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Beneficiaries' Satisfaction Towards the Public Distribution System (PDS) Among PHH and AAY Cardholders in the Selected Districts of Assam: A Survey-Based Study

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Abstract
India's Public Distribution System (PDS) plays an important role in the nation's food security strategy, particularly for economically disadvantaged groups in rural regions. Although policy enhancements and digital interventions have been introduced, the system continues to struggle with issues reflecting beneficiary satisfaction. This study aims to identify the key dimensions of beneficiary satisfaction and evaluate the satisfaction levels and influencing factors among PDS beneficiaries in two purposively selected districts of Assam, Barpeta, and Kamrup (Rural), focusing on individuals holding Antyodaya Anna Yojana (AAY) and Priority Household (PHH) ration cards. Data were gathered from 400 households using a structured questionnaire. Using Exploratory Factor Analysis (EFA), five critical dimensions of satisfaction were identified: (1) Administrative Processes and Pricing Transparency; (2) entitlement fulfilment and availability; (3) Staff Conduct and Service Delivery; (4) Household Food Security and Grain Quality; and (5) Integrity and Documentation-Related Issues. Multiple regression results confirmed that all five factors significantly influenced overall satisfaction, with the strongest predictors being household food security and the perceived quality of grains. The study concludes with policy recommendations and highlights the need for future research focusing on longitudinal analysis and comparative studies across different Indian states to further explore regional disparities in PDS performance.

Introduction

Food security remains a foundational element of social justice and human development, particularly in nations like India, where a significant share of the population experiences economic vulnerability. To address this concern, the Government of India has implemented the Public Distribution System (PDS), a nationwide initiative aimed at supplying essential food items such as rice, wheat, and kerosene to economically disadvantaged households at subsidised rates (Ministry of Consumer Affairs 2022). With the implementation of the National Food Security Act (NFSA), 2013, the PDS transitioned into a more targeted framework, categorizing beneficiaries into Antyodaya Anna Yojana (AAY) and Priority Household (PHH) groups to promote equitable access to food (Khera, 2011). Although substantial improvements have been introduced, including adadhaar-based biometric authentication, digitisation of ratio cards, and end-to-end computerisation, several operational inefficiencies persist, such as leakages, delays, corruption, and low beneficiary satisfaction (Drèze & Khera, 2015; Overbeck, 2016).

Research has also pointed to stark disparities across states in terms of PDS effectiveness; while some regions have achieved high coverage and accountability, others continue to face challenges like exclusion errors and weak monitoring mechanisms (MaCurdy & Nagavarapu, 2007; Sora, 2018).

In Assam, a significant portion of the rural population relies on the PDS for their nutritional needs, the efficient delivery of the scheme becomes increasingly vital (NITI Aayog, 2023). In many northeastern states, Fair Price Shops (FPS) operating under the Targeted PDS are often administered by grassroots entities such as women's self-help groups, cooperatives, urban local bodies, and village panchayats. Although these decentralised models promote local engagement, they are frequently constrained by insufficient infrastructure and inadequate storage facilities. These logistical weaknesses not only contribute to the deterioration of food grain quality but also raise the risk of diversion into unregulated markets. As emphasised by Tamang and Rizal (2023), there is an urgent need to expand and modernise storage systems to minimise waste and enhance the overall accountability of the PDS network. Although numerous studies have examined the implementation of the Public Distribution System (PDS) across various Indian states, there is a noticeable lack of empirical research focusing on the multidimensional aspects of beneficiary satisfaction in the northeastern region, especially in Assam. The region's unique operational, infrastructural, and administrative challenges have not been adequately explored, resulting in a gap in formulationting of effective, localised policy interventions. To bridge this gap, the present study seeks to answer mainly two research questions that is, what are the primary dimensions that define customer satisfaction with the Public Distribution System (PDS) among PHH and AAY beneficiaries in the districts of Barpeta and Kamrup (Rural) in Assam? In what ways do these dimensions affect beneficiaries' overall satisfaction with the PDS in terms of meeting their household food security needs?

Given these ongoing gaps and the region-specific challenges of the North East, this study aims to empirically assess the satisfaction levels of PDS beneficiaries, specifically AAY and PHH cardholders in Assam's Barpeta and Kamrup (Rural) districts. Using primary data collected, the study investigates key dimensions influencing beneficiary satisfaction and evaluates their impact on the PDS's perceived success in achieving household food security.

