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Article

A Novel Beneficiary-Centric Analysis of Public Distribution System Constraints: Evidence from Multi-Regional Assessment in an Emerging Economy

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Abstract: This study examines the operational constraints affecting India's Public Distribution System (PDS), with particular focus on beneficiary experiences across northern, central, southern, and eastern states. Employing a multi-stage random sampling methodology, the research analysed data from 1,120 beneficiaries (560 rural, 560 urban) using Garrett's ranking technique to quantify the relative significance of identified constraints. Seven critical implementation challenges were evaluated: quality of foodgrains, geographical accessibility, temporal consistency of distribution, procedural efficiency, waiting times, staff behaviour, and inventory management. The findings reveal that the provision of inferior quality foodgrains consistently emerges as the primary constraint across regions, achieving the highest Garrett scores (ranging from 60.85 to 73.16). The non-availability of scheme-specified items ranks second in severity, particularly pronounced in central states (GS: 68.48 in rural areas). Operational inefficiencies, manifested through multiple visits to Fair Price Shops, constitute the third most significant barrier, with notable urban-rural variations in impact. The research indicates that while physical access and staff behaviour pose minimal impediments, systemic issues in quality control and supply chain management require immediate policy intervention to enhance PDS effectiveness in ensuring food security for vulnerable populations.

Keywords: public distribution system; PDS; Food security governance; beneficiary constraints; garrett ranking; supply chain

Introduction

The Public Distribution System (PDS) constitutes a fundamental pillar of social welfare architecture across diverse national contexts, operating as a critical mechanism for ensuring nutritional security and economic stabilisation among demographically vulnerable segments. Originally implemented during the Second World War as a universal provision framework, PDS has undergone substantial methodological and operational transformations in its institutional evolution. The system's trajectory from urban-centric delivery mechanisms to comprehensive rural integration represents a paradigmatic shift in developing nations' conceptualisation and implementation of food security governance. This evolution reflects broader transformations in welfare state architecture and distributive justice frameworks, particularly within emerging economies grappling with multidimensional poverty challenges. The contemporary iteration of PDS exemplifies the complex interplay between state capacity, market mechanisms, and social protection imperatives, whilst simultaneously highlighting the dynamic nature of policy adaptation to evolving socio-economic conditions. The system's development trajectory illuminates fundamental questions regarding the role of state intervention in basic commodity distribution, the efficacy of targeted versus universal welfare approaches, and the optimal institutional arrangements for ensuring equitable access to essential nutritional resources. This historical evolution and contemporary configuration of PDS provides critical insights into the operational challenges and strategic opportunities inherent in large-scale welfare delivery systems, particularly within contexts characterised by significant socio-economic heterogeneity and resource constraints.

India's PDS stands as the most extensive food distribution network globally, with its contemporary structure emerging from a series of strategic expansions and reforms. The system's significant expansion in the 1960s was precipitated by acute food shortages, while subsequent modifications through the Revamped PDS (1992) and Targeted PDS (1997) refined its operational efficiency and beneficiary targeting. The system's scale is remarkable, serving over eight hundred million beneficiaries through an extensive network of 5.5 million Fair Price Shops (FPSs), with particular emphasis on below-poverty-line households and geographically remote communities.

The administrative architecture of India's PDS exemplifies a cooperative federalist approach, with policy design undertaken at the federal level while implementation rests with state governments. This dual-level governance structure facilitates the distribution of essential commodities at subsidised rates through FPSs, creating a comprehensive food security network. However, the system encounters substantial operational challenges, including systemic inefficiencies, endemic corruption, and targeting errors that compromise its effectiveness.

Scholarly discourse suggests that while PDS possesses significant potential for addressing food insecurity, its realisation requires substantial structural reinforcement. Two critical reform pathways have been identified: the establishment of robust legal entitlements and the implementation of electronic governance systems. These mechanisms aim to enhance transparency, reduce leakage, and improve targeting accuracy.

The system's effectiveness faces multiple impediments, including persistent urban bias in distribution networks, suboptimal quality of food grains, systematic diversion of commodities to open markets, and political interference in operational decisions. These challenges collectively undermine the system's capacity to serve its intended beneficiaries effectively, particularly in reaching the most vulnerable segments of society.

