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Assessing the Impact of the PLI and PMFME Schemes on Food Processing Enterprises in India: Evidence from Secondary Data

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ABSTRACT: The food processing policies in India aim at increasing manufacturing capacity and enhancing the capacity of micro enterprises; however, the achievements of the programmes have been reported with care needs to be taken. The study has compared the official secondary statistics, disclosures made in the Parliament, scheme guidelines and some empirical literature available till 17 October 2026 of the two schemes, viz. the Production Linked Incentive Scheme for Food Processing Industry (PLISFPI) and the Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) Scheme. Implementation outputs, enterprise outcomes and environmental performance are differentiated by descriptive growth calculations, state shares and structured policy-document analysis. A calculated 85.3% rise in nominal value of product sales was achieved from 2019-20 to 2025-26, with PLI support. By July 2026, PMFME loan sanctions have surpassed 200,000, with five states having 63.2% of the loans sanctioned by December 2025. The scheme addresses various constraints; PLI provides for the incentive for eligible manufacturing expansion while PMFME includes credit-linked upgrading and formalisation, skills and shared services. Environmental opportunities are realised by optimising equipment, protecting and recovering resources, but can also be realised by

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expanding production, which can raise overall resource demand. The documents reviewed do include some relevant safeguards, such as the provisions for PMFME incubation centres, however similar scheme-wide energy, water, emissions and waste outcomes are not reported in the monitoring instruments reviewed. The dairy example shows the need to consider output in the context of market and operating costs. The results do not provide causal treatment effects, but rather reach and outcomes of implementation. Policy priorities are monitoring operational enterprises, resource-efficient financing of upgrades, regional access and the dissemination of commercial and environmental data for the benefit of the enterprises.

1. INTRODUCTION

Food processing is the link between agriculture production and preservation, manufacturing and consumer markets. The development of enterprises can provide opportunities for value addition and off-farm activities, provided that there is a supply of reliable raw materials, financial resources and infrastructure, and demand. The policy response in India involves support for industrialization, and for upgrading of small and informal businesses. The resources that are used for production and commercial activity need to be considered in understanding these interventions. Environmental pressures, such as from heating, refrigeration, cleaning and packaging, cannot be determined based on sales and investment figures alone (IFC, 2007b).

The sector consists of companies that have very different products, technology and structures. The registered manufacturing statistics are a different population to the administrative lists of micro enterprises supported. Therefore, sector gross value added (GVA) and the number of employees in factories should be considered as separate series as should the participation in the scheme. The economic contribution of the sector can be analysed using national accounts and industrial statistics prepared by the Ministry of Food Processing Industries (MoFPI) and scheme records will describe the extent of specific interventions (MoFPI, n.d.-b). This is important when comparing the growth of the nation with that of the assisted companies.

Here PLISFPI is known as PLI, and supports food manufacturing and overseas branding. PMFME helps develop micro-enterprises by providing credit-linked investment assistance and capacity building and shared infrastructure. The distinct nature of their financing mechanisms imply complementary functions – PLI for expansion of eligible manufacturers and PMFME for capabilities and access constraints at a smaller enterprise scale (MoFPI, 2020, 2021a). These are policy intentions, not policy rules. The impact on profitability and employment or environmental performance will depend on how the assistance is implemented, the reaction of the enterprises and factors outside the schemes.

The term impact is generally used in public evaluations of investment and loan sanctions, sales and employment. The indicators are related to different phases of implementation, however, and cannot be used as a substitute for each other. The same issue is found when a decrease in sectoral energy intensity is associated with a programme without the identification of assisted enterprises and/or a credible comparison group. Defining what was measured, the population measured, the time frame measured and whether the evidence allows for attribution (Gertler et al., 2016) are all elements of a disciplined assessment.

In the sources consulted, economic development indicators, environmental clauses and environmental monitoring systems are mostly reported in isolation and in different terms. This study attempts to tackle that fragmentation by making a consistent definition of the two schemes. The dates, counting units and coverage of administrative progress releases are quite varied but provide significant information. The contribution is in identifying those differences, and assessing the quality of the evidence created. It also provides a connection between resource management and enterprise economics via dairy processing, but does not make any statements about national dairy trends based on the scheme beneficiaries.

It examines four questions: What are the recent trends and indicators in food processing; What are the reported results of the schemes; What are the differences in financing, number of enterprises and geographical coverage of PLI and PMFME; What are the documented environmental implications, safeguards and outcome measures; and What is the next step in enterprise upgrading and dairy

economics. These questions will be used to inform the descriptive statistical analysis and institutional comparison, for enterprise and policy implications, and to help identify evidence to isolate reported performance from that that could be attributed to assistance.

The analysis is done for India and sources are available till 17 October 2026. The quantitative windows are based on the indicator (national GVA, industrial statistics, eligible product sales, implementation snapshots and dairy data), which have their own reference periods. The PMFME administrative counts are based on a common time period (December 2025) for state analysis. Environmental analysis is about processing operations and related provisions of programmes and does not estimate a national life-cycle footprint. The assessment that ensues is comparative and descriptive, not causal, unless there is evidence of an identified counterfactual to which it is compared.

2. REVIEW OF LITERATURE

The research on food processing in India shows that enterprise development is related to efficient utilization of capital, labour and agriculture resources. Ali and colleagues used data envelopment analysis and Malmquist productivity decomposition for 12 organised-industry segments between 1980-81 and 2001-02, separating out the technological change from the change in technical efficiency (Ali et al., 2009). Padmavathi (2019) employed a stochastic frontier using data from NSS 2015–16, and estimated the mean technical efficiency to be 67% for 12,993 unorganised food-processing enterprises. These estimates are not suitable for a time series as the populations, aggregation and methods are not consistent. They still demonstrate the importance of taking the growth of investment and output into account when considering input utilisation, productive capabilities and organisational diversity. The processes of manufacturing expansion and upgrading of micro-enterprises are similar but not identical. Both studies were conducted prior to PLI and PMFME, and do not include emissions or freshwater withdrawal or pollutant load measurements. Their production efficiency results, therefore, provide information about mechanisms and measure, but not about environmental improvements or effects of the ensuing schemes.

