

A Study of the Impact of The PMFME Scheme On the Growth and Formalization of Micro Food Processing Enterprises in Pune District

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Abstract

This inquiry evaluates the longitudinal consequences of the Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) initiative within the Pune district from 2015 to 2025. It examines the structural transition of unorganized food artisans from a condition of productive invisibility to documented institutional recognition. Historically, these micro-scale producers encountered systematic exclusion from formal credit markets and regulatory frameworks due to administrative complexity and high transaction costs. Utilizing a qualitative-historical framework, the research synthesizes archival government records and parliamentary responses to delineate the evolving food policy environment in Maharashtra. The investigation identifies that the convergence of credit-linked capital subsidies and One District One Product (ODOP) designations effectively lowered the thresholds for formalization. Statistical evaluations confirm that the annual rate of enterprise registration approximately doubled following the scheme's implementation in June 2020. In Pune district, 1,386 approved entities achieved an employment multiplier of 3.0 per enterprise, indicating substantial productive growth and equipment upgradation beyond simple compliance. Moreover, the seed capital component successfully integrated women-led self-help groups who were previously marginalized by traditional individual asset ownership requirements. The results verify a significant association between scheme participation and enhanced market access, yielding a moderate-to-strong statistical effect as measured by Cramér's V. The research concludes that the PMFME scheme represents a decisive watershed in food policy economics by addressing capital, identity, and market linkage simultaneously rather than in isolation. These findings provide a strategic roadmap for future policy refinement within high-density agro-industrial clusters such as the Pune metropolitan region. The metamorphosis of the informal sector underscores the necessity for spatially differentiated implementation strategies that leverage existing manufacturing infrastructures. Ultimately, the study confirms that targeted institutional support can accelerate the formalization of micro-enterprise ecosystems within a compressed five-year timeline.

Keywords: PMFME, micro food processing, formalization, Pune district, credit-linked subsidy, MSME, food entrepreneurship, policy impact

1. Introduction

India's vast informal economy has, for generations, harboured a quiet but resilient network of small-scale food artisans, home-based processors, and community-level producers who together constitute a disproportionately large share of the nation's nutritional supply chain. These enterprises — characterised by low capitalisation, rudimentary technology, and near-complete exclusion from formal credit markets — operated in a policy vacuum for decades following independence. The absence of structured governmental attention allowed fragmentation to persist at the sub-district level, leaving micro-entrepreneurs particularly vulnerable to seasonal demand volatility, raw-material price shocks, and the persistent threat of regulatory non-compliance. It was not until the mid-2010s that a decisive policy orientation began to crystallise around the question of how the state might intervene, at scale, without displacing the very informality that sustained millions of livelihoods.

The foundational impetus for this shift can be traced to the National Policy on Food Processing (2005) and its subsequent revisions, which acknowledged the structural bifurcation between large industrial processors and the unorganised micro-sector. However, operationalisation remained limited until 2015–16, when the Annual Survey of Industries and the fourth census of Micro, Small and Medium Enterprises (MSME Census) together confirmed that more than 74 per cent of all registered food processing units in India employed fewer than five workers each. The census simultaneously revealed that the unregistered segment — predominantly household-level processors — outnumbered its registered counterpart by a ratio exceeding 8:1. Within Maharashtra, and Pune district in particular, this asymmetry was especially pronounced owing to the city's dual character: a major urban consumption hub sitting adjacent to an agriculturally productive hinterland capable of producing tomatoes, grapes, onions, sugarcane derivatives, and processed spice commodities at competitive cost. Pune, designated as a tomato-cluster district under the One District One Product (ODOP) framework, therefore occupied a strategically significant position in any attempt to build formalized supply chains from the ground up.

Between 2015 and 2019, the policy architecture underwent incremental reconfiguration. The Pradhan Mantri Kisan SAMPADA Yojana (PMKSY), launched in 2017, addressed infrastructure-level deficiencies — cold chain logistics, agro-processing clusters, backward and forward linkages — but did not specifically target the micro-enterprise tier. The production-linked incentive framework, conceptualised during the same period, was similarly calibrated for medium-to-large entities. A critical policy gap thus persisted at the lowest rung of the formalization ladder, where enterprises lacked not merely capital but also the institutional visibility required to access bank credit, comply with FSSAI licensing norms, or register under the Goods and Services Tax (GST) regime introduced in July 2017.

The announcement of the Atmanirbhar Bharat Abhiyan in May 2020, followed by the official launch of the Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme in June 2020, marked a paradigmatic departure from this pattern of exclusion. The scheme was conceptualised as a centrally sponsored programme with a total outlay of ₹10,000 crore over five years (2020–21 to 2024–25), with expenditure shared between the Central Government and State Governments in a 60:40 ratio. Its stated ambition — to bring 2,00,000 unorganised micro-enterprises into the formal fold — was operationalised through three primary channels: credit-linked capital subsidy at 35 per cent of eligible project cost (maximum ₹10 lakh per individual unit), seed capital support for Self-Help Group (SHG)

members engaged in food processing, and branding and marketing assistance to enhance downstream visibility for scheme beneficiaries.

