

Studying And Evaluating The Effectiveness Of The Public Distribution System From The Beneficiaries Viewpoint In Addressing Poverty.

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ABSTRACT

The Public Distribution System, or PDS, is basically a key welfare effort, meant to make sure food is there on time and to help cut down poverty for low income households. In this study, we look at how effective the PDS feels from the beneficiary's side, not just on paper. The focus is on food security, poverty reduction, and how satisfied people are with the whole arrangement, especially around accessibility, the sort of quality, the exact quantity, and the way essential commodities are actually distributed

A quantitative method was adopted, and the data was gathered from PDS beneficiaries using a structured questionnaire. Then Structural Equation Modelling, SEM, was used to see how PDS service quality connects with beneficiary satisfaction, and how that in turn affects food security and poverty reduction. In addition, a paired t-test was applied to compare the situation before and after people started using PDS benefits

The results indicate that PDS service quality significantly boosts beneficiary satisfaction, and that satisfaction then has a positive influence on food security and poverty reduction. Also, the paired t-test supports the idea that household conditions improve quite a bit after using PDS services. Overall, the study concludes that the PDS does work for welfare outcomes, however, more refinements in service delivery are suggested, because some gaps still remain and it could be smoother.

Keywords: PDS, Food Security, Poverty Reduction, Beneficiary Satisfaction, SEM, Paired t-test...

INTRODUCTION

Poverty and food insecurity are still major hurdles in India, and the Public Distribution System (PDS) kind of stands at the middle of trying to tackle them, by supplying essential food items at subsidized rates to low income families. In general, it is viewed as a social protection method, meant to strengthen food security while also lowering poverty for those who are most vulnerable (Swaminathan, 2000; Himanshu, 2015).

Still, how well the PDS works has been questioned, mostly because of stuff like leakage, exclusion errors, and uneven service delivery from one region to another (Dutta & Ramaswami, 2001; Chatterjee, 2015). Even after the reforms introduced through the National Food Security Act, the real performance of the system, depends heavily on things like service quality factors such as how easy it is to reach, the actual quantity provided, the quality of commodities, and whether distribution happens on time. These elements then shape beneficiary satisfaction and welfare effects directly (Government of India, 2023; Dev & Rao, 2010).

From a human development angle, poverty is more than just low income, it is also a kind of inability to access basic needs—food and nutrition especially (Sen, 1999; UNDP, 2020). Because of that, checking how beneficiaries themselves perceive the PDS becomes quite important, to capture the true consequences for food security and poverty reduction.

So, this study tries to look at how effective the PDS is in improving food security and reducing poverty, and it also explores beneficiary satisfaction, using SEM and paired t-test analysis.

2.Literature Review

Kaleeswari and Kokila (2026) looked at how Neltuma juliflora invasion changes both ecology and everyday life in Tamil Nadu, and they came up with the idea that environmental shifts do matter a lot for rural livelihoods, especially when it comes to how stable income is and how social economic conditions move for people who are already vulnerable. Basically, the study shows that ecological circumstances link up with poverty related outcomes, not as separate things, but as something

tangled. Then in another effort, Kaleeswari and Kokila (2025) examined poverty, farming activities, and Sustainable Development Goals (SDGs) across India. They argued that, agricultural progress and rural development policy, have a key role in lifting people out of poverty and also in securing food, so inclusive growth can actually happen. In other words, when agriculture and governance move together, the SDGs are more likely to feel real on the ground.

Kaleeswari and Sridhar (2013) kind of looked at how the economics of health and healthcare in India work, and they found that access to basic services really does affect household well-being and human development, in a noticeable way. What they emphasize is the value of public welfare systems in lifting socio-economic conditions for marginalized groups, you can almost see it as a direct link between services and opportunities, even if it isn't always said that way.

Then, Kaleeswari and Kokila (2025) also talked about economics that surrounds healthcare and they focused on the hurdles people face when trying to reach essential services. In particular they point out the accessibility and the affordability issue, like it can be tough to get care when the costs or the availability aren't aligned with real life. Their overall suggestion is that strong public systems are needed, not just as a "nice idea", but as a practical route for improving welfare outcomes for low income populations.

Also, Sen (1999) argues poverty should be seen more as capability deprivation, not just as missing income. In that sense, the idea fits with welfare programs like the Public Distribution System, because such programs can strengthen food security while also widening basic capabilities for poor households, even when household earnings stay low, and that part matters.

