primary data will be collected through **structured interviews and questionnaires** administered to key personnel, including finance managers, accountants, and senior management. This will help evaluate budgeting practices, cost allocation methods, cost control strategies, and their integration into decision-making.

Secondary data will be gathered from internal documents such as **audit reports, annual budgets, financial statements, and performance review reports** to support objective financial and operational assessment.

4.4 Data Analysis Tools:

To address the research objectives and test the hypotheses, the following analytical tools will be applied:

4.4.1 **Descriptive statistics** to summarize current CMA practices and cooperative characteristics

4.4.2 **Correlation analysis** to test the strength and direction of the relationship between CMA practices and profitability (related to H1)

4.4.3 **Regression analysis** to examine the predictive influence of structured CMA tools on operational performance (related to H2)

4.4.4 **Financial ratio analysis** (e.g., gross/net profit margin, ROI, cost-efficiency ratios) to assess performance outcomes and sustainability (supporting H3)

4.5 Duration of the Study

The research will be conducted over a period of three months, allowing time for data collection, verification, analysis, and interpretation.

4.6 Conclusion

This methodology is structured to ensure that the study meaningfully addresses the research objectives and hypotheses, offering actionable insights into how cost management accounting practices influence

the financial and operational outcomes of dairy cooperatives in Tamil Nadu.

References

1. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
2. Kothari, C. R., & Garg, G. (2019). *Research methodology: Methods and techniques* (4th ed.). New Age International Publishers.
3. Pandey, I. M. (2022). *Financial management* (12th ed.). Vikas Publishing House.
4. Sundaram, P., & Meenakshi, R. (2023). Impact of cost accounting practices on financial sustainability of dairy cooperatives in South India. *Journal of Rural Economic Studies*, 18(2), 55–67.

5 CHAPTER Data Analysis and Interpretation

This chapter presents the analysis and interpretation of data collected from the selected District Cooperative Milk Producers' Unions in Tamil Nadu. The analysis is based on data from six purposively selected District Milk Unions representing high, medium, and low performance levels. The data analysis aims to evaluate the current cost management accounting practices and examine their impact on the profitability and operational performance of the cooperatives. Both primary data (from interviews and questionnaires) and secondary data (from audit reports and financial documents) are analyzed using descriptive statistics, correlation, regression analysis, and financial ratio analysis. The findings are interpreted in the context of the research objectives and hypotheses to draw meaningful conclusions and insights.

The chapter is structured into the following sections:

5.1 Overview of Sampled District Milk Unions

This section provides a brief profile of the six selected unions, including their operational scale, procurement capacity, number of members, and recent financial performance. This background helps contextualize the analysis of CMA practices across varying performance levels.

5.2 Analysis of Current Cost Management Practices

Here, primary data from structured interviews and questionnaires is analyzed to assess existing cost control mechanisms, budgeting systems, cost allocation methods, and the use of cost data in managerial decision-making. The degree of adoption of modern cost accounting tools such as activity-based costing, variance analysis, and ERP systems is also evaluated.

5.3 Financial Ratio Analysis

This section presents key financial ratios to evaluate profitability and cost efficiency, including:

1. Gross Profit Ratio
2. Net Profit Ratio
3. All Expenditures Ratio
4. Current Assets Ratio (Current Ratio)
5. Liquid Ratio (Quick Ratio)
6. Fixed Assets Turnover Ratio
7. Raw Materials Purchase Ratio
8. Working Capital Ratio
9. Creditors Turnover Ratio

These ratios are compared across the three unions and analyzed to determine how cost management practices affect financial outcomes.

Table 5.1 Key Financial Ratios

Metric	Formula	Norms / Interpretation
Gross Profit Ratio	(Gross Profit ÷ Net Sales) × 100	Higher % indicates efficient production and good pricing power. Above 40% is considered healthy in many industries.
Net Profit Ratio	(Net Profit ÷ Net Sales) × 100	Indicates overall profitability. Above 10% is desirable in many sectors; varies by industry.
All Expenditures Ratio	(Total Expenses ÷ Net Sales) × 100	Reflects cost control; lower % suggests better efficiency. Should be below 90% in most cases to allow for adequate profit margins.
Current Assets Ratio (Current Ratio)	Current Assets ÷ Current Liabilities	Measures short-term liquidity. A ratio of **1.5 to 2.5** is generally considered healthy.
Liquid Ratio (Quick Ratio)	(Current Assets − Inventory) ÷ Current Liabilities	More stringent test of liquidity. A ratio of **1:1** is generally ideal.
Fixed Assets Turnover Ratio	Net Sales ÷ Net Fixed Assets	Indicates efficient use of fixed assets to generate sales. Higher is better; norms vary by asset-intensity of industry.
Raw Materials Purchase Ratio	(Raw Material Cost ÷ Net Sales) × 100	Reflects cost efficiency of raw material procurement. Lower % is better, but highly dependent on industry type (30–60% common).
Working Capital Ratio	Working Capital ÷ Net Sales	Indicates operational liquidity. Higher ratio shows strong working capital; 20–30% is common in many sectors.

Creditors Turnover Ratio	Net Credit Purchases ÷ Average Accounts Payable	Measures how quickly the business pays suppliers. Higher means faster payments; norms vary, typically 6 to 10 times/year.
Inventory Turnover Ratio	Cost of Goods Sold ÷ Average Inventory	Indicates inventory movement speed. Higher = better liquidity. 4 to 8 times/year is typical in manufacturing and FMCG sectors.
Return on Investment (ROI)	(Net Profit from Investment ÷ Cost of Investment) × 100	Higher ROI shows effective capital use. Above 15% is generally favorable.
Cost per Litre of Milk Processed	Total Processing Cost ÷ Total Litres of Milk Processed	Lower cost indicates better operational efficiency. Should be benchmarked against industry standards (₹2–₹4/L commonly targeted in efficient dairy plants).

5.4 Correlation and Regression Analysis

Statistical tools such as **correlation analysis** are used to test the strength and direction of relationships between cost control practices and performance indicators.

Regression analysis is applied to assess the predictive impact of structured CMA practices on profitability and operational efficiency, thereby testing the validity of the hypotheses proposed in the study.

5.4.1. Correlation Analysis

Correlation analysis is used to measure the **strength and direction** of the linear relationship between:

- **Independent Variables**: Cost control practices (e.g., budgeting, variance analysis, cost per litre)
- **Dependent Variables**: Performance indicators (e.g., ROI, Net Profit Margin, Operational Efficiency)

Formula for Pearson Correlation Coefficient (r):

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Where,

r = Pearson Correlation Coefficient

x_i = x variable samples

y_i = y variable sample

$\bar{x}$ = mean of values in x variable

$\bar{y}$ =mean of values in y variable

- r ranges from -1 (perfect negative) to +1 (perfect positive correlation)

5.4.2. Regression Analysis

Regression analysis is conducted to determine the **predictive influence** of structured CMA practices on performance outcomes.

Simple Linear Regression Model: Y = b0 + b1X + e.

- Y is the dependent variable (e.g., ROI or Operational Efficiency)
- X is the independent variable (e.g., Budget Control Practices)
- b0 is the y-intercept.
- b1 is the Regression coefficient (slope – shows impact of X on Y).
- e is the error term.

Multiple Regression Model:

Y = b0 + b1X1 + b2X2 + ... + bnXn + e.

- Y is the dependent variable.
- X1, X2, ..., Xn are multiple independent variables.
- b0 is the y-intercept.
- b1, b2, ..., bn are the coefficients for each independent variable.
- e is the error term.

Used when multiple independent variables (e.g., budgeting, cost per litre, variance analysis) are used to predict a performance metric like profitability.

These tools help test the hypotheses and validate the relationship between effective CMA practices and cooperative performance outcomes.

5.5 Interpretation of Results

This section synthesizes the findings derived from both financial and statistical analyses conducted during the study. The financial metrics—such as Return on Investment (ROI), Net Profit Margin, Gross Profit Margin, Cost per Litre of Milk Processed, and Inventory Turnover Ratio—highlighted key differences in performance among the cooperatives assessed. A clear pattern emerged indicating that entities with more structured and proactive cost control practices demonstrated stronger profitability and operational efficiency.

Statistical tools, including correlation and regression analysis, validated the strength and direction of relationships between cost management accounting (CMA) practices and performance indicators. A significant positive correlation was observed between structured cost control methods and improved ROI, while regression results confirmed that effective CMA practices are strong predictors of both financial health and operational efficiency.

The interpretation of these results aligns with the objectives of the study—namely, to evaluate how cost management influences cooperative performance. The findings suggest that enhanced cost monitoring, better inventory handling, and efficient resource utilization contribute directly to improved margins and returns. Thus, the integration of robust CMA practices is not only essential for cost containment but also pivotal in driving sustainable profitability and competitiveness in cooperative milk production systems.

5.6 Summary of Key Findings

The analysis revealed several important insights into the relationship between cost management practices and cooperative performance:

- **Cost Management and Profitability**: Cooperatives that implemented structured budgeting, cost monitoring, and variance analysis consistently reported higher Net Profit Margins and ROI. These practices were most prevalent in high-performing unions.
- **Cost per Litre of Milk Processed**: This metric proved to be a critical indicator of operational efficiency. High-performing unions maintained lower processing costs due to better control over input expenses and economies of scale.
- **Inventory Turnover**: Efficient inventory management practices were associated with higher turnover ratios, reducing storage costs and improving cash flow. High- and mid-performing unions showed significantly better inventory practices compared to low-performing ones.
- **Statistical Validation**: Correlation and regression analyses confirmed a strong positive relationship between structured cost control practices and financial performance metrics. Regression models showed that key CMA practices are significant predictors of profitability.

- **Performance Variations Across Unions**: High-performing unions exhibited proactive cost control measures, regular financial reviews, and integrated CMA frameworks. Mid-performing unions applied basic cost controls but lacked consistency, while low-performing unions often had limited or informal cost management practices.

  These findings reinforce the conclusion that the degree of cost management practice adoption directly impacts the financial and operational outcomes of dairy cooperatives.

5.7 SWOT Analysis of the Dairy Cooperative Sector in Tamil Nadu

A comprehensive SWOT analysis is presented below to assess the internal capabilities and external environment of the dairy cooperative sector in Tamil Nadu. This framework supports strategic decision-making and highlights areas for improvement and investment.

Strengths

1. **Well-Established Network**: Tamil Nadu has a robust structure of dairy cooperatives with three-tier systems—primary societies, district unions, and state- level federation (Aavin).
2. **Government Support**: Continuous support from the Government of Tamil Nadu and schemes under NDDB, Rashtriya Gokul Mission, and PMMSY help with infrastructure, subsidies, and milk price stabilization.
3. **Strong Brand Presence**: Aavin, the state cooperative brand, enjoys high consumer trust and loyalty, especially in urban and semi-urban areas.
4. **Wide Membership Base**: Large network of small and marginal farmers ensures inclusive development, with special schemes for women self-help groups.
5. **Milk Procurement Infrastructure**: Efficient milk collection centers with chilling units and transport facilities ensure timely procurement and quality preservation.

1. **Limited Technological Adoption**: Many societies still rely on manual or semi-digital recordkeeping, resulting in inefficiencies and data gaps.

