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Role of the Public Distribution System in Shaping Household Food and Nutritional Security in India

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Role of the Public Distribution System in Shaping Household Food and Nutritional Security in India

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Foreword

Over the last decade, poverty has declined substantially in India, driven largely by the country's more recent rapid economic growth. Sadly, improvements in the nutritional status, particularly of children, have not kept pace. This new research study by the National Council of Applied Economic Research, done for India's *NITI Aayog*, seeks to understand why. I am grateful to NITI staff and its vice-chairman, Professor Arvind Panagariya, and its CEO, Shri Amitabh Kant, for supporting this study by NCAER. It follows in a long line of collaborative work with India's erstwhile Planning Commission going back to the mid-1950s.

National Sample Survey (NSS) and other data reveal that per capita cereal consumption and caloric intake steadily declined for both rural and urban populations between 1993-94 and 2011-12. The public procurement and distribution of grains by India's Public Distribution System (PDS) has been the country's preferred policy tool to tackle nutritional deficiency by supplying subsidised rice, wheat, sugar and kerosene, initially universally in the context of food shortages, and then targeted to the poor.

With rising incomes, PDS use should have declined, but instead it has risen sharply in rural and urban areas for both the poor and non-poor. But increasing use of the PDS has not been associated with reductions in malnutrition and underweight children: the availability of inexpensive cereals does not seem to have translated into nutritional security, as many national surveys, including the National Family and Health Survey-3, have shown. Furthermore, increasing incomes have not led to greater diet diversity in India, and it is vital to understand why, particularly as the country approaches an epidemiological transition from communicable to non-communicable diseases and is often referred to as the diabetes capital of the world.

The PDS was the original key element of the policy mix to deal with food insecurity in India. Criticism about widespread leakages, poor targeting, and urban bias led to the introduction of a more streamlined Targeted PDS (TPDS) some 20 years back. It targeted very poor households and provided them subsidised grains to improve food security and nutrition. The more recent 2013 National Food Security Act, making food a legal right, also seeks to provide universal food security and improve nutritional status by expanding the PDS.

For this important study, the NCAER research team has used its own data from India's only national longitudinal household panel data set, the *India Human Development Survey* (IHDS). IHDS panel datasets, which are open access and available to all researchers, are uniquely well suited to answering questions about the relationship between economic growth, food security, and malnutrition. The richness of the IHDS data comes both from repeated interviews of the same households at different points in time, and from the extensive, high-quality, scientifically collected information about household characteristics—such as the health, education, marital status, asset holdings, incomes, and livelihoods of household members—that can be analysed along with their food consumption and nutritional status. Using powerful quantitative and analytical tools deployed by economists, demographers, and other social scientists, IHDS data can help evaluate the impacts of public programmes such as the PDS.

IHDS data are collected jointly by NCAER and researchers from the University of Maryland (UMD) at College Park in the U.S. IHDS panel data are available so far for 2004-05 (IHDS-I) and 2011-12 (IHDS-II) and are leading to an explosion of original research on the economic and social changes that India has undergone from a period of sustained rapid economic growth in the mid-2000's through the Global Financial Crisis and its aftermath. IHDS has its roots in an earlier 1993-94 NCAER Survey called the Human Development Profile of India, for which partial longitudinal data are also available. All IHDS data are freely available to the global scientific community through the Interuniversity Consortium for Political and Social Research (www.icpsr.umich.edu) housed at the University of Michigan.

Using IHDS-I and IHDS-II data, this study asks questions about the targeting efficiency of the PDS; the impact of rising incomes on PDS use; the role of PDS in the food baskets of households at different income levels; access to the PDS by poor people and how at different levels of income and other household correlates it shapes household choices between cereal and non-cereal expenditures and food and non-food expenditures. It also asks questions such as: Do rising incomes translate into greater food consumption? Are households with growing incomes likely to shift from cereal to non-cereal foods? How do households with declining incomes cope with income loss? Do they curtail food expenditure? I invite policymakers, professional economists and social scientists, and informed citizens and the media to find answers to these and other questions in this important NCAER study.

India continues to grapple with complex policy and programme challenges of ensuring that economic growth not only remains high but is also inclusive, job creating, and life improving. As recent, unprecedented political events in the US and UK show, democratic governments cannot afford to leave people behind. Independent, rigorous research data and assessments such as this NCAER study can and should help guide public policy making and programme design, implementation, and monitoring in this endeavour. NCAER remains committed to collecting, providing and analysing scientific, unbiased data of the highest quality that can help in this process.

I am deeply grateful to the two team leaders, Drs Sonalde Desai and Indira Iyer, for their leadership of the project team comprising P K Ghosh, Asrar Alam, Dr Prem Vashishtha, Jaya Koti, Anupma Mehta, and Deepa S. I am also grateful to the entire IHDS Survey Team for their painstaking effort in the field and at NCAER and UMD, work that is now making possible studies such as this one.

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The PDS research study has been supported by a grant to NCAER, the National Council of Applied Economic Research, from the Government of India's premier think tank, the NITI Aayog. The data collection for the India Human Development Survey Rounds I (2004-05) and II (2011-12) has been supported principally by three major grants from the U.S. National Institutes of Health (R01HD041455, R01HD046166 and R01HD061048) to the University of Maryland (UMD) at College Park in the US, and then by sub-grants from UMD to NCAER. The IHDS work has also been supported by grants to NCAER from the Ford Foundation and the Knowledge Partnership Programme of the UK Government, the latter providing vital support for the early dissemination of the data. IHDS data collection is a long-standing, collaborative effort between NCAER and UMD led by Professors Sonalde Desai (who holds a joint appointment with UMD and NCAER), Reeve Vanneman (UMD) and Amaresh Dubey (senior NCAER consultant). The IHDS surveys have been guided by an Advisory Panel chaired by Dr Pronab Sen, former Chairman of the National Statistical Commission and India's Chief Statistician, and including representatives from statistical agencies, civil society institutions, and academic researchers. IHDS-I and II received considerable logistical assistance from the erstwhile Indian Planning Commission, and we continue to do so from the NITI Aayog as plans are shaping up for IHDS-III. We gratefully acknowledge the generous and unstinting support of all these organisations, particularly NITI. The fruits of that support are easy to see in studies such as this one and the large number of researchers worldwide now using IHDS data for their own research.

Initial results from this study were presented to NITI Aayog at a meeting chaired by NITI Aayog Member Dr Ramesh Chand. His comments as well as those of other attendees helped strengthen this report. Any errors and omissions are those of the study team.

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Executive Summary

Study Motivation

It has been observed that even though the Indian economy has achieved remarkable economic growth along with a decline in poverty over the last two decades, improvements in nutritional status have not kept pace with this economic growth. The National Sample Survey (NSS) data also documents that the per capita cereal consumption steadily declined for both the rural and urban population between 1993-94 and 2011-12. This study examines the reasons for the disjunction between economic advancement and nutritional improvement in India by analysing the role and performance of the Public Distribution System (PDS) in determining food consumption patterns and nutritional outcomes over a period of time. The PDS, conceptualised as one of the largest safety net programmes in the country, was envisaged as a means of dealing with nutritional deficiency by supplying rice, wheat, sugar and kerosene at highly subsidised prices to the poor. It was launched as a universal programme in the context of food shortages during the early years after Independence. However, since it was widely criticised for its urban bias, it was subsequently streamlined through the launch of the Targeted PDS (TPDS) in June 1997, which aimed at providing very poor families access to foodgrains at reasonably low costs to help them improve their nutrition standards and attain food security. The National Food Security Act also focuses on providing food security via expansion of the PDS.

In this context, greater access to subsidised grains for the poor was expected to reduce malnutrition, leading to a concomitant fall in the number of underweight children. However, most national level surveys conducted during this period including the National Family Health Survey-3, Annual Health Survey and District Level Health Survey did not find any correlation between PDS use and decline in malnutrition. Another expectation which has been belied is that with a rise in incomes, households would increasingly buy higher quality grains from the market rather than the PDS shops. Research findings instead document that rather than declining, PDS use has risen sharply in both urban and rural areas for the poor as well as the non-poor. This study explores these issues in depth and attempts to identify the prevalent food consumption patterns across socio-demographic groups in the country while linking them to questions of food security, malnutrition and the economic status of different categories of households.

Using unique panel data from 2004-05 and 2011-12, this study addresses the following questions:

- How far has the PDS achieved targeting efficiency?
- Has the role of grains purchased at fair price shops become more or less important in recent years?
- Holding income constant, are households that possess Below Poverty Line (BPL) and Antyodaya Anna Yojana (AAY) cards more likely to purchase food from fair price shops than their counterparts with similar incomes?
- How does access to PDS shape the balance between cereal and non-cereal expenditure, and food and non-food expenditure?
- How do households suffering declining incomes cope with income loss? Is curtailment in food expenditure one of the ways of coping with poverty?
- How do households with rising incomes change their food consumption patterns? Are these changes similar for households with access to BPL and AAY cards and those without?

The assessment shows significant qualitative and quantitative changes in the PDS since its advent in the 1970s. The goal of this report is not to replicate the analyses arrived at by other data sources such as the NSS but to exploit the unique nature of the India Human Development Survey that offers information about both incomes and expenditures for the same households at two points in time.

Methodology

The study is based on the findings of the India Human Development Survey (IHDS), a panel survey undertaken jointly by researchers from the National Council of Applied Economic Research and the University of Maryland in 2004-05 and 2011-12. The goal of IHDS-I (2004-05) and IHDS-II (2011-12) has been to trace changes in the daily lives of Indian households in an era of rapid transformation. Therefore, by documenting these changes in the way people live, work, educate their children, care for their aged parents, and deal with ill health, these surveys seek to infuse the development discourse with the lived experiences of ordinary people. IHDS-I and IHDS-II provide a rich empirical database that is available free of charge to a wide range of researchers in India and abroad. At present, more than 7000 users have downloaded these data and more than 200 papers and dissertations have been published using them.

This report contains two types of data analyses. First descriptive statistics are presented to show changes in household use of TPDS in 2004-05 and 2011-12. Second, multivariate analyses using Propensity Score Matching (PSM) and Fixed Effects Regressions are presented to ensure that households with and without access to TPDS

subsidies are compared with similar households in cross-sectional data as well as with their own consumption patterns across the two rounds and thereby hold unobserved food preferences constant.

The report is organised as follows. Subsequent to the Introduction in Chapter 1, Chapter 2 focuses on the coverage and targeting of households under the TPDS. Chapter 3 discusses the access and use of TPDS by consumers. Chapter 4 analyses the efficiency and delivery of the TPDS. Chapter 5 describes the methodology used in matching households with and without BPL and AAY cards in order to address the role of TPDS in shaping household food consumption patterns. Using the PSM method, Chapter 6 examines differences in consumption of different food groups among households with access to TPDS subsidies and comparable households without access to these subsidies. Chapter 7 examines changes in food expenditure and the intake of cereals and milk for the same households at two points in time using a fixed effects regressions approach. Chapter 8 concludes the report by summarising the results and discussing policy implications. Appendix I provides detailed tables pertaining to the data collected during the surveys whereas Appendices II and III provide information about the re-contact and sample attrition rates for IHDS-I and II while also facilitating an assessment of the quality of IHDS data.

Key Findings

The findings of the study are briefly elucidated below:

Coverage of TPDS

- PDS cards are ubiquitous with households that do not own any card declining from 19 per cent to 14 per cent of the total households between 2004-05 and 2011-12.
- Bureaucratic difficulties are seen as being the single most important reason for households not having a card.
- The proportion of households holding Below Poverty Line (BPL) or Antyodaya Anna Yojana (AAY) cards increased from 36 per cent of all households to 42 per cent between 2004-05 and 2011-12. Much of this increase comes from expansion of the AAY programme.
- Although BPL and AAY card holders come from the poorer sections of the society, this concordance is not perfect. The use of the consumption-based poverty line cut-off suggested by the Tendulkar Committee indicates that only 29 per cent of the BPL cardholders are poor while 71 per cent are not poor. In contrast, about 13 per cent of the APL cardholders are poor while 87 per cent

are not poor. Thus, many non-poor have BPL cards while some of the poor are excluded from the ownership of BPL cards.

- The access of the poor to AAY/BPL cards has improved because of the issuance of more cards. However, the access of the rich has also improved because the programme has failed in efficient targeting and an increased proportion of cards have been distributed to the whole population.

Access and Use of the TPDS

- There was a striking rise in PDS use between 2004-05 and 2011-12. In 2011-12, about 27 per cent of all households purchased cereals from the PDS whereas by 2011-12, this proportion had risen to 52.3 per cent.
- Every category of cardholders has recorded a growth in PDS use during the period under study. While almost all the BPL and AAY cardholders are seen to purchase PDS grains, as many as 32 per cent of the Above Poverty Line (APL) cardholders also use the PDS.
- Despite the increase in the use of PDS by the purchasing households, the amount of purchase or the share of PDS grain to the total grain consumed has remained more or less stable.
- PDS use increased not just for food grains but also for kerosene, with 79 per cent of the PDS card holders purchasing kerosene from PDS shops. Although the use of kerosene as a primary cooking fuel is negligible, nearly 28 per cent of the households use kerosene in conjunction with biomass (e.g. firewood) and LPG.

Targeting Efficiency

- Exclusion errors in PDS targeting have declined between 2004-05 and 2011-12 while inclusion errors have increased. However, both types of errors remain high. This change can be attributed both to a decrease in the poverty levels as well as a slight increase in the number of cards being distributed to the whole population.
- Inclusion errors increased across all regions between 2004-05 and 2011-12 and were particularly high for the Southern states.
- While exclusion errors are decreasing, they remain highest for the marginalised groups.

Use of Propensity Score Matching as an Analytical Technique in the Study

- In order to examine if the TPDS is the best way of enhancing food security for all households, it is important to compare households with access to food subsidies to those without such access, while holding income constant. However, this is a difficult proposition due to the general lack of availability of data on household income.

- The India Human Development Surveys I and II contain detailed data on household income as well as a brief consumption expenditure module that allows for an analysis of different aspects of consumption.
- Since random assignment of the households with and without access to subsidies via AAY and BPL cards is not feasible, the study uses the Propensity Score Matching (PSM) technique to compare similar households.
- The results show that at any given income level, households with BPL/AAY cards are far more likely to buy cereals from PDS shops than those that do not have access to these subsidies.

Role of BPL/AAY Subsidies in Shaping Food Expenditure

- Application of the PSM techniques highlights notable distinctions between consumption patterns of households with BPL/AAY cards and those not having access to these cards. The results show that at any given income level, households with BPL/AAY cards are more likely to buy cereals from PDS shops than those with APL cards. Since only BPL cardholders are eligible for subsidised cereals, this is not surprising.
- The expenditure incurred on food by households with BPL/AAY cards is less than the corresponding expenditure incurred by their counterparts who do not have these cards. Once implicit subsidies via PDS transfers are factored in, this difference is smaller but remains statistically significant.
- Households with BPL/AAY cards are ostensibly trying to obtain their caloric needs from cheaper cereals rather than from more expensive items like dairy, fruits, nuts and meats.
- Rising incomes lead to greater dietary diversification for households without BPL cards than the matched households with BPL cards.

Role of TPDS in Shaping Food Consumption in the Context of Income Growth/Decline

- When the same households are compared over time, the trends in food expenditure and food consumption vary between households that experience income growth vis-à-vis those that experience income declines.
- Regardless of access to PDS, food expenditure among households that suffer economic distress does not change substantially, possibly because they economise in other areas. However, food expenditure for households experiencing income growth increases. This suggests that food expenditure has a sticky floor.
- Growth in incomes leads to a higher increase in food expenditure by households without BPL/AAY cards than for those with these cards, even after implicit food subsidies are taken into account.

- While all households experiencing substantial income growth increase their cereal consumption, this increase is lower for households without BPL/AAY cards as compared to those with these cards.
- The results from the household level fixed effects regression suggest that income elasticity for cereal consumption is small but positive, though it is greater for households owning BPL cards than for those without these cards.
- Rising income is more likely to increase milk consumption in households without BPL/AAY cards than in those with these cards, suggesting that higher incomes coupled with the absence of subsidies on cereals lead to greater dietary diversification.

Apart from the specific findings detailed above, the study also indicates that the TPDS became better targeted between 2004-05 and 2011-12, due to a sharp decline in the errors of exclusion, though errors of inclusion persist with many economically better-off households continuing to derive benefits under the TPDS. While the access of the poor improved because of the issuance of a higher number of AAY/BPL cards, the access of the rich also improved due to inefficiency in targeting. Moreover, many households continued to retain the BPL cards they had been issued earlier despite having moved out of poverty after economic growth.

A comparison of the same households between 2004-05 and 2011-12 highlights a differential impact of the TPDS on household food consumption by households that suffer economic distress as opposed to households that experience income growth. Households witnessing a per capita income decline of 20 per cent or greater in constant terms seem to use the TPDS to stabilise their consumption and maintain at least some degree of dietary diversity. When faced with adversity, households increase their use of the PDS to try and keep their food consumption habits constant. In contrast, households whose incomes remain stable or register a sharp increase seem to use the TPDS as a way of obtaining cheaper calories, thereby investing less in increasing dietary diversity than they would possibly have done in the absence of food subsidies.

Theoretically, food subsidies are expected to have two types of effects. As households try to balance their various needs including ensuring adequate caloric consumption, augmenting the quality of their diets, improving their living conditions, and investing in the health and education of household members, the TPDS may change their calculations. For households that value dietary diversity, being able to buy cheap cereals will free up money to purchase other foods such as milk, fruits, nuts, and perhaps eggs and meat (the income effect). For households that have other dominating consumption needs, the money saved by purchasing subsidised cereals may be devoted to those needs and diverted from food expenditure (the substitution effect). Which

effect dominates remains an empirical question. The findings of this study suggest that the substitution effect dominates with households holding BPL/AAY cards acquiring more of their calories from cereals and not increasing investments in other food groups by the same level as non-BPL households.

The results presented in this report thus paint a complex picture of the TPDS programme. While on the one hand, the rising proportion of the Indian population relying on the TPDS for procuring subsidised cereals points to the ubiquity of the TPDS, it also has alarming implications in terms of skewing the dietary composition of households by increasing their cereal consumption. This poses a critical problem particularly for a society facing an epidemiological transition from the dominance of communicable diseases to the rise in non-communicable diseases (NCDs) like cardiovascular diseases, strokes, diabetes and cancer, the four leading NCDs in India. The country also has the highest number of people with diabetes in the world, and this burden has been rising over time, which is why it is sometimes referred to as the 'diabetic capital of the world'. At least some of this increase in the occurrence of the disease could be due to the rising consumption of processed foods and refined foodgrains as unprocessed foods and healthier cereals like small millets are considered inferior foods that households abandon as they get rich.

Cash Transfers—A Way Forward?

Although this report does not directly examine the role of cash transfers, the results arrived at have substantial implications for the discourse about cash transfers, which could help prevent skewing the household consumption of cereals by depressing prices. However, their success would depend on the effective administration of the transfers and reduction in leakages. Moreover, the impact of cash transfers on grain markets cannot be predicted. Thus, while theoretically, cash subsidies instead of in-kind subsidies via the PDS could enhance dietary diversity, it may be more prudent to initially implement a cash transfer programme in only a few districts, particularly those exhibiting diverse food habits and market infrastructure before engaging in the massive transformation of the PDS.

1. The Targeted Public Distribution System in India

1.1 Income, Food and Nutrition Puzzles: Study Motivation

Almost all observers agree that the Indian economy has experienced tremendous economic growth and decline in poverty over the past two decades (Bhagwati and Panagariya, 2012; Dreze and Sen, 2013). However, this transformation has not been matched by improvements in nutritional status (Desai et al. 2016). This disjunction is reflected in a number of puzzles.

1.1.1 Rising incomes and declining cereal consumption

The National Sample Survey (NSS) data, presented in in Table 1.1, documents that between 1993-94 and 2011-12, the per capita cereal consumption declined steadily for both the urban and rural population (National Sample Survey Office, 2014). In view of the steady decline in poverty over this period, the decline in cereal consumption is puzzling. Caloric consumption also seems to have fallen. As suggested by Deaton and Drèze (2009), disaggregated analysis shows that most of this decline took place at the upper income levels, which may be due to a reduction in physical activity and the resultant caloric demands.

Table 1.1: Per capita cereal consumption per month (in kg.)

	1993-94	1999-2000	2004-05	2009-10	2011-12
Rural	13.4	12.7	12.1	11.4	11.2
Urban	10.6	10.4	9.9	9.4	9.3

Source: National Sample Survey (2014, p. 40).

1.1.2 Sharp poverty decline, modest improvement in undernutrition

Although we must rely on the National Family Health Survey of 2005-06 (International Institute for Population Sciences and Macro International, 2007) for national data on nutrition, the results from a variety of other surveys suggest only a modest improvement in the proportion of underweight children. Table 1.2 plots the poverty decline against trends in underweight children from the National Family Health Surveys 1, 2 and 3; surveys from the National Institute of Nutrition (National Nutrition Monitoring Bureau, 2012) and those from the National Council of Applied Economic Research and University of Maryland (Thorat and Desai, 2016). This graph shows a

steady but modest improvement in undernutrition against a sharp drop in poverty. Recently released fact sheets for National Family Health Survey 2015-16 for a selected number of states show a continuation of this trend.

Table 1.2: Changes in Poverty and Underweight children for children under 5 since the 1990s

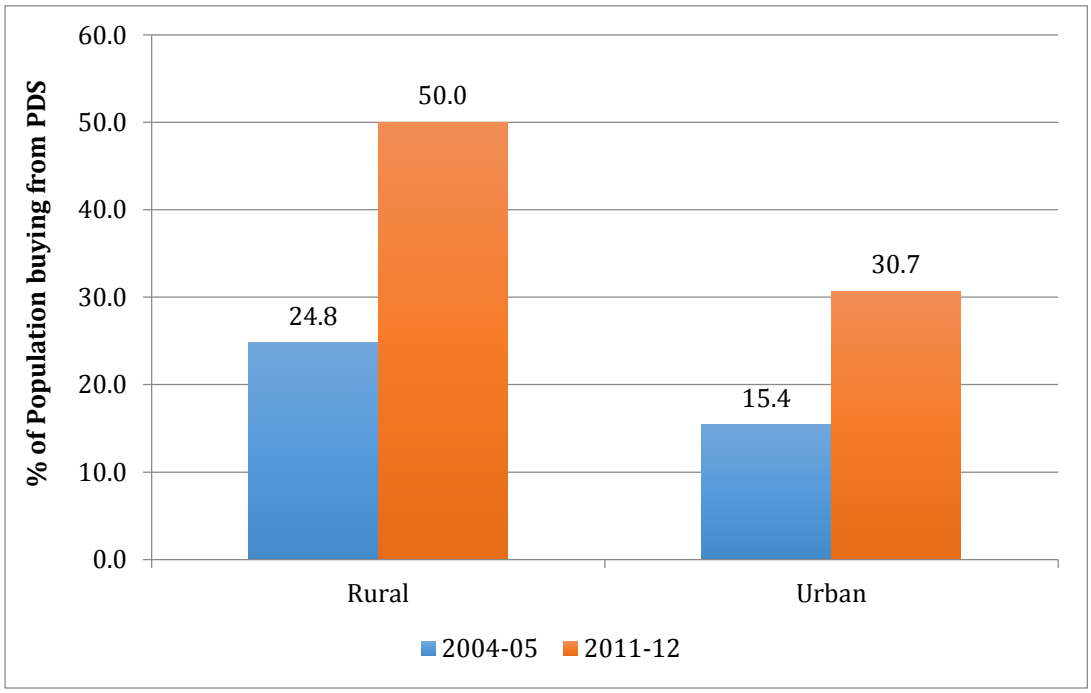
	Poverty Rate	NFHS Underweight	NNMB (Rural) Underweight	IHDS Underweight
1990s	45.3	43.0	48.6	-
2000s	37.2	40.0	-	40.6
2010s	21.9	-	41.1	37.2

Sources: NSSO 2014; IIPS and Macro 2.

1.1.3 Declining poverty, increasing use of the Public Distribution System

The Public Distribution System (PDS) is one of the largest safety net programmes in India, set up to provide subsidised grains to the poor. Although it began as a universal programme in the context of food shortages in the early years of the nation, since 1997 it has been targeted towards the poor, providing rice, wheat, sugar and kerosene at highly subsidised prices to the poor, although households above the poverty line may also access PDS at economic cost. It is generally assumed that as incomes rise, households will buy higher quality grains from the market rather than the PDS shops. Market purchase also offers greater convenience through shops that are open for longer hours and do not have queues. However, as Figure 1.1 shows, instead of declining, PDS use has risen sharply in both urban and rural areas for the poor as well as the non-poor (Himanshu and Sen, 2013a). Figure 1.1 presents only data for cereal purchase but the proportion of households purchasing other food items from PDS shops, including sugar, has also risen.

Figure 1.1: Per cent population purchasing cereals from PDS (NSS 61st and 68th Rounds)



Source: Himanshu and Sen (2013a).

1.1.4 Increase in the use of PDS is not correlated with a decline in malnutrition

It would be reasonable to expect that greater access to subsidised grains would lead to a decline in malnutrition but when we juxtapose the data on PDS use from the NSS with the decline in the proportion of underweight children from the National Family Health Survey 3 (NFHS 3) and the Annual Health Survey (AHS) conducted by the Office of the Registrar General of India and the District Level Health Survey (DLHS) conducted by the International Institute of Population Sciences in Table 1.3, it is difficult to find any correlation between the two. Judging by the comparison between NFHS-3 of 2005-06 and either AHS or DLHS, circa 2012-14, the state of Chhattisgarh, where the PDS is extremely efficient, shows only a decline of 7 percentage points in the proportion of underweight children as compared to Jharkhand, where the decline is 11 percentage points in spite of the prevalence of a relatively less efficient PDS. Judging by these two data sources, Tamil Nadu recorded a tiny decline in undernutrition in spite of the availability of a rice subsidy. At the household level also, a comparison of similar households with and without TPDS subsidy shows no difference in child undernutrition (Desai and Vanneman, 2015).

Table 1.3: Percentage of children under the age of five years classified as malnourished according to indices of nutritional status: height-for-age and weight-for-age, by state

	% Households using PDS			% Children Underweight				
	NSS 2004-05	NSS 2011-12	%age point improvement in PDS use	IHDS-I (2004-05)	IHDS-II (2011-12)	NFHS-3 (2005-06)	DLHS-4/AHS (2012-14)	%age point improvement NFHS-3 to DLHS/AHS
Andhra Pradesh	58.5	76.1	**17.6**	33.4	40.1	32.5	28.1	4.4
Assam	8.4	52.7	**44.3**	50.3	46.6	36.4	30.8	5.6
Bihar	1.9	42.7	**40.8**	54.8	41.4	55.9	40.3	15.6
Chhattisgarh	24.2	57.5	**33.3**	27.6	38.7	47.1	39.4	7.7
Delhi	5.7	12.3	**6.6**	48.5	31.9	26.1		
Gujarat	25.5	22.7	**-2.8**	49.9	37.5	44.6		
Haryana	4.3	16.2	**11.9**	29.6	28.5	39.6	36.2	3.4
Himachal Pradesh	51.6	89.5	**37.9**	28.4	26.6	36.5	28.5	8.0
Jammu & Kashmir	39.5	79.6	**40.1**	10.9	18.2	25.6		
Jharkhand	5.5	29.6	**24.1**	48.8	51.5	56.5	45.7	10.8
Karnataka	50.0	63.1	**13.1**	34.7	32.6	37.6	29.7	7.9
Kerala	39.7	81.9	**42.2**	24.5	23.2	22.9	20.9	2.0
Madhya Pradesh	20.8	36.6	**15.8**	50.9	49.5	60.0	40.6	19.4
Maharashtra	22.1	33.1	**11.0**	38.2	39.1	37.0	38.7	-1.7
Orissa	18.6	63.3	**44.7**	44.0	39.3	40.7	38.9	1.8
Punjab	0.5	19.8	**19.3**	20.1	21.4	24.9	25.2	-0.3
Rajasthan	10.2	25.4	**15.2**	33.5	34.4	39.9	36.6	3.3
Tamil Nadu	72.7	87.1	**14.4**	32.5	29.7	29.8	32.5	-2.7
Uttar Pradesh	5.7	25.4	**19.7**	45.0	39.6	42.4	44.9	-2.5
Uttarakhand	21.0	69.0	**48.0**	45.6	32.8	38.0	28.0	10.0
West Bengal	13.2	44.6	**31.4**	47.5	32.1	38.7	37.4	1.3
All India	**22.4**	**44.5**	**22.1**	**41.9**	**37.4**	**42.5**		

Sources: NFHS and DLHS-IV/AHS data from published reports; NSS PDS use data from Himanshu and Sen (2013a), IHDS data on underweight children, authors' calculations.

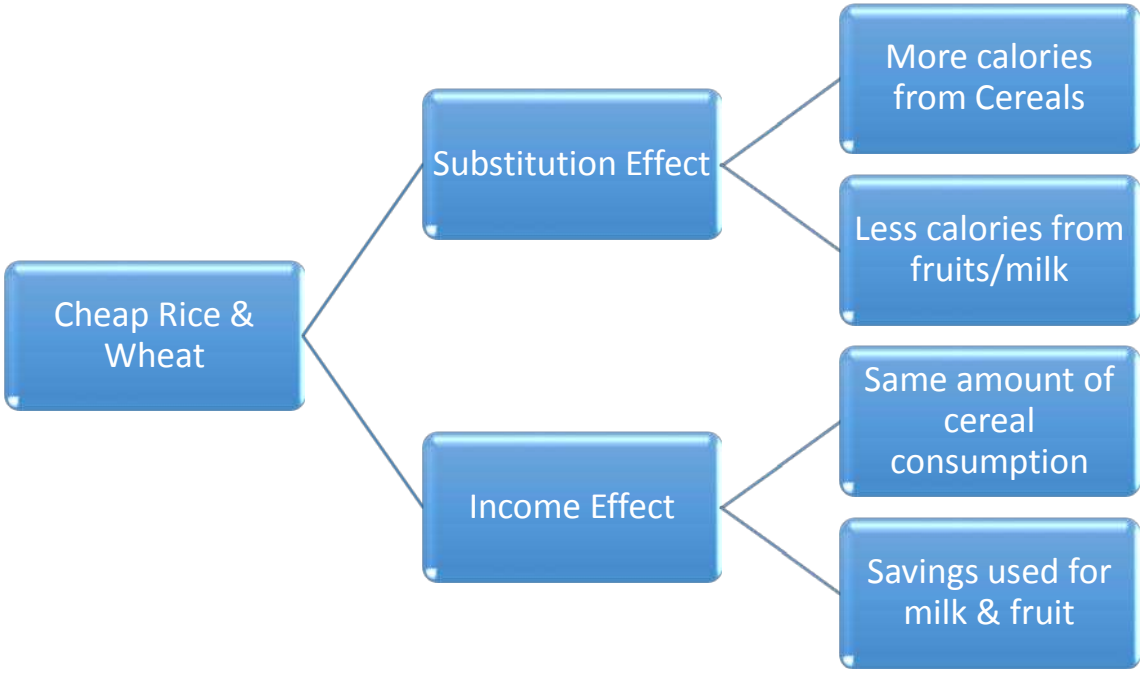
*The IHDS state samples are very small and hence the results should be treated with great caution. The IHDS-I sample for underweight children is only 5,630 children aged 0-5 years and the IHDS-II sample is 10,555.

The disjunction between economic growth, food consumption and nutritional outcomes motivates the present study.

1.2 Food Security and Nutritional Security

The National Food Security Act primarily focuses on providing food security via expansion of the PDS. However, the extent to which this would lead to nutritional security depends on how households respond to the availability of cheap cereals.

Figure 1.2: Competing impacts of cereal subsidies



Source: Authors description for this report.

Figure 1.2 outlines two potential effects that PDS subsidies may have on household consumption decisions. Households continually try to balance their various needs including ensuring adequate caloric consumption, enhancing the quality of their diets, improving living conditions and investing in the health and education of household members. For households that value dietary diversity, being able to buy cheap cereals will free up money to purchase other foods such as milk, fruits, nuts, and perhaps eggs and meat (income effect). For households that have other dominating consumption needs, money saved by purchasing subsidised cereals may be devoted to those needs and diverted from food expenditure (substitution effect). Which effect dominates remains an empirical question.

The issue of dietary diversity has received little attention in Indian policy discourse until recently (Bhargava, 2014; Gaiha et al. 2014). However, this is an issue that deserves considerable attention as India approaches an epidemiological transition

with the increasing incidence of non-communicable diseases (NCDs). Although communicable diseases remain dominant in the country, the prevalence of NCDs is rising. Cardiovascular diseases, strokes, diabetes, and cancer are the four leading NCDs in India (Upadhyay, 2012). India has the highest number of people with diabetes in the world (Ghaffar, Reddy, and Singhi, 2004) and this burden has been rising over time (Kaveeshwar and Cornwall, 2014), which is why it is often referred to as the 'diabetic capital of the world' (IDF, 2009). At least some of this increase in the occurrence of the disease could be due to the rising consumption of processed foods and refined foodgrains (Mohan et al., 2010) as unprocessed foods and healthier cereals like small millets are considered inferior foods that households abandon as they get rich.

Ironically, increasing incomes have not led to improving diets. Studies of dietary diversity document declining diversity over time (Gaiha et al., 2014), anaemia remains prevalent at almost all income levels (International Institute for Population Sciences and Macro International, 2007), and the proportion of individuals suffering from NCDs has grown even as India has experienced a surge in economic growth.

This issue is particularly critical for India since there is some possibility that either genetic factors or their traditional carbohydrate-based diets make Indians more susceptible to cardiovascular diseases and diabetes. South Asian populations living abroad, particularly in Europe and the United States, have shown very high rates of diabetes, high blood pressure and heart conditions (Gunarathne et al., 2009; Gupta et al., 2011). The rates of coronary heart disease have been reported to be unusually high in several parts of the world among people originating from the Indian subcontinent (McKeigue, Miller, and Marmot, 1989). A UK study showed that men and women from India had the highest standardised mortality rates due to cardiovascular diseases, and that young Indian men were at particularly high risk of contracting these diseases (Balarajan et al., 1984). The cardiovascular mortality of South Asian migrants was also seen to increase with the duration of residence in England and Wales, presumably as these migrants became richer (Harding, 2003). Indian immigrants in the United States show a higher prevalence of diabetes and a number of related chronic diseases such as hypertension and cardiac conditions (Bhopal, 2000; Shah et al., 2015), possibly due to the increased consumption of processed carbohydrates facilitated by increasing incomes.

Thus, it is important to examine the extent to which the availability of subsidised cereals affects dietary diversity.

1.3 Study Goals

Using data from the India Human Development Survey of 2004-05 and 2011-12, this study addresses the following questions:

1. What is the targeting efficiency of the PDS?
2. Has the role of grains purchased at fair price shops become more or less important in recent years? Rising incomes may reduce reliance on PDS, whereas in contrast, rising food prices may spur PDS usage. Thus, evaluating the role of the PDS in the food baskets of families at various income levels remains an empirical priority.
3. Holding income constant, are households with BPL and Antyodaya cards more likely to purchase food from fair price shops? How does access to PDS shape the balance between cereal and non-cereal expenditure, and food and non-food expenditure?
4. Do rising incomes translate into greater food consumption? Are households with growing incomes likely to shift from cereal to non-cereal foods?
5. How do households with declining incomes cope with income loss? Do they curtail food expenditure?

1.4 India Human Development Surveys I and II

This study relies on data from the India Human Development Survey of 2004-05 and 2011-12. The IHDS-I (2004-05) and IHDS-II (2011-12) constitute a collaborative research programme between researchers from the National Council of Applied Economic Research (NCAER) and the University of Maryland. The goal of IHDS is to document changes in the daily lives of Indian households in an era of rapid transformation. In documenting changes in the way people live, work, educate their children, care for their aged parents, and deal with ill health, these surveys seek to infuse the development discourse with the lived experiences of ordinary people. These surveys provide a rich empirical database that is available free of charge to a wide range of researchers in India and abroad, providing data for informed policy debates. At present, more than 7000 users have downloaded these data and more than 200 papers and dissertations have been published using them.

IHDS-I is a nationally representative survey of 41,554 households conducted in 2004-05. IHDS-II has re-interviewed 83 per cent of the original households as well as split households residing within the same locality and an additional sample of 2134 households. This takes the sample size for IHDS to around 42,152 households. The

sample is spread across 33 (now 34) states and Union Territories and covers rural as well as urban areas. Most of the IHDS-I interviews were conducted between October 2004 and December 2005 while most of the IHDS-II interviews were conducted between October 2011 and December 2012.

India has a long and distinguished history of survey research starting with the 1950s. However, most national surveys are single-focus surveys, making it difficult to study inter-relationships between different aspects of human development. Moreover, these cross-sectional surveys only allow for snapshots of society at different points in time. Repeatedly interviewing the same households allows for a richer understanding of which households are able to partake in the fruits of growth, what allows them to move forward, and the process through which they are incorporated in or left out of a growing economy.

IHDS-I and IHDS-II collected extensive data on education, health, livelihoods, family processes as well as the way in which households are embedded in a broader social structure. Contextual information was also collected in surveys of village infrastructure and markets, and from one private and one government school and medical facility in each village/block. The data that are of greatest use in this report include data on income and expenditure. The income data are based on nearly 56 sources of income inclusive of wage and salary incomes, self-employment incomes from farms and businesses, and incomes from public and private transfers. The consumption expenditure module mimics the short consumption expenditure module used by the National Sample Survey Organisation in their employment-unemployment surveys and includes purchases of cereals, sugar and kerosene from both PDS and non-PDS sources.

The IHDS fieldwork, data entry and analyses have been funded through a variety of sources including the US National Institutes of Health, UK Department of International Development (DFID), The Ford Foundation, Poorest Area Civil Societies (PACS) Initiative, The World Bank and International Research Development Centre (IRDC), Canada. Logistical support for this work was provided by The Planning Commission. Throughout this work, IHDS has been guided by an advisory panel chaired by Dr Pronab Sen, Chairman, National Statistical Commission, and consisting of eminent Indian researchers, policy makers and representatives of several government ministries. A detailed description of the IHDS sample and assessment of IHDS data quality is provided in Appendices II and III.

1.5 Targeted Public Distribution System

Of all the safety net operations in India, the most far-reaching is the public distribution system (PDS). The PDS provides basic items such as rice, wheat, sugar, and non-food items such as kerosene in rationed amounts at below-market prices. The programmes originated during the early period after Independence, when food shortages necessitated large imports of food under the PL-480 grants from the United States. A large network of PDS shops, also known as Fair Price Shops, was established: local traders were enrolled as owners, and each household was issued a PDS card with monthly per capita entitlements of food staples. The programme continued with indigenous public resources even after the PL-480 programme ceased to exist when India's food production improved. According to the annual report of the Department of Food and Public Distribution, a network of about 5.21 lakh Fair Price Shops (FPS) distributed subsidies worth Rs 98,979.52 crore in 2014-15 from the Centre (Department of Food and Public Distribution, 2015).

