From Liquid Milk to Value-Added Products

Mapping the Readiness and Resistance in India's Dairy Cooperative Transition

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"Cooperatives earn ₹4.50 per liter on liquid milk and ₹28 on cheese. Liquid milk is 48% of revenue. Cheese is 3%. This article quantifies the cost of that gap"

The Most Expensive Habit in Indian Dairy

Every day, India's organized dairy cooperative sector procures approximately 660 lakh liters of milk. A large portion of that milk - nearly half by revenue weight - is pasteurized, pouched, and sold as liquid drinking milk at a net cooperative margin of approximately ₹4.50 per liter. This is the foundational product of the Indian dairy cooperative movement, the one that connected 1.72 crore farmer members to urban markets, the one that Operation Flood was built to deliver. It is also, by a considerable distance, the lowest-value use of that milk.

Cheese earns approximately ₹28 per liter equivalent. Butter and spreads earn ₹22. Dahi earns ₹14. Yet cheese represents just 3% of cooperative revenue today. The Jordbrukare India Market Sentiment Survey, conducted across dairy value-chain participants in H1 2023, found that 17.5% of respondents identified cheese as their primary growth category - the second-highest expectation behind liquid milk (47.5%). Industry participants are already pricing a cheese growth cycle. Cooperative revenue architecture hasn't moved.

"Cheese earns ₹28 per liter. Liquid milk earns ₹4.50. Cheese is 3% of Co-op revenue. That is not a product strategy. It is an inherited structure that has not been questioned loudly enough."

What the Market Is Saying

Figure 1 presents three data series side by side for each product category: the current cooperative revenue share, the industry's stated growth expectation from the 2023 survey, and the revenue share achieved by mature dairy economies (EU, New Zealand, and USA, weighted average). The result is a structural misalignment made visual.

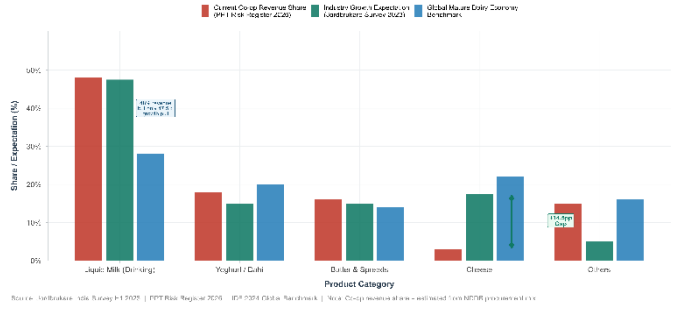

Fig. 1. Market Sentiment vs Current Co-op Revenue Share by Product Category

Source: Jordbrukare India Survey H1 2023 | IDF 2024 Global Benchmark

Note: Cheese gap: 3% current revenue vs 17.5% growth expectation = 14.5 percentage point structural misalignment

For cheese, the gap is 14.5 percentage points: 3% current revenue share against 17.5% growth expectation. In mature global dairy economies, cheese accounts for 22% of sector revenue. India's cooperatives are not just behind the market signal - they are 19 percentage points behind the structural endpoint that the market is moving toward. For liquid milk, the misalignment runs in the opposite direction: 48% of current revenue against a global mature benchmark of 28%, and an industry growth expectation of 47.5% that is essentially flat with current consumption rather than indicative of genuine category expansion.

One reading of the survey data is that the industry is bullish on everything, and the numbers simply reflect optimism. A more precise reading is this: the respondents identifying liquid milk as the 'primary growth category' are largely procurement-side participants - the 27.9% of survey respondents who work in collection and raw milk handling. They are right that liquid milk volumes will grow as production expands. They are describing a supply trajectory, not a value trajectory. The cheese signal, in contrast, came overwhelmingly from processors and retailer participants who are watching consumer expenditure data in real time.

The ₹12,430 Crore Question

The revenue gap between the current cooperative model and a VAP-optimized model can be calculated at the sector level with reasonable precision. The methodology is straightforward: applying each model's blended margin per liter to the current national organized procurement volume of 660 lakh liters per day. No assumption about procurement growth is required. No optimistic volume forecast. The same milk. Different products.

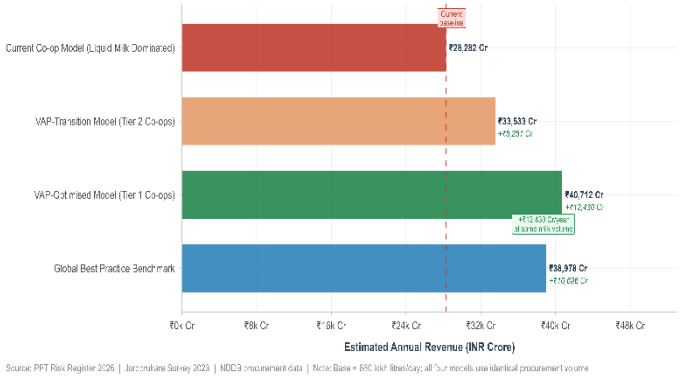

Fig. 2. Annual Sector Revenue by Co-op Model at Identical Procurement Volume

Source: Jordbrukare Survey 2023 margin data | NDDB procurement

Note: All models use 660 lakh liters/day current organized procurement; no volume growth assumed