Additional sales and investment questions are key to the additional evaluation questions posed by PLI's commercial performance conditions. Previous Indian industrial-policy research illustrates why the growth of the benefits cannot be captured by the aggregate programme-level. In an analysis of a 2006 increase in eligibility for small-firm subsidies, Rotemberg reported that newly-eligible firms experienced increases in sales and that these increases had repercussions on competitors. The displacement was larger for less internationally-traded products (Rotemberg, 2019). The intervention is not a food-processing PLI and does not provide an effect size that can be transferred. Its importance is that partly reallocation of activity from unsupported firms can be a way for supported firms to grow. Beneficiary expansion, net sector-wide additionality, and competition, export exposure and export persistence post-incentives should be assessed separately from PLI.

The combined financing and formalisation approach of PMFME can be studied using a basis of research on small-enterprise finance. Using a sample-selection model, an Indian study on unorganised manufacturing showed that being registered, larger size of the enterprise and higher level of education of the owner were positively related to access to formal-credit (Nikaido et al., 2015). These associations do not make a statement of registration leading to better financing. The more recent sectoral evidence relates to the MoFPI's study titled '2025' that was carried out by Crisil through interactions with around 200 industry entities and 10-15 financial institutions. The complexity of documentation was reported by 41% of respondents and delays in processing or approval by 38% (Crisil, 2025). These sample responses are not prevalence estimates or causal PMFME results, but rather can be used to explore facilitation and lending processes in conjunction with subsidies.

Some of the earlier Indian credit interventions have better identification. Banerjee and Duflo (2014) demonstrated that an increase in credit availability led to an increase in production from constrained firms, and not to an increase in other credit. In Hyderabad, group microcredit was randomly introduced, which led to an increase in small business investment and profits for existing small businesses, but had no significant impact on their consumption (Banerjee et al., 2015). The various findings and outcome domains illustrate that finance can impact on enterprises but not in a uniform way in terms of welfare gains. Both studies do not assess the current package of capital subsidy, skills and formalisation of PMFME. Their contribution is methodological and conceptual: focus on the use of finance and on the different effects that can occur, but not on the idea that the delivery of credit is a common good for all those who receive it.

The evidence reviewed covers a range of levels of productivity, credit constraints and programme progress. It does not provide a consistent financial, employment and environmental outcome for both schemes by providing a common beneficiary panel.

The present study, therefore, provides a clear comparison between measurement and implementation, instead of combining dissimilar observations into an estimated treatment effect. The added value is to find environmental protection in the specific scheme or component in which it is included, and to find information for later evaluation.

3. POLICY AND INSTITUTIONAL FRAMEWORK

PLI is a Central Sector scheme with sanctioned outlay of INR 10,900 crore for the period of 2021-22 to 2026-27. It has a structure that connects manufacturing incentives to sales that are eligible for this incentive and has provisions for branding abroad (MoFPI, 2026c). The programme's conditions for the applicant are related to the product, sales and investment, depending on the category. MoFPI and its project management procedures evaluate applications and validate claims (MoFPI, 2021a). The economic argument for this is that it pays for a commercial expansion that has already been realised, but risks the risks of demand and operating costs for the beneficiaries.

PMFME was launched in 2020 with an initial allocation of INR 10,000 crore, and a goal of providing support to 200,000 micro food processing enterprises (MoFPI, 2020). Support as per MoFPI comprises of credit linked capital subsidy of INR 10 lakh per unit for eligible project cost, which is limited to 35%. The support for common infrastructure is 35% up to INR 3 crore and group branding is 50% up to INR 50 lakhs (MoFPI, 2025c). In May 2026, there was a further extension until September 2026 (MoFPI, 2026e). The financing provisions examined are those provided in the study period; they are not assumed to continue or be changed. Assessment of subsidy is to be made in conjunction with the provision of loans, commissioning and sustained operation.

Public assistance works at different stages—the main difference is when. PLI is performance based on eligible commercial criteria. The PMFME approach is a blend of project financing, training, facilitation and shared services. The strategy of PMFME is One District One Product which is organized by the national, state and district level institutions on the basis of local production opportunities (MoFPI, 2020). Both are not necessarily a cure-all for enterprise constraints. A manufacturer can increase sales and have decreased margins, or a micro processor can obtain a loan, but still require working capital, reliable utilities or customers. Implementation assessment needs to be done in the sequence of approval to use and enterprise performance.

PLI is applicable to specified ready to cook/ready to eat products, processed fruits and vegetables, marine products and mozzarella and is applicable to additional products as innovative or organic SME products, branding and millet based products (MoFPI, 2026a). PMFME caters to eligible new and existing micro processors and groups like self help groups, farmer producer organisations and cooperatives (MoFPI, 2022, 2025c). A basic classification of large enterprises and small enterprises is not sufficient as micro enterprises, small and medium enterprises (MSMEs) are also included in PLI. The schemes relate to businesses depending on their product eligibility and financing requirements and also according to the size of the enterprise. It is not possible to assume that someone who has participated in one programme is ineligible for the other public assistance.

