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Abstract

India being home to the largest number of poor and malnourished population in the world, the tabling of National Food Security Bill has renewed the public pressure for universalization of PDS in India. In this regard, Tamil Nadu's model of universal PDS has been cited for its success in providing comprehensive food security. We conducted a survey in Coimbatore-Tiruppur region of Tamil Nadu to assess the merits and demerits of universal system. The survey covering 154 households seeks to understand the utilization of the PDS by the poor and the non-poor households, if there is voluntary exclusion of better-off sections of the population from the system and the reasons behind them. It is found that there is low drop-out of non-poor households from the universal system. This is because around 25 percent of all households who are eligible for any PDS commodity reported selling one of the commodities or feeding them to livestock. Also, the entitlements of the poor to subsidized commodities are reduced in uniform universal system. Based on the survey experience, this study puts forward an analytical framework to analyse the resource use efficiency and redistribution achieved in the food distribution system of India. Based on the theoretical framework and the observations from the survey, we make further recommendations in designing an optimal PDS model.

Keywords: *Universal PDS, resource use efficiency, redistribution*
JEL Codes: *I30, I38*

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INTRODUCTION

There has been renewed public pressure for universalization of PDS in India since the introduction of National Food Security Bill, for two important reasons. (1) Despite India's remarkable economic growth, prevalence of malnutrition in India is much higher than that in sub-Saharan Africa. The Prime Minister stated that malnutrition in the country is a national shame while releasing the recent HUNGaMA (Hunger and Malnutrition) survey report that found 42 percent of children under-5 are malnourished[1]. (2) Many studies have pointed that there has been a decline in average calorie intake of the population[2], though there is disagreement on the reasons behind this declining calorie intake. On one hand, the hypothesis stated in Deaton and Dreze (2009) is that the decline may be due to lower levels of physical activity or improvements in the health environment. On the other hand, Patnaik (2010) attributes this decline to eroding real incomes leading to secularly increasing hunger, thus demanding universalization of PDS. To add to this, there are instances of news citing the example of success of universal PDS in Tamil Nadu[3,4], although many have not defined what is meant by success in this context. For instance, Alamu, using a survey conducted in Dindigul and Dharmapuri districts[5], had reported that the system is functioning well in Tamil Nadu. Khera (2011a) showed that Tamil Nadu out-performed other states in terms of accessibility of PDS outlets, ensuring transparency and accountability through computerization, setting up grievance redressal mechanism etc. But, the food ministry of Government of India has ruled out universalization of PDS citing that huge quantities of rice and wheat would have to be procured, that may lead to lower availability and increased prices in the open market. Further, to manage such a level of subsidy, the present entitlement of poor families (35 kgs

[1] http://www.indianexpress.com/news/problem-of-malnutrition-a-matter-of-national-shame-pm/898024/
[2] Refer to Deaton and Dreze (2009) for a recent survey of literature
[3] http://www.thehindu.com/opinion/op-ed/article562922.ece
[4] http://www.tribuneindia.com/2011/20110907/edit.htm#7
[5] http://www.thehindu.com/arts/magazine/article2475948.ece?homepage=true

of food grains) has to be reduced and the central issue prices increased[6]. Given this background, we conducted a survey in Tamil Nadu to empirically evaluate the universal PDS model. But, as Kenneth Boulding says, "*Theories without facts may be barren, but facts without theories are meaningless*", we later developed a theoretical framework to evaluate the PDS from efficiency and equity perspectives. The theoretical framework defines and conceptualises measures of resource use efficiency and extent of redistribution.

The study is organised as follows. In the following paragraphs, we give an overview of PDS model implemented by Government of Tamil Nadu and its coverage of the population. Subsequently, we describe the theoretical framework developed for evaluation of universal PDS in Tamil Nadu. Following this, we present the major findings of the survey conducted and make estimations of resource use efficiency and redistributive nature of universal PDS in Tamil Nadu using simplifying methodology. We conclude with relevant policy implications in the final section.

