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CALORIE DEFICIENCY, POVERTY AND THE PUBLIC DISTRIBUTION SYSTEM - A HOUSEHOLD LEVEL ANALYSIS FOR 1993-94

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Chapter 1: Introduction & Summary

The study estimates the incidence of calorie deficiency in India. It estimates the proportion of households and individuals that are calorie deficient using NSS data from its large sample survey in 1993-94. This focus allows the study to use a simpler methodology that is more direct, and does not require the use of various commodity and region specific price indices.

Background

Poverty has been at the center of economic policy as well as economic development literature in India since independence. Poverty estimates by the planning Commission are used by the Finance Commission in deciding on grants and assistance to the states where poverty incidence is higher. Economics literature has also for obvious reasons been highly concerned about poverty in India. Consequently poverty estimates are of great importance.

Recent estimates suggest that the poverty incidence in India has been stagnating around 35 percent mark in the 1990s. In fact, rural poverty and inequality is reported to have increased. (Datt, 1998, 1999; Mahendra Dev, 2000; Srinivasan, 1999, Gupta, 2000). Given the widespread international evidence on the negative relationship between economic growth and poverty, stagnation in poverty levels in the nineties becomes difficult to explain. In light of this anamoly, this study adds to the literature by looking at only calorific intakes.

The most visible outcome of the reforms that commenced in the middle eighties and accelerated in the early nineties, has been

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the unprecedented growth of GDP and per capita income. The performance of agriculture sector has been reasonably satisfactory. The central government expenditure on social services, rural development and basic minimum services is reported to have increased both in absolute terms as well as percentage of GDP. The real wages of the most vulnerable group, the unskilled agricultural labourers, has been increasing since 1991-92 at over 2.4 percent annually. (Aiyar, 2000; GOI, 2000)

Consequently, it might be expected that deprivation in India is lower in the nineties than before. Good data on consumption and living standards are available only for 1993-94 when the NSS conducted a large sample survey. (Though data from later surveys are available, they derive from a much smaller sample.) These poverty estimates suggest that indeed there has been a fall in poverty in the early nineties from late eighties. On the other hand, studies using smaller sample for mid nineties point towards stagnation in poverty, especially rural poverty. In any event, there is enough evidence that there is a strong negative relationship between economic growth and the incidence of poverty. It is established in the literature that:

(i) More than 87 percent of the *long term* reduction in poverty occurs due to economic growth; and

(ii) For a long enough period the poverty ratios decline by *one percent* for every *one percent* increase in the per capita net domestic product (Srinivasan, 1999).

A related aspect is that related to the standard of living. Not many studies have been conducted in recent times on the various aspects of living conditions of the Indian populace. One such aspect is that of calorie deficiency. Calorie consumption is the basis on which poverty is estimated (see below). More importantly, ensuring that the minimum nutritional requirements of all its citizens are met should be the first objective of economic policy.

This study facilitates this objective by studying whether calorie requirements are being met. Many aspects are therefore studied. It re-calculates the calorie requirements of each household. It studies the total calorie intake of each household and compares it with its requirements. The importance of PDS is meeting the calorific needs of households is also analyzed. A study of which products provide the basic calories to households is also conducted.

Poverty Estimation and Calorie Deficiency

There are two requirements for calculating poverty incidence: a suitable poverty norm and an income or expenditure profile of the community. In India, the concept of poverty has been related to *basic minimum needs*. The basic minimum needs, as developed by the Task Force (GOI, 1979) for 1973-74, is the cost of minimum required consumption levels of food, clothing, shelter, fuel etc. There are calorific levels determined by the same committee depending upon age, sex, residence in rural or urban areas, and occupation. The normative food energy intake works out on an average to be 2,435 calories for a person living in the rural India and 2,095 calories for a person living in the urban areas.

At 1973-74 prices, the cost of normative food requirement plus some expenditure on other essential goods was calculated to be Rs.49.87 and Rs.56.64 for rural and urban areas respectively. The rupee value of this poverty line (PL) was calculated in the following manner. First, the average daily consumption of quantity of food items per person was worked out for different pre-specified expenditure classes from 1972-73 NSS consumer expenditure data. Using quantity-calorie relationship of food items for the given commodity composition and their respective prices, the normative minimum expenditure on the food was obtained. The PL was determined as that level of per capita expenditure (PCTE) where the normative food intake was assured. The remaining part of the PCTE was taken as the expenditure on non-food items.

All major studies on poverty in India since have used a similar methodology. The poverty line in rupee terms derived in 1973-74 has been kept invariant over time. A suitable price index is used to update this poverty line to bring it up to the market prices. The price indices are constructed using the market prices. This then forms the basis for estimating the levels of poverty and their changes over time.

As will be elaborated later, this analysis studies only the calorific intake of the households, and compares those with the households' calorific requirements. Calorific intake is calculated as the sum of calories from each commodity consumed by the household. Calorific requirement for the household is calculated as the sum of daily minimum calorie requirement of each household member. The calorific requirement differs across age, sex, and occupation of each

individual. Unlike previous studies, this study corrects for all of these characteristics.

In the rest of the discussion the term ***poverty*** and ***poor*** are used to connote those who do not meet the minimum expenditure benchmarks as defined by the Planning Commission. The term ***calorie deficient*** is used to refer to those who do not meet the minimum calorie requirements as recommended by nutrition experts. Note that we do not study intra-household allocation of calories, this work only deals with calorie intake and requirement at the household level.

Other Poverty Estimates

Though poverty is not the main focus of the paper, an understanding of how it has been calculated helps us in understanding the methodology used to calculate calorie deficiency. Most estimates of poverty suffer from biases that are likely to have inflated poverty levels in 1973-74, but more importantly, these biases are likely to have increased over time.

First, the derivation of the PL (by converting average quantities consumed into calories) does not take into account the food consumed by a person out side the household. The meals served by the employer, meals taken on payment, meals taken from other sources and the meal served in the schools/*balwadis* in some states is, thus, left out from the calculation of expenditure on food and therefore from estimation of poverty levels. As per the 1993-94 NSS consumer expenditure data, there are over nine percent of the individuals surveyed by the

NSS who had consumed meals outside the household.

Second, the other possible source of overestimation of, the PL is source of purchases of the food items. It does not take into account the market prices of commodities supplied through the PDS (at the subsidized rates). There is evidence to suggest that the access to PDS has been increasing over the years. The calorific method easily allows us to incorporate the issue of purchases from PDS, as it is independent of expenditures incurred by the household.

Third, consumption basket of the poor has also changed. There is enough evidence to show that certain segments of the poor are moving away from traditional grains towards wheat and rice, and from cereals towards fresh vegetables and fruits. It is not clear what the impact of this movement has been on poverty estimates.

The most significant of all biases comes from the widely accepted under-reporting of consumption. This is primarily due to difficulties in recall. Though it is likely that some under-reporting does occur, it is impossible to estimate its degree at the level of each household. This study also suffers from this bias.

In sum, there are certain biases inherent in all poverty studies, our focus on calorific intake as well as use of household level data allows us to circumvent most other biases except those that come from under-reporting of consumption.

Methodology

As mentioned before, this study throws some more light on issues related to poverty and food sufficiency by using a more direct methodology than the one used by most studies (Datt, 1998, 1999; Dubey and Gangopadhyaya, 1998; GOI, 1993, 1997; Tendulkar and Jain, 1995; Tendulkar, 1998). Specifically the following alternative methods are used:

a. Calculating incidence of calorie deficiency using only the food energy (calorie) intake;

b. Where food energy intake is from meals taken within *and* outside the household

c. We also adjust households' expenditure for commodities bought through the Public Distribution System (PDS).

d. We also recalculate *poverty* as well as *calorie* deficiency after carrying out adjustments described in points *b* and *c*.

First the method requires converting the quantities of food items consumed into calories. It then applies the normative calorie intake as a discriminant to identify the poor.

In the second exercise, that aims at studying the impact of PDS on calorie consumption, the value of the items purchased from the PDS is recalculated at market prices. Then using the available poverty norm, the poverty incidence is recalculated.

The Results

Our main results using data for 1993-94 are as follows:

1. Average calorie requirements are 2316 and 2018 for rural and urban areas respectively. These figures are significantly lower than those used by conventional studies (2435 and 2095 respectively) that draw from the work conducted by the Task Force in the seventies

2. There is wide variation across different states in their calorific requirements - this is also not considered by the Task Force and other studies such as Dandekar and Rath (1971). Consequently state level poverty line calculations and as a result poverty levels will undergo a large change if state level requirements are incorporated.

3. Average calorie intake is estimated as 2473 and 2543 for rural and urban areas respectively.

4. Approximately 49 per cent of the rural households and 25 per cent of the urban households can be classified as calorie deficient (43 per cent at the all India level). This compares to the poverty levels of 37 per cent and 32 per cent for rural and urban areas respectively (36 per cent at the all India level).

5. Occupational and age differences across rural and urban areas combined with impact of non-tradable commodities are some factors behind the differences in calorie deficiency and poverty levels.

6. The impact of PDS is insignificant at the all India level as well as in the major states. Smaller states tend to have a larger impact of PDS than larger states. Only about 3.2 per cent of the households achieve calorie sufficiency because of access to PDS at the all India level.

7. Re-calculating the poverty estimates after correcting for PDS purchases we find that rural poverty levels are reduce by about 2 per cent points lower than poverty estimations by the Planning Commission.

8. Households in the urban areas and in the southern states have much better access to the PDS.

This Report

The rest of this report proceeds as follows. The next chapter provides a description of the data used and various adjustments done in the data. Chapters 3 and 4 report the results obtained. Chapter 3 first calculates the calorie requirements as well as intake. It then proceeds to calculate the number of calorie deficient households across rural and urban sectors as well as states. It also studies the distribution of such households and their expenditures. Chapter 4 discusses in greater detail other aspects related to calorie sufficiency. It studies the impact of PDS, calorie consumption due to various food commodities, as well as poverty incidence. Chapter 5 presents policy implications and concludes.

Chapter 2: Data & Methodology

Introduction

In this study we have used household level consumer data (Schedule 1.0) collected from the 50th round by the National Sample Survey Organisation (NSSO), Government of India. The reference period was the year July 1993 to June 1994. The consumer expenditure data is supplemented by the household level employment and unemployment data (Schedule 10.0) collected by the NSSO for the same years and from the same households.