At the current liquid-milk-dominated revenue mix, blended margin is ₹11.74 per liter, generating an estimated ₹28,282 crore in annual sector revenue from the organized procurement base. A Tier 2 transitioning model - lifting cheese to 8%, dahi to 22%, butter to 18% - raises blended margin to ₹13.92 per liter and annual revenue to ₹33,533 crore: a ₹5,251 crore uplift at zero additional procurement. A fully VAP-optimized model, calibrated to the product mix of India's most advanced Tier 1 cooperatives, reaches ₹16.90 per liter and ₹40,712 crore annually - a ₹12,430 crore annual uplift over the current model at the same milk volume.

The ₹12,430 crore figure is not a long-term aspiration. It is the annual revenue left on the table while the structural composition of cooperative output remains static. Over the five-year duration of White Revolution 2.0 (2024–29), the cumulative cost of inaction at current transition rates is approximately ₹62,000 crore in foregone revenue - enough to have funded the entire Rashtriya Gokul Mission more than 18 times over.

Model	Blended Margin (₹/L)	Annual Revenue	Uplift vs Current
Current (Liquid Milk Dominated)	₹11.74	₹28,282 Cr	-
Tier 2 Transition Model	₹13.92	₹33,533 Cr	+₹5,251 Cr
VAP-Optimized (Tier 1)	₹16.90	₹40,712 Cr	+₹12,430 Cr
Global Best Practice Benchmark	₹16.18	₹38,978 Cr	+₹10,696 Cr

Which States Are Ready?

Not every state can execute VAP transition simultaneously, and attempting a uniform policy across structurally different dairy economies would be an expensive mistake. A composite readiness assessment across 15 major producing states - scoring processing infrastructure, cooperative institutional strength, urban demand proximity, cold chain density, and policy alignment - produces a three-tier segmentation that has direct policy implications.

Gujarat stands as the definitive Tier 1 anchor with a readiness score of 4.65 - the Amul model represents the architectural blueprint for what a VAP-optimized cooperative looks like on a national scale. Karnataka (3.75), Maharashtra (3.85), Punjab (3.70), and Haryana (3.65) also qualify as Tier 1. These six states together produce 98,000 tonnes annually - approximately 40% of national output - and collectively process enough milk to generate a measurable shift in sector blended margins within a three-year investment horizon.

The most strategically significant finding in Figure 3 is the location of Rajasthan and Madhya Pradesh. Both are classified as Tier 2, despite being the two fastest-growing dairy states in India (CAGRs of 8.41% and 8.14%). These are states where milk production capacity is being built faster than processing infrastructure - a classic lead-lag problem. Every liter added to Rajasthan's procurement base without corresponding VAP investment is another liter locked into the ₹4.50/liter liquid milk revenue floor. The opportunity cost is compounding.

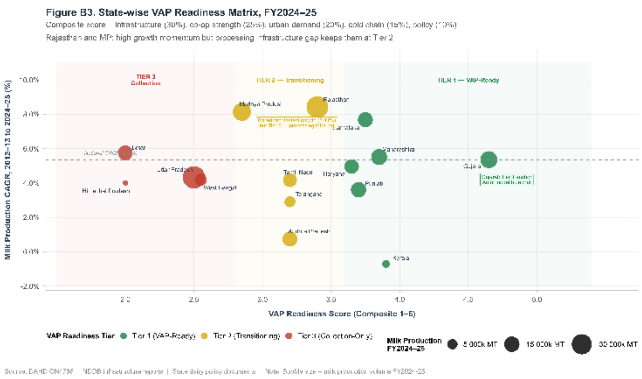

Fig. 3. State-wise VAP Readiness Matrix - Composite Score vs Production CAGR

Source: DAHD ON4738 production data | NDDB infrastructure reports | State dairy policy documents

Note: Composite score = weighted average: Processing Infrastructure (30%), Cooperative Strength (25%), Urban Demand (20%), Cold Chain (15%), Policy Alignment (10%)

Bihar, Jharkhand, and West Bengal form the Tier 3 base. These states have the lowest composite readiness scores, but are not without strategic purpose. Their role in a national VAP transition is to consolidate procurement volumes, improve raw milk quality to processing standards, and act as feeder networks for Tier 1 and Tier 2 processing hubs. UP, despite being India's largest producing state at 38,815 thousand tonnes, sits in Tier 3 on cooperative institutional strength - a structural deficit that White Revolution 2.0's new society formation program must directly address.

"Rajasthan is growing milk production at an annual compound rate of 8.41%, but lacks the processing infrastructure to convert that growth into value. Every liter added is another liter at ₹4.50/liter."