4. RESEARCH METHODOLOGY

The study is based on a descriptive quantitative analysis and structured qualitative analysis of policy documents. The units of analysis are national sector-year observations, dated scheme indicators, state-level PMFME counts and specific provisions in official guidelines. It does not sample enterprises or develop a treatment-control sample. The analytical framework is presented in Figure 1, where public support is connected to implementation outputs, enterprise changes and potential commercial or environmental outcomes, and market and institutional conditions play a role in these connections. In order to identify an effect, a credible estimate of outcomes if no help had been provided must be made (Gertler et al., 2016).

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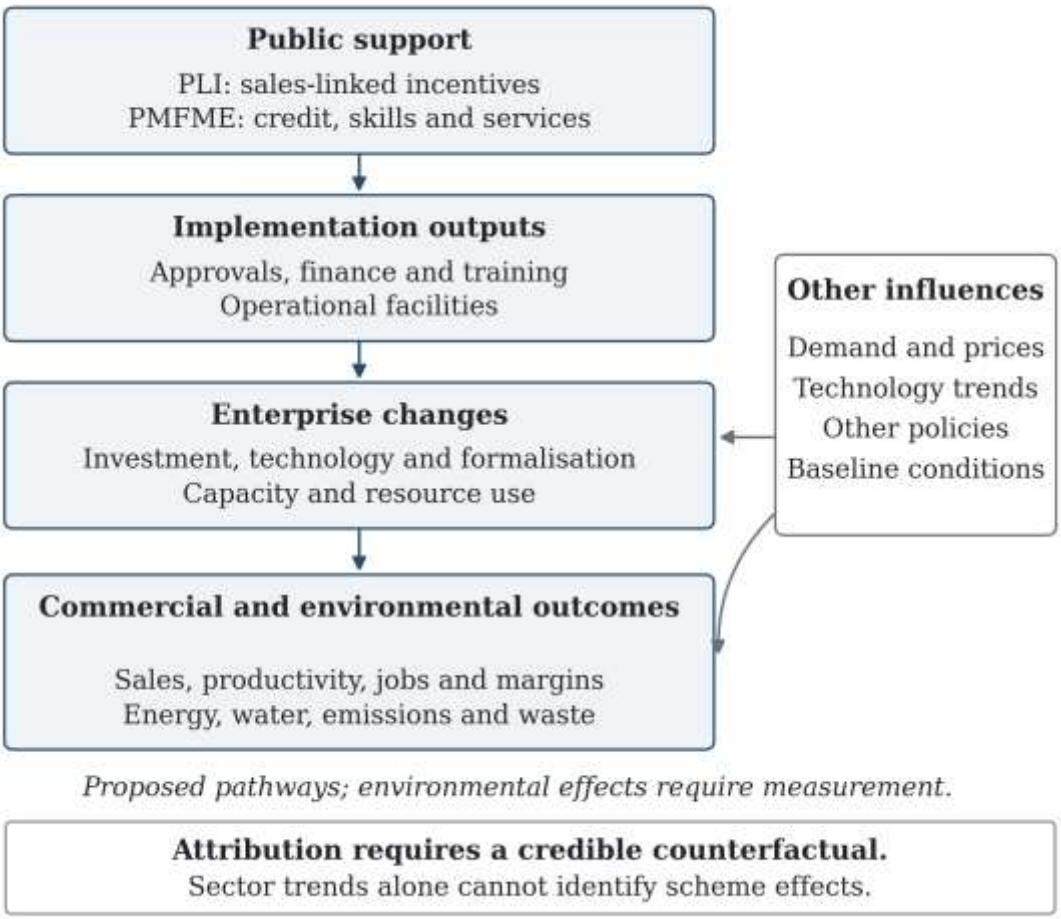


Figure 1. Analytical framework for interpreting scheme performance

The diagram distinguishes between programme delivery, intermediate enterprise changes and commercial and environmental outcomes. The arrows indicate potential relationships and not estimated effects. The principles of analytical synthesis of scheme design and counterfactual evaluation are taken from Gertler et al. (2016) and MoFPI (2020, 2021a).

The sources for principal sources include the Ministry of Food Processing Industries (MoFPI), the Ministry of Statistics and Programme Implementation (MoSPI), Parliamentary reports and Parliamentary replies published by the Press Information Bureau. The sources of the dairy indicators are from the Ministry of Fisheries, Animal Husbandry and Dairying (MFAHD) and Agricultural and Processed Food Products Export Development Authority (APEDA). Scheme guidelines set out policy design and International Finance Corporation (IFC) guidance and the National Dairy Development Board (NDDB) provide information regarding environmental mechanisms in processing. Analytical context from selected original empirical studies. Official statistics and technical guidance are separated from beneficiaries' reports and policy recommendations.

The revised GVA series for 2019–20 to 2023–24 is used for the economic analysis and 2018–19 is added to test baseline sensitivity. Food-products-and-beverages employment is registered for 2022-23 and there is also a separate food-products observation for 2024-25. PLI sales are compared to 2019-20 and will be implemented by the July 2026 release, which will cover incentive disbursement up to June. Progress in PMFME is assessed to July 2026 and state counts are done at 31 December 2025. Manufacture of dairy products continues until 2024-25 and receipts from exports continue until 2025-26. Historical loss surveys continue to have the 2012-14 and 2020-22 reference periods. These observations are not a balanced annual panel, but rather a set of descriptive data sets.

Indicators are categorized in a results chain. Financing is measured in terms of government fund releases and disbursement of incentives, while delivery is measured in terms of approvals, loan sanctions, training and commissioning. Investment and

installed capacity are mid-level responses, whereas sales and employment and formalisation are reported responses to enterprise activity. Proposed environmental measures are electricity (kWh per tonne), thermal energy (MJ per tonne), freshwater withdrawal (cubic metres per tonne), effluent volumes and pollutant loads, greenhouse gases (kg CO2 equivalent per tonne), organic waste generated and recovered and packaging waste generated and recovered. A tonne is a specific product or processing stage. Intensities should be accompanied by total quantities for the whole year. These environmental variables are suggested measures and not results that are estimated here (IFC, 2007a, 2007b).

