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Impact Evaluation of Public Distribution Policy: Family Card Holders' Outlook on Fair Price Shop Operations in Mayiladuthurai.

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Abstract
Digital innovation has become an important driver of entrepreneurship, productivity and The Public Distribution System (PDS) functions as a cornerstone of India's social safety net, safeguarding food security and promoting inclusive socio-economic sustainability. This study evaluates the policy impact and operational effectiveness of Fair Price Shops (FPS) through the lens of family cardholders in Mayiladuthurai District, Tamil Nadu. Adopting an empirical survey design, primary data was gathered from cardholders across rural and semi-urban localities to evaluate key performance dimensions: regularity of supply, pricing transparency, biometric/POS point-of-sale efficiency, commodity quality, and grievance redressal mechanisms. Statistical tools, including descriptive and inferential analyses, were applied to assess cardholder satisfaction and pinpoint operational bottlenecks. The findings reveal critical insights into grassroots welfare delivery, indicating that while digital interventions have minimized leakages, challenges in distribution timeliness and stock adequacy persist. The study proposes actionable policy refinements to enhance grassroots supply chain resilience, directly contributing to UN Sustainable Development Goal 2 (Zero Hunger) and sustainable public policy governance.

Keywords: Public Distribution System, Fair Price Shops, Policy Evaluation, Food Security, Consumer Satisfaction, Sustainable Development.

1. INTRODUCTION
Food security and equitable resource distribution are fundamental pillars of inclusive socio-economic development. In developing economies, social safety nets play an indispensable role in shielding vulnerable populations from market volatility, inflationary pressures, and nutritional deprivation. In India, the Public Distribution System (PDS) constitutes one of the largest welfare networks in the world, serving as a critical instrument of state intervention to ensure physical and economic access to essential commodities. Anchored to national policy objectives and global mandates—most notably **United Nations Sustainable Development Goal 2 (Zero Hunger) and Goal 10 (Reduced Inequalities)—**the PDS acts as a primary buffer against poverty and food insecurity at the grassroots level.

1.1 The Context of Tamil Nadu's PDS Model
While the national framework transitioned largely toward targeted distribution under the National Food Security Act (NFSA), Tamil Nadu has historically distinguished itself through a **Universal Public Distribution System.** Under this egalitarian framework, subsidized and free essential commodities—including rice, wheat, sugar, pulses, and edible oil—are made accessible to all eligible households without exclusionary barriers. The operational execution of this massive welfare mandate relies on the network of **Fair Price Shops (FPS)**, predominantly managed by cooperative societies and the Tamil Nadu Civil Supplies Corporation (TNCSC).

In recent years, the state government has spearheaded extensive administrative and technological reforms to enhance operational transparency and curtail leakages. The introduction of the **Smart Family Card system**, Aadhaar-enabled biometric authentication at Point-of-Sale (e-PoS) devices, end-to-end computerization of the supply chain, and mobile-based SMS alerts have modernized the retail interface. These interventions aim to transform the traditional ration shop from a mere distribution outlet

into an accountable, technology-enabled civic service centre.

1.2 The Operational Reality: Mayiladuthurai District

Despite robust structural policy designs, the ultimate efficacy of any public welfare program depends on **last-mile delivery and ground-level execution.** The actual performance of Fair Price Shops often hinges on micro-level operational factors, such as:

- Timely procurement and replenishment of stocks,
- The sensory and nutritional quality of distributed grains,
- Technical reliability of biometric devices and network connectivity,
- Adherence to standard operating hours and fair weighing practices, and
- The responsiveness of local grievance redressal mechanisms.

Mayiladuthurai District, being an agrarian heartland with a blend of rural farming communities, coastal settlements, and growing semi-urban centers, presents a dynamic operational landscape for evaluating PDS performance. Beneficiaries across different economic strata depend on local FPS outlets to meet their essential caloric and household needs. Evaluating their lived experiences provides a reliable barometer for assessing whether high-level policy intentions translate into operational efficiency at the shop floor.

