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Special volume published March 2016 containing selected papers from the IAAE-ISAE Inter-Conference Symposium on Re-visiting Agricultural Policies in the Light of Globalisation Experience: The Indian Context. The symposium was held in Hyderabad, India, October 12-14, 2014.

**RE-VISITING AGRICULTURAL POLICIES IN THE LIGHT OF
GLOBALISATION EXPERIENCE: THE INDIAN CONTEXT**

**Edited by
Dinesh Marothia, Will Martin, A. Janaiah and C.L. Dadhich**



INDIAN SOCIETY OF AGRICULTURAL ECONOMICS
in collaboration with
National Institute of Agricultural Extension Management (MANAGE)
Professor Jayashankar Telangana State Agricultural University (PJTSAU)
Acharya N.G. Ranga Agricultural University (ANGRAU)

Supported by
International Association of Agricultural Economists (IAAE)

ANJANI KUMAR, P. SHINOJ AND MADHUSUDAN BHATTARAI*

Whether Public Food Distribution System has Contributed in Reduction of Poverty and Food Insecurity in India?

I

INTRODUCTION

Despite ensuring adequate availability of food at national level, ensuring food security at the micro-level continued to remain a formidable challenge for India. The Government of India has embraced a number of strategies to improve the status of food security in the country, which include concerted efforts to increase food grain production, intervention in the grain markets, and setting up institution of public food distribution system (or PDS) and maintenance of buffer stocks of major foodgrains. The latest ammunition to attack the menace of food insecurity is the enactment of National Food Security Act (NFSA) in August 2013. This act aims to mark a paradigm shift in tackling the conundrum of food security—from the current welfare approach to an entitlements based approach. The central pivot of the Bill is large-scale subsidised grain distribution to almost two-thirds of the country's population of 1.25 billion.

The enactment and implementation of this NFSA has intensified the debate on approaches of ensuring the food security at grassroots level and consequently, functioning of Public Distribution System (PDS) came under further scrutiny. PDS is one of the most important public intervention programs to enhance food security in India. With an annual expenditure of about USD 13 billion, the Public Distribution System (PDS) in India is one of the largest welfare schemes globally. It provides social safety nets and food security to over 65 million households by entitling eligible households to selected commodities at subsidised prices through network of over 500,000 “fair price shops” all over the country.

PDS provides rationed amount of basic food items and other non-food items at subsidised prices to consumers. The coverage and functioning of PDS underwent several changes overtime but it essentially remained an instrument to augment food security. The access to PDS was universal until 1992 (at least in theory). Rampant corruption and high operational costs led to repackaging the program as Revamped Public Distribution System (RPDS) with focus in tribal, arid, hill and remote areas in 1992 and then to a Targeted Public Distribution System (TPDS) in 1997. The aim of

*International Food Policy Research Institute, South Asia Office, New Delhi, ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala, and Crops Research Institute for the Semi-Arid Tropics, Patancheru, Telangana.

We are grateful to National Centre for Agricultural Economics and Policy Research, New Delhi; International Crops Research Institute for the Semi-Arid Tropics, Hyderabad and International Food Policy Research Institute, South Asia Office, New Delhi for providing institutional, infrastructural and intellectual support for conducting this study.

the TPDS was to target the poorest households by differentiating the access quantities and prices at which one is allowed to buy. The differentiation was achieved by classifying the beneficiaries into Above Poverty Line (APL), Below Poverty Line (BPL) or Antyodaya households based their economic status, assessed based on the state-specific poverty lines. Antyodaya cards, which enjoy a larger subsidy than BPL households, are meant for the poorest of the poor.

In spite of the extensive coverage of PDS and its important role in ensuring food security, its relevance and effectiveness in reducing poverty and improving food security has been questioned frequently in India (Khera, 2011). A number of studies related to PDS have pointed out shortcoming and anomalies on effectiveness of PDS such as large-scale inclusion and exclusion errors (Swaminathan and Misra, 2001; Hirway, 2003; Khera, 2008; Mahamalikand Sahu, 2011), large-scale leakages (Jha and Ramaswami, 2010; Himanshu and Sen, 2011; Khera, 2011; Kumar *et al.*, 2012; among others) and so on. On the other hand, the critical role played by PDS in reducing poverty and food and nutrition insecurity were highlighted in a few other studies such as Radhakrishna *et al.*, 1997; Dreze and Khera, 2013; Tritah, 2003; Himanshu and Sen, 2013; and Kumar and Ayyappan, 2014. In this context, in this paper, we analyse contribution of PDS on reduction of poverty and food and nutrition insecurity of the beneficiary population separately for rural and urban sectors, and by covering large set of data sets for a longer period of time. The analysis covers temporal as well as spatial dimensions of the transformation that PDS has brought about in the country in terms of income gains, poverty reduction and nutritional (calorie) enhancements.

