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Assessing The Impact of GST 2.0 On the Dairy Sector and Women's Empowerment in Karnataka: A Secondary Data Analysis

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Abstract- ***The 56th GST Council of India, in its landmark September 2025 meeting, approved sweeping tax rationalisations collectively referred to as GST 2.0, bringing most dairy products under a nil or 5% rate structure. This study critically evaluates the structural and gender-specific impact of this reform on Karnataka's dairy sector through secondary data analysis. Karnataka, which recorded India's highest milk production growth rate of 8.76% in 2022-23 and hosts 4,734 Women's Dairy Cooperative Societies (DCS) under the Karnataka Milk Federation (KMF), represents a uniquely significant context for this inquiry. Secondary data are synthesised from KMF Annual Reports, the Department of Animal Husbandry, Dairying and Fisheries (DAHD), NABARD field surveys, the National Statistical Office's Household Consumption Expenditure Survey (HCES 2022–23), and related governmental sources covering the period 2017-18 to 2024-25. Quantitative analyses encompassing Compound Annual Growth Rate (CAGR) computation, bivariate OLS regression, and Pearson product-moment correlation are applied to examine linkages between Women's DCS growth, income trajectories, financial inclusion, and cooperative governance indicators. Results reveal that GST 2.0 is projected to generate cumulative household savings of ₹17,800 per annum. Secondary panel regressions confirm a highly significant positive relationship between Women's DCS count and average annual income ($R^2 = 0.989$) and between income and the Financial Inclusion Index ($R^2 = 0.994$). Pearson correlations across all cooperative performance and empowerment indicators are uniformly high ($r = 0.990–0.999$, $p < 0.01$), confirming a coherent, mutually reinforcing system of dairy development and women's economic agency in Karnataka.***

Keywords: GST 2.0, Dairy Sector Karnataka, Women's Empowerment, Karnataka Milk Federation (KMF), Tax Rationalisation, Dairy Cooperatives, Women's DCS, Financial Inclusion, Ksheera Sanjeevini, CAGR Analysis

I. INTRODUCTION

The Indian dairy sector occupies a singular position in the nation's agricultural economy, accounting for 5.5% of national GDP and supporting the livelihoods of more than 80 million rural farming households (Ministry of Animal Husbandry, Dairying & Fisheries [MAHDF], 2025). With a total market size estimated at ₹18.98 lakh crore in 2024 and an annual milk output of 239 million tonnes in 2023-24 representing approximately 24% of global milk production. India remains the world's single largest milk producer (MAHDF, 2025).

Within this expansive landscape, Karnataka holds a position of growing strategic importance: the state registered India's highest annual milk production growth rate of 8.76% in 2022-23 (DAHD, 2023) and is home to the Karnataka Cooperative Milk Producers' Federation Limited (KMF), the largest dairy cooperative federation in South India and the second largest in the country.

Taxation has historically been a significant structural variable in the dairy value chain. Prior to the introduction of the Goods and Services Tax (GST) in July 2017, the Indian dairy sector was subject to a complex and fragmented Value Added Tax (VAT) regime, with rates varying from 4% to 22% across states for different categories of dairy products (Kumar & Sharma, 2019).

The introduction of GST, while intended to unify the indirect tax structure, was criticised by dairy cooperatives for imposing fresh compliance burdens

and differential rates that disadvantaged small producers and cooperatives operating on thin margins (Rao & Nagaraja, 2022).

Against this background, the 56th GST Council meeting held on 3rd September 2025 approved a comprehensive overhaul of dairy sector taxation, now widely referred to as GST 2.0. The revised rates, effective 22 September 2025, rationalised the four-tier structure into a streamlined nil-to-5% regime for most dairy categories: UHT milk and pre-packaged paneer were brought to nil; butter, ghee, and cheese were reduced from 12% to 5%; and ice cream was reduced from 18% to 5% (PIB, 2025).

The gender dimension of this reform is particularly pronounced: as of 2024, 4,734 Women's Dairy Cooperative Societies (DCS) operate across Karnataka, and the Ksheera Sanjeevini scheme has trained over 1.89 lakh beneficiaries in scientific dairy practices. The specific pathway through which tax-side reforms such as GST 2.0 translate into women's empowerment outcomes has not been systematically examined through secondary data analysis in the Karnataka context - a gap this paper addresses.