UNIVERSAL PDS IN TAMIL NADU

PDS model adopted by Tamil Nadu government provides for universal access as it makes no distinction between Above Poverty Line (APL) and Below Poverty Line (BPL) families. Households can choose among three different types of ration card- rice card, sugar card and white card based on their needs. Table 1 gives the distribution of ration cards as on 31.07.2011. This also includes two schemes - Antyodaya Anna Yojana (AAY - for the poorest of the poor) and Annapurna Yojana (for elderly persons without a pension). The essential commodities supplied are rice, wheat, sugar and kerosene. In addition to this, Tamil Nadu also has special PDS which supplies toor dhal, urad dhal, palmolein oil, fortified wheat atta etc. at highly subsidized prices for all eligible

[6] http://www.asianage.com/india/pawar-rejects-universal-pds-715

cardholders. However, this study is confined to three main commodities, namely, rice, wheat and sugar.

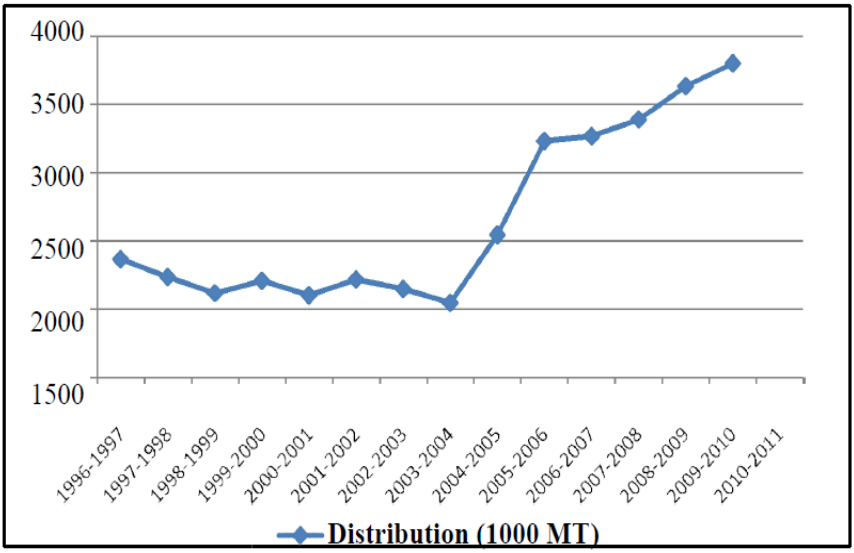
Table 1: PDS in Tamil Nadu: A Profile

Type of card	Commodities Entitled	Number of Cards	Percent of Cards
Rice cards (includingAAY and Annapurna)	All commodities	1,85,31,983	94
Sugar cards	All commodities except rice*	10,82,659	5.4
White cards	No commodity	60,547	0.4
Khakhi cards (Forpolice personnel only)	All commodities	61,336	0.4

Source: Government of Tamil Nadu (2011).
Note: *3 kgs extra sugar is provided instead of rice for sugar cards.

The universal system has been in operation in Tamil Nadu since the introduction of TPDS by the central government in 1997. Chart 1 shows quantity of rice distributed through PDS outlets in Tamil Nadu since 1996-97. The quantity distributed declined between 1996-97 and 2003-04, after which it showed steep increases in the years 2003-04 and 2004-05. Since then, there has been a steady increase in the quantity of rice distributed. The price of the PDS rice was decreased from Rs. 3.50 in 2002 to Rs. 2 in 2006 to Re. 1 in 2008. The rice is being distributed free of cost since 01.06.2011. Thus, pricing does not seem to be the reason behind the spike in the quantities distributed in 2003-04 and 2004-05; in fact the populist Rs.2 per kg scheme was implemented much later in 2006. Going by the quantity of rice distributed through the PDS, the performance of the universal system only deteriorated in the initial years to improve lately.

Figure 1: Rice Distribution: PDS



Source: Statistical handbook of Tamil Nadu for various years.

PDS EVALUATION: A CONCEPTUAL FRAMEWORK

The debate on the PDS is mostly concentrated on errors of targeting (inclusion and exclusion errors), and illegal diversion from the system. Given the contemporary emphasis on efficiency in resource use and social costs of reform packages, it is important to evaluate any public policy from these perspectives. For this purpose, we develop a conceptual framework to define and estimate (i) resource use efficiency; and (ii) the redistributive dimension of the PDS from a welfare perspective. This framework can be used to evaluate the performance of different models of PDS implemented by state governments in India as explained below.