The PDS has changed both qualitatively and quantitatively since the 1970s. At first, the PDS was confined to urban areas and regions with food deficits. The main emphasis was on price stabilisation. Private trade was considered exploitative, and the PDS was considered a countervailing power to private trade. Since the early 1980s, the welfare role of the PDS has gained importance. Nevertheless, the PDS was widely criticised for its failure to reach those living below the poverty line (BPL), that is, for whom the programme was intended. Although rural areas were covered in many states in the 1980s, the PDS had an urban bias and large regional inequalities in its operation. An effort was thus made to streamline the PDS by introducing the Targeted Public Distribution System (TPDS) in June 1997. The objective was to help very poor families buy food grains at a reasonably low cost to enable them to improve their nutrition standards and attain food security. The new system followed a two-tier subsidised pricing structure: one for BPL families, and another for Above the Poverty Line (APL) families. The Union Budget 2000-011 announced a monthly allocation of 25 kg of foodgrains to about 60 million BPL families under the TPDS. The issue price of foodgrains for BPL families was initially fixed at 50 per cent of the economic cost that the APL families pay. All prices are revised by the Food Corporation of India (FCI) from time to time, and the states may offer further subsidies. The total food subsidy (including that offered by programmes other than the PDS) has significantly increased in real terms over the years.

In order to target the TPDS more towards the poor, the Antyodaya Anna Yojana (AAY) was launched in December 2000. This scheme sought to identify the 10 million

poorest of the BPL families and to provide each of them with 25 kg of foodgrains per month at a fixed price of Rs 2 per kg for wheat, and Rs 3 per kg for rice.

The TPDS operates through a coordinated system between the Centre and the state governments wherein the Centre is responsible for setting the Minimum Support Prices (MSP) for foodgrains bought from the farmers and allocates this purchase among the states at the Central Issue Price (CIP). The allocation of foodgrains for BPL quota to the states/UTs is made on the basis of the poverty estimates from 1993-94 and population size of 2001. Allocation for the APL quota, on the other hand, is subject to availability.

The Centre, however, does not choose the actual beneficiaries, as this is in the domain of state governments, which identify the poor and distribute the foodgrains through a network of over five lakh fair price shops (FPSs). Nonetheless, state policies on the PDS can differ. For instance, Tamil Nadu has a universal PDS; Chhattisgarh has its own legislation called the Chhattisgarh Food Security Act 2012, which categorises beneficiaries as AAY, priority, and general, similar to the National Food Security Act (2013); while Gujarat follows the Central schemes and classifies beneficiaries as AAY, BPL and APL.

Ration cards are also used as proof of residence and BPL cards are particularly valuable for accessing other benefits like free LPG connections and medical health insurance. Under the Rashtriya Swasthya Bima Yojana (RSBY) launched by the Ministry of Labour and Employment, Government of India, BPL cardholders are entitled to hospitalisation coverage of up to Rs 30,000 with pre-existing conditions also being covered. State governments offer additional benefits to BPL cardholders, which may differ from state to state. For instance, in Delhi, under the Swaran Jayanti Shahari Rozgar Yojana (SJSRY), the government provides loans to the unemployed to set up gainful self-employment of up to Rs 50,000 with a subsidy component of 15 per cent of the project cost.

1.5.1 (Over) Identification of the poor

The Central Government identifies the BPL households by using the 1993-94 poverty estimates of the Planning Commission. The identification of the poor under the scheme is done by the states as per the state-wise poverty estimates of the Planning Commission for 1993-94, which are derived using the methodology of the "Expert Group on estimation of proportion and number of poor" chaired by Late Professor Lakdawala. The Ministry of Rural Development provides the criteria for classification based on the BPL Census of 2002. Until recently, BPL cards were given on the basis of a list prepared during the BPL survey of 2002, though many states have added their own criteria and expanded the BPL list. Over the last two years, some states have begun to

re-issue BPL cards (now usually called Priority Household Cards) using the recently conducted Socio-Economic and Caste Census (SECC), but this practice has not yet been extended to the entire nation and does not affect the periods being examined in this report, that is, 2004-05 and 2011-12.

Poverty levels have been falling since then and the Planning Commission released poverty estimates in 2004-05 and 2011-12 following the new methodology suggested by the Tendulkar Committee (see Table 1.4). Some part of the over-identification of the poor and targeting leakages under TPDS in 2011-12 is because of the misclassification of those who now are non-poor but are still identified as poor by the government. As seen in Chapter 4, this has led to significant inclusion errors (mis-classification of the non-poor as poor).[1]

Table 1.4: Poverty estimates

Years	Planning Commission	IHDS
1993	45.3	N/A
2004-05	37.2	38.4
2011-12	21.9	21.3

Sources: Planning Commission (2013); IHDS surveys 2004-05 and 2011-12 using poverty lines established by the Tendulkar Commission.

1.5.2 Beneficiary categorisation

The PDS cards essentially entitle the identified beneficiaries in the AAY, Annapurna, BPL and APL categories to purchase foodgrains (rice, wheat, coarse cereals), sugar, kerosene and a few other items at subsidised costs.

The beneficiaries under the TPDS fall under two main categories: BPL households, and APL households. The Planning Commission calculates the state-wise estimates of those to be covered under the TPDS while the state governments identify the BPL households. The Antyodaya Anna Yojana (AAY) was introduced in 2000 and targets the poorest among the poor of the BPL households. The IHDS surveys indicate that access of the poor to AAY/BPL cards has improved as more cards were given out. However, the access of the rich also increased as the programme was not well targeted and more cards were given out to the population as a whole.

[1] The Saxena Report (2009), constituted to advise the Ministry of Rural Development on the methodology for conducting the BPL Census for the Eleventh Five Year Plan also reports a similar finding.

In addition to the BPL, APL and AAY categories, the Annapurna scheme launched on April 1, 2000, for senior citizens makes the destitute citizens not covered under the National Old Age Pension Scheme (NOAPS) or State Pension Schemes eligible to receive 10 kg of foodgrains free of cost.

1.5.3 Rising food subsidies

The TPDS offers food security at highly subsidised prices. The food subsidy is the difference between the Central Government's cost price, which includes the MSP for crops purchased from the farmers, transportation and handling cost (called the economic cost), and its selling price, which is the CIP. The food subsidy has been increasing over the years from Rs 23,793 crores in 2004-05 to Rs 72,371 crores in 2011-12 (Table 1.5), and is estimated to be Rs 1,07,824 crores in 2014-15.[2] In 2011, almost two-thirds of the food subsidy bill was spent on AAY/BPL beneficiaries.

Table 1.5: Scheme-wise food subsidy under various welfare schemes

(Rs in Crore)

Scheme	2009-10	2010-11	2011-12
Total Subsidy	**58242**	**62930**	**72371**
Scheme-wise Subsidy			
Antyodaya Anna Yojana (AAY)	14224	14083	15486
Above Poverty Line (APL) (Including Special Additional)	12595	15875	16191
Below Poverty Line (BPL)	19564	20385	30571
Targeted Public Distribution System (TPDS)	**46383**	**50343**	**62248**
Mid-Day Meal (MDM)	3087	2849	2703
Other Welfare Schemes	1765	1473	1512

Source: Lok Sabha unstarred question No. 775, dated 14.08.2012.

However, as has been found in several studies and reports, the subsidies on food have not been well targeted and there have been significant leakages, though these appear to be declining in recent years. The leakage was estimated to be around 54 per cent in 2004-05 though it declined to 44 per cent in 2007-08 (Khera, 2011). Much of this leakage seems to be concentrated in the APL category. Using both the NSS and IHDS data, Dreze (2015) finds that APL leakages were 67 per cent, using NSS (2011), and 56 per cent using IHDS (2011), while the BPL leakages for the two surveys were at 30 per cent and 21 per cent, respectively (Dreze, 2015). Chapter 4 discusses in detail the efficiency issues that arise in the functioning of the TPDS in its current form.

[2] Economic Survey, Volume I, 2015.

1.5.4 Right to food under the National Food Security Act of 2013

The National Food Security Act (NFSA) 2013 envisages to provide subsidised foodgrains to over two-thirds of India's population. It will be the world's largest food security scheme. It comes at a significant monetary cost though there is no consensus on the estimate. The annual cost of NFSA is estimated at Rs 1.3 lakh crores per year (Sinha, 2013), at Rs. 1 lakh crores per year (Khera, 2012), and at Rs 6.8 lakh crores over the next three years, or Rs 2.3 lakh crores per year (Gulati, Gujral, and Nandakumar, 2012). At the top end, Surjit Bhalla has estimated the cost at an even higher level at Rs 3 lakh crores or 3 per cent of GDP per year (Bhalla, 2013), whereas Prachi Mishra made a far more conservative estimate of the cost in 2013-14 at Rs 44,411 to Rs 76,486 crores (Mishra, 2013). The vastly differing estimates of the cost of NFSA are due to the different methodologies used for calculating leakages, the agricultural production costs, and other costs related to transportation and storage.

Noting that the leakages from the TPDS ranged from 40 to 50 per cent, even going up to 70 per cent in some states, the Shanta Kumar Committee (Government of India, 2015) recommended that the Government of India should defer the implementation of the NFSA in states that have not set up end-to-end computerisation, have not put up the beneficiaries online for anyone to verify, and have not set up vigilance committees to check pilferage from the PDS. In addition, the Committee also recommended that the coverage under NFSA should be 40 per cent as against the present 67 per cent and that alternative mechanisms to TPDS for making cash transfers could potentially be more effective as well as save subsidy costs of up to Rs 30,000 crores a year.

However, there are mixed reviews of whether or not cash transfers will improve food security. Using the NSSO 2011-12 survey, Ashok Gulati and colleagues (Gulati and Saini, 2015) make a strong argument for shifting the support to the poor from a highly subsidised price policy to an income policy of cash transfers through the Jan-Dhan Yojana and dovetailing the Unique Identification (UID) or the Aadhaar scheme as almost half of the grain allotted for the TPDS does not reach the beneficiaries due to inefficient targeting. There is a legitimate concern about cash subsidies being used for other expenditures besides food consumption but results from two randomised controlled trials that provided unconditional cash transfer to a group of households (Gangopadhyay, Lensink, and Yadav, 2012; Sewa Bharat, 2013), find that an unconditional cash transfer does not lead to a decline in food security, but provides opportunities for households to shift to other nutritious options in the non-cereal segment. Interestingly, if the PDS system is functioning well, it is found that the poor prefer in-kind food transfers to cash transfers. Based on a household survey conducted in May–June 2011 and covering more than 1,200 rural households across nine Indian

states, Ritika Khera found that over two-thirds of the respondents expressed a preference for food instead of cash transfers (Khera, 2013).

The TPDS prevalent at the time of the IHDS 2011-12 survey and the NFSA 2013 differ in some significant respects (Balani, 2013). The TPDS has been set up under an administrative order and has no legal backing whereas the NFSA provides statutory backing to the right for food. The beneficiaries under the TPDS were categorised as AAY, BPL or APL, whereas under the NFSA, the beneficiaries would be categorised as AAY, priority, and excluded. The entitlements under both schemes also vary. The AAY beneficiaries would continue to get 35 kg/household/month under both schemes. However, while the BPL households were getting 35 kg/household/month under the TPDS, the "priority" category under the NFSA will be getting 5 kg/person/month. Unlike the TPDS, where the cost of foodgrains was different for different categories of beneficiaries, under the NFSA, the cost of foodgrains would be the same for all categories at Rs 3/kg for rice, Rs 2/kg for wheat, and Re 1/kg for coarse grains, although this may be revised every three years. In this report, we focus on data collected during 2011-12 preceding the enactment of the NFSA, allowing us to sidestep the complexities associated with modelling differential implementation of the NFSA across states and providing a baseline assessment against which future studies can be carried out in the post-NFSA period.

1.6 Structure of This Report

This report analyses the impact of the PDS on household well-being using data from the India Human Development Surveys (IHDS) I and II, carried out in 2004-05 and 2011-12, respectively. The following chapters explore in detail the data collected during the two rounds of the IHDS surveys. Chapter 2 focuses on coverage and targeting under the TPDS. Chapter 3 discusses the access and use of TPDS. Chapter 4 analyses the efficiency of the TPDS. Chapter 5 describes Propensity Score Matching (PSM), the primary analytical technique used in this report, and assesses the quality of matching. Chapter 6 applies PSM to examine differences in consumption patterns between households with access to TPDS subsidies and comparable households without access to these subsidies. Chapter 7 examines changes in food expenditure and the intake of cereals and milk for the same households at two points in time using a fixed effects regressions approach, and Chapter 8 summarises the results to discuss policy implications. Appendix I provides detailed tables while Appendices II and III provide information about re-contact and sample attrition for IHDS-I and II as well as assessment for the quality of IHDS data.

2. Coverage

Key messages

- *PDS cards are ubiquitous as there are very few households that do not have PDS cards. The proportion of cards with the AAY/BPL households has grown between the two survey periods, viz. 2004-05 and 2011-12.*
- *The proportion of households with BPL and AAY cards is quite large. This proportion is larger than the proportion of the poor based on the NSS.*
- *Poverty ratios have been decreasing but the number of those holding AAY/Annapurna and BPL cards has been increasing.*
- *Supply chain leakages as well as leakage due to inclusion are both found to be quite high in 2004-05 as well as 2011-12.*
- *The access of the poor to AAY/BPL cards improved because more cards were handed out. However, the access of the rich also improved because the programme did not become better targeted and the increased cards were distributed to the whole population.*

2.1 Introduction

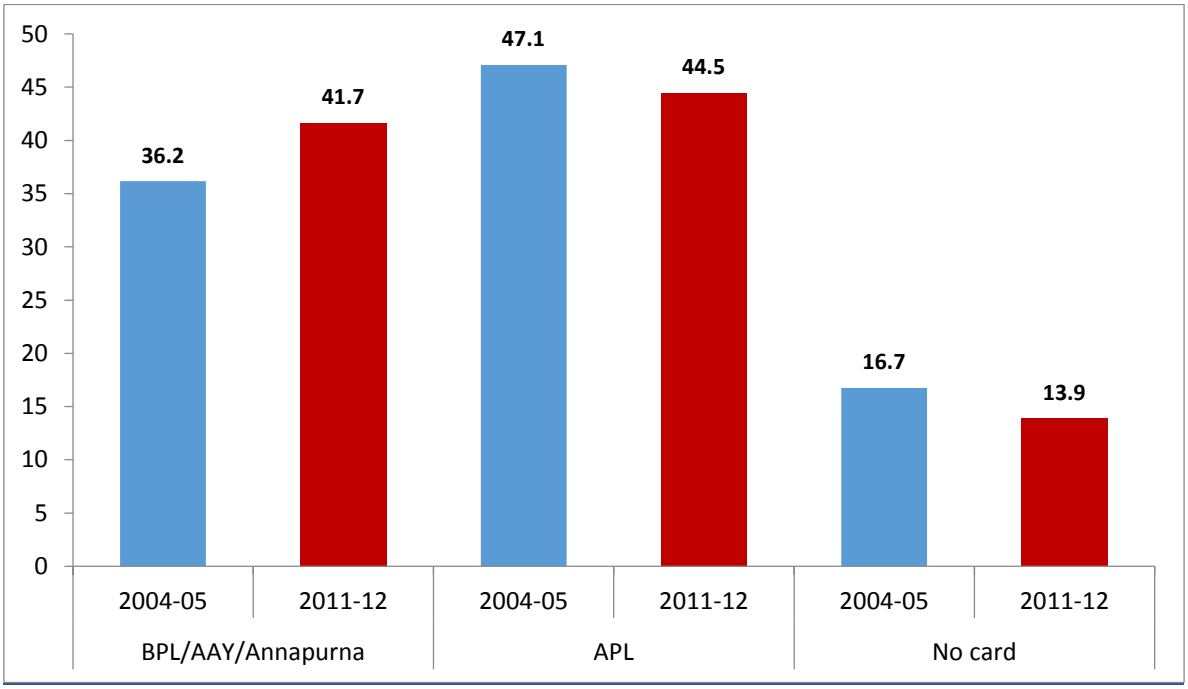
In order to access the PDS, households must first acquire a card which lists the number of household members included on the card and the place of residence for the cardholder. The card also identifies the household as Above Poverty Line (APL), Below Poverty Line (BPL) or Antyodaya Anna Yojana (AAY) category. Difficulties in accessing PDS may begin with difficulties in obtaining a card, particularly for households that have newly migrated and may not be able to provide proof of residence. In this chapter we examine households' access to PDS cards.

2.2 PDS Cards Are Ubiquitous

The coverage of the PDS increased from 83.3 per cent of the households in 2004-05 to 86.1 per cent of the households in 2011-12. Over this period, the proportion of those using AAY/Annapurna cards and BPL cards grew from 2.5 per cent to 6 per cent for AAY/Annapurna cards and from 33.7 per cent to 35.7 per cent for BPL cards.

Simultaneously, the number of those using APL cards decreased from 47.1 per cent to 44.5 per cent and the number of those with no cards decreased from 16.7 per cent to 13.9 per cent during this period (Figure 2.1). In comparison, using the NSSO 2011-12 Round, Rahman (2014) finds a slightly higher percentage of beneficiaries for BPL cards at 37.9 per cent and a slightly lower percentage for APL cardholders at 42.3 per cent.

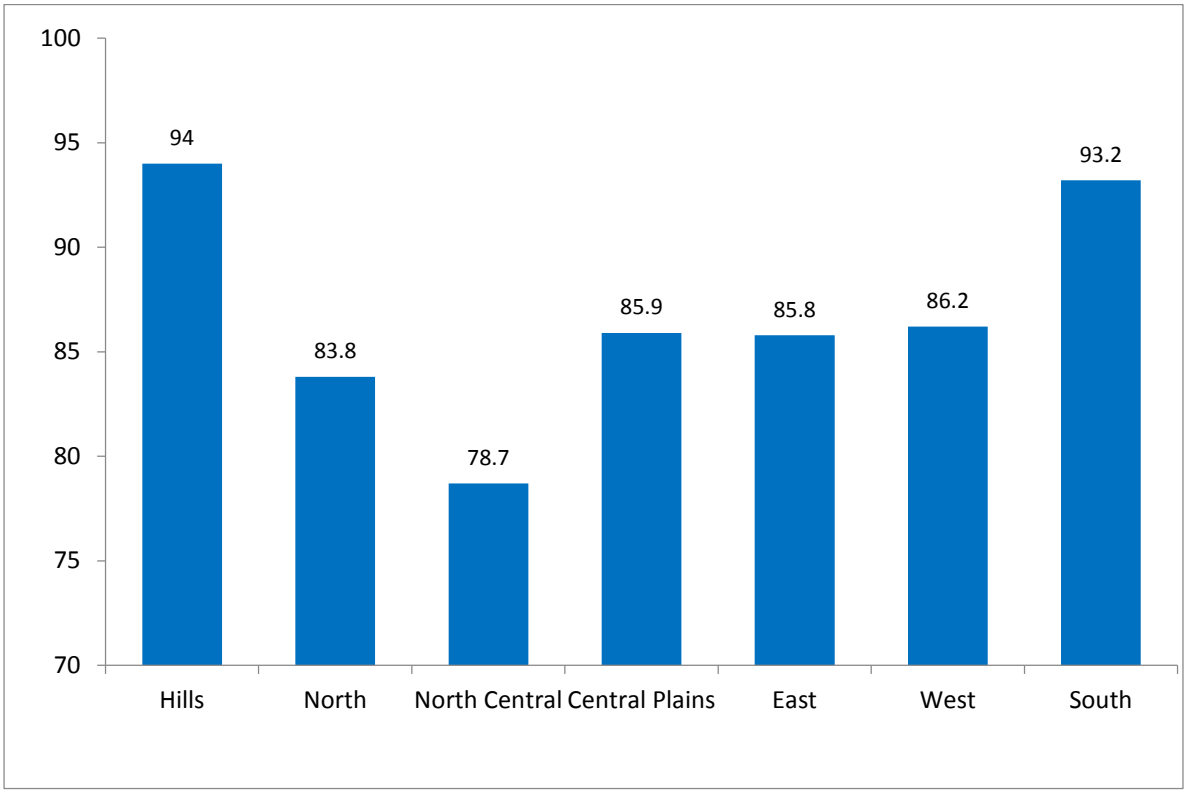
Figure 2.1: Distribution of cards under different categories in 2004-05 and 2011-12 (in per cent)



Source: Authors' calculations from IHDS data.

Not unexpectedly, there is a wide regional spread in coverage. In the hill region and the South, there is close to full coverage with 94 per cent and 93.2 per cent of the households having a PDS card. In contrast, in the North central region, only 78.7 per cent of the households have a PDS card (Figure 2.2).

Figure 2.2: Region-wise distribution of cards (in per cent)



Source: Authors' calculations from IHDS data.

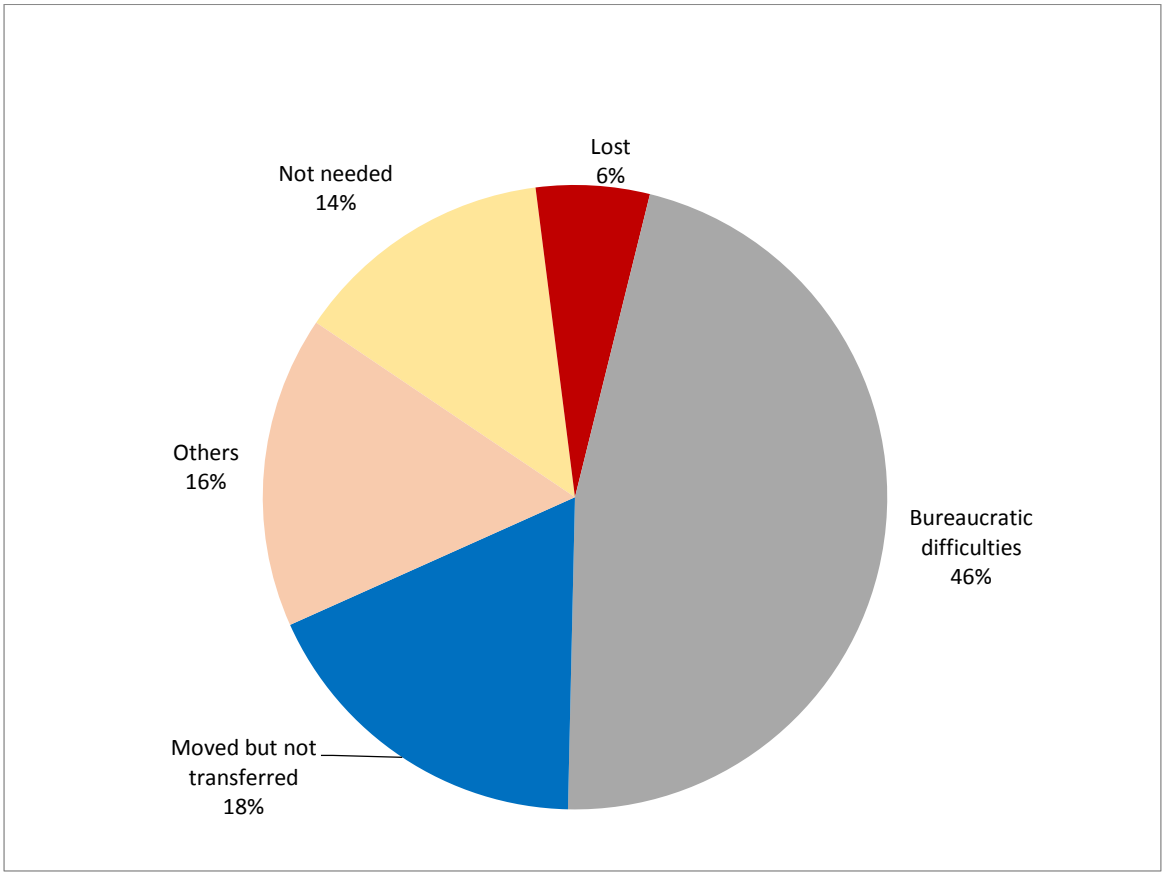
2.3 Bureaucratic Difficulties Seen as Singular Reason for Not Having a Card

The percentage of households not having a card decreased between the two survey periods from 16.7 per cent to 13.9 per cent (Figure 2.3). Of those not having a card, close to 43 per cent of the respondents in 2004-05 and 47 per cent in 2011-12 cited "bureaucratic difficulties" as being the major reason for not having it. The proportion of those who reported "not needing" a card increased from 9.3 per cent to 13.5 per cent over this period. Bureaucratic difficulties are seen to be experienced the most by the least developed villages and the least by college graduates and rich households.

Bureaucratic difficulties are also seen to be a major impediment in obtaining ration cards in the northern, central and eastern regions with over 50 per cent of the beneficiaries reporting this as a major problem. In contrast, less than a quarter of the respondents in the western and southern regions reported this as a major difficulty. In

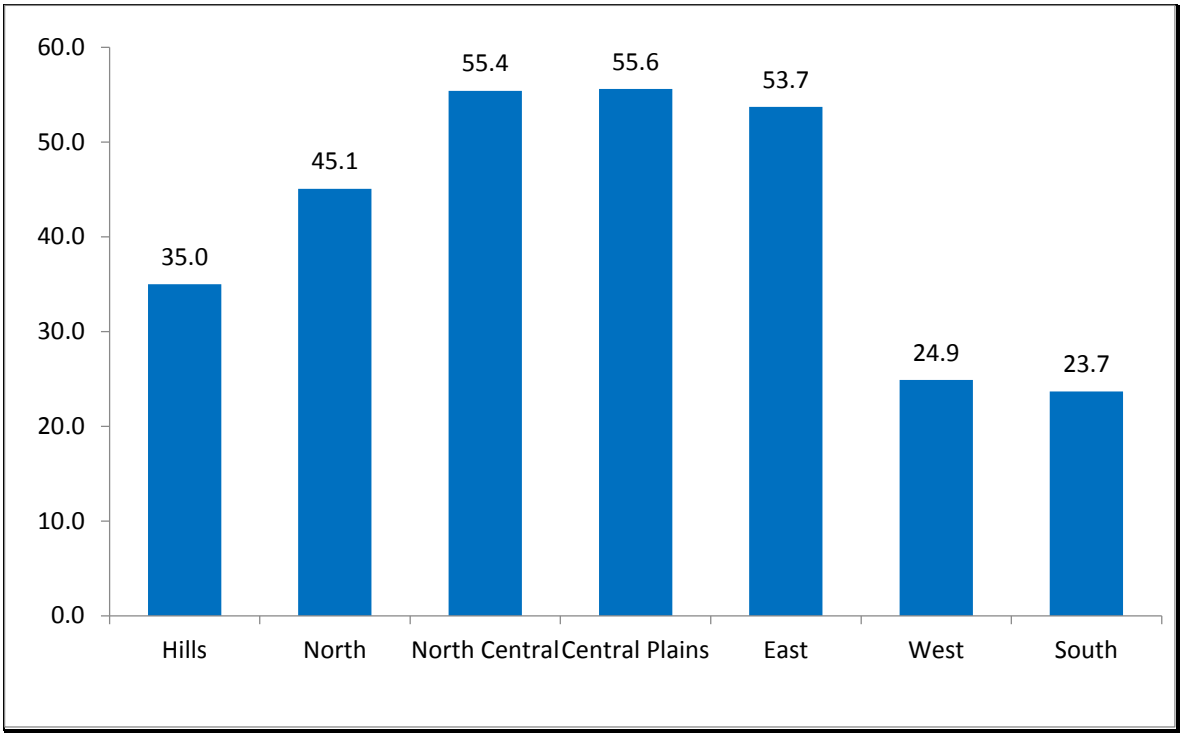
the latter two regions, the beneficiaries who did not have a card mainly said that they did not need it or that they had moved (Figure 2.4).

Figure 2.3: Reasons for not having ration cards 2011-12



Source: Authors' calculations from IHDS data.

Figure 2.4: Region-wise proportion of households claiming bureaucratic difficulties in getting ration cards in 2011-12 (in per cent)



Source: Authors' calculations from IHDS data.

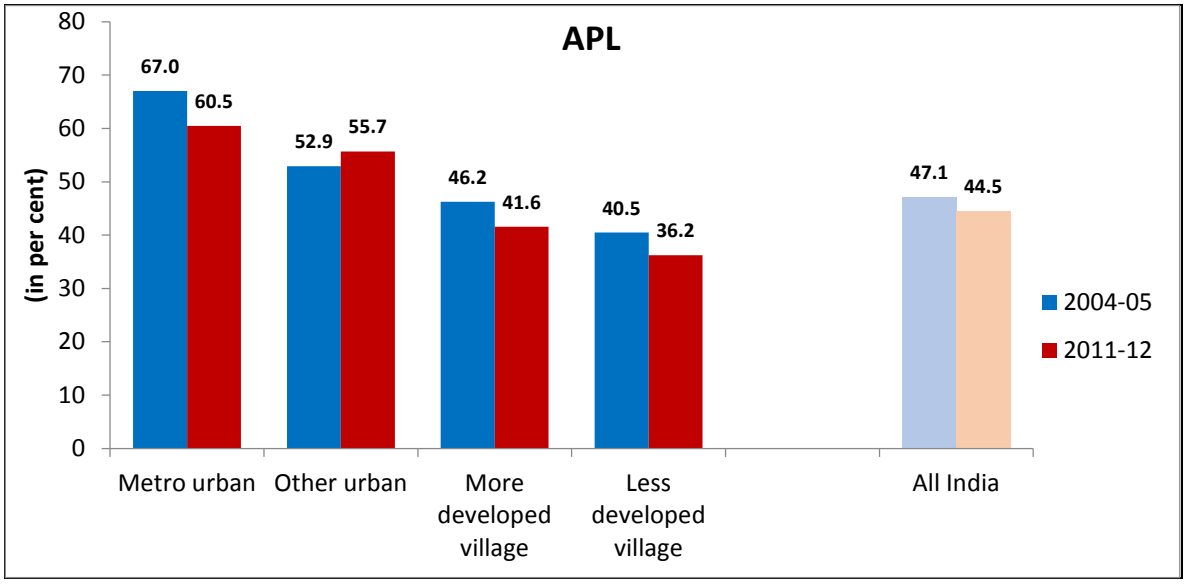
2.4 The Rural Spread

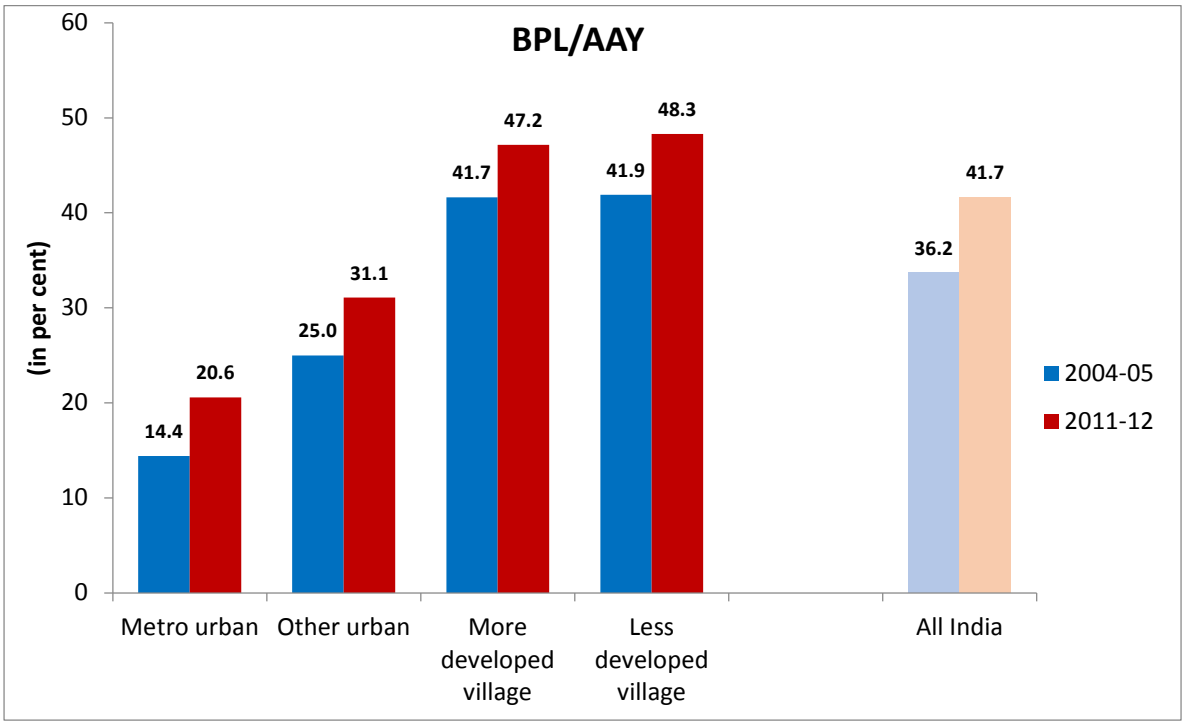
An analysis of the spatial distribution of ration cards in 2011-12 indicates that 32 per cent of the beneficiaries were located in urban areas and 68 per cent in rural areas, figures which are close to the national population distribution. This is a welcome change from the urban bias in the PDS system at its inception. Almost 85 per cent of the AAY/Annapurna beneficiaries were concentrated in rural areas while the corresponding percentages for the BPL and APL cardholders were 77 per cent and 59 per cent, respectively. The increase in the number of AAY/BPL cards in the different areas including metro urban, other urban, more developed villages and less developed villages indicates that the percentage of households with AAY/BPL cardholders increased more or less evenly by 6 percentage points over the period 2004-05 to 2011-12 (Figure 2.5).

The biggest challenge facing the PDS lies in its difficulties in identifying appropriate beneficiaries for the BPL and AAY subsidies. The fact that almost 85 per cent of AAY/Annapurna beneficiaries are concentrated in rural areas along with 77 per

cent BPL beneficiaries suggests a need to look at the extent to which these errors are distributed across urban and rural areas as well as between different social groups.

Figure 2.5: Place of residence and change in cardholders between 2004-05 and 2011-12 (in per cent)



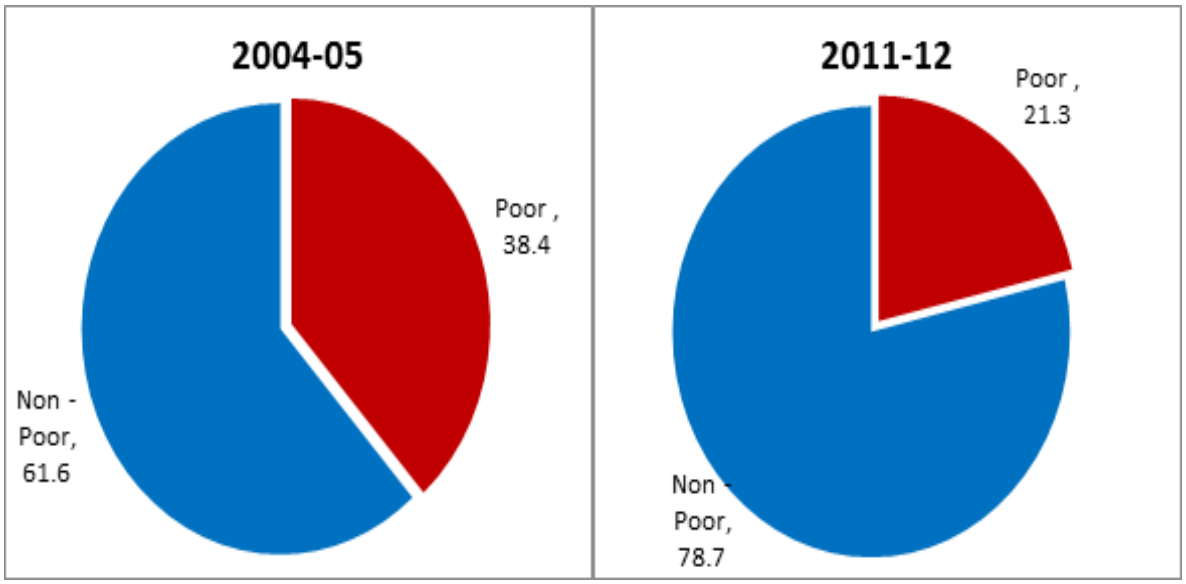


Source: Authors' calculations from IHDS data.

2.5 Income Distribution of PDS Cardholders

As per the IHDS 2004-05 and 2011-12 surveys, the percentage of the poor came down from 38.4 per cent in 2004-05 to 21.3 per cent in 2011-12 using the Tendulkar Committee poverty line based on consumption data, while the proportion of non-poor went up from 61.6 per cent to 78.7 per cent. Hence, while poverty was declining, ironically the proportion of households with AAY or BPL cards had actually increased slightly.

Figure 2.6: Poverty ratios in 2004-05 and 2011-12 (in per cent)



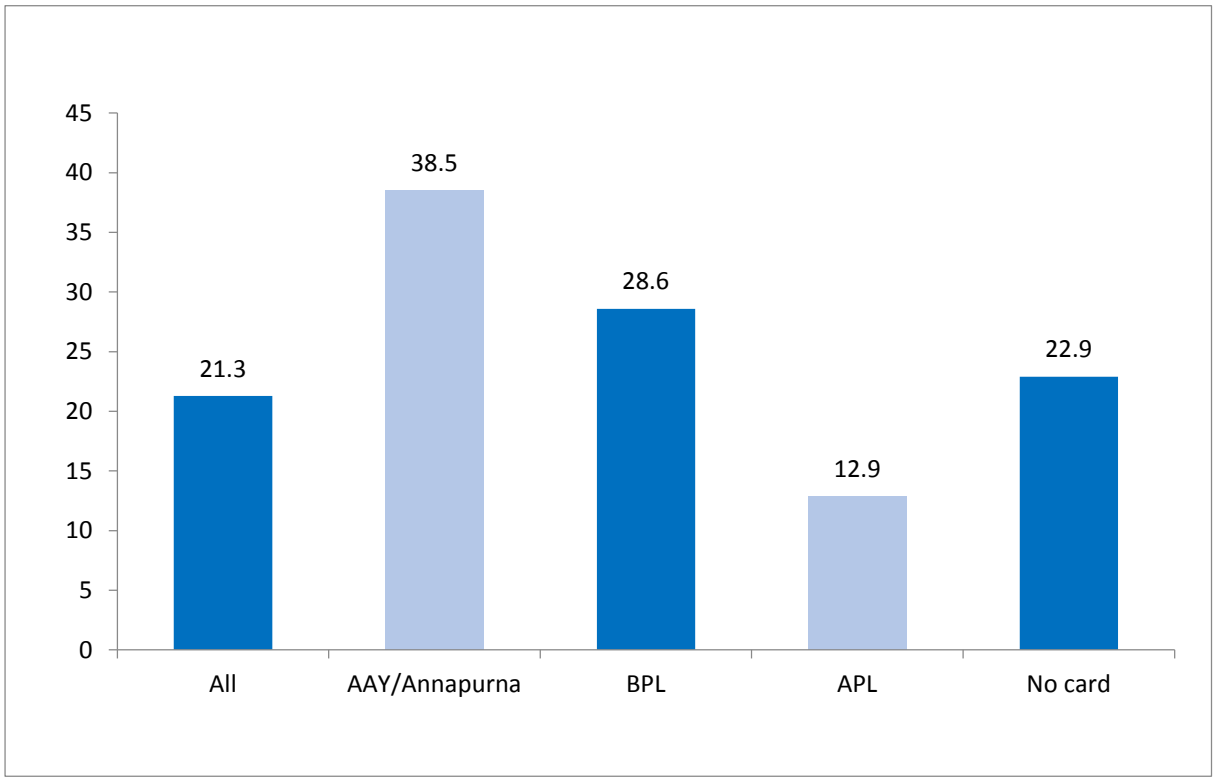
Source: Authors' calculations from IHDS data.