1.3 Objectives of the Study

1. The demographic profiles and dependency patterns of family cardholders relying on Fair Price Shops.
2. Cardholders' perceptions regarding service quality dimensions, including commodity quality, measure accuracy, and distribution regularity.
3. The operational efficacy of technological integrations (e-PoS devices and smart cards) in day-to-day transactions.
4. Strategic policy and administrative interventions required to enhance grassroots delivery and ensure sustainable social welfare.

2. RESEARCH METHODOLOGY

The present study adopts an empirical, descriptive, and analytical research design to evaluate the operational effectiveness of the Public Distribution System (PDS) and beneficiary perceptions across Fair Price Shops (FPS).

Research Design: An empirical survey design combining qualitative beneficiary feedback and quantitative statistical analysis was employed. The descriptive approach facilitates the profiling of cardholders, while the analytical framework assesses service quality dimensions, technological interventions, and operational bottlenecks.

Study Area: The investigation was conducted in Mayiladuthurai District, Tamil Nadu. As an agrarian district with a substantial proportion of rural agricultural laborers, artisanal fishing communities along the coastline, and semi-urban retail centers, Mayiladuthurai offers a representative socio-economic cross-section to evaluate grassroots public distribution performance. The study encompasses major taluks within the district: Mayiladuthurai, Sirkazhi, Tharangambadi, and Kuthalam.

Target Population & Sampling Framework

Target Population: All active Family Cardholders (Priority Household - PHH, Antyodaya Anna Yojana - AAY, and Non-Priority Household - NPHH) drawing essential commodities from Fair Price Shops managed by Primary Agricultural Cooperative Credit Societies (PACCS) and the Tamil Nadu Civil Supplies Corporation (TNCSC).

Sample Size Determination: Using Cochran's sample size formula for large/unknown populations with a 95% confidence interval.

Formula: n = (Z^2 * p * q) / e^2

Where:

- n = Required sample size
- Z = 1.96 (Confidence level at 95%)
- p = 0.50 (Assumed variability rate)
- q = 1 - p = 0.50
- e = 0.0438 (Permissible margin of error)

Calculation: n = [(1.96)^2 * (0.50) * (0.50)] / (0.0438)^2 n = [3.8416 * 0.25] / 0.00191844 n = 0.9604 / 0.00191844 n = 500.61 (approx. 500)

Therefore, the sample size chosen for the study is 500 Family Card Holders.

Sampling Technique: A multi-stage stratified random sampling technique was applied. First, the district was stratified across the four administrative taluks. Second, rural and semi-urban fair price shops were proportionally selected. Finally, individual cardholders were drawn using systematic random sampling at the FPS outlets during distribution cycles.

Sources of Data

- **Primary Data:** Collected directly from cardholders using a comprehensive, pre-tested structured interview schedule. The questionnaire covered demographic variables, cardholder entitlement categories, frequency of FPS visits, service quality parameters, digital/e-PoS transaction ease, and grievance handling.
- **Secondary Data:** Sourced from official statistical reports of the Department of Food and Consumer Protection (Government of Tamil Nadu), District Civil Supplies Office records, annual reports of the TNCSC, economic surveys, and published peer-reviewed journals.

Measurement and Scaling Key operational performance dimensions—including commodity quality, measurement accuracy, staff responsiveness, billing transparency, and e-PoS system reliability—were quantified using a standard 5-point Likert Scale (ranging from *5 = Strongly Agree / Highly Satisfied* to *1 = Strongly Disagree / Highly Dissatisfied*).

Data Analysis Tools & Statistical Techniques The collected raw data was coded, cleaned, and analyzed using standard statistical software (SPSS). The following analytical tools were utilized: Descriptive Statistics: Percentage analysis, mean scores, and standard deviations to summarize demographic profiles and dependency rates. Chi-Square (\chi^2) Test of Independence: To evaluate associations between cardholders' socio-economic status (income, card category) and their satisfaction levels. One-Way Analysis of Variance (ANOVA) / t-test.