In targeted PDS, BPL households are supplied food grains at a

price below their economic cost[7] while APL households are given at economic costs. In a uniform universal PDS, the state government does not distinguish between APL and BPL categories in terms of quantity as well as price of food grains distributed. Some states follow differentiated universal system, in which both APL and BPL households receive subsidized food grains but differentiate between these households in terms of quantity or price. For instance, Pondicherry has differentiated universal PDS where BPL households are entitled to higher quantity of food grains than APL households while pricing is the same for both the categories. Some states like Andhra Pradesh and Chhattisgarh have quasi-universal PDS (Khera, 2011a), which implies that the state government targets a higher proportion of the population than the official estimates of incidence of poverty (broad targeting). For example, Andhra Pradesh follows quasi-universal system by covering more than 80 percent of the population under the PDS, though the percentage of poor estimated by the Planning Commission for the state is only 20 percent.

Consider that all the households are entitled to subsidized or non-subsidized food grains in a food distribution system. Let N_p be the number of poor and N_r be the number of rich in the state. The decision of the household to utilise the PDS depends on transaction costs like bureaucratic hurdles in obtaining a ration card, time spent in queues to purchase food grains from PDS outlets, quality of foods grains etc. Let A_p be the proportion of poor who access the PDS and A_r, the corresponding proportion for the rich. The per capita entitlement of the poor is E_p and that of the richer section is E_r. Purchase-entitlement ratios of the poor and the rich are PER_p and PER_r respectively. Let P_p be the price (per kg) at which the PDS food grains are supplied to the poor and P_r be the price paid by the rich. The per kg economic cost of

[7] Economic costs include procurement costs, storage costs, transportation costs etc

the food grains is assumed to be C. PDS is considered to be universal when both the poor and the rich are given subsidized food grains, i.e., $P_p < C$ and $P_r < C$. In a uniform universal PDS, $E_p = E_r$ and $P_p = P_r$. In case of differentiated universal PDS, $E_p > E_r$ and/or $P_p < P_r$. Note that in the case of targeted PDS, $P_r = C$ and $P_p < C$.

Government subsidy to the poor (S_p) is then calculated as a product of number of poor who access the PDS ($N_p * A_p$) and amount of grains purchased by them ($E_p * PER_P$) and difference between the cost and price paid ($C - P_p$). This is shown in Equation 1. Subsidy to the rich is calculated similarly (Equation 2). Subsidy is lost in leakages due to illegal diversion of the PDS commodities from the system to black market. This happens when people who have access to PDS do not utilise it or do not purchase their entitlements fully. Let 'x' be the proportion of unsold food grains that are diverted to the black market (Equation 3). Here, we assume that leakages happen at the point of sale of PDS commodities to consumers, i.e., at Fair Price Shops (FPS). Note that the leakages can happen at other points of sale too when the commodities are transported from FCI to state depots and from state warehouses to FPS. But these are ignored for the sake of simplicity.

Subsidy to the poor $(S_p) = N_p * A_p * E_p * PER_p * (C - P_p)$ (1)

Subsidy to the rich $(S_r) = N_r * A_r * E_r * PER_r * (C - P_r)$ (2)

Subsidy lost due to leakages $(S_L) = x * [N_p * A_p * E_p * (1 - PER_p) * (C - P_p) + N_r * A_r * E_r * (1 - PER_r) * (C - P_r) + N_p * (1 - A_p) * E_p * PER_p * (C - P_p) + N_r * (1 - A_r) * E_r * PER_r * (C - P_r)]$ (3)

For subsidizing the poor by S_p, the government spends

$S_p + S_r + S_L$ .Let $\eta = \frac{S_p}{S_p + S_r + S_L}$ where $\eta \in [0,1]$. Higher the value of η, higher the fraction of the government subsidy reaching the poor. Thus, to improve efficiency, it is important to increase S_p and decrease S_r and S_L. Given N_p and C, subsidy to the poor (S_p) can be increased by: (1) increasing the proportion of poor who access the PDS, A_p, or the purchase-entitlement ratio, PER_p (2) increasing the per capita entitlement of the poor, E_p, or decreasing the price per kg of PDS food grains paid by the poor, P_p. Note that former can be achieved by reducing the transaction costs, creating awareness among the households on entitlements, ensuring transparency etc. Similarly to lower the subsidy to rich, S_r, the proportion of the rich accessing the PDS and their per capita entitlement can be lowered and/or the price per kg of PDS food grains paid by the rich can be increased. To reduce the leakages from the system, it is important to put in place a mechanism that lowers the proportion (x) of the PDS commodities diverted to the black market.