Literature Review

The Public Distribution System (PDS) in India has evolved as a critical policy tool to address food insecurity and poverty. Despite this, numerous studies continue to highlight persistent inefficiencies, inequities, and operational challenges, which directly influence beneficiary satisfaction, particularly among targeted groups like Priority Households (PHH) and Antyodaya Anna Yojana (AAY) cardholders.

MaCurdy and Nagavarapu (2007) critically examined the limitations of India's TPDS and AAY programs, focusing particularly on targeting inefficiencies. By drawing comparisons with the U.S. The Food Stamp Program (FSP) identified a key policy dilemma: frequent assessments of short-term economic status may allow for more accurate targeting but significantly increase administrative overhead, whereas long-term, easily observable indicators lower administrative costs but increase inclusion errors. Through micro-simulation techniques, the study concludes that India's dependence on outdated poverty identification metrics undermines both the equity and efficiency of its food subsidy programs. The authors recommended a shift toward evidence-based, internationally informed eligibility criteria to enhance both precision in targeting and overall system performance (MaCurdy & Nagavarapu, 2007).

Using econometric tools, Overbeck (2016) explored leakage within the PDS, defining it as the share of government-supplied grains that failed to reach the intended beneficiaries. The study highlighted that the Above Poverty Line (APL) quota is especially prone to misuse and corruption, contributing disproportionately to system-wide leakage. Drèze and Khera (2015), who, using data from the 68th round of the National Sample Survey, also reported leakage rates of 67% for the APL and 30% for the BPL (Below Poverty Line) quotas. Their analysis emphasised that such inefficiencies severely

impact program credibility and the satisfaction of the intended recipients.

Tamang and Rizal (2023) undertook a comparative analysis of PDS performance across northeastern states, with a particular focus on Sikkim. The authors emphasised the importance of increasing the number of Fair Price Shops (FPS), ensuring timely delivery, and enhancing the storage infrastructure. They argued that poor oversight and delayed distribution continue to negatively affect user satisfaction, especially in economically backward areas, such as Assam.

Kumari et al. (2023) analysed the grain distribution under the AAY and PHH schemes in Bihar. Their study, based on secondary data, indicated that PHH card usage is notably higher in rural areas, and wheat is more frequently distributed than rice under this scheme. The observed regional and poverty-based variations were potential sources of unequal satisfaction levels among beneficiaries, stemming from inconsistent implementation practices.

Chinnadurai (2024) focused on the effectiveness of AAY in enhancing food security among the rural poor in Maharashtra, Uttar Pradesh, and Jharkhand. The study reported that 77.3% of beneficiaries needed to buy supplementary food from open markets because of insufficient PDS allocation. Further, 49.3% faced year-round food shortages due to low income and large household size. The quality of the grains was often substandard, and local traders were reported to exploit price differentials for illicit gains, all of which contributed to low satisfaction and trust in the system.

In their field-based study in Hazaribagh, Jharkhand, Sheyam and Khurshid (2024) evaluated the challenges faced by FPS operators and the availability of food stocks. They found that while urban and semi-urban areas maintained a relatively steady supply, about 60% of respondents in rural regions reported frequent stockouts. Additionally, food grain quality ranged from average to poor, particularly in the rural blocks, indicating an urban-rural divide in distribution efficiency and beneficiary experience.

Priya et al. (2024) examined beneficiary satisfaction in North Coimbatore using a mixed-methods approach. The study revealed that accessibility, infrastructure gaps, supply chain inefficiencies, and a lack of transparency significantly impacted consumer perceptions. The researchers reported that 40% of respondents faced challenges with inadequate storage and distribution infrastructure, while 37% identified non-transparent allocation processes as a major issue. These findings underscore the multidimensional nature of satisfaction among users of PDS.

Collectively, these studies demonstrate that satisfaction with the PDS is not merely a function of food grain distribution, but is influenced by a constellation of factors—ranging from operational efficiency, transparency, and technological intervention to socio-economic characteristics such as education, income, and location. Despite ongoing reforms, systemic weaknesses and regional disparities continue to challenge the goal of delivering a uniformly satisfactory PDS experience, especially for marginalised groups such as PHH and AAY beneficiaries.

Objectives

1. To identify the key dimensions of customer satisfaction with the Public Distribution System (PDS) among PHH and AAY cardholders.
2. To evaluate the impact of these factors on beneficiaries' overall satisfaction with the PDS in addressing household food security requirements.