Using combinations of food processing, PLI, PMFME, investment, employment, formalisation, state-wise, environmental safeguards, energy, water, dairy and impact evaluation, official websites and publisher or institutional sources were searched. Sources were kept when the responsible institution, definition of indicator and the relevant period were determined. The quantitative comparisons were not made for unsupported causal claims or for totals that were not dated. The source URL, publication date, observation period, unit, coverage and revision status were kept in an extraction record. Consistently using revised series within an indicator. Environmental documents were reviewed to determine eligibility, compliance, eligible infrastructure, training and reporting requirements, with each provision for the components being coded separately.

The percentage change was computed as 100 × [(final value / initial value) − 1] and the compound annual growth was computed as 100 × [(final value / initial value)^(1/n) − 1] where n is the number of years elapsed. State shares equal 100 × state sanctions / national sanctions; the five-state concentration ratio adds up the top 5 shares. Calculations are performed based on published precision, and results presented to the nearest value. Unless otherwise indicated, monetary series are given in nominal terms. Job multipliers, benefit-cost ratios or significance tests are not computed from incomparable aggregates. The results of the policy-document analysis indicate existence and extent of provisions, with missing results not being represented by zero.

5. RESULTS AND ANALYSIS

5.1 Sector trends

The GVA of food processing is estimated to have increased by INR 2.24 lakh crore in 2023–24 from INR 1.96 lakh crore in 2019–20, representing a calculated growth of around 14.3% or 3.4% per year over four years. It has a downward trend in 2021-22 and then recovery. However, it's contribution to manufacturing GVA decreased at end of the period compared to the beginning (Table 1) (MoFPI, n.d.-b). This is an example of the importance of separating the growth of a sector's absolute value added from its growth in economic share.

The starting year sensitivity in the endpoint comparison is evident in the case of GVA which was higher in 2018-19 than in 2023-24 by around 5.1% and INR 2.36 lakh crore. The main 2019-20 window does not show continuous growth, but rather matches the reported PLI sales baseline in terms of time period, and is not evidence of uninterrupted growth (MoFPI, n.d.-b). The comparison period is also a factor for exports. The ITC-HS chapters 16–23 aggregate reached US$10,097.97 million in 2024–25, approximately 61.2% above 2019–20 but 7.2% below 2023–24 and 22.8% below 2022–23 (MoFPI, 2025a, 2026d). These individual trends are shown in Figure 2. Beverages and food industry residues are part of the export aggregate, whereas dairy (HS04) is not. Export receipts are not a measure of real GVA or PLI-beneficiary performance.

According to MoFPI (2025a), there are around 42,800 registered food-processing factories in 2022-23. Its ASI-based food-products-and-beverages employment series rose from 2,036,874 persons in 2020–21 to 2,296,654 in 2022–23, a calculated increase of 12.8% (MoFPI, 2025b). A more recent observation is from ASI 2024–25, which was published on 30 September 2026, and shows that there were around 2.361 million persons engaged in the food-products division (MoSPI, 2026). This more limited observation does not include beverages and is reported separately. Both employment measures relate to registered industrial establishments, not all micro processors and neither offers any indication of the number of jobs that can be credited to the two schemes.

Table 1. Selected national food-processing indicators by financial year

Financial year	Real GVA (INR lakh crore)	Share of manufacturing GVA (%)	Registered employment (persons)	HS16–23 exports (US$ million)
2019–20	1.96	8.67	—	6,264.02

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Financial year	Real GVA (INR lakh crore)	Share of manufacturing GVA (%)	Registered employment (persons)	HS16–23 exports (US$ million)
2020–21	1.96	8.43	2,036,874	8,565.60
2021–22	1.90	7.40	2,068,048	10,412.82
2022–23	2.08	8.28	2,296,654	13,078.36
2023–24	2.24	7.93	—	10,881.81
2024–25	—	—	—	10,097.97

Sources: MoFPI revised national accounts series, Annual Report 2024–25, ASI-based employment disclosure and export reply (MoFPI, 2025a, 2025b, 2026d, n.d.-b). GVA is at 2011–12 prices; 2023–24 is the first revised estimate. Employment covers registered food products and beverages. Exports are nominal receipts for ITC-HS chapters 16–23, a different product universe. The newer food-products-only employment observation is discussed separately in the accompanying sector-trends discussion. A dash means no observation is included in this assembled consistent series, not zero. One lakh equals 100,000; one crore equals 10 million.