Let $\omega = \frac{S_p}{S_r + S_L}$ where $\omega \in [0, \propto]$ is a measure of redistributive nature of the system. When $\omega < 1$, the PDS is regressive as more subsidy is given to the rich or lost in leakages. Here, we assume that poor are not benefited by the subsidy lost in leakages. Similarly, $\omega > 1$ implies that the PDS is progressive in nature. Thus, the PDS model is redistributive if subsidy to poor exceeds the sum of subsidy to the rich and subsidy lost due to leakages. Higher the value of ω, more redistributive is the system.

The performance of the PDS can also be assessed in terms of

income transfers to the poor and the rich. Income transfer to the poor is given by total grains purchased by the poor multiplied by the difference in the market price (P_m) and the PDS price paid by poor (P_p) (Equation 4). The rich households purchase the PDS commodities if they find the quality satisfactory and transaction costs lower. If the quality is perceived to be poor, the rich households may simply opt out of the PDS. But the rich can also buy the PDS grains for making a profit out of it, for example, by selling the grains in the black market at a price (P_{bm}) higher than the PDS price (P_r). Assume that the fraction of food grains consumed is F_c and that used for making business profits F_{bm}. The income transfer to the rich is given by Equation (5). Apart from this, the rich also get benefits indirectly by illegal diversion of the PDS grains into the black market (Equation 7). Similarly the poor receive transfers indirectly by buying the PDS grains from the black market if the price of the black market grains is less than that of the open market (Equation 6).

$$\text{Direct income transfer to the poor} \quad (D_p) = N_p * A_p * E_p * PER_p * (P_m - P_p) \tag{4}$$

$$\text{Direct income transfer to the rich} \quad (D_r) = N_r * A_r * E_r * PER_r * [F_c * (P_m - P_r) + F_{bm} * (P_{bm} - P_r)] \tag{5}$$

$$\begin{aligned}\text{Indirect income transfer to the poor} \quad (I_p) = \text{x} * [&N_p * A_p * E_p * (1 - PER_p) * (P_m - P_{bm}) \\ &+ N_r * A_r * E_r * (1 - PER_r) * (P_m - P_{bm}) \\ &+ N_p * (1 - A_p) * E_p * PER_p * (P_m - P_{bm}) \\ &+ N_r * (1 - A_r) * E_r * PER_r * (P_m - P_{bm})]\end{aligned} \tag{6}$$

$$\begin{aligned}\text{Indirect income transfer to the rich} \quad (I_r) = \text{x} * [&N_p * A_p * E_p * (1 - PER_p) * (P_{bm} - P_p) \\ &+ N_r * A_r * E_r * (1 - PER_r) * (P_{bm} - P_r) \\ &+ N_p * (1 - A_p) * E_p * PER_p * (P_{bm} - P_p) \\ &+ N_r * (1 - A_r) * E_r * PER_r * (P_{bm} - P_r)]\end{aligned} \tag{7}$$

For the PDS to be efficient, indirect transfers should be completely eliminated, i.e., $I_p = I_r = 0$. It is expected that per capita

direct transfer to the poor should be greater than that of the non-poor for the PDS model to be more redistributive. Let $\omega_I = \frac{D_p / N_p}{D_r / N_r}$ where $\omega_I \in [0, \propto]$. Thus, the PDS is progressive when $\omega_I > 1$. There are two assumptions made in this framework. The non-poor households benefit from selling the PDS commodities in the black market while the poorer households are the ones buying from the black market. The second assumption is that of zero wastage. However, these assumptions can be relaxed without affecting the results.

