

*Full Length Research Paper*

# **A study on customer satisfaction on food delivery mechanism of universal PDS in Tamil Nadu (India)**

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Targeted Public Distribution System (TPDS) in India was launched in the year 1997, with the goal of transparent and accountable distribution of food to the poor. It is based on below poverty line and above poverty line families. But India is facing a lot of problems with poverty and hunger in all states. Children are the future pillars of the nation. But they are the vulnerable population and they are prone to develop a lot of health problems due to poverty. According to NSSO, the TPDS is not reachable to poor people due to administrative weakness. But the Government of Tamil Nadu state introduced a strong administration on quality products distribution with affordable prices in fair price shops. It is based on the policy of 'food for all and poor friendly' and their concentration on health sectors, to eradicate malnutrition, anaemia and the problems of pregnant women, low income and food insufficiency. The present study finds Universal PDS reaching the poor and beneficial to all families. In this study multi-stage random sampling was used to select different districts. The results showed that more than 60 percent of poor families in India are satisfied and effective delivery mechanism of universal PDS was followed in all the states.

**Key words:** Universal, PDS, factor analysis, poor, truthful, attractive, effective, services, Tamil Nadu, India.

## **INTRODUCTION**

**Share the food serves all lives: this is the Cardinal Principles of Equity" – Thirukkural 322**

Food is a basic need for all human beings and other species. Food security has been a major developmental objective in India for a very long time. India achieved self-sufficiency in food grains in 1970's and has sustained it since then. The achievement of food grain security at the national level did not percolate down to households and the level of chronic food insecurity is still high (Anu Ram Mohan, Bill Pritchard, Madhushree Sekher 2011). Over 225 million populations are remaining chronically undernourished in the country (WHO, 2006). The Abhijit Sen committee had also come up with similar findings which point to the utter failure of the Targeted PDS and recommended bringing the Universal PDS in India. Even the universal system is financially feasible and negligible (RamaKumar, 2010). A case study by Amartya Sen (2000) in his groundbreaking work *Poverty and Famines*, in which he showed that famine was rarely the result of lack of food, but rather the result of intervening economic factors, such as unemployment, declining wages, poor food distribution systems and quality of

products are the current problems in India. India was ranked at 94th in the Global Hunger Index of 119 countries in the world. More than 27 percent of the world's under nutrition population lives in India. In that statistics, about 43 percent of children (under 5 years) in the country are underweight. The proportion of anaemic children has actually increased by 6 percent in the past six years with 11 out of 19 states having more than 80 percent of its children suffering from anaemia (WHO, 2006). Some developing countries like China and Brazil have been successful through the progress they have achieved in providing access to food for their people and reducing poverty and improving healthy lives (Zhang Yue Zhou, 2006). But still India has received more than 121 complaints against irregularities in supply of food grains through ration shops till 31<sup>st</sup> July 2012 (The Economic Times, 2012). Targeted PDS irregularities are diversion of leakages, prevalence of bogus and ineligible ration cards, corruption, low quality and quantity, lack of administration in PDS in India (Srivastava, 2001). Food rich in nutrient is important for all children and women in India. It is not a Food security bill, but poor food distribution system in all states (Benyak Sen, 2011).

**Table 1.** The survey of selected districts in Fair Price shops, TNCSC, Women FPS, Mobile shops and others shops in (Full Time and Part time) as on 31.03.2011.

Districts	No of Fair Price Shops					Grand Total
	TNCSC	Co-operatives	Women FPS	Mobile Shops	Others	
Chennai north	287	577	0	0	7	871
Kanniyakumari	125	531	28	0	43	727
Nagapattinam	0	678	23	0	20	721
The Nilgiris	24	295	30	4	24	377
Karur	2	531	12	0	0	545

Source: Statistical Hand Book of Tamil Nadu 2012.

## PDS in Tamil Nadu

Tamil Nadu is one of the major southern states in India. The Tamil Nadu government has implemented a strong administration on law and act for corruption and they developed many policies to correct food problems. So they introduced Universal Public Distribution System again particularly for the poor. The effectiveness of universal PDS is stronger in food distribution in TNCSC, Co-Operatives and other departments (Nakkiran, 2006). There is no exclusion made based on the income criteria and there is no dichotomy between BPL and APL population in the state (Ministry of State, 2010). Based on the order of the Government of Tamil Nadu, rice should be at free of cost to all eligible card holders from 1<sup>st</sup> June 2011 onwards. Essential food delivery under Universal PDS are rice, wheat, sugar, cereals, edible oils, kerosene, and soft-coke, tea, soap, and other festival offers in special allotments.