II

DATA AND METHODOLOGY

This study is based on the unit level data from 50th (1993-94), 61st (2004-05), 66th (2009-10) and 68th (2011-12) rounds of the Consumption and Expenditure Survey conducted by the National Sample Survey Organization (NSSO), of the Government of India (GoI). Each survey contains detailed information on values and quantities of household consumption along with other household specific information. The Planning Commission (now NITI Ayog), and several GOI agencies rely on these surveys to estimate poverty lines on a regular basis. We have used the same household data to compute the average per capita consumption expenditure. The calorie intake was computed by using the nutrient charts provided by the NSSO for each commodity (NSSO, 2012). The questionnaires used by the NSSO for data collection distinguishes consumption from the PDS and from other sources. It is therefore possible to estimate the price paid at the PDS and at the open market if the households have used both sources of provision. Thus, it allows estimating the share of PDS in consumption expenditure and calorie intake of each household.

Impact of PDS on Food Security and Poverty

The precise impact of PDS on poverty and food security is an important but a complex question. The question is difficult to be answered as the impact of PDS is pervasive in the Indian economy and have implications for the livelihood at all levels. The fiscal transfer method assesses the direct benefit impact of PDS as a distributive mechanism on poverty and food security. The approach has been widely used in estimating benefit impact of fiscal distribution. It has been used by Radhakrishna *et al.*, (1997), Tritah (2003), Himanshu and Sen (2013 a & b) to assess the impact of PDS.

The subsidy transfer or income gain due to PDS is defined as the additional expenditure that the household would have incurred in the absence of PDS. It is estimated by multiplying the quantity of purchases from PDS with the difference between open market price and PDS price. The income gain (ΔY) given to a household is defined as:

$$\Delta Y = Q_r(P_m - P_s)$$

where P_m and P_s are the open market and subsidized price. Q_r is the quantity purchased from the PDS. The open market and subsidized prices are estimated from NSS survey data on quantities and values of expenditure.

Official Poverty lines provided by the Planning Commission, GoI have been used to assess the impact of PDS on poverty in this study. The extent of poverty has been measured as head count ratio (HCR) in the total population and the depth of poverty is measured by the poverty gap index (PGI) which is constructed based on the following formula (Grusky and Kanbur, 2006):

$$PGI = \left(\frac{1}{N}\right) \sum_{i=1}^m (z - y_i/z)$$

where, N is the total population, m is the population who are living at or below poverty line, z is the poverty line and y_i is the income of the poor individual i . PGI by definition ranges between 0 and 100 per cent and is a measure to sense how poor the poor are?.

Similarly, the impact of PDS on calorie intake was estimated by assuming that without access to PDS, the household's budget allocation would have been the same. The quantity has been recalculated that the household would have bought in the absence of PDS. The adjusted quantity was then used to re-estimate the calorie consumption of the same household. This provides the average calorie consumption of the households without access to PDS. The difference between the two gives the gain in calorie intake (ΔC), which is defined as follows;

$$\Delta C = C_{pds} - C_{wpds}$$

where C_{pds} and C_{wpds} are the actual (including from PDS) and estimated (without PDS) per capita calorie intake. In the paper, the extent of calorie deficiency has been measured by head count ratio in the total population and the depth of deficiency is measured by the Deficiency Gap Ratio (DGR).¹ The minimum (threshold) food-energy requirement was taken as 1800 kcal/person/day for rural households and 1575 kcal for the urban households. They represented 75 per cent of the recommended values, 2400 kcal/person/day for rural and 2100 kcal/person/day for urban [for more information, see Dandekar 1996]. The households consuming below this level were treated as undernourished or deficient in calorie intake.