Errors of exclusion are seen in the proportion of households that are poor but do not have a BPL card. Among APL cardholders, 12.9 per cent are poor but do not have a BPL card; among those with no cards, 22.9 per cent are poor. This group forms a part of the error of exclusion. In contrast, errors of inclusion are shown by the proportion of households that have BPL or AAY card but are not poor.

In fact, the proportion of households having AAY/Annapurna/BPL cards is very high as compared to the poverty rates. For instance, the IHDS data document that in 2011, over two-thirds of the population under the AAY/Annapurna scheme comprised the non-poor while over three-quarters having BPL cards were non-poor (Figure 2.6). On the other hand, only 13 per cent of the households having APL cardholders were found to be poor. Hence, inclusion errors seem more significant than exclusion errors in

the TPDS (Figure 2.7). It is important to note that these figures are based on the poverty line recommended by Tendulkar Committee, which has sometimes been considered too low.

Figure 2.7: Proportion of poor by card type in 2011-12 (in per cent)



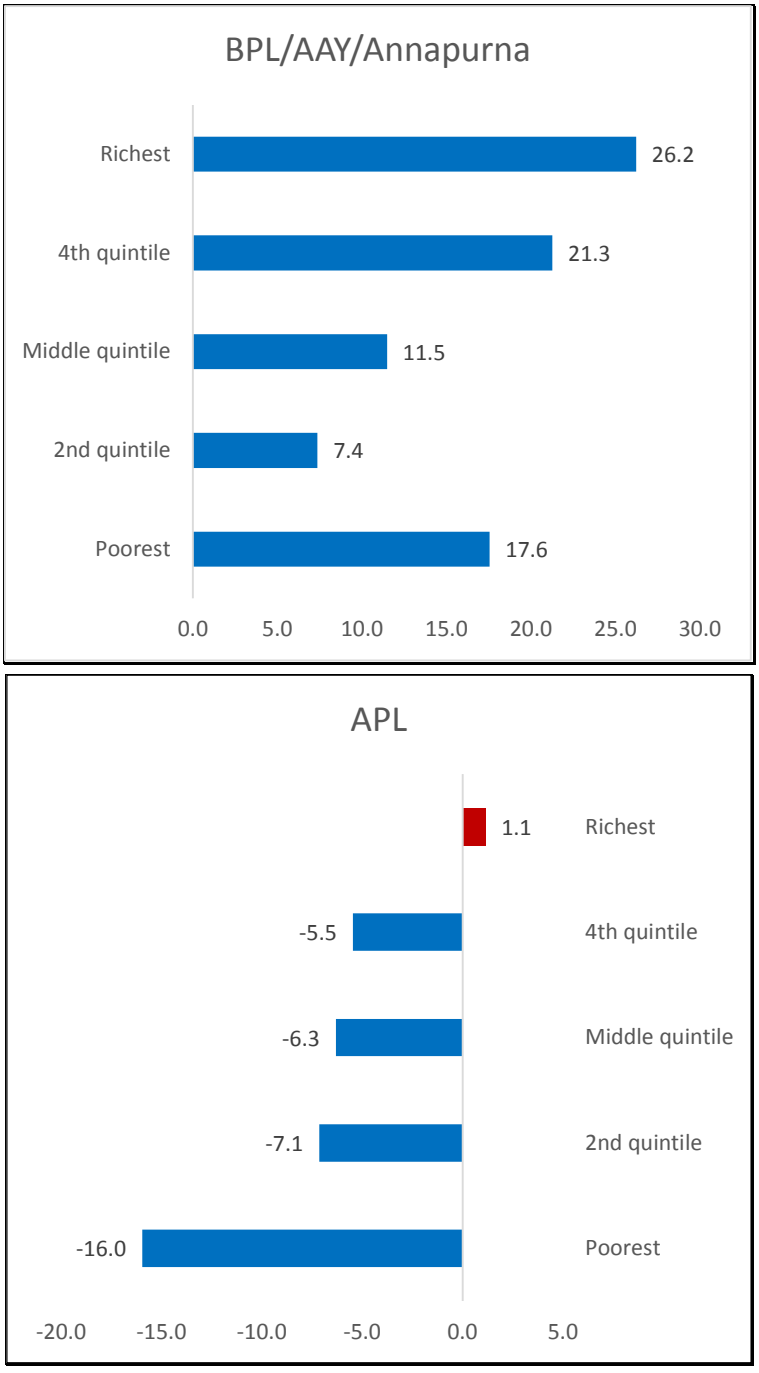
Source: Authors' calculations from IHDS data.

We see somewhat greater errors of inclusion when we use income-based categories as compared to the consumption-based categories presented above. In 2011, close to 54 per cent and 50 per cent of the households in the bottom 20 per cent income bracket (quintile 1) and in the second quintile held AAY/Annapurna and BPL cards, respectively. Interestingly, among the top 20 per cent of the households, close to 21 per cent held AAY/Annapurna or BPL cards, pointing to inclusion errors.

The percentage of those holding AAY/Annapurna or BPL cards increased for all quintiles between 2004-05 and 2011-12 (Figure 2.8). For instance, in the bottom 20 per cent income bracket, the proportion of those holding these cards increased by 18 per cent while among those in the top 20 per cent income bracket, the corresponding figure increased by 26 per cent. The errors of inclusion are greater in rural India as compared to urban India. For instance, in the 4th quintile, in 2011, almost 46.1 per cent of the

households had AAY/Annapurna or BPL cards in rural India whereas the corresponding figure in urban India was much less, at 32 per cent.

Figure 2.8: Per cent change in ownership of different card types between 2004-05 and 2011-12 by income quintile (in per cent)



Source: Authors' calculations from IHDS data. Note that increase in BPL/AAY/Annapurna card is not strictly counterbalanced by decrease in APL card since proportion of households with no card declined in 2011-12 vis-à-vis 2004-05.

Increasing inclusion errors are mostly due to rising incomes. About 28 per cent of those in the richest 20 per cent quintile in the rural areas and 15 per cent of the richest quintile in the urban areas have AAY, Annapurna or BPL cards (Table 2.1). In fact, between 2004-05 and 2011-12, the proportion of BPL cards among the rich grew by 22.6 per cent in the rural areas and by 25.3 per cent in the urban areas. Significantly, this is mostly due to the fact that most states were living with old BPL lists and hence, households that had BPL cards continued to hold them even when economic growth had taken them out of poverty.

Table 2.1: According to cards per capita income and growth rate

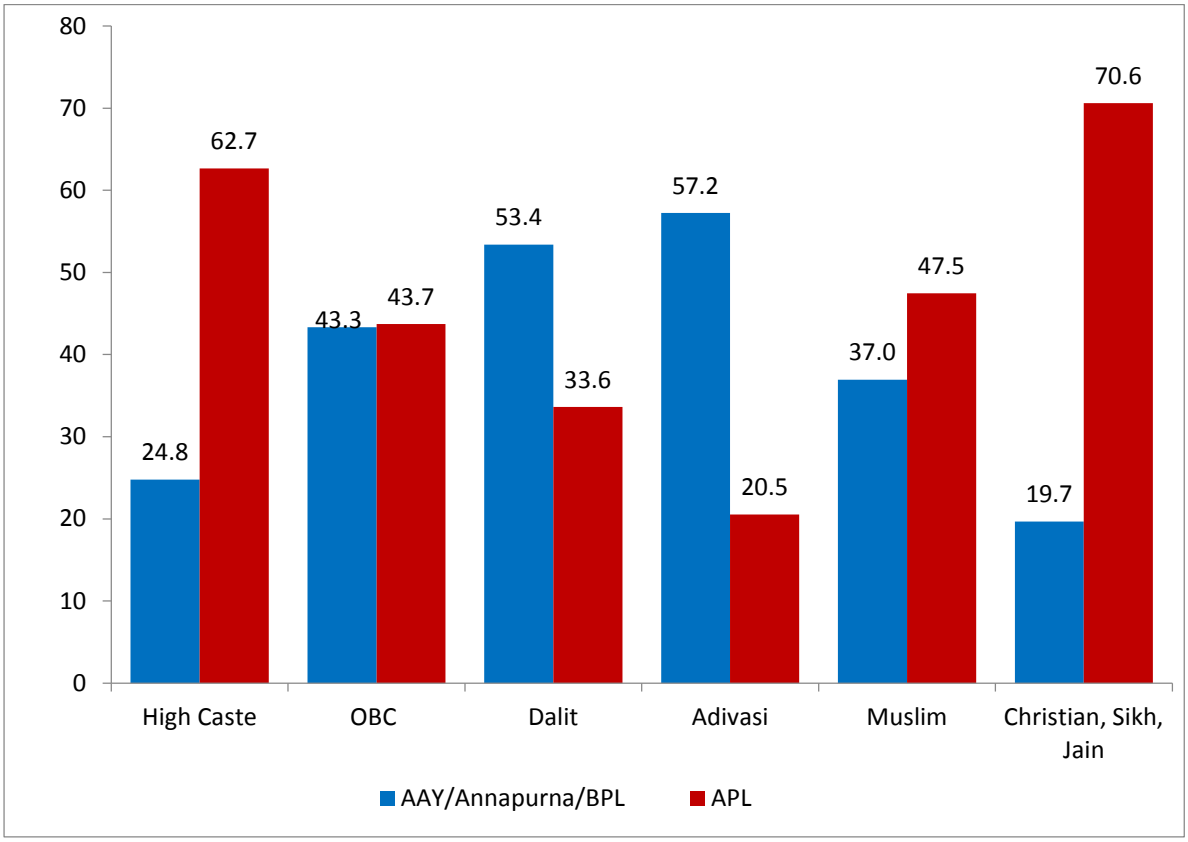
Rural/ Urban	BPL/AAY/ Annapurna	APL	No card
Per Capita Income Quintile; Top 20%			
Rural	28.0	62.0	10.0
Urban	15.3	68.9	15.9
Growth rate between 2004-05 and 2011-12			
Rural	22.6	-3.9	-39.2
Urban	27.8	2.1	-35.7

Source: Authors' calculations from IHDS data.

2.6 The Caste-wise Composition of Beneficiaries Has Remained Stable

In 2011, almost two-thirds among the high caste group held APL cards, while 22 per cent of them held BPL cards and 13 per cent held no cards. The OBCs, Muslims and Christians, who accounted for 35.7 per cent, 11.3 per cent and 2.2 per cent of the households, respectively, in 2011-12, also predominantly held APL cards, while the Dalits and Adivasis, who accounted for 22.1 per cent and 8.3 per cent of the households, respectively, in 2011-12, predominantly held BPL cards (Figure 2.9). The caste-wise composition of beneficiaries under all the PDS schemes remained more or less stable between 2004-05 and 2011-12, with the only significant change being that the proportion of Dalits under the AAY/Annapurna scheme increased from 29.1 per cent to 34.7 per cent while simultaneously the proportion of Adivasis under this scheme fell from 18.9 per cent to 11.8 per cent.

Figure 2.9: Distribution of cards among social groups in 2011-12 (in per cent)

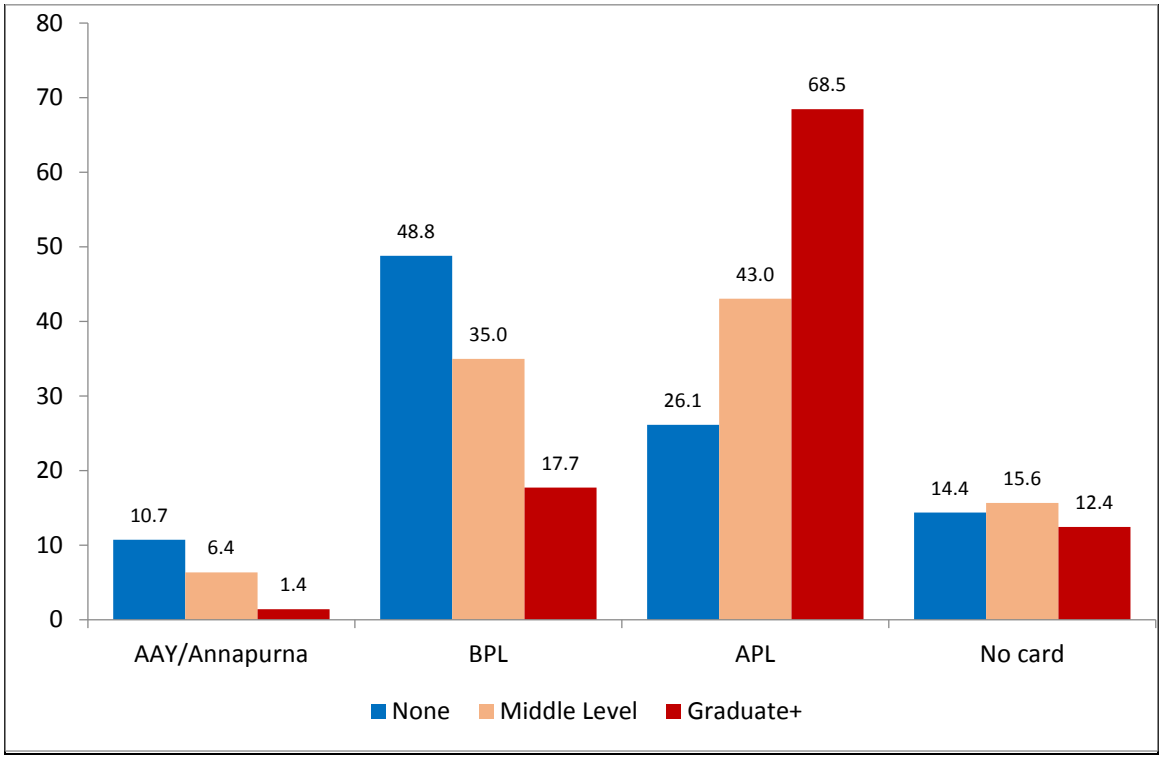


Source: Authors' calculations from IHDS data.

2.7 BPL Cardholders Have Substantially Lower Education

Not surprisingly, there is a strong correlation between education levels and ownership of AAY/Annapurna and BPL cards. Of those who had no education at all, close to 60 per cent had AAY/Annapurna and BPL cards, while 26 per cent of them had APL cards and 14 per cent had no card at all in 2011 (Figure 2.10). In comparison, the proportions of beneficiaries under the same categories for those with higher secondary education were 32 per cent, 55 per cent and 13 per cent, respectively, while the corresponding proportions of those who were graduates were 19 per cent, 69 per cent and 12 per cent, respectively.

Figure 2.10: Education level (in per cent)

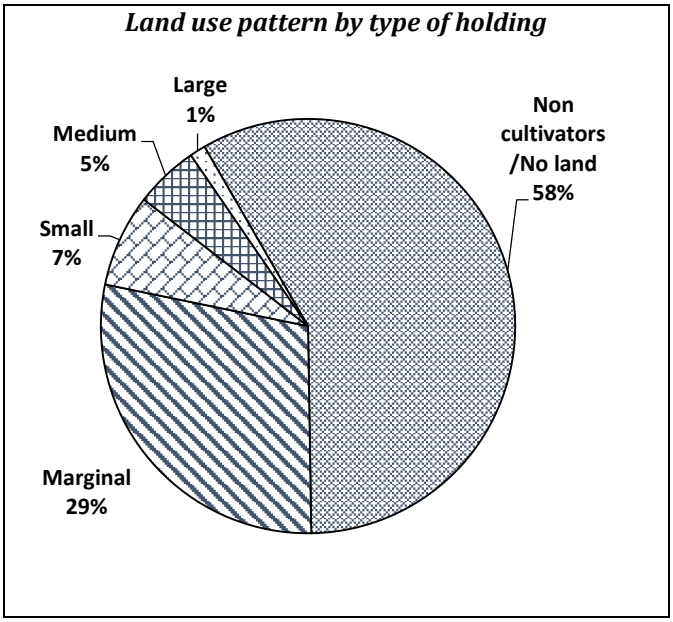


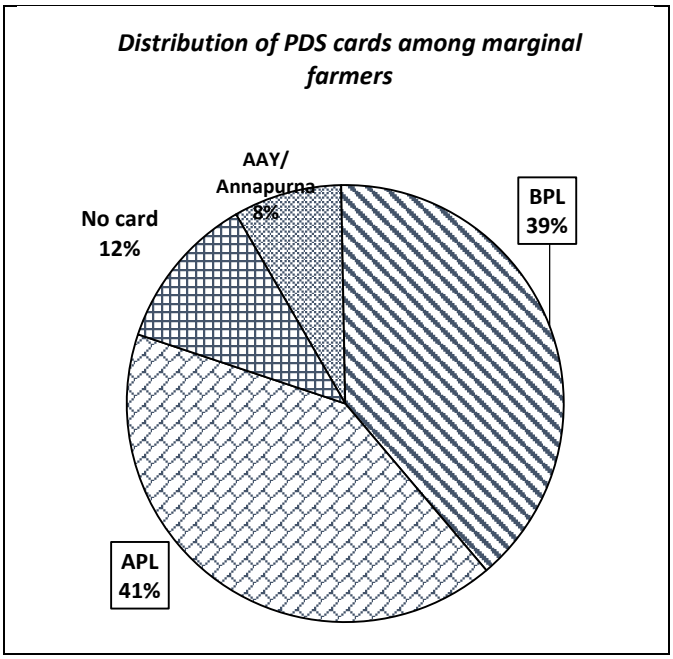
Source: Authors' calculations from IHDS Data.

2.8 Marginal Farmers More Likely to Have BPL Cards

In 2011, 58.1 per cent of the households comprised non-cultivators, 28.5 per cent had marginal (0-1 hectare), 7.2 per cent small (1-2 hectares), 5 per cent medium (2-5 hectares) and 1.2 per cent large (5 and more hectares) holdings of land (Figure 2.11). The maximum number of AAY/Annapurna and BPL cards were owned by marginal farmers, while over two-thirds of the medium and large cultivators had APL cards. Interestingly, the percentage of all cultivators, whether marginal, small, medium or large, holding APL cards increased between 2004-05 and 2011-12. Most of this increase was due to the fact that households that previously had no card had subsequently acquired an APL card.

Figure 2.11. Land use pattern and PDS card distribution



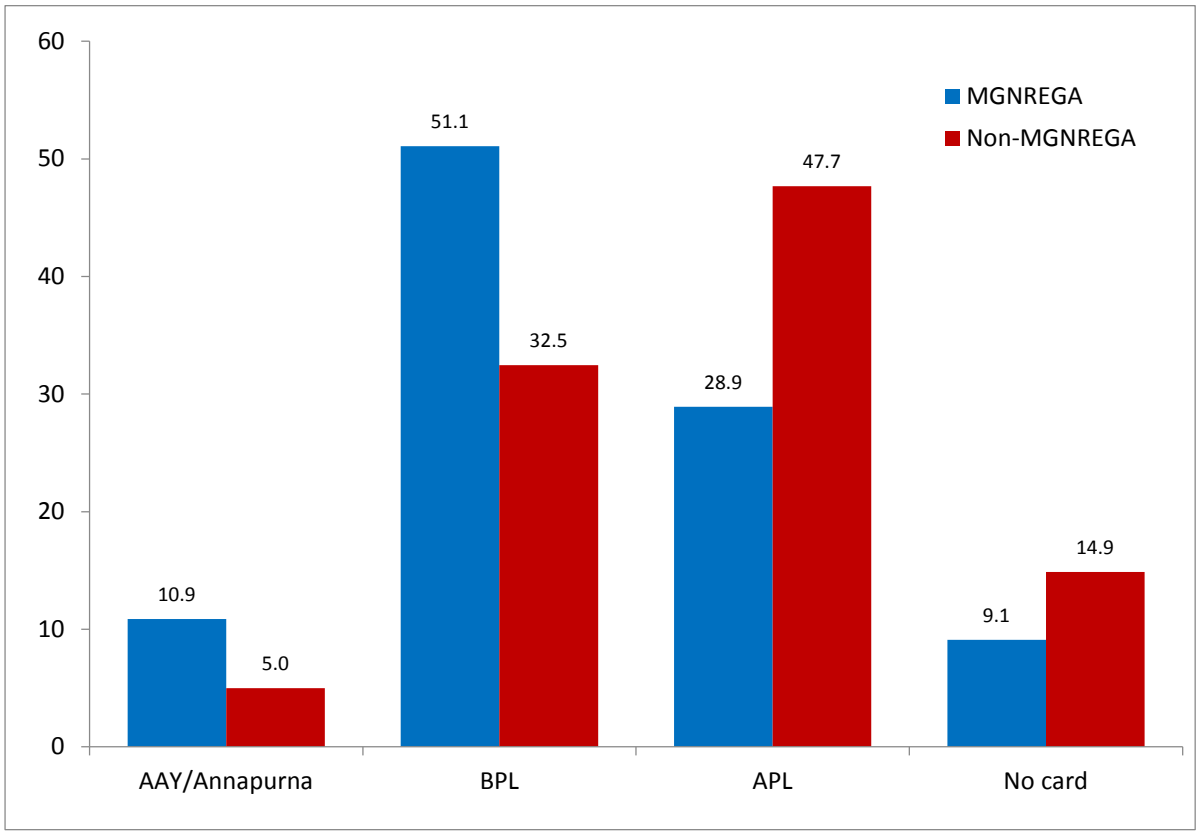


Source: Authors' calculations from IHDS data.

2.9 The Beneficiaries of MGNREGA Are Mainly AAY/Annapurna/BPL Cardholders

In 2011, 17.2 per cent of the households surveyed participated in the MGNREGA programme. Of these, close to two-thirds had AAY/Annapurna or BPL cards, about 29 per cent had APL cards and 9 per cent had no card at all (Figure 2.12).

Figure 2.12: MGNREGA participation and ration card type (in per cent)

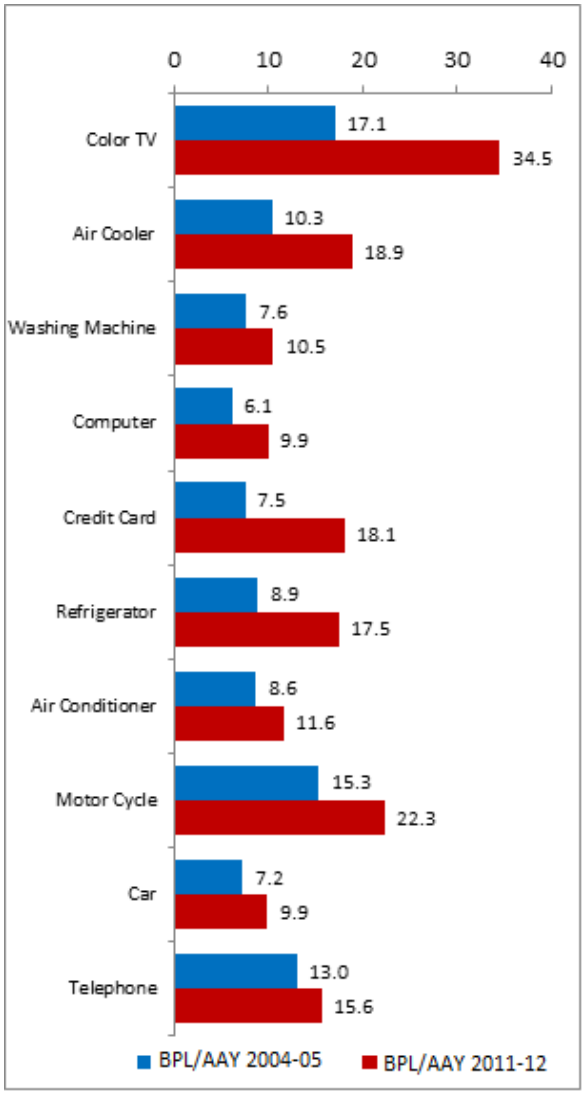


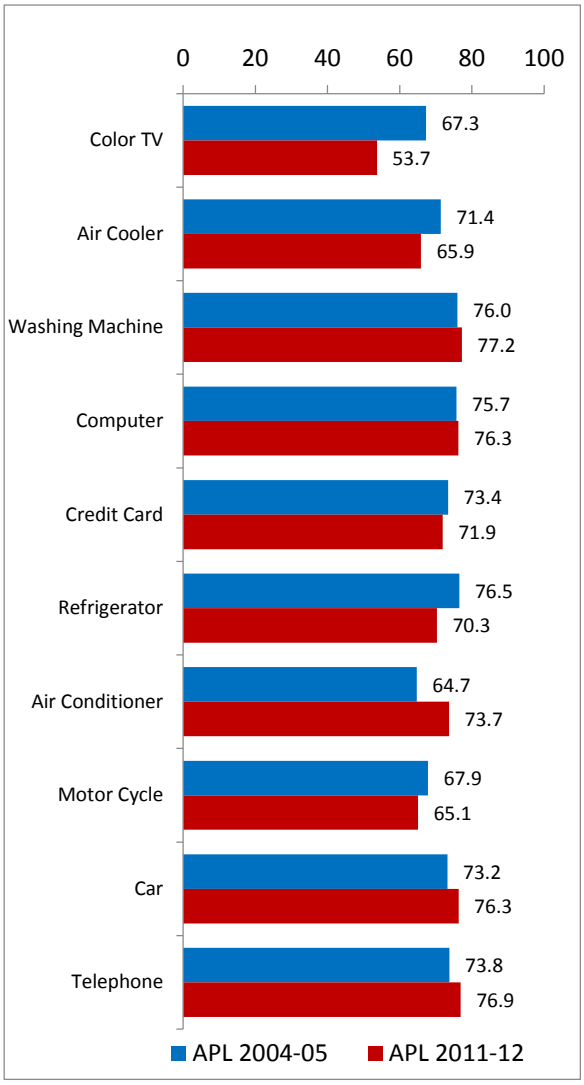
Source: Authors' calculations from IHDS data.

2.10 BPL Cardholders Increasing Their Asset Shares

Income growth between 2004-05 and 2011-12 has affected both AAY/Annapurna/BPL households as well as APL households. In 2011-12 the AAY/Annapurna/BPL households owned close to 40 per cent of the mobiles, own homes and milch animals. However, they owned just around 10 per cent of the assets of high value like a washing machine or a computer (Figure 2.13). Although they remain behind the APL households, these 10 per cent represent a clear trend in improvement in living standards. Between 2004-05 and 2011-12, the BPL households increased their ownership share across all forms of assets that were included in the survey. This can be partly attributed to the increase in the share of BPL households over these two survey periods along with a decline in poverty levels, which facilitated greater disposable income among the BPL class.

Figure 2.13: Asset ownership among different cardholders in 2004-05 and 2011-12 (in per cent)





Source: Authors' calculations from IHDS data.

3. PDS Utilisation

Key messages

- *PDS use grew strikingly between 2004-05 and 2011-12. In 2011-12, about 27 per cent of all households purchased cereals from the PDS whereas by 2011-12, this proportion had risen to 52.3 per cent.*
- *The growth in PDS use has occurred for each category of cardholders. Almost all the BPL and AAY cardholders purchase PDS grains and as many as 32 per cent of the APL cardholders purchase from the PDS.*
- *Although PDS use has increased, for the purchasing households, the amount of purchase or share of PDS grain to the total grain consumed has remained more or less stable.*
- *Nearly 72 per cent of the Indian households purchased kerosene from PDS shops. Although the use of kerosene as a primary cooking fuel is negligible, nearly 28 per cent of the households were found to use kerosene in combination with firewood in rural areas and with LPG in urban areas.*

3.1 Striking Growth of the PDS for Cereal Purchase

Even before the NFSA was implemented, the role of the PDS in household food consumption was seen to be growing. The IHDS found that between 2004-05 and 2011-12, the number of households purchasing cereals from the PDS nearly doubled. This expansion parallels the expansion of PDS utilisation observed in the NSS.

The PDS moved from being universal to targeted in 1997. This move was accompanied by a sharp increase in price for the APL cardholders. This change reduced the urban bias of the PDS and led to a sharp decline in PDS use between 1993-94 and 2004-05. However, since then, PDS use has grown steadily in both urban and rural areas. Table 3.1, reproduced from calculations by Himanshu and Sen (2013a), shows that by 2011-12, NSSO records about 50 per cent of the rural and 30.7 per cent of the urban population as purchasing cereals from the PDS.

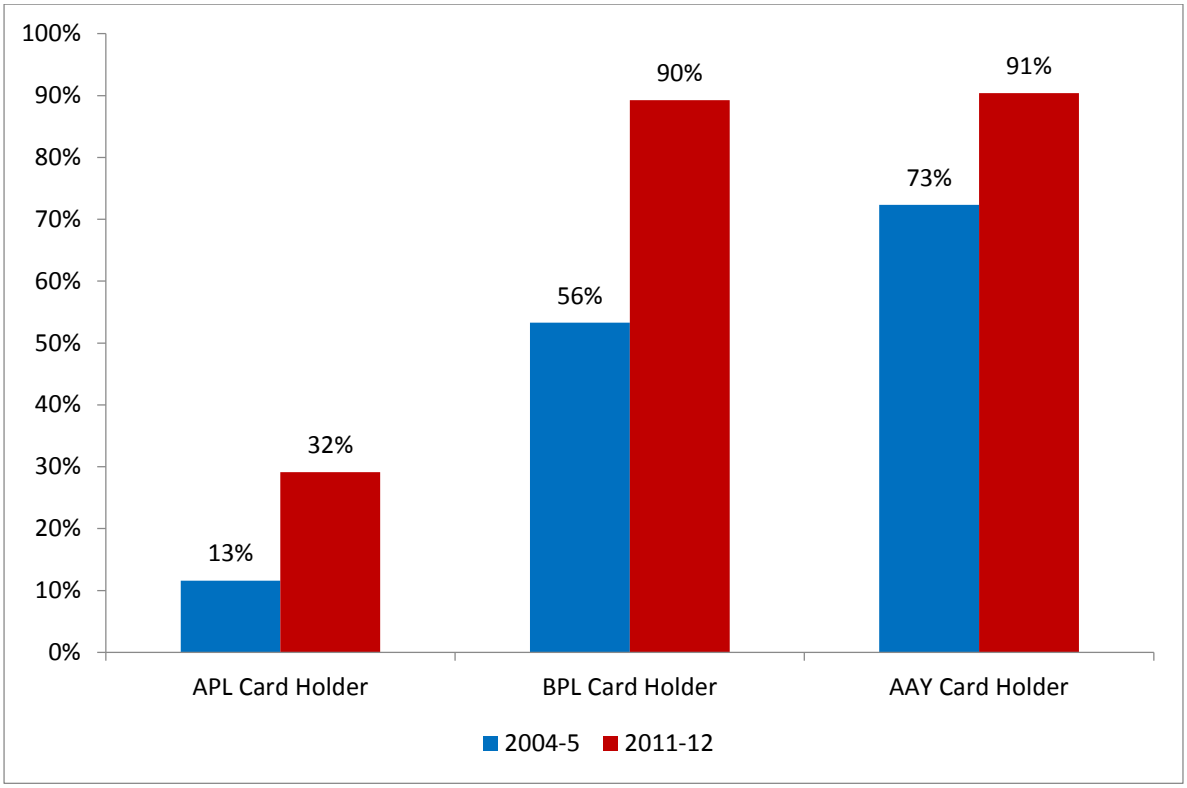
Table 3.1: Per cent households purchasing cereals from PDS

	NSS		IHDS	
	Rural	Urban	Rural	Urban
1993-94	25.6	32.1		
2004-05	24.8	15.4	28.3	17.2
2009-10	43.3	28.2		
2011-12	50	30.7	53.4	44.0

Sources: Himanshu and Sen, 2013a for NSS; authors' calculations for IHDS.

The IHDS also records an increase in the number of households purchasing from the PDS, albeit somewhat greater than that recorded for the NSS. In 2004-05, about 27.1 per cent of all households purchased any cereals from the PDS in the month prior to the interview, whereas this proportion had grown to 52 per cent by 2011-12. About half the interviews in IHDS were carried out in the latter half of 2012, a period of rapid food price inflation. This may account for higher use of PDS among IHDS households compared to the NSS households. As Figure 3.1 shows, as of 2011-12, about 91 per cent of the households holding AAY or BPL cards purchased cereals from the PDS. Even more surprisingly, about 32 per cent of the households with APL cards also purchased cereals from the PDS. This is a substantial change from 2004-05 when only 13 per cent of the households with APL cards purchased grain from the PDS. It is possible that due to rapid food inflation during the 2010-12 period, even the economic price of grains charged to APL households was lower than the market price. This is a topic to which we return in a later section.

Figure 3:1 Growth in PDS usage between 2004-05 and 2011-12 by card type



Source: Authors' calculations from IHDS data.

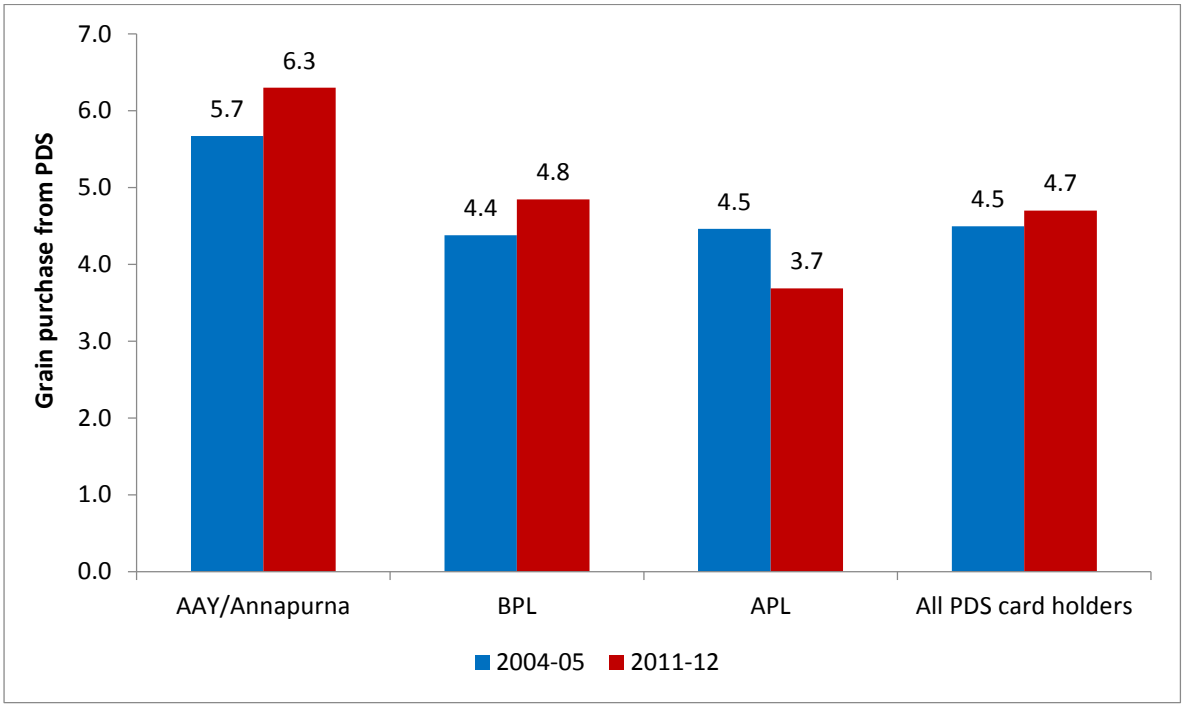
Arguably, the most striking thing about PDS usage lies in the fact that the largest growth has taken place among the most privileged households. Metro cities experienced 230 per cent growth in PDS use between 2004-05 and 2011-12 as compared to a corresponding figure of 106 per cent in the less developed villages; households with a college graduate saw 161 per cent growth as compared to 75 per cent for households with no literate adult; the highest income quintile households saw 180 per cent growth as compared to 71 per cent for the bottom quintile. Much of this can be explained in terms of the increasing PDS use by APL households. At an all India level, the use of PDS by AAY cardholders grew by 24 per cent, and that by BPL cardholders grew by 61 per cent whereas the use by APL cardholders grew by a whopping 150 per cent. In absolute terms, however, the poorest households remain the greatest purchasers with over 60 per cent of the households in the bottom four quintiles buying grain from the PDS and only 40 per cent of the richest in the fifth income quintile buying from PDS shops.

This discussion has combined rice and wheat but Appendix Tables A45 to A65 present separate results for households purchasing rice and wheat. The results remain fairly similar.

3.2 The PDS Contributes Less than Half of the Total Cereal Consumption

Although the number of households that purchase cereals from the PDS has grown sharply, the per capita amount of grain purchased from the PDS has risen only slightly. For example, the AAY cardholders purchased 5.7 kg/month per person in 2004-05 and 6.3 kg in 2011-12, while the increase for BPL cardholders was less, from 4.4 kg to 4.8 kg, and the APL cardholders, on the other hand, experienced a decline from 4.5 to 3.7 kg/month (Figure 3.2).