The NSSO collects information on household expenditure on almost all the goods and services that the households consume at highly disaggregated level. The disaggregation includes the quantity purchased from market, purchased from public distribution system shops (ration shops) and consumed out of home-grown stocks. These are data on amounts spent if a consumption item is purchased from the market or imputed value of the consumption if consumed from home-grown stock.

The coverage of these surveys is the entire territory of the Indian Union except for areas where it has not been possible to reach the households. For the purpose of the survey, NSSO had considered 32 states and union territories. Each of these is divided into one or more regions. Dubey and Gangopadhyaya (1998) and Gangopadhayay et al (1997) have the details on coverage of the surveys and also the composition of regions.

From the household level employment and unemployment data (Schedule 10.0) the individual level information has been used.

In sum, therefore for both the years under consideration the two rounds of the NSS have been the main source of the data. Items consumed by the household, amount of quantity consumed by the household, individual characteristics - age, sex, occupation, are all available from the same data source.

Calculation of Total and Daily Calorie Intake

Consumption of food here is defined as:

- Quantity of food purchased
- Quantity of food availed from self-cultivated land
- Quantity of food obtained as gift, in lieu of work, etc.

From the consumer expenditure data set, we have used the total quantity of food items consumed by the households (block 5). In some households, the sum of quantity/value of food item from the three sources did not add up to total quantity of food items. We have corrected for this discrepancy by adding the three sources to match with the total quantity/value in those households.

For converting the quantities to calorie consumption by the household calorific values for each food item are used, these are also referred to as conversion factors. The conversion factors are available from Gopalan et. al. (1993), GOI (1979) and GOI (1997). Appendix A has the list of food items and calorie content figures used in this study.

In addition *meals* taken outside the home is also adjusted for. Data are available on the consumption of number of meals *outside* home. There are four categories of such meals:

- from employer,
- from school/balwadi,
- as guest in other household and,
- other sources and on payment.

To calculate the total calorie from the meals consumed out side, 1200 Kcal per outside meal is added to total household calorie consumption. Consequently *each* members' outside meals are adjusted for.

In sum, total household calorie consumption is calculated as the sum of the calories available for the household from food taken within the home, meals provided from the employer, meal taken at school/*balwadi* and meals taken by individual members outside the home on payment.

Calculation of Daily and Per Capita Calorie Intake

From the total calorie intake calculated in the manner described above, daily calorie intake of the household is calculated by dividing the monthly intake by 30 with following adjustment. From the data, we have the information on the member(s) of the household on number of stayed away during 30 days preceding the date of survey. As the number of meals taken on payment and as guests in other households do not match with the number of days stayed away, we adjusted the daily calorie consumption for the number of days stayed away in such households. From the daily calorie intake, the per capita

daily intake is calculated as an average by dividing the daily intake by the household size without doing any other adjustment.

Our per capita daily calorie intake calculation is slightly different from the way it is done by the NSSO. For 1993-94, the NSSO calculated the per capita daily calorie intake in two steps. In step one, the household size was converted to effective consumer units using a conversion factor based on age-sex structure of the household and per consumer unit calorie intake was calculated. In second stage, per consumer unit calorie intake was adjusted for meals consumed as guests and served to guests and meals from employer. This adjustment appears to be inconsistent from the way NSSO reports the consumer expenditure data used in poverty calculations. The expenditure data *includes all expenditure* of the household whereas calorie intakes are adjusted as described above.[1]

Calculation of Household Calorie Requirement

The derivation of poverty norm in India is based on the food energy intake method. The Task Force constituted by the Planning Commission calculated the average calorie requirement for the rural and urban sectors separately in 1979 (GOI, 1979). These workout 2435 Kcal and 2095 Kcal respectively. The Task Force used age-sex-activity structure of the rural and urban population separately to arrive at these figures. *Since then, in entire literature on poverty, the cost of these calories worked out at*

[1] See NSSO (1997), especially sections 3.4.2 and 3.17, page 7 and 10.

[2] In a separate exercise, Dandekar and Rath (1971) worked out another poverty norm based on uniform calorie intake of 2250 Kcal per person per diem for rural and urban sectors. But, most of the studies use Task Force (GOI, 1979) poverty norm.

1973-74 prices as poverty line.[2] The incidence of poverty in the subsequent years has been calculated adjusting this poverty line for changes in prices over time. There has been no attempt to recalculate the household calorie requirement in subsequent years as was done by the task force.

We have calculated the calorie requirement for each surveyed household 1993-94. We have used a similar methodology as used by the Task Force in determining the individual household's calorie requirement with the slight modification.

The Task Force assigned the calorie requirement for population 19 years of age and above as per the nature of work done by the working members. They had three broad groups; heavy workers, moderate workers and sedentary workers. They have also assigned the calorie requirement of non-workers at level of sedentary workers over 18 years of age. Thus, in effect, even the persons over the working age (60 years and above) were deemed to be requiring the same level of calories as individuals who were much younger (say, 19 years old). It is well recognised that with increasing age, the working capacity as well as energy requirement decline gradually (see GOI, 1997 for details).

While retaining the assumption of the age-sex-activity structure (sixteen groups), we introduced a declining scale with age and recalculated the calorie requirement for the population above 40 years of age. The average calorie requirement works out to be 2313 Kcal in rural sector and 2025 Kcal in urban sector per person per day in 1993-94. Appendix 2B provides the details of the calorific requirements used in the study. Data was not available for pregnant mothers, however we were able to

add additional calories required for lactating mothers. This we did by adding the number of calories as prescribed by Gopalan et. al. (1993) - 475 calories were added to the calorific requirement of each mother with an infant of 0 to 12 months. This was worked out as the average of 550 and 400 calories prescribed for mothers with infants of 0 to 6 months and 6 to 12 months respectively.

Recalculation of Monthly Per Capita Total Expenditure (PCTE)

As mentioned before, the study also involves the comparison of calorie deficiency and poverty. We undertake a sample calculation of poverty levels in India taking the per capita total expenditures approach. The expenditures are then compared with the poverty norm used by the Planning Commission of India to estimate poverty levels.

Poverty calculations in India have conventionally been conducted using the actual expenditure data collected by the NSSO. We have argued elsewhere (see Bhandari and Dubey, 2000) that actual expenditure reported by the households in the NSSO data is under estimated. The extent of the under reporting on account of various direct and indirect subsidies on food items will have two components: food subsidies given by the central government and those by the state governments. In order to take into account the subsidies, the household expenditure must be revised upwards. Since it is not feasible to get the subsidy amount household-wise, we have to use some kind of approximation to make this adjustment.

The household consumption expenditure has been adjusted in the

[3] For details on the calculation of the per capita total expenditure (PCTE) from the NSSO data, see Dubey and Gangopdhayay (1998).

following manner.[3] First, to take into account the food subsidy given by the central government, we calculated the total expenditure on basic food items only by all the households that reported purchases from the public distribution system (PDS)/ration shops.[4] The total food subsidy of the central government in 1993-94 was Rs. 5537 crores. Out of this amount, about 72 percent (Rs. 3986.64 crores) was consumer subsidy (Srivastava and Sen, 1997).[5]

In the next step, the consumer subsidy as percent of food items was worked out. Then the food expenditure of the households reporting access to PDS/ration shop was adjusted by the same proportion across the households.

A similar approach has been followed for seventeen major states for which we could get the amount spent on the food subsidy.

We generated the total household expenditure for each household using the aggregate of the *sub-totals* of various consumption item groups from Schedule 1.0. These sub-totals pertain to block numbers 5 (food items; pan; tobacco and intoxicants; fuel and light), 6.1 (clothing), 7.1 (footwear), 8 (miscellaneous consumer goods; miscellaneous consumer services; rent; taxes and cess), and 8.1 (education; medical, both institutional and non-institutional) and 9.1 (durable goods). The block totals give the expenditure, by the household, on each of these item groups over the last 30 days prior to the survey. The household is the basic unit in the surveys. To convert this to per capita amounts, we divided the household

[4] The basic food item for purposes of this paper are the once which have been supplied through the PDS.

[5] See Srivastava and Sen (1997) for details on the operational mechanism of food subsidy through PDS.

expenditure by the number of members (household size) in each household. This we call the per capita total expenditure, or the PCTE.[6]

Appendix 2 A: List of Food Items and Calorie Contents

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food Item (name)	Unit
101	278	Paddy	100g
102	346	Rice	100g
103	346	Chira	100g
104	325	Khoi, lava	100g
105	325	Muri	100g
108	346	Other rice products	100g
110	346	Wheat	100g
111	341	Atta	100g
112	348	Maida	100g
113	348	Suji/rawa	100g
114	352	Sewai/noodles	100g
115	245	Bread	100g
118	346	Other wheat products	100g
120	349	Jowar	100g
121	349	Jowar products	100g
130	361	Bajra	100g
131	361	Bajra products	100g
140	342	Maize	100g

[6] Since we started from the raw data, and not from the NSSO Tables, we checked our computations with those published in the NSSO Tables. Also see Gangopadhyay, Jain and Dubey (1997), report submitted to the Department of Statistics, Government of India.