III

RESULTS AND DISCUSSION

Access to PDS

Table 1 provides a glimpse of the reach of people to PDS food grains during 1993-94, 2004-05, 2009-10 and 2011-12. The PDS coverage shrunk between 1993-94 and 2004-05. During this decade, the percentage of households accessing PDS cereals fell from 27.7 per cent to 23.3 per cent. The shrinkage was sharp in urban areas from 29.8 per cent to 14.7 per cent, whereas, the decline in rural area was negligible. This shrinkage may be attributed to the shift from universal to TPDS in 1997 along with sharp increase in PDS commodity prices for APL households. This shift in policy also eliminated the existing urban bias to a great extent, but appeared to have increased exclusion errors significantly (Himanshu and Sen, 2013). The share of PDS in consumption of cereals increased slightly from 8.5 per cent to 9.8 per cent during this period and the increase was confined to rural households only (from 7.7 per cent to 10.6 per cent). In urban households, it declined from 11.4 per cent to 7.3 per cent.

TABLE 1. CONTRIBUTION OF PDS IN HOUSEHOLD CONSUMPTION OF FOOD GRAINS

Year (1)	Households accessing PDS for cereals (per cent)			Share of PDS in total cereal consumption (per cent)		
	Rural (2)	Urban (3)	All (4)	Rural (5)	Urban (6)	All (7)
1993-94	26.6	29.1	27.3	7.7	11.4	8.5
2004-05	26.6	14.7	23.3	10.6	7.3	9.8
2009-10	44.9	26.2	39.4	19.3	13.2	17.8
2011-12	52.1	28.5	44.8	21.7	13.9	19.7

Source: Authors estimates based on unit level data from NSSO surveys.

The subsequent period after 2004-05 saw a reversal of the earlier shrinkage in terms of access to PDS. The percentage of people who accessed PDS cereals in 2011-12 was much higher than that in 2004-05 and 1993-94. In 2011-12, on an average, 44.7 per cent of the households at all India level had accessed PDS for purchase of cereals, with 52.1 per cent in rural areas and 28.5 per cent in urban areas. Even, in

terms of quantity, this increase was explicitly evident. PDS accounted for about one-fifth (19.7 per cent) of the total consumption of rice and wheat in 2011-12, with 21.7 per cent in rural areas and 13.9 per cent in urban areas. The expansion of PDS access was widespread and improvement was recorded in most of the Indian states. By 2009-10, a majority of households were accessing PDS cereals in 13 out of 30 states, up from only 6 states in 2004-05 (Table 2). The revival of PDS continued and access expanded significantly in 2011-12 during which period, 20 out of 30 states where the majority of households accessed the PDS for cereals.

TABLE 2. CONTRIBUTION OF PDS IN HOUSEHOLD CONSUMPTION OF FOOD GRAINS ACROSS STATES IN INDIA

State (1)	Per cent households accessing PDS for cereals				Share of PDS in cereal consumption (per cent)			
	1993-94 (2)	2004-05 (3)	2009-10 (4)	2011-12 (5)	1993-94 (6)	2004-05 (7)	2009-10 (8)	2011-12 (9)
Andhra Pradesh	57.5	54.6	72.2	73.9	20.3	20.4	28.5	27.1
Arunachal Pradesh	77.3	40.2	46.7	52.3	50.2	25.8	28.3	31.0
Assam	20.9	8.4	27.2	50.4	4.1	3.5	10.0	22.1
Bihar	0.7	1.9	12.1	42.2	0.3	0.8	4.7	17.8
Chhattisgarh	11.8	22.7	62.2	58.8	3.2	11.3	37.8	34.3
Goa	74.9	11.0	47.8	60.8	42.7	7.5	17.8	25.3
Gujarat	35.5	24.0	26.1	21.6	15.0	9.3	11.4	7.6
Haryana	4.6	4.4	16.4	15.7	1.0	2.7	11.4	11.2
Himachal Pradesh	43.7	47.0	79.4	82.1	26.4	30.2	43.9	43.3
Jammu and Kashmir	20.3	37.4	63.5	76.2	12.1	28.6	46.9	47.1
Jharkhand	12.7	5.5	23.7	27.6	2.6	2.0	13.5	15.0
Karnataka	54.6	47.1	56.4	60.3	17.1	34.5	32.9	26.0
Kerala	78.3	36.7	57.1	76.8	44.8	18.7	26.3	34.0
Madhya Pradesh	1.2	0.9	42.3	35.6	3.3	11.2	19.2	16.6
Maharashtra	32.5	21.1	33.1	31.3	12.4	15.4	21.8	17.6
Manipur	3.7	0.5	8.5	5.3	2.1	0.3	2.4	1.4
Meghalaya	60.8	19.0	54.0	60.6	20.8	10.3	26.1	27.0
Mizoram	91.9	63.5	90.8	92.6	54.5	37.2	41.5	46.9
Nagaland	4.2	0.2	0.0	13.8	3.1	0.0	0.0	5.4
Odisha	6.4	19.4	49.9	58.3	1.2	6.0	22.3	27.2
Punjab	1.5	0.4	18.8	17.4	0.8	0.3	11.5	10.1
Rajasthan	14.2	10.1	16.4	26.0	10.6	8.1	9.0	10.4
Sikkim	47.1	38.4	38.5	45.9	47.9	28.7	31.3	36.5
Tamil Nadu	65.7	68.2	84.2	82.6	19.3	35.1	47.9	47.8
Tripura	57.0	33.7	72.0	81.3	19.8	20.7	31.9	40.1
Uttar Pradesh	1.6	5.7	21.5	24.7	0.6	2.4	10.0	12.4
Uttarakhand	56.3	20.3	28.3	63.4	44.1	13.1	16.0	25.9
West Bengal	16.4	12.7	32.2	43.4	3.9	2.9	8.3	12.3