Hypotheses of the Study

Based on the conceptual framework and analytical model of the study, the following null hypotheses were formulated:

- **H_{01}:** Administrative Access and Pricing Fairness do not significantly influence beneficiaries' overall satisfaction with the Public Distribution System (PDS).
- **H_{02}**: Availability and Quantity Entitlement does not significantly influence overall beneficiary satisfaction with the PDS.
- **H_{03}**: Staff Behaviour and Service Quality do not significantly influence the overall satisfaction of PDS beneficiaries.
- **H_{04}:** Food Security and Grain Quality do not significantly affect overall beneficiary satisfaction with the PDS.

- **H_{05}:** Corruption and Documentation Challenges do not significantly influence the overall satisfaction of beneficiaries with the PDS.

Methodology

Study Area and Sampling Design

This study is based on primary data collected from two districts of Assam—Kamrup (Rural) and Barpeta—purposively selected due to their substantial population of ration card beneficiaries under the Antyodaya Anna Yojana (AAY) and Priority Household (PHH) schemes. These districts were chosen based on secondary data provided by the Directorate of Food, Civil Supplies, and Consumer Affairs Assam, which highlighted their significance in terms of the total number of ratio cardholders.

A multistage and stratified sampling technique was adopted. In the first stage, the two districts were selected. In the second stage, development blocks within each district were identified using the number of issued ration cards as the selection criterion. Specifically, blocks with the highest and lowest numbers of ration cardholders were chosen. From Kamrup district, which comprises 14 development blocks, four were selected—two with the largest and two with the smallest beneficiary populations. Similarly, from Barpeta district, three blocks were chosen from a total of nine. Notably, two Gaon Panchayats representing the highest and lowest beneficiary counts fell under the same administrative block, warranting the selection of three blocks to ensure representative coverage.

Following this stratification, a sample of 400 ration card-holding households was surveyed. The sample size was statistically determined using Cochran's formula $n = \frac{n_0}{1+\frac{n_0-1}{N}}; where, n_0 = \frac{Z^2 \times p \times (1-p)}{E^2}$ to ensure adequate representation and precision in capturing the population's satisfaction levels. Out of the 400ration card-holding households surveyed, 63 (15.8%) were Antyodaya Anna Yojana (AAY) cardholders, while 337 (84.3%) belonged to the Priority Household (PHH) category.

Data Collection Tool and Instrument Design

Primary data were collected through a structured questionnaire, developed to capture comprehensive information on beneficiary satisfaction with the PDS. The questionnaire incorporated both closed-ended questions and 5-point Likert-scale items ranging from "Strongly Dissatisfied (1)" to "Strongly Satisfied (5)". Prior to final data collection, a pilot study was conducted to assess the clarity and reliability of the instrument. The revisions were made based on the feedback received. The final questionnaire included the major sections: Socio-demographic profile of respondents, Household amenities, Accessibility and availability of food grains, Quality and quantity of distributed items, Pricing and affordability, Staff behaviour and service quality at Fair Price Shops (FPS), Transparency and administrative procedures (e.g., application and grievance redressal), Nutritional value of distributed food items, Overall satisfaction with the PDS system.

Variables and Measures

The dependent variable in the study is the overall satisfaction of the beneficiaries with the PDS in fulfilling their household's food security needs.

The independent variables include a set of service-related and perception-based factors, such as delay in obtaining or renewing ration cards, receipt of subsidised foodstuffs as per government rule, availability of essential items at FPS, Frequency of receiving less than the entitled quantity, costs incurred during ration card issuance, fairness and transparency of the pricing system, Behaviour of the PDS staff, Responsiveness of the PDS staff addressing concern of the beneficiaries, satisfaction with the overall food quality, satisfaction with the overall service provided by the PDS shop, nutritional value of the food grains, occurrence of corruption, favouritism, malpractice, transparency in the ration card issuance and distribution process, experience with the application process, and identification verification process with ration card.

Data Analysis Techniques

Quantitative data were analysed using IBM SPSS (Statistical Package for the Social Sciences). To explore the underlying structure of beneficiary satisfaction, Exploratory Factor Analysis (EFA) was conducted. Sampling adequacy was assessed using the Kaiser-Meyer-Olkin (KMO) measure, and Bartlett's Test of Sphericity was performed to confirm the suitability of data for factor analysis.