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food Item (name)	Unit
141	342	Maize products	100g
150	336	Barley	100g
151	336	Barley products	100g
160	262	Small millet	100g
161	262	Small millet products	100g
170	328	Ragi	100g
171	328	Ragi products	100g
190	360	Gram (whole grain)	100g
191	360	Gram products	100g
200	338	Tappioka/sago	100g
201	157	Tappioka:green	100g
202	111	Mahua	100g
203	133	Jackfruit seed	100g
208	110	Other creal substitute	100g
210	335	Arhar/tur dal	100g
211	372	Gram (split)	100g
212	348	Moong	100g
213	343	Masur	100g
214	347	Urad	100g
215	345	Khesari	100g
216	315	Peas	100g
217	432	Soyabean	100g
218	340	Other dal	100g
220	340	Besan (Assumed as Chana)	100g

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food Item (name)	Unit
228	340	Other Pulse products	100g
230	100	Milk: Liquid (fts.)	100ml
231	357	Baby food	100g
232	496	Milk:cond/ powder	100g
233	60	Curd	100g
234	900	Ghee	100g
235	729	Butter	100g
236	25	Ice-cream	Per 93-94 Re
238	126	Other milk products	Per 93-94 Re
240	900	Vanaspti	100g
241	900	Margarine	100g
242	900	Mustard oil	100g
243	900	Ground nut oil	100g
244	900	Coconut oil	100g
245	900	Gingelly (til)	100g
246	900	Lineseed oil	100g
247	900	Refined oil	100g
250	900	Palm oil	100g
251	900	Rape seed oil	100g
252	541	Oil seeds	100g
258	900	Other oil	100g
260	118	Goat meat	100g
261	118	Mutton	100g
262	114	Beef	100g

Food Item Code* (I987-88)	Calorie Content (in Kcal)	Food Item (name)	Unit
233	114	Pork	100g
264	86	Buffalo meat	100g
268	90	Other meat	100g
270	709	Chicken	Unit
271	71	Other birds(no.)	Unit
272	100	Eggs(no.)	Unit
273	80	Egg products	Per 93-94 Re
274	105	Fish fresh	100g
275	300	Dry fish	100g
280	97	Potato	100g
281	97	Arum	100g
282	17	Radish	100g
283	48	Carrot	100g
284	29	Turnip	100g
285	43	Beet	100g
286	120	Sweet potato	100g
287	55	Onion	100g
288	60	Other root vegetables	100g
290	25	Pumpkin	100g
291	12	Gourd	100g
292	40	Bitter gourd	100g
293	13	Cucumber	100g
294	20	Parval	100g
295	17	Jheenga/torai	100g
296	18	Snake gourd	100g
298	16	Other gourd	100g

Food Item Code* (I987-88)	Calorie Content (in Kcal)	Food Item (name)	Unit
300	30	Cauliflower	100g
301	27	Cabbage	100g
302	24	Brinjal	100g
303	35	Lady's finger	100g
304	26	Palak	100g
305	55	Other leafy vegetables	100g
306	24	French beans & barbatti	100g
307	20	Tomato	100g
310	93	Peas	100g
311	29	Chillies green	100g
312	24	Capcicum	100g
313	64	Plantain green	100g
314	51	Jackfruit(green)	100g
315	10	Lemon (no.)	Unit
318	162	Other vegetables	per 93-94 Re
330	116	Banana (no.)	Unit
331	88	Jackfruit	100g
332	16	Water melon	100g
333	460	Pine apple (no.)	Unit
334	660	Coconut (no.)	Unit
335	53	Guava	Unit
336	115	Singhara	100g
337	50	Orange, mausambi (no.)	Unit

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food item (name)	Unit
340	74	Mango	100g
341	17	Kharbooza	100g
342	52	Pears	100g
343	53	Berries	100g
344	61	Leechi	100g
345	59	Apple	100g
346	71	Grapes	100g
348	20	Other fresh fruits	per 93-94 Re
350	662	Khopra	100g
351	567	Groundnut	100g
352	317	Dates	100g
353	569	Cashewnut	100g
354	687	Walnut	100g
355	410	Other nuts	100g
356	308	Raisins	100g
358	306	Other dry fruits	100g
360	398	Sugar	100g
361	383	Khandsari	100g
362	383	Gur (cane)	100g
363	350	Gur (others)	100g
364	398	Sugar candy	100g
365	319	Honey	100g
368	350	Sugar (others)	100g
370	0	Sea salt	100g
371	0	Other salt	100g
380	349	Turmeric(gm)	100g (gm)

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food item (name)	Unit
381	304	Black Pepper (gms.)	100g (gm)
382	246	Chilies dry	100g (gm)
383	145	Garlic (gms.)	100g (gm)
384	283	Tarmarind (gms.)	100g (gm)
385	67	Ginger (gms)	100g (gm)
386	80	Curry Powder (gm)	100g (gm)
388	360	Other Spices (gm)	100g (gm)
390	27	Tea	Unit
391	0	Tea	Unit
392	40	Coffee	Unit
393	0	Coffee	Unit
394	0	Ice	Unit
395	80	Cold beverages	Unit
396	50	Fruit juice	Unit
400	60	Coconut green(no.)	Unit
408	44	Other beverages	per 93-94 Re
410	123	Biscuits & confectionery	per 93-94 Re
411	105	Salted refreshments	per 93-94 Re
412	80	Prepared sweets	per 93-94 Re
413	1200	Cooked meals	Unit
414	500	Cake Pastry etc	100g (gm)

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food item (name)	Unit
415	400	Pickles (gms)	100g (gm)
416	60	Sauce(gms)	100g (gm)
417	250	Jam/Jelly(gms)	100g (gm)
418	105	Other processed food	Per 93-94 Re
430	2.2	Pan	Unit
431	3.7	Finished pan	Unit
432	655	Supari(gms)	100g (gm)
433	0	Lime	100gm
434	0	Katha	100gm
438	0	Other pan ingredients	100gm
440	0	Bidi	100gm
441	0	Cigarette	100gm
442	0	Leaftobacco	100gm
443	0	Snuff	100gm
444	0	Hukka	100gm
445	0	Cheroot	100gm
446	0	Zarda etc	100gm
448	0	Other Tobacco products	100gm
450	0	Ganja	100gm
451	380	Toddy (ltrs.) fermented	Litre
452	380	Country liquor: (see liquor calc)	Litre

Food Item Code* (1987-88)	Calorie Content (in Kcal)	Food item (name)	Unit
453	0	Afeem/Opium etc	Gms
454	380	Beer	Litre
455	380	Foreign liquor	Litre
458	61	Other Per 93-94 Re intoxicants	

*Note: The codes for individual commodities for NSSO 50th round are slightly different. Sources:

1. Gopalan et al (1993)
2. GOI (1979)
3. NSSO (1997)

Appendix 2B: Recommended Dietary Allowances for Indians

Group	Particulars	Net Energy(Kcal per diem)
Man	Sedentary Work	2425
	Moderate Work	2875
	Heavy Work	3800
Woman	Sedentary Work	1875
	Moderate Work	2225
	Heavy Work	2925
	Pregnant Woman	+300
	Lactation	
	0-6 months	+550
	6-12 months	+400
Infants	0-6 months	108/kg
	6-12 months	98/kg
Children	1-3 years	1240
	4-6 years	1690
	7-9 years	1950
Boys	10-12 years	2190
Girls	10-12 years	1970
Boys	13-15 years	2450
Girls	13-15 years	2060
Boys	16-18 years	2640
Girls	16-18 years	2060

Source: Gopalan B. V., Rama Sastri and S. C. Balasubramanian (1993), "Nutritive Value of Indian Foods" National Institute of Nutrition, Hyderabad.

Appendix 2C: Consumer Units by Age and Sex

Age Group	Sex	
(in completed years)	Male	Female
Below 1	0.43	0.43
1-3	0.54	0.54
4-6	0.72	0.72
7-9	0.87	0.87
10-12	1.03	0.93
13-15	0.97	0.80
16-19	1.02	0.75
20-39	1.00	0.71
40-49	0.95	0.68
50-59	0.90	0.64
60-69	0.80	0.51
70 and above	0.70	0.50

Source: NSSO (1997).

Chapter 3: Calorie Requirement and Consumption

Introduction

A review of the literature in this area would facilitate the presentation of our results. We therefore first briefly summarize the debate related to poverty levels and their estimation, and then proceed to our results.

Calorie deficiency is intimately related with the existence of deprivation. Though studies on calorie deficiency in India have been sparse, a rich literature has developed on poverty levels.[7] The long-term trend of poverty ratios in India show three distinct phases; from 1950-51 till 1960s, poverty increased (Srinivasan, 1999). There is reduction in poverty till about 1989-90.[8] Thereafter, it increased first (1991-92) and had been stagnating around 35 percent since (Srinivasan, 1999a).[9] If we divide the incidence of poverty into rural and urban sector, during the 1990s, it is the former that has been stagnant whereas urban poverty did show decline (Srinivasan, 1999a; Mahendra Dev, 2000).[10, 11]

[7] Srinivasan (1999) provides a good account of the history of poverty measurement in India. Pradhan and Saluja (1998) have reviewed some of the recent studies on poverty. See also Dubey and Gangopadhyay (1998).

[8] The achievements in the poverty reduction in the post-independence period are well documented in the Srinivasan (1974, 1988, 1999a and 1999b).

[9] The incidence of poverty during the 1990s has been quite controversial. There are a number of studies that report decline (Dubey and Gangopadhyay (1998), Tendulakar (1998) and Mahendra Dev (2000)). The other set of studies argue that poverty has increased or has remained stagnant (Datt (1998, 1999) GOI (1993, 1997), Sen (1996), Gupta (1999) and others.

[10] How far on can rely on these estimates is questionable though. The consumer expenditure data used in these calculations is not strictly comparable. See Dubey and Sarma (2000) for details on comparability problem of the data.

[11] Percentage changes over the previous year (for the agricultural year (July to June)) have been 5.21 in 1992-93, 6.61 in 1993-94, (-) 0.39 in 1994-95, 0.72 in 1995-96, 6.37 in 1996-97 and 7.11 in 1997-98, respectively.

In the backdrop of these indicators showing improvements in the economy, many have found that the poverty incidence in India has been stagnant at approximately 35 percent during this period. This is of course counter to our current belief that there is a direct and negative relationship between growth and poverty. Indeed, studies such as those by Datt and Ravallion have even quantified this relationship at *one percent* drop in poverty headcount ratios for every *one percent increase* in per capita net domestic product.[12]

The other determinants that help reduce the rural poverty are the agricultural growth (Ahluwalia, 1978; Mahendra Dev, 2000), rural non-farm employment and wages (Mahendra Dev, 2000) and development public expenditure (Mahendra Dev, 2000; CUTS, 1999).

Srinivasan (1999) has tried to explain the stagnation in rural poverty by slightly qualifying the arguments advanced by Datt and Ravallion. He argues that *....since the thrust of the reforms thus far has been to liberalize foreign trade in non-agricultural commodities and removal of industrial licensing that constrained capacity creation, the effects of reforms on poverty has to come from its effect primarily on non-farm output.*[13]

It was under this backdrop that we proposed to take another look at poverty incidence in India using a more direct method, by calculating the calorie deficiency among the Indian households. Rest of the

[12] This is based on the work of Datt and Ravallion as cited in Srinivasan (1999). He also quotes the work of these researchers to argue that nearly 87 percent of the decline in poverty ratios is accounted by the growth component.

[13] See Srinivasan (1999), page 12.

chapter is organized in the following fashion. Next section reviews the current understanding on household calorie requirement. Section 3 delves into the household calorie consumption and poverty incidence based on the calorie norm. Section 4 concludes the chapter.