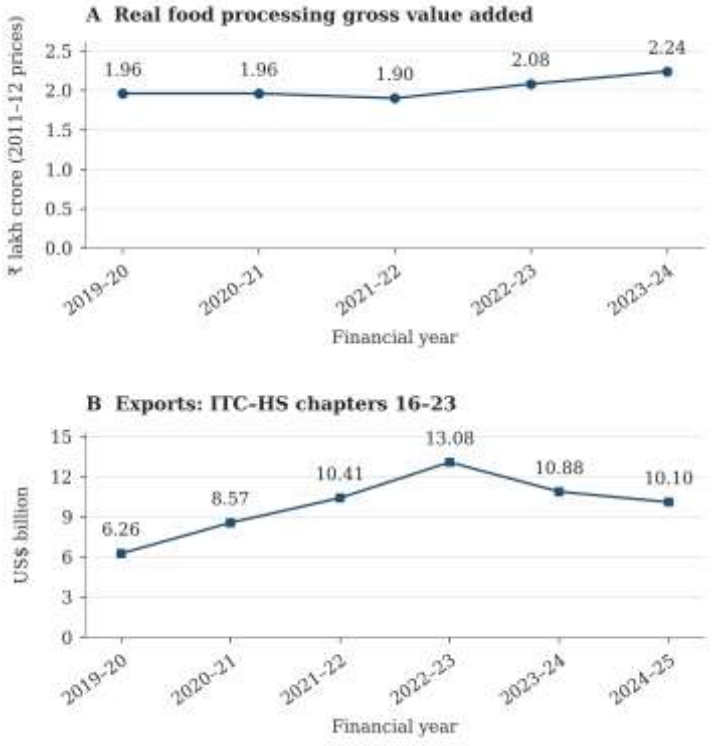


Figure 2. Real food-processing GVA and nominal processed-food export trends

Panel A uses the consistent MoFPI series at 2011–12 prices; Panel B uses exports under ITC-HS chapters 16–23. The panels retain different units, coverage and end years. Label values are rounded; Table 1 contains numerical inputs. Sources: MoFPI Economic Data Bank, Annual Report 2024–25 and March 2026 export disclosure (MoFPI, 2025a, 2026d, n.d.-b). These are sector context, not estimates of scheme effects.

5.2 Scheme implementation and enterprise outcomes

The July, 2026 PLI snapshot is recorded in Table 2. The committed investment was calculated to be 19.2% less than the reported investment by the applicants. The sales of PLI-supported products increased from INR 58,758 crore in 2019-20 to

INR 108,854 crore in 2025-26, representing nominal growth of 85.3%, and a compound annual rate of growth of 10.8% over 6 years (MoFPI, 2026c). The series of reported sales are described by these calculations. The increase is not directly attributable to real productivity growth or extra sales due to the incentive because of price changes and product mix changes.

Different units of counting are applications, companies and manufacturing sites. Similarly, capacity is not necessarily the amount of processing that is actually used, but rather the potential capacity, as is the case with annual processing capacity. Any changes in reported totals should be compared with the coverage of the separate releases first to determine if they are an increase or decrease. The study thus employs the "snapshots" for implementation and the "series" for sales, which are baseline to endpoint over the course of the release.

The number of credit sanctioned for PMFME had increased from 172,707 in December 2025 to over 200,000 in July 2026 (MoFPI, 2026b, 2026h). This is an indicator of increased programme reach. It does not add to the registered numbers of enterprises in a factory, and is not a statement of the net number of enterprises that are created: support does not equal disbursement, operation or survival, and sanctions do not confirm support. For a reliable enterprise-growth series, one would need to have business identifiers, entry and exit dates and a well-defined population of eligible businesses.

In addition to training and shared facilities, PMFME's July release also indicates increased credit support and formalisation (Table 2). These measures outline various stages of enterprise development (MoFPI, 2026h). Operational progress is especially significant: At December 2025, 108 common-infrastructure loans sanctioned, 88 disbursed and 59 facilities up and operational. So, at that time, 54.6% of the operations were conducted under sanctions. Out of 80 approved incubation centres, 32 (40.0%) are commissioned and the remaining centres were not found to be overdue (MoFPI, 2026g, 2026h).

The average turnover of beneficiaries increased by “about 1.7 times” following the improvement in the market linkages of beneficiaries (MoFPI, 2026g) as summarised in a mid-term evaluation dated 31 March 2025 in a parliamentary reply dated 22 March 2026. This is a more direct enterprise information than an approval count. The summary, however, does not explain the convention used by ratio, nor does it provide baseline and follow-up periods for the enterprise, information on the sampling, or information on price adjustment or comparison groups. The finding is thus not translated into an exact percentage increase or a causal estimate, but is left to be an officially reported benefic result without being converted to an exact percentage increase or a causal estimate.

Table 2. Reported scheme implementation and enterprise outcomes

Indicator	PLI	PMFME
Enterprise coverage	163 applications from 127 companies; 69 MSMEs included (July 2026).	More than 200,000 enterprise loan sanctions; over 75,000 enterprises formalised (July 2026).
Investment associated with support	INR 9,207 crore applicant investment against INR 7,722 crore committed (July 2026).	Over INR 20,300 crore project investment (July 2026).
Public payments or releases	INR 3,271.44 crore incentives disbursed cumulatively through June 2026.	INR 1,142.56 crore central share released to states/UTs in FY2024–25.
Capacity or shared facilities	34 lakh metric tonnes per annum processing capacity; 212 locations in 22 states (July 2026).	80 incubation centres approved and 32 commissioned (July 2026).
Reported employment opportunities	Approximately 3.35 lakh, direct and indirect (July 2026).	Nearly 11 lakh, direct and indirect (July 2026).
Skills and participation	MSMEs participate alongside other eligible manufacturers.	Over 1.76 lakh beneficiaries trained; 44% of entrepreneurs were women (July 2026).

Sources: July 2026 PLI and PMFME releases and December 2025 PMFME financial disclosure (MoFPI, 2025c, 2026c, 2026h). July denotes publication/reporting timing where no separate observation date is given. Amounts are nominal. Applications, companies, loans and formalisation are distinct units. Public payment figures have different periods and transfer

stages and do not permit a fiscal-efficiency comparison. Reported investment and employment are not estimates of causal additionality. Training participation and the share of women entrepreneurs have different denominators.

PLI applicant investment should continue to be a separate accounting category from project investment (PMFME) and public financial releases. The first two are investment linked to programme activity, the third is government financing. It would be misleading to compare investments per reported job as the schemes focus on different technologies, enterprise sizes and job definitions. The opportunities reported are not necessarily net additional payroll positions, but rather direct and indirect opportunities and should not be considered as verified opportunities (MoFPI, 2026c, 2026h). The length of employment, wages, and working conditions and enterprise survival are also important in evaluating employment quality, but are not defined by the selected aggregate releases.