Source: Same as in Table 1 provided earlier.

During the last few years, improvement in performances of PDS is particularly noteworthy in some of the states. . The most notable case is Bihar, until last few years considered being the worst performing states in terms of the functioning of PDS in the country. However, in 2011/12, more than 42 per cent of households in Bihar had

accessed PDS distributed cereals, which was only 14 per cent in 2009-10, and was less than 2 per cent in 2004-05. The share of PDS in consumption of cereals in Bihar was next to nil (0.2 per cent) in 1993-94, and less than 1 per cent in 2004-05, which went up to 17.8 per cent in 2011-12. Similarly, significant improvement in the expansion of PDS² access took place during this period also in Chhattisgarh, Uttarakhand, Tripura, Odisha, etc.

Factors for Expansion of PDS Access

The impressive improvement in beneficiaries' access to PDS food grains in many states can be attributed to several factors. However, consistent fall in the diversion of PDS food grains to non-target sectors and the widening divergence between market price and PDS price of food grains stand out to be the major factors for expanding the PDS outreach. The divergence between market and PDS prices of rice and wheat has widened and therefore PDS grains have become more lucrative for the population who are dependent upon PDS access for their basic food-items. In 1993-94, the average market price of rice was 1.4 times of the PDS rice and that of wheat was same for open market and PDS. However, the price advantage in availing PDS benefits was accentuated overtime. In 2011-12, the market price of rice was about five times higher than the PDS price, and open market price of wheat was about three times higher than the PDS wheat price (Figure 1). The growing price advantage of PDS food grains created demand side pressure to ensure availability of PDS food grains.

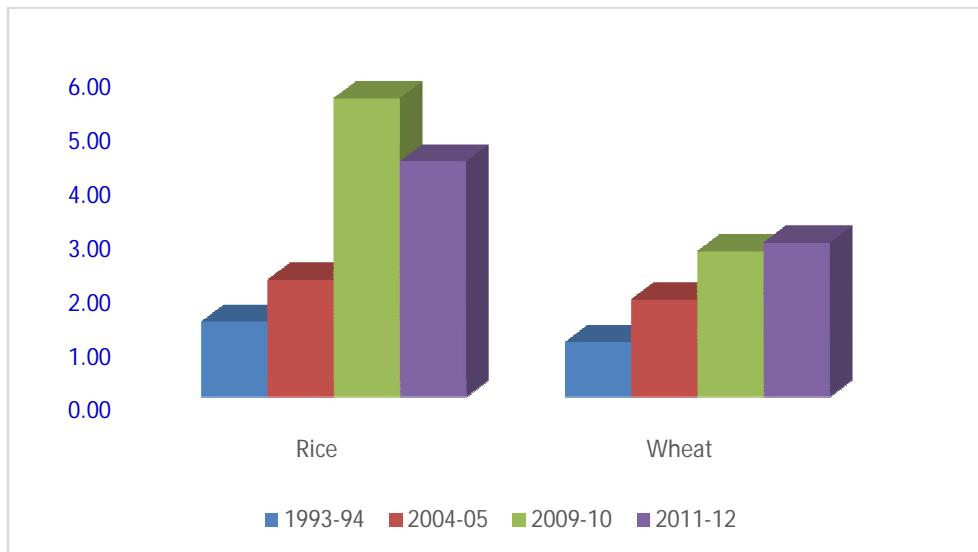


Figure 1. Ratio of Market and PDS Price.