Figure 3.2: Per capita monthly grain purchase from PDS by card type for purchasing households, 2004-05 and 2011-12 (in per capita kg/month)

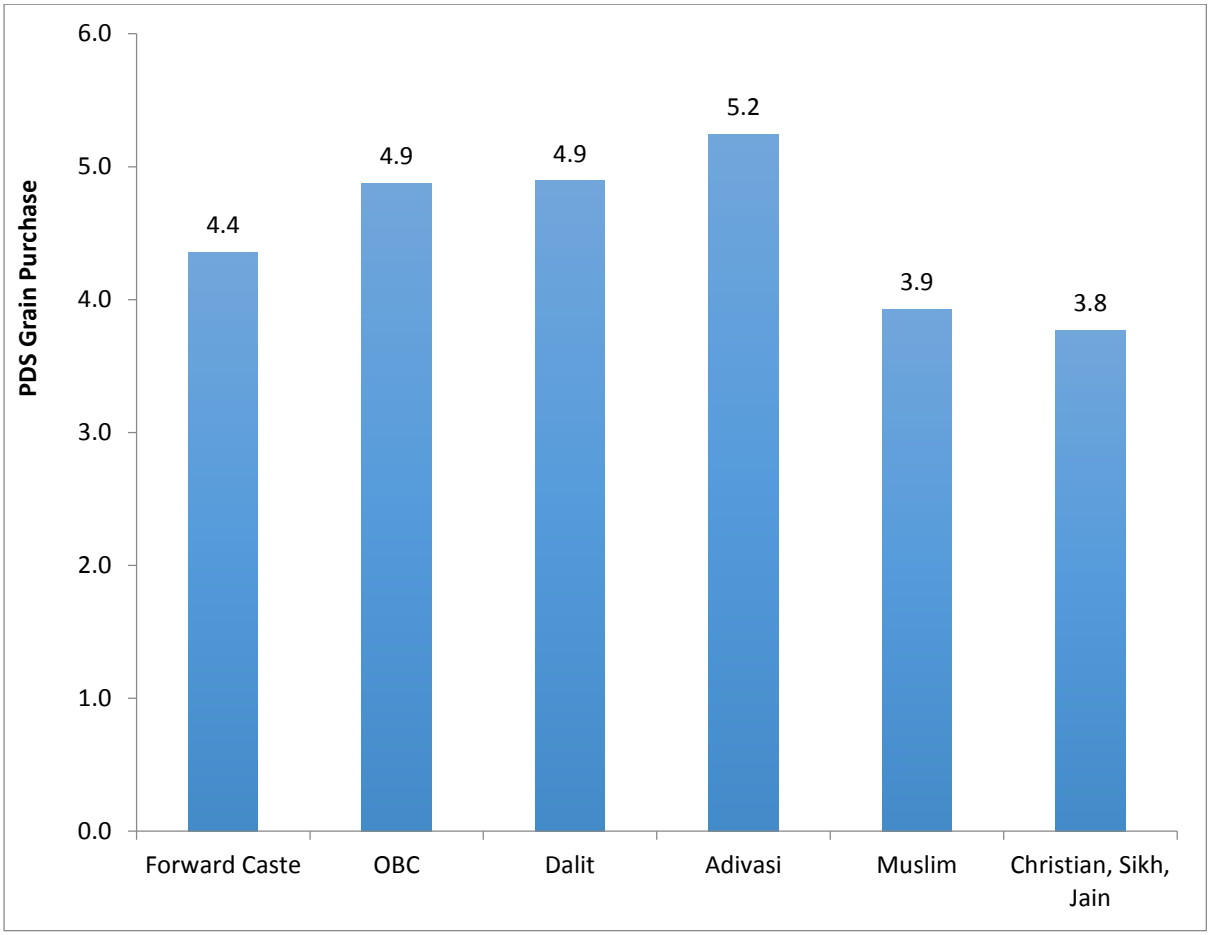


Source: Authors' calculations from IHDS data.

Since the purchased amount is dictated by state allocation criteria, we see relatively little variation in cereal purchase across different socio-economic strata

within any card category (as shown in Figure 3.3) for the households that purchase from the PDS.

Figure 3.3: Per capita PDS grain purchase by social group, 2011-12 (in per capita kg/month)

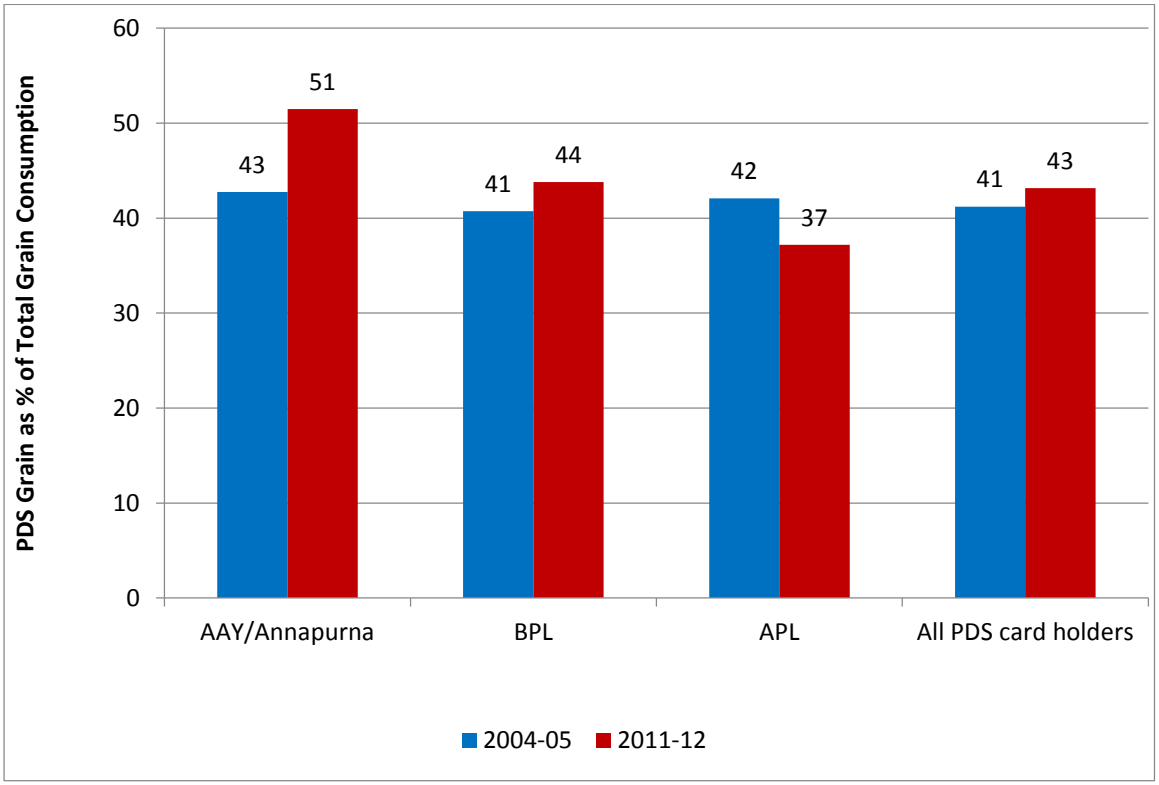


Source: Authors' calculations from IHDS data.

In spite of the significant increase in the proportion of households buying from the PDS and a relatively small increase in the quantity purchased, households also buy a substantial amount of grains from the market, making the PDS a relatively small component of the household food basket. For example, the PDS contributed 43 per cent of the household cereal consumption for AAY households in 2004-05, which increased to 52 per cent but still remains barely half of the total need (Figure 3.4). For BPL households, the proportion of cereals purchased from the PDS is even smaller, at only 44 per cent. On an average, for the population as a whole, the grain purchased from the

PDS accounts for about 43 per cent of the per capita household cereal consumption in 2011-12, up from 41 per cent in 2004-05, but still comprising a modest share.

Figure 3.4: Share of PDS grain in household total cereal purchase for PDS using households, 2004-05 and 2011-12



Source: Authors' calculations from IHDS data.

3.3 A Vast Majority of Households Rely on the PDS for Kerosene

The recent government decision to deregulate the non-PDS kerosene supply and considerations regarding reduction of the kerosene supply in the PDS, along with recent experiments with direct transfer of kerosene subsidy, suggest the need for a deeper understanding of which households use kerosene.

The IHDS results, like other studies based on the NSS, suggest that the PDS is extensively used for kerosene purchase. Nearly 79 per cent of the PDS cardholders and 71 per cent of the total number of households purchased kerosene from the PDS shops

in the month preceding the survey in 2011-12. This proportion has remained more or less steady over time.

Contrasting these household purchases with the use of kerosene for cooking has led to a strong advocacy for reducing kerosene subsidy. Both the NSS and the Census suggest that the proportion of households using kerosene as a cooking fuel is tiny, at less than 3 per cent of the total beneficiaries. This very low figure, combined with concerns about the black market sale of kerosene for industrial use, has generated substantial concern. This is also the core of the recommendation by the B. K. Chaturvedi Committee to remove subsidies on kerosene. However, it is important to note that both the NSS and the Census ask about the primary cooking fuel. Many households use both firewood and kerosene for cooking. Slow cooking, particularly while making *chapatti* or simmering *dal*, may be done by using firewood while tea may be made by using the kerosene stove. Since both the Census and the NSS focus on the primary source of fuel, they tend to miss out on subsidiary use and any analysis of kerosene leakage based on these data alone would suggest much greater leakage than would be the case if multiple fuels were counted.

Table 3.2: Use of cooking fuel including multiple types of fuel IHDS I and II

Source of Energy	2004-05 (% Households)	2011-12 (% Households)
Biomass	45.94	38.13
Biomass+Coal	2.01	1.74
Biomass+LPG	8.30	11.87
Biomass+LPG+Coal	0.21	0.33
LPG	17.16	19.43
LPG+Coal	0.08	0.11
Coal	0.66	0.10
Kerosene	1.72	0.85
Kerosene+Biomass	16.68	15.98
Kerosene+Biomass+Coal	1.16	0.80
Kerosene+Biomass+LPG	2.31	5.15
Kerosene+Biomass+Coal+LPG	0.16	0.16
Kerosene+Coal	0.20	0.09
Kerosene+LPG	3.37	5.19
Kerosene+LPG+Coal	0.04	0.05

Source: Authors' calculations from IHDS data.

The IHDS survey contains an extensive array of questions on fuel use. For a variety of fuels including dung cakes, firewood, crop residue, kerosene, LPG and coal, the households were asked whether this fuel was used and if so, whether it was used for

cooking, lighting, heating or a combination of these activities. Table 3.2 just focuses on the use of fuel for cooking and combination use, and calculates the distribution of households based on the types of fuels used for cooking. The results show that in 2011-12, 38 per cent of the households used only biomass (dung, firewood, crop residue) as cooking fuel, while about 19 per cent used only LPG.

The proportion of households using kerosene alone for cooking was very small, at less than 1 per cent, in 2011-12. If we only rely on primary fuel use, we might assume that most of the kerosene used is for lighting and hence solar lighting may easily replace kerosene. However, when we look at the use of kerosene in combination with other fuels (for example, biomass) we find that about 28 per cent of the households use kerosene for cooking. Even if we were to look at kerosene use solely for cooking (not for lighting), we find that 10 per cent of the households used kerosene in 2011-12, either as a sole source or in combination with other fuels.

Table 3.2 thus indicates that replacing kerosene by solar lights or greater electrification may not quite replace its current use. Nonetheless, it is important to note that 53 per cent of the households in 2004-05 and 47 per cent of the households in 2011-12 used kerosene mainly for lighting. Thus, a significant reduction in kerosene consumption is possible by ensuring greater electrification and improved reliability of electricity supply.

4. Targeting Efficiency

Key messages

- *Exclusion errors in PDS targeting have declined between 2004-5 and 2011-12 while inclusion errors have increased. However, both types of errors remain high. This change can be attributed both to a decrease the poverty levels as well as an increase in the number of cards being distributed to the whole population.*
- *Inclusion errors increased across all regions between 2004-05 and 2011-12 and accounted for over 50 per cent of the total errors for the South region.*
- *The inclusion errors for the historically under-represented groups have been increasing. However, exclusion errors still remain the highest across all the social groups.*

4.1 Introduction

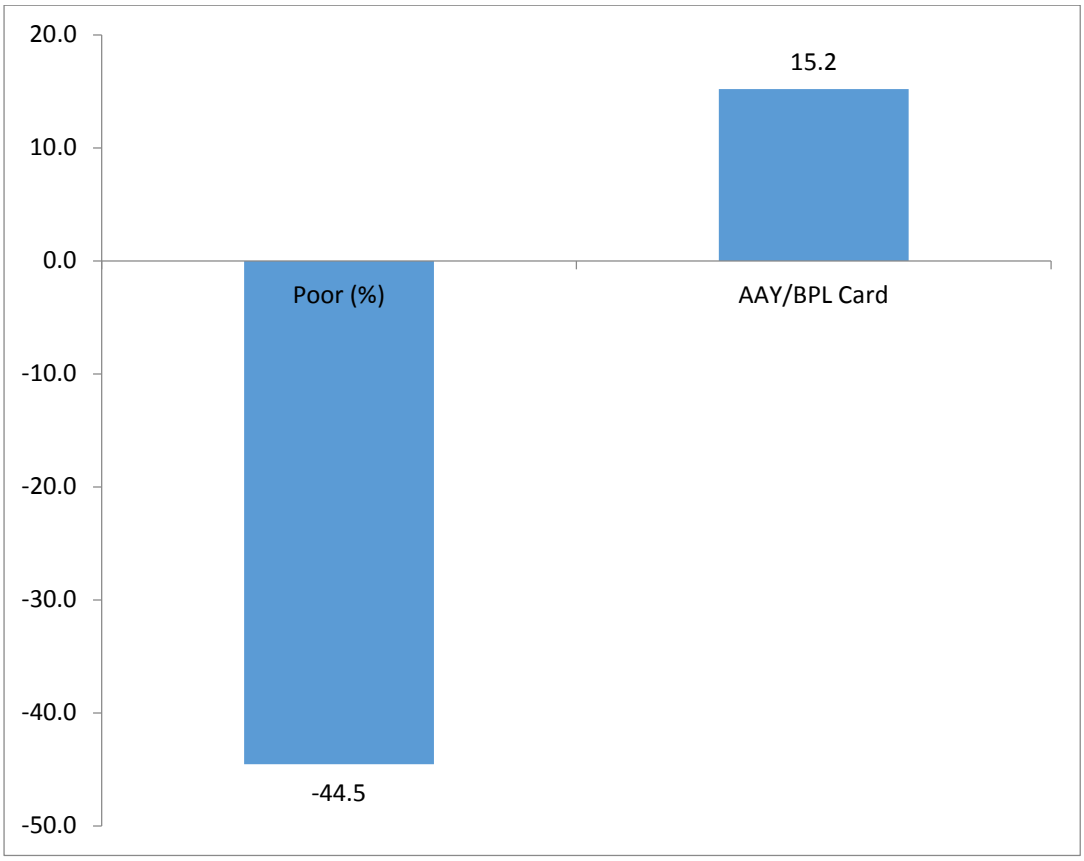
When the PDS became a targeted instead of a universal intervention in 1997, it faced significant challenges of identifying the poor for food subsidies. Since then, several studies have tried to look at the efficiency of TPDS targeting and suggested that the system is full of both inclusion and exclusion errors (Dreze and Khera, 2010), and that perhaps a universal system may be a solution to this challenge (Sen and Himanshu, 2011). Nonetheless, the empirical analysis provides some indication that the targeting efficiency of the TPDS has improved over time (Dreze, 2015; Himanshu and Sen, 2013b). This issue has been explored below.

4.2 Targeting Errors

A singular aim of the TPDS is to provide ration cards to ensure food security for the poor. Hence, the number of households identified as poor and receiving subsidised food can also be expected to decrease over time with a decline in poverty levels. In line with the NSS data, the IHDS data also indicate that the poverty rates in India fell from 38.4 per cent in 2004-05 to 21.3 per cent in 2011-12. Hence, in theory, it is expected that the percentage of households that use AAY, Annapurna, or BPL cards would decrease over

time concurrently with the decrease in poverty rates. However, though the poverty rate between the two survey periods decreased by 44.5 per cent, the number of households having an AAY/BPL card increased by 15.2 per cent (Figure 4.1). As Figure 3.1 shows, the use of cards by households owning AAY/BPL cards nearly doubled between this period.

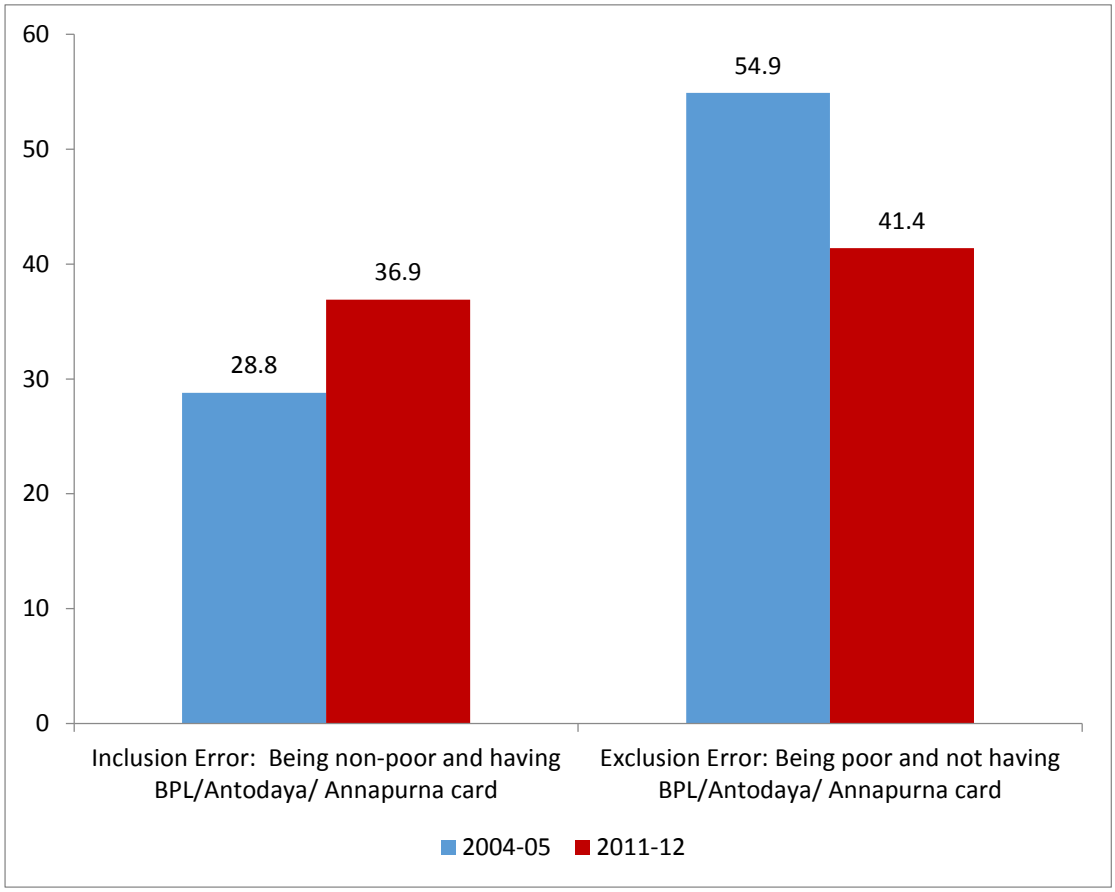
Figure 4.1: Change in poverty and distribution of AAY/BPL cards between 2004-05 and 2011-12



Source: Authors' calculations from IHDS data.

Targeting errors arise either when the poor do not get the benefits of the scheme, and/or the non-poor are seen to benefit from the scheme. Targeting errors are of two types: inclusion errors and exclusion errors (Figure 4.2). Inclusion errors comprise the percentage of non-poor households that are holding AAY, Annapurna, or BPL cards. Exclusion errors, on the other hand, comprise the percentage of poor households that are entitled to but do not have AAY, Annapurna, or BPL cards. Exclusion errors reflect poor coverage of the target group.

Figure 4.2: Inclusion and exclusion errors: 2004-05 and 2011-12 (in per cent)



Source: Authors' calculations from IHDS data.

The IHDS I and II surveys suggest that the inclusion errors increased from 28.8 per cent in 2004-05 to 37 per cent in 2011-12. Simultaneously, the exclusion errors declined. This trend is both due to more households being issued PDS cards, particularly the expansion of the AAY category, as well as over-identification of the poor under the TPDS in 2011-12, as despite a decline in poverty rates over this period, the non-poor are still identified as poor by the government.

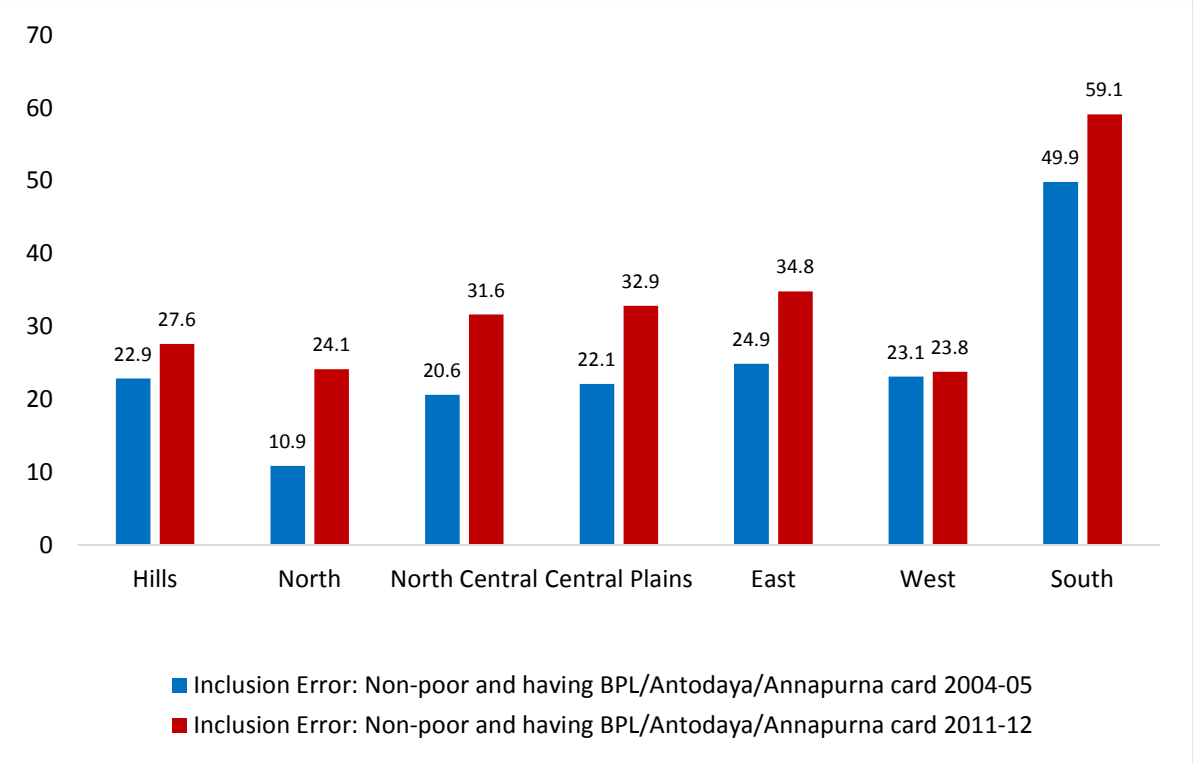
High inclusion errors lead to subsidies being wastefully spent. Using the NSS 2004-05 survey, Jha and Bharat (2012) measure the percolation of food subsidy expenditures to the poor by measuring both targeting leakages (inclusion errors) as well as non-targeting leakages due to excess costs and fraud. Comparing India to the Philippines, which had a universal programme, Jha finds that despite the PDS being a targeted programme in India, only one-third of the total subsidy went to the poor, which is in contrast to the Philippines, where 60 per cent of the subsidy went to the poor.

4.2.1 The regional spread in targeting errors is significant

The Programme Evaluation Office of the Planning Commission[3] had evaluated the performance of the TPDS and found that not only are the inclusion errors high but also that there are significant variations in inclusion errors across states in India. The inclusion error in southern states was found to be generally higher than in the northern and western states. For instance, the inclusion error in the southern region was found to be 59.1 per cent, whereas that in the North and West was around 24 per cent (Figure 4.3).

Inclusion errors increased across all regions between 2004-05 and 2011-12. For instance, in the North, inclusion errors increased from 10.9 per cent to 24.5 per cent, and in the South from 49.9 per cent to 59.1 per cent. Exclusion errors, on the other hand, are seen to be decreasing across all regions.

Figure 4.3: Regional distribution of inclusion errors: 2004-05 and 2011-12 (in per cent)



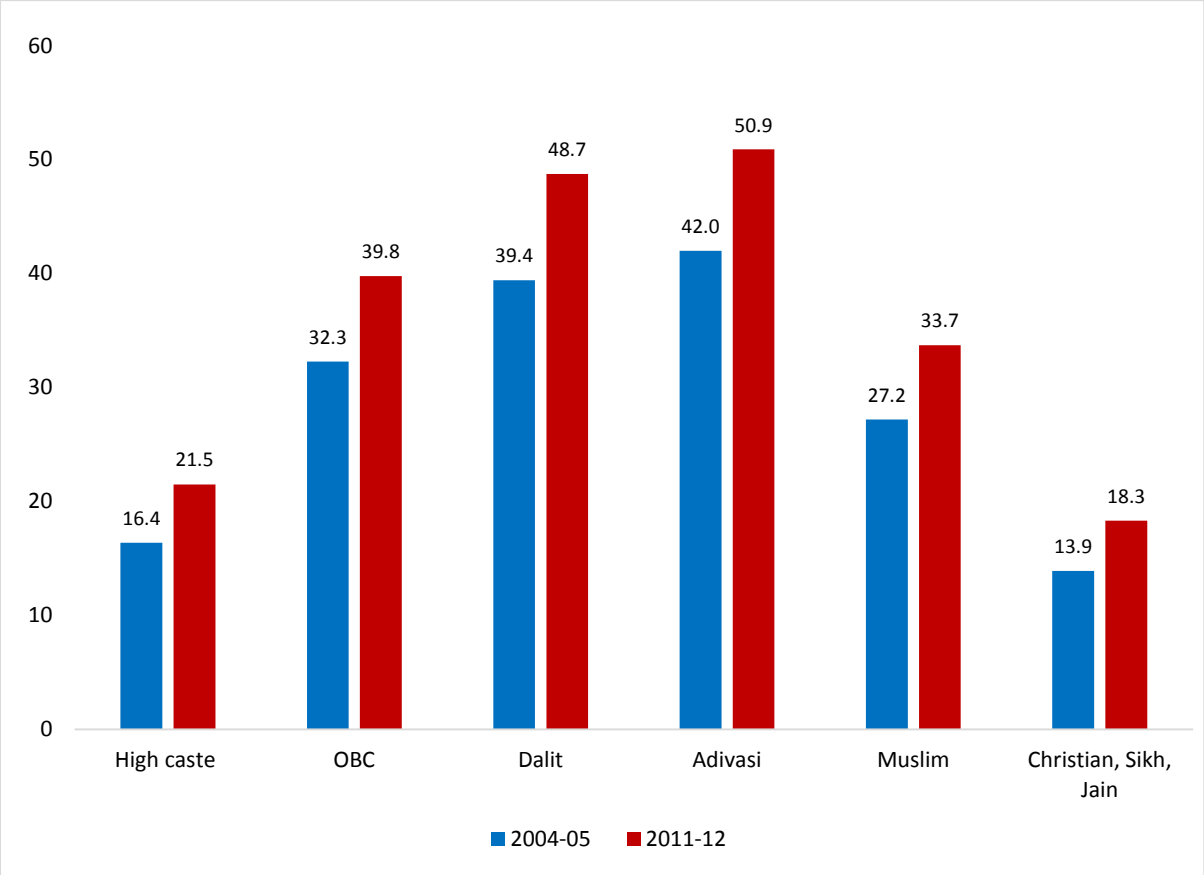
Source: Authors' calculations from IHDS data.

[3] Programme Evaluation Office, Planning Commission. 2005. Performance Evaluation of Targeted Public Distribution System (TPDS).

4.3 Inclusion Errors Increasing for Historically Under-represented Groups

The number of non-poor among the OBCs, Dalits, Adivasis, and Muslims who got a PDS card increased between the two survey periods of 2004-05 and 2011-12. In 2011-12, the inclusion errors were 40 per cent for the OBCs, 49 per cent for the Dalits, 51.1 per cent for the Adivasis, and 34.1 per cent for the Muslims (Figure 4.4). Part of this may be due to increasing movement out of poverty for the marginalised groups (Thorat et al., 2016) and part may be due to greater distribution of PDS cards with greater focus on including historically marginalised groups. However, as seen in Table 4.1, exclusion errors were still high among all the social groups in 2011-12.

Figure 4.4: Social groups and inclusion errors: 2004-05 and 2011-12 (in per cent)



Source: Authors' calculations from IHDS data.

4.4 Exclusion Errors Decreasing

Exclusion errors steadily came down across all quintiles between 2004-05 and 2011-12. Note that poverty is determined by per capita consumption and even in the highest income quintiles some households remain poor. For the poorest, the exclusion errors in urban areas are slightly higher at over 50 per cent as compared to less than 40 per cent in the rural areas (Table 4.1).

The inclusion errors across all the quintiles increased, with the errors in the fourth quintile showing the greatest jump (Table 4.1), this is the group where substantial poverty decline took place but the households may still have retained their BPL/AAY cards. The inclusion errors among the top 20 per cent of the households increased from 13 per cent in 2004-05 to 18 per cent in 2011-12. In the topmost bracket, in 2011-12, the inclusion errors in rural areas, at 24 per cent, were greater than in urban areas at 14 per cent.

Table 4.1: Poverty status and type of PDS cardholders

	Non-poor population (%)		Inclusion Error: Non-poor and having BPL/Antodaya/ Annapurna card		Poor population (%)		Exclusion Error: Poor and NOT having BPL/Antodaya/ Annapurna card	
Population Groups	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	**61.5**	**78.7**	**28.8**	**36.9**	**38.4**	**21.3**	**54.9**	**41.4**
Place of Residence								
Metro urban	83.6	94.3	13.5	20.1	16.3	5.8	79.0	58.3
Other urban	68.4	84.4	19.1	28.1	31.5	15.6	64.8	51.6
More developed village	63.7	79.4	34.9	42.5	36.3	20.6	51.6	39.7
Less developed village	52.2	71.9	32.9	41.9	47.8	28.1	52.3	38.5
Social Groups								
High caste	78.9	89.3	16.4	21.5	21.0	10.7	68.4	54.4
OBC	63.2	80.7	32.3	39.8	36.8	19.3	56.8	42.6
Dalit	52.9	73.0	39.4	48.7	47.1	27.0	48.8	36.0
Adivasi	34.6	58.5	42.0	50.9	65.4	41.6	36.4	33.2
Muslim	56.0	76.9	27.2	33.7	44.0	23.1	67.7	49.1
Christian, Sikh, Jain	82.3	93.2	13.9	18.3	17.3	6.8	54.7	46.2

contd... Table 4.1

Population Groups	Non-poor population (%)		Inclusion Error: Non-poor and having BPL/Antodaya/ Annapurna card		Poor population (%)		Exclusion Error: Poor and NOT having BPL/Antodaya/ Annapurna card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Per Capita Income Quintile-All India								
Poorest	37.6	56.9	38.7	46.6	62.3	43.1	51.0	37.4
2nd quintile	43.1	68.8	40.7	47.2	56.9	31.2	53.4	43.5
Middle quintile	56.8	80.5	37.0	43.4	43.2	19.5	57.9	41.6
4th quintile	76.2	90.0	26.5	36.0	23.8	10.0	61.6	48.2
Richest	92.9	97.0	12.8	18.6	6.9	3.0	70.8	56.8
Region								
Hills	81.4	84.1	22.9	27.6	18.5	15.9	44.4	44.7
North	81.7	88.8	10.9	24.1	17.9	11.2	78.2	49.0
North Central	51.3	72.2	20.6	31.6	48.6	27.8	63.8	44.5
Central Plains	48.5	75.0	22.1	32.9	51.3	25.0	58.6	39.1
East	57.7	73.7	24.9	34.8	42.3	26.3	52.1	38.6
West	63.1	80.7	23.1	23.8	36.9	19.3	53.6	53.2
South	74.7	87.9	49.9	59.1	25.3	12.1	30.9	24.6

Source: Authors' calculations from IHDS data.

Declining exclusion errors and increasing inclusion errors are due to two forces. First, programme expansion—particularly the expansion of the AAY programme—brought many poor under its ambit, thereby reducing the proportion of poor who do not have access to BPL/AAY/Annapurna cards. Second, income growth occurred at a time when BPL lists were more or less frozen, allowing BPL cardholders who experienced income growth to continue to hold onto their BPL cards. This observation of changes between 2004-05 and 2011-12, which are far modest in comparison to the changes expected under NFSA, foreshadow the challenges that NFSA is likely to face.

5. Propensity Score Matching to Evaluate Behaviours of Households with Access to the TPDS and Their Peers

Key messages

- *There is emerging advocacy for cash transfers.*
- *Is TPDS the best way of enhancing food security of the households? In order to examine this issue, we need to compare households with access to food subsidies and those without this access on their food choices, while holding income constant.*
- *It is difficult to do so without the availability of data on household income.*
- *The India Human Development Surveys I and II contain detailed data on household income as well as a brief consumption expenditure module that allows us to look at different aspects of consumption.*
- *The fundamental research question is about household choices in the context of access to subsidies via BPL and AAY cards. However, random assignment is not feasible. We use propensity score matching to compare similar households.*
- *The propensity score matching technique has been described and the quality of our matching data evaluated.*
- *The quality of matching from our matching procedures seems to be acceptable in providing the matched sample of households with access to BPL/AAY cards and those without these cards.*
- *The results show that at any given income level, households with BPL/AAY cards are far more likely to buy cereals from PDS shops than those that do not have access to these subsidies.*

5.1 Introduction

Recent evidence points to an improvement in the efficiency of the PDS (Dreze, 2015; Paul, 2015; Sen, Himanshu, Dreze, and Khera, 2015). Nonetheless, two concerns about providing food security via the PDS remain (Gulati and Saini, 2015): (1) Leakages and

administrative expenditures increase the expenditure involved in delivering food subsidy; and, (2) Procurement policies may distort agricultural markets. The approach of providing households with cash rather than food is being increasingly advocated internationally as well as in India to address some of these problems (Ruel and Alderman, 2013; Sewa Bharat, 2013). However, randomised experiments comparing cash transfers, food subsidies and food vouchers in diverse countries suggest that the effectiveness of these programmes depends on pre-existing market and institutional conditions. A comparison of randomised control trials in four countries undertaken by the International Food Policy Research Institute (IFPRI) documents that "… there is no one 'right' transfer modality. The relative effectiveness of different modalities depends heavily on contextual factors such as the severity of food insecurity and the thickness of markets for grains and other foods. In three countries (Ecuador, Uganda, Yemen), cash had a relatively larger impact on improving dietary diversity as did vouchers in Ecuador, but in the fourth country (Niger), food had a larger impact on dietary diversity. Cash assistance was always significantly more cost-effective to deliver," (Hoddinott, 2013).

If international experience offers us little guidance, what information do we have of the Indian context? Unconditional cash transfer experiments by SEWA document that households receiving cash transfers tend to diversify their diet but simultaneously, they also increase expenditure on other needed items like children's education (Sewa Bharat, 2013). However, it is difficult to generalise from these experiments. In view of the relatively short time span for the experiment, households may not really make fundamental changes to their long-term consumption patterns as a result of cash transfers in experimental settings.

A comparison of the time trends in NSS data between 1993-94 and 2009-10 for the states which substantially expanded the TPDS, that is, West Bengal, Chhattisgarh, Andhra Pradesh, Tamil Nadu, and Odisha, with the other states shows that an increase in access to the TPDS is associated with decreased monthly expenditure on cereals. It was also found that some of these savings were used to augment the expenditure on pulses, edible oils, vegetables and sugar (Kishore and Chakrabarti, 2015). However, one of the problems of relying on NSS data is that expenditure decisions as a function of the decline in cereal prices are often conflated with secular changes in income. Since consumption is an endogenous variable, it makes more sense to compare households at similar levels of income rather than those at similar levels of consumption.

Below we use data from IHDS, waves I and II, of 2004-05 and 2011-12, respectively, to examine the role of income as well as of the PDS in shaping household consumption decisions.

5.2 Dealing with Non-Random Assignment of BPL/AAY Cards

Although randomised assignments of the household categories eligible for food subsidies would allow us to better understand the role of the TPDS in shaping household food consumption decisions, politically this would not seem to be a feasible strategy, nor is it easy to run these experiments for relatively long periods required to observe fundamental changes in spending preferences. At the same time, using access to food subsidies via ownership of BPL and AAY cards in a regression framework would ignore the fact that households are not randomly chosen to receive these cards and are likely to be different from each other in terms of caste, religion, place of residence, and most importantly, household income. In this report, we adopt an alternative approach and employ the propensity score matching technique to compare households that are as similar to each other as possible.

Propensity score analysis (Heckman and Navarro-Lozano, 2004; Rosenbaum and Rubin, 1983) is frequently used in the context of non-random treatment assignments in observational studies. The propensity score is expressed as:

$$e(X_i) = pr(Z_i=1 \mid X_i = x_i)$$

where the propensity score for subject i (i = 1… N), is the conditional probability of being assigned to treatment Zi = 1 vs. control Zi = 0, given a vector xi of observed covariates.

Conceptually, estimating the treatment effect in a quasi-experimental situation is relatively simple and involves predicting participation in a treatment by using a set of covariates, and then matching two respondents with similar propensity scores, including one from the treatment group and another from the control group. However, the results tend to be sensitive to the quality of matching. In order to maximise the quality of the match, we have used the nearest neighbour matching within calipers, followed recommendations available in the literature (Austin, 2011), and set calipers to 0.2 standard deviations of the predicted logit. Since our matching procedure does not allow a comparison case to match with more than one treatment case, it also reduces the number of treated observations that have a valid match, which is an issue of potential concern. We examine both these potential sources of bias in a later section.

In this analysis, we match households holding BPL/AAY cards with households without these cards on the following variables: log of per capita household income, squared term for log of per capita household income, an indicator for whether household income is 0 or less than zero (about 1.5 per cent of the sample), state of residence, place of residence, highest education level obtained by an adult aged above 21 years in the household, the number of persons in the household, caste and religion (categorised as forward castes, OBCs, Scheduled Castes, Scheduled Tribes, Muslims, and those following other religions), whether the household owns or cultivates land, and whether it draws any income from wage and salary work.

Note that in Chapters 5-7 we focus only on access to BPL/AAY cards and ignore participation in the Annapurna scheme since it is available only to individuals of specific ages and it would restrict our analyses to households with senior citizens. Also, we focus on access to BPL/AAY cards rather than the use of these cards since the decision to purchase from the PDS is one of the decisions we want to model.