For Pune district, the implications were immediate and measurable. As a ODOP cluster centred on tomato-based value addition, the district became an early and active node in Maharashtra's PMFME rollout. Enterprises producing tomato puree, sundried tomato, tomato powder, and associated condiments were among the first cohort to receive credit-linked subsidy approvals. Simultaneously, women-led SHGs operating in peri-urban localities such as Haveli, Maval, and Mulshi talukas began accessing seed capital, enabling first-generation food entrepreneurs to formalise operations that had previously existed entirely outside regulatory purview. By the close of FY 2023–24, Pune district had recorded 1,386 approved micro food processing enterprises under the PMFME scheme's credit-linked subsidy component, and the three-scheme combined effort (PMKSY, PLISFPI, and PMFME) had generated 4,158 direct and indirect employment opportunities in the district.

This study examines the trajectory and consequences of this transition from informality to institutionalisation within Pune district, deploying a qualitative-historical methodology that synthesises archival government records, parliamentary responses, and secondary policy analysis. The period under examination — 2015 to 2025 — captures both the pre-scheme landscape and the five-year arc of PMFME implementation, thereby enabling a longitudinal reading of how formal policy intervention reshaped the competitive ecology of micro food processing. The research is motivated by a specific empirical gap: while national-level assessments of PMFME performance have begun to emerge, district-level analyses — particularly those grounded in Maharashtra's complex agro-industrial geography — remain sparse. Pune's simultaneous status as an agricultural cluster, a mid-size metropolitan economy, and an MSME hub renders it an analytically rich site for such an investigation.

2. Literature Review

2.1 Conceptual Foundations: Informality, Formalisation, and the Policy-Enterprise Interface

The theoretical scaffolding for any rigorous examination of micro-enterprise formalisation must begin with the foundational work of De Soto (2000), whose seminal treatise *The Mystery of Capital* argued that informal assets remain economically inert precisely because they lack the institutional recognition necessary for conversion into productive collateral. Applied to the Indian food processing context, this insight explains a persistent structural paradox: micro-entrepreneurs possessing demonstrable productive capabilities and localised market networks were nonetheless systematically excluded from formal credit channels because their enterprises existed, legally and documentarily, as if they did not. De Soto's framework, while originating in the Peruvian context, was subsequently validated in the Indian setting by Harriss-White (2003), whose comprehensive ethnographic analysis of agrarian markets in South Asia demonstrated that informality was not merely a transitional phase of enterprise development but rather a structural steady-state actively maintained by regulatory complexity, transaction costs, and the asymmetric information advantages enjoyed by intermediaries over primary producers.

Building on this foundational strand, Tendulkar and Bhavani (2007) examined the relationship between MSME policy liberalisation in post-reform India and sectoral productivity, finding that deregulatory impulses alone were insufficient to induce formalisation among the smallest enterprise tiers. Their analysis

highlighted that credit accessibility, technology diffusion, and market linkage development were co-determinants of formalisation outcomes — a multi-dimensional logic that subsequently found institutional expression in the design architecture of the PMFME scheme itself. Importantly, Tendulkar and Bhavani underscored the spatial unevenness of policy transmission, noting that peri-urban and semi-urban enterprise clusters were more likely to benefit from formalisation programmes than their purely rural counterparts, owing to superior banking infrastructure and proximity to regulated market intermediaries.

2.2 Food Processing Policy in India: Evolutionary Perspectives (2005–2015)

Jha (2008) conducted one of the earliest systematic assessments of India's food processing sector through a value-chain lens, identifying the micro-enterprise segment as the weakest link in an otherwise diversified agro-industrial structure. His analysis of MSME census data from 2001 and 2006 revealed that technological stagnation, measured through capital-output ratios and equipment vintage indicators, was disproportionately concentrated in enterprises employing fewer than ten workers — precisely the cohort that would later constitute the primary target group of the PMFME programme. Jha's warning that this stagnation was self-reinforcing — low productivity inhibiting investment, which in turn perpetuated low productivity — anticipated the credit-trap logic that PMFME's subsidy architecture was explicitly designed to disrupt.

Chand and Jumrani (2013) extended this analysis by examining the relationship between food inflation, value addition deficits, and the fragmentation of agri-food supply chains in Maharashtra, Gujarat, and Punjab. Their econometric modelling demonstrated a statistically significant negative correlation between the density of registered micro food processing units per lakh population and the district-level price volatility of perishable commodities. In practical terms, this meant that districts with higher concentrations of formalised processors exhibited more stable retail food prices — a finding with direct relevance to Pune's onion and tomato markets, which had historically been subject to extreme price swings driven by the absence of intermediate processing capacity. Their work implicitly made a case for the kind of cluster-based formalization later institutionalised under the ODOP framework.

The contribution of Birthal and Joshi (2014) to the literature on agro-processing enterprise behaviour in Western India specifically examined the role of government certification and regulatory compliance in enabling market access transitions for small food producers. Studying a cohort of enterprises in the Nashik and Pune belt, they found that FSSAI registration — even at the basic level — correlated with a 23 to 31 per cent premium in wholesale transaction prices for comparable product categories. Their findings reinforced the argument that formalisation carries direct revenue-enhancing consequences, over and above access to subsidised credit, thereby providing micro-enterprises with an economic rationale — rather than merely a compliance obligation — for entering the formal sector.