In addition, in recent years, many states have taken several initiatives to revive PDS infrastructure and to plug the rampant leakages in PDS grains distribution. A number of studies report improvements in the functioning of PDS and reduction in leakages (for example, Khera, 2011a and 2011b; Himanshu and Sen, 2011; Kumar *et al.*, 2012). The estimated proportions of cereals diverted from PDS in 1993-94, 2004-05, 2009-10 and 2011-12 are depicted in Table 3.³ At the all-India level, the leakages from the PDS have been consistently declining since 2004-05. It declined from 53 percent in 2004-05 to 39 percent in 2009-10, and further to 35 percent in 2011-12. Though there has been a decline on the extent of leakages from PDS in most of the states in 2011/12, leakages continue to be alarmingly high in Gujarat (62.2 per cent), Haryana (45.9 per cent), Manipur (95.4 per cent), Rajasthan (65.7 per cent), Uttar Pradesh (57.9 per cent), Uttarakhand (53.6 per cent) and West Bengal (68.7 per cent). Diversion of PDS grain was observed to be nil in Chhattisgarh, Jammu and Kashmir

TABLE 3. TRENDS IN DIVERSION OF PDS FOODGRAINS (PERCENTAGE)

State (1)	1993-94 (2)	2004-05 (3)	2009-10 (4)	2011-12 (5)
Andhra Pradesh [#]	8.7	24.6	9.9	-3.5
Arunachal Pradesh	25.4	46.6	39.8	21.2
Assam	73.1	88.1	66.5	37.9
Bihar	94.6	91.3	65.0	12.5
Chhattisgarh [#]	NA	49.6	-33.0	-17.9
Goa	30.7	-10.9	32.6	34.8
Gujarat	49.0	50.3	48.5	62.2
Haryana	91.2	83.5	35.5	45.9
Himachal Pradesh	56.0	24.4	19.0	17.3
Jammu and Kashmir [#]	83.9	17.3	-12.0	-21.2
Jharkhand	NA	84.2	41.7	30.9
Karnataka	40.3	27.4	20.8	17.6
Kerala	20.9	24.9	24.4	18.6
Madhya Pradesh	50.0	46.4	43.7	37.8
Maharashtra	56.6	47.6	39.1	37.1
Manipur	88.3	98.0	91.2	95.4
Meghalaya	61.7	64.9	35.6	45.5
Mizoram ^{##}	43.4	45.0	11.6	-18.0
Nagaland	94.4	100.0	100.0	87.8
Odisha	85.8	73.4	27.4	11.4
Punjab	84.6	94.2	65.0	55.7
Rajasthan	97.9	55.3	65.7	52.6
Sikkim	47.7	42.3	46.4	38.2
Tamil Nadu [#]	-12.6	-4.6	0.5	-3.4
Tripura	49.9	44.9	32.3	11.2
Uttar Pradesh	59.8	83.7	57.9	50.0
Uttaranchal	NA	19.5	53.6	16.8
West Bengal	80.8	84.5	68.7	53.1
India	46.7	52.9	39.3	28.5

Note: NA denotes 'not available' Source: Same as in Table 1.

[#]These states (possibly a few other also) augment centrally allocated grain through open market sales or open market purchase or "state pool" contributions. Using the allocation and off take figures reported in the monthly food grains bulletins leads to underestimation of grain bulletin diversion. For accurate estimation, the grain allocated to the PDS by the state from local procurement and other sources should be added to the off take figure. The lack of readily availability of data on contribution of state pool constrained further analysis in this article.

and Tamil Nadu. The extent of leakages in Andhra Pradesh (-3.5 per cent), Himachal Pradesh (17.3 per cent), Karnataka (17.6 per cent) and Kerala (18.6 per cent) was relatively less. Bihar’s PDS grain leakages reduced to about 13 per cent in 2011-12 from 65 per cent in 2009-10 and 97 per cent in 2004-05. Assam, Tripura, Uttarakhand and West Bengal also recorded huge reduction in leakages of PDS grains in the recent years (Table 3).

The increasing contribution of PDS in foodgrains consumption and reducing PDS leakages over the years suggests that wider access reduces PDS leakages. Himanshu and Sen (2011) and Kumar *et al.* (2012) have also observed this earlier.