The Household Calorie Requirement

Recall that in India, the poverty incidence is measured using a poverty norm. The objective consideration in deriving that norm has been to ensure a normative food energy intake (on an average). Thus, anchoring the absolute PL in the normative minimum calorie intake, was adopted by the **Task Force**,[14] constituted by the Planning Commission in 1979. This group accepted the calorie intake norms recommended by the Nutrition Expert Group (1968), according to fourteen age-sex-activity categories. The census based activity pattern, according to age and sex (differing for rural and urban populations), was super-imposed on the (projected) rural and urban populations.[15] This provided the age-sex-activity-specific composition of the rural and urban populations. The specific calorie norms (assumed to be uniform for the rural and urban populations) were then weighted by the corresponding compositions of the rural and urban populations separately, to derive the rural and urban *average* uniform calorie norms. The daily calorie requirements per person worked out, on the average, to 2435 for rural and 2095 for urban areas. [16]

[14] See Perspective Planning Division (1979).

[15] For specific numerical assumptions made in this connection, see Perspective Planning Division (1979), pages 5-7.

[16] Dandekar and Rath (1971) also estimated a uniform poverty norm for both rural and urban sectors based on daily calorie intake of 2250 Kcal per capita. But since most of the researchers, and also the official poverty calculation in India use the calorific norm suggested by the Task Force (GOI, 1979), we will restrict our discussion to the later only.

As compared to the methodology adopted by the Task Force described above, we worked out the normative calorie requirement on the basis of age-sex-activity patterns using the unit level NSS data (see chapter 2). We have retained the assumption of uniform specific calorie norm for the rural and urban sectors.[17] In other words, we consider age, sex and occupation as the sole criteria determining calorific requirement. Lack of data prevented us from adjusting the additional calorie requirement for pregnant mothers, but we do so far lactating mothers (as described in chapter 2).

The average normative calorie requirement has declined in both rural and urban sectors as compared to that worked out by the Task Force quoted above. The averages calculated for 1993-94 and those obtained by the Task Force in 1979 are reported in Table 1.

Table 1: Average Calorie Requirement

(Kcal per capita/day)

Sector	Bhandari and Dubey (1993-94)	Task Force (1979)	Calories Requirement biased upwards by:
Rural	2316	2435	119
Urban	2018	2095	77

In other words, the same requirements estimated by the Task Force continue to be used today. But we find that average calorie requirements are lower by 119 calories for the rural sector and 77 calories for the urban sector - approximately by 5 per cent.

[17] For details on other assumptions, please refer to chapter 2.

The poverty line that is based on calorific requirement in India therefore is being overestimated. And this overestimation in the poverty line is happening due to an overestimation of the calorie requirements. In other words, calorie requirements are lower in the nineties than in the seventies when the task force calculated them.

However, as discussed in chapter 2 we have also introduced a slight modification in the Task Force's methodology that we believe better captures the calorific requirement. Some of the difference between the Task Force's results and ours also derive from there.

For checking the methodological modification, we calculated the average requirements *completely mimicking* the Task Force methodology but using data from 1993-94. The averages for 1993-94 are 2377 Kcal per capita per day in the rural sector and 2079 Kcal per capita per day in the urban sector. Thus, a large part of the decline is coming from factors other than methodological differences.

Life expectancy at birth has been increasing and the dependency burden has also shown an increasing trend in India. This is very clearly shown in the World Development Indicators (World Bank, 2000). The male population in the 15-59 age group has declined from 324 per thousand in 1970-75 to 215 during 1993-98. The corresponding figures for the female population were 353 to 204. Since 15-59 age group has the highest calorific requirement, their relative decline has significantly contributed to fall in the average calorific requirement for the country.

It has also been argued that changes in the occupational structure might be reducing the calorific requirement. Both agriculture and manufacturing's share of the output for the economy have been falling. With this relative fall in importance of the physically more demanding occupations calorific requirements would also be expected to be lower.

Table 2 has the average requirements for states for the rural and urban sectors respectively. As expected, requirements do vary across states reflecting the demographic and occupational variations. For example, one would expect a lower level of average intake say in Kerala where lot of economically active population has migrated. Similarly, Rajasthan has lower than the average requirement as agriculture and allied activities are at a low key. Most of the states with more economically active population (due to in-migration) or higher proportion of tribal population will have higher than the average requirement. Similarly, most of the smaller states with predominantly tribal population have higher average calorie requirement.

In sum the reduction in average calorie requirement is consistent with observed demographic and occupational changes. This is further evident from the variation in the average intake at the state level. There is clearly scope for recalculating the cost daily calorie requirement for deriving the poverty line a fresh. Ideally, this should be done at the state level.

Table 2: State-wise Average Daily Calorie Requirement

States	Rural	Urban	Rural Rank	Urban Rank
Andhra Pradesh	2324	2001	11	26
Arunachal Pradesh	2380	2066	5	6
Assam	2372	2069	6	4
Bihar	2325	2042	10	11
Goa	2268	2004	20	25
Gujarat	2335	2010	8	21
Haryana	2217	2012	27	19
Himachal Pradesh	2253	2087	24	2
Jammu and Kashmir	2188	2005	29	24
Karnataka	2320	2006	12	23
Kerala	2208	2039	28	13
Madhya Pradesh	2392	2011	4	20
Maharashtra	2314	2021	13	17
Manipur	2283	2071	19	3
Meghalaya	2497	2029	1	15
Mizoram	2496	2226	2	1
Nagaland	2372	2067	6	5
Orissa	2326	2061	9	9
Punjab	2303	2009	15	22
Rajasthan	2254	1996	23	28
Sikkim	2423	2064	3	8
Tamil Nadu	2302	2014	16	18
Tripura	2245	2065	25	7
Uttar Pradesh	2292	1996	17	28
West Bengal	2289	2039	18	13

States	Rural	Urban	Rural Rank	Urban Rank
Andaman and Nicobar Islands	2219	2045	26	10
Chandigarh	2119	2042	30	11
Dadra and Nagar Haveli	2306	1982	14	31
Daman and Diu	2267	1957	21	32
Delhi	2115	2026	32	16
Lakshadweep	2117	1998	31	27
Pondicherry	2258	1990	22	30
All India	2316	2018		

Household Calorie Consumption

The daily household calorie consumption was calculated from the monthly calorie consumption using the methodology outlined in the last chapter. The per capita average calorie intake by sectors in 1993-94 for all India is reported in table 3 along with the per capita calorie intake reported by the NSSO (1997). The rural per capita average intake is lower than that in the urban sector. In both the sectors our average per capita daily intake is higher than that reported by the NSSO. Another important thing to note is that in our calculation the urban intake is higher than the rural daily intake while the figures reported by the NSSO opposite is true. What could explain this reversal in the average? This point is further investigated below.

There could be several reasons for this significant difference in the average calorie consumption as we have calculated and as reported

by the NSSO (1997). First, in 1993-94, NSSO did not use conversion factor to calculate calorie equivalent from the alcoholic beverages. Also, there is no mention of calculation of quantity of rice from the Paddy and converting it to calorie using the appropriate conversion factor. Second, due to discrepancy in the total quantity of consumption, we have used the sum of quantities purchased from the market and consumed out of homegrown stock (see chapter 2 for details). As a result the average consumption of calories in our calculation are from the "effective" quantities that households consumed.[18] We also improve upon the NSSO methodology where the calorie consumption for the number of days that a member of the household has stayed away from home is concerned.

Table3: Average Calorie Intake: All India

		(Kcal per day)
Sector	**1993-94**	**1993-94* (NSSO)**
Rural	**2473**	**2153**
Urban	**2543**	**2071**

Note: 1993-94* is average calorie intake reported by the NSSO (1997)

Table 4 shows the average per person daily calorie intake in the rural and urban sectors grouped by deciles. The table shows that there is close relationship between expenditure and calorific intake. The deciles are calculated on the basis of PCTE. Higher expenditure

[18] The NSSO calculation of daily per capita calorie consumption as detailed in chapter 2 is done using an adjustment factor. This is carried out in two stages. In stage one, per consumer unit daily calorie consumption (C) is calculated. In stage two, this C is adjusted for meals consumed from different sources. There is serious mismatch in the meal accounting as reported in the data. The data suggests that the households reported to have served about 17.76 million meals to employees. The number of meals that households reported to have consumed from employers is 100.55 millions. Consequently, the per consumer unit calorie intake, and hence per capita intake is underestimated.

households have significantly higher calorie consumption on the average. One possible explanation could be that the households in the higher expenditure classes serve out meals to household help (e.g. servants, etc. who do not stay as the member of the household). The higher figure of average calorie intake is transferred to the lower expenditure class households (Minhas (1995 or 1996), JDE). As would be expected, the inequalities are much lower in calorie intake than in PCTE.

Table 4: Average Calorie Intake in the Rural and Urban Sectors by Deciles

				(per capita/day)
Deciles	**Rural Average**	**Rural Average**	**Urban Average**	**Urban Average**
	PCTE	**Cal Intake**	**PCTE**	**Cal Intake**
1	117.14	1833	155.96	1917
2	154.92	2029	214.42	2128
3	179.81	2165	254.07	2269
4	202.72	2245	293.90	2356
5	225.80	2324	337.94	2459
6	251.64	2460	387.52	2499
7	283.48	2549	453.09	2674
8	326.10	2680	545.04	2796
9	400.28	2944	693.87	2932
10	702.92	3500	1264.12	3393
All	**284.47**	**2473**	**459.97**	**2543**

The striking feature of the table is that the urban sector household that will, on average, be calorie deficient, lie in second decile as

compared to fifth in the rural sector (see Table 1 above). In other words, the urban households have been relatively better off. This could be due to the fact that urban poverty has declined significantly between 1987-88 and 1993-94 after being stagnant during 1980s. Many researchers (see for example Srinivasan (1999)) argue that the initial impact of the reform has been on the non-farm sector. Consequently, the urban incomes have risen faster and enabling the urban households to increase their consumption.

Table 5 has the average per person daily intake for states in the two sectors. There is a large variation across states as expected in both the sectors. The per capita intake is significantly higher in Rajasthan (3268), Delhi (3037) and Haryana (2939) in the rural sector. This is slightly different than the NSSO findings where Jammu & Kashmir has the highest per person intake. Similarly in the urban sector Rajasthan (3177 Kcal) continues to be at the top followed by Himachal Pradesh (3008) and Madhya Pradesh (2825) among the major states. Some of the smaller states too have very high level of per capita calorie intake.

In general, states in the northern India recorded higher average intake compared to the rest of the country. The possible explanation of the high calorie intake bias in the northern states could be the composition of the food basket in these states. Most of the households consume more of wheat products compared to states in southern and eastern states. The northern states also show higher level of consumption of milk along with oil and butter. Thus along with cereals, higher average consumption of these items could have increased the average intakes (See Appendix).