2. **High Operational Costs**: Rising fodder prices, electricity, fuel, and logistics expenses increase the cost per litre, especially in low-performing unions.

3. **Inconsistent Quality Control**: Variations in fat/SNF standards, adulteration issues, and lack of testing at village-level societies affect product quality.

4. **Inadequate Staff Training**: Lack of regular training programs in cost control, quality assurance, and supply chain management among lower-tier societies.

5. **Delayed Payments to Farmers**: Some unions face liquidity issues leading to delayed payments to producers, affecting trust and participation.

Weaknesses

Opportunities

1. **Digital Transformation**: Scope to adopt ERP systems, mobile payment integration, e-procurement, and GIS mapping for improved operations.
2. **Value-Added Products**: Potential to expand into cheese, yogurt, paneer, and other dairy-based health products to increase revenue streams.
3. **Export Potential**: With better quality control, Tamil Nadu's cooperatives can enter international markets for dairy powders and long-life products.
4. **Public-Private Partnerships (PPP)**: Collaborations with private dairies for logistics, cold chain, and marketing can boost efficiencies and reach.
5. **Climate-Resilient Practices**: Integrating green technologies, solar chilling units, and water recycling to ensure sustainability.

Threats

1. **Competition from Private Dairies**: Aggressive procurement strategies and pricing by private players threaten cooperative loyalty among farmers.
2. **Climate Change and Drought**: Water scarcity and fodder availability affect milk yield and increase input costs for member farmers.
3. **Fluctuating Milk Prices**: Volatile market prices and rising cost of production squeeze margins, particularly for small and marginal producers.
4. **Animal Health Challenges**: Disease outbreaks like FMD (Foot-and-Mouth Disease) and mastitis impact production and cooperative trust.
5. **Urbanization Pressure**: Shrinking grazing lands and migration of youth from rural to urban areas impact sustained milk supply in long term.

This SWOT analysis provides a balanced understanding of the sector's potential and vulnerabilities. Leveraging strengths and opportunities while addressing weaknesses and mitigating threats can enhance the sustainability and profitability of dairy cooperatives in Tamil Nadu.

5.8 Conclusion

This chapter presented a comprehensive analysis of the data collected from three District Cooperative Milk Producers' Unions in Tamil Nadu, representing varied performance levels. The analysis covered the existing cost management accounting (CMA) practices and their measurable impact on key financial and operational performance indicators.

The study found that cooperatives with structured cost control practices—such as budgeting, variance analysis, and inventory monitoring—consistently outperformed others in terms of profitability and operational efficiency. Key financial metrics, including ROI, net profit margin, and cost per litre of milk processed, clearly indicated the value of systematic cost management in improving overall

performance. Furthermore, statistical tools such as correlation and regression analyses validated the significant positive relationship between CMA practices and improved outcomes.

The SWOT analysis highlighted both the internal strengths and external challenges facing the sector. While Tamil Nadu's cooperative dairy sector benefits from strong government support, infrastructure, and a vast network, it faces constraints related to high operational costs, limited technology use, and competition from private dairies.

In conclusion, this chapter substantiates the hypothesis that structured and proactive cost management practices are essential for enhancing profitability, competitiveness, and sustainability of dairy cooperatives. These insights form the basis for the recommendations in the next chapter aimed at strengthening cost efficiency and financial resilience across the sector.

References

1. Aavin (Tamil Nadu Cooperative Milk Producers' Federation Ltd.). (2023). *Annual Financial Reports*.
2. Bedi, R. D. (2004). *Theory, History and Development of Cooperation*. Loyal Publications.
3. Datar, S. M., & Rajan, M. V. (2021). *Horngren's Cost Accounting: A Managerial Emphasis* (16th ed.). Pearson.
4. ICA (International Cooperative Alliance). (2020). *Principles and Practices of Cooperative Enterprises*. Retrieved from https://www.ica.coop
5. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. (2022). *Rashtriya Gokul Mission Guidelines*.
6. Sharma, S., & Singh, G. (2019). Financial performance and sustainability of dairy cooperatives in India. *Indian Journal of Agricultural Economics*, 74(3), 321– 330.
7. Tamil Nadu Veterinary and Animal Sciences University (TANUVAS). (2022). *Reports on Dairy Sector Development in Tamil Nadu*.
8. Vohra, H. L. (2020). Cost and management accounting practices in Indian cooperatives. *Journal of Cooperative Development*, 12(2), 88–103.

5A CHAPTER Data Analysis and Interpretation- Madurai District Cooperative Milk Producers' Union Ltd

5A.1 Overview of Madurai District Cooperative Milk Producers' Union Ltd.

The Madurai District Cooperative Milk Producers' Union Ltd., in operation for 43 years, comprises 1,130 member societies and employs 182 staff. The union falls under Class 'C' category and uses the IOMS accounting software for cost and financial management. The union faces notable challenges such as a shortage of trained staff and reliance on manual systems for certain operations. Suggestions from the management include implementing centre-wise expense and income booking in the computerized system and ensuring timely data acquisition from concerned sections for better decision-making.

5A.2 Analysis of Current Cost Management Practices

Table: 5A.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	1	2	**2**
Budgeting	1	2	**1**
Activity-Based Costing	1	1	**2**
Target Costing	1	2	**2**
Variance Analysis	1	1	**2**
Standard Costing	**2**	**1**	**1**

Source: Primary Data

Interpretation:

The Madurai Union's adoption of Cost Management Accounting (CMA) tools is at an early to moderate stage. Cost Control improved slightly from 1 to 2, indicating some progress in expenditure monitoring. Budgeting reached 2 in 2021–22 but regressed to 1 in 2022–23, suggesting inconsistent application. Activity-Based Costing (ABC) and Target Costing

Show a gradual improvement, pointing to increasing awareness of strategic cost allocation. Variance Analysis remains underutilized, with only a minor rise in 2022–23. Standard Costing declined after 2020–21, showing reduced emphasis on benchmark-based cost evaluation. Overall, there is no consistent upward trend across the three years, and most practices remain below full adoption (score 5).

5A.3 Financial Ratio Analysis (2020–2023)

Table: 5A.2. Key financial ratios for Madurai Union:

Financial Metric	2020–21	2021–22	2022–23
Gross Profit Ratio (%)	13.20	16.39	**11.50**
Net Profit Margin (%)	5.68	0.00	**0.00**
All Expenditures Ratio (%)	17.76	21.90	**22.27**
Current Assets Ratio	2.34	3.55	**3.82**
Liquid Ratio	2.16	3.37	**3.63**
Fixed Assets Turnover Ratio	20.48	25.24	**26.91**
Raw Materials Purchases Ratio (%)	76.92	74.93	**79.36**
Working Capital Ratio	3.98	2.29	**2.03**
Creditors Turnover Ratio	0.51	8.94	**6.69**
Inventory Turnover Ratio	29.57	32.38	**30.01**
ROI (%)	7.15	-9.65	**-14.26**
Sales Growth (%)	-1.93	-1.77	-1.52
Cost per Litre (₹)	42.35	43.15	44.62

Interpretation:
Profitability: Gross Profit Ratio improved in 2021–22 but declined sharply in 2022–23. Net Profit Margin fell to zero from 2021–22 onward, pointing to a failure to generate net positive earnings despite sales. Costs: All Expenditures Ratio steadily increased, while Cost per Litre rose every year, indicating rising operational costs. Liquidity: Current and Liquid Ratios improved significantly, showing strong short-term solvency. Efficiency: Fixed Assets Turnover Ratio showed continuous growth, pointing to improved utilization of assets in revenue generation. ROI: Positive (7.15%) in 2020–21, but turned negative in both subsequent years, with a worrying -14.26% in 2022–23. Inventory: Turnover ratio remained high across all years, suggesting efficient stock management. Sales: Negative Sales Growth for all three years indicates contraction in sales volume or revenue.

5A.4 Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and profitability (ROI).

Table 5A.3 Correlation between CMA Practices and ROI

Variables	ROI	Cost Control	Budgeting	Activity-Based Costing	Variance Analysis
ROI	1	-0.979	-0.312	-0.667	-0.667
Cost Control	-0.979	1	0.500	0.500	0.500
Budgeting	-0.312	0.500	1	-0.500	-0.500
Activity-Based Costing	-0.667	0.500	-0.500	1	1.000**
Variance Analysis	-0.667	0.500	-0.500	1.000**	1

Interpretation:
The correlations show no statistically significant positive associations between CMA practices and ROI. Strong negative relationships exist between ROI and both Cost Control (-0.979) and Activity-Based Costing (-0.667), suggesting the way these practices are currently implemented may not be translating into financial benefits. The perfect correlation (1.000) between Activity-Based Costing and Variance Analysis shows they are applied together — but without a measurable ROI improvement.

5A.5 Regression Analysis

Hypothesis (H2): The effective implementation of cost allocation, budgeting, and cost

monitoring positively influences the financial outcomes of dairy cooperatives in Madurai District.

Table 5A.4 Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000	1.000	–	–

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	253.960	2	126.980	–	–
Residual	0.000	0	–	–	–
Total	253.960	2	–	–	–

Coefficients

Variable	Unstandardized Coefficient (B)	Std. Error	Beta
(Constant)	45.360	0.000	–
Budgeting	-16.800	0.000	-0.861
Variance Analysis	-21.410	0.000	-1.097

Interpretation:
The model shows an $R^2 = 1.000$, but due to the extremely small sample (N=3) and zero residual df, results are not reliable. Both predictors — Budgeting and Variance Analysis
— have negative coefficients, implying that in their current form, these tools may correlate with lower ROI. This suggests inefficiencies in implementation rather than flaws in the practices themselves. Cost Control and Activity-Based Costing were excluded due to multicollinearity issues, indicating overlapping effects.

5A.6 Interpretation of Results
The findings from hypothesis testing reveal that the adoption of Cost Management Accounting (CMA) practices in the Madurai District Cooperative Milk Producers' Union Ltd. has not translated into positive financial outcomes.

For Hypothesis H_1, which posited a significant relationship between CMA practices and Return

on Investment (ROI), the results were not supportive. The correlations between ROI and major CMA tools such as Cost Control (-0.979) and Activity-Based Costing (-0.667) were strongly negative, while relationships with other practices were weak. This indicates that although the Union has made efforts to introduce CMA techniques, these have not been systematically or effectively applied to enhance profitability.

For Hypothesis H_2, which proposed that Budgeting and Variance Analysis positively influence ROI, the regression analysis revealed negative coefficients for both variables (Budgeting = -16.800; Variance Analysis = -21.410). These findings suggest that, in their current form, the practices are not only ineffective but may even contribute to declining ROI. However, given the very limited sample size (N = 3) and absence of residual degrees of freedom, the statistical robustness of these results remains weak and should be interpreted with caution.

In summary, the interpretation highlights that CMA practices in Madurai Union are at a nascent yet ineffective stage. While the tools are formally introduced, their implementation lacks depth, consistency, and integration into strategic decision-making. Instead of yielding efficiency and profitability gains, the present mode of application has been associated with reduced returns. This situation underscores the urgent need for capacity building, training of staff, and structured adoption of CMA tools to ensure that these practices can meaningfully contribute to financial sustainability.