Trends in Income Transfers through PDS

The value of in-kind food transfers through PDS is summarised in Table 4. The value of per capita PDS food transfers is calculated as the excess, if any, of the market cost of PDS purchases over what was actually incurred as out of pocket expenditure on them. To maintain the temporal comparability, the PDS transfers were converted into real terms at 2004-05 prices. On an average, an amount of Rs. 286 per person at 2004-05 prices, was transferred to a household through PDS in 2011-12, up from Rs.86 in 1993-94. This transfer accounted for only 1.4 per cent of the per capita consumption expenditure of a household in 1993-94, which increased to 2.2 per cent in 2011-12. Such transfer was higher in rural areas (Rs. 313) than in urban areas (Rs. 217). However, the transfer was pro-urban in 1993-94, wherein income transfer to the rural household was only Rs. 86 per person in comparison to Rs. 146 per person in urban areas. The changing trends in PDS transfers explicitly reflect the waning urban-bias, and its renewed pro-rural inclination, where the concentration of poor is higher.

TABLE 4. TRENDS IN MONTHLY INCOME TRANSFER THROUGH PDS AT VALUE OF 2004-05 CONSTANT PRICES

Year (1)	Rural		Urban		All	
	PDS Subsidy (Rs./person) (2)	Share of subsidy in expenditure (per cent) (3)	PDS Subsidy (Rs./person) (4)	Share of subsidy in expenditure (per cent) (5)	PDS Subsidy (Rs./person) (6)	Share of subsidy in expenditure (per cent) (7)
1993-94	86	1.3	146	1.4	101	1.4
2004-05	116	1.6	103	0.8	113	1.3
2009-10	329	3.3	262	1.4	310	2.5
2011-12	313	3.1	217	1.1	286	2.2

Source: Same as in Table 1.

The share of PDS transfers in monthly per capita expenditure (MPCE) increased over time in most of the states. The states like Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Madhya Pradesh, Odisha and Sikkim registered remarkable increase in contribution of PDS subsidy to the monthly per capita expenditure (Table 5). In some states, the share of PDS subsidy in MPCE

increased 3-4 times and even more between 1993-94 and 2011-12. In Odisha, the share increased from 0.80 percent in 1993-94 to 5.6 percent by 2011-12. Similarly, Bihar and Chhattisgarh also provide strong evidence for improvement in PDS subsidy over time. On the other hand, the contribution of PDS subsidy in some other states showed either stagnation or slight decline. They include Goa, Gujarat, Haryana, Manipur, Nagaland, Punjab and Rajasthan. The extent of income transfer through PDS varies considerably across the states, though the level of variation (intensity) has declined over the time (Table 5). Evidently, the coefficient of variation in income transfer across different states declined from 92 per cent in 1993-94 to 73 percent in 2011-12.

TABLE 5. TRENDS IN INCOME TRANSFERS THROUGH PDS ACROSS DIFFERENT STATES IN INDIA

State (1)	PDS Subsidy (Rs./person/month) at 2004-05 prices				Share of PDS subsidy in expenditure (per cent)			
	1993-94 (2)	2004-05 (3)	2009-10 (4)	2011-12 (5)	1993-94 (6)	2004-05 (7)	2009-10 (8)	2011-12 (9)
Andhra Pradesh	202	194	627	523	2.7	2.2	4.3	3.5
Arunachal Pradesh	217	54	342	315	2.8	0.6	2.2	2.5
Assam	69	69	214	310	1.1	0.9	2.1	3.3
Bihar	43	47	127	232	0.8	0.8	1.6	2.9
Chhattisgarh	55	82	632	441	0.9	1.3	7.1	5.1
Goa	244	78	220	344	2.1	0.6	1	1.6
Gujarat	115	149	189	130	1.4	1.5	1.4	0.9
Haryana	66	23	104	79	0.7	0.2	0.6	0.4
Himachal Pradesh	105	163	613	583	1.2	1.5	4	3.8
Jammu and Kashmir	107	184	618	614	1.2	1.7	4.5	4.4
Jharkhand	50	35	215	279	0.9	0.5	2.3	3.1
Karnataka	106	263	467	415	1.5	3	3.5	2.8
Kerala	270	159	391	497	2.8	1.2	2.1	2.5
Madhya Pradesh	45	54	226	185	0.7	0.8	2.2	1.9
Maharashtra	76	87	221	196	0.9	0.8	1.4	1.2
Manipur	21	15	81	43	0.3	0.2	0.8	0.4
Meghalaya	138	67	294	281	1.6	0.7	2.6	2.3
Mizoram	387	217	544	736	3.8	1.8	3.7	5
Nagaland	51	0	0	58	0.5	0	0	0.4
Odisha	43	60	399	468	0.8	1	4.6	5.6
Punjab	50	8	108	80	0.5	0.1	0.6	0.4
Rajasthan	53	48	104	115	0.7	0.6	0.8	0.9
Sikkim	71	245	467	578	1	2.6	3.5	4.4
Tamil Nadu	262	474	1095	740	3.3	4.8	7.6	4.7
Tripura	213	203	562	599	2.6	2.9	4.6	5.7
Uttar Pradesh	37	49	164	145	0.5	0.7	1.7	1.4
Uttaranchal	271	98	222	450	3.4	1.1	1.3	3.2
West Bengal	99	93	197	238	1.3	1.1	1.7	2
India	101	113	310	286	1.4	1.3	2.5	2.2