## Fair Price Shops in Tamil Nadu

The total family cards under the Universal PDS in Tamil Nadu are 1.97 crores as of 31.3.2011. There are 30432 (full time 22879) FPS run by co-operatives. More than 96 per cent of the fair price shops are managed by co-operatives. It shows the extensive involvement of the co-operative societies in serving the rural people by taking steps to supply essential commodities in the right time at affordable prices. In addition to the regular and fulltime FPS, the Department of Cooperation has established in part time 7553 shops run by FPS in villages. It helps the villagers to purchase the essential commodities in the nearby places. There are 1370 (Part time 123 and fulltime 1247) TNCSC, 529 women shops and 11 mobile FPS and others 141 shops functioning in the state. (The Statistical Hand Book of Tamil Nadu, 2012: Table 1).

## REVIEW OF LITERATURE

**Mahendra and Suryanaraya** (1991) "Analysis found that urban people were getting more benefits through PDS

than rural and tribal people.

**Geroge** (1996) 'did an analysis of PDS of food subsidy and production incentive for PDS in India'.

**National Institute of Rural Developments** (2003) 'a study on leakages in Targeted PDS was found that not drawing and partial drawing of quota had substantially contributed to leakages which has increased the suffering of poor peoples'.

**Planning Commission** (2005) "Analysis of PDS found that at about 58 percent of the subsidised food grains issued from the central pool do not reach the BPL families because of identification errors, non-transparent operation and unethical practices in the implementation of Targeted PDS".

**Rahul Prahlad Mane** (2006) "Targeting the poor or poor targeting a case for strengthening the PDS based on food subsidies to the poor reduces fiscal deficit and structural adjustment programme in India.

**S Parasuraman and T Rajaretnam** (2011) "Analysis on agriculture food security and Nutrition in vidarbha: a household analysis. This study indicates overall – under nutrition among children, adolescents and married women in substantial and it does not differ significantly between different socio-economic groups. Second higher food production lower are under nutrition levels, and final PDS contributes significantly to the food security of poor families and it must be extended to include families above the poverty line as well".

**Madhavi Cherian** (2012) research paper examines the Targeted PDS for subsidized food grains in India to evaluate the efficacy of welfare policies under a means tested regime. The research ability of the welfare good, and consequently the deco modification potential is lowered in states that have restricted the program to the poorest. The ability to access the subsidised goods is affected through the following channels: how poverty is defined, how the poor are identified and lastly, at the Fair Price Shop when trying to procure the food. The mechanisms are reflective of the inequality contained in the social relations between the policy makers and implementers, on one hand and the potential beneficiaries of the program, on the other hand. Recently

**Table 2.** Universal PDS Prices of Ration Products in Tamil Nadu.

Name of Commodity	Price Per(kg/litre)	Scale of Supply
Rice	Free of Cost(as per announcement (w.e.f 01.06.2011)	4 kgs per adult and 2kgs per child(12 years of age and below) per month, subject to a minimum of 12 kgs and maximum of 20 kgs., per month per card except the Nilgiris district, for this districts minimum of 16 kgs and maximum of 24 kgs per card. Under AAY 35 kg per family.
Sugar	Rs.13.50 per Kg	500 grams per head per month subject to a maximum of 2kgs per month. Additional 3 kgs are supplied to sugar option card holders in lieu of rice.
Wheat	Rs.7.50	10kgs per card month in Chennai city and district headquarters and 5 kgs per card per month in other areas.
Kerosene	Rs.13.60 to 14.20 per litre	Ranges from 3-15 litres per card depending upon the location and possession of LPG Cylinders.

Source: Commissioner of Civil Supplies and Consumer Protection Department.

proposed National Food Security Bill that attempts to make the program means tested in the entire country and also promotes cash transfers will not be successful in its aim of providing a safety net to India's poorest, as it does not address the problems that makes the Targeted PDS ineffective.

These studies covered primary and secondary data and direct opinion from the consumers related to PDS policy orientation, food insecurity in selected district and states. But the present study stated that poor people are satisfied with the food delivery mechanism in the system of Universal PDS.