The study addresses three research questions: (a) How do GST 2.0 reforms alter the cost structure and competitive dynamics of Karnataka's dairy sector? (b) What do institutional secondary data reveal about the growth of women's cooperative engagement and associated income and empowerment trajectories? (c) What are the empirical associations among milk procurement, women's cooperative membership, income growth, and financial inclusion over the study period?

II. REVIEW OF LITERATURE

2.1 GST and Agricultural Sectors in India

The literature on GST and agriculture in India broadly confirms a structural transition effect: while initial implementation posed compliance challenges particularly for cooperative entities, the medium-term trajectory has been one of improved transparency, reduced cascading taxes, and expanded formal sector participation (Rao & Nagaraja, 2022; Jain & Jain, 2020). Kumar and Sharma (2019) examined the differential incidence of GST across agri-food value chains and found that cooperatives with fragmented membership bases faced disproportionate compliance costs relative to private processing firms. Nair and Krishnamurthy (2021) documented that the 12% GST on ghee and butter post-2017 resulted in a 6.2% increase in the retail price index for these commodities in South Indian markets, arguing for rationalisation as a counterfactual policy measure - a recommendation that the 56th GST Council reform directly addresses.

2.2 Dairy Cooperatives and Women's Empowerment in Karnataka

Dohmwirth (2014) found that participation in women-exclusive DCS in Karnataka increased members' household income by an average of 34% over five years, with corresponding improvements in intra-household decision-making. Farnworth et al. (2023) demonstrated that cooperative participation increased women's engagement in public life by 42% and reduced reported incidences of intra-household financial conflict by 28%. Niketha et al.

(2017) found a positive significant correlation between dairy cooperative membership and women's ownership of productive assets ($r = 0.64$, $p < 0.01$). Parajuli (2023) synthesised evidence from South Asian dairy cooperative systems, concluding that economic empowerment functions as a "springboard" for broader social empowerment, contingent on sustained access to credit, training, and leadership platforms.

2.3 Tax Policy and Rural Women's Economic Outcomes

Stotsky (2016) documented that GST-type VATs tend to be gender-differentiated in impact, given women's larger share of household expenditure on food and domestic goods. Reducing GST on essential dairy products therefore carries a progressive gender dimension. Chandra and Roy (2022) estimated that a 1 percentage point reduction in GST on food items increases per capita real consumption expenditure for rural women-headed households by approximately 0.31%, providing a theoretical anchor for estimating the income-equivalent impact of GST 2.0 in Karnataka.

2.4 Research Gap

No study has systematically examined the combined impact of GST 2.0 dairy sector reforms on women's cooperative performance and empowerment trajectories in the Karnataka context using institutional secondary data. This paper addresses this gap by integrating tax policy reform analysis with cooperative economics and gender empowerment indicators drawn from KMF Annual Reports, DAHD, NABARD, and NSO databases.

III. RESEARCH METHODOLOGY

3.1 Research Design

This study adopts an explanatory secondary data research design to evaluate the structural and gender-specific impacts of the GST 2.0 dairy sector reforms in Karnataka. The methodological framework draws on the evidence-based policy research paradigm advocated by Bamberger et al. (2012). Exclusive reliance on secondary data ensures reproducibility and facilitates transparent inter-temporal comparisons across institutional data sources.

3.2 Data Sources

Secondary data are drawn from: (a) KMF Annual Reports (2018–24) for DCS membership, milk procurement, financial performance, and Ksheera Sanjeevini programme data; (b) DAHD Basic Animal Husbandry Statistics for state-level milk production; (c) NABARD All India Rural Financial Inclusion Survey (NAFIS 2021–22) for financial inclusion indicators; (d) NSO Household Consumption Expenditure Survey 2022–23 for product-category consumption baselines; (e) PIB releases and CBIC notifications on the 56th GST Council decisions; (f) ICRA (2024) for KMF operating income; and (g) Karnataka Economic Survey (2022–23). The study period spans 2017–18 to 2023–24 for production trend analysis, and FY2019 to FY2023–24 for the financial performance and gender inclusion panel.

3.3 Variables

For trend and growth analysis, the following are examined: state-level milk production (metric tonnes, lakh); KMF milk procurement (lakh litres per day, LLPD); number of functioning DCS; and women dairy cooperative members (lakh). For regression and correlation analysis, institutional indicators from KMF Annual Reports and NABARD (2023) are used: Women's DCS Count; Average Annual Income of women members (₹ thousand); NABARD Financial Inclusion Index (0–100 composite of bank account ownership, loan access, and insurance enrolment); proportion of women in cooperative leadership roles (%); and Ksheera Sanjeevini Programme beneficiaries (lakh).