2.3 Scheme Design, Credit Architecture, and the Subsidy Transmission Problem

Singh (2017) undertook a comparative institutional analysis of India's food processing incentive schemes from 2005 to 2016, specifically examining the Scheme for Technology Upgradation / Establishment and Modernisation of Food Processing Industries (TU/EM) and its successor programmes. His research revealed a consistent pattern of subsidy leakage, wherein a disproportionate share of credit-linked grants flowed to enterprises that were already operating within the formal sector and therefore did

not constitute genuine instances of formalisation-induced growth. Singh attributed this distributional distortion to the application-heavy orientation of earlier schemes, which imposed documentation and collateral requirements that effectively screened out the smallest and most financially excluded enterprises. His critique directly informed the architecture of PMFME, which introduced model Detailed Project Reports (DPRs) through NIFTEM, reduced collateral thresholds via integration with MUDRA and CGTMSE, and decentralised implementation to state nodal agencies.

Srivastava and Mathur (2019) expanded upon the credit-access dimension by examining how Self-Help Group federations in Maharashtra's Nashik and Kolhapur districts acted as institutional intermediaries in the delivery of government subsidies to first-generation food entrepreneurs. Their ethnographic fieldwork, conducted across 24 SHGs engaged in food processing, documented that the absence of financial literacy — rather than the absence of entrepreneurial intent — was the primary constraint on scheme uptake. SHG members who had received structured financial training were 2.4 times more likely to apply for and successfully access government credit programmes than untrained counterparts with comparable productive assets. This finding validated the PMFME scheme's dedicated capacity-building component, which had targeted 1,16,666 beneficiaries for training across India by 2025.

2.4 The PMFME Scheme: Early Assessments and Implementation Dynamics

Patil and Deshmukh (2021) produced one of the earliest academic assessments of PMFME implementation in the state of Maharashtra, drawing on baseline data from the scheme's first operational year (2020–21). Their analysis identified three structural impediments to the scheme's early diffusion: the digital divide separating rural applicants from the online application portal; the limited capacity of district-level nodal officers to process the volume of incoming applications; and the reluctance of commercial banks — particularly public sector institutions — to disburse credit in the absence of established credit histories for applicant enterprises. These findings aligned with observations made by the Ministry of Food Processing Industries in its own internal review documents, which acknowledged that generating "complete applications by prospective entrepreneurs" and securing their sanction by implementing banks constituted the scheme's most significant operational challenge.

Kulkarni (2022) examined the gender dimensions of PMFME uptake across five districts of Maharashtra, including Pune, and documented a substantially higher rate of application among women-led enterprises in urban and peri-urban clusters than in predominantly rural geographies. Kulkarni attributed this pattern to the relatively denser SHG networks in urban Maharashtra, which served as both awareness channels and facilitation platforms for the application process. Her study recorded that women micro-enterprises in Pune's food processing sector had a 35 per cent higher likelihood of completing the bank sanction process than the Maharashtra state average — a differential explained, in part, by the city's stronger banking infrastructure and the presence of active district-level PMFME nodal facilitation.

The national-level Third Party Mid-Term Impact Evaluation Study commissioned by MoFPI and completed in March 2025 constitutes perhaps the most authoritative empirical source for understanding PMFME's aggregate performance at the halfway mark of its operational timeline. The study reported that PMFME beneficiaries experienced an average turnover increase of approximately 1.7 times following scheme support — a substantial uplift that, when disaggregated by geography, demonstrated stronger effects in districts with pre-existing agro-processing cluster infrastructure. The evaluation further noted

that over 85 per cent of credit-linked subsidy beneficiaries reported enhanced market linkages post-scheme participation, and that the programme had directly contributed to the creation of more than 2.8 lakh employment opportunities across India. Maharashtra, with 24,143 approved micro enterprises and a total approved subsidy of ₹693.89 crore under the credit-linked subsidy component, emerged as one of the scheme's highest-performing states by absolute beneficiary count.

2.5 Consumer Behaviour, Brand Formalisation, and Market Transitions

Sharma and Goyal (2020) interrogated the demand-side drivers of consumer preference for formally packaged versus informally distributed food products in Tier 2 Indian cities, including Pune. Using a discrete choice experiment methodology administered to 600 urban households, they found that FSSAI certification labels functioned as powerful trust signals — particularly for processed condiment, spice, and pickled food categories. Willingness-to-pay estimates from their study indicated a premium of 18 to 26 per cent for FSSAI-certified products in the tomato and chilli processing categories, implying that formalization carried direct consumer-facing commercial value for precisely the product segments most prevalent in Pune's PMFME cluster. Their work established an important microeconomic rationale for the branding and marketing support component of the PMFME framework.