Factors were extracted using the Principal Component Analysis (PCA) method and rotated using the varimax orthogonal rotation technique. A scree plot was generated and visually inspected to determine the optimal number of factors that should be retained. Factors with eigenvalues greater than 1.0 were retained, and a clear "elbow" in the scree plot was used to confirm the number of components representing distinct satisfaction dimensions. Variables with factor loadings below 0.50 were excluded to maintain interpretive clarity. The internal consistency and reliability of the extracted factors were evaluated using Cronbach's alpha. Subsequently, multiple linear regression analysis was conducted to examine the influence of the identified factors on the overall satisfaction of beneficiaries.

Result and Discussion

Sampling Adequacy and Suitability for Factor Analysis

To assess whether the dataset was suitable for Exploratory Factor Analysis (EFA), Kaiser-Meyer-Olkin (KMO) (Table 1) measures of sampling adequacy and Bartlett's Test of Sphericity were conducted. The KMO statistic was found to be 0.803, which is considered meritorious according to Kaiser's scale (1974). This indicates that the sample size was adequate for reliable factor extraction. Additionally, Bartlett's Test of Sphericity yielded a Chi-square value of 3293.774 ($df = 120$, $p < 0.001$), indicating that the correlations among items were sufficiently large to proceed with factor analysis. These results collectively confirm that the data are well suited for factor analysis and that meaningful underlying structures can be extracted. The communalities (table 2) derived from the Principal Component Analysis (PCA) represent the proportion of variance in each observed variable explained by the extracted components. In this study, all 16 variables demonstrated acceptable communality values, each exceeding the threshold of 0.50, indicating that the factor solution accounted for a meaningful share of the variance across the items. The variables with the highest communalities were "Received subsidised foodstuffs as per government rules" and "Frequency of receiving less than the entitled quantity" (both at 0.892), closely followed by "Issues with ration card or identification process" (0.857), suggesting that these items are strongly associated with the underlying factor structure. Conversely, the variable "Nutritional value of food grains" had the lowest communality (0.534), yet remained within the acceptable range. Overall, these results support the adequacy of the selected variables for further factor analysis and confirm their relevance in capturing the core dimensions of beneficiary satisfaction with the Public Distribution System (PDS). Table 3 shows that to determine the appropriate number of components to be retained, the total variance explained by the extracted factors was analysed. By applying the Kaiser criterion (eigenvalues greater than 1), five components were identified using Principal Component Analysis (PCA). Collectively, these five components account for 69.84% of the total variance, reflecting a robust factor structure. Following rotation, the first component contributed 19.45%, with the subsequent components explaining 17.92%, 15.90%, 9.49%, and 7.09% of the variance, respectively. This distribution indicates that the retained components capture the underlying dimensions of beneficiary satisfaction with the Public Distribution System (PDS) effectively and comprehensively. To assess whether the dataset was suitable for Exploratory Factor Analysis (EFA), Kaiser-Meyer-Olkin (KMO) (Table 1) measures of sampling adequacy and Bartlett's Test of Sphericity were conducted. The KMO statistic was found to be 0.803, which is considered meritorious according to Kaiser's scale (1974). This indicates that the sample size was adequate for reliable factor extraction. Additionally, Bartlett's Test of Sphericity yielded a Chi-square value of 3293.774 ($df = 120$, $p < 0.001$), indicating that the correlations among items were sufficiently large to proceed with factor analysis. These results collectively confirm that the data are well suited for factor analysis and that meaningful underlying structures can be extracted. The communalities (table 2) derived from the Principal Component Analysis (PCA) represent the proportion of variance in each observed variable explained by the extracted components. In this study, all 16 variables demonstrated acceptable communality values, each exceeding the threshold of 0.50, indicating that the factor solution accounted for a meaningful share of

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Table 1 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	3293.774
	df	120
	Sig.	.000

Table 2 Communalities

	Initial	Extraction
Delay in obtaining or renewing ration cards (1=No 2=Yes)	1.000	.654
Received of subsidized foodstuffs as per Government rule reversed (1=No 2=yes)	1.000	.892
Availability of essential items at FPS	1.000	.656
Frequency of receiving less than the entitled quantity	1.000	.892
Costs incurred during ration card issuance (1=Yes, 2=No	1.000	.573
Fairness and transparency of the pricing system of PDS	1.000	.644
Behaviour of the PDS staff	1.000	.632
Responsiveness of the PDS staff addressing concern of the beneficiaries	1.000	.642
Satisfaction with the overall service provided by the PDS shop	1.000	.714
Satisfaction with meeting household food security needs	1.000	.668
Satisfaction with the overall food quality	1.000	.708
Occurrence of corruption, favoritism, or malpractice (1=Yes, 2=No)	1.000	.618
Nutritional value of the food grains	1.000	.534
Transparency in the ration card issuance and distribution process	1.000	.745
Experience with the application process	1.000	.746
Issue with Identification verification process with ration card reversed (1=yes,2=no	1.000	.857
Extraction Method: Principal Component Analysis.		