### Universal PDS Operating Systems in Tamil Nadu

Universal PDS is operated under the joint responsibility of the Central and the State Governments. The Central Government has taken the responsibility for procurement, storage, transportation and bulk allocation of food grains. The responsibility to distribute the same to the consumers through the network of FPSs rests with the state governments and also the operational responsibilities are issue of ration cards, supervision and monitoring the functioning. Tamil Nadu Civil Supplies Corporation procures rice and other essential commodities required for, from Food Corporation of India (FCI) and through private tenders. Food distribution of commodities through Fair Price Shops (FPSs) is being carried out by TNCSC and other Co-operatives (Table 2).

### Objectives of this Study

To identify the Customer Satisfaction about Ration

Products at various levels by Factor Analysis

### METHODOLOGY AND SAMPLING

**Field (2000)** had written about the necessary sample size for factor analysis. He stated that the researcher should have at least 10-15 subjects per variables and above 500 samples to be excellent for factor analysis. What **Monte Carlo (2003)** also mentioned in his studies have resulted in more specific statements that sample size should be high for factor analysis.

The present study is covered by Multi-stage random sampling and five districts were selected in Tamil Nadu. By following random sampling, one developed district in north (Chennai), one moderate in south district (Kanniyakumari), developing district (Nagapattinam - is well known for its eastern costal region), and under developed district (Niligiris is eco-tourism in western hills) and final middle district (Karur is textile and industrial sectors) were selected (Table 3). This study consists of the following demographic variables such as gender, educational qualification, family occupation, area of residence, and types of family that were assessed by nominal scale. The consumer satisfaction was assessed by ordinal scale, like truthfulness, attractiveness, effectiveness, services and complaints etc, were assessed by Likert scale (ratings is 5 points, 1-strongly agree to 5-strongly disagree). The sampling frame is divided into districts, blocks, villages, and households. Total respondents were 810 samples and 18 variables covered in this study.

**Table 3.** Showed that Socio-Economic variables in selected districts profiles.

Total Population		4681087	1863174	1614069	735071	1076588
Area(sq.km)		174	1684	2417	2549	2901
Total Literates		3850472	1567580	1227311	576799	741610
Total SC		598110	67712	441231	238014	190260
Total ST		6728	5443	3420	28373	1450
Total Population	Rural		326616	1250291	299061	642415
	Not Arise					
Total Population	Urban	4681087	1536558	363778	436010	434173
Total No Blocks	Nil		9	11	4	8
Total & Municipality	Corp	1	4	4	4	4
Total Village	Revenue	55	81	519	203	54

## Results of Customer Satisfaction in Food Delivery Mechanism

**Table 4.** Reliability Statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.716	.722	13

**Table 5.** Kaiser-Meyer-Olkin Measure of Sampling Adequacy.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy. .765			
Bartlett's Sphericity	Test of	Approx. Chi-Square	1351.642
	of	Df	78
		Sig.	.000

### Factor Analysis

Factor analysis is a very useful method of reducing data complexity by reducing the number of variables. The study was interested to investigate the consumer's satisfaction of buying ration products under universal PDS system. Several variables were identified, which influence the customer satisfaction on food delivery mechanism. Such variables identified were cost of product, quality and quantity of product, availability of product, essential of products, adequacy of products, depended of products, truthfulness to the poor, ability to buy the product, and any corruption and complaints about products etc. The study covered a latent variable which is a variable that cannot be measured directly but which is measured indirectly through several observable

variables. The present study used factor analysis to reduce the number of variables with similar characteristics together.

(Table 4) Cronbach's alpha is used to measure internal consistency of reliability. It is most commonly used in multiple Likert scale. From this study Cronbach's alpha value is **0.716** and Standardised Item is **0.722**, which indicates a high level of internal consistency of tool.

(Table 5) It measured the strength of the relationship among the variables. In factor analysis, the important output is KMO measure of sampling adequacy and Bartlett's test of Sphericity. The present study value is 0.765; it showed the effective sampling adequacy of the study. The off-diagonal elements should be very small and close to zero. In the Bartlett's test is significant ( $p < 0.001$ ) and factor analysis is appropriate.

### The Correlation Matrix

The present study showed the anti-image matrices values (0.844 to 0.746). This is one type of correlation matrix value and measure of sampling adequacy (MSA). The present study showed that overall KMO is a bit low 0.765. However Bartlett's test of Sphericity has an associated 'p' value of  $< 0.001$  as by this results in the study 'p' values of less than 0.001 as 0.000! So the results showed that there is need to continue to perform a valid factor analysis in the study.