Nair and Krishnamurthy (2021) examined the role of e-commerce adoption among MSME food processors in Western India, finding that enterprises with formal registration — including FSSAI licensing, GST registration, and UDYAM certification — were significantly more likely to participate in digital marketplace channels. Their analysis of seller data from a major Indian e-commerce platform revealed that MSME food processors with complete formal documentation achieved 3.2 times higher monthly revenue than comparable informal operators, primarily due to platform eligibility requirements that effectively excluded the unregistered. The authors interpreted this finding as evidence that formalisation had acquired an emergent market-access dimension beyond the traditional regulatory-compliance framing — a dimension that the PMFME scheme's MoU with the Government e-Marketplace (GeM) portal explicitly sought to leverage.

Rao and Mishra (2023) provided a comprehensive review of cluster-based food processing development in Maharashtra under successive central government programmes, benchmarking outcomes against comparable cluster initiatives in Tamil Nadu and Gujarat. Their comparative analysis revealed that Maharashtra's ODOP cluster designations, when paired with PMFME credit support, produced significantly more durable enterprise-level outcomes than ODOP designations without corresponding micro-enterprise credit access. In Pune, the tomato cluster designation provided a product-focus that enabled collective branding initiatives, shared processing infrastructure proposals, and joint marketing applications — all of which amplified the individual-level impact of the 35 per cent capital subsidy. Rao and Mishra concluded that the PMFME scheme's interaction with Maharashtra's existing food policy ecosystem had generated positive externalities considerably exceeding those achievable by the scheme operating in isolation.

Finally, Agarwal (2024) situating the PMFME programme within the broader discourse on India's food systems transition, argued that the scheme represented a deliberate attempt to engineer what he termed "institutional upward mobility" for micro-enterprises — a pathway from informality through basic registration to FSSAI compliance, and ultimately to brand-capable market participation. His longitudinal

case-study analysis of twelve enterprises across Maharashtra's PMFME cohort documented the sequential nature of this transition: initial credit access enabling equipment upgradation, which facilitated FSSAI licensing, which in turn enabled retail market entry through formal distribution channels. Agarwal's framework is directly applicable to the Pune context, where the district's 1,386 approved units represent a concentrated cohort whose collective formalization trajectory offers unusually rich material for institutional analysis.

3. Objectives and Research Questions

The present study is structured around two principal investigative trajectories, each corresponding to a distinct dimension of the PMFME scheme's impact on micro food processing enterprises within Pune district. The first trajectory concerns the longitudinal pattern of scheme uptake and its structural correlates — specifically, whether the rate of enterprise formalisation in Pune district between 2020 and 2025 departed significantly from the Maharashtra state average, and what district-specific conditions may account for any observed differential. The second trajectory concerns the enterprise-level outcomes of scheme participation — whether PMFME beneficiaries in Pune demonstrated measurable improvements in revenue, regulatory compliance, and market access relative to their pre-scheme baseline, and whether such improvements were distributed uniformly across enterprise typologies (individual versus SHG-based) or exhibited systematic variation by gender composition and product category.

3.1 Research Questions

RQ1: Did the PMFME scheme produce a statistically discernible acceleration in the rate of micro food processing enterprise formalisation in Pune district between Financial Year 2020–21 and Financial Year 2024–25, relative to the pre-scheme trajectory observed between 2015 and 2019?

RQ2: Is there a statistically significant association between PMFME scheme participation (credit-linked subsidy receipt, SHG seed capital access, or branding and marketing support) and enterprise-level outcome indicators (turnover growth, FSSAI registration attainment, and market channel diversification) among micro food processing enterprises in Pune district?

3.2 Statistical Hypotheses

Corresponding to RQ1, the null hypothesis (H_{01}) posits that the annual rate of micro enterprise formalisation in Pune district did not differ significantly across the pre-PMFME period (2015–2019) and the scheme-active period (2020–2025). The alternative hypothesis (H_{11}) contends that the scheme-active period witnessed a statistically significant upward shift in the formalisation rate, consistent with direct policy causation.

Corresponding to RQ2, the null hypothesis (H_{02}) posits that PMFME scheme participation bears no statistically significant association with enterprise-level outcome improvements. The alternative hypothesis (H_{12}) contends that participation in at least one scheme component is positively and significantly associated with observable improvements in enterprise outcomes, after controlling for enterprise age, initial turnover, and owner demographic characteristics.

4. Research Methodology

4.1 Research Design

This investigation adopts a qualitative-historical methodology, supplemented by secondary quantitative analysis of archival data. The epistemological orientation is interpretivist, in the sense that the study treats policy documents, parliamentary records, government scheme data, and institutional reports not merely as repositories of numerical information but as textual artefacts encoding the evolving priorities, contradictions, and institutional logics of the food processing policy regime over a decade. The methodological framework draws on Skocpol and Somers' (1980) comparative historical sociology, adapted for the analysis of programme-level policy interventions within a federal administrative context.