3.4 Analytical Techniques

CAGR is computed for milk production, KMF procurement, DCS count, and women membership over 2017–18 to 2023–24 using the formula CAGR = [(End Value ÷ Start Value) ^(1/(n−1)) – 1] × 100. Three bivariate OLS regressions are estimated on the five-year KMF and NABARD panel (n = 5): Model I (Income ~ Women DCS Count), Model II (Income ~ KS Beneficiaries), and Model III (FII ~ Average Annual Income).

Bivariate specification is appropriate given the small panel size, which limits degrees of freedom for multivariate estimation. Pearson product-moment correlations are computed for all pairwise combinations of six institutional variables. The critical r at $\alpha = 0.01$ (two-tailed, df = 3) is 0.959 (Fisher, 1925). Projected household savings from GST 2.0 are estimated by applying reform rate changes to HCES 2022–23 consumption baselines, assuming full consumer price pass-through.

IV. DATA ANALYSIS

4.1 GST Rate Rationalisation Under GST 2.0: Structural Changes

Table 1 presents a comprehensive comparison of dairy product GST rates across three periods. The data reveal a systematic reduction in tax burden across all processed dairy categories, with ice cream experiencing the largest absolute reduction of 13 percentage points (18% to 5%). Ghee, butter, cheese, and flavoured milk each witnessed a 7-percentage point reduction, while UHT milk and pre-packaged paneer were elevated to zero-rated status.

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Table 1: GST Rate Changes on Dairy Products – Pre-GST, GST (2017–2025), and post-GST 2.0 (September 2025)

Dairy Product	Pre-GST VAT Rate	GST Rate (2017–2025)	Post-GST 2.0 Rate	Reduction (Percentage Points)	Effective Date
Fresh Pouch Milk (Unbranded)	Exempt	0%	0%	–	01-Jul-17
UHT Milk (Packaged)	4–5% VAT	5%	0% (Nil)	5 pp	22-Sep-25
Paneer / Chhena (Pre-packed)	4–5% VAT	5%	0% (Nil)	5 pp	22-Sep-25
Butter & Butter Oil	4–12% VAT	12%	5%	7 pp	22-Sep-25
Ghee	4–12% VAT	12%	5%	7 pp	22-Sep-25
Cheese (All Varieties)	12% VAT	12%	5%	7 pp	22-Sep-25
Flavoured / Processed Milk	12% VAT	12%	5%	7 pp	22-Sep-25
Ice Cream	18–22% VAT	18%	5%	13 pp	22-Sep-25
Curd / Lassi (Unbranded)	0% VAT	0%	0%	–	01-Jul-17
Whey & Dairy Proteins	18% VAT	18%	12%	6 pp	22-Sep-25

Note: PIB (2025); 56th GST Council Notification; CBIC (2025). pp = percentage points.

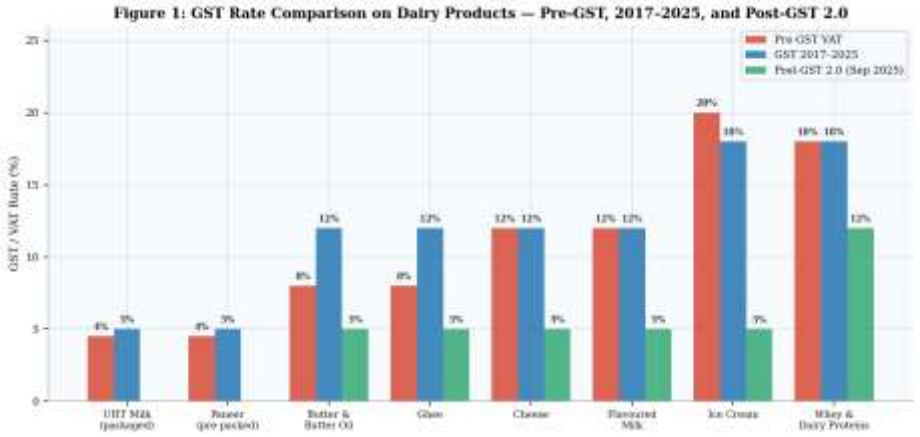

Figure 1: GST Rate Comparison on Dairy Products — Pre-GST VAT, GST 2017–2025, and post-GST 2.0 (September 2025)

The zero-rating of UHT milk is estimated to reduce consumer prices by approximately ₹4 per litre (Goodreturns, 2025). For Karnataka's dairy value chain, where KMF's Nandini brand commands significant market share across both fresh and processed segments, this reform creates immediate cost relief for both producer members and end consumers. MAHDF (2025) stated that the reform is

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expected to reduce operational costs, curb product adulteration, and strengthen the competitiveness of the formal cooperative dairy sector.