Table 3 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.377	33.609	33.609	5.377	33.609	33.609	3.112	19.450	19.450
2	2.148	13.422	47.031	2.148	13.422	47.031	2.867	17.919	37.369
3	1.381	8.632	55.663	1.381	8.632	55.663	2.543	15.896	53.265
4	1.227	7.671	63.334	1.227	7.671	63.334	1.519	9.491	62.756
5	1.041	6.508	69.842	1.041	6.508	69.842	1.134	7.087	69.842
6	.893	5.581	75.424						
7	.766	4.790	80.213						
8	.617	3.859	84.072						
9	.533	3.331	87.404						
10	.426	2.663	90.067						
11	.385	2.404	92.471						
12	.351	2.195	94.666						
13	.330	2.060	96.726						
14	.283	1.768	98.494						
15	.193	1.206	99.700						
16	.048	.300	100.000						
Extraction Method: Principal Component Analysis.									

In the Figure 1: The Scree Plot was analysed to determine the appropriate number of components to retain for factor extraction. The graph shows a distinct "elbow" at the fifth component, after which the line flattens, indicating a diminishing contribution of additional components to the overall variance. This visual trend implies that the first five components capture a significant portion of the variance in the data, while the subsequent components offer limited explanatory power. The sharp decline followed by a gradual levelling off supports the decision to retain five components, consistent with the eigenvalue-greater-than-one rule. This confirms the adequacy of the five-factor solution in representing the key dimensions of beneficiary satisfaction with the Public Distribution System (PDS). After the Scree plot analysis, the rotated component matrix obtained through Principal Component Analysis with Varimax rotation identified five key dimensions underlying beneficiary satisfaction with the Public Distribution System (PDS). The first component, representing Administrative Access and Pricing Fairness, includes aspects such as ease of application or renewal, transparency in issuance, cost of acquiring ratio cards, and fairness in pricing which highlight the procedural and financial accessibility of the scheme. The second component, labelled Availability and Quantity Entitlement, reflects the PDS's operational performance in delivering subsidised food items in adequate quantity and quality, as per government norms. The third component, Staff Behaviour and Service Quality, encompasses the interpersonal experience of beneficiaries, including staff conduct, responsiveness to concerns, and overall service delivery. The fourth component, Food Security and Grain Quality, captures beneficiaries' satisfaction with the nutritional quality of food grains and the extent to which the system ensures household food security. The fifth and final component, Corruption and Documentation Challenges, together groups issues related to ration card verification and perceived corruption or favouritism, reflecting broader concerns about transparency and governance. Together, these components provide a comprehensive understanding of the multiple interrelated factors that shape beneficiary experiences and satisfaction with the PDS in Assam.

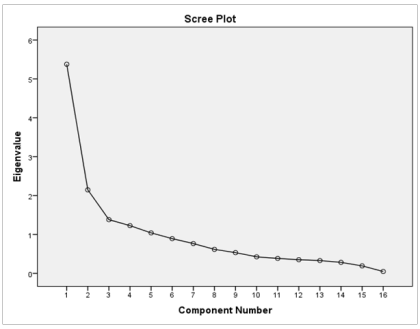

Figure 1 Scree Plot Indicating the Optimal Number of Components to Retain (five)

Table 4 Rotated Component Matrix

Variables	Component				
	1	2	3	4	5
Experience with the application process	.814				
Delay in obtaining or renewing ration cards	-.789				
Transparency in the ration card issuance and distribution process	.657				
Costs incurred during ration card issuance	.522				
Fairness and transparency of the pricing system of PDS	.711				
Received of subsidized foodstuffs as per Government rule		.923			
Frequency of receiving less than the entitled quantity		.929			
Availability of essential items at FPS		.559			
Nutritional value of the food grains		.583			
Behaviour of the PDS staff			.746		
Responsiveness of the PDS staff addressing concern of the beneficiaries			.617		
Satisfaction with the overall service provided by the PDS shop			.532		
Satisfaction with meeting household food security needs				.759	
Satisfaction with the overall food quality				.797	
Issue with Identification verification process with ration card					.920
Occurrence of corruption, favoritism, or malpractice					.727
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 6 iterations.					