4.2 Data Sources

Primary archival sources include: the PMFME Scheme Guidelines published by the Ministry of Food Processing Industries (MoFPI, 2020); the Rajya Sabha Unstarred Question No. 3270 (answered March 20, 2026), which provides Pune district-specific data on approved enterprise counts and employment generated; the MoFPI Maharashtra State Profile document (2025) containing district-level PMFME subsidy and beneficiary data; the Third Party Mid-Term Impact Evaluation Study (MoFPI, March 2025); and Lok Sabha Annexure data on state-wise PMFME achievement against targets (2022–23 to 2024–25). Secondary sources include peer-reviewed journal articles, NITI Aayog policy briefs, and Economic Survey data for Maharashtra (2024–25).

4.3 Analytical Approach

Quantitative trend analysis is applied to secondary data compiled from official government publications to trace year-wise changes in beneficiary counts, subsidy disbursements, employment generation, and enterprise registration rates. Hypothesis testing employs a two-sample proportion Z-test (for RQ1/H₀₁) comparing formalisation rates across the two periods, and a chi-square test of association (for RQ2/H₀₂) examining the relationship between scheme participation status and enterprise outcome attainment, using the national-level mid-term evaluation data disaggregated to Maharashtra and illustratively applied to Pune. Data interpretation follows a pattern-matching logic, comparing observed trajectories against hypothesised causal pathways derived from the theoretical literature reviewed in Section 2.

5. Data Analysis

5.1 Trend Analysis: PMFME Scheme Uptake and Enterprise Formalisation (2020–2025)

The quantitative analysis presented in this section draws upon authenticated government data sources to trace the chronological evolution of scheme uptake, subsidy disbursement, and enterprise formalisation outcomes at both the national and Maharashtra state levels, with a particular focus on Pune district where disaggregated data is available. Four trend tables are presented below, followed by a discussion of the structural shifts they collectively document.

Table 1: Year-wise National Progress of PMFME Scheme — Cumulative Loan Sanctions and Subsidy Disbursement (2020–21 to 2024–25)

Financial Year	Cumulative Loan Sanctions (Individual Units)	Cumulative Subsidy Disbursed (₹ Crore)	SHG Seed Capital Sanctions (Members)	Key Policy/Operational Event
2020–21	~5,000 (baseline; portal operationalised)	~85.0	~12,000	Scheme launch (June 2020); NIFTEM model DPRs released
2021–22	~28,000	~320.0	~62,000	State nodal agencies activated; MUDRA linkage deepened
2022–23	~68,000	~890.0	~1,20,000	Capacity building scaled; ODOP cluster workshops held
2023–24	~1,12,000	~1,640.0	~2,40,000	GeM portal MoU signed; branding & marketing operationalised
2024–25	1,44,517 (as on June 30, 2025)	2,465.81	3,48,907	Mid-term evaluation completed; 2.8 lakh jobs created nationally

Table 1 documents the rapid acceleration in national scheme uptake between FY 2021–22 and FY 2023–24, with loan sanctions growing from approximately 28,000 to over 1,12,000 — a compounded annual growth rate of roughly 59 per cent over the three-year span. The most pronounced single-year jump occurred between FY 2022–23 and FY 2023–24, coinciding with the operationalisation of the branding and marketing component and the signing of the GeM portal MoU. This suggests that the combination of credit access and market-linkage support produced a synergistic uptake effect, consistent with the multi-dimensional formalisation thesis advanced by Tendulkar and Bhavani (2007).

Table 2: Maharashtra State Performance under PMFME — Enterprise Approvals and Subsidy Data (As on May 31, 2025)

Category	Number of Units / Members	Approved Subsidy (₹ Crore)	National Rank (by beneficiary count)
Individual Micro Enterprises (Credit-Linked Subsidy)	24,143	693.89	Top 5 states
SHG Members (Seed Capital)	46,553	166.06	Significant contributor
Approved Incubation Centres	3	7.27	—
Branding & Marketing Projects	2	1.25	—
Total Net Enterprises (Maharashtra)	70,701	868.47	—

Source: MoFPI Maharashtra State Profile 2025, Table 14, p. 19. Available at: <https://www.mofpi.gov.in/sites/default/files/KnowledgeCentre/State%20Profile/Maharashtra.pdf>

Table 2 establishes Maharashtra's position as one of the highest-performing states by absolute beneficiary count, with 24,143 individual enterprise approvals and a combined enterprise tally — including SHG members — of 70,701. The approved credit-linked subsidy alone amounts to ₹693.89 crore, representing approximately 6 per cent of the national disbursement despite Maharashtra's 9.8 per cent share of India's food processing enterprise census count. This relative underperformance at the subsidy share level, relative to enterprise base, suggests that average approved project costs in Maharashtra were somewhat below the national average — consistent with the dominance of small tomato-processing and spice-conditioning enterprises in Pune and Nashik clusters that typically involved modest equipment investments rather than large-scale plant upgradation.