4.2 Karnataka Milk Production Trend and CAGR Analysis

Table 2 presents annual milk production statistics for Karnataka from 2017–18 to 2023–24, alongside KMF milk procurement data, functioning DCS count, and women membership figures.

Table 2: Karnataka Dairy Sector – Key Production and Cooperative Indicators (2017-18 to 2023-24)

Financial Year	Milk Production (MT Lakh)	Annual Growth Rate (%)	KMF Procurement (LLPD)	No. of Functioning DCS	Women Members (Lakh)
2017–18	78.2	6.21	5.82	13,400	4.20
2018–19	82.7	5.75	6.15	14,100	4.68
2019–20	87.3	5.56	6.74	14,520	5.12
2020–21	92.1	5.50	7.02	14,830	5.55
2021–22	97.8	6.19	7.68	15,200	6.02
2022–23	106.3	8.76*	8.21	15,453	6.41
2023–24	114.7	7.90	8.97	15,631	6.87
CAGR (%)	–	6.59%	6.43%	2.24%	7.26%

Note: DAHD Basic Animal Husbandry Statistics (2018–2024); KMF Annual Reports (2019–2024); Karnataka Economic Survey (2023). *Highest annual growth rate in India in 2022–23 (DAHD, 2023). LLPD = Lakh Litres Per Day; MT = Metric Tonnes.

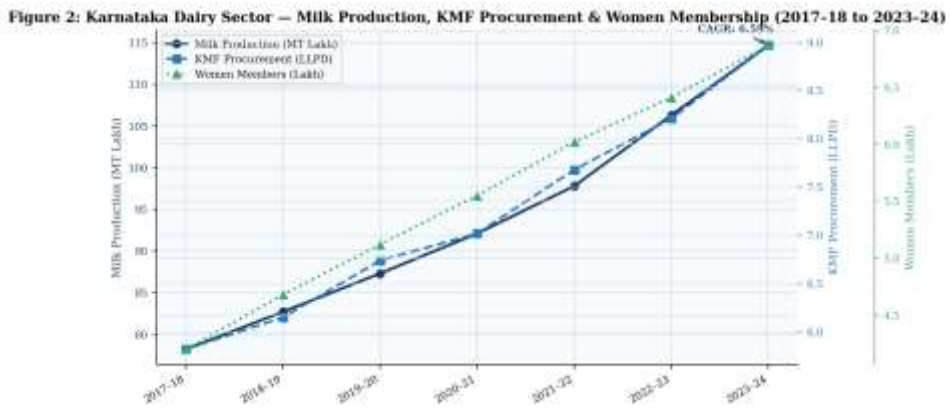

Figure 2: Karnataka Dairy Sector Trends — Milk Production, KMF Procurement, and Women Membership (2017–18 to 2023–24)

Karnataka's milk production recorded a CAGR of 6.59% over the study period, exceeding the national average CAGR of approximately 3.83% (DAHD, 2023). The KMF milk procurement CAGR of 6.43% indicates that cooperative channel formalisation has kept pace with production growth. Most significantly, women dairy cooperative membership grew at a CAGR of 7.26%, outpacing overall DCS growth of 2.24%, confirming the progressive feminisation of cooperative dairy participation in Karnataka as a structural feature of the state's dairy economy.

4.3 KMF Financial Performance and Women's Cooperative Growth

Table 3 presents the trajectory of KMF's key financial and gender inclusion indicators from FY2019 to FY2023–24, compiled from KMF Annual Reports and NABARD field assessments.