Within the above framework, we try to explain the merits and the demerits of the universal PDS in Tamil Nadu in terms of proportion of rich accessing the PDS, purchase-entitlement ratio of beneficiaries, per capita entitlements of the poor and the rich. A survey was conducted in Tamil Nadu during November, 2011 that sought to address the following questions - Did better-off sections of the population utilize the PDS? Or did they exclude themselves voluntarily out of the system? What were the households' perceptions of quality of the grains and transaction costs of purchasing them from the PDS?

THE SURVEY

We conducted a survey in Coimbatore-Tiruppur region, a major industrial and commercial hub in Tamil Nadu, during November 2011. The urban survey was conducted in the north zone of Coimbatore Corporation and the rural survey in a village in Tiruppur district (It was part of Coimbatore district before the formation of Tiruppur in 2009). These areas were chosen for convenience. The survey covered 154 households i.e., 96 (62 percent) urban and 58 (38 percent) rural; the region is highly urbanized with 70 percent of the population living in urban areas according to Provisional Population Totals of Census 2011. The survey collected information on type of ration cards possessed by

households, entitlements to the PDS commodities, quantities and prices of these commodities purchased in the preceding month of the survey, their utilisation, households' perceptions of quality of these commodities and complaints about functioning of the FPS. Also, information like demographics of household members, their education levels and occupation categories, type of dwelling unit, land and cattle possessed and ownership of assets like television, phone, water supply and electricity connection was collected.

Table 2 gives a profile of households based on the type of ration cards possessed by them. Only households with sugar and rice cards (i.e. 88 percent of households surveyed) are entitled to any PDS commodity. Of the 58 rural households surveyed, 2 had sugar cards and remaining 56 had rice cards. The households that did not possess any type of ration card reported delay in issue of cards by government officials. White cards possessed by households were used as proof of identification.

Table 2: Composition of Sample Households by Ration Card

Type of Ration Card	Number of Households	Percent of Households
No card	14	9.09
White card - No commodity card	40	25.97
Sugar card - All PDS commodities except rice	40	25.97
Rice card (including AAY and Annapurna) - All commodities	94	61.04
Total	154	100.00

Source: Author's own calculations from primary survey

A majority of the households belonged to the OBC category (79 percent), while 12 percent belonged to SC/ST category and 9 percent were of general category. Around 15 percent of the households reported annual income levels to be less than Rs. 60,000, 38 percent reported income levels between Rs. 60,000 and 1 lakh and others

reported more than Rs. 1 lakh. All the households in the bottom two income categories possessed only rice cards (including AAY and Annapurna). Around 19.5 percent of all the household members aged above 6 were illiterate. The average distance to FPS from the dwelling places is 455 metres. Table 3 lists the complaints against Fair Price Shops (FPS) reported by 134 households that are eligible to buy any PDS commodity.

Table 3: Complaints About Functioning of FPS

Percentage of Respondents Reporting	
FPS are not opened on all working days	2 percent
FPS are opened on irregular timings	49 percent
Long queues	48 percent
Non-availability of commodities in FPS	38 percent
Cheating while weighing	32 percent
Multiple visits to shop due to non-availability	51 percent
Fraud by FPS owner	52 percent
Rude behaviour by the FPS owner	30 percent

Source: Author's own calculations from primary survey

PDS Utilisation: APL Dimension

Given the objective of the survey, we sought information on quantity of food grains purchased by the households from the PDS in the preceding month of the survey and their utilisation. It was found that majority of non-poor households made a purchase from the FPS in the preceding month. Of the rice card holders, 94 percent reported regular monthly purchase of rice from the FPS and remaining 6 percent made no purchase. The latter belonged to the top income category. Since most of the households rated the quality of the PDS commodities from poor to average, it was expected that the non-poor households would voluntarily exclude themselves from the system. But this was not the case. This is because the PDS rice was used for non-consumption purposes. For instance, the PDS rice was used for: feeding the cattle and poultry, making profit by selling the rice at a price higher than the purchase price

etc. Some households donated the PDS entitlements or lent their ration cards to others like more needy friends, relatives, neighbours and servants.