Different policy functions are suggested by the commercial comparison. PLI's incentive program is tightly linked with sales and manufacturing growth. PMFME is a mixture of finance and formalisation & enterprise services. Thus, their administrative totals cannot be compared to measure relative effectiveness without comparable outcomes and costs. A higher number under PMFME is consistent with the micro-enterprise focus, and a higher number of investments per PLI applicant would not necessarily indicate better policy performance.

5.3 Regional distribution

The total number of PMFME loan sanctions in Bihar, Maharashtra, Uttar Pradesh, Tamil Nadu and Madhya Pradesh is 109,158, which represents 63.2% of the total PMFME loan sanctions in the country as of December 2025 (Table 3). When formalised enterprises are taken into account, the ranking gets reversed with Maharashtra outperforming Bihar on that indicator, despite fewer loan sanctions (MoFPI, 2026b, 2026g). This shows that the outcome selected will influence the regional assessment. The ratio of formalisation totals and sanctions are not considered as conversion rates as they are not linked cohorts. There are no denominators for eligible enterprises and application demand for raw state counts, so they are merely about concentration and don't necessarily represent relative efficiency or equitable access. While PLI is reported to be present across 22 states, there is no similar measure of micro-enterprise access (MoFPI, 2026c).

Table 3. PMFME sanctions and formalisation in the five states with most sanctions at 31 December 2025

State or aggregate	Loan sanctions	Share of national sanctions (%)	Enterprises formalised
Bihar	28,648	16.59	4,938
Maharashtra	27,360	15.84	13,722
Uttar Pradesh	22,060	12.77	3,650
Tamil Nadu	17,869	10.35	8,350
Madhya Pradesh	13,221	7.66	5,721
Five states combined	**109,158**	**63.20**	**36,381**
Other states/UTs	63,549	36.80	22,821
India	**172,707**	**100.00**	**59,202**

Sources: State annexures in the 27 March and 13 March 2026 parliamentary replies (MoFPI, 2026b, 2026g); calculations from unrounded counts. Sanctions and formalisation share an observation date but are not linked enterprise cohorts. Their ratio is not a conversion rate. Shares may differ slightly when rounded individual entries are summed. The table measures concentration of administrative uptake, not performance relative to the number of eligible enterprises.

5.4 Environmental implications and safeguards

Table 4 distinguishes between mechanisms and safeguards and measured results in the environmental comparison. Increased investment may be supported by PLI to allow for the efficient acquisition of equipment, heat recovery or treatment

infrastructure; however, increased throughput can lead to greater overall energy and water consumption. There may be potential for enhanced preservation and recovery of organic residues in the PMFME upgrading and shared services, and potentially high maintenance, testing and treatment costs for dispersed small businesses. They are analytical implications of programme designs and processing technologies and not observed environmental effects (IFC, 2007b).

There are varying degrees of safeguards documented. PLI application forms ask for information and approvals required for the licence and permit and acknowledge prior use of existing effluent treatment infrastructure for expansion (MoFPI, 2021a). In the case of individual PMFME projects, the District Resource Person (DRP) Manual includes relevant approval checks and documentation, which include pollution clearances (MoFPI, 2022). The guidelines for the incubation centres also specify the eligible effluent treatment infrastructure, waste-utilisation planning and pollution-control clearances. These are not the same treatment plant requirements for all micro enterprises (MoFPI, 2021b). The updated capacity building handbook also covers pollution compliance and effluent-treatment (MoFPI, n.d.-a).

Commercial and implementation fields are included in the PLI quarterly return in which they are not designated to a series of energy, water, emissions or waste. Environmental intensity reporting is also not set up in PMFME's original management information system (MoFPI, 2020, 2021a). This finding is likely only to the instruments and releases examined and does not indicate that there are no monitors of resources benefiting the beneficiaries. Under the Pradhan Mantri Kisan Sampada Yojana (PMKSY), a statement in February 2026 lists certain provisions relating to renewable energy and refrigeration. These cannot be assumed to be transferred to PLI or PMFME (MoFPI, 2026f). Similarly, the additional green supports recommended should be separated from adopted conditions.

Official reporting also recently has reproduced historical estimates of harvest and post harvest losses. The loss of milk was estimated at 0.92% in ICAR-CIPHET (2012-14) and 0.87% in NABCONS (2020-22) study, which is 0.05 percentage points difference (MoFPI, 2026b). These are individual surveys of a larger supply chain than just processing plants. They are not current environmental measurements even though they were republished in 2026. They offer background information for preservation and waste reduction, and the timing and scope of their use in an industry that does not identify beneficiaries means that they are not attributed to PLI or PMFME.

Table 4. Environmental implications, safeguards and measurement in the reviewed scheme documents

Dimension	PLI	PMFME
Policy emphasis	Manufacturing expansion, investment, eligible sales and market development.	Micro-enterprise upgrading, formalisation, credit and shared services.
Potential improvements	New investment can enable efficient equipment, heat recovery and treatment capacity.	Better handling, preservation, equipment and shared services can support loss reduction and recovery.
Potential pressures	Higher throughput may increase total resource demand, wastewater and packaging despite lower unit intensity.	Dispersed small units may face maintenance, monitoring and recurring treatment-cost constraints.
Documented compliance provisions	Application formats request licence and approval information. Expansion provisions recognise existing ETP infrastructure.	DRP approval checks and pollution-clearance documentation; incubation-centre waste planning, eligible ETP infrastructure and applicable clearances.
Capability building	Industrial upgrading creates an opportunity for cleaner processes; it does not verify adoption or savings.	Credit-linked-beneficiary training includes pollution compliance and effluent treatment; attendance does not establish improved performance.