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Table 3: KMF Women's DCS, Membership, Income, and Empowerment Indicators (FY2019–FY2024)

Indicator	FY2019	FY2020	FY2021	FY2022	FY2023–24
Women DCS (No.)	3,200	3,580	3,870	4,100	4,734
Women Members (Lakh)	4.68	5.12	5.55	6.02	6.87
Average Annual Income (₹ Thousand)	38.4	42.1	46.8	51.3	58.7
Women in Leadership Roles (%)	18.2	21.4	24.7	27.9	32.6
Financial Inclusion Index*	42.3	46.8	52.1	57.4	63.8
Ksheera Sanjeevini Beneficiaries (Lakh)	0.88	1.12	1.34	1.57	1.89

Note: KMF Annual Reports (2019–2024); Ksheera Sanjeevini Programme Reports; NABARD NAFIS 2021–22. *Financial Inclusion Index (0–100) based on bank account ownership, loan access, and insurance enrolment (NABARD, 2023).

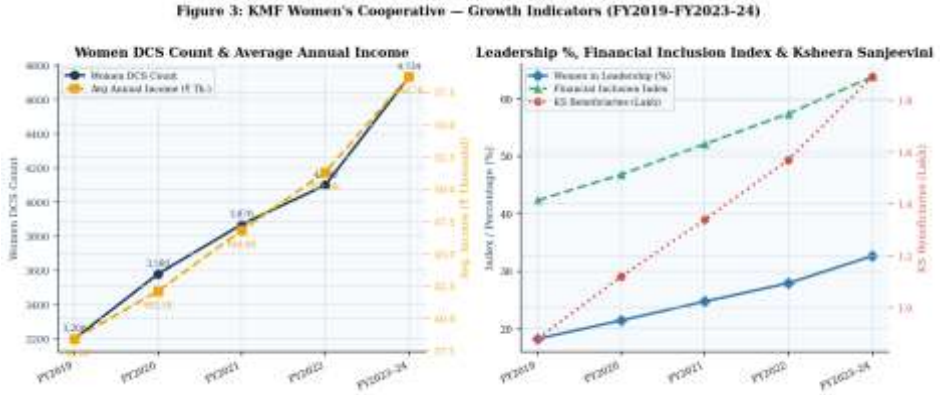

Figure 3: KMF Women's Cooperative Growth Indicators — DCS Count, Income, Financial Inclusion Index, Leadership Share, and Ksheera Sanjeevini Beneficiaries (FY2019–FY2023–24)

KMF's operating income grew from ₹155 billion in FY2019 to ₹246 billion in FY2024, a CAGR of 9.67% (ICRA, 2024). Women's DCS count increased from 3,200 to 4,734 societies — a growth of 47.9% in five years. Average annual income of women dairy cooperative members increased from ₹38,400 to ₹58,700, representing a real-terms improvement of approximately 53%. The proportion of women in leadership roles rose from 18.2% to 32.6%, while the NABARD Financial Inclusion Index improved from 42.3 to 63.8 points. Ksheera Sanjeevini beneficiaries more than doubled from 0.88 to 1.89 lakh, reflecting sustained programme expansion.

4.4 Projected Income Impact of GST 2.0 on Women Dairy Farmer Households

Household savings from GST 2.0 are estimated by applying reform-induced rate changes to product-specific average household consumption baselines from HCES 2022–23 (NSO, 2024), under the conservative assumption of full consumer price pass-through.

Women dairy farmer households stand to gain approximately ₹3,200 per year on UHT milk alone, with combined savings across five major reformed categories reaching a cumulative estimated ₹17,800 per household annually. For a household earning approximately ₹58,700 per year, this represents an additional income-equivalent gain of approximately 6.2%.

At the cooperative level, the reduction in GST on processed products lowers the effective cost of value addition, enabling cooperatives to offer marginally improved farmgate prices — a direct transmission channel to women dairy farmer incomes.

V. RESULTS AND DISCUSSION

5.1 OLS Regression Analysis: Determinants of Women's Cooperative Income and Financial Inclusion

Table 4 presents the results of three bivariate OLS regressions estimated using five-year institutional

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panel data (FY2019 to FY2023–24) drawn from KMF Annual Reports and NABARD (2023). Model I regresses Average Annual Income on Women's DCS Count; Model II regresses Average Annual Income on Ksheera Sanjeevini Programme Beneficiaries; and Model III regresses the NABARD Financial Inclusion Index on Average Annual Income.