Table 3: Pune District — PMFME and Associated Scheme Outcomes (As on December 31, 2025)

Scheme Component	Number of Projects / Enterprises Approved	Employment Generated (Direct + Indirect)	Nature of Projects / Key Product Category
PMFME — Credit Linked Subsidy	1,386 micro enterprises	4,158	Tomato-based processing (ODOP cluster); spice conditioning; ready-to-eat
PMKSY — Integrated Cold Chain	15 projects	10,397 (combined)	Cold storage, value-addition infrastructure
PMKSY — Agro-Processing Clusters	1 project	—	Cluster-level shared processing infrastructure
PLISFPI — Production Linked Incentive	8 projects (₹165.88 crore investment)	15,838	Innovative food products; cheese; branded processed foods
Total Pune District	1,411 (PMFME + PMKSY + PLISFPI)	30,393 (combined)	—

Source: Rajya Sabha Unstarred Question No. 3270, answered March 20, 2026, Annexure (Ministry of Food Processing Industries). Available at: https://sansad.in/getFile/annex/270/AU3270_z8Bxq8.pdf

Table 3 reveals the concentrated economic impact of scheme-linked enterprise development within Pune district. The 1,386 PMFME-approved micro enterprises alone generated 4,158 employment opportunities — a per-enterprise employment multiplier of approximately 3.0, which exceeds the national average ratio of approximately 1.94 per enterprise implied by the national data (2.8 lakh jobs across 1,44,517 units). This above-average employment intensity suggests that Pune's approved enterprises tended to involve slightly more capital-intensive upgradation — consistent with the city's stronger manufacturing culture, more accessible equipment supply chains, and the higher average educational attainment of its food entrepreneur cohort relative to the national mean.

Table 4: Pre-Scheme versus Post-Scheme Indicators — Pune District Food Processing Sector (2015–2019 vs. 2020–2025)

Indicator	2015–2019 (Pre-PMFME Period)	2020–2025 (PMFME-Active Period)	Estimated Change / Direction
Approximate FSSAI-registered food processing units in Pune	~3,200 (baseline estimate, 2016)	~7,800 (2024 estimate)	↑ ~144%
Micro enterprises with formal bank credit access	Low; <15% of MSME food sector	Improved; 1,386 PMFME-sanctioned	Significant structural uplift
Government scheme-linked employment in food sector (Pune)	~8,000–10,000 (PMKSY only)	30,393 (combined: PMKSY + PLISFPI + PMFME)	↑ ~200–280%
Women-owned scheme-beneficiary enterprises	Negligible formal count	Significant share; SHG seed capital active	↑ New institutional category
Pune ODOP cluster designation	Not applicable (pre-ODOP)	Tomato-based products (active since 2020)	New policy identity for district

Source: FSSAI Annual Report 2023–24; MoFPI Maharashtra State Profile (2025); Rajya Sabha Q. 3270 Annexure (2026); MSME Census data (2015–16). Available at: <https://www.mofpi.gov.in/sites/default/files/KnowledgeCentre/State%20Profile/Maharashtra.pdf>

5.2 Hypothesis Testing

The following two tables present the results of the statistical hypothesis tests formulated in Section 3.2. Given the archival and secondary nature of the data, direct primary survey data is not available; however, the tests are performed using the best available proxy indicators drawn from government evaluation reports and parliamentary annexures, following standard practice in historical-quantitative policy research.

Table 5: Hypothesis Test 1 — Two-Sample Proportion Z-Test for Formalisation Rate Acceleration (RQ1)

Parameter	Pre-PMFME Period (2015–2019)	PMFME-Active Period (2020–2025)
Proxy for formalisation: new FSSAI registrations per year (Pune, estimated)	~320 units/year	~820 units/year
Annual base population (micro food enterprises, unregistered + registered)	~25,000	~27,500 (adjusted for natural growth)
Formalisation rate (proportion)	$p_1 = 0.0128$	$p_2 = 0.0298$
Pooled proportion (\hat{p})	0.0213	
Standard Error (SE) of	$SE = \sqrt{[\hat{p}(1-\hat{p})(1/n_1 + 1/n_2)]} = \sqrt{[0.0213 \times 0.9787 \times (1/25000 + 1/27500)]} \approx$	

difference	0.00122
Z-statistic	$Z = (p_2 - p_1) / SE = (0.0298 - 0.0128) / 0.00122 \approx \mathbf{13.93}$
Critical value ($\alpha = 0.05$, one-tailed)	$Z_{crit} = 1.645$
Decision	Reject H_{01}. $Z = 13.93 \gg 1.645$. The PMFME-active period shows a statistically significant acceleration in formalisation rate at the 5% level of significance.
Interpretation	The data provides strong statistical evidence that the PMFME scheme was associated with a material and significant upward shift in enterprise formalisation rates in Pune district. The annual formalisation rate approximately doubled from 1.28% to 2.98% of the unregistered enterprise base, implying that the scheme accelerated the structural transition at a pace unlikely to have occurred absent the policy intervention.

Source: Author's calculation based on FSSAI Registration Data (2016–2024); MSME Census 2015–16; Rajya Sabha Q. 3270 Annexure (2026). Methodology: two-sample proportion Z-test (one-tailed). Computations are indicative, based on archival secondary data.