5.3 Quality of Propensity Score Matching

Table 5.1 provides an illustrative example of the quality of matching in this analysis. For each characteristic against which the households are being matched, the top row provides the mean value for the BPL/AAY and non-BPL samples before matching, while the bottom row provides the means after matching. For example, before matching, 46 per cent of the PDS users in 2011-12 belonged to households that own or cultivate land while 44 per cent of those belonging to the non-PDS sample owned or cultivated land. After matching, this proportion was 46 per cent for both types of households. The T-test examines the differences in these means. As Tables 5.1a and 5.1b show, matching substantially reduces the bias on each independent variable. Wherever a statistically significant bias remains for an individual covariate, it is very small in size.

The danger with propensity score matching lies in our inability to find a comparable match among non-users for the households using the PDS or households that are not on a common support. The reason for households being off support is usually that the probability of receiving the BPL subsidy is so high that no comparable non-recipient household is available for matching. Of the 16,591 households having BPL or AAY cards in 2011-12 in the IHDS survey, no match was found for 3,732 households or about 22 per cent of the total sample. Of these, 1,504 households were in Andhra Pradesh and 1,162 in Karnataka, where almost all households from the lower income categories depended on food subsidy in 2011-12, indicating the widespread prevalence of food subsidies in these two states. These off-support households are omitted from our comparisons presented below.

The second important caveat for this analysis is that since households are selected in a way that they match with each other on a variety of observable characteristics of interest such as the state and place of residence as well as other characteristics like income, household size and caste/religion, these matched samples are closer to the samples included in the experimental design and do not form a nationally representative sample. Thus, sampling weights are not used for analyses based on PSM.

In evaluating the caveats presented above it is important to remember the goal of this report. While Chapters 1-4 provide descriptive statistics with nationally representative estimates, Chapters 5-7 of the report seek to understand the behavioural factors underlying household consumption decisions in the context of availability of food subsidies via BPL/AAY. In this quasi-experimental approach, in order to maintain internal consistency of the analysis, it is important to focus only on households that do not have near certainty of having a BPL card. For example, in Karnataka, given the high number of BPL cards, it is difficult to find an appropriate comparison case that has the same characteristics as a BPL cardholding household but does not have a BPL card. In that case, in order to maintain internal consistency, it is important to compare cases for which a counterfactual is available.

Table 5.1a: Distribution of BPL/AAY and non BPL households, before and after PSM matching 2004-05

	Unmatched	Mean			%reduct	t-test	Prob < t
Variable	Matched	BPL/AAY	Non-BPL	%bias	bias		
Log Income Per Capita	Unmatched	9.1341	9.6558	-54.7		-51.39	0
	Matched	9.1857	9.1926	-0.7	98.7	-0.61	0.542
Squared Term for Income	Unmatched	84.182	94.3	-56.9		-52.91	0
	Matched	85.157	85.273	-0.7	98.9	-0.56	0.575
Negative Income	Unmatched	0.01335	0.01434	-0.8		-0.81	0.416
	Matched	0.01433	0.01475	-0.4	57.5	-0.27	0.786
Own/Cultivate Farm	Unmatched	0.43813	0.40905	5.9		5.69	0
	Matched	0.44318	0.4511	-1.6	72.7	-1.23	0.22
Any work in Wage and Salary	Unmatched	0.79634	0.66547	29.8		28.08	0
	Matched	0.77323	0.76522	1.8	93.9	1.46	0.143

(contd..)

Variable	Unmatched Matched	Mean BPL/AAY	Mean Non-BPL	%bias	%reduct bias	t-test	Prob < t
OBC	Unmatched	0.36615	0.32457	8.8		8.48	0
	Matched	0.37076	0.37009	0.1	98.4	0.11	0.914
Dalit	Unmatched	0.25783	0.17076	21.3		21.09	0
	Matched	0.23824	0.2336	1.1	94.7	0.84	0.4
Adivasi	Unmatched	0.12927	0.05899	24.2		24.77	0
	Matched	0.11457	0.10344	3.8	84.2	2.75	0.006
Muslim	Unmatched	0.10172	0.11918	-5.6		-5.32	0
	Matched	0.11212	0.12182	-3.1	44.5	-2.32	0.02
Christian/Sikh/Jain	Unmatched	0.01789	0.04301	-14.7		-13.31	0
	Matched	0.02023	0.02209	-1.1	92.6	-0.99	0.321
Household Size	Unmatched	5.0751	5.2535	-7.3		-6.92	0
	Matched	5.1288	5.1976	-2.8	61.4	-2.17	0.03
Highest level education by adult household members (none omitted)							
Std 1-5	Unmatched	0.10769	0.05775	18.2		18.4	0
	Matched	0.10099	0.09703	1.4	92.1	1.02	0.307
Std 5-8	Unmatched	0.3445	0.29531	10.6		10.25	0
	Matched	0.35407	0.36014	-1.3	87.7	-0.98	0.329
Std 10-11	Unmatched	0.12338	0.16121	-10.8		-10.28	0
	Matched	0.13084	0.1321	-0.4	96.7	-0.29	0.773
Higher Sec. & Some College	Unmatched	0.06872	0.12327	-18.6		-17.24	0
	Matched	0.07655	0.08085	-1.5	92.1	-1.23	0.219
Graduate	Unmatched	0.05814	0.20082	-43.5		-38.99	0
	Matched	0.06778	0.07056	-0.8	98.1	-0.84	0.398
No. of Assets Owned	Unmatched	9.3818	13.739	-76.6		-71.19	0
	Matched	9.8664	10.024	-2.8	96.4	-2.32	0.02
Place of residence (Metro omitted)							
Non Metro Urban	Unmatched	0.18975	0.32106	-30.5		-28.6	0
	Matched	0.21059	0.21261	-0.5	98.5	-0.38	0.703

(contd..)

Variable	Unmatched / Matched	Mean BPL/AAY	Mean Non-BPL	%bias	%reduct bias	t-test	Prob > t
Developed Village	Unmatched	0.37254	0.29235	17.1		16.64	0
	Matched	0.35053	0.34497	1.2	93.1	0.9	0.368
Less Developed Village	Unmatched	0.39838	0.28517	24		23.5	0
	Matched	0.39243	0.3931	-0.1	99.4	-0.11	0.915
State of Residence (UP Omitted)							
Jammu & Kashmir	Unmatched	0.01072	0.02043	-7.8		-7.22	0
	Matched	0.01265	0.0134	-0.6	92.2	-0.52	0.606
Himachal Pradesh	Unmatched	0.02321	0.03801	-8.6		-8	0
	Matched	0.02757	0.02858	-0.6	93.2	-0.47	0.637
Uttarakhand	Unmatched	0.0088	0.01218	-3.3		-3.12	0.002
	Matched	0.01028	0.01088	-0.6	82.6	-0.44	0.657
Punjab	Unmatched	0.00603	0.05815	-29.9		-25.72	0
	Matched	0.00717	0.01012	-1.7	94.3	-2.46	0.014
Haryana	Unmatched	0.02009	0.04866	-15.7		-14.28	0
	Matched	0.02386	0.02622	-1.3	91.7	-1.16	0.245
Delhi	Unmatched	0.01469	0.02743	-8.9		-8.18	0
	Matched	0.01737	0.0188	-1	88.7	-0.83	0.408
Bihar	Unmatched	0.03372	0.03469	-0.5		-0.52	0.606
	Matched	0.03912	0.04055	-0.8	-47.2	-0.56	0.573
Jharkhand	Unmatched	0.01981	0.02346	-2.5		-2.39	0.017
	Matched	0.02293	0.02276	0.1	95.4	0.09	0.931
Rajasthan	Unmatched	0.0433	0.06825	-10.9		-10.16	0
	Matched	0.05117	0.05918	-3.5	67.9	-2.7	0.007
Chhattisgarh	Unmatched	0.03301	0.02586	4.2		4.16	0
	Matched	0.03625	0.03777	-0.9	78.8	-0.62	0.536
Madhya Pradesh	Unmatched	0.06162	0.07059	-3.6		-3.45	0.001
	Matched	0.07258	0.0854	-5.2	-42.8	-3.66	0

(contd..)

Variable	Unmatched Matched	Mean BPL/AAY	Mean Non-BPL	%bias	%reduct bias	t-test	Prob < t
Northeast	Unmatched	0.02414	0.02382	0.2		0.2	0.843
	Matched	0.02664	0.02689	-0.2	19.5	-0.12	0.904
Assam	Unmatched	0.01867	0.02747	-5.9		-5.49	0
	Matched	0.02217	0.02411	-1.3	78	-0.99	0.321
West Bengal	Unmatched	0.04153	0.06537	-10.6		-9.91	0
	Matched	0.04873	0.05724	-3.8	64.3	-2.93	0.003
Orissa	Unmatched	0.0739	0.03732	16		16.28	0
	Matched	0.06399	0.05547	3.7	76.7	2.77	0.006
Gujarat	Unmatched	0.05743	0.0506	3		2.94	0.003
	Matched	0.05952	0.0607	-0.5	82.7	-0.38	0.702
Maharashtra & Goa	Unmatched	0.06836	0.08766	-7.2		-6.82	0
	Matched	0.0768	0.07781	-0.4	94.8	-0.29	0.771
Andhra Pradesh	Unmatched	0.1052	0.03473	27.9		29.23	0
	Matched	0.07739	0.06255	5.9	78.9	4.48	0
Karnataka	Unmatched	0.16285	0.06289	32		33.03	0
	Matched	0.12334	0.10521	5.8	81.9	4.39	0
Kerala	Unmatched	0.04408	0.04046	1.8		1.75	0.08
	Matched	0.04915	0.04839	0.4	79.1	0.27	0.786
Tamil Nadu	Unmatched	0.08007	0.03918	17.3		17.66	0
	Matched	0.07343	0.06736	2.6	85.2	1.83	0.068
Sample Size	Unmatched	41,554					
	Matched	23,724					

Source: Authors' calculations from IHDS data.

Table 5.1b: Distribution of BPL/AAY and non BPL households, before and after PSM matching 2011-12

Variable	Unmatched Matched	Mean Treated	Mean Control	%bias	%reduct bias	t-test	Prob < t
Log Income Per Capita	Unmatched	9.4605	9.9607	-52.1		-51.22	0
	Matched	9.5024	9.5243	-2.3	95.6	-1.99	0.047
Squared Term for Income	Unmatched	90.249	100.31	-53.9		-52.68	0
	Matched	91.085	91.498	-2.2	95.9	-1.98	0.047
Negative Income	Unmatched	0.01495	0.01425	0.6		0.59	0.557
	Matched	0.01379	0.01441	-0.5	11.2	-0.42	0.672
Own/Cultivate Farm	Unmatched	0.462	0.43552	5.3		5.34	0
	Matched	0.45809	0.46004	-0.4	92.6	-0.31	0.754
Any work in Wage and Salary	Unmatched	0.82533	0.66652	37.1		36.36	0
	Matched	0.79919	0.7893	2.3	93.8	1.96	0.05
OBC	Unmatched	0.35375	0.32935	5.1		5.17	0
	Matched	0.34842	0.36649	-3.8	25.9	-3.02	0.003
Dalit	Unmatched	0.27509	0.17115	25.2		25.67	0
	Matched	0.26165	0.25113	2.5	89.9	1.93	0.054
Adivasi	Unmatched	0.12676	0.06025	23		23.86	0
	Matched	0.11552	0.09581	6.8	70.4	5.14	0
Muslim	Unmatched	0.10361	0.12227	-5.9		-5.86	0
	Matched	0.11482	0.12393	-2.9	51.2	-2.25	0.024
Christian/Sikh/Jain	Unmatched	0.0135	0.03829	-15.7		-14.97	0
	Matched	0.01706	0.01807	-0.6	95.9	-0.62	0.537
Household Size	Unmatched	4.8424	4.8648	-1		-0.97	0.334
	Matched	4.8934	4.8794	0.6	37.4	0.48	0.628
Highest level education by adult household members (none omitted)							
Std 1-5	Unmatched	0.0795	0.04679	13.5		13.86	0
	Matched	0.07634	0.0726	1.5	88.6	1.14	0.254
Std 5-8	Unmatched	0.36074	0.29117	14.9		15	0
	Matched	0.37249	0.38082	-1.8	88	-1.38	0.168

(contd..)

Variable	Unmatched Matched	Mean Treated	Mean Control	%bias	%reduct bias	t-test	Prob < t
Std 10-11	Unmatched	0.13447	0.15147	-4.9		-4.84	0
	Matched	0.13803	0.14737	-2.7	45	-2.14	0.032
Higher Sec. & Some College	Unmatched	0.1018	0.15548	-16.1		-15.82	0
	Matched	0.1138	0.1177	-1.2	92.7	-0.98	0.329
Graduate	Unmatched	0.07625	0.23565	-45		-43.18	0
	Matched	0.08701	0.08755	-0.2	99.7	-0.15	0.877
No. of Assets Owned	Unmatched	12.39	16.462	-70.5		-69.6	0
	Matched	12.855	13.18	-5.6	92	-4.69	0
Place of residence (Metro omitted)							
Non Metro Urban	Unmatched	0.18558	0.29314	-25.4		-25.05	0
	Matched	0.19801	0.20393	-1.4	94.5	-1.18	0.237
Developed Village	Unmatched	0.36743	0.30251	13.8		13.88	0
	Matched	0.34546	0.34928	-0.8	94.1	-0.64	0.521
Less Developed Village	Unmatched	0.40872	0.30853	21		21.18	0
	Matched	0.41291	0.40279	2.1	89.9	1.65	0.099
State of Residence (UP Omitted)							
Jammu & Kashmir	Unmatched	0.01091	0.02117	-8.2		-7.93	0
	Matched	0.01379	0.01511	-1.1	87.1	-0.89	0.374
Himachal Pradesh	Unmatched	0.0317	0.03739	-3.1		-3.09	0.002
	Matched	0.03754	0.03973	-1.2	61.6	-0.91	0.365
Uttarakhand	Unmatched	0.00814	0.01307	-4.8		-4.71	0
	Matched	0.01013	0.01153	-1.4	71.6	-1.09	0.278
Punjab	Unmatched	0.03303	0.04872	-7.9		-7.8	0
	Matched	0.04058	0.04066	0	99.5	-0.03	0.975
Haryana	Unmatched	0.03164	0.05014	-9.3		-9.16	0
	Matched	0.03957	0.04027	-0.4	96.2	-0.29	0.774

(contd..)

Variable	Unmatched Matched	Mean Treated	Mean Control	%bias	%reduct bias	t-test	Prob < t
Delhi	Unmatched	0.01272	0.02707	-10.3		-9.95	0
	Matched	0.01644	0.0194	-2.1	79.4	-1.79	0.074
Bihar	Unmatched	0.04876	0.02877	10.4		10.67	0
	Matched	0.04681	0.03996	3.6	65.7	2.7	0.007
Jharkhand	Unmatched	0.01597	0.0231	-5.2		-5.07	0
	Matched	0.02025	0.0215	-0.9	82.5	-0.7	0.485
Rajasthan	Unmatched	0.0405	0.07973	-16.6		-16.08	0
	Matched	0.05203	0.0592	-3	81.7	-2.51	0.012
Chhattisgarh	Unmatched	0.04466	0.02282	12.1		12.56	0
	Matched	0.04237	0.03443	4.4	63.6	3.31	0.001
Madhya Pradesh	Unmatched	0.07842	0.07127	2.7		2.73	0.006
	Matched	0.09332	0.09106	0.9	68.4	0.63	0.532
Northeast	Unmatched	0.022	0.02066	0.9		0.93	0.351
	Matched	0.02485	0.02446	0.3	70.9	0.2	0.841
Assam	Unmatched	0.02116	0.02491	-2.5		-2.49	0.013
	Matched	0.02648	0.02703	-0.4	85.5	-0.27	0.787
West Bengal	Unmatched	0.04533	0.06603	-9		-8.89	0
	Matched	0.05663	0.05686	-0.1	98.9	-0.08	0.936
Orissa	Unmatched	0.06395	0.03916	11.2		11.53	0
	Matched	0.06325	0.0525	4.9	56.6	3.69	0
Gujarat	Unmatched	0.03405	0.05667	-10.9		-10.64	0
	Matched	0.04292	0.04759	-2.2	79.3	-1.8	0.072
Maharashtra & Goa	Unmatched	0.05841	0.09901	-15.1		-14.79	0
	Matched	0.07267	0.07859	-2.2	85.4	-1.79	0.073
Andhra Pradesh	Unmatched	0.11398	0.01192	43		47.15	0
	Matched	0.03046	0.02274	3.2	92.4	3.84	0
Karnataka	Unmatched	0.15086	0.05293	32.8		34.49	0
	Matched	0.1022	0.08451	5.9	81.9	4.87	0

(contd..)

Variable	Unmatched / Matched	Mean: Treated	Mean: Control	%bias	%reduct bias	t-test	Prob > t
Kerala	Unmatched	0.02736	0.04356	-8.8		-8.59	0
	Matched	0.03497	0.0405	-3	65.9	-2.33	0.02
Tamil Nadu	Unmatched	0.04882	0.04951	-0.3		-0.32	0.751
	Matched	0.0585	0.06348	-2.3	-628.3	-1.67	0.095
Sample Size	Unmatched	42,152					
	Matched	25,718					

Source: Authors' calculations from IHDS data.

Descriptive statistics for the full sample have been provided in Chapters 1-5. In this chapter and in Chapter 7, our goal is to examine the behavioural models underlying household food consumption decisions. Although matching households on comparable characteristics reduces the sample size, it provides less biased estimates of differences between two groups. Consequently, PSM has emerged as a preferred method when random assignment is not feasible.

5.4 Access to BPL/AAY Card Increases PDS Purchase

When we examine the matched samples, we find that for all income categories, households that have access to BPL/AAY cards are more likely to purchase cereals from the PDS in the month preceding the survey. This is not surprising as households that are eligible for a higher PDS subsidy via BPL/AAY prices would be more likely to use the PDS.

What is surprising is that a substantial proportion of the BPL households continue to rely on the PDS at both low and high incomes. Among the BPL households, PDS use was seen to decline only after the per capita income touched Rs 3,500 per month in 2004-05, and Rs 4,500 per month in 2011-12 – a level that 90 per cent of the households failed to attain in these periods. This suggests that regardless of current income, households are sensitive to cereal prices and when cheaper cereals are available, these households continue to purchase from the PDS shops regardless of any concerns about inconvenience and grain quality.

Table 5.2: Per cent households purchasing cereals from PDS by BPL/AAY cardholders and non-BPL households in PSM matched sample, 2004-05 and 2011-12

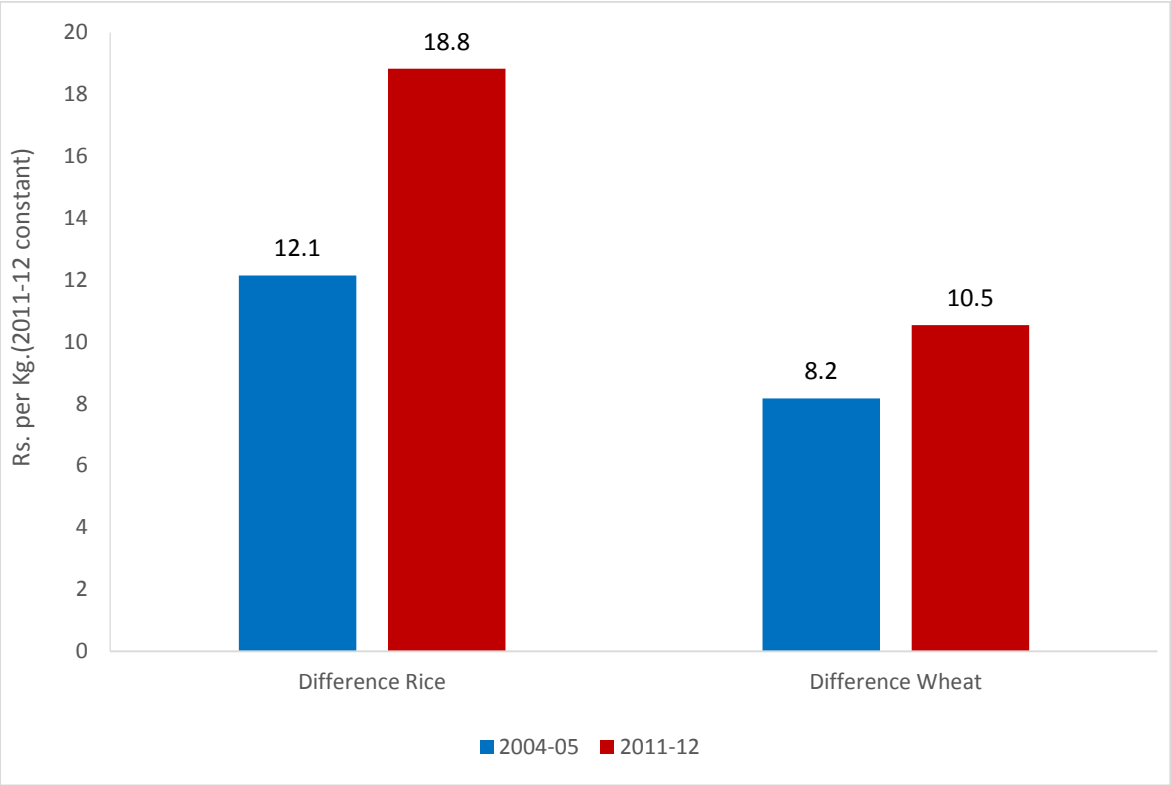
Monthly Income Per Capita	2004-05		2011-12	
	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	13.86	54.21	19.69	88.05
501-1000	14.68	56.90	24.26	88.57
1001-1500	17.28	55.92	30.65	88.93
1501-2000	15.32	55.14	34.06	89.05
2001-2500	13.16	46.41	38.74	87.32
2501-3000	15.40	48.04	40.52	86.82
3001-3500	14.22	38.89	41.53	86.98
3501-4500	15.35	35.59	40.55	83.23
4501-5500	12.93	28.44	36.80	81.90
5501-6000	13.51	31.03	26.83	75.36
6000 and above	7.75	28.24	30.00	64.60
Total	**14.80**	**53.77**	**29.32**	**87.40**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	69.3***			
2011-12	120.0***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

Source: Authors' calculations from IHDS data.

The increasing use of the PDS for both BPL and non-BPL households between 2004-05 and 2011-12 is a testament to this price sensitivity. As Figure 5.1 shows, among the IHDS households, implicit subsidies per kilogram of rice and wheat, defined as the difference between the average market price and the average PDS price, for both BPL and non-BPL families increased substantially between 2004-05 and 2011-12. Not surprisingly, the household tendency to purchase from the PDS also increased. Consequently, in our matched sample, in 2004-05, 15 per cent of the non-BPL households and 54 per cent of the BPL households purchased food from the PDS, and by 2011-12, this proportion had risen to 29 per cent and 87 per cent, respectively.

Figure 5.1: Implicit subsidy for rice and wheat in PDS, 2004-05 and 2011-12 (in 2011-12 constant prices)



Source: Authors' calculations from IHDS data.

One anomaly in Table 5.2 should be noted. When households with incomes of less than Rs 1,000 per month are denied BPL/AAY cards, they also seem to be excluded from PDS purchase during the year 2011-12.

6. Access to PDS and Dietary Composition

Key messages

- *Households with BPL/AAY cards have very different consumption patterns than matched households that do not have these cards.*
- *The share of expenditure on food for households with BPL/AAY cards is smaller than that for their peers. Once implicit subsidies via PDS transfers are factored in, this difference is smaller but remains statistically significant.*
- *It appears that households with BPL/AAY cards are trying to obtain their caloric needs from cheaper cereals rather than from more expensive items like dairy, fruits, nuts and meats.*
- *Rising incomes lead to greater dietary diversification for households without BPL cards than matched households with BPL cards.*

6.1 Introduction

This report began with the goal of understanding ways in which access to food subsidy changes the consumption patterns of Indian households. In this chapter, we examine the way in which households with access to the TPDS via BPL/AAY cards differ in their consumption behaviour from their peers who do not have these cards. All the results presented in this chapter are based on the Propensity Score Matching technique described in Chapter 5.

6.2 Similar Incomes, Different Consumption Patterns

As we look at different aspects of household consumption decisions between households with BPL/AAY cards and those that do not have these cards, it is important to check if these households have similar income levels. Since we matched households on income, by definition, they should be similar. Table 6.1 supports this expectation and

shows that the mean per capita income for BPL/AAY households in the matched sample for 2004-05 and 2011-12 is very similar to that of their non-BPL counterparts. The results show that for 2004-05, the mean incomes in two groups are almost identical. For 2011-12, the non-BPL group has slightly higher incomes but the difference is not statistically significant at the 0.05 level.

Table 6.1: Income per capita (in constant 2011-12 Rs.) for BPL/AAY cardholders and Non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	282	289	263	255
501-1000	716	715	740	735
1001-1500	1207	1206	1214	1213
1501-2000	1702	1705	1714	1711
2001-2500	2199	2193	2205	2208
2501-3000	2705	2697	2714	2708
3001-3500	3183	3182	3192	3200
3501-4500	3882	3869	3915	3903
4501-5500	4826	4911	4895	4892
5501-6000	5655	5665	5719	5665
6000 and above	9167	10742	8968	10212
Total	**1158**	**1157**	**1621**	**1598**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	0.08			
2011-12	0.96			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

However, having similar incomes does not imply similar consumption patterns across the two groups. Table 6.2 shows a comparison of the per capita consumption across the two groups, which reveals significant differences. It shows lower per capita expenditure for the BPL households during both years. The average difference is Rs 115 in 2004-05, and Rs 158 in 2004-05 with BPL/AAY households spending less than non-BPL households. In both cases, the difference is statistically significant. This difference may well be due to the underlying long-term poverty of the BPL/AAY households. As research on the link between income and consumption suggests, individuals are more likely to shape their consumption according to long-term income (often seen as being permanent income) than to short-term fluctuations (Friedman, 1957). However, when

we look at the composition of household expenditure—particularly the expenditure on food—this explanation does not seem fully satisfactory.

Table 6.2: Mean per capita consumption expenditure (in constant 2011-12 Rs.) for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	998	930	1337	1263
501-1000	1113	1063	1415	1251
1001-1500	1446	1341	1604	1542
1501-2000	1692	1578	1885	1778
2001-2500	1950	1742	2106	2119
2501-3000	2353	1957	2572	2268
3001-3500	2602	2269	2613	2280
3501-4500	2734	2612	2930	2715
4501-5500	3339	2858	3421	2998
5501-6000	3135	2907	4060	3349
6000 and above	4198	3697	4664	4267
Total	**1390**	**1276**	**1848**	**1690**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	7.11***			
2011-12	7.01***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

Research across the world shows that poorer households tend to spend a greater proportion of their expenditure on food (Brown and Deaton, 1972; Ritson and Hutchins, 1995). In fact, the proportion of income spent on food is often used as an indicator of poverty. If the BPL/AAY households in this matched sample are chronically more poor than their non-BPL counterparts, their expenditure should be more skewed toward food than that of the non-BPL households. However, the data on the ratio of food to non-food expenditure in Table 6.3 indicates that this is not the case. Higher incomes are clearly associated with a declining ratio of food to non-food items, but at any given income level, the BPL/AAY households seem to incur a lower food expenditure as opposed to non-food expenditure than households that do not have BPL/AAY cards.

This difference was relatively small in 2004-05 but widened by 2011-12, and became statistically significant at the 0.001 level.

Table 6.3: Ratio of food to non-food expenditure for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	2.40	2.20	1.51	1.41
501-1000	2.23	2.18	1.52	1.42
1001-1500	1.89	1.91	1.47	1.34
1501-2000	1.76	1.77	1.37	1.30
2001-2500	1.36	1.68	1.31	1.16
2501-3000	1.33	1.48	1.16	1.16
3001-3500	1.37	1.51	1.11	1.40
3501-4500	1.19	1.32	1.10	1.13
4501-5500	1.12	1.33	0.99	0.97
5501-6000	0.95	1.40	0.88	0.89
6000 and above	1.29	1.09	0.85	0.95
Total	**2.04**	**2.01**	**1.39**	**1.32**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	1.15			
2011-12	4.80***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

Table 6.3 highlights several interesting observations. First, the ratio of food to non-food items steadily declined for all income categories between 2004-05 and 2011-12. Going up as it did from a ratio of 2:1 to 1.3:1 over this short period, this decline is considerably large. While this is consistent with theoretical expectations that growing incomes lead to movement away from food, it is not applicable to this table. Since here we are examining the same income levels after adjusting for inflation, the decline seems to be a secular decline rather than simply the result of income growth. This change suggests that growing demands on the consumer's purse for other expenditures such as education, health care, housing and transportation may play a substantial role in squeezing his food expenditure. Second, we see that in 2011-12, the gap between the BPL/AAY and the non-BPL households widened at the lowest income groups. In the case of households with per capita monthly incomes of Rs 1,000 or less (those placed near or

below the poverty line in 2011-12), the non-BPL households exhibit a food to non-food expenditure ratio of 1.5 while the corresponding ratio for BPL/AAY households is 1.4.

This finding suggests that the BPL/AAY households are not simply responding to the underlying poverty but also seem to be following different spending patterns.

6.3 Food Subsidy Bridges the Gap in Food Expenditure

In the analysis of the lower food expenditure among BPL/AAY households, it is important to recognise that a focus on the actual expenditure ignores the role of food subsidies. In order to adjust for this omission, we add the value of the implicit subsidy to food expenditure. For wheat, rice, other cereals and sugar, we calculate the price that the household would have paid had it purchased these items from the market. The market price in most cases is obtained by the price that the households themselves actually pay for non-PDS cereals or would have paid had they purchased them from the market. In rare cases where the households purchased these goods only from PDS shops and did not provide the market price, we use the average price paid by their neighbours. This allows us to calculate the value of the subsidy by subtracting the PDS price from the market price and multiplying the resultant figure by the quantity purchased.

The calculation of the ratio of food expenditure including the value of this subsidy to non-food expenditure, as shown in Table 6.4, indicates that the difference in expenditure patterns between the BPL/AAY and non-BPL households reverses and the BPL/AAY households incur a higher food to non-food expenditure ratio than non-BPL households. In 2004-05, this difference is not statistically significant, but in 2011-12, when the value of the implicit subsidy is greater, the food to non-food expenditure ratio for BPL/AAY households is significantly higher.

Table 6.4: Ratio of food to non-food expenditure after including implicit value of food subsidy for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	2.43	2.32	1.55	1.62
501-1000	2.25	2.30	1.55	1.60
1001-1500	1.91	2.02	1.51	1.50

(contd…)

Monthly Income Per Capita	2004-05 Non-BPL Households	2004-05 BPL/AAY Households	2011-12 Non-BPL Households	2011-12 BPL/AAY Households
1501-2000	1.78	1.86	1.40	1.44
2001-2500	1.37	1.76	1.35	1.30
2501-3000	1.34	1.55	1.20	1.30
3001-3500	1.39	1.58	1.15	1.56
3501-4500	1.21	1.36	1.14	1.25
4501-5500	1.13	1.36	1.03	1.08
5501-6000	0.96	1.44	0.90	0.98
6000 and above	1.30	1.11	0.88	1.03
Total	**2.07**	**2.12**	**1.43**	**1.49**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	1.56			
2011-12	3.33***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

This observation has interesting implications. On the one hand, it is heartening to see that the PDS subsidies help BPL/AAY households address some of the decline in their food expenditure caused by rising costs and aspirations reflected in other expenditures such as on education and health care. On the other hand, it suggests the domination of the substitution rather than the income effect.

We began this report by seeking to understand how food subsidies may affect the food consumption choices made by households (See Figure 1.3). We outlined two potential pathways: (1) The Income Effect – where the savings from lower cereal prices might be applied to purchasing a diverse food basket with higher nutritional value foods; and, (2) The Substitution Effect – where households may use these savings for other purchases. The results presented above strongly suggest that the substitution effect seems to dominate, particularly in 2011-12, where households with BPL cards spend a smaller portion of their overall expenditure on food, relying on subsidies to make up the difference.

6.4 Differential Allocation to Cereals, Cereal Complements and Substitutes

Conventional wisdom suggests that higher incomes lead to the consumption of a greater number of calories (Strauss and Thomas, 1995). This research has been buttressed by computations of Engel curves, which show that higher incomes lead to greater expenditure on food but at a declining rate. However, this conventional wisdom is not always consistent with empirical observations. Empirical research often finds that higher income does not translate into higher caloric intake (Behrman and Deolalikar, 1987; Bocoum et al., 2014) and over time, the Engel curve of caloric consumption in India has become increasingly flat (Deaton and Drèze, 2009). Part of this disjunction may be associated with the source of caloric intake (Bhargava, 2014). Poor households may obtain calories from cheaper staples like cereals whereas richer households may obtain their calories from a more diversified food basket that includes fish, meat, eggs, fruits, nuts and dairy but they may need fewer calories due to lower likelihood of engaging in physically demanding work.

It may be helpful to revisit the role of the PDS in household nutrition in the context of this distinction between caloric consumption and the source of calories. Indian diets in all parts of the country are carbohydrate-rich. By providing cheaper rice, wheat, and to a more limited extent, coarse cereals, the PDS strengthens carbohydrate consumption. But these starchy foods must be consumed with items like vegetables and pulses, which are referred to as cereal complements. In contrast, foods like dairy products, nuts, fruits and meat may act as substitutes for cereals in providing alternative sources of calories. Hence we divide household food expenditure into the following four categories:

1. **Cereals**—which includes rice, wheat and coarse cereals.
2. **Cereal complements**—which includes pulses, eggs, oil and vegetables.
3. **Cereal substitutes**—which includes meat, fruits, nuts and milk.
4. **Other foods**—which includes sugar and other sweeteners, restaurant food and other items like spices.

Tables 6.5a to 6.5d show the proportion of household food budget allocated to these four categories, inclusive of the contribution of implicit subsidies for rice, wheat, other cereals and sugar to the household food expenditure.

Table 6.5a: Expenditure on cereals as proportion of food expenditure after including implicit value of food subsidy for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	0.38	0.40	0.30	0.33
501-1000	0.35	0.36	0.28	0.30
1001-1500	0.30	0.32	0.25	0.27
1501-2000	0.27	0.29	0.23	0.25
2001-2500	0.25	0.28	0.23	0.25
2501-3000	0.26	0.28	0.22	0.24
3001-3500	0.24	0.26	0.22	0.23
3501-4500	0.25	0.24	0.21	0.23
4501-5500	0.23	0.24	0.20	0.22
5501-6000	0.21	0.22	0.21	0.20
6000 and above	0.20	0.23	0.20	0.21
Total	**0.33**	**0.34**	**0.26**	**0.28**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	8.28***			
2011-12	13.84***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

Source: Authors' calculations from IHDS data.

Table 6.5b: Expenditure on cereal complements (+) as proportion of food expenditure after including implicit value of food subsidy for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	0.25	0.25	0.29	0.28
501-1000	0.25	0.25	0.28	0.28
1001-1500	0.25	0.25	0.28	0.27
1501-2000	0.25	0.24	0.26	0.27
2001-2500	0.24	0.24	0.26	0.25
2501-3000	0.24	0.24	0.26	0.25
3001-3500	0.23	0.23	0.26	0.25
3501-4500	0.23	0.24	0.24	0.25
4501-5500	0.22	0.24	0.24	0.25
5501-6000	0.22	0.26	0.23	0.24
6000 and above	0.23	0.22	0.24	0.24
Total	**0.25**	**0.25**	**0.27**	**0.27**

(contd…)

Monthly Income Per Capita	2004-05 Non-BPL Households	2004-05 BPL/AAY Households	2011-12 Non-BPL Households	2011-12 BPL/AAY Households
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	0.37			
2011-12	0.13			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

+Cereal complements includes pulses, vegetables, eggs and oil.

Source: Authors' calculations from IHDS data.

Table 6.5c: Expenditure on cereal substitutes (+) as proportion of food expenditure after including implicit value of food subsidy for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

Monthly Income Per Capita	2004-05 Non-BPL Households	2004-05 BPL/AAY Households	2011-12 Non-BPL Households	2011-12 BPL/AAY Households
500 and below	0.16	0.15	0.20	0.18
501-1000	0.18	0.18	0.22	0.21
1001-1500	0.22	0.21	0.25	0.24
1501-2000	0.25	0.23	0.28	0.26
2001-2500	0.27	0.24	0.29	0.28
2501-3000	0.26	0.24	0.29	0.28
3001-3500	0.26	0.27	0.30	0.30
3501-4500	0.27	0.28	0.31	0.29
4501-5500	0.29	0.28	0.32	0.30
5501-6000	0.29	0.30	0.32	0.31
6000 and above	0.30	0.30	0.33	0.29
Total	**0.20**	**0.19**	**0.25**	**0.23**
T-Statistic from PSM Samples				
BPL Vs. Non-BPL Samples (Matched within survey round)				
2004-05	5.55***			
2011-12	10.10***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

+Cereal substitutes includes dairy, fruits and nuts and meat.

Source: Authors' calculations from IHDS data.

Table 6.5d: Expenditure on other foods (+) as proportion of food expenditure after including implicit value of food subsidy for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	0.19	0.19	0.20	0.19
501-1000	0.20	0.19	0.20	0.19
1001-1500	0.21	0.21	0.20	0.20
1501-2000	0.21	0.21	0.21	0.20
2001-2500	0.21	0.21	0.20	0.20
2501-3000	0.22	0.22	0.21	0.20
3001-3500	0.23	0.22	0.20	0.20
3501-4500	0.23	0.22	0.21	0.21
4501-5500	0.23	0.22	0.22	0.21
5501-6000	0.24	0.20	0.21	0.22
6000 and above	0.23	0.22	0.21	0.23
Total	**0.204**	**0.199**	**0.202**	**0.198**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05	4.20***			
2011-12	3.56***			

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

+ Other foods includes sweeteners, restaurant food, spices and other items

Source: Authors' calculations from IHDS data.

The above four tables (6.5a–6.5d) present an interesting picture. Overall, households with BPL cards appear to spend a greater proportion of their food budget on cereals at every income level (Table 6.5a). Note that these calculations include the value of the implicit subsidy for cereals. This difference is statistically significant for both the years, 2004-05 and 2011-12. The expenditure share of cereal complements such as *dal* and vegetables is about the same for BPL/AAY households and other households (Table 6.5b). However, as Table 6.5c shows, the share of cereal substitutes such as dairy, fruits and meat is substantially lower, even at the highest income levels for the BPL/AAY households. This difference is statistically significant in both 2004-05 and 2011-12 but the magnitude of the difference is larger in 2011-12. The expenditure incurred on other food items is slightly smaller for the BPL/AAY households than for other households but the difference, while statistically significant, is very small in size.

These results suggest that access to cheaper cereals via the PDS skews household consumption towards cereals and cereal complements and away from foods that might be seen as cereal substitutes such as milk, fruit, nuts and meat.