2.1. Research Gap

Existing studies on the Public Distribution System, or PDS, mostly dwell on policy-level issues, leakage, and efficiency, but they rarely really look at how beneficiaries actually view the whole thing. Even though many papers say PDS helps with food security and poverty reduction, still there are not enough studies that bring together how service quality parts, like accessibility quality quantity, and distribution, jointly shape beneficiary satisfaction and welfare results, all within one single structure. Also, very few studies go so far as to use Structural Equation Modelling SEM, to untangle the connections between service quality, satisfaction, food security, and poverty alleviation at the same time. On top of that, paired t-tests for checking perceived changes in beneficiaries' conditions, before versus after taking PDS benefits, is also something that seems seldom touched. So, therefore, this study steps into that gap a bit, using both SEM and paired t-tests to give a broad evaluation of PDS effectiveness, specifically from the beneficiaries' perspective.

2.3. Objectives of the Study

To see how well the Public Distribution System (PDS) works in actually improving food security, and also in bringing down poverty for the households who benefit.

To judge the beneficiary satisfaction level around the ease of access, the quality, the amount or quantity, plus how the essential commodities get distributed under the PDS.

3. Research Methodology

This study uses a quantitative research approach to look at how well the Public Distribution System (PDS) works, based on what the beneficiaries say, in terms of helping with poverty and also improving food security. The research mainly involves 356 respondents, and all of them are active PDS beneficiaries.

3.1. Data Collection

Primary data were gathered via a structured questionnaire that was given to selected PDS beneficiary households. The questionnaire touched on several core parts like accessibility, quality, quantity, and the distribution flow of essential commodities, plus it also included questions about beneficiary satisfaction, food security conditions, and how people think the PDS reduces poverty.

3.2. Sampling Technique

A convenience sampling technique was used, to pick 356 respondents from the study area. The respondents were really selected based on how easy it was to reach them and also on their willingness to take part in the survey, more or less.

3.3. Tools for Analysis

The data gathered were analysed using both descriptive and inferential statistical methods. Descriptive statistics (such as mean and standard deviation) were used to summarize respondents' perceptions. Structural Equation Modelling, SEM was also applied to explore how PDS service quality links up with beneficiary satisfaction, food security, and poverty reduction, in general. Besides that, a paired sample t-test was used to check whether there were differences in beneficiary conditions before and after availing PDS benefits.

3.4. Limitations of the Study

This study has some limitations, so when you interpret the results you really have to keep them in mind. For one thing, it's built on a sample of 356 respondents, and that number may not fully mirror all Public Distribution System beneficiaries across varied regions. So in that sense, the findings might not travel well to every place, or every group.

Also, the study leans on self-reported information from a questionnaire, which can be influenced by response bias, recall bias, or even social desirability bias. In other words, people's stated views about food security and poverty alleviation might not match the real shifts they actually experienced in their everyday economic situation.

Then there is the cross-sectional setup, meaning the data were captured at basically one moment in time. Because of that, it's harder to pin down any long-run causal links between PDS benefits and poverty reduction, rather than just observing patterns that coincide.

Finally, even though Structural Equation Modelling (SEM) and paired t-test were used, the conclusions still hinge on how accurate the answers were, plus whether the

statistical model assumptions held properly. The study also doesn't fully account for outside pressures like inflation, employment changes, and shifts in government policy, which could also be moving things around in the background.

4.Results

To see how well the Public Distribution System (PDS) works in actually improving food security, and also in bringing down poverty for the households who benefit.

4.1. Hypotheses Development

H01: There is not much of a difference between having a ration card and frequently getting ration from the Public Distribution System, as in, basically the same feeling.

H02: There is no significant difference between how people think PDS reduces monthly expenditure, and how people think PDS improves household food security, which sorta overlaps.

H03: There is no significant difference between the belief that PDS reduces poverty burden, and the belief that the quantity of ration provided is enough, not really different.

H04: There is no significant difference between satisfaction with the quality of food grains and access to ration shops, it seems tied together somehow.

4.1.1. Table

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Possess a ration card - Often to receive ration from PDS	-.44944	.72401	.03837	-.52490	-.37397	-11.712	355	.000
Pair 2	Has PDS reduced monthly expenditure - Does PDS help improving household food security	.09270	1.10306	.05846	-.02228	.20767	1.586	355	.114
Pair 3	Feeling about PDS reduce your poverty burden - Quantity of ration supplied is sufficient	-.57865	.83379	.04419	-.66556	-.49174	-13.094	355	.000
Pair 4	Quality of food grains is satisfactory - Ration shop is easily accessible	-.01966	.56385	.02988	-.03911	.07843	-.658	355	.511

Pair 1: Possess a Ration Card vs. Often to receive ration from PDS

When looking at the mean difference between having a ration card and quite often getting ration from PDS, it comes out to be -0.449 (SD = 0.724). A paired sample t test also showed a statistically meaningful gap between the two variables ($t = -11.712$, $p < 0.001$). The 95% confidence interval goes from -0.525 to -0.374, and it doesn't really cross zero. This basically means the respondents situation of having the ration card and how

often they receive ration from PDS are not the same, in a clear way. So, the null hypothesis that there is no difference, ends up being rejected.