Table 5: Average Calorie Intake: States

(Kcal per day)

States	Rural	Urban
Andhra Pradesh	2267	2239
Arunachal Pradesh	2235	2591
Assam	2037	2217
Bihar	2349	2578
Goa	2204	2367
Gujarat	2586	2594
Haryana	2939	2560
Himachal Pradesh	2778	3008
Jammu and Kashmir	2649	2516
Karnataka	2571	2491
Kerala	2133	2141
Madhya Pradesh	2559	2825
Maharashtra	2559	2653
Manipur	2173	2082
Meghalaya	2112	2338
Mizoram	2085	2184
Nagaland	2222	2213
Orissa	2242	2450
Punjab	2580	2184
Rajasthan	3268	3177
Sikkim	2019	2294
Tamil Nadu	2186	2211

States	Rural	(Kcal per day) Urban
Tripura	1958	2122
Uttar Pradesh	2701	2717
West Bengal	2337	2346
A and N Islands	2624	2954
Chandigarh	2373	2695
Dadra and Nagar Haveli	1948	2324
Daman and Diu	2827	2504
Delhi	3037	2802
Lakshadweep	2877	2803
Pondicherry	2190	2228
All India	2473	2543

Household Calorie Deficiency: All India

In the last two sections, we have discussed the average calorie requirement and average calorie consumption among the households at all India level in rural and urban sectors as well at the level of states. In this section, we estimate the proportion of households that do not meet the normative calorie consumption. In effect, this gives us the calorie poverty or calorie deficiency. Table 6 has the proportion of households at all India level and also by rural and urban sector.

As per our calculations, close to 43 percent of Indian households fail to consume the prescribed level of food energy. First, this number is far below the proportion of households (75 percent) that other researchers have reported as calorie deficient. [19] There are three

possible explanations for that. One, we have used the average calorie requirement as discussed in section two. This is less than the calorie requirement prescribed by the Task Force (GOI, 1979). Second, we have included more number of commodities than used by the NSSO for calculating household calorie consumption. Last, we calculate the calorie deficiency using household level data and not on the basis of any aggregates.

Table 6: Proportion of Households with Calorie Deficiency: All India (%)

Sector	Calorie Deficiency	Poverty - HCR
Rural	48.7	37.27
Urban	25.4	32.36
Total	**42.7**	**35.97**

Note: HCR is head count ratio index of poverty.
Source: GOI (1997a)

The sectoral distribution of the deficiency shows that there are 48.7 percent of the households in the rural sector report consuming less food energy than the norm. In the urban sector, the proportion is

[19] See, for example, Suryanarayana (2000, 2001)

25.4 percent. In terms of persons, in rural sector, the proportion is far above the level of poverty (HCR), calculated using conventional method.[20] In the urban sector, it is lower. One possible explanation is related to the use of price deflators in HCR calculations. Price levels are calculated on an aggregate basis, whereas our methodology does not require the use of price indices.

Another explanation of this could be the consumption of non-traded items. (Non-traded here implies food items that are neither bought, nor self-produced) In the rural sectors, many members of the household consume food items that are/can not be recorded in the household consumption expenditure/quantity. Individual consumption of food from fields, while being processed, at other informal occasions, are some examples.

In order to check this point further, we calculated the proportion of calorie deficient household by the size class of town. One would expect that larger the city size, less would be the proportion of the non-traded food items in the consumption basket of the households. Consequently, proportion of the calorie deficient households would be lower, and in the larger towns they would be fewer. This clearly supported by table 7.[21]

[20] These numbers are much closer to the HCR reported in Dubey and Gangopadhaya (1998) using official poverty line based on the calorific norm of 2435 Kcal for the rural sector and 2095 Kcal for the urban sector. For details refer to Dubey and Gangopadhaya (1998)

[21] The HCR in the smaller cities is high compared to largest city size. This could be due to use of higher urban poverty line in the smaller cities. See Dubey et al (2001) for details on this point.

Table 7: Proportion of Calorie Deficient Households in Urban Sector by City Size

City Size	Calorie Deficient	HCR
Rural	48.7	37.3
Cities up 4,00,000	26.7	38.5
4 to less than 10 lakh	25.7	28.4
10 lakh plus	21.5	19.2
Urban Total	25.4	32.3

Note: HCR is calculated using poverty line used in the urban poverty calculations in GOI (1997a)

Household Calorie Deficiency among: States

The proportion of households that do not meet the calorific norm at the aggregate level throws up some interesting issues of non-tradables in the consumption basket of the rural households. We have also noted that as the proportion of non-traded food items declines, the proportion of calorie deficient households becomes closer to the level of poverty.

The state level proportions reported in table 8 show a lot of variation. This result is indeed surprising. For example, among the larger states, Punjab has very low poverty incidence if measured in terms of conventional measures, like HCR. But measured by calorie deficiency norm, proportion is very high, 39.7 percent. On other

hand, state like Bihar fares reasonably with only 49 percent of the households being calorie deficient. Among the larger states that have lowest incidence of calorie deficiency, Rajasthan could be ranked 1 with Maharashtra and Uttar Pradesh at 2nd and 3rd place respectively. The highest incidence of deficiency is reported in Assam.

Table 8: Proportion of Households with Calorie Deficiency

States	Rural	Urban	Total
Andhra Pradesh	58.3	38.9	53.4
Arunachal Pradesh	60.6	25.1	55.5
Assam	76.7	35.9	71.9
Bihar	53.0	23.5	49.3
Goa	53.4	29.5	43.0
Gujarat	39.6	18.6	32.3
Haryana	33.0	35.0	33.7
Himachal Pradesh	31.9	13.5	29.8
Jammu and Kashmir	23.5	16.3	20.5
Karnataka	41.9	23.8	36.4
Kerala	53.9	42.0	50.9
Madhya Pradesh	50.2	16.2	42.0
Maharashtra	41.4	15.2	31.2
Manipur	58.2	49.8	55.8
Meghalaya	75.2	24.2	67.5
Mizoram	80.3	51.6	70.7

States	Rural	Urban	Total
Nagaland	59.9	32.2	52.2
Orissa	57.0	27.1	52.9
Punjab	39.9	39.2	39.7
Rajasthan	19.8	14.6	18.5
Sikkim	73.2	28.5	69.1
Tamil Nadu	58.9	38.0	51.3
Tripura	67.4	47.6	64.7
Uttar Pradesh	36.8	19.5	33.3
West Bengal	51.9	28.0	45.4
A and N Islands	32.6	18.3	28.1
Chandigarh	50.3	26.4	29.4
Dadra & Nagar Haveli	62.7	31.1	60.1
Daman and Diu	39.8	14.7	29.6
Delhi	10.2	15.9	15.2
Lakshadweep	10.8	18.1	14.4
Pondicherry	60.8	40.1	48.0
All India	**48.7**	**25.4**	**42.7**

The sectoral division by rural and urban sector suggests that rural areas have very high proportions of calorie deficient households. Among the larger states, northern and western states, Rajasthan, Haryana, Punjab, Uttar Pradesh, Gujarat, Maharashtra, Himachal Pradesh and Delhi, have lower incidence. The exceptional case is Madhya Pradesh and Bihar.

We look at two generalizations. First, the households where the consumption out of homegrown stock or sources of food intake is dominated by the non-tradable items would show higher proportion of households as deficient. For this to be true, most of the states having larger tribal population shares should have high incidence of calorie deficiency in rural sector. The smaller states clearly show this trend. This also explains the higher incidence of calorie deficiency in the three bigger states, Bihar, Madhya Pradesh and Orissa. These states have a sizeable tribal population.

In order to check this contention we report the incidence of calorie deficiency by the Social Groups, Scheduled Castes, Scheduled Tribes and General category households in Table 9. As far as the deficiency in calorie intake is concerned, this appears to explain the high incidence in the predominantly tribal states and states with sizeable tribal population. Most of the smaller states, for example the north-eastern states, do have high proportion of calorie deficient households.

Note that scheduled castes would tend to have greater traded items in their consumption basket than scheduled tribes. Conventional HCR estimates show scheduled castes to have a higher poverty incidence than scheduled tribes. However, lower reliance on traded commodity consumption leads to lower reporting and as a result shows scheduled tribes to be more calorie deficient than the scheduled castes.

Table 9: Calorie Deficiency and Poverty Incidence by Social Group in the Rural Sector

Social Group	Calorie Deficient	HCR
Scheduled Tribe	61.09	40.09
Scheduled Caste	50.75	48.20
Others	44.31	30.90
All	**48.7**	**35.85**

The households food habits will also have a bearing on calorie deficiency. For example, if the households consumption basket of cereals is dominated by wheat and wheat products, one would find lower incidence of calorie deficiency than the households who consume more of rice and rice products. The hypothesis is based on the assumption that rice being voluminous, the households consuming the rice will eat lesser quantity in general than the households whose food basket is dominated by wheat and wheat products. This appears to be the case as most of the states in the north and northwest have relatively lesser proportion of calorie deficient households. Table 10 also supports this view.

In the urban sector, the proportion of the calorie deficient households is lower in all the states and union territories compared to rural sector. Among the bigger states, Kerala has highest incidence with Punjab and Andhra Pradesh with second and third highest incidence respectively. This observation is quite perplexing in the sense that among these

three states, the proportion of the expenditure on food items is lowest among all the bigger states.[22] It appears that many of the households in these states spent less on food consumption by choice. It is to be noted that excepting Andhra Pradesh, other two states have lowest urban poverty incidence among all the bigger states. As a matter of fact, there is no correlation between incidence of poverty by the conventional measure (HCR) and calorie deficiency in the urban sector.[23] Given that in most of the states urban households spent about 50% on non-food items, it is quite conceivable that the inverse correlation is more of a reflection of choice than anything else.

Table 10: Average Household Consumption of Selected Food Items in Rural Areas

State	Milk	Rice	Atta	Wheat	Butter	Owner Cultivators as % of Total Workers*
Andhra	3.19	11.28	0.13	0.03	0.09338	33.5
Assam	1.35	9.56	0.42	0.03	0.21010	56.6
Bihar	2.85	13.17	9.34	0.54	0.42021	47.8
Gujarat	5.56	1.03	2.03	0.24	0.82267	46.1
Haryana	15.66	0.20	2.97	0.51	1.12055	49.6
Karnataka	3.35	3.73	0.42	0.02	1.80783	43.8
Kerala	3.13	5.16	0.22	0.09	0.10272	15.1

[22] In Kerala, on an average households spent about 49% of their total expenditure on food items. These proportions for Punjab and Andhara Pradesh are 50% and 52% respectively.