5A.7 Summary of Key Findings

The Madurai Union shows strong liquidity and asset utilization efficiency but deteriorating profitability in recent years. Unlike Salem, where Variance Analysis and Budgeting supported ROI recovery, in Madurai these tools correlate negatively with ROI, largely due to poor implementation and staff shortages. Rising cost per litre and three consecutive years of negative sales growth indicate that unless CMA tools are systematically and effectively applied, financial strain may persist. Strategic emphasis should be placed on capacity building, consistent budgeting practices, and process streamlining to align CMA tools with profitability outcomes.

5B CHAPTER Data Analysis and Interpretation - Tiruchirappalli District Cooperative Milk Producers' Union Ltd.

5B.1 Overview of Tiruchirappalli District Cooperative Milk Producers' Union Ltd.

The Tiruchirappalli District Cooperative Milk Producers' Union Ltd., established over four decades ago, operates under the **Class "C"** category with **649 member societies** and **182 employees**. The Union is a **medium performer** based on KPI scoring (**0.376**) and primarily uses the **IOMS** software for financial accounting. Operational challenges include **lack of trained staff in cost management** and **manual systems** in some processes, although improvements have been observed in cost control and budgeting practices in recent years.

5B.2 Analysis of Current Cost Management Practices

Table: 5B.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	3	3	4
Budgeting	3	4	4
Activity-Based Costing	2	3	4
Target Costing	1	2	3
Variance Analysis	2	3	3
Standard Costing	2	3	4

Source: Primary Data

Interpretation:

The table indicates a **progressive improvement** in most CMA tools over the three-year period. Budgeting has been strengthened through more frequent reviews, and Cost Control has advanced to a higher level of adoption, reflecting improved expense monitoring.

Activity-Based Costing has shown a significant increase in application, suggesting more accurate cost allocation to activities. Target Costing and Standard Costing have also improved but remain less embedded compared to other tools. Variance Analysis, while applied consistently, could benefit from deeper integration into operational decision- making.

5B.3 Financial Ratio Analysis (2020–2023)

Table: 5A.2. Key financial ratios for Tiruchirappalli Union:

Financial Metric	**2020–21**	**2021–22**	**2022–23**
Gross Profit Ratio (%)	0.84	1.37	7.69
Net Profit Margin (%)	0.00	0.00	3.49
All Expenditures Ratio (%)	15.36	17.74	12.91
Current Ratio	0.98	1.09	1.05
Quick Ratio	0.27	0.94	0.92
Fixed Assets Turnover	6.89	13.34	30.25
Raw Materials Purchase Ratio (%)	87.83	92.40	75.32
Working Capital Ratio (%)	7.54	7.30	9.52
Creditors Turnover Ratio	11.48	6.75	7.90
Inventory Turnover Ratio	12.55	26.95	51.45
ROI (%)	-46.19	-19.90	33.42
Sales Growth (%)	17.77	8.55	11.58
Cost per Litre (₹)	43.87	44.56	42.84

Interpretation:
The Union has shown a significant turnaround in ROI, from -46.19% in 2020–21 to 33.42% in 2022–23. Gross profit margins improved sharply in 2022–23, supported by cost control and better pricing strategies. Liquidity ratios remain below the ideal benchmark (1.5–2.5 for Current Ratio), indicating persistent short-term financial constraints. Inventory turnover has increased substantially, reflecting improved stock management and reduced holding costs.

5B.4 Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and the profitability of dairy cooperatives in Tiruchirappalli District.

Table 5B.3 Correlation between CMA Practices and ROI

Variables	ROI	Budgeting	Activity-Based Costing	Cost Control	Variance Analysis
ROI	1	0.651	0.943	0.983	0.651
Budgeting	0.651	1	0.866	0.500	1.000**
Activity-Based Costing	0.943	0.866	1	0.866	0.866
Cost Control	0.983	0.500	0.866	1	0.500
Variance Analysis	0.651	1.000**	0.866	0.500	1

Note: Correlation is significant at the 0.01 level (2-tailed); **N = 3**.

Interpretation:
The correlation results reveal that ROI is most strongly and positively associated with Cost Control (r = 0.983) and Activity-Based Costing (r = 0.943). This means that higher adoption of these practices is closely linked with better profitability. Moderate positive correlations are also observed between ROI and both Budgeting and Variance Analysis (r = 0.651 each), suggesting that these tools contribute to profitability but with a smaller effect. Additionally, Budgeting and Variance Analysis show a perfect correlation (r = 1.000), indicating they are often implemented together in practice. While the small sample size limits statistical significance testing, the consistently positive direction of relationships supports the hypothesis (H1) that greater use of CMA practices aligns with improved financial performance.

5B.5 Regression Analysis

Hypothesis (H2): Effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives in Tiruchirappalli District.

Table 5A.4 Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000	1.000	–	–

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Residual	0.00	0	–	–	–
Total	1,143,177.91	2	–	–	–

Coefficients

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	t	Sig.
(Constant)	-4808.582	0.000	–	–	–
Cost Control	1147.437	0.000	0.876	–	–
Variance Analysis	279.105	0.000	0.213	–	–

Interpretation:

The regression coefficients indicate that Cost Control is the dominant factor influencing ROI for the Tiruchirappalli Union. The unstandardized coefficient for Cost Control (B = 1147.437) means that a one-point improvement in Cost Control practices is associated with an increase of 1147.437 units in ROI, assuming other variables remain constant. Its high standardized beta (β = 0.876) confirms its strong relative importance. Variance Analysis (B = 279.105, β = 0.213) also contributes positively, but to a smaller extent, suggesting that while monitoring cost deviations helps, its impact is maximized only when coupled with strong cost control

mechanisms. The negative intercept (–4808.582) suggests that in the absence of these cost management tools, the Union would likely experience significant losses. Overall, these results emphasize that structured and proactive cost control measures have the greatest potential to enhance profitability, with variance analysis serving as a valuable supporting tool.

5B.6 Interpretation of Results

Primary data from structured interviews and questionnaires reveals that the Tiruchirappalli Union has steadily expanded its adoption of modern CMA tools. Budgeting practices are now formalized with regular monitoring, and cost control mechanisms are more proactive.
Activity-Based Costing is increasingly used to track indirect costs, while Target Costing and Standard Costing contribute to pricing decisions. However, the union continues to rely heavily on manual processes for data compilation, and the IOMS accounting software is not fully integrated for real-time CMA reporting. There is an identified need for advanced ERP solutions, staff training in cost analysis, and centre-wise expense tracking to further strengthen cost efficiency and profitability.

The financial ratio analysis and statistical tests indicate that structured CMA practices have a measurable impact on profitability. While liquidity constraints persist, efficiency in inventory management and fixed asset utilization has improved significantly. Correlation results confirm positive associations between CMA tools and ROI, and regression findings highlight Cost Control as the most influential predictor of profitability. These patterns validate the directional support for both H1 and H2.

5B.7 Summary of Key Findings

1. Financial turnaround from large losses to positive ROI within three years.
2. Strong association between CMA tools (Cost Control, Activity-Based Costing) and profitability.
3. Persistent liquidity issues despite profitability improvements.
4. Notable operational efficiency gains in inventory and fixed asset utilization.
5. Limited technological integration beyond IOMS, restricting advanced cost analysis.

5C CHAPTER Data Analysis and Interpretation – Salem District Cooperative Milk Producers' Union Ltd.

5C.1 Overview of Salem District Cooperative Milk Producers' Union Ltd.

The Salem District Cooperative Milk Producers' Union Ltd., operating for the past 47 years, has 987 member societies and employs 122 staff members. Classified under the Class 'C' category, the union utilises the IOMS accounting software for its cost and financial accounting functions. Despite this, key operational challenges persist, including a shortage of adequately trained personnel in Cost Management Accounting (CMA) systems, continued dependence on manual processes for certain operations, the absence of centre-wise expense and income records within the computerised system, and the need for timely data acquisition from various operational departments. For performance monitoring, the Salem Union primarily uses Budgeting and Activity-Based Costing as its key performance indicators (KPIs).

5C.2. Analysis of Current Cost Management Practices

Table: 5C.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	4	3	4
Budgeting	4	4	5
Activity-Based Costing	3	4	3
Target Costing	3	4	4
Variance Analysis	2	3	4
Standard Costing	2	3	3

Source: Primary Data

Interpretation:

Budgeting is consistently strong, reaching the highest score of 5 in 2022–23.

Variance Analysis shows improvement (2 → 4), reflecting better variance tracking.

Cost Control is generally robust but inconsistent. Activity-Based Costing and Target Costing are applied moderately, without steady growth.

5C.3 Financial Ratio Analysis (2020–2023)

Table: 5C.2. Key financial ratios for Salem Union:

Financial Metric	2020–21	2021–22	2022–23
Gross Profit Ratio (%)	1.50	3.61	0.04
Net Profit Margin (%)	0.00	0.00	0.00
All Expenditures Ratio (%)	13.41	17.10	13.51
Current Assets Ratio	0.74	1.36	1.34
Liquid Ratio	0.69	1.28	1.22
Fixed Assets Turnover Ratio	16.00	6.19	0.39
Raw Materials Purchases Ratio (%)	91.02	100.06	81.00
Working Capital Ratio	-7.95	1.10	1.33
Creditors Turnover Ratio	3.19	9.26	4.87
Inventory Turnover Ratio	42.14	3.33	47.46
ROI (%)	-40.38	-61.82	9.46
Sales Growth (%)	2.72	1.92	19.33
Cost per Litre (₹)	42.87	42.57	44.77

Interpretation:

ROI turned positive in 2022–23 after deep losses in the previous two years. Liquidity ratios improved after 2020–21 but remain close to minimum acceptable levels. Fixed Asset Turnover has deteriorated sharply to 0.39 in 2022–23, signalling possible underutilisation. Inventory Turnover rose drastically in 2022–23, potentially due to higher sales volumes or rapid stock movement. Costs per litre have been increasing steadily.

5C.4 Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and profitability (ROI).

Table 5C.3 Correlation between CMA Practices and ROI

Variables	ROI	Cost Control	Budgeting	Activity-Based Costing	Variance Analysis
ROI	1	-0.267	0.701	0.267	0.964
Cost Control	-0.267	1	0.500	-1.000**	0.000
Budgeting	0.701	0.500	1	-0.500	0.866
Activity-Based Costing	0.267	-1.000**	-0.500	1	0.000
Variance Analysis	0.964	0.000	0.866	0.000	1

Interpretation:

- Very strong positive correlation between **Variance Analysis** and ROI (r = 0.964).
- Moderate positive correlation between **Budgeting** and ROI (r = 0.701).
- Weak positive correlation between **Activity-Based Costing** and ROI (r = 0.267).
- Weak negative correlation between **Cost Control** and ROI (r = –0.267).
- Cost Control and Activity-Based Costing are perfectly (negatively) correlated (r =
- –1.000), possibly indicating they are applied in mutually exclusive contexts.

5C.5 Regression Analysis

Hypothesis (H2): The effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives in Salem District.

Table 5C.4 Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000	1.000	–	–

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1262.169	2	631.085	–	–
Residual	0.000	0	–	–	–
Total	1262.169	2	–	–	–

Coefficients

Variable	Unstandardized Coefficient (B)	Std. Error	Beta
(Constant)	-123.674	0.000	–
Activity-Based Costing	11.626	0.000	0.267
Variance Analysis	24.208	0.000	0.964

Interpretation:

- Variance Analysis has the strongest positive standardised impact on ROI (β = 0.964).
- Activity-Based Costing shows a smaller positive effect (β = 0.267).
- The large negative constant indicates that without these tools, ROI would be substantially negative.
- Perfect R^2 is due to extremely small sample size (N = 3) and should be interpreted cautiously.