3. Data Analysis and interpretation

Table 3.1: Demographic Profile of the Family Card Holders (N = 500)

Demographic Variable	Category	Frequency (No. of Respondents)	Percentage (%)
Gender	Male	184	36.8
	Female	316	63.2
Age Group	Below 30 Years	68	13.6
	31 – 45 Years	214	42.8
	46 – 60 Years	146	29.2
	Above 60 Years	72	14.4
Educational Status	Primary / Middle School	138	27.6
	High School / Higher Secondary	192	38.4
	Graduate / Diploma	114	22.8
	Illiterate	56	11.2
Type of Ration Card	PHH (Priority Household)	262	52.4
	AAY (Antyodaya Anna Yojana)	74	14.8
	NPHH (Non-Priority Household)	164	32.8
Monthly Family Income	Below Rs. 10,000	178	35.6
	Rs. 10,001 – Rs. 20,000	208	41.6
	Rs. 20,001 – Rs. 30,000	82	16.4
	Above Rs. 30,000	32	6.4
Locality	Rural	335	67.0
	Semi-Urban / Urban	165	33.0
Total		**500**	**100.0**

Source: primary data

The demographic profile in Table 3.1 outlines the socio-economic characteristics of the 500 family cardholders surveyed across Mayiladuthurai District: **Gender Distribution:** A substantial majority of the respondents are female (**63.2%**, n = 316), while males constitute **36.8%** (n = 184). **Age Composition:** The dominant age cohort is **31 to 45 years** (**42.8%**), followed by those aged **46 to 60 years** (**29.2%**). **Educational Background:** Cardholders with high school/higher secondary education represent the largest share (**38.4%**), followed by primary/middle school education (**27.6%**). Graduates and diploma holders account for **22.8%**, while **11.2%** are illiterate.

Entitlement Category: More than half the respondents (**52.4%**) hold **PHH cards**, followed by **NPHH cardholders** (**32.8%**) and **AAY beneficiaries** (**14.8%**). **Economic Status & Area:** The monthly household income analysis shows that **77.2%** of cardholders earn **Rs. 20,000 or below** per month (with **41.6%** falling in the Rs. 10,001–20,000 bracket and **35.6%** earning below Rs. 10,000). Geographically, two-thirds of the respondents (**67.0%**) reside in rural areas of the district, reflecting the agrarian profile of Mayiladuthurai and underlining the critical dependency of low-income rural households on Fair Price Shops for daily sustenance.

Table 3.2: Cardholders' Perception and Satisfaction towards Fair Price Shop Operations (N = 500)

Operational Dimensions	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Total Score	Mean Score	Std. Dev.	Rank
Pricing & Subsidized Rates	284 (56.8%)	162 (32.4%)	38 (7.6%)	12 (2.4%)	4 (0.8%)	2210	**4.42**	0.77	**I**
Weighing & Measurement Accuracy	182 (36.4%)	210 (42.0%)	62 (12.4%)	32 (6.4%)	14 (2.8%)	2014	**4.03**	0.98	**II**
e-PoS & Smart Card Billing Ease	165 (33.0%)	195 (39.0%)	78 (15.6%)	44 (8.8%)	18 (3.6%)	1945	**3.89**	1.05	**III**
Regularity & Timeliness of Supply	120 (24.0%)	186 (37.2%)	94 (18.8%)	68 (13.6%)	32 (6.4%)	1794	**3.59**	1.17	**IV**
Quality of Distributed Grains	88 (17.6%)	154 (30.8%)	126 (25.2%)	86 (17.2%)	46 (9.2%)	1634	**3.27**	1.19	**V**
FPS Infrastructure & Waiting Time	42 (8.4%)	96 (19.2%)	114 (22.8%)	152 (30.4%)	96 (19.2%)	1336	**2.67**	1.21	**VI**
Grievance Redressal Mechanism	36 (7.2%)	82 (16.4%)	138 (27.6%)	148 (29.6%)	96 (19.2%)	1318	**2.64**	1.16	**VII**

Source: primary data

(Scale: Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, Strongly Disagree = 1)

Top Strengths (Pricing and Measurement): Beneficiaries expressed the highest satisfaction with the **subsidized pricing structure** (Mean = 4.42, Rank I), reaffirming the welfare intent of the universal distribution model. This was followed by **weighing and measurement accuracy** (Mean = 4.03, Rank II), demonstrating that electronic weighing scales linked to the distribution system have largely addressed past concerns regarding quantity discrepancies.

Technological Adoption: The **e-PoS and Smart Card interface** secured a positive rating (Mean = 3.89, Rank III). Most cardholders find the automated billing and SMS alerts convenient, though periodic biometric mismatches and server connectivity drops account for the remaining neutral/negative responses.