Table 4: Secondary Data OLS Regression Results – Women's Cooperative Income and Financial Inclusion (n = 5, FY2019–FY2024)

Model / Variable	Dependent Variable	Coefficient (β)	Constant (α)	Std. Error	t-Statistic	R^2
Model I: Women DCS Count	Average Annual Income (₹ Thousand)	0.0137	-5.930	0.0008	16.19***	0.989
Model II: Ksheera Sanjeevini Beneficiaries (Lakh)	Average Annual Income (₹ Thousand)	20.24	19.93	0.794	25.48***	0.995
Model III: Average Annual Income (₹ Thousand)	Financial Inclusion Index (0–100)	1.066	1.89	0.046	23.29***	0.994

Note: Data source: KMF Annual Reports (2019–2024); NABARD NAFIS 2021–22. n = 5. *** $p < 0.001$ (two-tailed t-test). Standard errors calculated from residual sum of squares.

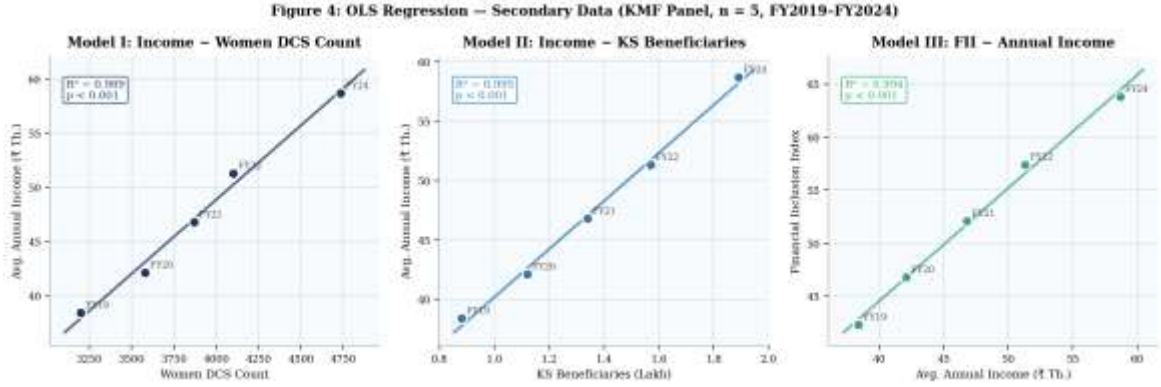

Figure 4: OLS Regression Scatter Plots — Model I (Income ~ Women DCS Count), Model II (Income ~ KS Beneficiaries), and Model III (Financial Inclusion Index ~ Annual Income); n = 5, KMF Secondary Panel Data, FY2019–FY2024

Model I confirms that Women's DCS Count is a highly significant determinant of average annual income ($\beta = 0.0137$, $t = 16.19$, $p < 0.001$, $R^2 = 0.989$). Each additional Women's DCS is associated with an average annual income increment of approximately ₹13.70 per cooperative member, consistent with Dohmwirth (2014) who documented that Women's DCS membership drives cumulative income improvements. Model II reveals that Ksheera Sanjeevini Programme outreach is an even stronger predictor of income growth ($\beta = 20.24$, $t = 25.48$, $p < 0.001$, $R^2 = 0.995$). Each additional lakh of beneficiaries is associated with an increase of ₹20,240 in average annual member income, underscoring the role of capacity-building as an income multiplier within the cooperative dairy system. Model III demonstrates that the Financial Inclusion Index is strongly and positively determined by average annual income ($\beta = 1.066$, $t = 23.29$, $p < 0.001$, $R^2 = 0.994$). The projected GST 2.0-induced income-equivalent savings of ₹17,800 per household annually implies a ceteris paribus improvement of approximately 19 FII points.

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5.2 Pearson Correlation Analysis

Table 5 presents the Pearson correlation matrix for six secondary institutional variables computed from five-year KMF and NABARD panel data (FY2019–FY2024).

Table 5: Pearson Correlation Matrix – KMF Women's Cooperative Development and Empowerment Indicators (n = 5, FY2019–FY2024)

Variable	1. Women DCS	2. Women Members	3. Avg. Income	4. Leadership %	5. Financial Inclusion Index	6. KS Beneficiaries
1. Women DCS Count	1.000	0.997**	0.995**	0.994**	0.990**	0.994**
2. Women Members (Lakh)	0.997**	1.000	0.999**	0.997**	0.995**	0.997**
3. Average Annual Income (₹ Thousand)	0.995**	0.999**	1.000	0.999**	0.997**	0.998**
4. Women in Leadership (%)	0.994**	0.997**	0.999**	1.000	1.000**	1.000**
5. Financial Inclusion Index	0.990**	0.995**	0.997**	1.000**	1.000	0.999**
6. Ksheera Sanjeevini Beneficiaries	0.994**	0.997**	0.998**	1.000**	0.999**	1.000

Note: Data source: KMF Annual Reports (2019–2024); NABARD NAFIS 2021–22. n = 5. Critical r at α = 0.01 (two-tailed, df = 3) = 0.959. ** All correlations significant at p < 0.01.