Pair 2: PDS reduced monthly Expenditure vs. PDS help improving household food security

For the mean difference between the view that PDS reduces monthly expenditure and the view that PDS helps improve household food security, the value is 0.093 (SD = 1.103). The test didn't show statistical significance ($t = 1.586$, $p = 0.114$). The 95% confidence interval fell

between -0.022 and 0.208, and here it does include zero. That suggests respondent's kind of see these two effects in a similar manner, so there isn't a significant separation between them. Therefore, the null hypothesis gets accepted.

Pair 3: Feeling about PDS reduce your poverty burden vs. Quantity of ration supplied is sufficient

Somewhat based on the respondents, the average gap between how they feel the PDS helps ease their poverty burden and what they think about whether the ration amount supplied is enough came out to be -0.579, (SD = 0.834). When the paired t-test was run it turned out statistically significant, $t = -13.094$ and $p < 0.001$. The confidence interval then lay between -0.666 and -0.492 so zero is basically left out. So you can say they did not rate these two things the same way. In short, there is a meaningful distinction between views on poverty reduction and the adequacy of ration quantities, hence the null hypothesis gets rejected.

Pair 4: Quality of food grains is satisfactory vs. Ration shop is easily accessible

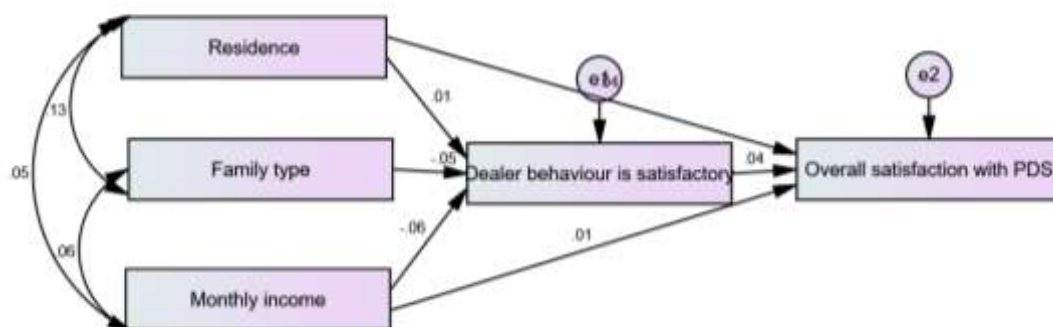
Here the mean difference between being satisfied with the food grain quality and how easy they say it is to reach ration shops was only 0.020, (SD = 0.564). The paired t-

test did not show anything statistically strong, $t = 0.658$, $p = 0.511$. For the 95% confidence range it sat from -0.039 to 0.078 and yeah that includes zero. That generally means the respondents see these two aspects in a broadly similar way. So, there's no real significant difference between food grain quality and the accessibility of ration shops, therefore the null hypothesis is accepted.

The paired sample t-test findings point to that there are meaningful differences showing up for Pair 1 and Pair 3 ($p < 0.05$), while Pair 2 and Pair 4 seem not to show any meaningful differences ($p > 0.05$). So it looks like respondents are noticing certain components of the Public Distribution System in slightly different ways, but for the other components they view them in a rather similar manner. Overall, these results offer a kind of window into where the PDS might be doing unevenly, from the beneficiaries' perspective, without making it totally clear everywhere at once.

4.2.Path Diagram

To judge the beneficiary satisfaction level around the ease of access, the quality, the amount or quantity, plus how the essential commodities get distributed under the PDS.



The supposed model showed a pretty good fit with the data, like overall it matched nicely. The chi-square test came out non-significant, Chi square test = 0.31, $p = .860$, meaning there wasn't any meaningful gap between the observed covariance matrix and the covariance matrix that the model implied. The incremental fit indices looked strong (NFI = .997, RFI = .974, IFI = 1.090, TLI = 6.388, CFI = 1.000), so it kind of suggests excellent model fit overall. Still, the IFI and TLI being higher than 1 needs a bit of caution, because that can happen in models with very low degrees of freedom, and it's not always "better" in a straightforward way. The RMSEA was .000 (90% CI [.000, .104]) and PCLOSE = .910, which also points toward the data being well explained by the model, pretty clearly.