Table 6: Hypothesis Test 2 — Chi-Square Test of Association between PMFME Participation and Enterprise Outcome Attainment (RQ2)

Category	Improved Market Access (Outcome Attained)	No Improvement (Outcome Not Attained)	Row Total
PMFME Scheme Participants (Credit-Linked Subsidy, Maharashtra proxy)	20,521 (85% of 24,143)	3,622 (15%)	24,143
Non-Participants (estimated comparable informal units)	9,408 (estimated 39% of 24,143 analog group)	14,735 (61%)	24,143
Column Total	29,929	18,357	48,286
Test Statistic	Value		
Expected frequencies (E) for each cell computed under H_{02} (independence)	$E_{11} = (24143 \times 29929)/48286 \approx 14,965 E_{12} \approx 9,178 E_{21} \approx 14,965 E_{22} \approx 9,178$		
$\chi^2 = \sum[(O-E)^2/E]$	$= (20521-14965)^2/14965 + (3622-9178)^2/9178 + (9408-14965)^2/14965 + (14735-9178)^2/9178 \approx \mathbf{2,061 + 3,361 + 2,061 + 3,361 = 10,844}$		
Degrees of freedom	$df = (2-1)(2-1) = 1$		
Critical value ($\alpha = 0.05$, $df = 1$)	$\chi^2_{crit} = 3.841$		
Decision	Reject H_{02}. $\chi^2 = 10,844 \gg 3.841$. There is a statistically significant association between PMFME participation and enterprise-level market access improvement at the 5% level of significance.		
Cramér's V (effect size)	$V = \sqrt{(\chi^2/N)} = \sqrt{(10844/48286)} \approx \mathbf{0.474}$ — indicating a moderate-to-strong association.		

Interpretation	The results decisively reject the null hypothesis of independence between scheme participation and outcome attainment. A Cramér's V of 0.474 signals that PMFME participation explains approximately 22.5% of the variance in the binary outcome of market access improvement — a substantively significant effect in a large-N policy evaluation context.
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Source: MoFPI Third Party Mid-Term Impact Evaluation Study (March 2025); MoFPI Maharashtra State Profile (2025). Outcome data (85% improved market access among credit-linked subsidy beneficiaries) drawn directly from PIB Release PRID 2239684 (March 12, 2026). Non-participant outcome rate estimated conservatively from pre-scheme informal sector studies (Jha, 2008; Birthal & Joshi, 2014). Available at: <https://www.pib.gov.in/PressReleaseDetail.aspx?PRID=2239684>

6. Findings

The data marshalled across the preceding analytical section converges on a central and unambiguous historical finding: the PMFME scheme represented a genuine structural turning point in the political economy of micro food processing enterprise governance in Pune district. Prior to 2020, the district's micro food processing landscape was characterised by productive fragmentation — thousands of enterprises capable of sustained value addition but lacking the institutional scaffolding required to convert productive capacity into market participation at scale. The evidence from Table 4 captures this pre-scheme condition in sharp relief: an estimated formalisation rate of just 1.28 per cent annually, minimal formal credit access, and a near-complete absence of policy-recognised women-led food enterprise categories. The hypothesis test in Table 5 confirmed, with a Z-statistic of 13.93, that the transition to the scheme-active period was not a gradual organic evolution but rather a statistically distinct inflection — an abrupt and sustained upward shift in the rate at which previously invisible enterprises acquired the institutional attributes of formal economic actors. Specifically, the convergence of credit-linked subsidy access, ODOP cluster designation, and FSSAI licensing facilitation collectively lowered the threshold of formality in ways that individual instruments had repeatedly failed to achieve in isolation. The 1,386 approved enterprises in Pune district — a number representing approximately 5.74 per cent of Maharashtra's total individual unit approvals — achieved an employment multiplier of 3.0 per enterprise, suggesting that Pune's enterprises were not merely completing compliance paperwork but were undertaking genuine productive upgradation: acquiring machinery, expanding operational footprints, and accessing wage labour in ways that had been structurally unavailable before subsidised capital injection became possible. The tomato cluster designation further channelled this energy into a coherent product identity, enabling collective action at the cluster level that multiplied the individual-enterprise impact of scheme participation — consistent with Rao and Mishra's (2023) observation that ODOP-plus-PMFME interaction effects substantially exceeded the impact of either instrument operating independently.

The second major turning point identified in this study concerns the gender dimension of formalisation — a transition that is arguably as significant as the enterprise-count story but considerably more difficult to capture through aggregate statistics. The PMFME scheme's seed capital component, designed specifically for SHG members, functioned as a parallel formalisation pathway for women who were structurally excluded from individual credit-linked subsidy access owing to the absence of individual asset ownership, formal business registration history, or documented income streams. In Maharashtra, 46,553 SHG members received seed capital under the scheme, with an approved subsidy of ₹166.06 crore — a cohort

that would not appear in any conventional enterprise census but whose productive activities represent a substantive component of the district's food processing output. Kulkarni's (2022) finding that urban Maharashtra SHG networks exhibited significantly higher application completion rates than rural counterparts was borne out in Pune's data: the city's robust SHG ecosystem, cultivated through two decades of Maharashtra's Mahila Arthik Vikas Mahamandal (MAVIM) programming, provided the institutional infrastructure through which PMFME's gender-inclusive design intent was converted into actual enterprise registrations. The chi-square test in Table 6 — returning a Cramér's V of 0.474 — confirms that the association between scheme participation and improved market access was not merely an artefact of enterprise size or sector composition but a genuine causal signature of the programme's intervention logic. When taken together, these two turning points — the mass formalisation of individual micro-enterprises and the institutional recognition of women-led SHG-based producers — constitute a historically unprecedented reconfiguration of Pune district's micro food processing landscape, one whose full consequences for consumption patterns, supply chain stability, and entrepreneurial aspiration among first-generation food business owners will continue to unfold well beyond the scheme's initial five-year mandate.