Operational Bottlenecks: The lowest satisfaction levels were recorded for **shop infrastructure and waiting time** (Mean = 2.67, Rank VI) and **grievance redressal responsiveness** (Mean = 2.64, Rank VII). Prolonged queues during the initial 10 days of every distribution month, insufficient shed/seating facilities at rural outlets, and lack of awareness regarding toll-free dispute resolution lines constitute the critical areas requiring administrative policy reform.

Table 3.3: Chi-Square Test for Association Between Family Card Category and Overall Satisfaction with FPS Operations

Card Category	Low Satisfaction	Moderate Satisfaction	High Satisfaction	Total	Chi-Square Value (\chi^2)	df	p-Value	Significance
AAY (Antyodaya Anna Yojana)	8 (10.8%)	22 (29.7%)	44 (59.5%)	74 (100%)	**21.84**	4	**0.0002**	**Significant at 1% Level**
PHH (Priority Household)	38 (14.5%)	86 (32.8%)	138 (52.7%)	262 (100%)				
NPHH (Non-Priority Household)	42 (25.6%)	68 (41.5%)	54 (32.9%)	164 (100%)				
Total	**88 (17.6%)**	**176 (35.2%)**	**236 (47.2%)**	**500 (100%)**				

Source: primary data

Hypothesis:

- **Null Hypothesis (H_0):** There is no significant association between the type of family card held by beneficiaries and their overall level of satisfaction with Fair Price Shop operations.
- **Alternative Hypothesis (H_1):** There is a significant association between the type of family card held by beneficiaries and their overall level of satisfaction with Fair Price Shop operations.

Interpretation:

Table 3.3 tests the statistical dependence between the entitlement category of family cardholders and their overall satisfaction level using the Chi-Square test of independence:

Satisfaction Trends Across Groups: High satisfaction is most prevalent among **AAY cardholders (59.5%)** and **PHH cardholders (52.7%)**. Because these segments receive the highest grain allocations at zero cost, the economic utility and perceived value of the PDS remain highest for them. Conversely, **NPHH cardholders** report

the lowest proportion of high satisfaction (**32.9%**) and a higher share of dissatisfaction (**25.6%**), primarily driven by stricter quota limits on non-rice commodities (such as sugar and pulses) and long queue times for discretionary purchases.

Statistical Significance: The calculated Pearson Chi-Square value is **\chi^2 = 21.84** with **4 degrees of freedom**, resulting in an asymptotic p-value of **0.0002**. Since the p-value is less than the standard significance threshold (\alpha = 0.01), the null hypothesis (H_0) is rejected at the 1% significance level.

There is a statistically significant association between the card entitlement category and beneficiary satisfaction. The public distribution mechanism achieves its strongest policy impact among the poorest socio-economic cohorts (AAY and PHH), while operational delays and product restrictions dampen satisfaction among non-priority beneficiaries.

5. FINDINGS AND SUGGESTIONS

Major Findings of the Study

- **Demographic Dependency:** Female cardholders represent nearly two-thirds of the active beneficiaries (**63.2%**), and over **77%** of respondent households earn below Rs. 20,000 monthly, highlighting that rural homemakers and low-income families rely primarily on Fair Price Shops (FPS) for daily food security.
- **Core Satisfaction Drivers:** Beneficiaries reported the highest satisfaction with subsidized pricing (**Mean = 4.42, Rank I**) and digital weighing accuracy (**Mean = 4.03, Rank II**), proving that subsidized provisioning and electronic scales have largely resolved historical overcharging and quantity shortages.
- **Technological Acceptance:** The smart card and e-PoS device ecosystem achieved favorable perception (**Mean = 3.89, Rank III**). Automated billing and transaction SMS alerts have noticeably increased transparency and reduced illicit diversion.
- **Quality & Supply Variations:** Staple grain quality (**Mean = 3.27, Rank V**) and supply consistency (**Mean = 3.59, Rank IV**) received moderate ratings, with periodic complaints concerning raw rice discoloration and delayed commodity replenishment during month-end cycles.
- **Entitlement Association:** Chi-Square analysis (\chi^2 = 21.84, p = 0.0002) confirmed a statistically significant relationship between card categories and satisfaction: **AAY (59.5%)** and **PHH (52.7%)** households reported significantly higher satisfaction than **NPHH cardholders (32.9%)**.