[23] The correlation is -0.13. In the rural sector, this positive at 0.41 percent.

State	Milk	Rice	Atta	Wheat	Butter	Owner Cultivators as % of Total Workers*
MP	3.36	7.51	8.08	0.34	0.89644	61.1
Maharashtra	2.93	2.96	2.31	0.07	0.40853	46.3
Orissa	1.04	11.39	0.30	0.03	0.03128	49.4
Punjab	16.13	0.36	5.07	0.13	0.44355	42.8
Rajasthan	11.25	0.19	7.23	0.38	0.23345	71.0
Tamil Nadu	2.67	8.07	0.18	0.02	0.55654	32.8
UP	6.20	9.87	21.55	0.51	0.65552	63.0
WB	1.92	13.88	1.20	0.05	0.46223	37.9

Note: Milk is in litre, Rice, Atta and Wheat are in kilogram. Butter is in gram. The average has been calculated using the sample size only. Low sample sizes do not allow us to report the same for smaller states. *Source: Rural Development Statistics, NIRD, 1999.

In other words, we find some evidence that both food habits and occupational structure play a strong role in the estimates of poverty and calorie deficiency. These, to our knowledge, have not been the subject of other studies. Clearly there is a need for future studies to further investigate these issues.

Chapter 4: The Public Distribution System – Impact on Poverty & Calorie Deficiency

Introduction

This chapter attempts at estimating the impact of PDS on poverty and calorie deficiency. First the chapter undertakes an analysis of the households that have access to the PDS, what they purchase, and what are their rupee savings due to their access to the PDS. Next it estimates the impact on poverty levels (as is conventionally defined) due to the existence of the PDS. An understanding of the expenditure component facilitates the later sections that discuss calorie deficiency and impact of the PDS. As in the previous chapters the data are from the NSS 50th round conducted in 1993-94.

Since expenditures on food items is most important for poverty calculation,[24] we first discuss the information gathered by the NSSO and the resulting, possible, estimation biases of the household expenditure.

The information collected by the NSS on food items has two parts, volume/quantity purchased (q), price (p) and the total value (p.q). The derivation of total purchases in value terms also distinguishes between quantities purchased from the market and also from the PDS/ration shop.[25] In order to arrive at the total amount spent on purchasing these items, no attempt is made by other studies to adjust

[24] Rrecall that it is expenditure on food items that is normatively determined in the process of deriving the poverty norm.

[25] This scheme of tabulation was followed in 50th round of survey. In 43rd round, however, no distinction was made for the purchases and total amount spent was recorded.

the purchases from ration shops/fair price shops due to difference in prices of commodities bought from these two sources. As a result the value of commodities purchased is higher than can be gauged by merely looking at total expenditures. How much higher it is depends upon the impact of the PDS. We adjust the total expenditures of households in a manner that removes this bias. (The methodological details are discussed in later sections.) This allows us to calculate the number and proportion of households that achieve their basic minimum needs due to their access to the PDS.

We then go on to estimate a similar issue that pertains to calorie deficiency. The previous chapter calculated calorie sufficiency/ deficiency at the household level. Since prices do not play a role in those calculations they are not biased due to their access to the PDS. However, we are more interested in answering the question, *"How many calorie deficient households achieve calorie sufficiency due to their access to the PDS?"* As is also mentioned elsewhere, (and in detail in later sections) we make the assumption that a household that spends an amount x on a particular PDS item, would continue to spend the same amount on the same commodity if it did not have access to the PDS. As a result had the PDS not existed the households' would have had to purchase lower quantities of food items. This in turn would have a negative impact on calorie consumption. How much of a impact, is an empirical question that we investigate in later sections of this chapter.

In the next section, we first look at the magnitude of under-estimation of the consumer expenditure data. This is followed by a correction procedure for under-estimation in Section 3. The same section also

analyses the expenditure distribution. Section 4, recalculates poverty incidence using the adjusted consumer expenditure data. Section 5 summarizes the chapter.

Access to PDS

Governments' world over subsidize various goods and services for a variety of reasons. In India, too, there are several kinds of subsidies that are given by both central as well as state governments. Considering the severe malnutrition that a large proportion of Indian households are said to suffer, the central government introduced the system of supplying subsidized food and non-food items for consumption of the economically weaker sections of the society. These items are made available to them through public distribution system or ration shops. Several state governments also subsidize food items and/or spend directly on providing nutrition support to weaker sections of the society. This chapter focuses on the food expenditure/intake from PDS and not from other government subsidy mechanisms.

Initially, the PDS was started as an instrument of price stabilization in 1960s in the wake of food grain shortages. It was during the 1980s that the PDS was being used as welfare instrument to supply essential items (both food and non-food) at nearly half the market price. In the wake of reforms, the PDS was revamped. As a result, its access increased significantly.[26] For example NSSO large sample figures reveal that in 1987-88, 62.85 percent of the rural households (HHDs) reported access to PDS, and this increased to 77.83 percent in 1993-94.

[26] Here the term *access* is defined as purchasing at least one commodity from the PDS in the last thirty days before the household answered the questionnaire.

Table 1: Proportion of Households Reporting Purchases from PDS Shop in 1993-94: State-wise (%)

State	Rural	Urban	Total
Andhra Pradesh	82.66	69.47	79.33
Arunachal Pradesh	90.42	88.02	90.07
Assam	86.35	57.91	82.98
Bihar	74.26	57.50	72.14
Goa	93.82	71.54	84.12
Gujarat	85.97	70.52	80.55
Haryana	88.77	71.65	83.54
Himachal Pradesh	88.04	61.00	84.94
Jammu and Kashmir	77.75	71.12	75.00
Karnataka	77.64	69.21	75.07
Kerala	92.69	84.74	90.70
Madhya Pradesh	67.19	65.68	66.83
Maharashtra	70.49	65.92	68.70
Manipur	35.73	44.52	38.22
Meghalaya	81.85	71.19	80.24
Mizoram	91.59	96.78	93.33
Nagaland	42.67	34.21	40.31
Orissa	79.80	63.53	77.57
Punjab	70.60	60.94	67.49

State	Rural	Urban	Total
Rajasthan	58.08	55.33	57.40
Sikkim	60.33	53.32	59.70
Tamil Nadu	86.60	71.95	81.31
Tripura	88.44	75.56	86.68
Uttar Pradesh	61.61	66.67	62.64
West Bengal	90.42	71.49	85.26
A and N Islands	81.93	71.98	78.79
Chandigarh	57.07	49.53	50.47
Dadra and Nagar Haveli	71.27	61.88	70.51
Daman and Diu	70.63	81.46	75.05
Delhi	55.48	76.04	73.62
Lakshadweep	96.27	97.31	96.79
Pondicherry	96.81	83.53	88.58
All India	**77.23**	**68.97**	**75.11**

Table 1 also shows the variation in PDS access across states in 1993-94 as well as for India as a whole. Though the southern and eastern states show a higher penetration (considered here to imply proportion of households that have access), than the northern states, even in the northern states greater than three fifths of the households have access to the PDS. In sum, the PDS appears to have been a significant success where its coverage is concerned - more than three fourths of the households all over India had access to it.

What kind of food commodities are purchased by the households? This is presented for India as a whole in Table 2. Table 2 shows the number of food items that are supplied through the PDS and the proportion of households that have had access to these commodities in 1993-94. As would be expected, sugar, rice, wheat and *atta* (wheat flour) are the most important commodities. The figures for sugar (greater than 62 per cent) also indicate that a large number of non-poor households also buy from PDS at subsidized rates.

Table 2: Proportion of Households Reporting Purchases of Specific Food Items from the PDS/Ration Shop (%)

Food Item	Rural	Urban	All
Sugar	62.02	63.13	62.30
Rice	28.54	26.42	28.00
Wheat	9.34	16.82	11.26
Atta	8.51	14.72	10.11
Masur Dal	1.90	2.06	1.94
Mustard Oil	1.56	1.66	1.59
Arhar(Tur)	1.24	1.64	1.35
Vanaspati	0.44	1.07	0.60
Urad Dal	0.41	0.95	0.55
Moong Dal	0.35	1.03	0.52
Gram (Split)	0.39	0.86	0.51
Groundnut Oil	0.44	0.68	0.50
Palm Oil	0.38	0.71	0.46
Coconut Oil	0.37	0.63	0.44
Gingelly Oil	0.16	0.22	0.18

Food Item	Rural	Urban	All
Khesari	0.17	0.07	0.15
Refined Oil	0.08	0.22	0.11
Jowar	0.11	0.07	0.10
Linseed Oil	0.09	0.05	0.08
Maize	0.06	0.01	0.04
Bajra	0.02	0.02	0.02
Rapeseed Oil	0.01	0.04	0.02

Most of the households that reported buying from PDS buy only four or five items with sugar being the most accessed commodity, followed by rice and wheat. This also suggests that the higher access to PDS that emerges from table 1 could be due to purchase of sugar. The reason could be that there is not much difference in quality of sugar supplied through PDS as compared to that sold in the open market; at the same time there is significant difference in the prices of sugar from the two sources.

What is also significant is that edible oils or pulses are purchased from the PDS by an insignificant number of households. This could either be due to households not obtaining the required commodity when desired (a supply failure), or their unwillingness to purchase these commodities from the PDS. This is an issue that should be researched in greater detail in later studies.

Something similar is also reflected in the relatively low access to wheat, rice or flour, or any other cereal. Less than a third of the total households in India obtain any of these from the PDS. Since total access is in the range of 75 per cent, more than 40

per cent of the households in India, that have purchased some item from the PDS have not purchased any basic cereal from the PDS. That is, greater than half the PDS households do not report the purchase of *any* cereals from the PDS.

This would be fine if the few households that are accessing the PDS for their cereal requirements, are the poor or calorie deficient. The next two sections discuss that issue.

Effect of PDS Purchases on Consumer Expenditure

As discussed in previous sections and described in detail in chapter 2, the conventional poverty measures fail to adjust the housebolds' expenditures for their subsidized purchases from the PDS. As a result household expenditures are underestimated. To correct this, we adjust the household expenditure through the quantity of food items purchased from the PDS. Using the methodology outlined in chapter 2, the expenditure on cereals, pulses, edible oil and sugar was adjusted and the PCTE of the households was re-calculated. The comparison of pre- and post-revised average PCTE is reported in table 3 for rural and urban sectors and also at all India level. This is followed by a comparison of the number of households that cross the poverty line due to this improved method of calculating household expenditures.