This research initiative focuses specifically on the constraints affecting PDS operations in Telangana, employing a beneficiary-centric analytical framework. The investigation aims to comprehensively examine operational inefficiencies, access barriers, and quality concerns from the perspective of system users. This methodological approach facilitates the identification of specific areas requiring intervention and reform, ultimately contributing to the enhancement of food security outcomes among vulnerable populations.

The study's significance lies in its potential to inform evidence-based policy reforms that could strengthen PDS effectiveness. By examining beneficiary experiences and perspectives, the research aims to generate actionable insights for system improvement, particularly in addressing challenges related to targeting accuracy, distribution efficiency, and service quality. This analysis is crucial for developing targeted interventions that can enhance the system's capacity to fulfill its fundamental objective of ensuring food security for vulnerable populations.

Furthermore, the research contributes to the broader discourse on social safety net design and implementation in developing economies. Through detailed examination of PDS operations in Telangana, the study offers valuable insights for policymakers and practitioners engaged in food security initiatives across similar socio-economic contexts. The findings have particular relevance for regions grappling with comparable challenges PDSs.

Sampling Procedure and Methodological Framework

The respondent beneficiaries were selected through a systematically designed multi-stage random sampling approach, incorporating both purposive and random sampling elements to ensure representativeness across geographical and administrative strata. At the first stage, one district from each state exhibiting the highest concentration of beneficiaries was selected purposively, establishing the primary sampling units. In the subsequent stage, two tehsils were identified from each of the 28 selected districts through a purposive sampling framework, specifically selecting one tehsil with the highest number of beneficiaries and another with the lowest number of beneficiaries, thereby ensuring capture of varied implementation contexts.

The third stage of sampling involved the selection of two villages and two urban areas from each of the 56 tehsils, incorporating both rural and urban demographic distributions. At the final stage, five beneficiaries were systematically selected from each selected village and urban area, yielding a balanced sample distribution. This methodological approach resulted in a comprehensive sample of 560 rural and 560 urban beneficiaries, comprising a total sample size of 1120 beneficiaries, thereby ensuring adequate statistical power for subsequent analyses.

Identification and Analysis of Implementation Challenges

Through preliminary field investigation during the pre-testing survey phase, complemented by extensive literature review, seven critical problems were systematically identified in the delivery and receipt of PDS entitlements by beneficiaries. These challenges encompassed: (1) the provision of bold seeded rice or inferior quality grains, compromising nutritional objectives; (2) geographical accessibility challenges regarding distance to the point of delivery; (3) temporal inconsistencies manifested through irregularity in monthly issue of entitlements; (4) procedural inefficiencies necessitating multiple visits to the Fair Price Shops (FPSs); (5) excessive waiting times characterised by long hours in queue; (6) interpersonal challenges stemming from improper behaviour of employees; and (7) inventory management issues resulting in non-availability of items specified under the scheme.

To establish a hierarchical understanding of these implementation challenges, constraints faced by the beneficiaries were systematically ranked according to the Garrett's scoring methodology, enabling quantitative assessment of the relative significance of each identified challenge. This analytical approach facilitated the development of a prioritised framework for addressing systemic inefficiencies in PDS implementation.

The methodology incorporated rigorous validation procedures to ensure data quality and reliability, while the sampling framework was designed to capture diverse socio-economic contexts and implementation variations across the selected geographical units. This comprehensive approach enables robust statistical inference and generalizable conclusions regarding PDS implementation challenges.

Ranking Technique

Garrett ranking technique was employed to identify the various constraints, as perceived by the PDS beneficiaries and ranked as per the order of severity of problem. The order of merit given by the respondents, N_j , was changed to ranks using the formula unit $100X(R_{ij} - 0.50)$; where, R_{ij} stands for rank given for the i^{th} constraint ($i = 1, 2, \dots, n$) by the j^{th} individual ($j = 1, 2, \dots, n$) and N_j denotes number of constraints ranked by j^{th} individual.

The predicted percentage positions were translated into scores using Garrett's table as a guide, which provided a standardized framework for converting relative rankings into numerical values that could be meaningfully compared and analyzed. The scores of different respondents were then summed for each factor to determine the mean value, allowing for the aggregation of individual assessments into a single representative measure. The order of these means was declining, creating a natural hierarchy of importance among the factors being evaluated.