Impact of PDS on Poverty

The increased access to PDS has contributed in reducing the poverty and the food and nutrition insecurity in the country. The PDS reduced poverty by 3.5 per cent points in 2011-12, with 4.2 per cent points in rural areas and 1.7 per cent points in

urban areas (Table 6). However, in percentage terms, the extent of poverty reduction may not appear much impressive, but in absolute terms, 40 million people have been able to escape poverty due to access to PDS. The impact of PDS transfers to poverty reduction has increased over time. The contribution of PDS transfers to poverty reduction rose from only 1.5 per cent in 1993-94 to 3.5 per cent in 2011-12. Furthermore, the contribution of PDS transfers in poverty reduction was higher in rural areas than in urban areas, except in 1993-94. The impact of PDS transfers is also discernible in reducing the poverty gap index. The poverty gap index was found declining over time with similar trends as that in the case of head count ratio. This implies that PDS resulted in not only reducing incidence of poverty but also the extent of poverty. The impact of PDS on poverty at disaggregate level are given in Appendix Table 1, which provides further insights on the distributional aspects of the PDS program across the states in India.

TABLE 6. IMPACT OF PDS ON POVERTY

Sector (1)	Poverty rate "with TPDS" (2)	Poverty rate "without TPDS" (3)	Average impact on HCR ("without"- "with") (4)	Average normalised poverty gap with PDS (5)	Average normalised poverty gap without PDS (6)	Average impact on PGI (7)
Rural						
1993-94	55.3	56.7	1.4	13.47	14.28	0.81
2004-05	41.8	43.9	2.1	7.96	9.08	1.12
2009-10	33.3	38.0	4.7	5.53	7.89	2.35
2011-12	25.3	29.5	4.2	3.71	5.43	1.71
Urban						
1993-94	36.1	37.9	1.8	7.44	8.15	0.71
2004-05	25.7	26.8	1.2	4.41	5.00	0.60
2009-10	20.8	23.4	2.5	3.26	4.41	1.15
2011-12	13.7	15.4	1.7	1.74	2.32	0.58
All						
1993-94	50.5	52.0	1.5	9.72	10.41	0.69
2004-05	37.7	39.6	1.9	6.99	7.96	0.97
2009-10	29.9	34.0	4.1	4.86	6.86	2.00
2011-12	22.0	25.5	3.5	2.68	3.79	1.12

Source: Same as in Table 1.

Impact of PDS on Food Security

The improvement in physical access of food to the PDS beneficiaries has brought about commensurate changes in their nutritional status over time. The share of PDS in calorie consumption has been increasing continuously since 2004-05. The share of PDS in per capita calorie intake was 7 per cent in 1993-94, which slightly declined 5.8 per cent in 2004-05. Thereafter, it showed an increasing trend and in 2011-12, PDS accounted for about 12 per cent of calorie intake in India. This trend has been pervasive across states with notable outcomes in Bihar, Chhattisgarh, Jammu and Kashmir, Odisha, etc. (Appendix Table 2). The impact of PDS in improving the