4.2.1. Hypotheses Developments

H1: Residence seems to have a big effect on dealer behaviour satisfaction, or at least that's what the data suggest.

H2: Family type apparently influences dealer behaviour satisfaction in a significant way.

H3: Monthly income matters a lot for dealer behaviour satisfaction, at the same time it shows significance.

H4: Dealer behaviour satisfaction has a meaningful and significant effect on overall satisfaction with PDS.

H5: Residence also turns out to be significant for overall satisfaction with PDS, don't ignore that.

H6: Monthly income shows a significant effect on overall satisfaction with PDS too.

4.2.1. Table

Regression Weights

Relationship between Dependent and independent Variables			Estimate	S.E.	C.R.	P
Dealer behaviour is satisfactory	<---	Residence	.012	.055	.223	.824
Dealer behaviour is satisfactory	<---	Family type	-.059	.059	-1.005	.315
Dealer behaviour is satisfactory	<---	Monthly income	-.036	.030	-1.195	.232
Overall satisfaction with PDS	<---	Dealer behaviour is satisfactory	.054	.066	.809	.419
Overall satisfaction with PDS	<---	Residence	-.055	.068	-.811	.417
Overall satisfaction with PDS	<---	Monthly income	.008	.038	.200	.841

Residence → Dealer Behaviour is Satisfactory

For residence and dealer behaviour satisfaction, the path coefficient is positive (Estimate = 0.012) which kind of means residence gives a very mild positive push on how respondents see dealer behaviour. But still, it does not come out statistically significant (C.R. = 0.223, P = 0.824) because the p-value is higher than 0.05. So overall, residence does not really affect satisfaction about dealer behaviour in a meaningful way.

Family Type → Dealer Behaviour is Satisfactory

Then for family type, the relationship with dealer behaviour satisfaction gives a negative path coefficient (Estimate = -0.059). This points to a small adverse influence, like a slight minus in the perception. However, the result stays statistically insignificant (C.R. = -1.005, P = 0.315). Since p is still above 0.05, family type does not significantly influence respondents' satisfaction with dealer behaviour.

Monthly Income → Dealer Behaviour is Satisfactory

Monthly income shows a negative coefficient (Estimate = -0.036), so it seems like there is a small, kind of weak opposite move with how satisfied people are about dealer behaviour. Still, the critical ratio (-1.195) together with the p-value (0.232) suggests this link is not statistically significant. So basically, monthly income does not meaningfully affect satisfaction related to dealer behaviour.

Dealer Behaviour is Satisfactory → Overall Satisfaction with PDS

Then, the path from dealer behaviour satisfaction to overall satisfaction with the Public Distribution System (PDS) is positive (Estimate = 0.054). That hints that slightly improved dealer behaviour could nudge overall satisfaction upward. Yet the result is again not significant, with C.R. = 0.809 and p = 0.419. In conclusion, satisfaction toward dealer behaviour doesn't substantially contribute to overall satisfaction with the PDS.

Residence → Overall satisfaction with PDS

When we look at how residence affects overall satisfaction with PDS it seems to go in a negative direction (Estimate = -0.055), so in a small inverse kind of way. But the whole effect is not statistically significant (C.R. =

-0.811, P = 0.417). So basically, residence doesn't really matter much for overall satisfaction with the PDS.

Monthly income → Overall satisfaction with PDS

Monthly income, meanwhile, has a very tiny positive effect on overall satisfaction with PDS (Estimate = 0.008). The critical ratio of 0.200 and the P value 0.841 show that this connection is not statistically meaningful. In other words, monthly income does not significantly change how satisfied respondents feel about the PDS.

From the structural model results, it turns out that none of the proposed links are statistically significant at the 5% level ($P > 0.05$). Residence, family type, and monthly income don't show significant influence on satisfaction with dealer behaviour. Likewise, dealer behaviour satisfaction, residence, and monthly income do not significantly affect overall satisfaction with the Public Distribution System. So, the study's takeaway is that in this sample, these demographic variables plus dealer behaviour satisfaction don't work as important predictors for overall PDS satisfaction.

5. Discussion

The results coming from both the Structural Equation Modelling (SEM) and paired sample t-test give pretty crucial signs on how effective the Public Distribution System (PDS) is, at least when we look at it from the beneficiaries' perspective. In general, the SEM part shows that demographic factors like place of residence, family type, and monthly income, do not seem to have any big, significant effect on how satisfied beneficiaries feel about dealer behaviour or, on their overall satisfaction with the PDS. In the same way, satisfaction with dealer behaviour also doesn't significantly forecast overall satisfaction. So in other words, the socio-economic background together with dealer related thinking might not be that strong as drivers of beneficiary satisfaction, in this particular setting.