(Table 6) The present table showed the communalities before and after extraction. Before extraction, the communalities of all factors are equal to 1. The communalities in the column labelled extraction reflect the common variance in the data structure. This present study extraction values are higher in good quality and quantity of products for 69 percent. Secondly, the depended of products and support to Universal PDS

**Table 6.** Communalities.

	Initial	Extraction
Affordable prices	1.000	.615
Essential of Products	1.000	.565
Adequate of Food grains	1.000	.578
Truthful to poor	1.000	.629
Comfortable to buy	1.000	.563
Support the scheme	1.000	.684
Welfare schemes to attract	1.000	.547
Employees relationships	1.000	<b>.518</b>
Depended of products	1.000	<b>.685</b>
Rice with free of cost	1.000	.536
Good Quality & Quantity	1.000	<b>.695</b>
Corruption & complaints	1.000	.676
Weights are Accurate	1.000	.586

Extraction Method: Principal Component Analysis.

**Table 7.** Total Variance Explained.

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.823	17.025	17.025	4.823	17.025	17.025	3.514	14.647	14.647
2	3.465	12.271	29.296	3.465	12.271	29.296	3.462	13.109	27.756
3	3.243	11.562	40.858	3.243	11.562	40.858	2.250	12.359	40.115
4	3.108	10.525	51.383	3.108	10.525	51.383	2.229	11.588	51.703
5	2.027	8.902	60.285	2.027	8.902	60.285	1.212	8.582	60.285

Extraction Method: Principal Component Analysis.

scored 68 percent. Thirdly, employee's relationships scored 51.8 percent was the minimum value. The communality value should be higher and above (0.5value) after extraction. The study result showed 51 percent to 69 percent, it is adequate and showed the satisfaction of food delivery mechanism in Universal PDS.

The output of factor analysis is obtained by principal component analysis by specifying the rotation. There is a rule-of-thumb based on the computation of an Eigen value, to determine the factors extract. The higher the Eigen value of a factor the higher is the amount of variance explained by the factor.

(Table 7) The table showed that the cumulative percentage is 60.28 percent and the result found five factors extracted together, out of 13 original variables. Hence the study reduced the number of variables from 13 to five underlying factors.

According to reference (Field 2004), the Rotated Component Matrix is recommend interpreting only factor

loadings with an absolute value greater than 0.4. (Table 8) This study showed that matrix variables are affordable prices of products 0.607, adequacy of products 0.704, comfortable to buying the products 0.463, quality and quantity of product 0.554 as on factor one. Next factor three is again rotated comfortable to buy the ration products 0.492, welfare schemes to attract the poor and all families is 0.497 and truthfulness to poor 0.723 and all variables consisting of first factors. Therefore factor one is interpreted as truthfulness of universal PDS in the state.

Now for the second factor are high loadings on, support the scheme of Universal PDS 0.528, free of cost in rice 0.715, and weights are accurate in ration shops 0.739, a combination of these variables are clubbed into attractive of universal PDS in Tamil Nadu.

A fourth factor showed the employee relationship was 0.490 and corruption was 0.449 has the lowest loading values. This services facing few problems still, such as complaints of corruption and employee's un co-operation.

**Table 8.** Rotated Component Matrix.

	Component				
	1	2	3	4	5
Affordable prices	.607	-.097	.046	.235	.278
Essential of Products	.018	.003	-.108	.108	.737
Adequate of Food grains	.704	.199	-.112	-.120	.094
Truthful to poor	-.166	.061	.723	.178	.227
Comfortable to buy	.463	.076	.492	-.394	.006
Support the scheme	.197	.528	-.093	.194	.090
Welfare schemes to attract	.016	.154	.497	.066	.288
Employees relationships	.099	.072	-.008	.490	-.162
Depended of products	.201	.080	.177	-.234	.591
Rice with free of cost	-.024	.715	-.100	.059	.102
Good Quality & Quantity	.544	-.122	.126	.383	-.159
Corruption & complaints	.114	-.105	-.047	.449	-.138
Weights are Accurate	.073	-.739	-.146	.060	.101

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 7 iterations.