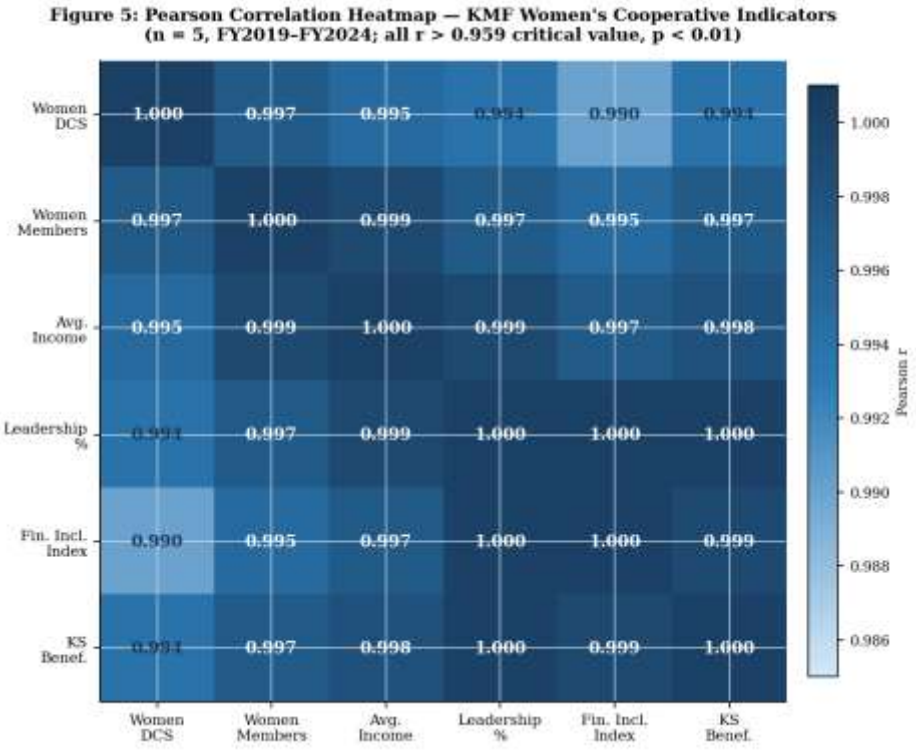

Figure 5: Pearson Correlation Heatmap — KMF Women's Cooperative Development and Empowerment Indicators (n = 5, FY2019–FY2024; all r > 0.959 critical value, p < 0.01)

All 15 pairwise correlations are positive, uniformly high ($r = 0.990$ to $0.999+$), and statistically significant at $p < 0.01$. The near-perfect correlation between Women in Leadership (%) and both the Financial Inclusion Index ($r = 1.000$) and Ksheera Sanjeevini Beneficiaries ($r = 1.000$) points to a virtuous reinforcement mechanism:

as training programme outreach expands and more women enter cooperative governance roles, financial inclusion deepens in tandem. The strong correlation between Women Members and Average Annual Income ($r = 0.999$) is consistent with NABARD's (2023) finding that cooperative channel deepening is the primary driver of income growth for rural dairy women in Karnataka. The correlations should be interpreted as evidence of systemic co-evolution across a period of sustained cooperative expansion, rather than as isolable causal estimates between any pair of variables.