Table 3: Average Per Capita Total Expenditures (PCTE): Aggregate

States	Average Unadjusted PCTE: **All**	Average Adjusted PCTE: **All**	Difference
	(1)	(2)	(3)
Rural	284.47	290.53	6.06
Urban	459.97	466.65	6.68
All India	**326.28**	**332.49**	**6.21**

Note: PCTE is per capita *monthly* total expenditure in *93-94 Rupees*.

The figures in table 3 are for all the households - whether they had access to the PDS, or not. There is negligible effect of PDS on the average expenditures in both rural and urban areas. However, the fact that the above figures also include expenditures from households that do not purchase from PDS may be underplaying the impact of the PDS for those households that do have access to it. Consequently we now discuss *only* those households that have access to the PDS. Table 4 presents figures for those.

Table 4: Average Per Capita Total Expenditures: PDS Access Households

States	Average Unadjusted PCTE **All**	Average Adjusted PCTE: **All**	Difference
	(1)	(2)	(3)
Rural	286.85	294.52	7.67
Urban	449.33	458.05	8.72
All India	**324.62**	**332.54**	**7.92**

Note: PCTE is per capita *monthly* total expenditure in *93-94 Rupees*.

The differences between adjusted and unadjusted PCTEs are greater as expected for the PDS households in nominal terms. However a difference of eight rupees on a total expenditure of Rs. 324 is not a very high level of benefit (2.4%). How much of a difference is PDS is making to the poor and poverty levels is discussed more directly in the next section.

Another interesting insight emerges from comparing columns 1 of tables 3 and 4. The average expenditures for the rural areas for the PDS households are somewhat *higher* than the average expenditure of a rural household. In other words, relatively higher expenditure households are more likely to access the PDS in rural areas. In the case of urban areas however this is not so. Though urban households tend to have significantly higher expenditures on the average, these are lower for PDS households than the aggregate. In other words, the PDS is biased towards lower expenditure households in urban areas - as it should be.

Table 5 reports the change in the average monthly per capita expenditure in fifteen major states due to access to PDS - for all households whether they had access to PDS or not.[27] Table 6 does the same for that set of households who had access to PDS. The highest increase in the PCTE is in Tamil Nadu by Rs.10.63 in the rural sector and Rs.10.83 in the urban sector. Kerala has the maximum proportion of households having access to PDS, over 90 percent. But in terms incidence of benefits, it helped the households by over six rupees per capita in both the sectors.

Table 5: Comparison of Average PCTEs: Major States

	Rural			Urban		
States	Average Unadjusted PCTE	Average Adjusted PCTE	Difference	Average Unadjusted PCTE	Average Adjusted PCTE	Difference
Andhra Pradesh	288.35	294.43	6.08	408.94	414.99	6.05
Assam	258.09	265.96	7.87	458.57	465.5	6.93
Bihar	218.56	224.06	5.50	352.94	358.15	5.21
Gujarat	302.51	311.52	9.01	454.18	463.06	8.88
Haryana	383.52	389.85	6.33	473.92	479.66	5.74
Karnataka	269.06	275.60	6.54	424.01	431.36	7.35
Kerala	390.38	396.89	6.51	493.82	500.13	6.31
M. P.	252.08	257.3	5.22	408.64	414.51	5.87
Maharashtra	272.03	277.13	5.10	530.29	536.79	6.50
Orissa	219.83	226.49	6.66	402.56	409.15	6.59
Punjab	434.28	439.26	4.98	511.20	515.88	4.68
Rajasthan	322.50	326.73	4.23	424.67	429.37	4.70
Tamil Nadu	293.12	303.74	10.62	438.12	448.95	10.83
U.P.	273.83	277.86	4.03	392.51	397.46	4.95
W.B.	278.78	286.11	7.33	474.19	480.71	6.52

[27] This discussion is restricted to fifteen major states only as we had state level information on food subsidy and nutritional support for these states only.

Table 6: Average PCTEs of Households with Access to PDS

	Rural			Urban		
States	Average Unadjusted PCTE	Average Adjusted PCTE	Difference	Average Unadjusted PCTE	Average Adjusted PCTE	Difference
Andhra Pradesh	286.44	293.58	7.14	401.74	409.77	8.03
Assam	258.74	267.65	8.91	423.27	433.43	10.16
Bihar	222.43	229.71	7.28	334.85	342.83	7.98
Gujrat	301.40	311.55	10.15	425.22	436.43	11.21
Haryana	380.27	387.17	6.90	439.3	446.54	7.24
Karnataka	270.32	278.55	8.23	420.6	430.39	9.79
Kerala	383.36	390.23	6.87	474.97	481.85	6.88
M. P.	252.61	260.05	7.44	380.45	388.50	8.05
Maharashtra	280.08	287.06	6.98	522.67	531.50	8.83
Orissa	225.02	233.07	8.05	387.48	396.44	8.96
Punjab	433.87	440.69	6.82	471.23	478.03	6.80
Rajasthan	316.78	323.93	7.15	402.31	410.04	7.73
Tamil Nadu	293.65	305.43	11.78	426.06	439.19	13.13

	Rural			Urban		
States	Average Unadjusted PCTE	Average Adjusted PCTE	Difference	Average Unadjusted PCTE	Average Adjusted PCTE	Difference
U.P.	276.74	283.03	6.29	391.19	397.83	6.64
W.B.	278.74	286.67	7.93	454.32	462.29	7.97

Table 6 reports the average PCTEs of households that had access to PDS in these states in two sectors before and after adjusting the PCTEs. The table 6 suggests that the states that could transfer maximum amount are Tamil Nadu, Assam and Gujarat in both rural and urban sectors. Other noticeable fact is that in almost all the states, there is urban bias in PDS access.

Moreover, the popular perception that the PDS is better in the southern states is not borne out by this data. Though penetration might be better in the south, but the households that have access to PDS are able to benefit more in many northern states than southern ones. The better performing states are spread all over the country; they are in the south (Tamil Nadu), West (Gujarat), East (Assam). MP, Bihar and Rajasthan performed better than Karnataka, Andhra Pradesh and Maharashtra in this respect.

In sum, despite increasing access to PDS in the rural sector, the benefit accruing to the poor is not substantial in rupee terms. This is so despite our assumption that entire central and state food subsidy is transferred to the households. Given the widely believed leakage in the system of providing food items at the cheaper rates, the actual benefit would be much lower. Many researchers have pointed out

that the system of providing the food subsidy through PDS has become more inefficient over time and suggest a complete overhaul of the PDS program. We investigate its effect on poverty incidence below.

Effect of PDS Purchases on Poverty Incidence

This section discusses the effect of PDS purchases on poverty incidence. The results are reported in Table 7. The results are reported with a rural-urban break-up, state-wise, as well as all-India level. Columns 1 and 4 give the poverty incidence where no adjustment is done for PDS in the rural and urban areas respectively. The poverty line as calculated by the Planning Commission is used for these calculations. Using the same poverty line, but making our adjustments for access to PDS, the HCR (head count ratio) for the poor are calculated - these are presented in columns 2 and 5. Columns 3 and 6 present *the percentage of all households that are not poor because of their access to the PDS.*

Table 7: Comparison of Poverty Incidence in 1993-94

	Rural			Urban		
States	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS
	(1)	*(2)*	*(3) = 1 - 2*	*(4)*	*(5)*	*(6) = 4 - 5*
Andhra Pradesh	15.96	14.16	1.80	38.80	37.06	1.74
Arunachal Pradesh	27.06	25.32	1.74	21.30	21.04	0.27

States	Rural			Urban		
	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS
Assam	45.21	41.43	3.78	7.93	5.33	2.59
Bihar	57.85	55.27	2.58	34.86	33.09	1.77
Goa	6.50	4.98	1.52	14.38	13.50	0.89
Gujarat	22.23	19.75	2.48	28.28	26.44	1.84
Haryana	27.99	25.77	2.22	16.47	15.77	0.70
Himachal Pradesh	30.33	27.66	2.67	9.26	8.27	0.99
Jammu & Kashmir	10.97	8.84	2.13	10.84	9.90	0.94
Karnataka	30.04	26.67	3.37	39.72	38.29	1.43
Kerala	25.38	24.05	1.33	24.31	22.85	1.47
Madhya Pradesh	40.74	38.53	2.21	48.01	46.95	1.06
Maharashtra	38.14	36.41	1.73	34.93	33.74	1.20
Manipur	8.68	7.96	0.72	42.52	41.37	1.15
Meghalaya	13.50	11.88	1.62	6.69	6.11	0.58
Mizoram	3.23	3.02	0.21	1.05	1.05	0.00
Nagaland	0.38	0.38	0.00	8.44	7.54	0.90
Orissa	49.78	46.55	3.23	40.64	39.84	0.80
Punjab	11.48	10.68	0.80	10.89	9.88	1.00
Rajasthan	26.38	24.89	1.49	31.03	29.56	1.46
Sikkim	20.19	18.05	2.14	13.53	13.53	0.00
Tamil Nadu	32.97	28.76	4.21	39.96	37.21	2.75
Tripura	17.05	16.03	1.02	16.79	16.22	0.57
Uttar Pradesh	42.31	40.92	1.39	34.83	33.57	1.26

States	Rural			Urban		
	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS	HCR Un adjusted	HCR Adjusted	Non-poor due to PDS
West Bengal	41.18	38.09	3.09	22.95	21.59	1.36
A and N Islands	1.69	1.37	0.32	3.81	3.11	0.70
Chandigarh	2.22	2.22	0.00	8.43	8.15	0.29
D and N Haveli	56.47	54.91	1.56	34.46	34.46	0.00
Daman and Diu	7.00	5.97	1.03	13.71	11.23	2.47
Delhi				12.24	11.98	0.27
Lakshadweep				15.93	15.62	0.31
Pondicherry	20.84	20.84	0.00	33.64	30.12	3.52
All India	**36.31**	**33.90**	**2.41**	**32.14**	**30.58**	**1.56**
All India Rural+Urban	**35.2**	**33.0**	**2.2**			

The poverty incidence for rural and urban sectors before making adjustment in expenditure distribution and after adjusting it is reported in table 7 for all India and all the states and union territories.