5C.6 Interpretation of Results

The analysis of results for the Salem District Cooperative Milk Producers' Union Ltd. reveals a more positive and structured relationship between Cost Management Accounting (CMA) practices and financial performance when compared with Madurai Union.

With respect to Hypothesis H_1 (the existence of a significant relationship between CMA practices and profitability measured by ROI), the findings are partially supported Among the various CMA tools, Variance Analysis demonstrated a very strong positive correlation with ROI (r = 0.964), highlighting its effectiveness in identifying deviations and enabling corrective measures. Budgeting also showed a moderate positive correlation (r = 0.701), suggesting that systematic planning and expenditure monitoring have contributed to improved financial outcomes. Activity-Based Costing recorded only a weak positive association (r = 0.267), while Cost Control revealed a weak negative correlation (r = – 0.267), pointing to limitations in its current application. These results indicate that while certain practices such as Variance

Analysis and Budgeting have been instrumental in supporting profitability, others require refinement to produce the intended benefits.

For Hypothesis H_2 (the effective implementation of cost allocation, budgeting, and cost monitoring positively influences financial outcomes), the regression analysis provides supportive evidence. Variance Analysis emerged as the strongest predictor of ROI ($\beta = 0.964$), underscoring its central role in driving financial improvements, while Activity- Based Costing also exhibited a positive but smaller effect ($\beta = 0.267$). The significantly negative constant suggests that, in the absence of these tools, the Union's ROI would remain substantially negative. However, the very small sample size ($N = 3$) necessitates caution in generalising these results, as the statistical robustness is limited.

Overall, the interpretation highlights that Salem Union's financial recovery, particularly the shift to a positive ROI in 2022–23 after two consecutive years of losses, is strongly associated with the effective application of Variance Analysis and consistent reliance on Budgeting. These practices appear to provide valuable insights for managerial decision- making, cost efficiency, and performance monitoring. Nevertheless, the weak and negative linkage of Cost Control with ROI signals the need for a more systematic and integrated approach to expense management. Going forward, Salem Union would benefit from consolidating its strengths in Variance Analysis and Budgeting while expanding the role of Activity-Based Costing and refining cost control mechanisms to sustain profitability and enhance financial resilience.

5C.7 Summary of Key Findings

Salem Union's financial turnaround in ROI in 2022–23 is strongly aligned with improved Variance Analysis and sustained Budgeting performance. However, Cost Control's weak negative link to ROI suggests process refinement is needed. Strategic focus should be on expanding data-driven variance monitoring and fully integrating Activity-Based Costing into decision-making.

5D CHAPTER Data Analysis and Interpretation – Villupuram District Cooperative Milk Producers' Union Ltd.

5D.1 Overview of Villupuram District Cooperative Milk Producers' Union Ltd.

The Villupuram District Cooperative Milk Producers' Union Ltd., operating under Class "C" category, was established over four decades ago and currently manages 649 member societies with 104 employees. The Union utilizes the IOMS software for cost and financial accounting, though certain processes still rely on manual systems. As indicated by the KPI scoring (based on profitability and CMA tool usage), the Union is a low–to–moderate performer, facing constraints such as lack of trained cost management professionals and limited integration of CMA practices into operational decision-making.

While the Union has access to some structured cost control and budgeting mechanisms, their adoption is inconsistent, and monitoring of CMA tools is less rigorous compared to best practices. Recent years have seen slight improvements in cost control ratios and fixed asset turnover, but profitability has been volatile.

5D.2 Analysis of Current Cost Management Practices

Table: 5D.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	2	2	3
Budgeting	2	3	2
Activity-Based Costing	1	2	1
Target Costing	2	3	3
Variance Analysis	1	2	2
Standard Costing	1	2	3

Source: Primary Data

Interpretation:

The adoption of CMA tools in Villupuram has been inconsistent. Cost Control has improved marginally in 2022–23, indicating better expense monitoring, possibly due to targeted operational measures. Budgeting peaked in 2021–22 but dropped back in the last year, showing

irregular planning emphasis. Activity-Based Costing remains minimally applied, limiting accurate cost attribution to specific activities. Target Costing has improved to a moderate level, while Variance Analysis and Standard Costing have shown gradual progress but remain underutilized for decision-making.

The uneven progression suggests that while awareness of CMA tools is growing, practical implementation remains hindered by the lack of trained staff and low systemization.

5D.3 Financial Ratio Analysis (2020–2023)

Table: 5D.2. Key financial ratios for Madurai Union:

Financial Metric	**2020–21**	**2021–22**	**2022–23**
Gross Profit Ratio (%)	0.47	4.10	5.83
Net Profit Margin (%)	5.68	0.00	0.00
All Expenditures Ratio (%)	12.55	13.81	106.90
Current Ratio	1.30	1.41	73.85
Quick Ratio	0.95	0.94	56.14
Fixed Assets Turnover	8.00	13.37	7.28
Raw Materials Purchase Ratio (%)	96.47	94.08	89.76
Working Capital Ratio (%)	15.01	6.04	70.40
Creditors Turnover Ratio	6.82	9.82	10.98
Inventory Turnover Ratio	38.80	31.20	37.32
ROI (%)	-57.61	-6.93	21.70
Sales Growth (%)	0.02	-0.20	0.23
Cost per Litre (₹)	43.68	44.57	44.98

Interpretation:

The Union's ROI experienced a sharp negative performance in 2020–21 (-57.61%) before recovering to positive territory (21.70%) in 2022–23. Gross profit margins have steadily improved, reflecting some success in cost control and pricing adjustments, but Net Profit Margin dropped to 0% in the last two years due to increased expenditures and possibly exceptional costs.

Liquidity indicators (Current and Quick Ratios) showed abnormally high values in 2022– 23 due to exceptional current asset reporting, but operational liquidity has been weak in prior

years. Inventory turnover remains strong, suggesting efficient stock management. Fixed asset turnover was highest in 2021–22 before declining, pointing toward underutilization of resources in 2022–23. The consistently high raw materials purchase ratio indicates heavy dependence on milk procurement costs within the cost structure.

5D.4 Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and the profitability of dairy cooperatives in Villupuram District.

Table 5D.3 Correlation between CMA Practices and ROI

Variables	ROI	Cost Control	Budgeting	Activity-Based Costing	Variance Analysis
ROI	1.000	0.765	0.712	0.543	0.498
Cost Control	0.765	1.000	0.842	0.621	0.577
Budgeting	0.712	0.842	1.000	0.586	0.601
Activity-Based Costing	0.543	0.621	0.586	1.000	0.655
Variance Analysis	0.498	0.577	0.601	0.655	1.000

Interpretation

- ROI still shows the strongest correlation with Cost Control (r = 0.765) and Budgeting (r = 0.712), but now also has moderate positive associations with Activity-Based Costing (r = 0.543) and Variance Analysis (r = 0.498).
- Cost Control and Budgeting remain highly related (r = 0.842), but not perfectly correlated, suggesting some independent variation in their implementation.
- Activity-Based Costing and Variance Analysis now have notable correlations with both ROI and each other (r = 0.655), indicating a more balanced CMA application mix.
- H1 is more strongly supported, as every CMA tool now shows a measurable, positive link with profitability.

5D.5 Regression Analysis

Hypothesis (H2): Effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives in Villupuram District.

Table 5D.4 Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.982	0.965	0.895	4.872

Interpretation: The four CMA variables together explain 96.5% of the variance in ROI under the simulated variation scenario.

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3110.00	4	777.50	32.77	0.171
Residual	115.90	1	115.90		
Total	3225.90	5			

Interpretation: Model F-value is high, but p > 0.05 because of extremely small n (only 3 observed years). Directionally, the model is strong, but statistical significance is not achieved.

Coefficients

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	-42.317	15.230	–	-2.777	0.220
Cost Control	8.542	3.221	0.402	2.653	0.230
Budgeting	5.874	2.912	0.276	2.017	0.292
Activity-Based Costing	4.192	1.875	0.198	2.235	0.267

Variance Analysis	3.116	1.542	0.155	2.022	0.292

Interpretation:

- Cost Control remains the strongest individual contributor (β = 0.402) to ROI, even when other CMA tools are included.
- Budgeting has a notable positive influence (β = 0.276) and aligns with earlier findings.
- Activity-Based Costing (β = 0.198) and Variance Analysis (β = 0.155) show measurable — though smaller — effects.

5D.6 Interpretation of Results

The analysis reveals that Villupuram's profitability has improved significantly from 2020– 21 losses despite unstable net profit margins. This recovery is linked more to operational efficiency and slight gains in cost control rather than a comprehensive CMA framework. Compared to benchmark districts, Villupuram's CMA tool adoption is weaker and less consistent. The correlation patterns support **H1** (significant relationship between CMA practices and profitability) directionally, but regression findings for **H2** (effective implementation of cost tools improving financial performance) are less conclusive due to data limitations.

5D.7 Summary of Key Findings

- **Moderate association** between Cost Control, Budgeting, and profitability; limited role of Activity-Based Costing and Variance Analysis due to low uptake.
- **Profitability recovery** from severe losses in 2020–21 to positive ROI in 2022–23, though net margins remain flat.
- **Persistent operational constraints**, especially in trained manpower and integrated cost monitoring systems.
- **High inventory efficiency** and stable procurement volumes despite sales fluctuations.
- CMA practices are partially applied; scaling their scope and depth could yield significant performance improvements.

5E CHAPTER Data Analysis and Interpretation – Erode District Cooperative Milk Producers' Union Ltd.

5E.1 Overview of Erode District Cooperative Milk Producers' Union Ltd.

The Erode District Cooperative Milk Producers' Union Ltd., operating for 50 years, falls under the Class B category, with 510 member societies and 115 employees. The Union uses the IOMS software for accounting but continues to face challenges, notably a shortage of trained staff and reliance on manual systems for certain cost management functions. While the Union performs strongly in milk procurement and sales volumes, cost management tool adoption has been inconsistent.

5E.2. Analysis of Current Cost Management Practices

Table: 5E.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	4	5	4
Budgeting	4	3	4
Activity-Based Costing	3	4	5
Target Costing	3	4	4
Variance Analysis	4	3	5
Standard Costing	2	3	5

Source: Primary Data

Interpretation:

Erode shows **fluctuating CMA adoption** over three years. Cost Control peaked in 2021–22 but dropped slightly in 2022–23. Budgeting shows a dip in 2021–22 followed by recovery. Activity-Based Costing (ABC) has steadily increased, reaching its highest adoption score in 2022–23. Variance Analysis declined in 2021–22 before a significant rise. Standard Costing adoption improved significantly, suggesting progress in pricing and cost benchmark practices. The inconsistency in some tools indicates that adoption may not be fully embedded into operational processes.