Table 4 provides information on utilization of the PDS rice by eligible card holders. Around 18 percent of urban households and 37 percent of rural households made a profit out of the free of cost PDS rice or used it as cattle/poultry feed. These households, as could be expected, belonged to higher income groups. Among the urban households, 24 percent donated the rice to the needy, while this was 4 percent in the case of rural families. Thus in both rural and urban areas, less than 60 percent of the households who purchased the PDS rice actually consumed it. Utilisation of the PDS rice as livestock feed was a common knowledge in the region. Also, respondents reported that the illegal sale of the PDS rice was done by the FPS owner if households did not purchase their quota. The rice was sold at Rs. 2-3 per kg to cattle and poultry farms in the villages[8] by the FPS owners.

[8] There are anecdotal evidences to support our findings; incidents of rice being sold by people have also been reported in newspapers in the recent past. The Hindu on Dec 21, 2010 reported that 120 bags of rice, each weighing 50 Kgs, were seized in Kancheepuram district allegedly procured from ration-card holders. The rice was sold by cardholders at a rate of Rs. 4-5 per kg which was being transported to Bangalore to be sold for Rs. 11-15 per kg. The Times of India on Aug 27, 2011 reported the story of migrant labourers from Tamil Nadu turning into rice traders in Kerala. These workers were found bringing large quantities of free rice from their native places in Tamil Nadu and selling it to construction workers from Bihar, Orissa and West Bengal for Rs.15 per kg

Table 4: Utilization of PDS Rice by Beneficiaries

Use of PDS rice	Number of urban households	percent of urban households	Number of rural households	percent of rural households
Personal consumption	22	57.89	34	61.82
Cattle/Poultry feed	1	2.63	15	27.27
Resale	6	15.79	5	9.09
Donate rice / Lend ration card	9	23.68	2	3.64
Total number of rice card holders	38	100.00	56	100.00

Source: Author's own calculations from primary survey

Some of the households also reported selling other PDS commodities. Almost 9 percent of the households reported selling PDS commodities like Toor dhal, Urad dhal, palmolein oil and kerosene. The sale for profit was the least in case of sugar (4 percent). Thus, proportion of the rich who accessed the PDS in Tamil Nadu is high because it subsidized the productive enterprises of the rich (by using it as cattle/poultry feed) or it helped in making profits by direct sale, in turn leading to inefficiency in distribution of the PDS commodities to the poor.

Illegal Diversion

In a recent study, Jha and Ramaswami (2011) found that neither the poor nor the rich in India receive most of the food subsidy directly. They estimated that around 43 percent of the subsidy was lost in illegal diversion while the income transfer to the poor and the non-poor was 10 percent and 19 percent respectively. Thus they argued that the coverage of PDS can be increased substantially without incurring additional costs if wastage due to diversion is reduced. Among the surveyed households, 52 percent (of those with sugar or rice cards) reported that they have heard or noticed cases of fraud by FPS owners like selling PDS commodities in the black market. This was more

rampant in urban areas than in rural areas. The households reported that FPS owner usually sold their entitlements in the black market if they did not make purchase within first two weeks of the month.

In the survey, we found instances of illegal diversion from the system by cheating the households of their entitlements, especially in the case of rice distribution. The entitlement to PDS rice is according to the number of units in the family. Adult member is counted as one unit and child as half unit. Table 5 provides the scale of supply of rice, wheat and sugar in the case of rice card holders:

Table 5: PDS Entitlements by Household Size and Item

No. of Units in Family (child being taken as0.5 unit and adult as 1 unit)	Rice in kg	Sugar in kg	Wheat in kg
1	12	0.5	5
1.5	14	1.0	5
2	16	1.0	5
2.5	18	1.5	5
3	20	1.5	5
3 and above	20	2.0	5

Source: Justice Wadhwa Committee on Public Distribution System, Report on the state of Tamil Nadu.

For example, consider 3-member households with rice card. The number of units of the household can be 2 (1 adult and 2 children), 2.5 (2 adults and 1 child) or 3 (3 adults) and they are entitled to 16, 18 or 20 kg of rice respectively. Of all the 3-member households surveyed, only 40 percent received their full ration of PDS rice. Remaining 60 percent of households received 2-5 kgs less than their entitlements. This was also true in the case of two-member households. The number of units of the household can be 1.5 (1 adult and 1 child) or 2 (2 adults) and their entitlements are 14 or 16 kgs of rice respectively. Only 50 percent of the households received their entitlements while remaining households received 1-5 kgs less than their entitlements. Similar findings are reported by Kumar (2010a) which conducted an evaluation of PDS functioning in 12 states based on a primary survey conducted in 2006-07. The study found that the quantity of cereals received by households varied between 20 and 35 kgs and it was far less than the stipulated amounts (fixed at 35 kgs) in the case of BPL households.