Table 5 shows the internal consistency of the extracted factors for which Cronbach's alpha was calculated for each set of items. As presented in Table 5, Factor 1 (Access and Transparency in PDS), Factor 2 (Availability and Quantity Entitlement), and Factor 3 (Staff Interaction and Service Quality) demonstrated acceptable reliability levels with alpha values of 0.640, 0.688, and 0.792, respectively,

indicating that these item groups consistently measure their respective constructs. In contrast, Factor 4 (Food Security & Grain Quality Satisfaction) and Factor 5 (Corruption and Documentation Issues) showed relatively low alpha values of 0.465 and 0.067 due to the small number of items used to measure these constructs, along with varied perceptions among beneficiaries in the sample. Although these two factors demonstrated lower internal consistency, they were retained in the model due to their theoretical relevance and their role in capturing critical aspects of food security and administrative challenges within the Public Distribution System (PDS). Future research could address this by expanding the number of indicators or refining existing ones to enhance internal consistency.

Table 5 Reliability Statistics for Identified Factors

Factor Name	Number of Items	Cronbach's Alpha
Factor 1: Access & Transparency in PDS	5	0.640
Factor 2: Availability and Quantity Entitlement	4	0.688
Factor 3: Staff Interaction & Service Quality	3	0.792
Factor 4: Food Security & Grain Quality Satisfaction	2	0.465
Factor 5: Corruption and Documentation Issues	2	0.067

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.817a	.668	.664	.18606	.752
a. Predictors: (Constant), Corruption and Documentation Issues, Food Security & Grain Quality Satisfaction, Staff Interaction & Service Quality, Availability and Quantity Entitlement, Access & Transparency in PDS					
b. Dependent Variable: Overall satisfaction of the beneficiaries with the PDS in fulfilling their household's food security needs					

Table 7 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.471	5	5.494	158.712	.000b
	Residual	13.639	394	.035		
	Total	41.110	399			
a. Dependent Variable: Overall satisfaction of the beneficiaries with the PDS in fulfilling their household's food security needs						
b. Predictors: (Constant), Corruption and Documentation Issues, Food Security & Grain Quality Satisfaction, Staff Interaction & Service Quality, Availability and Quantity Entitlement, Access & Transparency in PDS						

Table 8 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.085	.009		116.631	.000
	Access & Transparency in PDS	-.029	.009	-.092	-3.165	.002
	Availability and Quantity Entitlement	-.026	.009	-.082	-2.834	.005
	Staff Interaction & Service Quality	.079	.009	.247	8.506	.000
	Food Security & Grain Quality Satisfaction	.244	.009	.759	26.154	.000
	Corruption and Documentation Issues	.041	.009	.127	4.373	.000

a. Dependent Variable: Overall satisfaction of the beneficiaries with the PDS in fulfilling their household's food security needs