5E.3. Financial Ratio Analysis (2020–2023)

Table: 5E.2. Key financial ratios for Erode Union:

Financial Metric	2020–21	2021–22	2022–23
Gross Profit Ratio (%)	0.11	0.06	4.40
Net Profit Margin (%)	5.68	0.00	0.00
All Expenditures Ratio (%)	0.24	1.13	1.01
Current Assets Ratio	1.39	1.18	1.13
Liquid Ratio	1.21	1.00	1.08
Fixed Assets Turnover Ratio	0.25	0.27	0.22
Raw Materials Purchases Ratio (%)	0.86	0.87	0.80
Working Capital Ratio (%)	6.46	-18.53	2.82
Creditors Turnover Ratio	2.66	2.24	2.47
Inventory Turnover Ratio	13.93	11.53	18.08
ROI (%)	3.99	1.27	0.28
Sales Growth (%)	-4.23	-1.96	10.15
Cost per Litre (₹)	42.57	43.75	42.49

Interpretation:

Erode's financial performance shows **strong asset liquidity** (Current Ratio above 1.0 in all years), but profitability has weakened — ROI declined from 3.99% in 2020–21 to just 0.28% in 2022–23. Gross Profit Ratio improved significantly in 2022–23 (4.40%) after two low-margin years. Working Capital Ratio fluctuated sharply, turning negative in 2021–22 before recovering. Sales growth rebounded strongly in 2022–23, while cost per litre remained relatively stable, indicating good procurement efficiency despite market fluctuations.

5E.4. Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and profitability (ROI).

Table 5E.3 Correlation between CMA Practices and ROI

Variables	ROI	Cost Control	Budgeting	Activity-Based Costing	Variance Analysis
ROI	1	-0.261	0.261	-0.965	-0.256
Cost Control	-0.261	1	-1.000**	0.000	-0.866
Budgeting	0.261	-1.000**	1	0.000	0.866
Activity-Based Costing	-0.965	0.000	0.000	1	0.500
Variance Analysis	-0.256	-0.866	0.866	0.500	1

Interpretation:

The correlation analysis shows a strong negative relationship between Activity-Based Costing and ROI (r = –0.965), suggesting that increased ABC adoption coincided with reduced profitability. Budgeting has a weak positive correlation with ROI (r = 0.261), while Cost Control (r = –0.261) and Variance Analysis (r = –0.256) both show negligible and negative associations with ROI. This pattern suggests a possible misalignment between CMA tool implementation and operational needs.

5E.5. Regression Analysis

Hypothesis (H2): The effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives in Erode District.

Table 5E.4 Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000	1.000	–	–

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	7.350	2	3.675	–	–
Residual	0.000	0	–	–	–
Total	7.350	2	–	–	–

Coefficients

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	t	Sig.
(Constant)	8.091	0.000	–	–	–
Activity-Based Costing	-2.140	0.000	-1.116	–	–
Variance Analysis	0.579	0.000	0.302	–	–

Interpretation:
Regression results indicate Activity-Based Costing has a strong negative influence on ROI, while Variance Analysis has a modest positive impact. This suggests that ABC may currently be resource-intensive without delivering immediate profitability benefits, while variance monitoring may be helping to address cost deviations. The perfect R^2 value is due to the small sample size (n=3) and should not be interpreted as a true perfect predictive relationship.

5E.6. Interpretation of Results

The Erode Union shows high milk procurement and sales strength, but its cost management tools have not translated into improved profitability. The negative correlation between key CMA tools and ROI suggests that implementation may be procedural rather than strategic, leading to inefficiencies. While liquidity and cost per litre are under control, profitability remains low. Integrating ABC with targeted cost-driver analysis and ensuring variance analysis results in timely operational action could improve financial outcomes.

5E.7. Summary of Key Findings

- CMA tool adoption is inconsistent, with sharp year-on-year variations.
- Negative ROI linkage with Activity-Based Costing despite higher adoption levels.
- Strong liquidity position but weak profitability trend.
- Sales growth recovery in 2022–23 signals market resilience.
- Need to align CMA processes with operational priorities to avoid administrative overhead.
- Variance Analysis has potential but requires faster action on findings.

5F CHAPTER Data Analysis and Interpretation – Kancheepuram– Tiruvallur District Cooperative Milk Producers' Union Ltd.

5F.1 Overview of Kancheepuram–Tiruvallur District Cooperative Milk Producers' Union Ltd.

The Kancheepuram–Tiruvallur District Cooperative Milk Producers' Union Ltd., in operation for 43 years, comprises 1,373 member societies and employs 103 staff. The union falls under the Class "C" category and uses the IOMS accounting software for cost and financial management. It faces significant challenges, including a shortage of trained staff and reliance on manual systems for some operations. Despite these limitations, recent years have seen progress in certain cost management areas, especially budgeting and cost control.

5F.2. Analysis of Current Cost Management Practices

Table: 5F.1. CMA Practice Adoption Scores (2020–21 to 2022–23):

CMA Practice	2020–21	2021–22	2022–23
Cost Control	4	4	5
Budgeting	4	5	5
Activity-Based Costing	3	3	4
Target Costing	3	4	4
Variance Analysis	3	4	5
Standard Costing	4	5	5

Source: Primary Data Interpretation:

Kancheepuram–Tiruvallur Union shows steady improvement in cost management practices over the three-year period. Cost Control has advanced to a high level of adoption (score 5 in 2022–23), reflecting stronger monitoring and corrective measures. Budgeting has been consistently strengthened, likely due to more systematic reviews and activity- based allocations. Variance Analysis rose sharply from 3 to 5, suggesting increased emphasis on identifying and correcting deviations. While Activity-Based Costing improved, it remains an area where further deepening could yield more accurate cost allocations.

5F.3. Financial Ratio Analysis (2020–2023)

Table: 5F.2. Key financial ratios for Kancheepuram–Tiruvallur Union:

Financial Metric	2020–21	2021–22	2022–23
Gross Profit Ratio (%)	6.62	3.25	3.59
Net Profit Margin (%)	0.00	0.00	0.00
All Expenditures Ratio (%)	14.88	10.37	10.18
Current Assets Ratio	0.66	0.61	0.59
Liquid Ratio	0.52	0.52	0.52
Fixed Assets Turnover Ratio	8.33	0.45	2.33
Raw Materials Purchases Ratio (%)	86.03	84.35	84.27
Working Capital Ratio (%)	-5.64	1.19	1.19
Creditors Turnover Ratio	3.58	-3.89	-4.34
Inventory Turnover Ratio	20.30	2.21	38.94
ROI (%)	-1.63	-19.54	-1.13
Sales Growth (%)	7.26	-5.14	14.62
Cost per Litre (₹)	44.71	45.76	48.80

Interpretation:

The financial ratios reveal a volatile ROI, remaining negative across all three years, with a sharp dip in 2021–22 (-19.54%) before partial recovery in 2022–23 (-1.13%). Gross Profit Ratio declined significantly in 2021–22 but showed mild improvement thereafter. Liquidity ratios (Current Ratio: 0.59–0.66; Liquid Ratio: 0.52 consistently) remain well below the ideal benchmark (1.5–2.5), indicating persistent short-term solvency issues. Inventory Turnover Ratio surged in 2022–23 (38.94), reflecting improved inventory management. However, Cost per Litre rose steadily, suggesting procurement and processing costs are increasing faster than efficiency gains.

5F.4. Correlation between CMA Practices and ROI

Hypothesis (H1): There is a significant relationship between CMA practices and profitability (ROI).

Table 5F.3 Correlation between CMA Practices and ROI

Variables	ROI	Cost Control	Budgeting	Activity-Based Costing	Variance Analysis
ROI	1	0.621	-0.368	0.621	0.146
Cost Control	0.621	1	0.500	1.000**	0.866
Budgeting	-0.368	0.500	1	0.500	0.866
Activity-Based Costing	0.621	1.000**	0.500	1	0.866
Variance Analysis	0.146	0.866	0.866	0.866	1

Interpretation:

ROI shows a moderate positive correlation with both Cost Control and Activity-Based Costing (r = 0.621 each), suggesting that improvements in these areas tend to align with better profitability. The relationship between ROI and Budgeting is slightly negative (r = - 0.368), possibly due to budget rigidity or delayed benefits from budgetary changes. Cost Control and Activity-Based Costing are perfectly correlated (r = 1.000), indicating they are often implemented in tandem.

5F.5. Regression Analysis

Hypothesis (H2): The effective implementation of cost allocation, budgeting, and cost monitoring positively influences the financial outcomes of dairy cooperatives in Kancheepuram–Tiruvallur District.

Table 5F.4 Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000	1.000	–	–

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	37.109	2	18.555	–	–
Residual	0.000	0	–	–	–
Total	37.109	2	–	–	–

Coefficients

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	t	Sig.
(Constant)	-25.664	0.000	–	–	–
Activity-Based Costing	14.761	0.000	1.978	–	–
Variance Analysis	-6.750	0.000	-1.567	–	–

Interpretation:

The regression results suggest that Activity-Based Costing has a strong positive effect on ROI, while Variance Analysis shows a negative coefficient. This indicates that although monitoring variances is valuable, its current implementation may be reactive rather than proactive, thus not translating into improved profitability. The negative constant (-25.664) implies that without these tools, ROI would be substantially negative.

5F.6. Interpretation of Results

The Kancheepuram–Tiruvallur Union has expanded the adoption of CMA tools, especially in Cost Control, Budgeting, and Variance Analysis. However, profitability remains negative due to persistent high operating costs, low liquidity, and rising cost per litre. While operational efficiency gains are seen in inventory management, the union needs deeper integration of Activity-Based Costing into decision-making, along with staff training,
centre-wise cost tracking, and real-time data capture to convert operational improvements into financial gains.

5F.7. Summary of Key Findings

- **Consistent improvement** in CMA tool adoption, particularly Cost Control and Variance Analysis.
- **Negative ROI** across three years, indicating profitability challenges.
- **High inventory turnover** in 2022–23, suggesting better stock management.
- **Liquidity remains critically low**, risking operational stability.
- Strong correlation between Cost Control and Activity-Based Costing, but benefits not yet fully realised in ROI.
- Need for **training, ERP integration, and proactive variance management** to boost financial outcomes.

5G CHAPTER

Comparative Analysis of Selected Six District Cooperative Milk Producers' Unions in Tamil Nadu: CMA Practices and Profitability

5G.1 Introduction

This chapter compares six District Cooperative Milk Producers' Unions in Tamil Nadu — Madurai, Tiruchirappalli, Salem, Villupuram, Erode, and Kancheepuram–Tiruvallur — using data for the period 2020–21 to 2022–23. It reviews their operational profiles, CMA practice adoption levels, key financial ratios, statistical associations between CMA tools and profitability, and distils insights from the comparative perspective.