Dimension	PLI	PMFME
Green outcome reporting examined	The prescribed quarterly return does not specify energy, water, emissions or waste series.	The original MIS and selected national releases do not provide comparable scheme-wide resource or pollution outcome series.
Permissible conclusion	Environmental opportunities and safeguards are identifiable; achieved benefits cannot be ranked from these data.	Component-level safeguards are identifiable; achieved benefits cannot be ranked from these data.

Sources: Structured comparison of PLI guidelines; PMFME guidelines, DRP Manual, incubation provisions and training handbook (MoFPI, 2020, 2021a, 2021b, 2022, n.d.-a). Pathways and pressures are analytical inferences informed by processing guidance (IFC, 2007b). ETP means effluent treatment plant; MIS means management information system. Incubation conditions apply to that component. Food-safety compliance and organic-product certification are not substitutes for measured resource or pollution outcomes. An unreported outcome is not evidence of zero effect.

6. DISCUSSION

The results are in line with the different enterprise constraints addressed in the schemes. Help based on sale eligibility can enhance commercialisation incentives, and a package of financial, training and formalisation can help smaller processors with multiple constraints. However, there is a conditional link between support and outcomes. Increased sales can be accompanied by declining margins; commissioning can be done with an underused capacity; and registration can be made before a sustained commercial activity. These differences help to explain why progress should be measured in a number of steps instead of one headline measure. They also help avoid the confusion of scale differences between programmes as being causal differences.

Environmental interpretation is no exception. The total resource use is the product of physical output and resource intensity. For example, if the energy consumption per tonne is reduced by 10% and the production is increased by 20%, the total energy consumption would increase by 8%. This is an example of arithmetic, not an estimate for either of the schemes. The intensity can also be influenced by product mix and capacity utilisation, as well as changes in electricity supply. A plant-level monitoring should therefore be coupled with absolute burdens and clearly define the production boundary, together with resource efficiency.

Results are consistent with previous research as they focus on programme reach and reporting of outcomes and interpretation. The growth of PLI sales and the coverage of PMFME credit are compatible with investment and financing mechanisms discussed in the literature but aggregation does not test the mechanisms. The complementary capabilities and financing constraints (Crisil, 2025; Padmavathi, 2019) are found relevant in the context of the study because of the research conducted on unorganised processors. The evidence for other credit mechanisms comes from directed-lending research, whereas the evidence for firm subsidies helps to explain how supported-firm expansion can coexist with competitor displacement (Banerjee and Duflo, 2014; Rotemberg, 2019). The descriptive changes in the present study cannot be compared with published causal estimates of changes as equivalent results because of differences in design.

The PMFME turnover summary provides an enterprise perspective, but the publicly reported before and after result is not a valid treatment effect as identified by the PMFME. The recommendations on monitoring, working capital and resource management, as mentioned in the parliamentary discussion of the mid-term evaluation, also feature in the evaluation report. Those recommendations reinforce the importance of complementary services and data, but don't provide analytical coverage of the implementation of such reform.

There are three levels of effectiveness that can be looked at: delivery on programme milestones, improvements in the performance of beneficiaries, and added outcomes as a result of public support. There is evidence available and most informative on delivery and reported enterprise change. The limits of its application are the subject of fiscal and environmental evaluation: gross investment is not investment additionality and administrative employment is not a net labour-market effect. A realistic evaluation should also take account of the displacement of unprofitable firms, and the continued assistance and persistence beyond the expiration of incentives. These issues are not a reason to dismiss the documented achievements, but rather a means to further evidence which will inform a public value assessment (Gertler et al., 2016).

The amount of support an enterprise should offer must be evaluated according to its own operating limitations. Demand, maintenance and quality management, along with appropriate machinery, reliable procurement and adequate working capital, are all essential components. For shared facilities, utilisation and cost recovery are used to see if the subsidised equipment is able to offer a long life. Energy and water costs, material losses, treatment costs and any recoverable by-products should be considered for environmental investments when appraising the project. Whether a project is eligible for assistance is not the sole criterion for whether it is a feasible project that will enhance sustained operating performance and meet applicable requirements is a business question.

Dairy processing is a direct connection between agricultural production and these enterprise decisions. National milk output increased from 230.58 million tonnes in 2022–23 to 239.30 million tonnes in 2023–24 and 247.87 million tonnes in 2024–25, with annual growth moderating to 3.58% (MFAHD, 2025, 2026a). There is a specific segment for mozzarella in PLI, with four approvals reported at December 2021 (MoFPI, 2021a, 2026a). PMFME provides eligible micro dairy processors with its 35% capital subsidy up to a maximum of INR 10 lakh per unit along with technical and market support (MoFPI, 2025c). These mechanisms can help to preserve, maintain quality and value add milk, but profitability is dependent on milk procurement prices, capacity utilisation, working capital, energy costs and demand. The reduction in receipts from dairy exports was calculated at US$407.18 million in 2025–26, from US$492.86 million in 2024–25, highlighting the importance of considering market conditions, in addition to output, to assess the situation (APEDA, n.d.; MFAHD, 2026b). There is a linkage between operating costs and environmental performance through efficient pasteurisation, water reuse, condensate recovery and whey recovery (IFC, 2007a; NDDB, n.d.). Dairy outcomes, therefore, should be appropriate processing margins, milk-solid recovery, resource intensity and effluent performance. Methane and feed impacts need to be at the farm level. National production and trade statistics provide background information, but cannot be used to pinpoint the contribution of either scheme to processor profits or farmer incomes.