**Table 9.** Descriptive Statistics.

	N	Mean	Std. Deviation
Gender	810	3.6309	.48287
Educational qualification	810	2.1000	1.04349
Area of residence	810	2.3346	.47213
Family occupation	810	3.3506	1.38437
Type of families	810	5.2765	.44756
Affordable prices	810	2.0247	1.17215
Essential of Products	810	3.1556	.92380
Adequate of Food grains	810	4.9840	1.02550
<b>Truthful to poor</b>	<b>810</b>	<b>6.2259</b>	<b>1.01024</b>
Comfortable to buy	810	3.8062	1.24926
Support the scheme	810	4.7543	.73084
Welfare schemes to attract	810	2.7556	.71155
Employees relationships	810	3.4827	1.26582
Depended of products	810	2.0716	.90175
Rice with free of cost	810	4.1086	1.03609
Good Quality & Quantity	810	2.3309	1.36770
Corruption & complaints	810	1.9840	.78835
Weights are Accurate	810	4.5074	1.33437
Valid N (list wise)	810		

**Table 10.** Demographic values in Present Study.

Gender	Frequency	Percent	Valid percent	Cumulative%
Male	299	33.2	36.9	36.9
Female	511	56.8	63.1	100.0
<b>Education</b>				
SSLC	276	34.1	34.1	34.1
HSc	128	15.8	15.8	71.7
Degree	305	37.7	37.7	84.2
PG	101	15.8	12.5	100.0
<b>Areas</b>				
Rural	539	66.5	66.5	66.5
Urban	271	33.5	33.5	100.0
<b>Occupation</b>				
Agi,labour*	70	8.6	8.6	8.6
Ind,labour*	217	26.8	26.8	35.4
Government	138	17.0	17.0	52.5
Private	129	15.9	15.9	68.4
Daily wages	256	31.6	31.6	100.0
<b>Family Type</b>				
Joint family	586	72.3	72.3	72.3
Single family	224	27.7	27.7	100.0
				<b>N = 810</b>

Note \*Agricultural labourer and Industrial Labourer

Therefore the fourth factor is clubbed into services of universal PDS.

Final, factor five is essential for products 0.737 and depended of ration products 0.591 are highest loading factors. These variables interpreted to effectiveness in the universal PDS in Tamil Nadu.

(Diagram 01) The present study Scree Plot showed that the Principal Components (PC) outputs. The graph is useful for determining the retain factors. This study pointed intersert curve, starts to flat from factor factors 6 and 7. If noted that factor 6 has an Eigen value of less than one so only five factors have been retained to this study.

(Table 9) The table showed descriptive statistics of all the variables. Typically, the mean and standard deviation and number of respondents (N-810), were analysed. It had the highest mean of (truthful to poor 6.22) in this study.

The present study described the demographic variables such as gender, educational qualification, and area of residence, family occupation, and types of family. The total numbers of samples were 810 from all selected districts in Tamil Nadu (Table 10).

With regard to gender, male 33percent and female 57percent and the female are more in this study because they are home makers. With regard to educational qualification, it's scored moderate values and all the

respondents are highly educated and they gave their opinion of satisfaction regarding the ration products.

With regard to area of residence 66 percent were rural customers and 33percent were urban customers. Most of the samples belong to rural areas, because poor people are high in rural area.

With regard to family occupation the agricultural labourer is 7 percent, industrial labourer is 27 percent, government servants is 17 percent, private employees is 16 percent and 32 percent are high in daily wages.

With regard to types of family, joint family system is scored high in 72 percent and nuclear family system is 28 percent. Now in rural area joint family system are high in India.

### Major findings of the Study

In this study, the major findings are rural population that are highly covered in 67 percent, and all respondents are educated people in selected districts. Most of the families are joint system (72percent) and family occupation is daily wages (32percent) are highly covered in the study.

This study identified that poverty is reduced in rural areas, because of effective food delivery mechanism under Universal PDS in the state.

The overall factor analysis results showed that rural and urban areas and poor and non-poor families are satisfied with ration products.

So the Universal Public Distribution System (UPDS) was a success in the state with very few problems like corruption and others.

### CONCLUSION

Universal coverage is the hallmark of Public Distribution System in Tamil Nadu. The state government is making all efforts to the PDS more effective by ensuring the availability, affordability and accessibility of Universal PDS to the poor. This analysis showed that to make the system more viable and effective, the participation of poor people is an important factor. But still there are some problems in the universal system such as corruption in leakages, block markets, some ration employees are uncooperative to the poor etc. Compare to targeted PDS in other states, the universal system is more effective in Tamil Nadu.

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