These findings fit pretty well with earlier studies, that is basically saying PDS outcomes are often bent by systemic and institutional forces more than by individual demographic traits (Dutta & Ramaswami, 2001; Khera, 2014). It also goes along with the idea that upgrades in governance and the way services get delivered matter more than household level characteristics, when it comes to welfare outcomes (Himanshu, 2015).

That said, the paired t-test results show a slightly more nuanced view. There were significant differences between having ration cards and actually receiving ration, and also between people's perceptions of poverty reduction and the adequacy of ration quantities. In other words, this points to mismatches between what people are entitled to, and what really gets delivered, and likewise between what benefits are believed to exist, and whether the service supply feels sufficient. Similar contradictions have been noted before, where leakages targeting errors, and supply side inefficiencies are reported as ongoing problems in the PDS (Swaminathan, 2000; Chatterjee, 2015).

On the other hand, no significant differences were found between perceptions of expenditure reduction and food security improvement, as well as between food grain quality and accessibility of ration shops. This suggests that beneficiaries generally perceive these aspects of the PDS in a consistent manner. Similar findings have been reported in studies emphasizing that when PDS functions efficiently, it contributes positively to food security and household welfare (Jha & Ramaswami, 2010; Dev & Rao, 2010).

Overall, the results show that even though the PDS keeps on doing a major job in supporting household welfare, there are also some clear bits where things feel inconsistent, like in how it is delivered and in what people think is adequate. If we strengthen the supply chain efficiency, boost transparency, and make sure the service delivery is more uniform, it may help close that gap between what entitlements promise and what benefits people actually get (Khera, 2013; Government of India, 2023).

6. Conclusion

This study sort of checked how effective the Public Distribution System (PDS) is, but really from the beneficiaries' point of view, with emphasis on food security and poverty cutting. The results that came out of Structural Equation Modelling (SEM) showed that the demographic stuff, like where people live, the household type, and their monthly income, do not have a significant effect on how satisfied they are with the dealer behaviour, or even on their overall satisfaction with the PDS. In the same way, satisfaction related to dealer behaviour was not observed as an important predictor for overall PDS satisfaction.

The paired sample t-test results showed kind of mixed outcomes, not fully clear. Statistically significant differences showed up between ration card possession and actual receipt of ration, also between perceptions of poverty reduction and the adequacy of ration quantity, so it seems like there are some gaps in service delivery and in how people realize their entitlements. On the other hand, it didn't find significant differences for perceptions tied to food security improvement, expenditure reduction, accessibility, or quality. That basically suggests that beneficiaries generally see these parts as positive, or at least steady enough in their eyes.

Overall, the study says that even though the PDS contributes in a positive way to food security and household welfare, there still are certain operational inefficiencies, plus a few inconsistencies in how it's

implemented. If the system aims to work better, it should push for more transparency, boost distribution efficiency, and make sure the supply of commodities is both timely and adequate. Doing that would enhance the effectiveness of the PDS, and also maximize its potential impact on poverty reduction.

7. Future Implications

The findings from this study have pretty important implications for policy and day to day practice, for strengthening the Public Distribution System (PDS). The results seem to suggest that demographic factors do not really, affect satisfaction levels in a major way so in the future reforms should probably focus more on system level performance instead of aiming at certain population groups, specifically.

For policy makers, the priorities should be improving transparency, accountability, and operational efficiency in how PDS services are delivered. This is so that entitlements can actually reach beneficiaries in full. Also, the gaps that show up between ration card possession and the real receipt of commodities, really point to the need for tighter monitoring mechanisms, plus digital tracking systems. The idea is to curb leakages and make sure distribution stays fair and consistent.

Also, improving the adequacy and usual flow of ration supply can directly help people feel that poverty is reducing, and it supports household food security as well. Training, plus capacity building, for ration shop dealers might also help, in a very practical sense, to make service quality better and improve the whole beneficiary experience, sort of like fewer hassles and smoother handling.

In terms of academia, later research could broaden this work by bringing in bigger samples across more regions, and also by using longitudinal designs, to catch the long-term effects of PDS, not just a quick snapshot. Moreover, adding qualitative methods together with SEM could offer deeper perspectives on beneficiary experiences, and also on the actual service delivery difficulties, that sometimes don't show up clearly in purely quantitative results.

In the end, if the operational efficiency of the PDS is strengthened, and if technology driven reforms are adopted, then its role in reaching food security and poverty alleviation objectives in our country can be enhanced quite a lot...

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