Given the greatest rank, the problem with the highest mean value was deemed the most significant, and vice versa, establishing a clear prioritization system. This methodology enabled researchers to quantitatively assess the relative importance of different factors based on respondent feedback. The use of Garrett's table ensured consistency in the scoring process, while the calculation of mean values provided a robust measure of central tendency that accounted for variations in individual responses. This systematic approach to data analysis helped identify key issues requiring attention, with higher mean scores indicating greater perceived significance among survey participants.

Results and Discussion

Constraints Faced by PDS Beneficiaries in the Northern States

The constraints are evaluated based on their respective scores and ranks, highlighting their relative impact. These constraints include factors such as distance to FPSs, issues of quality with respect to fine variety grains and faulty food grains, irregular supply, multiple visits required to FPS, extended waiting times in queues, improper behaviour of employees, and non-availability of items specified under the scheme. Notably, the constraint of lack of quality food grains stands out as the major constraint, garnering the highest score and ranking in both urban (GS:60.85) and rural (GS:63.55) areas.

The second most important constraint faced by urban beneficiaries was multiple visit to FPS (GS:59.70) where the stock would not reach the FPS on regular dates such as first week of month as sometimes it may extend to second or third week followed by third ranked constraint was non-availability of items specified under scheme (GS:56.85) where only rice was distributed and often sometimes wheat but beneficiaries were awaiting to receiving other non-grain commodities such as sugar, pulses, oil etc., at subsidised prices followed by public have to spend long hours in queue as fourth (GS:55.00) and irregular supply of stock to FPS as fifth, where in case of rural and overall sample the constraint non-availability of items specified under scheme was ranked as second and multiple visits to FPS as third followed by irregular stock supply days to FPS as fourth and public to spend long hours in queues as fifth. The constraints distance to FPS and improper behaviour of employees were identified constraints in both rural and urban areas but these were ranked as sixth and seventh in both rural and urban showing least prominent constraints among the seven identified constraints.

Constraints Faced by PDS Beneficiaries in Central States

The empirical analysis revealed that among the seven identified impediments to entitlement access, the non-availability of scheme-specified items emerged as the predominant concern across both geographical contexts, as evidenced by the highest Garrett scores: 64.60 in urban areas, 68.48 in rural regions, and 66.54 for the pooled sample, thereby securing the foremost rank. The quality degradation of distributed food grains constituted the second most significant constraint, achieving a Garrett score of 63.31. This hierarchical pattern of challenges continued with the necessity for beneficiaries to undertake multiple visits to Fair Price Shops (FPS) ranking third in order of severity, followed by the irregular replenishment of FPS stock securing the fourth position. A particularly noteworthy finding emerged regarding the interpersonal dimension of service delivery: the improper behaviour of employees, despite its potential impact on beneficiary experience, registered the lowest Garrett score (24.93) among all identified constraints, suggesting that procedural and systemic impediments rather than human resource factors pose the most substantial barriers to PDS accessibility. These findings underscore the critical need for addressing supply chain inefficiencies and quality control mechanisms within the PDS framework, whilst indicating that behavioural aspects of service delivery, though requiring attention, may warrant relatively lower priority in immediate reform initiatives.

3.4. Constraints Faced by PDS Beneficiaries in Southern States

The analytical findings concerning PDS beneficiary constraints, as presented in Table 3, reveal a hierarchical pattern of impediments to service access. The distribution of substandard foodgrains emerged as the paramount concern, evidenced by the highest Garrett score of 73.16, followed by the unavailability of scheme-specified commodities (GS: 68.70) across both rural and urban demographics. A notable divergence emerged in tertiary constraints between geographical contexts: rural beneficiaries identified multiple Fair Price Shop (FPS) visits as the third most significant burden (GS: 50.93), whereas urban respondents prioritised queue-waiting duration (GS: 54.78), a pattern that maintained consistency with the aggregate sample. The analysis further established a descending

hierarchy of operational constraints: irregular FPS stock replenishment (GS: 46.73), FPS accessibility concerns (GS: 33.26), and suboptimal employee conduct (GS: 23.89) occupied the fifth, sixth, and seventh positions respectively. This empirical evidence suggests a clear stratification of systemic deficiencies, with quality control and supply chain management emerging as critical areas necessitating targeted intervention, whilst infrastructural and behavioural factors, though significant, demonstrate comparatively lower impact on beneficiary experience. The geographical variation in tertiary constraints underscores the necessity for context-specific policy adaptations within the broader framework of PDS reform initiatives.