While none of the households reported paying extra money for the commodities bought from FPS (this is mainly due to awareness among the people and compulsory display of prices outside the shops), there is little awareness about their entitlements (almost 50 percent answered the questions wrongly). Other problems plaguing the system

include bogus/ghost cards, duplicated members, bogus billing etc. as there is no unique mechanism to identify members being duplicated in more than one card and issuance of ghost ration cards. Kumar (2010b) estimated that the prevalence of such excess cards is more than 2 crores for India as a whole and Tamil Nadu ranked sixth among the states with large number of excess cards. Thus, the population of Tamil Nadu according to the ration card database is 8.37 crores while according to the Provisional Population Totals of Census, 2011 is 7.21 crores, a difference of 1.16 crores. Since, the state government incurs a subsidy of Rs. 2400 per card, these ghost cards create huge financial losses (Government of Tamil Nadu, 2011).

Diversion of commodities from the PDS also occurs through bogus billing which are prepared for households that are eligible to buy commodities but do not purchase them. The commodities thus billed are sold in the black market by the shop-owners. According to Justice Wadhwa Committee report, of the 20,223 FPS inspected in January 2009, bogus billing was detected in 7042 shops. This again points to distributional inefficiency in the system.

RESOURCE USE EFFICIENCY AND REDISTRIBUTION

The survey conducted in Tamil Nadu illustrates the reasons for non-exclusion of richer households from the PDS and the illegal diversion of the commodities. However, estimation of the parameters of the theoretical framework could not be done due to limited information[9]. Hence, we make approximate calculations of the resource use efficiency and redistributive nature of universal PDS in Tamil Nadu using the 66th round of Consumer Expenditure Survey (CES) of National Sample Survey Organisation (NSSO). This analysis, despite its simplifying assumptions throws light on subsidies reaching the poor. Similar methods have been

[9] For example, information on economic status of the households for classification into poor and non-poor and the amount of grains diverted at the FPS through bogus billing was not obtained in the survey. This is because the survey preceded the conceptualization of theoretical framework as mentioned previously.

used by studies like Khera (2011b) to calculate diversion rates of PDS commodities. The study has also highlighted the issues related with the methodology.

The parameters used for evaluation are calculated in terms of quantities of the commodities rather than the values. This is because, as previously mentioned, in Tamil Nadu price of the PDS commodities paid by the poor and the non-poor are the same, i.e., $P_p = P_r$, therefore price terms disappear from the numerator and the denominator of efficiency and redistribution calculations. The state-specific poverty lines for rural and urban population and projected population data for Tamil Nadu are obtained from Planning Commission (2012). Using these poverty lines, the households of CES are classified as poor and non-poor. The average per-capita consumption of PDS commodities- rice, wheat and sugar are then estimated for the poor and the non-poor separately using CES data.

Subsidy to the poor is the product of per capita consumption of PDS rice by the poor and the number of poor in the state. Similarly, subsidy to the non-poor is obtained by multiplying the number of non-poor and their per-capita consumption of PDS rice. The sum of subsidy to the poor and the rich gives the total consumption of PDS rice of the entire population in the state. Subsidy lost due to leakages is then obtained by subtracting this total consumption figure from the rice distributed through FPS outlets by the state government. The subsidy lost due to leakages includes losses due to transport, spoilage, illegal diversion etc. Similar estimations are obtained for the other PDS commodities - wheat and sugar. Table 7 shows that around 12 percent and 10 percent of PDS rice and sugar respectively are lost in leakages. In the case of wheat, the leakages are negative which only highlights the limitations of the methodology used. Khera (2011b) obtained similar results for Tamil Nadu and explained possible reasons for negative numbers in the case of wheat.