7. POLICY IMPLICATIONS AND RECOMMENDATIONS

Programme reporting should be done from the application of the project to the approval, financial disbursement, commissioning and operation of the project. The ability to identify the enterprise and date of the status change would enable the identification of delayed implementation from recent approvals and the analysis of enterprise survival after support. Applications, companies and locations should be consistent across releases in PLI reporting. There should be a separate category for credit linked units, group support, common infrastructure and incubation centres in PMFME reporting. The administrative data that already exists could be more useful if it were accompanied by publishing the revision notes and indicator definitions, and not every cumulative count as a new achievement.

The working capital and recurring costs need to be taken into account when assessing the project, along with the machinery purchase. Raw material procurement, storage, treatment systems and maintenance can be limiting factors after capital investment, due to seasonal nature. The costs could be considered together by lending and technical institutions based on product-specific cash-flow assumptions and realistic capacity utilisation. There needs to be a solid user need for shared infrastructure, and a clear hiring process and maintenance plan. Credit and complementary capabilities provide evidence that financing an asset is not a fully-fledged model of enterprise upgrading (Crisil, 2025). Costing and evaluation of any additional support being proposed should be undertaken prior to it being described as an adopted scheme entitlement.

Technical assistance should be a mix of bookkeeping, process control, food safety, marketing and resource management. In the case of micro processors, basic production, electricity, water purchase and rejected batch records and saleable by-products records can enhance management and evaluation. Where individual provision of testing and specialist environmental advice is expensive, cluster or incubation services may be able to offer this. Support should take into consideration the stage of the business and the nature of the product, not be based on the premise that the same equipment and training will be appropriate for all businesses. Assessment should assess the sustainability of enterprise ownership, decision making and income for women and first generation entrepreneurs beyond their initial participation.

In addition to the existing sanction numbers, the number of eligible enterprises, applications received, processing time, loan decisions and operational units must be added to the state comparisons. This would help to differentiate between limited demand and restricted access/implementation bottlenecks. Then, lower-participation districts might be able to be facilitated, coordinated for banking services, or shared services based on diagnosed constraints. It would be appropriate to explore the

concentration in five states in more detail, but it is not sufficient to make a blanket statement that they are doing well or that other states are doing poorly. The availability of resources, suitable products, transport and access to viable markets should also be taken into account in determining the regional support.

The starting point for environmental reporting should be a suite of product specific measures that is proportionate, and should be extended as the quality of the data improves. For larger PLI facilities, annual reporting of physical output, electricity and fuel consumption, freshwater consumption, effluent load and waste recovery could be reported. The PMPME might integrate less complicated enterprise records and sample-based measurement and monitoring at shared facilities. The assessment of renewable energy and efficient use of equipment and waste should not be limited to installation but be evaluated for the actual operation and savings. Future assessment should include the date of participation, pre-support and follow up results, and the use of an appropriate comparison design should be used if possible. The evaluation methods and anonymised analytical data would be published to enable claims of commercial and environmental effectiveness to be independently assessed.

8. CONCLUSION

PLI and PMFME are supporting various segments of the food processing economy in India. Selected secondary evidence shows an increase in nominal sales supported by PLI, increased credit reach for PMFME and significant investment and employment opportunities reported. State-level sanctions continue to be focused and operational signs demonstrate the need to differentiate between approved facilities and those that are operating. The architecture reviewed does contain environmental provisions, but the reporting available does not allow for a comparable numerical evaluation of the reduction of resources and/or pollution. The national dairy trends bear this out, and the need to evaluate commercial conditions and operating efficiency in tandem.

The study is a combination of the three elements of economic, institutional and environmental evidence in one comparative framework. Its contribution is a descriptive assessment that is repeatable and maintains dates, units, populations and stages of implementation. It also provides a separation of programme intentions, which allows safeguards and measured environmental performance. This offers a more accurate basis for understanding official results and priorities for collecting data, rather than giving unsupported causal attributions to overall changes.

Analysis is based on publicly reported statistics and summaries, which have varying degrees of coverage and revision and different reference periods. It has no firm records linked, verified profit measures and comparable untreated firms. Not all of the methods used in the summaries examined are available in the underlying data. The literature selected is not a systematic review and environmental document analysis does not provide actual compliance data at all facilities. The limitations do not justify the assumption that unreported outcomes are absent, but they do limit the extent to which conclusions can be drawn regarding the additionality, distributional effects and environmental outcomes.

Future studies should be able to bring together longitudinal enterprise information that connects the participation of schemes in the scheme, financing, operational status, cost, employment and environmental measures. For designs that involve credible eligibility thresholds and/or phased access or defensible comparison groups, the possibility of investigating additionality could be explored, with explicit assumptions evaluated. A dairy research project could link the relationship between dairy processor margins and milk-solid recovery with the relationship between procurement and measured water, energy and effluent outcomes. This evidence would enable the assessment of whether economic benefits from commercial expansion and upgrading of micro-enterprises are sustainable, while at the same time enhancing resource performance.

DATA AVAILABILITY

All empirical numerical inputs are from the public sources indicated in the text and table notes. The tables have the same reporting periods and units and the calculations are outlined in Section 4. No confidential enterprise microdata and no synthetic observations were used.

ETHICS STATEMENT

The study uses existing research and policy documents and published statistics to analyse. No human subjects were recruited and no animals were used in the study.

DECLARATION OF AI ASSISTANCE

OpenAI ChatGPT (GPT-6 Astra Pro) was helpful in discovering sources, verifying published totals, calculating descriptions, compiling figures and editing and drafting the manuscript. All the numerical observations stem from the public sources cited.

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