To determine how the identified factors influence overall beneficiary satisfaction with the Public Distribution System (PDS), a multiple linear regression analysis was performed. The results from the Table 6: Model Summary demonstrate a strong positive relationship between the independent variables and the dependent variable, with a multiple correlation coefficient (R) of 0.817. The model explained approximately 66.8% of the total variance in satisfaction ($R^2 = 0.668$), which is substantial for social science research. The adjusted R^2 value of 0.664 further affirms the model's explanatory power while accounting for the number of predictors included. The ANOVA, table 7 confirms the overall statistical significance of the regression model ($F = 158.712$, $p < 0.001$), indicating that the combined predictors significantly contribute to explaining variations in the overall satisfaction level of beneficiaries. An examination of the standardised beta coefficients showing in the table 8, reveals that "Food Security & Grain Quality Satisfaction" is the strongest predictor of overall satisfaction ($\beta = 0.759$, $p < 0.001$). This suggests that when beneficiaries perceive food grain quality as adequate and believe that the system helps meet their household food needs, their satisfaction with PDS significantly improves. The second most influential factor is "Staff Interaction & Service Quality" ($\beta = 0.247$, $p < 0.001$), implying that courteous, supportive behaviour by Fair Price Shop (FPS) staff plays a vital role in shaping positive beneficiary experiences. Interestingly, two predictors—"Access & Transparency in PDS" ($\beta = –0.092$, $p = 0.002$) and "Availability and Quantity Entitlement" ($\beta = –0.082$, $p = 0.005$) showing significant but negative relationships with overall satisfaction. This finding is not in line with theoretical expectations, indicating that even though these areas are critical, beneficiaries are dissatisfied with procedural delays, lack of clarity in entitlement communication, or unmet expectations. These negative coefficients likely reflect a gap between policy provisions and on-ground implementation, which lead to a decline in trust or frustration despite the availability of resources. This points to the complex relationship between policy design and user experience, where the mere availability of provisions does not always ensure perceived satisfaction. Finally, "Corruption and Documentation Issues" showed a positive and statistically significant effect on satisfaction ($\beta = 0.127$, $p < 0.001$). This result may indicate that perceived improvements in documentation processes, reduced favouritism, and administrative transparency contribute positively to beneficiaries' overall satisfaction with the scheme. Overall, the regression analysis offered a robust empirical framework for understanding the key drivers of satisfaction within the PDS. It highlights that while tangible aspects like food quality and

service behaviour are crucial, beneficiaries are equally sensitive to procedural transparency, entitlement delivery, and ethical administration.

Conclusion

This study sheds light on the various factors influencing customer satisfaction with the Public Distribution System (PDS) among PHH and AAY cardholders in Assam. The analysis identified five major dimensions: Administrative Access and Fair Pricing, Availability and Entitlement of Quantity, Staff Conduct and Service Delivery, Food Security and Quality of Grains, and Issues of Corruption and Documentation. Among these, satisfaction related to food security and grain quality, along with staff behaviour, proved to be the most significant contributor to overall beneficiary satisfaction. The results highlight the critical need not only to ensure the proper distribution of entitlements but also to enhance administrative transparency, reduce procedural bottlenecks, and improve staff engagement. Tackling concerns regarding corruption and complex documentation processes can help build greater confidence in the system. These insights offer valuable directions for policymakers and implementing bodies to develop more accountable and efficient PDS delivery systems, thereby advancing food security in economically vulnerable populations.

Nevertheless, this study had certain limitations. Since data were drawn from only two districts and the research design was cross-sectional, the ability to establish causal relationships is limited. Despite these constraints, the study advances theoretical understanding by combining perspectives from service quality and food security frameworks to assess the PDS. Future research could benefit from longitudinal studies, comparative analyses across different regions or states, and qualitative methods to capture deeper and more dynamic beneficiary perspectives. These findings can support policymakers in closing procedural gaps, improving transparency, and creating a more responsive and equitable PDS.

Policy Recommendations

Based on the findings of the study, the following policy recommendations are proposed to enhance beneficiary satisfaction and strengthen the effectiveness of the Public Distribution System (PDS) in Assam:

- **Simplify Administrative Procedures:** Digitize the application and renewal processes for ration cards through user-friendly platforms to reduce bureaucratic delays and minimize paperwork. For example, Telangana Government have successfully introduced Mee Seva portal, which helped reduce paperwork and delays (Ministry of Consumer Affairs, 2023).
- **Promote Transparency and Fair Pricing:** Equip Fair Price Shops (FPS) with digital display boards that provide real-time information on stock levels, pricing, and beneficiary entitlements. Rajasthan's Annapurna Bhandar Yojana offers a successful model of public display systems to reduce beneficiary confusion.
- **Enhance Food Quality and Nutrition:** Implement routine quality inspections of food grains distributed through the PDS to ensure compliance with nutritional standards. Introducing fortified grains can further strengthen food security and improve nutritional outcomes among vulnerable households. The central government launched rice fortification in 15 states to improve nutrition and reduce anaemia and undernutrition (Press Information Bureau, 2022).
- **Improve Grievance Redress Mechanisms:** Establish easily accessible grievance systems, including toll-free multilingual helplines. Taking example of Tamil Nadu's grievance redressal system which allows online tracking of complaints and has improved public trust in service delivery.
- **Address Documentation Barriers:** Streamline and standardize documentation protocols to reduce both inclusion and exclusion errors. Mobile service units can be introduced to assist residents in remote and underserved areas with completing verification and application procedures.

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