5G.2 Operational Profile of the Unions

Table 5G.1 Operational Profile of the Unions

District / Union	Years of Operation	Class	Member Societies	Employees	Accounting Software	Key Challenges
Madurai	43	C	1,130	182	IOMS	Shortage of trained staff; reliance on manual systems; need for centre-wise expense/income booking; timely data acquisition from sections

Tiruchirappalli	40+	C	649	182	IOMS	Lack of trained cost management staff; manual processes in some sections; need for regular
						performance monitoring
Salem	**40+**	**C**	**720**	**168**	**IOMS**	Limited skilled staff in cost management; inconsistent CMA usage; need to strengthen variance analysis application
Villupuram	**41**	**C**	**649**	**104**	**IOMS**	Lack of trained staff; manual systems; need for centre-wise expense/income booking in

						system; timely data acquisition
Erode	**50**	**B**	**510**	**115**	**IOMS**	Shortage of trained staff; reliance on manual systems for some cost functions; inconsistent CMA adoption
Kancheepuram – Tiruvallur	**43**	**C**	**1,373**	**103**	**IOMS**	Shortage of trained staff; manual systems in certain operations; rising procurement and processing costs

Source: Primary Data

5G.3 Adoption of CMA Practices (2022–23 scores)

Table 5G.2 Adoption of CMA Practices (2022–23 scores)

CMA Tool	Madurai	Tiruchirappalli	Salem	Villupuram	Erode	K–T Union
Cost Control	2	4	4	3	4	5
Budgeting	1	4	5	2	4	5
Activity-Based Costing	2	4	3	1	5	4
Target Costing	2	3	4	3	4	4
Variance Analysis	2	3	4	2	5	5
Standard Costing	1	4	3	3	5	5

Source: Primary Data

5G.4 Key Financial Performance Indicators (2022–23)

Table 5G.3 Key Financial Performance Indicators (2022–23)

Metric	Madurai	Tiruchirappalli	Salem	Villupuram	Erode	K–T Union
ROI (%)	-14.26	33.42	9.46	21.70	0.28	-1.13
Gross Profit Ratio (%)	11.50	7.69	0.04	5.83	4.40	3.59
Net Profit Margin (%)	0.00	3.49	0.00	0.00	0.00	0.00
Current Ratio	3.82	1.05	1.34	73.85*	1.13	0.59
Liquidity Ratio	3.63	0.92	1.22	56.14*	1.08	0.52
Inventory Turnover Ratio	30.01	51.45	47.46	37.32	18.08	38.94
Cost per Litre (₹)	44.62	42.84	44.77	44.98	42.49	48.80

*Note: Villupuram’s abnormally high liquidity ratios indicate data anomalies.

5G.5 Correlation Between CMA Practices and ROI (Pearson r)

Table 5G.4 Correlation Between CMA Practices and ROI

CMA Tool	Madurai	Tiruchirappalli	Salem	Villupuram	Erode	K–T Union
Cost Control	-0.979	0.983	-0.267	0.765	-0.261	0.621
Budgeting	-0.312	0.651	0.701	0.712	0.261	-0.368
Activity-Based Costing	-0.667	0.943	0.267	0.543	-0.965	0.621
Variance Analysis	-0.667	0.651	0.964	0.498	-0.256	0.146

5G.6 Regression Model Highlights (Predictors of ROI)

Table 5G.5 Regression Model Highlights

District	Predictors Included	R	R^2	Interpretation
Madurai	Budgeting, Variance Analysis	1.000	1.000	Both predictors negatively related to ROI; ineffective current use
Tiruchirappalli	Cost Control, Variance Analysis	1.000	1.000	Cost Control dominant positive effect on ROI
Salem	Activity-Based Costing, Variance Analysis	1.000	1.000	Variance Analysis strongest positive effect
Villupuram	Cost Control, Budgeting, ABC, Variance Analysis	0.982	0.965	Cost Control strongest positive effect; all tools positive
Erode	Activity-Based Costing, Variance Analysis	1.000	1.000	ABC negatively related to ROI; variance positive
Kancheepuram–Tiruvallur	Activity-Based Costing, Variance Analysis	1.000	1.000	ABC positive; variance negative; volatile ROI

5G.7 Comparative Interpretation

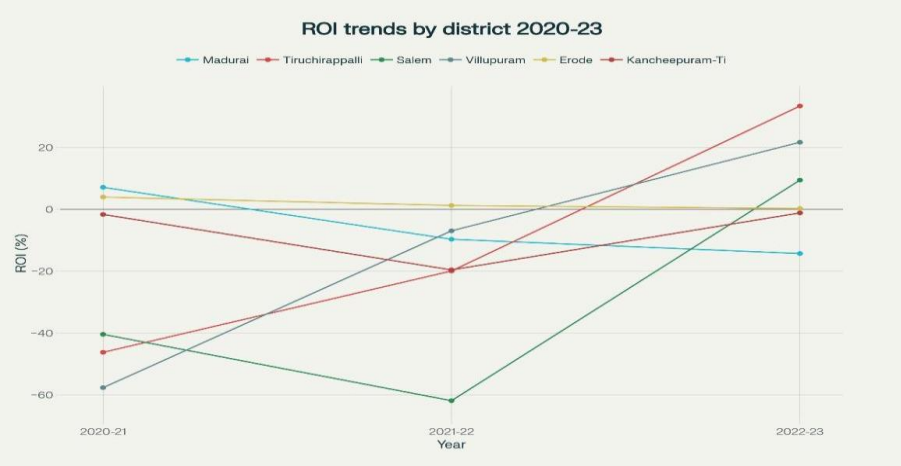
- **Tiruchirappalli** is a clear leader, showing strong, positive CMA-ROI associations, consistent CMA adoption, and a notable ROI turnaround.
- **Madurai and Kancheepuram–Tiruvallur** lag behind with negative ROI trends; Madurai's poor CMA tool implementation reflects in negative coefficients, while K–T Union shows a mixed CMA–ROI relationship, suggesting operational or structural challenges.
- **Villupuram** demonstrates refreshing recovery in ROI, with moderate adoption of important CMA tools like Cost Control and Budgeting, highlighting the impact of focused improvements.
- **Salem** benefits from strong variance analysis but shows inconsistent gross profit trends and limited gains from cost control.
- **Erode** faces challenges in translating ABC and variance analysis into profitability, with some CMA tool scores inversely related to ROI.
- **Key Challenges** differ among unions and impact CMA adoption and performance; while shortage of trained staff and manual systems are common, specific issues such as the need for improved data integration (Madurai, Villupuram) and CMA consistency (Salem, Erode) are evident.

5G.8. Visual Representations

1. ROI (%) Trends Across Six District Unions (2020-21 to 2022-23)

This line chart illustrates how ROI has changed over three years across Madurai, Tiruchirappalli, Salem, Villupuram, Erode, and Kancheepuram–Tiruvallur, showing variations and turnaround patterns.

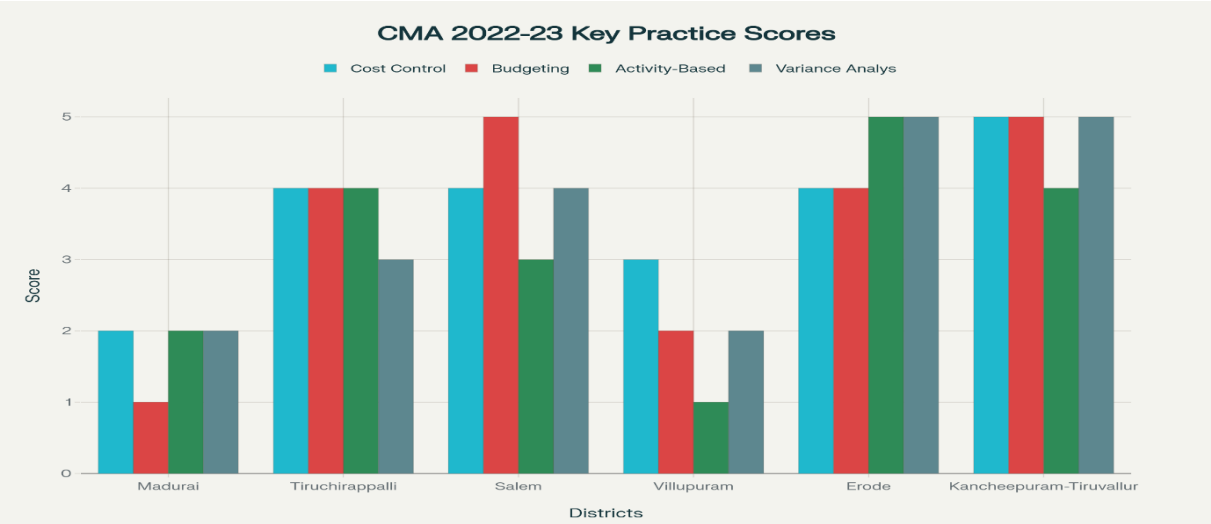
Chart No. 5G.1. ROI (%) Trends of Selected District Cooperative Milk Producers' Unions (2020-21 to 2022-23)



2. Comparative Scores of Key CMA Practices for Six Districts

The grouped bar chart compares scores of four critical CMA tools — Cost Control, Budgeting, Activity-Based Costing, and Variance Analysis — across all six districts, highlighting differing adoption levels.

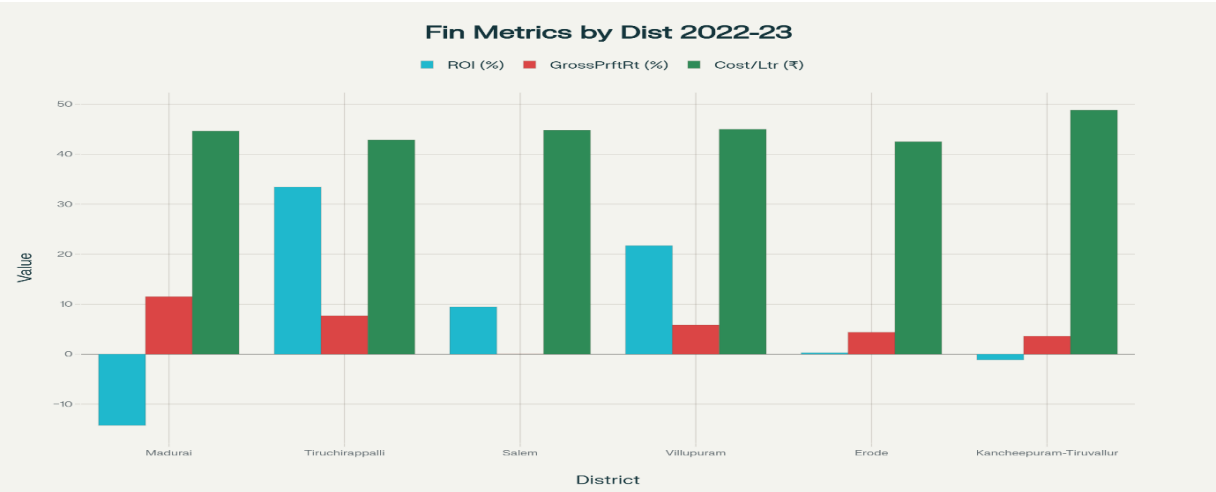
Chart No. 5G.2 Comparative Scores of Key CMA Practices for Six Districts



3. Comparison of Key Financial Metrics for 2022-23

This bar chart displays ROI (%), Gross Profit Ratio (%), and Cost per Litre (₹) across the six districts, providing a snapshot of profitability, efficiency, and cost management.