nutritional security of its beneficiaries was further examined based on fiscal transfer method. The findings suggest to laudable performance of PDS in reducing the food insecurity of people in the country. At the country level, the incidence of nutrition deficiency in terms of calorie intake would have been 36 per cent in the absence of PDS in 2011-12, but PDS has been able to tame it to 20.8 per cent (Table 7). This translates to almost 50 per cent reduction in nutrition deficiency on account of interventions through PDS. As results indicate, the contribution of PDS in ensuring food security has been in increasing trend over the time. In 1993-94, 3.4 per cent points of the Indian population could escape the incidence of energy deficiency due to PDS. The impact kept on increasing with 4.5 per cent points of decline in nutrition deficiency in 2004-05 and 11.1 per cent points decline in 2009-10, and further by 15.4 per cent points in 2011-12, the latest in the series. On similar lines, the depth of nutrition deficiency as measured by nutrition gap index (NGI) also kept on decreasing over years, with the average impact increasing for successive rounds of data. With increased access in rural areas, the impact of PDS on food security has been more than their counterparts in urban areas during all years under study except 1993-94.

TABLE 7. IMPACT OF PDS ON FOOD SECURITY

Sector (1)	Nutrition deficiency "with TPDS" (2)	Nutrition deficiency "without TPDS" (3)	Average impact on nutrition deficiency ("without"-"with") (4)	Average normalised nutrition gap with PDS (5)	Average normalised nutrition gap without PDS (6)	Average impact on NGI (7)
Rural						
1993-94	31.2	34.2	3.1	4.97	5.96	0.99
2004-05	31.2	35.9	4.7	4.46	6.84	2.39
2009-10	27.4	39.4	12.0	3.17	7.86	4.69
2011-12	24.2	42.0	17.8	2.66	8.37	5.70
Urban						
1993-94	19.1	23.3	4.2	2.96	3.77	0.81
2004-05	11.1	14.9	3.8	1.63	2.35	0.72
2009-10	16.1	24.6	8.5	1.72	3.83	2.11
2011-12	12.3	21.8	9.5	1.06	3.03	1.98
All						
1993-94	28.2	31.5	3.4	3.66	4.53	0.86
2004-05	26.1	30.6	4.5	3.68	5.61	1.93
2009-10	24.3	35.4	11.1	2.74	6.67	3.93
2011-12	20.8	36.2	15.4	1.93	5.91	3.98

IV

CONCLUSIONS AND POLICY IMPLICATIONS

PDS in India is one of the largest welfare programmes in the world with the primary aim of improving food and nutrition security of the socially and economically deprived sections of population. Though, it has passed through the

innumerable challenges over decades, PDS is facing intense scrutiny in the midst of market oriented national policy, replacing it with alternative institutions such as food stamps, cash transfers, etc. In this context, this paper assessed the impact of PDS in improving the economic access of the poor to essential food grains and consequently improved calorie consumption. The study used fiscal transfer method to estimate the subsidy transfer through PDS and its indirect benefits as a window for the poor to escape poverty.

We have derived average impact of PDS on head count ratio of poverty as well as poverty gap index. The findings suggest that at All India level, poverty rate reduced by around 3.5 per cent points in 2011-12 because of PDS subsidy transfers. Such impact was pervasive across rural/urban and regional divide across the country. The effectiveness of PDS as a tool to alleviate poverty was found to increase over the years with observed maximum impact in 2011-12. The effectiveness of the program was also reflected in terms of decreasing the depth of poverty as measured by poverty gap index.

In addition to taming poverty, PDS also contributed substantially in improving nutrition intake of the beneficiaries. The study observed that, the decrease in nutrition deficiency at all India level was as high as 15.4 per cent points in 2011-12. The impact of PDS in tackling under-nutrition was found to deepen across successive rounds of the survey. The contribution of PDS in reducing poverty and improving food security has improved over time. However, persisting imperfections in the system still pose substantial challenges to be tackled for improving cost effectiveness of the PDS services. This necessitates proactive and systematic attempts to improve the functioning of the PDS through introduction of new technologies continually. No doubt, despite recent controversies on effectiveness of PDS, our analyses clearly suggest that PDS has contributed substantially in reducing poverty, food and nutrition insecurity in the country.

NOTES

1. Estimated with the same approach as used in the case of PGI.
2. The expansion of coverage of PDS took places in these states in the recent past, when the overall political governance and states institutions also improved in these states. The variation in governance of PDS across the states is an important policy issue for PDS but which needs a separate in-depth assessment.
3. Using NSS data on per capita monthly purchase of wheat and rice from the PDS, the aggregate purchase of PDS cereals in each state has been estimated. This total purchase by the consumers has been compared with the corresponding 'off take' figure for that state. The difference between 'off take' and purchase provides an estimate of the 'diversion' of PDS food grains to the open market.

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