6.5 BPL/AAY Access Associated with Lower Food Diversity

The preceding section discussed the skewing of expenditure in favour of cereals in the context of access to BPL/AAY cards. The consequences of this bias in terms of the actual cereal consumption are delineated below. Overall cereal consumption in India has been falling as measured by both the NSS (Table 1.1) and IHDS. In some ways, this is not surprising as a rise in incomes may lead to a preference for a more diversified diet and a concomitant reduction in the consumption of cereals (Ritson and Hutchins, 1995). However, within the context of this decline, if income, social background and place of residence are held constant, it may be seen that households with BPL/AAY cards exhibit higher cereal consumption than those without these cards.

Table 6.6a: Per capita monthly consumption of cereals (in kg) for BPL/AAY cardholders and non BPL households in PSM matched sample, 2004-05 and 2011-12

	Cereals per person per month (in Kg)			
	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	11.66	11.74	11.50	12.27
501-1000	11.46	11.71	11.13	11.77
1001-1500	11.08	11.52	11.17	11.66
1501-2000	11.20	11.58	10.96	11.93
2001-2500	10.77	11.30	11.02	11.72
2501-3000	11.29	11.89	11.17	11.80
3001-3500	11.19	12.04	11.57	11.85
3501-4500	11.75	11.46	11.25	11.70
4501-5500	12.15	11.94	11.18	11.88
5501-6000	10.57	12.40	11.28	12.22
6000 and above	12.16	13.13	12.10	12.41
Total	**11.40**	**11.68**	**11.22**	**11.87**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05		4.29***		
2011-12		10.43***		

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05

Source: Authors' calculations from IHDS data.

As seen in Table 6.6a, cereal consumption for the non-BPL PSM sample fell from 11.40 kg per person per month in 2004–05 to a corresponding figure of 11.22 kg in 2011–12. In contrast, cereal consumption for the BPL sample increased slightly from 11.66 to 11.87 kg. While carrying out comparisons across the survey rounds, it is important to remember that the PSM matching is done within a round and hence, the PSM samples across surveys are not strictly comparable. The BPL and non-BPL samples within a survey round are quite comparable and show that in each round, and at all income levels, access to food subsidy via BPL/AAY prices is associated with a higher consumption of cereals. Moreover, this difference persists at almost all income levels.

These results prove that a person living in a BPL/AAY household consumed an additional 280 grams of cereal as compared to his or her non-BPL peers in 2004-05, and this difference rose to 650 grams by 2011-12. However, a reverse trend may be observed in milk consumption. The average milk consumption of a BPL/AAY resident was about 0.2 litres less than that of his or her non-BPL counterparts in 2004-05, with the difference growing to 0.44 litres by 2011-12 (Table 6.6b).

Research has shown that cereals constitute an easy source of cheap caloric intake (Desai et al., 2016), and the results presented above too suggest that access to food subsidy may contribute to increased caloric intake by augmenting cereal consumption. However, at the same time, it may also lead to decreased dietary diversity. When we compare per capita monthly milk intake for households with BPL/AAY cards and non-BPL households, we see that in a matched sample, at any given income level, non-BPL households have higher milk consumption than BPL/AAY households.

Table 6.6b: Per capita monthly consumption of milk (in ltr) for BPL/AAY cardholders and Non BPL households in PSM matched sample, 2004-05 and 2011-12

	Milk per person per month (in Ltr)			
	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
500 and below	1.66	1.50	1.87	1.68
501-1000	2.07	1.95	2.49	2.02
1001-1500	2.85	2.52	3.24	2.80
1501-2000	3.28	3.03	3.77	3.36
2001-2500	3.75	3.59	3.91	3.72
2501-3000	3.90	3.59	4.65	3.88
3001-3500	4.05	4.38	4.34	4.35
3501-4500	4.34	4.28	4.72	3.61
4501-5500	5.23	4.71	4.83	5.00

(contd…)

	Milk per person per month (in Ltr)			
	2004-05		2011-12	
Monthly Income Per Capita	Non-BPL Households	BPL/AAY Households	Non-BPL Households	BPL/AAY Households
5501-6000	4.35	4.28	5.82	5.97
6000 and above	6.15	6.40	6.09	4.84
Total	**2.50**	**2.31**	**3.21**	**2.77**
T-Statistic from PSM Samples				
BPL Vs. Non BPL Samples (Matched within survey round)				
2004-05		4.02***		
2011-12		7.13***		

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

These divergent patterns for actual milk and cereal consumption support the results about the expenditure shares above with BPL/AAY access being associated with higher cereal consumption and decreased milk consumption. One can thus conclude that with economic growth, the threat of starvation recedes, but it is simultaneously imperative to capitalise on this growth and the resultant improvement in financial outcomes by focusing on dietary diversity rather than merely caloric consumption.

7. Role of PDS in the Context of Household Income Fluctuations

Key messages

- *When the same households are compared over time, the trends in food expenditure and food consumption vary between households that experience income growth vis-à-vis those that experience income declines.*
- *Food expenditure among households that suffer economic distress does not change substantially, possibly because they economise in other areas. However, food expenditure for households experiencing income growth increases. This suggests that food expenditure has a sticky floor.*
- *The increase in food expenditure with income growth is higher for households without BPL/AAY cards than for those with these cards, even after implicit food subsidies are taken into account.*
- *Cereal consumption increases for all households experiencing substantial income growth but it is lower for households without BPL/AAY cards as compared to those with these cards.*
- *The results from the household level fixed effects regression suggest that income elasticity for cereal consumption is small but positive, though it is greater for households owning BPL cards than for those without these cards.*
- *Rising income is more likely to increase milk consumption for households without BPL/AAY cards than for those with these cards, suggesting that higher incomes lead to greater dietary diversification in the absence of subsidies for cereals.*

7.1 Introduction

There is no doubt that poverty has steadily declined in India, but the aggregate figures reflecting this poverty reduction actually mask considerable diversity. An assessment of the economic status of individual households over time based on IHDS data clearly shows that despite diminishing overall poverty, the profile of the poor is becoming increasingly dynamic, as some people are moving out of poverty, while others who were earlier characterised as being above the poverty line are becoming indigent and falling into the BPL category. Figure 7.1 is based on the poverty ratios (HCR) calculated by using the Tendulkar poverty lines for both 2004-05 and 2011-12 based on per capita

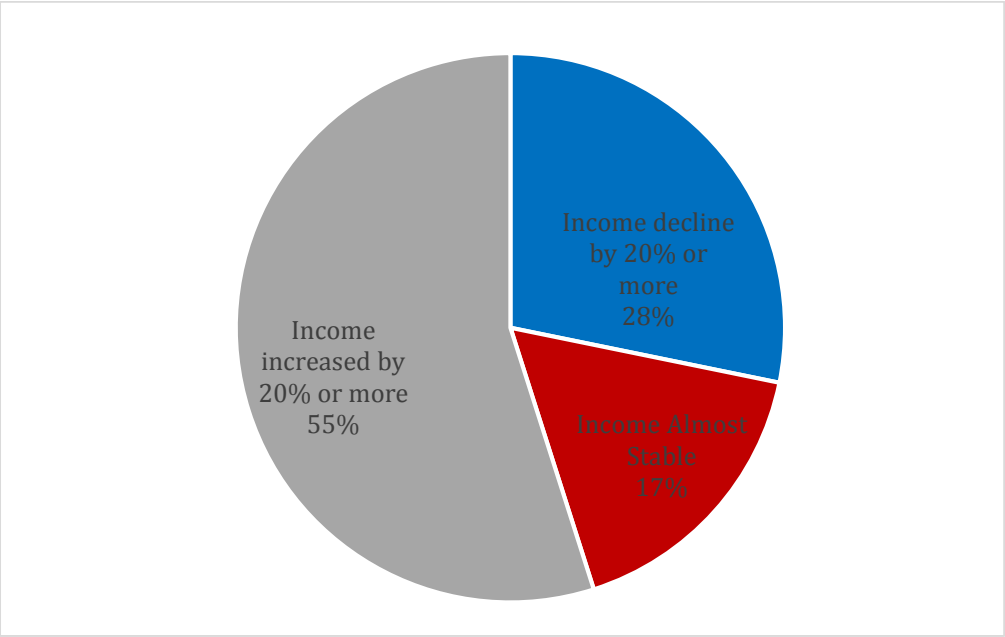
consumption. The sample for this analysis comprises 34,643 households that were interviewed both in 2004-05 and 2011-12 (in 2011-12, this sample consisted of 40,018 households because some of the root households had split between 2004-05 and 2011-12). While this figure shows declining poverty, it also documents that in 2011-12, of the 22 per cent of those characterised as poor, 9 per cent had become newly poor, which points to 40 per cent of the poor in 2011-12 being newly poor. This situation documents tremendous vulnerability among the households perched on the margins of indigence, wherein even a slight change in financial status could propel them on either side of the poverty line. How households cope with this fluctuation in fortunes is an important issue to be addressed as we explore the use of the PDS as a social safety net.

Figure 7.1: Poverty transition between IHDS-I and IHDS-II

Source: Authors' calculations from IHDS data.

Figure 7.1 highlights the churn in the household economic status using data on consumption poverty. It has long been recognised that income fluctuates more than consumption since individuals save during their peak working ages and consume when they are unable to work (Modigliani and Brumberg, 1954). The IHDS data, therefore, show tremendous income fluctuations over time—both in consumption and income, but more in income.

Figure 7.2: Changes in per capita income between 2004-05 and 2011-12



Source: Authors' calculations from IHDS data.

As can be seen from Figure 7.2, though a vast proportion of individuals live in households where incomes grew by at least 20 per cent between 2004-05 and 2011-12, after adjusting for inflation, about 28 per cent faced income declines of at least 20 per cent. The changes in their food consumption is the main issue of investigation and forms the core of this chapter.

7.2 Changes in Food Expenditure When Incomes Change

In this section, we compare different dimensions of food expenditure and intake for three groups of households: (1) Households whose incomes declined by 20 per cent or more between 2004-05 and 2011-12; (2) Households whose incomes remained more or less stable and did not change by more than 20 per cent in either direction; and, (3) Households whose incomes grew by 20 per cent or more. In each case, we compare the inflation adjusted per capita incomes by using state-urban specific consumer price indices (CPI-AL and CPI-IW). For each of these categories, we compare households with BPL/AAY cards in 2011-12 with those not having these cards.

Food is the most basic commodity required for human sustenance. Consequently, when incomes fall, households may economise on many other expenditures while trying

to protect food expenditure as much as possible. Thus, we do not expect to see a substantial decline in food expenditure in the context of an income decline. On an average, both the BPL/AAY and non-BPL households spent about the same in 2011-12 as in 2004-05 in spite of experiencing considerable economic distress (Panel A of Table 7.1a). The only surprise is the slightly higher food expenditure for households with per capita incomes of Rs 500 or less. For this distressed group, the difference between the BPL/AAY and non-BPL households is not statistically significant. For households whose incomes remained more or less stable as well as for those who experienced considerable income growth, expenditure on food increased consistently. However, this increase is greater for non-BPL households than for BPL/AAY households. Note that since we are comparing the same households at two points in time, all the other characteristics such as caste/religion and place of residence are held constant.

Table 7.1a: Changes in per capita food expenditure (exclusive of subsidy) for BPL/AAY and non-BPL households between 2004-05 and 2011-12 (in 2011-12 Rs.)

Per Capita income	Income Decline of 20%+		Stable income (+ or - 20%)		Income Growth (20%+)	
in 2011-12	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY
500 and below	58	20	103	58	105	51
501-1000	-1	-26	109	52	158	106
1001-1500	-33	-32	93	26	183	141
1501-2000	10	-124	135	62	229	203
2001-2500	-83	41	135	8	249	234
2501-3000	-7	-17	184	20	303	236
3001-3500	-79	-184	146	47	333	268
3501-4500	-178	250	136	114	349	330
4501-5500	-128	-96	161	-194	398	351
5501- 6000	115	-186	245	861	349	549
6000 and above	-340	-463	129	467	546	453
Total	**-3**	**-7**	**123**	**47**	**301**	**185**
T-Statistic						
BPL/AAY Vs. Non BPL	0.41		6.96***		16.91***	

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

Source: Authors' calculations from IHDS data.

Table 7.1b: Changes in per capita food expenditure (inclusive of subsidy) for BPL/AAY and non-BPL households between 2004-05 and 2011-12 (in 2011-12 Rs.)

Per Capita income in 2011-12	Income Decline of 20%+		Stable income (+ or - 20%)		Income Growth (20%+)	
	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY
500 and below	64	77	104	112	108	103
501-1000	5	28	114	106	160	159
1001-1500	-25	24	100	86	190	195
1501-2000	23	-69	146	119	237	264
2001-2500	-71	87	145	74	262	296
2501-3000	1	63	192	73	319	303
3001-3500	-67	-144	159	87	350	337
3501-4500	-168	294	143	136	367	400
4501-5500	-117	-58	173	-123	414	427
5501-6000	117	-130	258	830	363	627
6000 and above	-334	-451	144	435	561	524
Total	**5**	**48**	**131**	**102**	**313**	**244**
T-Statistic						
BPL/AAY Vs. Non BPL	4.25***		2.6**		9.9***	

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.

Source: Authors' calculations from IHDS data.

A comparison between the BPL/AAY and other households, as depicted in Table 7.1a, provides a somewhat biased picture, however, because it does not take into account the value of the PDS subsidy. Table 7.1b presents the same information for food expenditure where an implicit subsidy is included in the total food expenditure at both points in time. This table, on the other hand, presents a different picture. First, it shows that in the case of distressed households, food expenditure remained stable for the non-BPL households but grew slightly for the BPL/AAY households as the value of the PDS subsidy increased over time. The difference in food expenditure between these two groups is statistically significant, suggesting that the PDS has a significant impact on protecting food expenditure for distressed households.

However, even after the value of the subsidy is taken into account, it is clear that among the households that experienced income stability or significant income growth, the BPL/AAY households incur a lower food expenditure than their non-BPL counterparts. This is consistent with our observations in Chapter 6, where we found that BPL access skews household expenditure towards cereals. Since it is far cheaper to gain calories from cereals than from meat, dairy and fruits, households that get more of their calories from cereals are likely to spend less money on food.

7.3 Changes in Dietary Diversification When Incomes Change

The preceding section posits that when households experience significant income growth, they tend to increase their food expenditure, though this increase is greater for non-BPL than for BPL/AAY households, even when the value of the implicit subsidy is factored in. The implications of this for dietary diversity are examined below by focusing on the per capita cereal and milk consumption.

Table 7.2a: Changes in per capita monthly cereal consumption (in Kg.) for BPL/AAY and non-BPL households between 2004-05 and 2011-12 (in 2011-12 Rs.)

Per Capita income in 2011-12	Income Decline of 20%+		Stable income (+ or - 20%)		Income Growth (20%+)	
	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY
500 and below	-0.68	-0.48	-0.10	0.45	-0.20	-0.09
501-1000	-0.95	-1.01	-0.53	-0.55	-0.08	0.54
1001-1500	-1.00	-1.17	-0.38	-0.10	0.08	0.37
1501-2000	-1.01	-0.98	-0.51	-0.20	0.07	1.05
2001-2500	-1.21	-1.28	-0.73	1.13	0.04	0.61
2501-3000	-0.91	0.60	-0.84	-0.83	0.47	1.08
3001-3500	-2.05	-4.12	-0.53	-0.43	0.55	1.19
3501-4500	-1.14	-1.17	-0.90	-1.58	0.17	1.11
4501-5500	-1.73	-2.01	-0.45	1.28	0.63	1.74
5501-6000	-0.96	2.71	-0.97	3.67	0.01	1.10
6000 and above	-1.87	-1.12	-0.30	-0.58	0.59	2.00
Total	-0.93	-0.77	-0.51	-0.16	0.23	0.72
T-Statistic						
BPL/AAY Vs. Non BPL	1.29		2.35**		5.96***	

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

Table 7.2a shows changes in cereal consumption for households at different levels of income growth (or decline). The results presented below offer interesting implications for both the overall trends in cereal consumption as well as the role of the PDS in shaping cereal consumption. First, interestingly, the decline in cereal consumption is located mostly in households that did not experience rapid income growth. This suggests that households engage in complex dietary tradeoffs. In general, households are trying to diversify their diets within a given budget constraint. Hence, where incomes are plentiful and rising, households consume more of both cereals and other items, and where income constraints force tradeoffs, households tend to reduce cereal intake to diversify their diets.

Second, in almost any category, regardless of whether incomes are growing or declining, households with BPL/AAY cards are more likely to favour cereal consumption while making their food allocation choices. In the case of households challenged by a substantial income decline, the reduction in cereal consumption is smaller for BPL/AAY households than for others. In the case of households experiencing an income growth of 20 per cent or more, the cereal consumption increase is greater for BPL/AAY households than for other households.

Table 7.2b: Changes in per capita monthly milk consumption (in ltr) for BPL/AAY and non-BPL households between 2004-05 and 2011-12 (in 2011-12 Rs.)

Per Capita income in 2011-12	Income Decline of 20%+		Stable income (+ or - 20%)		Income Growth (20%+)	
	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY	Non-BPL	BPL/AAY
500 and below	-0.29	0.10	0.33	0.39	0.91	0.67
501-1000	-0.40	-0.32	0.65	0.39	1.10	0.77
1001-1500	-0.26	0.04	0.31	0.08	1.46	1.16
1501-2000	-0.18	-0.40	1.02	0.54	1.88	1.54
2001-2500	-0.15	1.48	0.82	-0.16	1.83	2.03
2501-3000	0.58	-0.16	0.88	-0.16	2.56	1.70
3001-3500	0.29	-3.02	0.45	0.54	2.37	2.57
3501-4500	-0.82	1.19	0.80	-0.41	2.53	2.12
4501-5500	-0.54	-2.36	1.23	1.48	3.11	3.02
5501-6000	1.86	-6.50	0.47	0.00	2.82	4.15
6000 and above	-0.65	0.80	1.00	7.50	3.85	2.21
Total	**-0.28**	**-0.05**	**0.67**	**0.32**	**2.26**	**1.43**
T-Statistic						
BPL/AAY Vs. Non BPL	2.07**		2.65***		9.90***	

Note: *** p <= .001, ** p <= 0.01, * p <= 0.05.
Source: Authors' calculations from IHDS data.

Table 7.2b presents similar results for per capita milk consumption. Both these results highlight the role of the PDS in *protecting* dietary diversity for households suffering from economic distress and in *reducing* dietary diversity for households experiencing economic growth. For households that suffer economic distress (depicted in columns 1 and 2 of the table), the average milk consumption is seen to decline for both the BPL/AAY households and other households, but less so for households with BPL/AAY cards. This may be because the income effect plays a role here and access to cheaper cereals allows the BPL/AAY households to sustain their milk consumption. However, in the case of households with stable or rising incomes, where the overall milk consumption is rising rather than declining, the increase is smaller for BPL/AAY

households than for other households, possibly because the former meet more of their caloric needs through the consumption of cheaper cereals.

7.4 Results from the Household Level Fixed Effects Models

While the above results can be understood intuitively, they simplify the complexity of studying change over time. Households do not simply gain or lose income but also gain or lose BPL/AAY status. Between 2004-05 and 2011-12, the proportion of households covered under the AAY programme expanded substantially. Moreover, it may be concluded that when households move or split, they often find it difficult to obtain another BPL card. All these factors cause a substantial churn in household BPL status.

Table 7.3: Changes in household BPL/AAY classification for household's survey in both rounds

	2004-05		
2011-12	Not BPL/AAY	BPL/AAY	Total
Not BPL/AAY	45.25	12.69	57.94
BPL/AAY	17.47	24.59	42.06
Total	**62.72**	**37.28**	**100**

Source: Authors' calculations from IHDS data.

Table 7.3 maps these changes. In order to examine the dietary implications emanating from simultaneous changes in income and BPL/AAY status, we undertake fixed effects regressions at the household level for the households surveyed in both 2004-05 and 2011-12, including household splits.

The fixed effects regressions we estimate take the following form (Greene, 2012):

$$Y_{it} = \beta X_{it} + \alpha_i + \varepsilon_{it}$$

where Y_{it} is the log of the dietary outcome variable for household i at time t, X_{it} refers to time varying covariates for household i at time t (in this case log of per capita income, BPL/AAY status and household size), α_i refers to a household specific constant term and ε_{it} refers to the error term. In this analysis, we centre the log of per capita income around the value 9.62179 to improve the interpretability of coefficients for BPL/AAY status around the population mean.

Table 7.4: Results from household fixed effects regression for per capita cereal and milk consumption

	Log Per Capita Cereal Consumption				Log Per Capita Milk Consumption			
	Coefficient	Standard Error	T-Statistic	P < t	Coefficient	Standard Error	T-Statistic	P < t
Log per capita income	0.030	0.003	11.3	0.000	0.150	0.005	29.4	0.000
BPL/AAY Card	0.040	0.004	9.1	0.000	-0.018	0.008	-2.1	0.037
Interaction term for BPL*Log Income	0.015	0.004	3.9	0.000	-0.020	0.008	-2.6	0.008
Survey Period 2011-12 (2004-05 omitted)	-0.048	0.003	-18.4	0.000	0.112	0.005	22.5	0.000
No. of persons in the household	-0.044	0.001	-48.5	0.000	-0.033	0.002	-19.4	0.000
Constant	2.679	0.005	504.0	0.000	1.441	0.010	141.8	0.000
Sample Size	74567							
Household Groups	34643							

Source: Authors' calculations from IHDS data.

The results for the two dietary intake variables discussed above, that is, the log of per capita cereal and milk intake from household level fixed effects regressions, are presented in Table 7.4. They support the observations from descriptive analyses presented in the prior section. Both cereal and milk consumption rise with an increase in incomes, though the increase for cereals is fairly small. A one per cent increase in income leads to an increase of 0.03 per cent in cereal consumption and 0.15 per cent in milk consumption, suggesting greater income elasticity for milk consumption than for cereals. These results also suggest that at mean income levels, access to a BPL/AAY card causes an increase in cereal consumption by 0.04 per cent and a decline in milk consumption by 0.018 per cent. The coefficient of the interaction between income and possession of a BPL card is particularly interesting. It indicates that growing incomes improve cereal consumption for households having BPL/AAY cards even as they depress milk consumption for the same households. All these effects are statistically significant at 0.05 levels or better.

The descriptive as well as regression results presented in this chapter clearly show that access to BPL/AAY cards improves cereal consumption but is associated with decreases in dietary diversity.

8. Policy Implications

This report set out to understand the role of the Targeted Public Distribution System (TPDS) in shaping household food consumption decisions and the changes in these decisions in the context of changing economic conditions between 2004-05 and 2011-12. It is based on analyses of data from the India Human Development Survey (IHDS), waves I and II, carried out in 2004-05 and 2011-12, respectively. The goal of this report is not to replicate the analyses that may be undertaken by other data sources such as the National Sample Surveys but rather to exploit the unique nature of the IHDS, which contains information about income as well as expenditure for the same households at two points in time.

8.1 Key Findings

The results presented in Chapters 2–7 paint an interesting picture of the changes in use of TPDS as well as their implications. Even before the full implementation of the National Food Security Act (NFSA), the TPDS is seen to play a crucial role in household food consumption. The TPDS provides highly subsidised cereals to households with Below Poverty Line (BPL) and Antyodaya Anna Yojana (AAY) cards as well as participation in the Annapurna scheme. For those with Above Poverty Line (APL) cards, the grains are supposed to be provided at economic costs though these households also benefit somewhat from the TPDS if they live in areas where the market prices are higher than the PDS prices.

PDS use grew strikingly between 2004-05 and 2011-12. In 2011-12, about 27 per cent of all households purchased cereals from the PDS, whereas by 2011-12, this proportion had risen to 52.3 per cent.

The growth in PDS use has occurred for each category of cardholders. Almost all BPL and AAY cardholders purchase PDS grains and as many as 32 per cent of the APL cardholders purchase from the PDS.

The results also show that the TPDS became better targeted between 2004-05 and 2011-12 with a sharp decline in errors of exclusion, though errors of inclusion remain with many better-off households taking advantage of the TPDS. The access of the

poor to AAY/BPL cards improved because more cards were issued, particularly in the AAY category. However, the access of the rich also improved because the programme did not become better targeted and an increased number of cards were distributed to the whole population. Moreover many households retained BPL cards issued earlier in spite of having moved out of poverty with economic growth.

In order to compare apples with apples, this report employed the Propensity Score Matching (PSM) technique in which households with and without BPL/AAY cards were matched on income, household size, caste/religion, place of residence, state of residence, and household education, and whether the household owns or cultivates land and whether the household has any income from wage and salary work. These matched samples show that access to BPL and AAY cards is associated with fundamental changes in household consumption behaviours. The following are the salient features with respect to the BPL/AAY cardholders:

- Spending a lower proportion of their overall expenditure on food, even when the value of implicit food subsidies is factored in.
- Incurring a greater proportion of their food expenditure on cereals and a lower proportion of expenditure on cereal substitutes such as fruits, nuts, dairy and meat.
- Consuming a greater amount of cereals at any given income level.
- Consuming a lower amount of milk.

When the same households are compared between 2004-05 and 2011-12, the results show that the impact of the TPDS on household food consumption varies between households that suffer economic distress versus households that experience income growth. Households that experience a per capita income decline of 20 per cent or greater in constant terms seem to use the TPDS to stabilise their consumption and maintain at least some degree of dietary diversity. Since dietary preferences change slowly and caloric needs remain stable, it is not surprising that under adversity, households work hard to retain their food consumption habits and use the PDS to support this. In contrast, households whose incomes remain stable or experience a sharp increase seem to use the TPDS as a way of obtaining cheaper calories, and thereby invest less in increasing dietary diversity than they might have done so in the absence of food subsidies.

8.2 Dietary Diversity in an Era of Growing Incomes

The results presented in this report paint a complex picture of the TPDS programme. On the one hand, the TPDS has become increasingly ubiquitous with a rising proportion of

the Indian population relying on it to provide subsidised cereals. The TPDS clearly has a role to play in providing food security to households that are placed at the lowest end of the income spectrum or that suffer from economic distress.

On the other hand, it also skews the dietary composition towards consumption of cereals. In the absence of the TPDS, cereals have relatively low income elasticity with cereal consumption rising by 0.03 per cent for every percentage point increase in per capita income. This suggests that as households grow richer, they will try to diversify their diet and obtain more of their calories from other sources such as fruit, nuts, milk and meat. However, access to the TPDS seems to skew their diets towards cereals.

Theoretically, we can expect food subsidies to have two types of effects. As households try to balance their various needs including ensuring adequate caloric consumption, improving the quality of their diets, improving their living conditions, and investing in the health and education of household members, the TPDS may change their calculations. For households that value dietary diversity, being able to buy cheap cereals will free up money to purchase other foods such as milk, fruits, nuts, and perhaps eggs and meat (the income effect). For households that have other dominating consumption needs, the money saved by purchasing subsidised cereals may be devoted to those needs and diverted from food expenditure (the substitution effect). Which effect dominates remains an empirical question. The results presented in this report suggest that the substitution effect dominates with households holding BPL/AAY cards acquiring more of their calories from cereals and not increasing investments in other food groups by the same level as non-BPL households.

This is a particular problem for a society facing an epidemiological transition. Although communicable diseases remain dominant in the country, the prevalence of non-communicable diseases (NCDs) is rising. Cardiovascular diseases, strokes, diabetes, and cancer are the four leading NCDs in India (Upadhyay, 2012). India has the highest number of people with diabetes in the world (Ghaffar et al., 2004) and this burden has been rising over time (Kaveeshwar and Cornwall, 2014), which is why it is sometimes referred to as the 'diabetic capital of the world' (IDF, 2009). At least some of this increase in the occurrence of the disease could be due to the rising consumption of processed foods and refined foodgrains (Mohan et al., 2010) as unprocessed foods and healthier cereals like small millets are considered inferior foods that households abandon as they get rich.

This issue is particularly critical for India since there is some possibility that either genetic factors or their traditional carbohydrate-based diets make Indians more susceptible to cardiovascular diseases and diabetes. The South Asian populations living abroad, particularly in Europe and the United States, have shown very high rates of

diabetes, high blood pressure and heart conditions (Gunarathne et al., 2009; Gupta et al., 2011). The rates of coronary heart disease have been reported to be unusually high in several parts of the world among people originating from the Indian subcontinent (McKeigue et al., 1989). A UK study showed that men and women from India had the highest standardised mortality rates due to cardiovascular diseases, and that young Indian men were at particularly high risk of contracting these diseases (Balarajan et al., 1984). The cardiovascular mortality of South Asian migrants was also seen to increase with the duration of residence in England and Wales, presumably as these migrants became richer (Harding, 2003). Indian immigrants in the United States show a higher prevalence of diabetes and a number of related chronic diseases such as hypertension and cardiac conditions (Bhopal, 2000; Shah et al., 2015), possibly due to the increased consumption of processed carbohydrates facilitated by increasing incomes.

If income growth is combined with the increased consumption of cereals in India and the TPDS facilitates the concentration of calories from starch, this may have long-term health implications for India. The economic as well as human costs of diseases like diabetes, heart conditions and high blood pressure may be substantial. Thus, it may be important to explore how food security for the poor via the TPDS may be combined with improving dietary diversity of the population.

8.3 Cash Transfers: A Way Forward?

This report does not examine the role of cash transfers directly. However, the results have substantial implications for the discourse about cash transfers. The results highlight that even in an era of growing overall incomes, the availability of subsidised cereals skews consumption towards greater cereal consumption at all income levels.

This is a somewhat surprising finding. The PDS does not meet all of the households' cereal needs. As this report documents, almost all the households purchase some cereals from the market and PDS purchase accounts for less than half of the total cereal consumption (Figure 3.4). At this infra-marginal level, would it not be possible for households to curtail their market cereal purchase and use that money for other foods? However, this does not seem to be the case. It may be that instead of the PDS grains being the staple and market grains being the additional, market grains form the staple of household consumption, possibly because of their higher quality. However, even if the market-purchased rice is being used for special meals, the PDS rice may be used for the preparation of foods like *dosa* or *khichdi*, in which case the quality of the grain is less important. Consequently, access to the TPDS may add to cereal consumption rather than replacing market purchases.

Cash transfers may be a way of avoiding skewing the household consumption of cereals by depressing prices. However, their success would depend on the ability to effectively administer transfers and reduce leakages. Moreover, how this may affect grain markets remains unknown. International research on cash versus in-kind food subsidies presents mixed results with the effectiveness of cash transfers depending on the institutional framework (Hoddinott, 2013). Thus, while in theory it seems likely that cash subsidies instead of in-kind subsidies via PDS may increase dietary diversity, it may make sense to experiment with a cash transfer programme in a few districts—particularly districts with diverse food habits and market infrastructure—before engaging in the massive transformation of India's Public Distribution System.

APPENDIX - I: Tables

Table A1: Percentage distribution of households with ration card ownership by place of residence

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	2.5	6.0	33.7	35.7	47.1	44.5	16.7	13.9
Place of Residence								
Metro urban	0.1	1.6	14.4	19.0	67.0	60.5	18.6	18.9
Other urban	1.2	3.2	23.8	27.9	52.9	55.7	22.1	13.2
More developed village	1.9	6.3	39.7	40.9	46.2	41.6	12.1	11.3
Less developed village	4.2	8.5	37.7	39.8	40.5	36.2	17.6	15.5

Source: Authors' calculations from IHDS data.

Table A2: Percentage distribution of households with ration card ownership by social groups

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	1.2	2.8	19.0	22.0	64.2	62.7	15.6	12.6
OBC	2.3	5.7	35.4	37.6	43.5	43.7	18.8	13.0
Dalit	3.3	9.5	43.3	43.9	39.8	33.6	13.6	13.0
Adivasi	6.0	8.5	50.0	48.7	23.0	20.5	21.0	22.2
Muslim	1.9	4.9	28.4	32.1	53.3	47.5	16.5	15.6
Christian, Sikh, Jain	0.3	1.9	19.9	17.8	67.0	70.6	12.8	9.7

Source: Authors' calculations from IHDS data.

Table A3: Percentage distribution of households with ration card ownership by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	4.4	10.7	45.5	48.8	31.8	26.1	18.3	14.4
Below primary	3.4	8.1	44.6	44.2	35.2	35.1	16.9	12.6
Primary	2.4	7.2	40.0	43.1	41.0	35.0	16.6	14.7
Middle	2.9	6.4	33.2	35	48.6	43.0	15.3	15.6
Secondary	1.3	4.1	28.3	34.6	54.6	48.5	15.9	12.9
Higher secondary	0.8	3.9	22.4	27.7	60.4	55.0	16.4	13.4
Graduate+	0.6	1.4	13.4	17.7	69.0	68.5	17.1	12.4

Source: Authors' calculations from IHDS data.

Table A4: Percentage distribution of households with ration card ownership by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	2.4	5.8	34.7	35.4	44.3	42.8	18.6	16.1
Marginal (0-1 hectare)	3.5	8.0	42.7	39.1	39.3	41.3	14.6	11.5
Small (1-2 hectare)	3.0	3.1	34.8	35.4	47.9	52.5	14.3	9.0
Medium (2-5 hectare)	2.3	1.9	25.0	24.5	59.7	63.6	13.0	10.0
Large (5 and more hectare)	1.5	2.5	24.4	17.0	58.9	71.3	15.1	9.1

Source: Authors' calculations from IHDS data.

Table A5: Percentage distribution of households with ration card ownership by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	4.6	10.3	41.2	43.5	36.4	30.6	17.9	15.6
2nd quintile	3.4	7.8	43.0	42.0	38.0	35.3	15.6	14.9
Middle quintile	2.7	6.5	39.4	40.4	42.4	39.7	15.6	13.4
4th quintile	1.5	4.4	30.7	34.7	51.8	49.0	15.9	11.9
Richest	0.6	1.7	14.8	17.8	66.2	67.0	18.4	13.6

Source: Authors' calculations from IHDS data.

Table A6: Percentage distribution of households with ration card ownership by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest 1	4.9	10.7	42.3	44.3	35.0	28.5	17.9	16.5
2nd quintile 2	4.1	9.1	44.2	43.6	36.6	32.6	15.1	14.7
Middle q 3	3.3	7.9	43.7	42.8	38.2	34.8	14.8	14.5
4th quintile 4	2.7	7.0	39.3	42.0	45.0	38.6	13.0	12.5
Richest 5	1.1	3.3	24.9	28.5	60.5	58.3	13.5	9.9

Source: Authors' calculations from IHDS Data.

Table A7: Percentage distribution of households with ration card ownership by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	2.3	5.5	32.7	37.6	43.8	42.3	21.2	14.6
2nd quintile	0.9	3.9	29.2	34.8	49.2	48.3	20.7	13.0
Middle quintile	0.5	2.1	23.9	29.4	54.5	54.8	21.0	13.7
4th quintile	0.4	1.7	14.1	19.9	65.0	63.4	20.6	15.0
Richest	0.5	1.0	6.7	8.0	70.4	74.1	22.4	16.8

Source: Authors' calculations from IHDS data.

Table A8: Percentage distribution of households with ration card ownership by asset quintile

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	5.1	11.8	45.9	44.3	28.7	24.9	20.3	19.1
2nd quintile	3.4	7.3	42.8	45.4	37.1	32.8	16.8	14.5
Middle quintile	1.9	5.7	39.5	41.9	43.1	41.3	15.4	11.1
4th quintile	0.9	2.6	25.2	30.0	58.7	55.9	15.2	11.5
Richest	0.4	1.2	10.5	12.4	73.9	73.7	15.2	12.6

Source: Authors' calculations from IHDS data.

Table A9: Percentage distribution of households with ration card ownership by households having MGNREGA card

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	10.9	-	51.1	-	28.9	-	9.1
Non-MGNREGA	-	5.0	-	32.5	-	47.7	-	14.9

Source: Authors' calculations from IHDS data.

Table A10: Percentage distribution of households with ration card ownership by social network

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Acquaintance	1.9	5.7	28.8	32.6	52.2	48.5	17.1	13.2
Organization	2.0	5.1	40.1	42.1	42.4	42.0	15.6	10.9
Panchayat/Nagarpalika	2.8	8.6	38.2	35.1	42.8	41.9	16.2	14.4

Source: Authors' calculations from IHDS data.

Table A11: Percentage distribution of households with ration card ownership by different regions of India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	5.4	6.8	25.8	24.8	60.5	62.3	8.3	6.0
North	0.3	8.4	12.5	18.4	74.1	57.0	13.1	16.2
North Central	3.6	8.3	25.3	29.6	46.6	40.8	24.5	21.3
Central Plains	5.3	9.1	27.5	30.6	49.1	46.2	18.1	14.1
East	2.3	5.7	32.0	35.1	52.7	45.0	13.0	14.2
West	1.6	2.8	30.3	25.2	56.0	58.2	12.1	13.8
South	0.9	3.5	52.8	56.5	29.9	33.2	16.4	6.8

Source: Authors' calculations from IHDS data.

Table A12: Percentage distribution of households with ration card ownership by asset ownership

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Colour TV	0.5	3.6	16.6	30.9	67.3	53.7	15.7	11.8
Air Cooler	0.5	2.4	9.8	16.5	71.4	65.9	18.3	15.2
Washing Machine	0.6	1.2	7.0	9.3	76.0	77.2	16.4	12.3
Computer	0.4	0.9	5.8	9.0	75.7	76.3	18.2	13.8
Laptop	-	0.8	-	7.8	-	76.6	-	14.8
Credit Card	0.7	1.9	6.9	16.3	73.4	71.9	19.1	10.0
Refrigerator	0.5	2.2	8.4	15.3	76.5	70.3	14.6	12.2
Air Conditioner	0.3	1.6	8.3	10.0	64.7	73.7	26.7	14.8
Motor Cycle	0.5	1.8	14.8	20.5	67.9	65.1	16.8	12.7
Car	0.9	1.0	6.3	8.8	73.2	76.3	19.6	13.9
Telephone	0.4	1.2	12.6	14.5	73.8	76.9	13.2	7.5
Mobile	0.5	5.0	12.0	33.2	69.3	49.2	18.3	12.7
Own House	2.6	6.3	34.9	36.2	47.7	44.5	14.8	13.0
Milch Animal	2.2	6.6	30.4	34.7	51.0	48.9	16.4	9.8

Source: Authors' calculations from IHDS data.