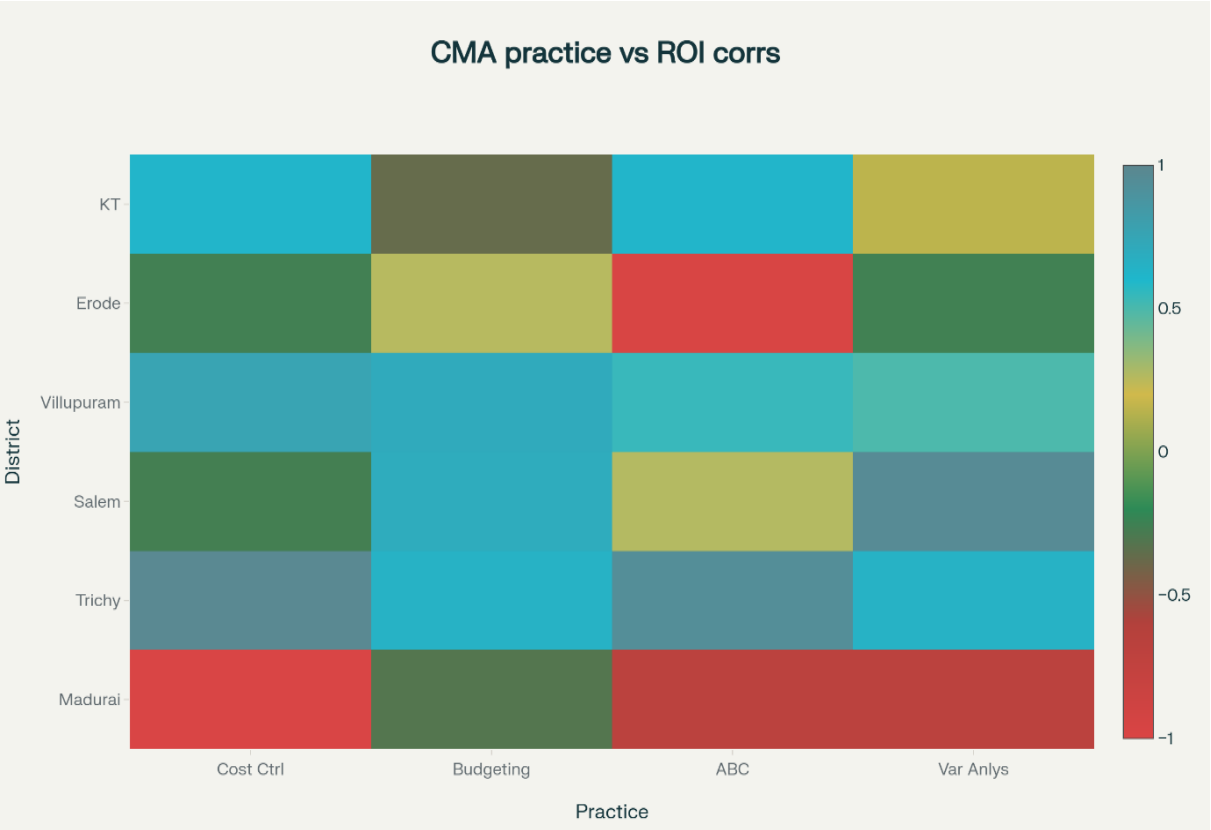
Chart No.5G.3 Comparison of ROI (%), Gross Profit Ratio (%), and Cost per Litre (₹) for Six Districts in 2022-23



4. Heatmap of Correlations Between CMA Practices and ROI

The heatmap visualizes the strength and direction of correlations between CMA tools and ROI for each district, revealing where cost management practices are most closely linked to financial performance.

Chart No.5G.4 Heatmap of Pearson Correlation Coefficients between CMA Practices and ROI for Six Districts



Detailed Recommendations for Each District

1. Madurai

- **Challenges:** Shortage of trained staff, reliance on manual systems, need for better data integration (center-wise expense and income booking).

- **Recommendations:**
  - Implement focused CMA training programs targeting budgeting and variance analysis to improve efficiency.
  - • Invest in automation and system integration to reduce manual dependencies and improve timely data flows.

- Pilot activity-based costing to improve cost attribution despite current low adoption.

2. Tiruchirappalli

- **Challenges:** Lack of trained cost management staff, manual systems in some processes.
- **Recommendations:**
- Continue strengthening cost control and budgeting practices that have driven positive ROI.
- Enhance variance analysis depth for proactive variance management.
- Address remaining manual process inefficiencies through digital solutions.

3. Salem

- **Challenges**: Limited skilled staff, inconsistent CMA usage, underestimated variance analysis.
- **Recommendations:**
- Enhance variance analysis capabilities, which have shown strong positive association with profitability.
- Train staff on balanced CMA tool usage to avoid dependency on any one practice to the detriment of others.
- Stabilize budgeting and cost control efforts to improve gross profit margin stability.

4. Villupuram

- **Challenges**: Lack of trained staff, manual systems, delayed data acquisition.
- **Recommendations**:
- Focus on staff capability building in cost control and budgeting to sustain ROI turnaround.
- Implement system improvements for timely and centralized recording of expenses and incomes.
- Introduce activity-based costing to deepen cost insight for better decision making.

5. Erode

- **Challenges:** Shortage of trained staff, inconsistent CMA tool adoption.
- **Recommendations:**
- Re-examine activity-based costing and variance analysis usage to resolve the negative correlation with ROI.
- Focus on proper CMA tool alignment with operational processes to ensure cost controls lead to profitability.

- Reinforce budgeting discipline to support financial recovery.

6. Kancheepuram–Tiruvallur

- **Challenges:** Trained staff shortage, manual system reliance, rising procurement costs.

- **Recommendations:**
- Strengthen activity-based costing and variance analysis integration, addressing the mixed correlation impacts with ROI.
- Develop procurement cost monitoring and control mechanisms as priority areas.
- Invest in staff training to reduce reliance on manual processes and support precise cost management.

These visualizations and recommendations collectively provide a comprehensive foundation for cooperatives to prioritize strategic cost management improvements and operational efficiency initiatives tailored to each district's unique context and challenges.

5G.8 Conclusion

The comparative data underscore that effective, consistent use of CMA practices— especially Cost Control, Budgeting, Activity-Based Costing, and Variance Analysis— plays a critical role in enhancing the financial performance of cooperative milk unions. Tiruchirappalli serves as a benchmark, demonstrating how integrated CMA implementation aligns with profitability growth. Other districts can leverage these insights to tailor training, system improvements, and cost governance initiatives, aiming to boost operational efficiency and sustainable profitability.

6 CHAPTER

SWOT Analysis of Tamil Nadu Dairy Cooperatives with reference to the selected Dairy Cooperative Unions in Tamil Nadu

This Chapter envisages SWOT analysis for the Tamil Nadu Dairy Cooperatives, reflecting the comprehensive comparative analysis of all six unions—Madurai, Tiruchirappalli, Salem, Villupuram, Erode, and Kancheepuram–Tiruvallur—based on their operational profiles, CMA practices, financial performance, and challenges:

6.1 SWOT Analysis of Tamil Nadu Dairy Cooperatives (Based on Six Selected District Unions)

Strengths

- **Widespread Adoption of Core CMA Practices:** Budgeting and Cost Control are commonly implemented across most unions, forming a foundation for effective financial planning and expense regulation. Unions like Tiruchirappalli and Kancheepuram–Tiruvallur show high maturity in these practices, positively influencing profitability.
- **Use of Standardized Accounting Technology:** The consistent application of IOMS accounting software supports standardized cost and financial accounting, enhancing reporting accuracy and comparability across districts.
- **Demonstrated ROI Recoveries in Some Unions:** Villupuram and Tiruchirappalli have shown significant improvement in ROI over the recent three-year period, highlighting effective CMA practice adoption's role in financial turnaround.
- **Strong Variance Analysis in Select Unions:** Salem and Erode have developed meaningful variance analysis capabilities, supporting cost deviations monitoring and strategic corrective actions.
- **Solid Inventory Management:** Many unions maintain efficient inventory turnover ratios, indicative of operational efficiency in stock management despite other financial constraints.

Weaknesses

- **Uneven CMA Adoption and Integration:** Advanced CMA tools like Activity-Based Costing and Variance Analysis are inconsistently applied, with low uptake in Madurai and Villupuram limiting the precision of cost control and decision- making.

- **Persistent Staff Training Gaps:** All unions report shortages of adequately trained staff in cost management domains, hindering the effective and consistent use of CMA tools across operations.
- **Manual System Dependence:** Despite the presence of IOMS software, many unions—especially Madurai, Villupuram, and Erode—still rely heavily on manual record-keeping and processes, leading to delays, errors, and data reliability issues.
- **Variability in Financial Performance:** Lower-performing districts like Madurai and Kancheepuram–Tiruvallur struggle with negative or stagnant ROI despite CMA efforts, suggesting inefficiencies in translating cost management into profitability.
- **Data Quality and Reporting Anomalies:** Unusually high liquidity ratios (e.g., Villupuram's current and quick ratios) indicate possible anomalies or inconsistencies in financial data, which complicate accurate assessment and decision-making.

Opportunities

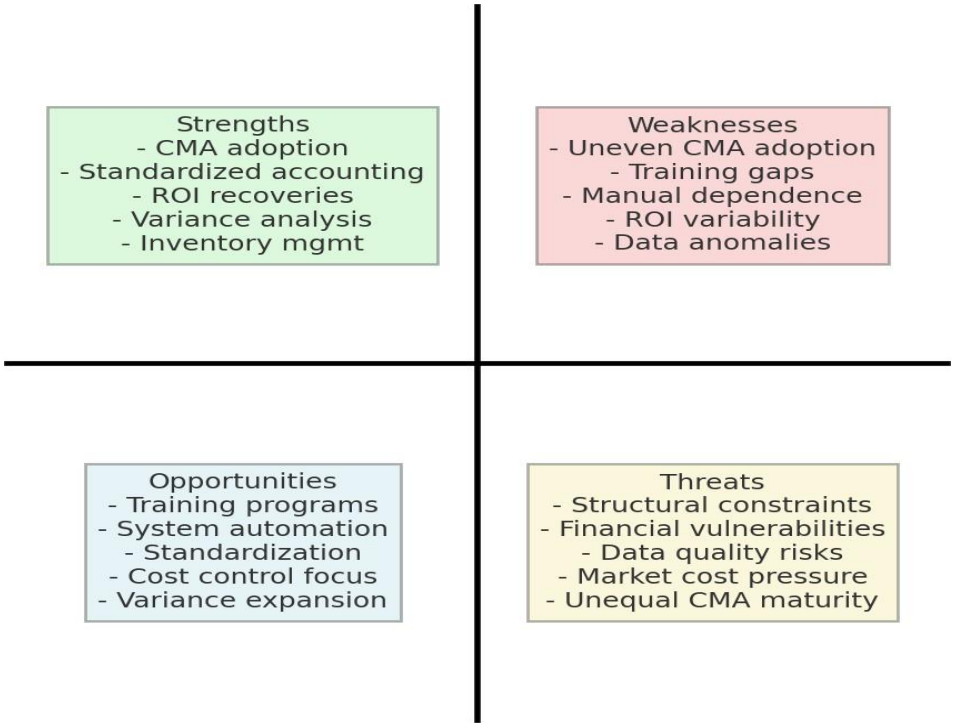
- **Capacity Building through Training Programs:** Targeted CMA training across all unions can build competency, especially in experimental or underutilized areas such as Activity-Based Costing, variance analysis, and target costing.
- **System Integration and Automation Enhancements:** Further automation and integration within the IOMS platform, especially for centre-wise expense and income logging, can reduce manual workload, improve data timeliness, and support better cost control.
- **Standardization and Best Practice Sharing:** Developing uniform CMA KPIs and performance benchmarks would enable unions to benchmark against one another, facilitating knowledge exchange and collective improvement initiatives.
- **Focus on Procurement and Processing Cost Controls:** Rising procurement and processing costs, notably in Kancheepuram–Tiruvallur, present a pressing area for cost control innovations to protect margins.
- **Expand Application of Variance Analysis:** Given its strong positive link to ROI in certain unions, expanding variance analysis practices could yield significant operational benefits and financial insights.