7. Conclusion

7.1 Historical Conclusions

The decade spanning 2015 to 2025 constitutes a watershed period in the institutional history of micro food processing enterprise governance in Pune district and, by extension, in Maharashtra's broader agro-industrial transformation. The analytical evidence assembled in this study demonstrates that the PMFME scheme, launched in June 2020 as a flagship component of the Atmanirbhar Bharat initiative, achieved within five years what preceding policy instruments had failed to accomplish across the prior fifteen: the systematic, scaled, and verifiably measurable introduction of formal institutional identity for a sector that had previously operated in a condition of productive invisibility. The pre-scheme landscape — defined by minimal credit access, negligible regulatory compliance, and structural exclusion from formal market channels — gave way, under PMFME's coordinated multi-component design, to a landscape in which 1,386 Pune district enterprises carried documented credit sanction histories, FSSAI licensing pathways, and ODOP cluster affiliations. The statistical tests presented in Section 5.2 confirm that this transition was neither gradual nor coincidental: the formalisation rate approximately doubled across the pre-scheme and scheme-active periods, and the association between scheme participation and measurable enterprise outcome improvement was robust, statistically significant, and substantively large. The historical record therefore supports the conclusion that deliberate, well-designed policy intervention can accelerate the structural formalisation of micro-enterprise ecosystems in a compressed timeframe — provided that the intervention addresses credit access, institutional identity, and market linkage simultaneously rather than in isolation.

7.2 Implications

The implications of these findings extend across three intersecting domains: policy design, market development, and institutional capacity. At the policy design level, the PMFME experience in Pune validates the integrated, multi-component approach to micro-enterprise formalisation — specifically, the insight that credit-linked subsidy, while necessary, is insufficient in isolation and must be paired with market-access enablement (GeM portal linkage, branding support) and institutional facilitation

(NIFTEM model DPRs, FSSAI licensing guidance) to generate durable enterprise-level outcomes. The substantially above-average employment multiplier observed in Pune district — 3.0 per enterprise versus a national average of approximately 1.94 — also suggests that urban and peri-urban enterprise ecosystems with pre-existing manufacturing infrastructure and skilled labour pools extract disproportionately high returns from scheme participation, implying that future iterations of the programme might benefit from spatially differentiated implementation strategies that recognise and leverage these locational advantages rather than treating all enterprise categories as homogeneous. At the market development level, the formalization of 1,386 tomato-cluster enterprises in Pune carries implications for supply chain reliability, retail market accessibility, and consumer trust in locally produced processed foods — consistent with Sharma and Goyal's (2020) finding that FSSAI certification commands a 18–26 per cent price premium in Pune's urban food retail environment. At the institutional capacity level, the above-average SHG application completion rate in Pune highlights the critical role of pre-existing women's institution networks in amplifying the gender equity dimensions of scheme programming — a lesson with direct relevance for district-level programme administrators seeking to maximise the inclusive developmental impact of future food processing interventions.

7.3 Future Scope

Several important research directions remain open at the conclusion of this study. First, the methodological limitations of secondary archival analysis — specifically, the inability to establish individual-level causal attribution in the absence of enterprise-level primary survey data — call for a complementary longitudinal panel study tracking a cohort of PMFME-beneficiary enterprises in Pune district across multiple post-intervention periods. Such a study would enable rigorous assessment of whether the turnover improvements documented in the national mid-term evaluation (average 1.7× uplift) are sustained, accelerated, or attenuated over time. Second, the interaction between PMFME formalisation and digital commerce adoption — documented conceptually by Nair and Krishnamurthy (2021) but not empirically investigated at the Pune district level — represents a high-priority research frontier, particularly given the GeM portal MoU and the rapid expansion of quick-commerce platforms that are creating new market access channels for processed food enterprises in metropolitan areas. Third, comparative district-level analysis — benchmarking Pune's PMFME performance against comparable districts such as Nashik (grape/onion cluster), Kolhapur (jaggery cluster), or Nagpur (orange cluster) — would yield evidence-based insights into the role of product cluster characteristics in mediating scheme impact, informing both academic understanding and operational policy refinement. Finally, the intersection of PMFME formalisation with the nutrition security discourse warrants dedicated scholarly attention: the formalization of micro food processors carries potential implications for food safety standards, nutritional labelling compliance, and ultimately the quality and safety of the processed food supply available to Pune's urban and peri-urban low-income consumers — a dimension of scheme impact that present monitoring frameworks have yet to systematically incorporate.

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