Table A13: Percentage distribution of ration cardholder households across place of residence in India

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Metro urban	7.6	7.6	0.2	2.0	3.2	4.0	10.8	10.3	8.4	10.3
Other urban	21.1	24.4	10.4	13.0	14.9	19.1	23.7	30.5	27.9	23.2
More developed village	34.4	30.5	26.8	32.0	40.6	35.0	33.8	28.6	24.9	24.8
Less developed village	36.9	37.5	62.6	53.0	41.2	41.9	31.7	30.6	38.8	41.8
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A14: Percentage distribution of ration cardholder households across social groups

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	20.6	20.4	9.9	9.6	11.6	12.5	28.1	28.7	19.2	18.4
OBC	35.7	35.7	33.2	34.1	37.5	37.7	33.0	35.1	40.0	33.4
Dalit	22.0	22.1	29.1	34.7	28.3	27.2	18.5	16.7	17.9	20.7
Adivasi	7.8	8.3	18.9	11.8	11.6	11.3	3.8	3.8	9.8	13.3
Muslim	11.2	11.3	8.6	9.2	9.5	10.2	12.7	12.1	11.0	12.7
Christian, Sikh, Jain	2.7	2.2	0.3	0.7	1.6	1.1	3.8	3.4	2.1	1.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A15: Percentage distribution of ration cardholder households across highest adult education level

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	23.4	19.4	41.4	34.6	31.6	26.6	15.8	11.4	25.5	20.1
Below primary	8.3	6.3	11.3	8.5	10.9	7.8	6.2	5.0	8.3	5.7
Primary	15.7	15.2	15.4	18.2	18.6	18.3	13.6	11.9	15.6	16.0
Middle	16.0	16.7	18.8	17.7	15.8	16.3	16.5	16.1	14.6	18.8
Secondary	13.6	13.7	6.9	9.2	11.4	13.2	15.7	14.9	12.9	12.7
Higher secondary	9.6	12.3	3.2	8.1	6.4	9.6	12.3	15.3	9.3	11.9
Graduate+	13.6	16.5	3.1	3.8	5.4	8.2	19.9	25.4	13.8	14.8
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A16: Percentage distribution of ration cardholder households across land ownership

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/ No land	57.1	58.1	54.7	56.0	58.9	57.6	53.7	55.9	63.6	67.3
Marginal (0-1 hectare)	13.6	28.5	19.0	38.1	17.3	31.2	11.4	26.5	11.9	23.7
Small (1-2 hectare)	8.0	7.2	9.7	3.8	8.3	7.2	8.2	8.5	6.9	4.7
Medium (2-5 hectare)	11.2	5.0	10.4	1.6	8.3	3.4	14.2	7.1	8.7	3.6
Large (5 and more hectare)	10.0	1.2	6.2	0.5	7.3	0.6	12.5	2.0	9.0	0.8
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A17: Percentage distribution of ration cardholder households across income quintiles - All India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest 1	33.4	29.9	22.5	22.0	14.1	12.2	19.7	20.3
2nd quintile 2	28.0	23.6	26.5	22.1	16.7	14.4	19.4	19.6
Middle quintile 3	21.4	22.9	23.5	22.6	18.1	17.3	18.8	19.4
4th quintile 4	12.5	16.4	18.6	21.2	22.4	22.3	19.5	18.9
Richest 5	4.6	7.2	9.0	12.2	28.7	33.8	22.5	21.8
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A18: Percentage distribution of ration cardholder households across income quintiles - Rural India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest 1	27.6	26.1	19.5	20.0	14.5	13.4	21.7	21.9
2nd quintile 2	26.5	24.6	23.4	22.2	17.4	17.3	21.0	22.1
Middle quintile 3	21.2	21.6	23.1	21.7	18.1	18.4	20.6	22.0
4th quintile 4	17.7	18.9	20.8	21.5	21.3	20.2	18.1	18.9
Richest 5	7.0	8.8	13.2	14.5	28.7	30.8	18.8	15.1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS Data.

Table A19: Percentage distribution of ration cardholder households across income quintiles - Urban India

Population Groups	AAY/Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest 1	48.9	36.7	30.3	28.1	15.2	14.4	19.8	19.2
2nd quintile 2	20.1	28.9	27.8	27.6	17.6	17.5	19.8	18.2
Middle quintile 3	11.6	14.8	22.3	22.5	19.1	19.2	19.7	18.5
4th quintile 4	7.9	12.3	13.3	15.6	23.0	22.7	19.5	21.0
Richest 5	11.6	7.4	6.4	6.2	25.0	26.3	21.3	23.1
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A20: Percentage distribution of ration cardholder households across asset quintile - All India

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	22.8	22.9	47.0	45.1	31.0	28.5	13.9	12.8	22.8	22.9
2nd quintile	21.2	17.5	28.8	21.2	27.0	22.3	16.7	13.0	21.2	17.5
Middle quintile	17.4	23.3	13.6	22.1	20.4	27.4	15.9	21.6	17.4	23.3
4th quintile	21.9	18.7	7.7	8.1	16.4	15.7	27.3	23.6	21.9	18.7
Richest	16.7	17.5	2.8	3.5	5.2	6.1	26.2	29.0	16.7	17.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A21: Percentage distribution of ration cardholder households across MGNREGA card ownership

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	17.2	-	31.2	-	24.6	-	11.2	-	11.3
Non-MGNREGA	-	82.8	-	68.8	-	75.4	-	88.8	-	88.7
Total	**-**	**100**	**-**	**100**	**-**	**100**	**-**	**100**	**-**	**100**

Source: Authors' calculations from IHDS data.

Table A22: Percentage distribution of ration cardholder households across different regions in India

Population Groups	Distribution of household		AAY/ Annapurna		BPL		APL		No card	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	3.3	3.3	7.1	3.7	2.5	2.3	4.2	4.6	3.3	3.3
North	5.5	5.6	0.6	7.8	2.1	2.9	8.7	7.1	5.5	5.6
North Central	22.0	23.7	31.6	32.8	16.5	19.7	21.8	21.8	22.0	23.7
Central Plains	12.7	13.3	27.0	20.1	10.3	11.4	13.2	13.8	12.7	13.3
East	16.0	15.6	14.6	14.9	15.2	15.4	17.9	15.8	16.0	15.6
West	3.3	3.3	7.1	3.7	2.5	2.3	4.2	4.6	3.3	3.3
South	5.5	5.6	0.6	7.8	2.1	2.9	8.7	7.1	5.5	5.6
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Authors' calculations from IHDS data.

Table A23: Households having no ration card (%) and reasons by place of residence

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
All India	**16.7**	**13.9**	**9.3**	**8.3**	**42.7**	**9.9**	**29.8**	**13.5**	**16.7**	**13.9**	**9.3**	**8.3**
Place of Residence												
Metro urban	18.6	18.9	17.2	3.4	19.3	16.7	43.5	28.0	18.6	18.9	17.2	3.4
Other urban	22.1	13.2	15.1	7.5	34.1	15.3	28.1	16.3	22.1	13.2	15.1	7.5
More developed village	12.1	11.3	7.0	9.4	40.4	8.7	34.4	10.8	12.1	11.3	7.0	9.4
Less developed village	16.7	13.9	9.3	8.3	42.7	9.9	29.8	13.5	16.7	13.9	9.3	8.3

Source: Authors' calculations from IHDS data.

Table A24: Households having no ration card (%) and reasons by social group

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
High caste	15.6	12.6	15.9	6.3	33.2	13.0	31.7	17.3	15.6	12.6	15.9	6.3
OBC	18.8	13.0	7.0	8.5	46.2	8.8	29.5	13.0	18.8	13.0	7.0	8.5
Dalit	13.6	13.0	6.3	10.1	44.3	8.9	30.4	8.0	13.6	13.0	6.3	10.1
Adivasi	21.0	22.2	10.7	7.6	53.4	7.3	21.1	20.2	21.0	22.2	10.7	7.6
Muslim	16.5	15.6	6.7	8.9	40.1	9.4	35.0	9.6	16.5	15.6	6.7	8.9
Christian, Sikh, Jain	15.6	12.6	15.9	6.3	33.2	13.0	31.7	17.3	15.6	12.6	15.9	6.3

Source: Authors' calculations from IHDS data.

Table A25: Households having no ration card (%) and reasons by highest adult education level

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
None	18.3	14.4	5.5	9.9	49.3	6.6	28.7	12.8	18.3	14.4	5.5	9.9
Below primary	16.9	12.6	4.1	11.2	51.5	7.9	25.4	8.5	16.9	12.6	4.1	11.2
Primary	16.6	14.7	4.7	8.6	47.6	9.1	30.0	11.1	16.6	14.7	4.7	8.6
Middle	15.3	15.6	7.2	7.8	44.3	11.7	29.0	8.2	15.3	15.6	7.2	7.8
Secondary	15.9	12.9	9.7	7.2	39.1	12.8	31.2	17.2	15.9	12.9	9.7	7.2
Higher secondary	18.3	14.4	5.5	9.9	49.3	6.6	28.7	12.8	18.3	14.4	5.5	9.9
Graduate+	16.9	12.6	4.1	11.2	51.5	7.9	25.4	8.5	16.9	12.6	4.1	11.2

Source: Authors' calculations from IHDS data.

Table A26: Households having no ration card (%) and reasons by status of land ownership

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Non cultivators/ No land	18.6	16.1	10.1	7.1	38.1	12.6	32.1	15.1	5.5	45.1	18.7	15.7
Marginal (0-1 hectare)	14.6	11.5	4.7	11.0	46.9	5.6	31.8	10.0	6.5	51.3	14.8	17.5
Small (1-2 hectare)	14.3	9.0	7.6	11.2	46.9	7.9	26.4	10.2	6.9	43.9	22.6	16.4
Medium (2-5 hectare)	13.0	10.0	12.4	9.2	50.2	3.0	25.2	11.7	5.9	48.9	19.8	13.7
Large (5 and more hectare)	15.1	9.1	7.9	10.4	59.0	4.7	18.1	20.8	15.9	24.1	16.5	22.7

Source: Authors' calculations from IHDS data.

Table A27: Households having no ration card (%) and reasons by Income quintile - All India

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Poorest	17.9	15.6	4.2	9.2	57.6	6.3	22.7	10.8	5.8	53.8	11.7	17.9
2nd quintile	15.6	14.9	4.2	9.8	53.8	7.4	24.8	10.0	6.3	52.5	17.2	14.1
Middle quintile	15.6	13.4	5.6	8.2	43.2	10.8	32.2	11.9	6.2	51.1	18.7	12.1
4th quintile	15.9	11.9	10.0	10.0	33.9	11.7	34.5	11.0	6.5	44.1	21.1	17.3
Richest	18.4	13.6	21.5	5.6	24.7	13.6	34.6	23.1	4.6	31.9	21.7	18.8

Source: Authors' calculations from IHDS data.

Table A28: Households having no ration card (%) and reasons by Income quintile - Rural India

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Poorest	17.9	16.5	3.0	10.5	58.0	5.1	23.4	11.8	6.4	51.9	11.0	18.9
2nd quintile	15.1	14.7	3.2	9.0	58.7	6.1	23.0	9.7	6.8	55.4	13.5	14.6
Middle quintile	14.8	14.5	3.6	11.4	50.4	7.4	27.2	9.8	5.8	54.0	18.0	12.4
4th quintile	13.0	12.5	6.2	9.3	40.8	9.0	34.8	6.7	7.7	50.5	21.4	13.7
Richest	13.5	9.9	14.3	7.7	33.6	6.7	37.8	13.7	4.9	40.0	22.3	19.1

Source: Authors' calculations from IHDS data.

Table A29: Households having no ration card (%) and reasons by Income quintile - Urban India

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Poorest	21.2	14.6	8.5	7.8	43.9	13.4	26.4	17.2	5.4	42.3	19.3	15.7
2nd quintile	20.7	13.0	9.2	6.4	36.7	15.7	31.9	12.3	4.4	48.7	19.6	15.0
Middle quintile	21.0	13.7	11.6	7.4	29.7	16.7	34.6	13.5	6.0	44.5	19.4	16.7
4th quintile	20.6	15.0	19.5	5.0	27.2	15.9	32.4	26.1	4.2	30.1	20.9	18.8
Richest	22.4	16.8	28.4	6.1	16.3	16.5	32.8	27.4	4.8	28.5	22.1	17.3

Source: Authors' calculations from IHDS data.

Table A30: Households having no ration card (%) and reasons by asset quintile - All India

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Poorest	20.3	19.1	4.5	10.0	56.4	7.9	21.2	10.0	5.5	53.6	14.8	16.2
2nd quintile	16.8	14.5	4.7	7.1	54.0	8.0	26.2	12.0	8.2	49.9	14.5	15.5
Middle quintile	15.4	11.1	7.6	8.2	36.8	7.9	39.4	8.6	5.6	50.2	20.0	15.5
4th quintile	15.2	11.5	10.5	8.4	33.8	13.0	34.3	13.2	5.5	40.0	22.0	19.3
Richest	15.2	12.6	24.6	6.8	19.9	14.2	34.5	28.7	4.7	29.9	22.0	14.7

Source: Authors' calculations from IHDS data.

Table A31: Households having no ration card (%) and reasons by MGNREGA card ownership

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
MGNREGA	-	9.1	-	-	-	-	-	6.4	9.9	47.8	14.1	21.8
Non-MGNREGA	-	14.9	-	-	-	-	-	14.4	5.4	46.3	18.4	15.4

Source: Authors' calculations from IHDS data.

Table A32: Households having no ration card (%) and reasons by social network

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not [illegible]	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not [illegible]	Others
Acquaintance	17.1	13.2	10.9	7.8	43.3	9.7	28.3	13.7	5.3	47.5	17.4	16.1
Organization	15.6	10.9	9.0	7.8	41.7	9.2	32.3	13.9	6.0	45.6	18.3	16.3
Panchayat/ Nagarpalika	16.2	14.4	9.0	8.4	49.1	5.7	27.8	11.5	4.8	53.4	12.0	18.3

Source: Authors' calculations from IHDS data.

Table A33: Households having no ration card (%) and reasons by different regions

Population Groups	% households having no card		Reasons for not having a ration card									
			2004-05					2011-12				
	2004-05	2011-12	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others	Not needed	Lost	Bureaucratic difficulties	Moved but not transferred	Others
Hills	8.3	6.0	14.6	3.2	30.0	9.0	43.2	7.0	12.2	35.0	26.1	19.7
North	13.1	16.2	17.0	10.3	22.2	13.4	37.1	14.9	6.6	45.1	12.4	20.9
North Central	24.5	21.3	6.0	9.2	61.0	4.2	19.6	15.9	4.2	55.4	12.0	12.6
Central Plains	18.1	14.1	11.5	7.4	62.2	4.8	14.2	6.7	7.3	55.6	15.0	15.4
East	13.0	14.2	12.0	15.7	44.4	5.2	22.6	6.6	8.9	53.7	14.0	16.9
West	12.1	13.8	14.7	9.4	22.5	34.7	18.6	16.5	6.4	24.9	33.8	18.4
South	16.4	6.8	6.8	3.5	20.7	10.8	58.1	20.6	3.6	23.7	29.8	22.3

Source: Authors' calculations from IHDS data.

Table A34: Percentage of households purchased grains from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	73.2	90.7	55.7	89.9	12.7	31.8	31.9	59.9
Place of Residence								
Metro urban	73.2	90.7	55.7	89.9	12.7	31.8	31.9	59.9
Other urban	-	68.0	37.9	75.2	5.4	23.8	11.1	36.7
More developed village	55.2	87.1	57.8	91.2	11.8	37.8	26.5	56.8
Less developed village	77.8	90.5	64.2	91.5	19.2	35.0	40.8	64.9

Source: Authors' calculations from IHDS data.

Table A35: Percentage of households purchased grains from PDS by social groups

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	51.0	80.4	49.3	87.8	6.9	26.2	17.1	43.4
OBC	74.9	90.2	59.3	90.9	16.9	32.8	37.0	61.7
Dalit	74.8	93.1	58.0	90.9	14.8	33.8	38.7	69.1
Adivasi	81.7	94.3	53.6	88.3	20.3	38.1	46.0	75.7
Muslim	71.0	90.2	45.3	88.2	9.8	34.1	23.2	57.9
Christian, Sikh, Jain	-	76.9	56.7	82.8	11.0	41.8	21.4	50.6

Source: Authors' calculations from IHDS data.

Table A36: Percentage of households purchased grains from PDS by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	77.9	91.9	56.2	91.9	14.0	25.7	41.0	71.7
Below primary	82.9	94.7	55.7	92.7	11.1	36.5	38.0	70.3
Primary	75.4	94.5	58.3	89.8	17.3	35.5	38.7	67.9
Middle	67.7	93.7	52.9	89.9	12.5	37.6	30.2	63.5
Secondary	69.4	81.3	59.6	91.0	13.3	35.2	29.7	59.5
Higher secondary	-	86.0	56.7	85.9	11.8	30.9	24.3	51.0
Graduate+	77.9	91.9	56.2	91.9	14.0	25.7	41.0	71.7

Source: Authors' calculations from IHDS data.

Table A37: Percentage of households purchased grains from PDS by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	76.4	90.7	57.4	90.3	13.5	36.3	34.1	62.8
Marginal (0-1 hectare)	76.5	91.6	61.7	89.0	20.7	30.2	43.4	61.8
Small (1-2 hectare)	69.3	87.0	54.4	92.7	11.6	19.6	31.0	50.3
Medium (2-5 hectare)	55.5	82.5	45.3	87.0	9.8	20.8	21.2	40.2
Large (5 and more hectare)	-	72.9	41.4	76.7	6.2	18.2	17.5	30.7

Source: Authors' calculations from IHDS data.

Table A38: Percentage of households purchased grains from PDS by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	80.7	94.9	54.5	89.6	16.0	24.6	39.0	66.7
2nd quintile	78.6	93.8	55.9	90.2	13.7	30.5	37.8	65.8
Middle quintile	76.9	89.0	59.2	91.3	15.3	34.2	37.7	64.9
4th quintile	55.4	86.6	57.9	91.3	13.5	36.9	30.5	60.8
Richest	23.1	69.6	44.5	83.6	8.2	29.9	14.9	41.7

Source: Authors' calculations from IHDS data.

Table A39: Percentage of households purchased grains from PDS by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	78.9	93.0	54.6	89.6	14.3	21.6	38.8	66.8
2nd quintile	84.8	95.4	55.7	90.0	14.9	26.6	39.5	66.3
Middle quintile	74.1	91.1	55.7	90.8	15.0	27.5	38.2	65.1
4th quintile	69.2	90.1	58.9	91.5	15.1	31.0	36.6	64.7
Richest	51.0	81.7	54.6	89.1	12.7	36.5	25.2	54.8

Source: Authors' calculations from IHDS data.

Table A40: Percentage of households purchased grains from PDS by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	67.2	92.9	61.8	90.5	16.4	41.0	36.7	66.1
2nd quintile	-	90.1	56.4	91.5	15.6	42.5	31.2	64.2
Middle quintile	-	85.8	55.8	91.7	9.0	38.9	23.4	58.0
4th quintile	-	75.8	43.7	85.2	7.8	33.1	14.3	46.2
Richest	-	31.8	27.8	62.1	4.0	22.0	6.1	26.0

Source: Authors' calculations from IHDS data.

Table A41: Percentage of households purchased grains from PDS by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	80.5	93.1	53.7	89.0	16.6	20.3	42.1	68.5
2nd quintile	76.1	93.2	51.8	90.0	14.3	26.8	36.1	66.0
Middle quintile	71.5	90.4	66.7	93.6	14.7	39.8	40.3	68.4
4th quintile	45.9	84.2	58.0	90.9	14.8	40.5	27.9	58.8
Richest	-	60.8	38.1	74.0	6.3	26.1	10.2	33.3

Source: Authors' calculations from IHDS data.

Table A42: Percentage of households purchased grains from PDS by MGNREGA card ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	94.1	-	93.3	-	43.9	-	77.7
Non-MGNREGA	-	89.1	-	88.7	-	30.3	-	56.0

Source: Authors' calculations from IHDS data.

Table A43: Percentage of households purchased grains from PDS by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	78.7	92.5	54.9	91.1	13.6	38.2	35.4	70.8
Acquaintance	65.0	89.9	56.8	89.3	12.1	30.3	28.8	56.3
No Organization	73.9	89.1	51.0	86.7	11.0	26.4	27.7	53.8
Organization	71.5	93.5	62.1	93.2	16.2	40.1	39.3	68.2
No Panchayat/Nagar	73.7	90.5	54.6	89.7	13.0	33.1	31.3	60.0
Panchayat/Nagar	70.2	90.9	64.4	90.4	10.2	27.5	36.9	59.6

Source: Authors' calculations from IHDS data.

Table A44: Percentage of households purchased grains from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	74.7	91.1	75.0	91.6	23.2	68.3	40.8	76.1
North	-	80.7	13.3	62.0	-	5.3	2.6	25.3
North Central	72.9	89.8	13.8	83.7	-	7.2	8.8	44.7
Central Plains	63.3	91.5	42.1	87.0	5.6	13.6	21.6	48.0
East	77.5	91.8	25.4	90.0	2.9	42.6	13.1	65.3
West	85.9	87.4	66.7	82.6	15.8	26.1	34.6	44.6
South	74.7	91.1	75.0	91.6	23.2	68.3	40.8	76.1

Source: Authors' calculations from IHDS data.

Table A45: Percentage of households purchased rice from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	66.8	79.8	52.1	82.9	10.8	22.9	29.2	51.7
Place of Residence								
Metro urban	-	63.2	34.1	70.6	4.7	10.7	9.9	25.8
Other urban	48.3	68.4	53.3	83.2	9.6	28.0	23.6	47.2
More developed village	70.1	75.3	60.6	84.9	16.5	28.7	37.6	57.9
Less developed village	68.6	86.0	44.7	82.3	7.6	16.4	27.7	54.4

Source: Authors' calculations from IHDS data.

Table A46: Percentage of households purchased rice from PDS by social groups

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	47.0	73.1	46.6	80.1	5.7	17.6	15.5	35.1
OBC	68.3	81.8	55.7	85.5	14.4	26.1	33.9	55.4
Dalit	65.4	77.9	54.5	81.3	13.4	21.7	36.0	57.9
Adivasi	77.9	85.9	48.9	84.1	17.1	33.4	41.8	70.9
Muslim	65.8	81.9	42.7	81.0	8.2	19.9	21.2	46.7
Christian, Sikh, Jain	-	37.9	47.5	73.1	5.5	37.3	15.1	44.3

Source: Authors' calculations from IHDS data.

Table A47: Percentage of households purchased rice from PDS by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	72.2	80.6	53.0	83.9	11.8	17.4	38.0	63.2
Below primary	75.5	85.4	53.2	86.4	10.0	22.4	35.8	60.6
Primary	66.9	84.3	54.6	82.5	15.9	24.2	35.9	58.7
Middle	60.6	82.9	49.0	83.1	10.6	25.8	27.3	53.9
Secondary	63.5	68.2	55.1	84.6	11.2	27.6	26.8	52.1
Higher secondary	-	75.7	51.9	80.1	8.9	24.2	20.9	44.4
Graduate+	-	61.6	40.0	77.8	7.7	19.3	12.9	31.8

Source: Authors' calculations from IHDS data.

Table A48: Percentage of households purchased rice from PDS by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	70.5	76.7	54.2	83.2	11.7	26.0	31.6	53.6
Marginal (0-1 hectare)	70.7	85.0	57.6	82.1	17.2	21.5	39.6	54.0
Small (1-2 hectare)	61.1	77.9	49.2	86.0	10.0	14.1	27.7	44.2
Medium (2-5 hectare)	43.6	72.5	40.3	82.5	7.8	15.7	18.1	35.1
Large (5 and more hectare)	69.4	72.9	38.9	68.7	4.6	15.2	15.7	26.8

Source: Authors' calculations from IHDS data.

Table A49: Percentage of households purchased rice from PDS by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	72.2	88.1	50.9	83.1	13.8	15.3	35.6	59.2
2nd quintile	73.8	83.9	52.6	83.0	11.8	18.3	35.1	56.2
Middle quintile	70.6	76.9	56.1	83.4	13.4	22.8	35.1	55.1
4th quintile	50.3	67.7	53.4	84.1	11.8	28.2	27.7	52.2
Richest	-	56.4	40.5	78.7	6.2	24.1	12.5	35.9

Source: Authors' calculations from IHDS data.

Table A50: Percentage of households purchased rice from PDS by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	70.1	86.8	50.9	83.8	11.9	13.4	35.4	60.2
2nd quintile	80.0	88.1	52.1	83.0	12.8	15.2	36.5	57.6
Middle quintile	69.7	80.4	52.6	83.8	13.4	18.9	35.6	57.1
4th quintile	61.0	75.0	55.5	83.8	13.0	24.6	33.7	56.9
Richest	-	66.2	51.1	83.0	10.5	30.7	22.7	48.6

Source: Authors' calculations from IHDS data.

Table A51: Percentage of households purchased rice from PDS by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	-	77.3	57.3	81.3	13.8	24.9	33.1	53.1
2nd quintile	-	70.1	53.0	83.4	13.8	26.2	28.8	51.0
Middle quintile	-	70.3	50.9	84.8	8.0	27.4	21.3	48.0
4th quintile	-	56.9	39.3	79.9	6.1	25.0	12.1	38.5
Richest	-	21.9	-	57.2	2.6	16.3	4.2	20.3

Source: Authors' calculations from IHDS data.

Table A52: Percentage of households purchased rice from PDS by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	73.8	87.2	49.9	82.1	14.8	11.8	38.8	61.3
2nd quintile	67.9	83.1	48.4	81.3	12.8	16.5	33.4	56.5
Middle quintile	65.9	77.2	63.7	87.8	13.1	27.7	38.0	59.2
4th quintile	43.3	60.1	54.0	85.0	12.4	31.4	25.1	50.4
Richest	-	26.2	33.4	65.6	4.2	20.1	7.8	26.6

Source: Authors' calculations from IHDS data.

Table A53: Percentage of households purchased rice from PDS by MGNREGA card ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	87.2	-	85.0	-	29.6	-	67.7
Non-MGNREGA	-	76.4	-	82.2	-	22.0	-	48.2

Source: Authors' calculations from IHDS data.

Table A54: Percentage of households purchased rice from PDS by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	69.7	80.2	50.9	83.1	11.8	25.0	32.3	60.4
Acquaintance	62.3	79.6	53.6	82.9	10.0	22.4	26.4	48.8
No Organization	66.8	76.1	47.1	76.4	9.2	17.3	25.0	43.9
Organization	66.5	86.6	58.8	89.9	14.0	31.6	36.5	62.2
No Panchayat/Nagar	66.7	80.7	50.9	82.6	11.0	23.0	28.5	51.2
Panchayat/Nagar	67.4	78.2	61.4	83.9	8.2	22.4	34.5	53.2

Source: Authors' calculations from IHDS data.

Table A55: Percentage of households purchased rice from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	74.2	87.5	74.2	90.0	22.2	60.8	39.9	70.4
North	-	9.7	-	13.4	-	2.6	-	5.7
North Central	67.2	89.6	12.7	82.1	-	2.0	8.0	41.3
Central Plains	49.5	69.4	26.8	52.2	3.0	2.7	14.0	27.4
East	76.3	87.9	23.7	85.2	2.5	15.3	12.3	48.7
West	79.1	86.3	62.5	81.2	13.9	23.4	31.8	42.3
South	86.1	97.0	83.4	96.9	38.6	67.9	67.4	86.6

Source: Authors' calculations from IHDS data.

Table A56: Percentage of households purchased wheat from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	56.6	70.8	26.7	62.8	6.9	25.3	16.4	44.0
Place of Residence								
Metro urban	-	66.6	17.4	52.8	2.3	21.7	5.0	29.9
Other urban	40.9	66.0	29.9	68.1	7.3	29.9	14.7	43.5
More developed village	63.4	72.5	29.1	64.6	9.6	26.7	19.6	47.4
Less developed village	56.4	71.1	23.8	59.9	5.5	20.5	16.5	44.1

Source: Authors' calculations from IHDS data.

Table A57: Percentage of households purchased wheat from PDS by social groups

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	40.9	62.3	26.3	61.2	4.9	21.5	10.2	32.8
OBC	56.8	68.6	27.7	63.7	9.3	26.1	18.7	45.1
Dalit	63.9	78.3	25.0	68.2	5.7	28.4	17.6	53.9
Adivasi	50.0	60.4	30.2	48.4	10.8	21.1	26.1	42.5
Muslim	65.6	72.0	23.9	62.7	5.7	26.9	13.2	43.1
Christian, Sikh, Jain	40.9	62.3	26.3	61.2	4.9	21.5	10.2	32.8

Source: Authors' calculations from IHDS data.

Table A58: Percentage of households purchased wheat from PDS by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	60.9	74.3	22.5	64.0	7.4	21.1	18.7	52.2
Below primary	52.3	74.7	29.9	66.1	7.2	29.3	21.2	52.1
Primary	60.3	67.8	27.4	61.4	7.9	28.1	18.8	48.3
Middle	54.3	73.7	28.4	65.3	7.2	31.2	17.1	48.5
Secondary	52.9	59.5	30.6	63.3	7.5	28.1	16.0	43.5
Higher secondary	60.9	74.3	22.5	64.0	7.4	21.1	18.7	52.2
Graduate+	52.3	74.7	29.9	66.1	7.2	29.3	21.2	52.1

Source: Authors' calculations from IHDS data.

Table A59: Percentage of households purchased wheat from PDS by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	60.0	72.3	25.4	63.8	6.7	29.0	16.2	46.7
Marginal (0-1 hectare)	55.8	71.7	31.1	61.5	10.6	23.6	22.7	44.7
Small (1-2 hectare)	50.3	51.9	35.3	64.9	8.4	14.8	20.8	35.5
Medium (2-5 hectare)	52.1	45.8	30.0	54.0	6.5	16.8	14.5	27.6
Large (5 and more hectare)	-	46.8	13.4	56.7	4.1	15.7	7.6	24.2

Source: Authors' calculations from IHDS data.

Table A60: Percentage of households purchased wheat from PDS by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	64.3	74.4	28.6	63.4	8.8	20.5	21.8	49.2
2nd quintile	56.7	74.7	27.6	61.8	7.8	25.7	19.8	48.0
Middle quintile	61.2	68.8	27.1	63.9	7.5	28.1	18.3	47.9
4th quintile	41.1	65.6	26.1	63.9	7.4	30.1	14.8	45.2
Richest	-	53.6	20.2	58.7	4.9	21.7	7.8	29.9

Source: Authors' calculations from IHDS data.

Table A61: Percentage of households purchased wheat from PDS by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	66.2	71.9	28.6	62.7	9.3	18.0	22.6	48.6
2nd quintile	57.6	76.0	27.7	60.7	7.3	22.8	20.3	47.9
Middle quintile	58.5	71.7	25.0	63.0	7.6	21.6	18.5	47.0
4th quintile	58.0	68.3	27.2	62.4	8.5	24.7	18.5	46.3
Richest	-	62.9	23.1	60.8	6.3	26.8	11.5	38.9

Source: Authors' calculations from IHDS data.

Table A62: Percentage of households purchased wheat from PDS by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	-	76.0	33.4	68.3	10.1	34.9	21.1	52.3
2nd quintile	-	68.6	29.3	67.7	8.7	35.8	16.6	50.0
Middle quintile	-	65.6	24.2	67.3	4.6	32.0	10.7	44.8
4th quintile	-	56.8	20.8	61.7	5.0	26.3	7.9	35.2
Richest	-	25.1	-	47.5	2.5	16.3	4.0	19.4

Source: Authors' calculations from IHDS data.

Table A63: Percentage of households purchased wheat from PDS by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	58.4	73.9	30.2	62.8	9.6	16.6	24.6	58.4
2nd quintile	64.0	73.2	24.3	63.1	6.1	21.6	17.8	64.0
Middle quintile	58.3	66.5	25.0	64.1	7.7	32.3	17.0	58.3
4th quintile	35.1	66.6	28.0	63.5	8.2	32.4	14.4	35.1
Richest	-	52.0	21.1	54.0	4.3	19.7	6.4	-

Source: Authors' calculations from IHDS data.

Table A64: Percentage of households purchased wheat from PDS by MGNREGA card ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	71.1	-	63.7	-	35.5	-	55.6
Non-MGNREGA	-	70.6	-	62.5	-	24.0	-	41.4

Source: Authors' calculations from IHDS data.

Table A65: Percentage of households purchased wheat from PDS by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	58.2	72.9	26.1	62.4	6.6	32.2	17.7	51.6
Acquaintance	54.2	69.9	27.4	63.0	7.2	23.7	15.3	41.4
No Organization	58.1	75.3	27.3	68.1	6.3	21.7	15.7	43.2
Organization	52.7	62.4	25.9	57.2	8.3	30.8	17.7	45.0
No Panchayat/Nagar	57.1	68.3	26.5	59.7	7.0	27.3	16.2	43.2
Panchayat/Nagar	53.1	75.1	28.2	72.0	6.6	18.9	18.0	46.3

Source: Authors' calculations from IHDS data.

Table A66: Percentage of households purchased wheat from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	55.3	76.9	46.8	76.9	11.2	56.3	23.8	63.2
North	-	80.3	12.6	60.0	-	5.0	2.2	24.6
North Central	71.4	83.8	12.5	66.1	-	6.3	8.2	37.0
Central Plains	35.7	65.4	27.6	80.9	4.4	12.8	14.2	42.6
East	-	45.7	4.4	38.7	-	33.6	3.2	36.5
West	83.9	83.3	62.4	77.6	13.6	22.6	31.7	40.6
South	65.6	61.9	27.9	60.8	18.8	53.3	25.1	58.2

Source: Authors' calculations from IHDS data.

Table A67: Percentage of households purchased sugar from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	18.0	55.8	32.9	60.5	13.0	17.7	21.2	38.1
Place of Residence								
Metro urban	0.0	37.9	30.4	53.2	10.0	11.0	13.6	21.5
Other urban	16.3	60.0	36.3	69.9	12.5	21.5	19.8	38.5
More developed village	22.8	55.5	38.6	64.1	14.9	19.8	25.8	42.7
Less developed village	16.3	55.6	26.2	53.9	12.5	14.3	19.0	37.1

Source: Authors' calculations from IHDS data.

Table A68: Percentage of households purchased sugar from PDS by social groups

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	13.1	49.7	30.0	60.1	9.1	15.0	13.8	27.5
OBC	15.5	57.3	37.1	65.9	16.1	20.5	25.3	42.6
Dalit	22.7	50.0	33.8	57.8	12.4	18.9	23.5	41.9
Adivasi	17.2	71.5	23.1	54.2	20.3	23.0	21.8	47.8
Muslim	18.6	61.8	29.9	55.0	14.4	13.3	19.7	32.0
Christian, Sikh, Jain	35.6	19.1	27.7	58.9	6.9	15.6	11.8	24.2

Source: Authors' calculations from IHDS data.

Table A69: Percentage of households purchased sugar from PDS by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	21.7	53.9	30.9	52.5	12.0	13.4	23.0	40.8
Below primary	22.5	59.5	31.5	59.0	13.9	13.0	23.7	40.6
Primary	16.5	59.8	35.1	60.7	15.8	19.7	25.1	43.8
Middle	9.6	65.7	31.3	64.0	13.2	19.1	20.2	41.2
Secondary	20.4	45.1	37.7	66.5	13.2	18.6	21.5	38.8
Higher secondary	21.1	48.6	34.1	63.3	10.7	18.8	17.1	34.4
Graduate+	1.8	42.2	33.0	67.3	13.0	17.6	16.1	28.1

Source: Authors' calculations from IHDS data.

Table A70: Percentage of households purchased sugar from PDS by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	16.9	52.0	34.8	59.9	13.6	19.7	22.7	38.9
Marginal (0-1 hectare)	14.3	61.1	34.7	59.2	17.2	17.7	25.8	40.0
Small (1-2 hectare)	27.5	60.4	28.8	68.6	14.9	12.2	21.0	35.8
Medium (2-5 hectare)	28.2	58.1	30.4	65.2	11.3	10.3	17.2	26.3
Large (5 and more hectare)	6.6	40.0	20.8	60.1	7.8	13.2	11.5	22.7

Source: Authors' calculations from IHDS data.

Table A71: Percentage of households purchased sugar from PDS by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	19.3	55.9	25.1	53.4	11.2	9.3	18.7	37.7
2nd quintile	14.1	58.4	30.2	54.7	12.7	12.0	21.7	37.3
Middle quintile	22.2	56.1	36.2	62.4	13.9	16.8	24.6	41.0
4th quintile	18.6	53.7	39.0	69.3	14.8	22.2	23.7	42.3
Richest	13.5	42.7	36.0	67.2	12.2	21.3	16.6	31.1

Source: Authors' calculations from IHDS data.

Table A72: Percentage of households purchased sugar from PDS by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	20.9	55.8	24.2	53.5	11.5	6.6	18.6	37.8
2nd quintile	14.6	55.7	28.8	49.9	11.1	10.4	20.5	35.4
Middle quintile	12.1	58.4	32.7	55.9	13.3	12.7	23.2	38.6
4th quintile	27.2	53.0	37.2	66.2	14.6	20.1	25.2	44.9
Richest	18.8	50.9	40.0	69.9	16.0	25.7	22.9	40.6

Source: Authors' calculations from IHDS data.

Table A73: Percentage of households purchased sugar from PDS by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	16.2	67.1	32.7	65.4	13.7	17.1	21.7	41.6
2nd quintile	22.2	55.3	35.1	69.5	14.7	20.0	22.3	41.4
Middle quintile	17.2	55.3	40.6	69.1	11.5	20.1	20.3	37.6
4th quintile	7.6	51.8	33.8	69.3	9.7	19.0	14.0	31.4
Richest	8.9	23.3	31.6	48.9	10.4	17.1	12.3	20.2

Source: Authors' calculations from IHDS data.

Table A74: Percentage of households purchased sugar from PDS by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	18.4	55.7	25.2	44.3	11.4	6.3	19.8	34.3
2nd quintile	19.0	59.6	29.7	56.7	13.6	12.0	22.1	39.8
Middle quintile	18.9	61.1	41.8	72.8	16.7	21.8	28.5	48.4
4th quintile	13.3	47.9	40.4	73.8	14.8	25.3	22.4	42.4
Richest	8.1	20.1	36.1	60.1	9.5	16.2	12.8	22.5

Source: Authors' calculations from IHDS data.

Table A75: Percentage of households purchased sugar from PDS by MGNREGA card ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	-	68.2	-	67.6	-	24.4	-	53.9
Non-MGNREGA	-	50.2	-	58.2	-	16.9	-	34.6

Source: Authors' calculations from IHDS data.

Table A76: Percentage of households purchased sugar from PDS by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	16.9	56.2	33.2	59.5	15.0	21.0	23.6	44.4
Acquaintance	19.6	55.7	32.5	61.0	11.7	17.0	19.1	36.0
No Organization	15.8	52.3	28.9	51.0	12.0	15.3	18.3	31.5
Organization	23.4	62.5	38.2	70.5	15.2	21.5	26.3	47.0
No Panchayat/Nagar	17.8	53.1	31.8	59.6	13.1	17.1	20.7	36.9
Panchayat/Nagar	19.1	60.6	40.9	63.0	12.7	19.7	25.7	41.6

Source: Authors' calculations from IHDS data.