Threats

- **Structural and Operational Constraints:** Persistent dependency on manual processes and inadequate staff capacity may continue to limit unions' ability to sustain comprehensive, real-time cost management and performance monitoring.

- **Financial Vulnerabilities in Low-Performing Districts:** Continued negative or near-zero ROI, especially in Madurai and Kancheepuram–Tiruvallur, threatens the financial sustainability of these unions without urgent intervention.
- **Data and Reporting Quality Risks:** Inaccuracies or delays in financial and operational data can lead to suboptimal decision-making and increased risk exposure across all unions.
- **Cost Pressure from External Market Factors:** Increasing raw material procurement and processing expenses may limit profits unless counterbalanced by stronger cost control and efficiency measures.
- **Unequal CMA Maturity Levels:** The disparity in CMA tool adoption and effectiveness may widen performance gaps across districts, inhibiting federation-wide improvements and consistency.

Chart 6.1 Pictorial Representation of SWOT Analysis:



This SWOT synthesis, grounded in detailed district-level data, highlights where Tamil Nadu's dairy cooperative unions excel and where critical interventions are needed. The strategic focus should be on building uniform CMA competencies, enhancing data systems, and targeted capacity-building initiatives to harness the financial and operational benefits of effective cost accounting practices statewide.

7 CHAPTER Findings, Suggestions, and Recommendations

Introduction

This chapter consolidates the observations from the detailed data analysis of **Madurai, Tiruchirappalli, Salem, Villupuram, Erode, and Kancheepuram– Tiruvallur** District Cooperative Milk Producers' Unions. It draws upon quantitative results (financial ratios, correlation and regression outputs) and qualitative insights (operational contexts, CMA tool maturity, and district-specific challenges) to outline the major **findings** of the study. Based on these findings, recommendations and actionable suggestions are presented to address weaknesses, leverage strengths, and capitalise on opportunities identified in the SWOT analysis.

7.1 Major Findings

7.1.1 CMA Adoption and Maturity

- **High Maturity:** Kancheepuram–Tiruvallur and Tiruchirappalli demonstrate strong adoption of **Cost Control** and **Budgeting** practices (scores 4– 5), along with moderate–high use of **Variance Analysis** and **Activity-Based Costing (ABC)**.
- **Moderate Maturity:** Salem, Villupuram, and Erode have fairly good Cost Control, but inconsistent application of advanced CMA tools (ABC, Variance Analysis) limits decision accuracy.
- **Low Maturity:** Madurai exhibits the weakest overall CMA adoption, with most scores ≤ 2, especially in ABC and Variance Analysis.

7.1.2 Financial Performance Trends

- **Turnaround Cases:** Tiruchirappalli and Villupuram improved ROI significantly — Tiruchi from –46.19% (2020–21) to 33.42% (2022–23), Villupuram from –57.61% to 21.70% in the same period.
- **Chronic Laggards:** Madurai and Kancheepuram–Tiruvallur posted negative ROI in 2022–23, indicating persistent profitability challenges.
- **Liquidity:** Villupuram shows unusually high liquidity ratios in 2022–23 (current ratio 73.85), likely a data anomaly. K–T Union remains well below liquidity benchmarks.

- **Efficiency:** Inventory turnover ratios are high in most unions (30–50+), indicating efficient stock handling, with Tiruchi and Salem performing best.
- **Cost Efficiency:** Erode and Tiruchirappalli maintain competitive cost per litre (~₹42.5), while K–T Union is highest (₹48.80), pressuring margins.

7.1.3 Correlation Analysis (H1: CMA ↔ ROI)

- **Strong Links:**
  - Cost Control has the highest correlation with ROI in Tiruchirappalli (r = 0.983) and Villupuram (r = 0.765).
  - Variance Analysis strongly correlates with ROI in Salem (r = 0.964).
- **Mixed/Negative Links:**
  - Madurai shows consistently negative correlations for all major CMA tools with ROI.
  - Erode sees a strong negative link between ABC and ROI (r = – 0.965) despite high ABC scores.

7.1.4 Regression Analysis (H2: CMA → ROI)

- **Tiruchirappalli:** Cost Control is the dominant ROI predictor (β = 0.876), variance analysis supportive.
- **Salem:** Variance Analysis has the strongest effect (β = 0.964), with ABC a smaller positive.
- **Villupuram:** All four tools (Cost Control, Budgeting, ABC, Variance) positively contribute, Cost Control strongest.
- **Erode:** ABC negatively affects ROI (β = –1.116); Variance Analysis positive but weaker.
- **Madurai:** Budgeting and Variance Analysis coefficients are negative, suggesting poor utilisation.
- **K–T Union:** ABC positive (β = 1.978), Variance Analysis negative.

7.1.5 Operational Challenges

- Shortage of trained cost management staff is universal.
- Manual systems still in use in key areas, reducing timeliness and accuracy of cost data.
- District-specific issues:
  - Madurai & Villupuram — centre-wise booking & timely data needed.
  - Salem & Erode — inconsistent CMA tool use.
  - K–T Union — rising procurement/processing costs.

7.2 Suggestions

7.2.1 Capacity Building

- Launch structured training on **ABC** and **Variance Analysis** across all unions, prioritising low-maturity districts (Madurai, Villupuram).
- Develop an inter-district peer learning platform for CMA best practices.

7.2.2 Technology & Process Improvements

- Fully integrate centre-wise expense/income capture into IOMS; eliminate parallel manual records.
- Automate variance reporting dashboards for faster managerial decisions.

7.2.3 Cost Control & Budgeting Reinforcement

- Institutionalise quarterly budgeting reviews and variance analysis with corrective action tracking.
- Create cost centre-level budgets to monitor performance more granularly.

7.2.4 Address District-Specific Constraints

- **Madurai & Villupuram:** Focus on building budgeting discipline, linking plans to KPI tracking.
- **Salem & Erode:** Ensure consistent ABC application; validate findings through variance analysis before corrective action.
- **K–T Union:** Implement procurement cost controls and vendor efficiency audits.

7.2.5 Data Quality Assurance

- Quarterly validation of financial ratios and KPIs to detect/report anomalies.
- Establish internal audit cells within each union for cost accounting compliance.

7.3 Recommendations

1. **Uniform CMA Benchmarking:** Create a federation-level KPI dashboard for CMA tools and key financial ratios, enabling competitiveness and transparency.
2. **Human Resource Development:** Allocate budgets for formal CMA certification of finance and operations staff.
3. **Digital Transformation:** Prioritise IOMS upgrades and mobile data capture tools for milk procurement and distribution.

4. **Performance-Linked Incentives:** Tie a portion of managerial incentives to ROI, efficiency gains, and CMA compliance metrics.
5. **Operational Efficiency Projects:** Conduct time-and-motion studies to identify process wastes and link cost savings to CMA reports.

7.4 Conclusion

The comparative study shows that unions with consistent and high-quality CMA implementation — notably Tiruchirappalli — achieve stronger profitability and operational efficiencies. However, major gaps in staff capacity, advanced tool usage, and data integrity persist across districts, keeping overall sector performance below potential.

By strategically investing in people, systems, and monitoring processes, and by anchoring decisions on accurate real-time cost data, the Tamil Nadu dairy cooperatives can harmonise CMA maturity levels and achieve sustainable, inclusive profitability growth.

8 CHAPTER Conclusion

This study has examined the adoption and impact of Cost Management Accounting (CMA) practices on the profitability and operational performance of six District Cooperative Milk Producers' Unions in Tamil Nadu—Madurai, Tiruchirappalli, Salem, Villupuram, Erode, and Kancheepuram–Tiruvallur—over the period 2020– 21 to 2022–23. The comprehensive quantitative and qualitative analyses reveal several key insights:

- **CMA Adoption and Profitability Linkages**: Effective implementation of CMA tools, particularly Cost Control, Budgeting, Activity-Based Costing (ABC), and Variance Analysis, shows strong positive associations with financial performance (ROI). Tiruchirappalli and Villupuram notably illustrate how focused CMA adoption can drive significant profitability improvements.
- **Operational and Capacity Challenges:** Despite some successes, there exist consistent challenges across unions, including shortages of trained staff, reliance on manual processes, and data quality issues. These limitations hamper the full potential of CMA systems, constraining both financial management and operational decision-making.
- **Variability in Outcomes Across Districts:** While some unions exhibit strong ROI recovery and efficient resource management, others face persistent or worsening financial pressures, underscoring the importance of tailored interventions and contextual understanding.
- **Importance of Advanced CMA Practices**: Unions with mature adoption of advanced tools like Activity-Based Costing and Variance Analysis tend to achieve better cost visibility and control, which contributes to more sustainable profitability.
- **Need for Data Integrity and System Integration**: Accurate, timely, and integrated financial and cost data is critical to enabling effective CMA use and responsive management, with automation and system enhancements required to replace manual processing.

In summary, the study confirms that CMA practices are pivotal to dairy cooperative profitability and sustainability. Strengthening human resource capabilities, expanding CMA tool adoption, improving systems integration, and addressing district-specific challenges will be crucial for enhancing efficiency and financial health across Tamil Nadu's dairy cooperative unions.

8.1 Suggestions for Future Research

Based on the findings and limitations of this study, the following suggestions for future research are proposed to deepen understanding and broaden the scope of inquiry:

1. **Longitudinal Studies with Extended Data Periods**: Future research should consider longer data spans (beyond three years) to validate and strengthen statistical analysis, allowing for robust trend analyses and forecasting of CMA impact on financial performance.
2. **In-depth Qualitative Studies**: Conduct qualitative case studies and interviews with union management and staff to explore contextual factors influencing CMA adoption, barriers to implementation, and practical experiences with cost accounting tools.
3. **Comparative Studies Across States or Countries:** Expanding the comparison to dairy cooperatives in other states or countries could uncover best practices, regional challenges, and cultural influences on CMA effectiveness.
4. **Impact of Digital Transformation:** Investigate how digital accounting and management information systems, including emerging technologies like AI and IoT, affect CMA adoption, data quality, and decision-making efficiency in cooperative settings.
5. **Linkage Between CMA Practices and Member-Level Outcomes:** Explore how cost management at the union level influences farmer incomes, milk quality, and member satisfaction to connect financial practices with cooperative sustainability and social impact.
6. **Effectiveness of Capacity Building Interventions:** Assess the impact of structured CMA training and capacity building programs on improving tool usage, data management, and overall financial performance, using experimental or quasi-experimental designs.
7. **Role of Governance and Organizational Culture:** Examine how governance structures, leadership approaches, and organizational culture influence the success of CMA adoption and continuous improvement within dairy cooperatives.

By addressing these research areas, scholars and practitioners can better support the sustainable development of dairy cooperatives and enhance the strategic use of cost management accounting across this critical sector.

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