Actionable Policy Suggestions

- **Staggered Distribution & Token Systems:** Implement an automated token or designated date-slot mechanism (e.g., categorizing visits by street, ward, or card end-digit) to eliminate heavy overcrowding and long queues during the initial week of every distribution month.
- **Outlet Infrastructure Upgrades:** Basic physical amenities—such as weather-proof waiting sheds, drinking water dispensers, and seating benches for senior citizens and pregnant women—should be mandated across rural Fair Price Shops in the district.
- **Godown Audits & Quality Control:** Enhance pre-dispatch inspection protocols at Civil Supplies warehouses to ensure moisture-controlled storage, preventing pest damage and grain discoloration before supplies reach retail counters.
- **Offline Biometric Fallback Protocol:** Introduce reliable offline authentication or iris-scanning fallbacks on e-PoS terminals to prevent transaction denials caused by fingerprint wear among elderly laborers or temporary rural network downtime.
- **Active Grievance Redressal Mechanisms:** Prominently display local Civil Supplies Officer contact numbers and toll-free helpline details on shop fronts, accompanied by quarterly grievance redressal camps at the taluk level to build beneficiary trust.

6. CONCLUSION

The Public Distribution System in Tamil Nadu stands as an effective, socially responsive welfare mechanism that successfully buffers vulnerable households against food insecurity and economic volatility. This empirical study conducted across Mayiladuthurai District confirms that grassroots operations through Fair Price Shops have made significant strides in pricing equity, measurement precision, and leakage containment through e-PoS and smart-card integration. The high degree of satisfaction observed among Priority Household (PHH) and Antyodaya Anna Yojana (AAY) beneficiaries underscores the program's vital role in advancing United Nations Sustainable Development Goal 2 (Zero Hunger) and Goal 10 (Reduced Inequalities).

However, the findings also illuminate clear operational friction points that temper overall beneficiary satisfaction. Inadequate physical amenities at shop fronts, extended waiting times during peak cycle openings, grain quality variations across procurement batches, and passive grievance mechanisms remain key hurdles. Bridging the gap between macro-level policy objectives and micro-level retail delivery demands focused administrative attention: implementing staggered distribution schedules, upgrading rural shop infrastructure, establishing multi-modal biometric fallbacks, and maintaining strict warehouse quality controls. Transforming Fair Price Shops from mere ration distribution points into resilient, customer-centric civic supply centers will safeguard grassroots food security and ensure inclusive, long-term social sustainability.

REFERENCES

1. Bhagyasree, R. (2017). Modernisation of Public Distribution System: An analysis of biometric authentication and e-governance initiatives. *Indian Journal of Public Administration*, 63(3), 412–424.
2. Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). John Wiley & Sons.
3. Deepa, S., & Saranya, M. (2021). Beneficiary perception and quality assessment of commodities in the Public Distribution System: An empirical study in Coimbatore District. *International Journal of Management and Social Sciences*, 9(2), 78–86.
4. Government of Tamil Nadu. (2024). *Policy note on food and consumer protection department*. Cooperation, Food and Consumer Protection Department, Chennai.
5. Mahendran, K. (2013). Universal Public Distribution System in Tamil Nadu: Performance, challenges, and consumer satisfaction. *Journal of Rural Development*, 32(4), 389–402.
6. Nagendran, P. (2018). Economic impact of targeted welfare schemes: A study on Public Distribution System and household expenditure in rural Madurai. *Shanlax International Journal of Economics*, 6(4), 45–52.
7. Srinivasalu, V., Radhakrishnan, P., & Balasubramanian, S. (2024). Digital inclusion and operational challenges in grassroots welfare delivery: Evidence from smart card-enabled PDS in Tamil Nadu. *Journal of Social and Economic Development*, 26(1), 115–131.
8. Velmurugan, R., & Lavanya, K. (2017). Service quality and customer satisfaction in Fair sPrice Shops: An empirical evaluation. *Asian Journal of Managerial Science*, 6(1), 22–27.