Table A77: Percentage of households purchased sugar from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	60.8	95.2	77.2	92.3	68.6	84.7	70.6	87.5
North	0.0	9.3	10.3	19.9	0.5	0.4	1.9	5.6
North Central	9.8	46.0	1.5	24.2	0.9	1.0	1.5	14.5
Central Plains	15.2	69.4	14.8	55.6	2.5	1.3	7.5	27.8
East	5.8	48.1	18.3	47.6	13.8	16.3	15.2	31.2
West	21.6	42.0	27.1	42.2	3.1	7.5	11.7	18.8
South	37.6	89.8	56.7	91.8	40.9	52.4	50.8	77.7

Source: Authors' calculations from IHDS data.

Table A78: Percentage of households purchased kerosene from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	83.3	88.3	84.9	88.7	68.9	70.1	75.8	79.1
Place of Residence								
Metro urban	0.0	52.6	55.6	59.9	43.0	51.2	45.2	53.3
Other urban	61.2	76.4	71.0	76.8	46.1	50.0	54.0	59.6
More developed village	88.4	86.0	88.9	92.3	78.5	79.5	83.4	85.9
Less developed village	85.1	93.9	88.3	93.9	84.7	87.7	86.4	91.2

Source: Authors' calculations from IHDS data.

Table A79: Percentage of households purchased kerosene from PDS by social groups

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	61.1	75.0	80.1	84.8	60.6	62.0	65.0	68.2
OBC	90.0	91.3	84.9	89.1	73.1	71.7	78.7	80.5
Dalit	86.9	86.5	87.8	89.7	72.2	75.3	80.6	83.8
Adivasi	76.5	94.8	86.2	90.3	70.7	78.2	81.0	87.6
Muslim	87.0	92.5	81.3	89.1	78.1	82.0	79.4	85.3
Christian, Sikh, Jain	43.8	47.6	81.5	75.9	46.6	45.1	54.5	51.2

Source: Authors' calculations from IHDS data.

Table A80: Percentage of households purchased kerosene from PDS by highest adult education level in a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	87.1	91.0	88.9	94.1	82.7	87.8	86.4	91.8
Below primary	87.5	94.8	87.2	94.6	84.4	87.8	86.0	91.9
Primary	77.7	90.7	84.1	89.2	77.5	79.8	80.7	85.5
Middle	85.9	88.3	84.5	89.7	75.2	77.7	79.2	83.5
Secondary	83.2	84.6	83.5	85.4	61.9	68.8	69.5	76.1
Higher secondary	75.3	77.9	81.3	81.9	60.3	64.6	66.1	70.7
Graduate+	87.1	91.0	88.9	94.1	82.7	87.8	86.4	91.8

Source: Authors' calculations from IHDS data.

Table A81: Percentage of households purchased kerosene from PDS by status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	78.2	84.9	82.1	85.4	57.6	61.3	68.7	73.1
Marginal (0-1 hectare)	88.6	93.0	90.9	93.2	83.7	83.1	87.5	88.5
Small (1-2 hectare)	94.1	92.0	87.7	94.0	80.9	80.5	84.1	86.2
Medium (2-5 hectare)	86.5	88.5	85.8	91.5	78.8	78.1	81.0	82.0
Large (5 and more hectare)	89.8	88.3	89.4	89.3	85.1	71.3	86.4	75.2

Source: Authors' calculations from IHDS data.

Table A82: Percentage of households purchased kerosene from PDS by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	93.7	95.0	88.6	93.5	84.5	87.0	87.1	91.3
2nd quintile	82.8	92.6	88.6	92.1	82.8	85.3	85.8	89.3
Middle quintile	77.3	86.0	86.5	89.6	76.6	77.6	81.2	83.9
4th quintile	80.0	79.6	82.8	84.6	69.0	68.6	74.3	75.4
Richest	51.7	65.5	66.2	75.2	48.0	52.1	51.4	57.1

Source: Authors' calculations from IHDS data.

Table A83: Percentage of households purchased kerosene from PDS by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	93.4	96.0	89.1	94.1	85.6	91.1	87.8	93.3
2nd quintile	89.2	94.0	90.6	94.9	88.3	90.8	89.5	93.2
Middle quintile	82.1	93.0	90.6	94.6	82.5	90.0	86.6	92.6
4th quintile	78.9	83.1	87.5	92.6	81.2	83.1	84.0	87.7
Richest	79.3	81.6	83.6	87.8	75.2	73.6	77.6	78.4

Source: Authors' calculations from IHDS data.

Table A84: Percentage of households purchased kerosene from PDS by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	71.6	81.6	76.8	81.6	66.1	65.7	70.7	73.7
2nd quintile	73.8	78.3	74.1	78.7	60.9	59.9	65.9	68.2
Middle quintile	62.2	74.7	67.9	71.5	47.9	55.9	54.1	61.7
4th quintile	26.3	62.6	54.4	64.0	36.8	48.4	39.9	52.4
Richest	7.2	25.8	34.9	51.8	27.3	33.3	27.8	35.0

Source: Authors' calculations from IHDS data.

Table A85: Percentage of households purchased kerosene from PDS by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	88.3	95.4	88.8	95.8	88.7	94.0	88.7	95.2
2nd quintile	88.6	92.0	88.5	93.1	88.3	92.1	88.5	92.6
Middle quintile	70.7	84.8	88.4	91.1	81.0	84.6	84.2	87.7
4th quintile	75.5	70.3	78.2	78.7	68.9	69.8	71.8	72.9
Richest	28.1	39.1	50.7	54.8	38.7	39.3	40.1	41.5

Source: Authors' calculations from IHDS data.

Table A86: Percentage of households purchased kerosene from PDS by MGNREGA card ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
MGNREGA	0.0	94.9	0.0	95.5	0.0	92.3	0.0	94.4
Non-MGNREGA	0.0	85.3	0.0	86.5	0.0	67.3	0.0	75.7

Source: Authors' calculations from IHDS data.

Table A87: Percentage of households purchased kerosene from PDS by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	84.0	92.0	85.2	90.3	75.9	76.5	80.5	85.1
Acquaintance	82.3	86.7	84.6	88.0	64.0	68.7	71.6	77.1
No Organization	82.1	87.4	83.3	87.7	67.9	69.6	74.0	77.7
Organization	86.3	90.0	87.1	89.8	71.0	71.0	79.0	80.9
No Panchayat/Nagar	83.2	89.1	85.2	88.1	68.4	69.0	75.6	78.1
Panchayat/Nagar	84.4	86.8	82.7	90.7	73.5	73.6	78.1	81.9

Source: Authors' calculations from IHDS data.

Table A88: Percentage of households purchased kerosene from PDS by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	82.4	66.8	71.3	70.2	49.5	51.8	57.5	57.8
North	40.0	38.2	34.9	39.5	16.8	9.8	19.5	19.2
North Central	94.4	96.6	89.6	96.9	85.1	91.2	87.0	93.9
Central Plains	76.7	93.5	86.7	92.2	72.1	72.3	77.3	81.6
East	71.9	92.2	85.2	93.5	85.1	93.4	84.8	93.4
West	83.9	83.4	82.7	83.1	59.0	60.0	67.6	67.5
South	85.6	93.2	86.6	87.8	71.1	61.7	81.0	78.7

Source: Authors' calculations from IHDS data.

Table A89: Share of PDS grain to total consumption of households by place of residence (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	32.3	47.0	20.6	39.2	4.7	10.3	11.8	25.2
Place of Residence								
Metro urban	-	38.1	18.1	34.0	2.2	8.1	5.1	14.9
Other urban	31.7	50.2	26.4	43.2	5.1	13.7	11.6	25.0
More developed village	38.9	48.8	24.6	41.2	6.6	12.1	14.9	28.1
Less developed village	29.9	45.6	15.9	36.8	3.2	7.0	10.1	24.6

Source: Authors' calculations from IHDS data.

Table A90: Share of PDS grain to total consumption of households by social groups (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	24.2	44.3	19.0	37.1	2.7	8.6	6.6	17.2
OBC	34.8	46.5	20.8	39.6	5.1	10.9	12.5	25.9
Dalit	31.6	48.1	21.2	40.1	4.9	10.7	14.0	29.8
Adivasi	34.7	53.3	19.9	42.6	10.4	13.1	18.3	35.7
Muslim	30.4	40.9	19.7	34.9	5.7	9.8	10.9	21.4
Christian, Sikh, Jain	-	34.9	28.2	44.5	3.7	14.7	8.6	21.1

Source: Authors' calculations from IHDS data.

Table A91: Share of PDS grain to total consumption of households by highest adult education level (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	38.1	48.8	20.4	40.8	5.0	8.5	15.2	32.0
Below primary	40.5	48.8	20.5	40.7	4.0	10.3	14.2	29.5
Primary	32.0	49.0	22.0	38.4	6.1	11.4	14.3	28.6
Middle	23.7	48.7	19.7	39.5	4.9	11.6	11.2	26.5
Secondary	29.3	39.7	21.9	38.8	5.1	11.8	11.1	24.2
Higher secondary	27.7	41.3	21.4	38.3	4.1	10.4	8.8	21.1
Graduate+	10.5	37.9	16.4	36.4	3.5	8.7	5.6	15.1

Source: Authors' calculations from IHDS data.

Table A92: Share of PDS grain to total consumption of households by status of land ownership (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	36.5	48.8	23.1	41.4	5.5	13.0	14.1	28.1
Marginal (0-1 hectare)	28.2	45.7	22.4	37.4	6.7	9.3	15.3	25.4
Small (1-2 hectare)	28.9	45.4	20.1	38.6	4.8	5.7	11.8	19.1
Medium (2-5 hectare)	27.7	35.9	14.5	31.8	3.8	6.2	7.4	13.6
Large (5 and more hectare)	28.6	31.7	11.2	25.0	2.0	5.1	5.0	9.5

Source: Authors' calculations from IHDS data.

Table A93: Share of PDS grain to total consumption of households by income quintile (%) - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	31.5	46.5	17.3	36.6	5.0	6.0	12.5	26.8
2nd quintile	35.9	49.2	20.4	38.1	4.4	8.4	13.3	26.8
Middle quintile	35.8	48.0	23.3	40.8	5.2	10.1	14.1	26.8
4th quintile	26.2	45.6	23.8	43.0	5.4	12.9	11.8	25.8
Richest	14.2	40.1	18.4	40.4	3.8	11.9	6.3	18.2

Source: Authors' calculations from IHDS data.

Table A94: Share of PDS grain to total consumption of households by income quintile (%) - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	33.0	44.9	16.6	36.3	4.7	5.2	12.3	26.6
2nd quintile	33.5	48.6	19.1	36.4	4.3	7.0	12.9	26.6
Middle quintile	33.9	48.2	20.4	39.1	5.0	7.7	13.5	26.7
4th quintile	30.2	46.3	23.3	41.8	4.8	10.0	13.1	27.2
Richest	26.5	45.0	21.4	42.5	5.4	13.4	9.5	22.9

Source: Authors' calculations from IHDS data.

Table A95: Share of PDS grain to total consumption of households by income quintile (%) - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	35.6	52.7	27.7	41.9	6.0	12.1	15.4	27.9
2nd quintile	-	50.6	26.9	41.7	6.3	13.5	13.7	26.5
Middle quintile	-	48.3	24.6	43.5	3.9	14.3	9.8	24.9
4th quintile	-	42.3	20.8	41.5	3.5	13.0	6.4	20.1
Richest	-	19.9	10.7	32.9	2.1	8.8	2.9	11.2

Source: Authors' calculations from IHDS data.

Table A96: Share of PDS grain to total consumption of households by asset quintile (%) - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	37.77	48.08	20.07	38.67	6.15	5.30	15.98	29.90
2nd quintile	29.48	48.52	18.89	37.96	4.60	7.82	12.71	26.98
Middle quintile	32.78	45.65	24.06	40.93	5.22	12.32	13.93	27.63
4th quintile	22.17	45.04	22.19	41.66	5.48	14.24	10.22	24.34
Richest	2.43	31.66	14.74	32.99	2.51	9.21	3.99	13.01

Source: Authors' calculations from IHDS data.

Table A97: Share of PDS grain to total consumption of households by social network (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	34.0	49.0	21.7	41.9	4.8	13.2	13.4	31.4
Acquaintance	30.0	46.2	19.5	38.1	4.7	9.7	10.5	23.3
No Organization	31.9	46.7	19.7	39.8	4.0	8.7	10.6	23.6
Organization	33.5	47.5	21.9	38.6	6.0	12.9	14.0	27.3
No Panchayat/Nagar	32.5	48.0	20.4	40.1	4.8	10.8	11.8	25.5
Panchayat/Nagar	30.9	45.3	22.3	37.0	3.6	8.8	12.3	24.3

Source: Authors' calculations from IHDS data.

Table A98: Share of PDS grain to total consumption of households across regions (%)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	46.8	55.2	45.3	49.6	17.1	32.9	26.2	39.1
North	-	39.0	7.1	35.5	0.3	2.3	1.3	13.6
North Central	26.9	42.4	4.9	35.4	0.4	1.8	3.2	19.0
Central Plains	31.4	53.3	17.8	40.5	2.3	3.2	9.3	21.6
East	26.8	39.8	7.7	33.8	1.6	8.9	4.6	21.7
West	54.1	53.3	26.3	42.6	6.9	11.3	14.5	22.2
South	48.8	60.0	35.6	43.4	18.1	33.5	29.8	40.9

Source: Authors' calculations from IHDS data.

Table A99: Average per capita consumption of grain by different cardholders (kg/month) and place of residence

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	12.7	12.1	11.3	11.0	11.0	10.4	11.2	10.8	11.6	10.7	11.3	10.8
Place of Residence												
Metro urban	9.0	9.5	9.3	9.1	8.8	9.0	8.9	9.0	9.1	8.7	8.9	9.0
Other urban	9.6	10.1	9.5	9.6	9.6	9.0	9.6	9.2	9.7	9.3	9.6	9.2
More developed village	12.9	11.5	10.9	10.8	11.4	10.6	11.2	10.8	11.8	11.1	11.3	10.8
Less developed village	13.1	13.1	12.5	12.0	12.3	12.0	12.4	12.2	13.0	11.8	12.5	12.1

Source: Authors' calculations from IHDS data.

Table A100: Average per capita consumption of grain by different cardholders (kg/month) and Social groups

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	11.8	11.0	10.6	11.2	10.5	10.0	10.5	10.3	10.5	10.2	10.5	10.3
OBC	13.0	12.3	11.5	11.1	11.5	10.7	11.5	11.0	12.0	10.9	11.6	11.0
Dalit	12.8	12.5	11.7	11.1	11.3	10.6	11.5	11.1	11.8	10.7	11.6	11.0
Adivasi	13.1	12.0	11.2	10.9	11.1	11.1	11.3	11.0	12.3	11.4	11.5	11.1
Muslim	11.8	11.7	11.2	10.7	11.1	10.6	11.1	10.7	10.8	10.7	11.1	10.7
Christian, Sikh, Jain	-	9.2	8.9	8.7	9.8	8.9	9.6	8.8	9.3	8.9	9.6	8.8

Source: Authors' calculations from IHDS data.

Table A101: Average per capita consumption of grain by different cardholders (Kg/month) and highest adult education level of a household

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	13.7	13.5	12.3	12.3	12.5	12.5	12.4	12.5	12.7	11.7	12.5	12.4
Below primary	12.1	12.5	11.7	11.7	11.8	11.7	11.8	11.8	12.5	11.0	11.9	11.7
Primary	12.3	11.8	11.3	11.0	11.2	11.0	11.3	11.1	11.5	11.4	11.3	11.1
Middle	13.0	11.6	11.0	10.9	11.1	10.7	11.1	10.9	11.0	10.9	11.1	10.9
Secondary	11.5	11.2	10.4	10.2	10.4	10.2	10.5	10.2	11.0	10.0	10.5	10.2
Higher secondary	11.3	10.7	10.2	10.1	10.7	9.8	10.6	9.9	11.3	10.4	10.7	10.0
Graduate+	9.0	10.7	10.4	10.0	10.4	9.6	10.4	9.7	10.3	9.3	10.4	9.7

Source: Authors' calculations from IHDS data.

Table A102: Average per capita consumption of grain by different cardholders (kg/month) and status of land ownership

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	12.0	11.7	10.7	10.5	10.0	9.5	10.4	10.1	10.5	10.1	10.4	10.1
Marginal (0-1 hectare)	14.0	12.8	11.7	11.9	11.9	11.5	11.9	11.8	12.4	12.1	12.0	11.8

(contd..)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Small (1-2 hectare)	13.1	11.9	11.7	11.0	11.9	11.6	11.9	11.4	12.0	11.1	11.9	11.3
Medium (2-5 hectare)	13.4	11.7	12.2	10.8	12.0	11.1	12.1	11.0	13.2	11.7	12.2	11.1
Large (5 and more hectare)	12.4	10.1	12.9	12.0	12.3	11.0	12.4	11.1	14.3	9.7	12.7	11.0

Source: Authors' calculations from IHDS Data.

Table A103: Average per capita consumption of grain by different cardholders (kg/month) and income quintiles - All India

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	12.7	12.3	11.5	11.2	11.8	11.0	11.7	11.3	12.2	11.2	11.8	11.3
2nd quintile	12.3	12.2	11.4	11.1	11.3	10.8	11.4	11.1	11.9	10.9	11.4	11.0
Middle quintile	13.0	11.5	11.4	10.9	11.0	10.6	11.2	10.8	11.5	10.6	11.3	10.7
4th quintile	13.8	12.9	10.9	10.9	10.8	10.1	10.8	10.5	10.9	10.2	10.8	10.5
Richest	10.6	11.4	11.2	10.8	10.4	10.0	10.6	10.2	10.7	10.5	10.6	10.2

Source: Authors' calculations from IHDS data.

Table A104: Average per capita consumption of grain by different cardholders (kg/month) and income quintiles - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	12.7	12.9	11.6	11.3	11.9	11.3	11.8	11.5	12.5	11.2	11.9	11.5
2nd quintile	12.8	12.1	11.7	11.5	11.9	11.2	11.8	11.5	12.8	11.4	12.0	11.5
Middle quintile	13.1	12.3	11.8	11.5	11.7	11.7	11.8	11.6	12.5	11.5	11.9	11.6
4th quintile	14.0	12.8	11.8	11.5	11.8	11.4	11.9	11.6	12.3	11.5	11.9	11.6
Richest	13.0	13.0	11.8	11.6	11.6	11.2	11.7	11.4	12.4	12.3	11.7	11.5

Source: Authors' calculations from IHDS data.

Table A105: Average per capita consumption of grain by different cardholders (kg/month) and income quintiles - Urban India

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	9.2	9.7	9.3	9.3	9.2	9.0	9.3	9.2	9.3	9.3	9.3	9.2
2nd quintile	-	10.2	9.2	9.4	9.3	8.9	9.3	9.2	9.3	8.6	9.3	9.1
Middle quintile	-	11.5	9.6	9.6	9.4	8.9	9.4	9.2	9.5	8.7	9.4	9.1
4th quintile	-	9.7	9.7	9.5	9.3	8.8	9.4	9.0	9.7	9.5	9.4	9.1
Richest	-	9.0	10.6	9.7	9.6	9.4	9.7	9.4	9.9	9.6	9.7	9.4

Source: Authors' calculations from IHDS data.

Table A106: Average per capita consumption of grain by different cardholders (kg/month) and asset quintiles - All India

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	13.7	13.5	12.3	12.4	12.7	12.6	12.5	12.7	12.6	11.9	12.5	12.5
2nd quintile	13.0	12.0	11.9	11.4	12.4	11.8	12.2	11.6	12.9	11.4	12.3	11.6
Middle quintile	11.8	11.3	10.9	10.6	11.6	11.0	11.3	10.9	11.3	10.6	11.3	10.8
4th quintile	10.2	9.8	10.1	9.7	10.4	9.8	10.3	9.8	10.4	9.6	10.3	9.7
Richest	8.2	8.7	9.3	9.1	9.6	9.0	9.6	9.0	9.6	9.2	9.6	9.1

Source: Authors' calculations from IHDS data.

Table A107: Average per capita consumption of grain by different cardholders (kg/month) and social network

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	13.1	12.1	10.9	11.0	11.1	10.7	11.1	10.9	11.1	10.6	11.1	10.9
Acquaintance	12.1	12.1	11.8	11.0	11.0	10.4	11.3	10.7	11.9	10.8	11.4	10.7
No Organization	12.8	12.2	11.4	11.2	11.0	10.6	11.2	10.9	11.4	10.7	11.3	10.9
Organization	12.3	11.9	11.2	10.8	11.0	10.2	11.1	10.6	11.8	10.8	11.2	10.6
No Panchayat/ Nagar	12.7	12.1	11.2	10.8	10.9	10.2	11.1	10.5	11.4	10.6	11.1	10.5
Panchayat/ Nagar	12.9	12.2	12.1	11.6	12.0	11.2	12.1	11.5	12.5	11.1	12.1	11.4

Source: Authors' calculations from IHDS data.

Table A108: Average per capita consumption of grain by different cardholders (kg/month) and regions

Population Groups	AAY/ Annapurna		BPL		APL		All PDS cardholders		No cardholders		All India	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	12.8	12.6	12.6	11.4	12.4	11.0	12.5	11.2	11.9	10.7	12.5	11.2
North	9.7	10.1	9.3	9.2	9.6	9.0	9.6	9.2	8.4	8.7	9.5	9.1
North Central	13.5	12.7	13.5	12.4	12.5	11.6	12.9	12.0	13.0	11.3	12.9	11.9
Central Plains	12.0	12.1	12.0	11.8	11.4	11.4	11.6	11.7	11.8	11.4	11.7	11.6
East	14.2	12.7	12.3	12.5	11.8	12.0	12.0	12.3	12.2	12.4	12.1	12.3
West	10.8	11.4	9.6	8.7	9.1	8.4	9.3	8.6	9.1	8.9	9.3	8.6
South	11.1	11.3	10.2	10.0	9.8	9.1	10.1	9.7	10.3	9.0	10.1	9.7

Source: Authors' calculations from IHDS data.

Table A109: Per capita purchase of PDS grain (kg/month) by place of residence

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
All India	5.7	6.3	4.4	4.8	4.5	3.7	4.5	4.7
Place of Residence								
Metro urban	-	5.0	4.4	4.1	3.6	3.1	4.1	3.7
Other urban	5.6	5.8	4.5	4.6	4.5	3.4	4.5	4.2
More developed village	6.6	6.3	4.4	4.9	4.3	4.1	4.5	4.8
Less developed village	5.3	6.5	4.3	5.0	5.0	3.7	4.6	5.0

Source: Authors' calculations from IHDS data.

Table A110: Per capita purchase of PDS grain (kg/month) by social group

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High caste	5.9	6.2	4.2	4.8	4.1	3.6	4.2	4.4
OBC	6.2	6.5	4.3	4.9	4.2	4.2	4.4	4.9
Dalit	5.4	6.4	4.5	4.9	4.1	3.6	4.5	4.9

(contd..)

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Adivasi	5.6	6.7	4.1	5.2	5.4	3.8	4.5	5.2
Muslim	5.0	5.2	5.0	4.2	6.2	3.0	5.4	3.9
Christian, Sikh, Jain	-	4.4	4.3	4.6	3.5	3.3	4.0	3.8

Source: Authors' calculations from IHDS data.

Table A111: Per capita purchase of PDS grain (kg/month) by highest adult education level

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
None	6.7	7.2	4.8	5.5	5.4	4.8	5.1	5.7
Below primary	5.8	6.5	4.5	5.2	4.1	3.6	4.6	5.0
Primary	5.2	6.1	4.5	4.7	4.4	4.0	4.5	4.8
Middle	4.5	6.1	4.2	4.8	4.7	3.7	4.3	4.6
Secondary	5.0	5.5	4.0	4.4	4.3	3.7	4.1	4.2
Higher secondary	-	5.1	3.9	4.6	4.0	3.5	4.0	4.2
Graduate+	-	6.1	4.1	4.4	4.1	3.3	4.1	3.9

Source: Authors' calculations from IHDS data.

Table A112: Per capita purchase of PDS grain (kg/month) by status of land ownership of households

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Non cultivators/No land	5.8	6.3	4.5	4.8	4.5	3.6	4.6	4.6
Marginal (0-1 hectare)	4.9	6.4	4.4	5.0	4.2	3.9	4.4	5.0
Small (1-2 hectare)	5.8	6.3	4.3	4.6	5.0	3.6	4.6	4.5
Medium (2-5 hectare)	7.1	5.5	4.0	4.0	4.7	3.8	4.4	4.0
Large (5 and more hectare)	-	3.8	3.7	4.0	4.1	3.9	4.0	3.9

Source: Authors' calculations from IHDS data.

Table A113: Per capita purchase of PDS grain (kg/month) by income quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	4.9	6.0	3.9	4.6	4.2	3.1	4.1	4.7
2nd quintile	5.7	6.4	4.3	4.7	4.0	3.2	4.4	4.6
Middle quintile	6.7	6.3	4.7	4.9	4.4	3.3	4.8	4.6
4th quintile	7.3	7.0	4.6	5.2	4.8	3.9	4.8	4.8
Richest	-	6.6	5.0	5.3	4.9	4.3	5.0	4.8

Source: Authors' calculations from IHDS data.

Table A114: Per capita purchase of PDS grain (kg/month) by income quintile - Rural India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	5.2	6.3	3.7	4.6	4.4	3.2	4.0	4.7
2nd quintile	5.0	6.2	4.2	4.7	3.8	3.4	4.2	4.7
Middle quintile	6.7	6.5	4.5	5.0	4.5	3.5	4.6	4.9
4th quintile	6.6	6.7	5.0	5.3	4.5	4.0	5.0	5.2
Richest	-	7.6	4.7	5.6	5.1	4.5	5.0	5.2

Source: Authors' calculations from IHDS data.

Table A115: Per capita purchase of PDS grain (kg/month) by income quintile - Urban India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	5.0	5.5	4.3	4.4	4.1	2.9	4.3	4.0
2nd quintile	-	5.8	4.5	4.4	4.2	3.0	4.5	3.9
Middle quintile	-	6.5	4.4	4.6	4.8	3.5	4.5	4.2
4th quintile	-	5.4	5.1	4.8	4.2	3.7	4.7	4.2
Richest	-	5.4	4.6	5.2	5.3	4.0	5.1	4.3

Source: Authors' calculations from IHDS data.

Table A116: Per capita purchase of PDS grain (kg/month) by asset quintile - All India

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Poorest	6.4	6.9	4.8	5.5	4.9	3.9	5.0	5.6
2nd quintile	5.0	6.3	4.5	4.8	4.6	3.8	4.6	4.9
Middle quintile	5.3	5.8	4.1	4.7	4.6	3.9	4.2	4.6
4th quintile	5.1	5.2	4.0	4.5	4.3	3.7	4.2	4.2
Richest	-	4.4	3.8	4.0	3.9	3.4	3.8	3.6

Source: Authors' calculations from IHDS data.

Table A117: Per capita purchase of PDS grain (kg/month) by social network

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
No Acquaintance	5.6	6.4	4.5	5.1	4.5	4.0	4.6	5.0
Acquaintance	5.8	6.3	4.2	4.8	4.5	3.6	4.4	4.6
No Organization	5.6	6.4	4.6	5.2	4.6	3.9	4.7	5.0
Organization	5.8	6.1	4.1	4.5	4.3	3.5	4.2	4.4
No Panchayat/Nagar	5.6	6.4	4.4	4.9	4.5	3.6	4.5	4.7
Panchayat/Nagar	6.0	6.2	4.4	4.8	4.5	4.0	4.5	4.8

Source: Authors' calculations from IHDS data.

Table A118: Per capita purchase of PDS grain (kg/month) by regions

Population Groups	AAY/Annapurna		BPL		APL		All PDS cardholders	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
Hills	7.6	7.5	7.5	6.3	8.4	5.3	7.9	5.8
North	-	4.9	5.3	5.3	-	3.7	4.8	4.9
North Central	4.9	6.1	4.5	5.2	-	2.8	4.7	5.2
Central Plains	6.2	7.0	5.3	5.6	4.8	2.7	5.4	5.4
East	4.9	5.5	3.6	4.7	6.1	2.5	4.1	4.0
West	6.8	7.0	3.8	4.5	3.7	3.8	3.9	4.4
South	6.3	7.0	4.3	4.4	3.9	4.2	4.2	4.5

Source: Authors' calculations from IHDS data.

Table A119: Percentage share of rice, wheat and other cereals to total household consumption - All cardholders

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Hills	56.5	38.2	5.3	100	50.1	47.6	2.3	100
North	10.1	86.1	3.8	100	16.9	82.0	1.1	100
North Central	47.3	50.8	1.9	100	48.3	49.8	1.9	100
Central Plains	30.1	55.3	14.6	100	27.1	62.4	10.5	100
East	90.2	8.8	1.0	100	87.5	10.6	1.9	100
West	30.8	41.4	27.8	100	31.5	55.7	12.9	100
South	85.9	6.0	8.0	100	84.4	8.8	6.7	100
Total	55.6	36.2	8.2	100	55.1	39.6	5.3	100

Source: Authors' calculations from IHDS data.

Table A120: Percentage share of rice, wheat and other cereals to total household consumption - AAY/Annapurna cardholders

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Hills	46.8	46.8	6.4	100	54.6	42.3	3.1	100
North	13.4	81.8	4.9	100	19.0	80.2	0.9	100
North Central	48.8	49.0	2.3	100	51.0	47.7	1.4	100
Central Plains	49.6	42.6	7.8	100	46.4	50.4	3.2	100
East	89.3	10.2	0.5	100	88.9	9.9	1.3	100
West	26.3	45.0	28.7	100	38.2	49.8	12.1	100
South	70.8	8.2	21.0	100	82.2	7.8	10.0	100
Total	54.5	38.7	6.8	100	56.6	40.1	3.3	100

Source: Authors' calculations from IHDS data.

Table A121: Percentage share of rice, wheat and other cereals to total household consumption - BPL cardholders

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Hills	62.1	34.0	4.0	100	52.8	45.2	2.0	100
North	12.5	82.3	5.2	100	17.4	81.1	1.5	100
North Central	52.9	45.3	1.9	100	54.1	44.2	1.7	100

(contd...)

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Central Plains	40.0	47.1	12.9	100	34.0	57.1	8.9	100
East	93.2	5.9	1.0	100	89.7	8.1	2.2	100
West	29.2	37.6	33.2	100	33.0	52.4	14.6	100
South	86.1	5.1	8.8	100	85.9	7.3	6.8	100
Total	65.2	25.7	9.1	100	64.6	30.0	5.4	100

Source: Authors' calculations from IHDS data.

Table A122: Percentage share of rice, wheat and other cereals to total household consumption - APL cardholders

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Hills	54.1	39.8	6.1	100	48.6	49.3	2.2	100
North	9.0	87.3	3.7	100	15.2	83.7	1.1	100
North Central	42.9	55.1	2.0	100	41.1	56.4	2.5	100
Central Plains	16.1	64.5	19.4	100	16.9	69.0	14.1	100
East	88.5	10.9	0.7	100	84.9	13.8	1.3	100
West	31.3	43.1	25.6	100	30.5	57.8	11.7	100
South	89.1	6.6	4.3	100	83.3	11.4	5.3	100
Total	48.2	43.5	8.4	100	47.0	47.2	5.8	100

Source: Authors' calculations from IHDS data.

Table A123: Percentage share of rice, wheat and other cereals to total household consumption - No cardholders

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
Hills	62.9	35.0	2.1	100	48.7	46.9	4.4	100
North	15.3	82.0	2.7	100	22.0	77.0	0.9	100
North Central	50.3	48.1	1.6	100	54.0	45.0	1.0	100
Central Plains	51.3	44.4	4.3	100	35.7	58.7	5.6	100

(contd...)

Regions	2004-05				2011-12			
	Rice	Wheat	Other cereals	Total	Rice	Wheat	Other cereals	Total
East	89.7	8.1	2.2	100	89.0	7.4	3.5	100
West	33.5	43.2	23.4	100	30.8	54.5	14.7	100
South	80.6	8.0	11.5	100	77.1	11.5	11.4	100
Total	59.1	35.1	5.8	100	55.4	40.0	4.6	100

Source: Authors' calculations from IHDS data.

APPENDIX - II: Distribution of IHDS Sample in Waves 1 and 2 and Re-contact Rate

States & Union Territories	Total Dist. in 2001	Included in IHDS-I				Households Surveyed		Re-contact Rate
		Districts	Urban Areas	Urban Blocks	Villages	IHDS-I	IHDS-II	
Jammu and Kashmir	14	5	5	21	20	715	720	87.3%
Himachal Pradesh	12	9	7	21	52	1,372	1476	91.3%
Punjab	17	13	11	36	61	1,593	1702	87.4%
Chandigarh	1	1	1	6	0	90	85	58.9%
Uttarakhand	13	6	3	9	20	458	468	88.7%
Haryana	19	14	6	18	79	1,618	1806	87.4%
Delhi	9	10	7	56	6	960	899	47.2%
Rajasthan	32	23	17	60	88	2,485	2707	86.8%
Uttar Pradesh	70	43	24	75	138	3,512	3824	88.2%
Bihar	37	17	10	31	61	1,430	1547	88.1%
Sikkim	4	1	1	3	3	105	107	81.9%
Arunachal Pradesh	13	1	1	3	6	165	159	84.9%
Nagaland	8	4	1	2	5	130	110	64.6%
Manipur	9	3	1	3	3	105	88	81.0%
Mizoram	8	1	1	3	3	105	78	70.5%
Tripura	4	2	1	3	7	229	220	60.7%
Meghalaya	7	3	1	3	6	161	134	80.8%
Assam	23	8	7	21	38	1,017	991	68.5%
West Bengal	18	14	21	75	66	2,380	2435	89.0%
Jharkhand	18	6	9	27	26	924	853	74.1%
Orissa	30	26	13	40	84	2,064	2058	88.1%
Chhattisgarh	16	15	6	18	49	1,175	1324	91.9%
Madhya Pradesh	45	31	13	42	121	2,805	3123	88.3%
Gujarat	25	17	14	60	70	2,078	1895	76.6%
Daman and Diu	2	2	0	0	3	60	59	86.7%
Dadra and Nagar Haveli	1	1	0	0	3	60	60	75.0%
Maharashtra	35	27	18	75	115	3,203	3309	89.8%
Andhra Pradesh*	23	19	18	60	94	2,435	2203	72.7%
Karnataka	27	26	21	78	144	4,021	3865	78.5%
Goa	2	2	1	3	6	165	188	97.6%
Lakshadweep	1	0	0	0	0	0	0	0.0%
Kerala	14	12	14	42	61	1,731	1570	82.3%
Tamil Nadu	30	21	22	74	62	2,098	1982	82.4%
Pondicherry	4	1	1	3	3	105	107	86.7%
Andaman and Nicobar	2	0	0	0	0	0	0	0.0%
Total	**593**	**384**	**276**	**971**	**1503**	**41,554**	**42152**	**83.3%**

Source: Authors' calculations from IHDS data.

Note: * Andhra includes Telangana since survey conducted before creation of Telangana

Households surveyed in IHDS-II include original households, split households and refresher households

APPENDIX - III: Comparison of IHDS Estimates with Other Data Sources

	IHDS I 2004–5	*NFHS–II I 2005–6*	*NSS 2004–5*	*Census 2001*	IHDS II 2011-12	NSS 2011-12	Census 2011
Per cent urban	27	31	25	28	32	29	31
Per cent literate							
Age 5+	67	67	66	NA	72	74	NA
Age 7+	68	69	67	65	73	75	73
Caste (per cent)							
Other backward class	42	40	41	NA	43	44	NA
Schedule castes	21	19	20	16	22	19	17
Schedule tribes	7	8	9	8	8	9	9
Others	30	32	31	76	27	28	75
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Religion (per cent)							
Hindu	80	82	82	81	81	82	80
Muslim	14	13	13	13	13	14	14
Christian	2	3	2	2	2	2	2
Sikh	2	2	2	2	1	2	2
Others	2	0	1	2	2	1	2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Per cent currently in	80	NA	83	NA	88	91	NA
Work Participation	49	NA	55	52	51	55	53
Work Participation	23	NA	29	26	24	22	26
Average Family Size	5	5	5	5	5	4	5
% of women currently	73	75	76	77	71	74	74
% of women currently	48	47	48	48	49	50	50
Per cent electricity	72	68	65	56	83	80	67
% of piped water	40	25	41	37	44	NA	44
TV Ownership (colour or b/w)							
Black and White TV	48	25	37	24	5	59	47
Colour TV					56		
LPG Use for cooking	33	25	22	18	34	32	29
Per cent toilets	23	NA	19	18	51	NA	47
Per cent poor	26	NA	27	NA	21	22	

Source: Authors' calculations from IHDS data.

Note: *NSSO: Principal+Subsidiary status; Census: Main+Marginal workers

IHDS works more than 240 hours/year in farming, salaried work or own business.

APPENDIX - IV: Comparison of IHDS PDS Data with National Sample Survey 2004-05 and 2011-12

	2004-05				2011-12			
	Rural		Urban		Rural		Urban	
	IHDS-1	NSSO	IHDS-1	NSSO	IHDS-2	NSSO	IHDS-2	NSSO
Distribution of households by type of ration card possessed (%)								
Antyodaya	3.1	3.0	0.9	1.0	7.5	5.0	2.8	2.0
BPL	38.7	26.5	21.3	10.5	40.3	38.0	25.8	16.0
APL	43.2	51.5	56.6	55.5	38.7	42.0	56.8	50.0
No Card	15.0	19.0	21.2	33.0	13.6	14.0	14.6	33.0
Per capita consumption of cereals (Kg/per month)								
Rice	6.7	6.5	4.9	4.9	6.4	6.1	4.8	4.7
Wheat	4.1	4.3	3.9	4.6	4.4	4.4	4.0	4.3
Other Cereals	1.1	1.3	0.5	0.4	0.7	0.7	0.4	0.3
Total Cereals	11.9	12.1	9.4	9.9	11.5	11.2	9.2	9.3
Share of PDS consumption								
Rice	13.5	13.0	11.4	11.0	28.0	27.9	24.7	19.6
Wheat	8.9	7.0	5.3	4.0	19.2	17.3	15.5	10.1
Sugar	11.1	10.0	7.4	7.0	14.6	15.8	12.0	10.3
Kerosene	76.5	77.0	64.2	57.0	80.9	80.8	72.3	58.1

Source for NSSO: (i) NSS Report No. 510-Public Distribution System and Other Sources of Household Consumption, 2004-05.
(ii) NSS Report No. 565-Public Distribution System and Other Sources of Household Consumption, 2011-12.

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