Table 6: Resource Use Efficiency and Redistributive Nature of PDS – Tamil Nadu

For the year 2009-10 (in kgs)	Rice	Wheat	Sugar
Average monthly distribution (1000s)*	316150.5	13699	34219
Per-capita consumption – poor #	4.78	0.33	0.34
Per-capita consumption – rich #	3.78	0.40	0.46
Subsidy to the poor, S_p (in 1000s)	58244.7	4068.1	4165.6
Subsidy to the rich, S_r (in 1000s)	220167.6	23117.3	26785.8
Subsidy lost due to leakages, S_L (in 1000s)	37738.1	-13486.4	3267.6
Leakages (percent)	11.94 percent	-98.45 percent	9.55 percent
Quantity distributed for every 1 kg consumed by the poor ($1/\eta$)	5.43	3.37	8.21
Extent of redistribution (ω)	0.23	0.42	0.14

Note: *Authors' calculations based on Tamil Nadu Statistical Handbook for the year 2012.
Authors' calculations based on the NSSO unit record data for the 66th CES (Agricultural year 2009-'10).

The estimates of resource use efficiency and redistribution reported in the table above throw light on the efficiency and equity aspects of universal PDS in Tamil Nadu. For every 5.43 kgs of PDS rice distributed by the government, only 1 kg reaches the poor. The inefficiency increases further in the case of sugar as only 1 kg of 8.21 kgs distributed in the PDS outlets is actually consumed by the poor but the system is more efficient in the case of wheat distribution. The estimates for redistribution parameter given by ω are less than 1 for all the three commodities showing that the PDS model of Tamil Nadu is regressive in nature. It may be noted that parameters pertaining to income transfers are not estimated here since it needs some specially designed survey on utilization of the PDS commodities by the poor and the non-poor households.

CONCLUSION

Universal PDS in Tamil Nadu has been increasingly cited as a successful example for providing comprehensive food security. In this context, this study brings out the merits and the demerits of the universal PDS model using a survey conducted in Tamil Nadu. The survey experience motivated us to develop a theoretical framework to measure resource use efficiency and welfare gain in terms of redistribution in the context of food distribution system in India. This framework can be used to evaluate different models of the PDS from efficiency and equity perspectives. However, empirical estimation of efficiency and extent of redistribution could not be done from the survey due to limited information. A more detailed study needs to be done to arrive at an accurate estimation of these parameters.

Tamil Nadu has a recurring subsidy burden of Rs. 4500 crores which is almost 5 percent of its annual expenditure. Justice Wadhwa Committee had even questioned its financial viability in the long run. In a system of universal coverage of PDS, if better-off sections of the population utilize the PDS and do not exclude themselves voluntarily, then these sections experience an income transfer at the cost of large subsidies for the government. Universal coverage of the PDS in Tamil Nadu also reduces the entitlements of the poor. All households in Tamil Nadu (except those with AAY cards) can receive a maximum of 25 kgs of food grains (20 kgs of rice and 5 kgs of wheat). But BPL households are entitled to 35 kgs of food grains in other states. Thus, Tamil Nadu has been able to adopt the universal system by spreading thinner the central allocations to the state under the BPL category. Also, the per-capita entitlement of the poor is lower than the rich since there is an upper limit to the entitlements per household and average size of poor households is higher than that of non-poor. The poor then resort to buying grains from better-off sections who sell their entitlements at a price higher than PDS price but lower than the market price, thus

making a profit out of the subsidized grains allotted to them. All these decrease resource use efficiency and redistributive nature in the universal scheme. In this context, the PDS models of Himachal Pradesh (universal PDS, differential pricing) which reduces the subsidy to the rich to some extent and Pondicherry (universal PDS, differential quantities) which gives higher entitlements to the poor than the rich are better than the PDS model of Tamil Nadu. Thus, the findings of the study do not support a uniform universal model.

Making the system simpler improves its efficiency of delivering essential commodities to the target population. The entitlements to PDS commodities should be per capita based and we argue against the setting of maximum and minimum limits and setting different entitlements for adults and children as done by Tamil Nadu government. Above all, it is important to put in place effective mechanisms to check illegal diversion from the system as this helps expanding the coverage without incurring heavy subsidy burden.

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