Constraints Faced by PDS Beneficiaries in Eastern States

The most prominent constraint, identified by the highest score and top rank, is the lack of quality rice or supply of inferior quality food grains, which scores 65.50 for urban, 66.95 for rural, and 66.23 for the pooled category, securing the first rank across all. Consumers in rural areas to some extent accept the PDS foodgrains despite of their inferior quality every month and however used for self-consumption due to their social status whereas in urban areas, for few months the quality of foodgrains are inferior quality claiming non-suitable for direct consumption and using them as processed (flour) form or involving in the resale of foodgrains according to the quality they receive. The next major constraint reported was non-availability of items specified under the scheme which score 62.82 for urban, 66.96 for rural, and 64.89 for pooled, securing the second rank for urban and pooled sample whereas in rural scenario, it is major concern that consumers were willing to avail the other goods such as wheat, sugar, oil etc., for subsidised prices but there is no supply of these items. Multiple visits to FPS present a notable challenge, with urban, rural, and pooled scores of 56.61, 52.98, and 54.80, respectively, positioning it at third place that the foodgrains stock arriving to the FPS at irregular days in a month which causes the beneficiaries to visit multiple times and also when the queue is large, consumers weren't availing their entitlements due to work hours and had to visit other day. The need for the public to spend long hours in queues is also a significant concern, with scores of 52.87 for urban, 46.83 for rural, and 49.85 for pooled, ranking it at 4th place. Regarding irregular supply, both urban and pooled areas are relatively worse off with scores of 47.83 and 49.46, respectively, ranking at fifth place, while rural areas score slightly higher at 51.08, placing fourth. When it comes to the distance to FPSs, all regions share similar challenges, with urban, rural, and pooled scores of 40.15, 40.46, and 40.30, respectively, ranking at sixth place. Finally improper behaviour of employees is identified as a constraint, but it ranks relatively lower in significance, with scores of 24.23 for urban, 24.73 for rural, and 24.48 for pooled, placing it at seventh place. The results reveal that due to obstacles, the goods supplied at PDS shops are of inferior quality and goods are not supplied in time to beneficiaries. various obstacles exist at PDS

Conclusion

Based on the comprehensive analysis presented, several critical constraints emerge in India's Public Distribution System across geographical regions. The empirical evidence consistently identifies the provision of inferior quality foodgrains as the paramount concern, ranking first across northern, southern, and eastern states with notably high Garrett scores. This systemic quality deficit fundamentally undermines the PDS's primary objective of ensuring nutritional security.

The second most prevalent constraint manifests in the non-availability of scheme-specified items, particularly pronounced in central states where it achieved the highest Garrett score of 68.48 in rural regions. This supply-side deficiency indicates significant gaps between policy design and implementation, particularly regarding the distribution of non-grain commodities such as sugar, pulses, and oil at subsidised rates. Operational inefficiencies emerge as the third tier of constraints, characterised by the necessity for multiple visits to Fair Price Shops (FPS) and extended waiting times. These procedural barriers demonstrate notable urban-rural variation, with urban beneficiaries reporting higher inconvenience from queue duration (GS: 54.78 in southern states), while rural beneficiaries emphasise the burden of multiple FPS visits.

Infrastructure-related constraints, specifically FPS accessibility and distance, consistently rank lower in severity across all regions, suggesting that physical access has become a relatively minor impediment to system utilisation. Similarly, the behavioural aspect of service delivery, manifested in employee conduct, consistently receives the lowest Garrett scores across all regions, indicating that systemic rather than interpersonal factors constitute the primary barriers to effective PDS implementation. These findings necessitate a hierarchical approach to reform, prioritising quality control mechanisms and supply chain management while simultaneously addressing operational inefficiencies through technological integration and process streamlining. The geographical variations in constraint patterns underscore the importance of context-specific policy adaptations within the broader framework of PDS reform initiatives.

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