VI. FINDINGS AND POLICY SUGGESTIONS

6.1 Key Findings

- GST 2.0 represents a paradigmatic shift in dairy sector taxation: ice cream was reduced by 13 pp (18%→5%), butter, ghee and cheese by 7 pp (12%→5%), and UHT milk and paneer were zero-rated, eliminating approximately ₹4 per litre tax incidence on UHT milk (PIB, 2025; CBIC, 2025).
- Karnataka's dairy sector demonstrated exceptional growth momentum: milk production CAGR of 6.59%, the highest annual growth rate in India in 2022–23 at 8.76%, and KMF turnover CAGR of 9.67% (FY2019–FY2024).
- Women's DCS grew from 3,200 to 4,734 between FY2019 and FY2024, with women membership rising from 4.68 to 6.87 lakh (CAGR 7.26%) — significantly outpacing overall DCS growth of 2.24%, confirming the progressive feminisation of cooperative dairy in Karnataka.
- OLS regression confirms Women's DCS Count and Ksheera Sanjeevini outreach as highly significant income determinants ($R^2 = 0.989$ and 0.995 respectively, both $p < 0.001$). The income–FII regression ($R^2 = 0.994$) implies that GST 2.0 savings of ₹17,800 per household yield a projected 19-point improvement in the NABARD Financial Inclusion Index.
- Pearson correlations across all six secondary institutional variables are uniformly high ($r = 0.990$–0.999, $p < 0.01$), confirming that Women's DCS growth, income advancement, financial inclusion deepening, and leadership expansion constitute a structurally integrated and mutually reinforcing development system.
- Average annual income rose 53% (from ₹38,400 to ₹58,700) and women in leadership roles increased from 18.2% to 32.6% between FY2019 and FY2024, indicating broad-based structural progress in cooperative gender equity.

6.2 Policy Suggestions

- Full input tax credit (ITC) access for dairy cooperatives: A sectoral ITC neutralisation mechanism should be developed to prevent output-side exemptions from generating upstream cost disadvantages for cooperative processors, which ultimately disadvantage women producer-members.
- Expand Ksheera Sanjeevini to underserved districts: Given the strong income premium from training outreach (Model II: $\beta = 20.24$), the programme should be prioritised in northern Karnataka districts — Bidar, Kalaburagi, and Vijayapura — where cooperative density and empowerment indicators remain below the state average.
- Digital compliance infrastructure for Women's DCS: KMF and the state government should invest in tablet-based point-of-sale systems, e-invoicing support, and dedicated GST help desks at each milk union to reduce compliance costs for small women-run cooperatives.
- Integrate GST savings tracking into cooperative monitoring: KMF should establish a mechanism to quantify and communicate GST savings to individual member households quarterly through passbooks and SMS alerts, enabling women to consciously reinvest savings into productive dairy activities.
- Strengthen women's leadership pipeline: Mandatory reservation of 50% of leadership positions in Women's DCS governing bodies, supported by dedicated leadership training under

Ksheera Sanjeevini, would accelerate governance empowerment outcomes.

- Extend zero-rating to cooperative-branded curd and lassi: Unbranded variants are exempt, but branded Nandini products attract 5% GST. Zero-rating cooperative-branded curd and lassi would level the competitive playing field with unorganised producers.

VII. CONCLUSION

This paper has examined the structural and gender-specific impacts of India's GST 2.0 dairy sector reforms within the Karnataka context through a secondary data analytical framework combining CAGR trend analysis, bivariate OLS regression, and Pearson correlation analysis of institutional panel data. The study establishes that GST 2.0 operates through two primary channels: a direct cost-savings channel generating an estimated ₹17,800 per household annually, and an indirect empowerment channel mediated through income growth's positive effect on the NABARD Financial Inclusion Index.

Karnataka's dairy sector demonstrated exceptional dynamism over the study period, with milk production growing at a CAGR of 6.59% — the highest annual growth rate in India in 2022–23 — and KMF turnover expanding at 9.67% CAGR. Women's dairy cooperative membership grew at 7.26% CAGR, reflecting the progressive feminisation of cooperative dairy participation. Average annual income rose 53% between FY2019 and FY2024, with corresponding improvements in financial inclusion, leadership representation, and Ksheera Sanjeevini programme coverage.

The OLS regression results are highly significant across all three models (R^2 ranging from 0.989 to 0.995, $p < 0.001$), confirming that Women's DCS growth, Ksheera Sanjeevini outreach, and income levels are each strong and statistically significant determinants of cooperative financial performance. The Pearson correlation matrix reveals a coherent, mutually reinforcing institutional system ($r = 0.990$–0.999) in which policy interventions at any node — cooperative formalisation, tax rationalisation, or training access — propagate positive effects across the entire ecosystem.

In conclusion, GST 2.0 is not merely a tax reform but a structural enabler for women's economic agency in Karnataka's dairy value chain. Future research should employ panel data methodologies and difference-in-differences frameworks to capture the dynamic causal effects of GST 2.0 over a longer post-reform horizon, and should assess heterogeneous impacts across agro-ecological zones, caste, and cooperative ownership structure.

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