The Three-Tier Cooperative Framework

A workable policy architecture for the VAP transition must operate at the level of the 241 district cooperative unions, not at the level of the 22 milk federations. The district union is the operational unit: it owns the procurement network, manages the chilling infrastructure, and sets the product mix for its zone. A three-tier segmentation of these 241 unions, applied based on the readiness criteria in Figure 3, creates three distinct policy tracks with different intervention logics.

The revenue uplift per district union per year under this framework is ₹8.4 crore for Tier 1 units, ₹3.2 crore for Tier 2 units, and ₹0.6 crore for Tier 3 units. Applied across all

241 district unions, the aggregate annual revenue uplift of a fully implemented three-tier transition program would be approximately ₹8,200 crore per year - separate from and in addition to the White Revolution 2.0 procurement volume growth target.

Tier	Est. Unions	Current VAP %	Target VAP %	Blended Margin	Lead States	Policy Track
Tier 1 - VAP-Ready	~48 (20%)	35%	60%	₹12.80/L	Gujarat, Karnataka	Scale cheese/paneer; export linkage; cold chain densification
Tier 2 - Transitioning	~108 (45%)	15%	40%	₹9.10/L	Rajasthan, MP	Dahi/ghee processing units; women SHG product lines; NDDB technical support
Tier 3 - Collection	~85 (35%)	3%	20%	₹5.20/L	Bihar, UP	Consolidate procurement; quality improvement; feeder supply to Tier 1/2

What White Revolution 2.0 Is Missing

White Revolution 2.0, launched in December 2024, targets 1,007 lakh kilograms per day in organized procurement by 2028–29, as well as the formation of 75,000 new cooperative societies. These are volume targets. They say nothing about what those 75,000 societies will produce. The PIB document announcing White Revolution 2.0 uses the phrase 'value-added products' once, in a subordinate clause. The operational SOP, launched 19 September 2024, contains no product-mix guidance, no VAP investment criteria, and no district-level differentiation between collection cooperatives and processing cooperatives.

This is not a criticism of the program's ambition. It is an observation about its architecture. Adding 75,000 new cooperative societies without specifying their product function will, by default, add 75,000 more liquid-milk collection units. That is not a bad outcome for farming - more collection points improve procurement access and reduce post-harvest loss. But it is an expensive way to do nothing to solve the revenue problem. The ₹12,430 crore annual opportunity identified in this analysis requires a different kind of intervention: it requires 22 Tier 1 VAP incubator hubs - one per milk federation - each equipped with the processing capacity, cold chain, and technical management to take the highest-potential district unions in their region from liquid milk dependence to a diversified, margin-positive product mix within five years.

The funding mechanism is already in place. The ₹1,000 crore additional RGM allocation announced in March 2025, if directed toward Tier 1 VAP infrastructure rather than additional AI program extension, would fund approximately 45 district-level VAP processing units at ₹22 crore per unit - enough to establish a functional VAP hub in every Tier 1 state's highest-readiness district. The return on that investment, at ₹8.4 crore per unit per year in additional revenue, would recover the capital cost in 2.6 years.

"White Revolution 2.0 adds 75,000 cooperative societies. It specifies nothing about what those societies will produce. By default, it will add 75,000 more liquid milk collection units."

The Transition That Pays for Itself

The case for VAP transition in Indian dairy cooperatives does not rest on aspirational benchmarking or international comparisons. It rests on four domestic data points already in the public record: ₹28 versus ₹4.50 per liter; a 14.5-percentage-point market-sentiment gap for cheese; ₹12,430 crore in annual foregone revenue at current procurement volumes; and a Tier 1 capital recovery period of 2.6 years.

The resistance to this transition is not financial. The risk register correctly identifies the barriers as institutional. Thirty percent of district cooperative unions are under financial stress, meaning they lack the balance sheet capacity to invest in processing equipment. The cooperative governance model - democratically elected boards of farmer members - makes product-mix decisions slowly and conservatively. Cold chain infrastructure outside Gujarat, Karnataka, and Maharashtra is insufficient for perishable VAP distribution at scale. These are real constraints requiring real policy responses.

But constraints are not permanent. Gujarat's cooperative model was built from the same base - smallholder farmers, traditional liquid milk routes, limited processing infrastructure - that defines the current Tier 2 and Tier 3 states today. The distance between Tier 3 and Tier 1 is not geography. It is investment sequencing, institutional capacity-building, and a policy architecture that treats product diversification as a performance metric rather than an afterthought. White Revolution 2.0 has the resources. What it currently lacks are the product mandate.

Data Sources: Jordbrukare India - Market Sentiment Survey H1 2023 | PIB, Ministry of Fisheries, AH&D, GoI (2025) - White Revolution 2.0 | DAHD, MoAFW, GoI - Basic Animal Husbandry Statistics (ON4738) | NDDB Annual Report 2024 | IDF World Dairy Situation 2024.

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