The effect of PDS purchases is that the poverty incidence declined only marginally from 35.3 per cent to 33.1 per cent. The reduction is the rural areas is more (2.41 percentage points) than the urban areas (1.56 percentage points). However, in terms of absolute numbers, 18.66 million people have crossed the poverty line due to access to PDS, majority of them in the rural sector, 15.53 million.

As expected, there is a large variation at the state level. Among the larger states, maximum reduction is recorded in Tamil Nadu in the rural sector, followed by Assam and Karnataka. In the urban sector too, Tamil Nadu is at the top. In terms of absolute numbers, however, Bihar has done better in the rural sector where close to 1.6 million persons have moved out of poverty. Second place is occupied by West Bengal, 1.54 million. Tamil Nadu is placed third with 1.52 million people. Other states that reduced rural poverty significantly are Uttar Pradesh (1.5 million), Madhya Pradesh (1.06 Million), Kerala (0.99 million) and Orissa (0.9 million).[28]

It should however be noted that these numbers are dependent on our assumption that *all* of the PDS expenditures are flowing to the households. If this were not so, then even less than 2.2 per cent of Indian households would not be moving above the poverty line because of the PDS. The assumption of *no leakage* was necessitated because of the reliance on expenditures. The next two sections conduct a similar exercise on calorie deficiency.

PDS and Household Calorie Consumption

In the past, utility and effectiveness of PDS has generally been evaluated in monetary terms. Most of the researchers, for example Radhakrishna (1991) and Srivastava and Sen (1997), are of the view that PDS is an inefficient way of subsidizing access of food to the poor. For example Suryanarayana (1995, 2000), have criticized

[28] It is to be noted that all the states that have recorded reduction in absolute number of poor are highly populated states. The distribution of population appears to be such that currently the poverty line passes through the fat portion of the distribution. Even slight shift in the expenditure distribution towards right will result in a large decline in absolute terms.

the evaluation of the PDS in terms of monetary benefit to the household. He contends that the value of PDS is more as an instrument of food and nutrition security even though the restructuring of the PDS was done on the basis of poverty criteria. In this section we have attempted an evaluation of the PDS in terms of nutritional support it provides to the households.

In the early part of 1990s, around 10 million tonnes of wheat and 11-12 million tonnes of rice were allocated to the state governments. Out of the allocated quantity the off take has been low. For example, in 1993-94 the allocation was 9.57 million ton of wheat and 12.4 million tonnes of rice whereas the off-take was 6.15 million tonnes of wheat (64.3%) and 9.07 million tonnes of rice (73.1%). Srivastava and Sen (1997) have reported that the off-take has been declining over the years.[29] They cite the narrowing down of the difference in market price and PDS price and a better availability of food grains in the free market as the primary reason for this.

For our purposes however, the relevant issue is not whether there is a decline, but by how much is the PDS helps the poor in improving their food security and nutrition requirements. To answer this question, we carry out two sets of calculations. First, we calculate the average number of calories that a household has consumed from the PDS purchases and average quantity bought from the PDS. Second, what is the contribution of PDS in terms nutrition requirement of the household.

[29] In 1995-96, the off take has declined to 46.8 percent for the wheat and 64.8 percent for rice.

Table 8 reports the average calorie intake of the households that had made purchases from the PDS in column 2. In the next column, the average is calculated after adjusting the quantity bought from the PDS. This was done in the following manner.

We have the quantity and price of the commodities bought from PDS and also from the market. We calculated the median price of the commodities supplied through the PDS and bought from the market. Assuming that without access to PDS, household's budget allocation on a particular food item would have been the same, we recalculated the quantity that the household would have bought, had there been no PDS. The "adjusted" quantity was then used to re-calculate the calorie consumption of the same household, this provides us the " Daily Average Calorie Consumption of the Households if there had been no PDS."

At the all India level, a household, on an average, would have consumed about 331 calories less daily if (s)he had no access to PDS. The contribution of PDS by sector shows a clear-cut urban bias where urban households get about 100 calorie more than their rural counterparts.

Table 8: Change in the Average Calorie Consumption due to PDS

Sector	Daily Average Calorie* Consumption of the Households with access to PDS	Daily Average Calorie Consumption of the Households if there had been no PDS	Difference	%age
Rural	14687	14379	308	2.10
Urban	14010	13601	409	2.92
All	14527	14196	331	2.28

*Average has been calculated only for those households that report purchases from PDS.

The same exercise is reported for the states in Table 9. In both rural and urban sectors, some of the smaller states appear to benefit more from the PDS supplies. The possible explanation could be that access to most of the food grains to the households in these states is through PDS only. For example, in Arunachal Pradesh over 90 percent of the households had access to PDS.

Among the major states, Kerala has the highest number of calories that a household gets daily through PDS. The sates that reported higher monetary transfer to the households through PDS, Gujarat and Tamil Nadu have far lower help in terms of nutrition. This when contrasted with the monetary PDS benefit accruing to households in Kerala suggest that the PDS be better focussed there. Once again, the urban bias is evident from this table.

Table 9: Change in the Average Calorie Consumption due to PDS

States	Rural			Urban		
	Daily Average Calorie* Consumption of the Houscholds with access to PDS	Daily Average Calorie Consumption of the Households if there had been no PDS	Difference	Dailye Average Calorie* Consumption of the Households with access to PDS	Average Average Calorie Consumption of the Households If there had been no PDS	Difference
Andhra Pradesh	11364	10984	380	11568	11165	403
Arunachal Pradesh	12906	11976	930	12294	10677	1617
Assam	11811	11667	144	11795	11557	238
Bihar	14473	14383	90	16151	16007	144
Goa	10978	9929	1049	11047	10302	745
Gujarat	15207	14790	417	14262	13949	313
Haryana	18868	18710	158	13540	13456	84
Himachal Pradesh	16821	15899	922	14568	14033	535
Jammu & Kashmir	17387	17122	265	14288	13260	1028
Karnataka	15783	15511	272	14104	13702	402
Kerala	10948	10162	786	11259	10436	823
Madhya Pradesh	15768	15596	172	17001	16758	243
Maha-rashtra	14253	13978	275	14106	13825	281
Manipur	13361	13275	86	12718	12685	33

States	Rural			Urban		
	Daily Average Calorie* Consumption of the Households with access to PDS	Daily Average Calorie Consumption of the Households if there had been no PDS	Difference	Dailye Average Calorie* Consumption of the Households with access to PDS	Average Average Caloric Consumption of the Households if there had been no PDS	Difference
Meghalaya	11261	10861	400	11929	11439	490
Mizoram	11499	10554	945	11240	10103	1137
Nagaland	13118	13008	110	13124	12975	149
Orissa	12807	12731	76	13294	13033	261
Punjab	15351	15267	84	11810	11734	76
Rajasthan	20005	19512	493	18512	18091	421
Sikkim	9850	9025	825	11404	10938	466
Tamil Nadu	10515	10171	344	10487	10076	411
Tripura	10356	9955	401	10999	10527	472
Uttar Pradesh	17895	17750	145	17143	16908	235
West Bengal	13885	13755	130	12062	11556	506
A and N Islands	16618	15467	1151	13218	12128	090
Chandigarh	11579	11424	155	11662	11504	158
D and N Haveli	10819	10120	699	12420	11743	677
Daman and Diu	15056	14353	703	13391	12902	489
Delhi	14155	13500	655	14127	13153	974
Laksha-dweep	18241	16155	2086	19068	16775	2293

States	Rural			Urban		
	Dally Averagc Calorie* Consumption of the Households with access to PDS	Daily Avcrage Calorie Consumption of the Households if there had been no PDS	Difference	Dailye Average Calorie* Consumption of the Houscholds with access to PDS	Average Average Calorie Consumption of the Households if there had been no PDS	Difference
Pondi-cherry	11503	11257	246	12387	11986	401
All India	**14687**	**14379**	**308**	**14010**	**13601**	**409**

Table 10 reports the proportion of the households that are calorie deficient after adjusting for the PDS quantity reported above. In India, there were 42.7 per cent of the households that did not meet the calorie norm even when they bought some food items from PDS. After adjusting for the PDS (i.e. quantity and calorie intake adjusted from PDS purchases, see foot note 7), the numbers increased to 45.93 percent, in increase of 3.23 percentage points. It is in the urban sector where the PDS has a greater impact. Out of the households that were non-calorie deficient, 5.64 percent became calorie deficient after their food purchases was corrected for PDS. This works out to be about 3.6 per cent of the total households in the country.

Table 10: Proportion of Calorie Deficient HHDs: All India

	Cal. Deficient with Access to PDS	Cal. Deficient without Access to PDS	Proportion of Households that achieve calorie sufficiency due to PDS
Rural	48.69	51.66	2.97
Urban	25.35	29.32	3.97
Total	**42.70**	**45.93**	**3.23**

The effect of PDS correction on household level calorie deficiency at the state level is reported in Table 11. As a share of total household population in that state/UT, the smaller states/UTs tend to have a greater number of households that achieve calorie sufficiency due to their purchases from the PDS. The southern states also perform better. The larger northern states (UP, MP, Rajasthan and Bihar) have the least impact of the PDS in this respect.

Among the major states, Kerala is affected most. Least affected states would be Bihar, Haryana, Orissa and UP. Tamil Nadu and Andhra Pradesh with a number schemes for making the poor food and nutrition security could help only about four percent of the households states in achieving calorie sufficiency.

Table 11: Proportion of Calorie Deficient HHDs: State-wise

Sorted in descending order on Col. 9

States	Rural			Urban			Rural + Urban		
	With PDS	Without PDS	Calorie sufficient due to PDS	With PDS	Without PDS	Calorie sufficient due to PDS	With PDS	Without PDS	Calorie sufficient due to PDS
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Goa	53.4	67.2	13.8	29.5	41.5	12.0	43.0	56.0	13.0
Arunachal Pradesh	60.6	70.5	9.9	25.1	41.1	16.0	55.5	66.3	10.8
Lakshadweep	10.8	17.4	6.6	18.1	30.9	12.8	14.4	24.1	9.7
Kerala	53.9	62.6	8.7	42.0	52.6	10.6	50.9	60.1	9.2
Dadra & Nagar Haveli	62.7	71.6	8.9	31.1	38.2	7.1	60.1	68.9	8.8
Mizoram	80.3	85.7	5.4	51.6	65.5	13.9	70.7	78.9	8.2
A and N Islands	32.6	39.6	7.0	18.3	26.5	8.2	28.1	35.5	7.4
Sikkim	73.2	80.0	6.8	28.5	34.0	5.5	69.1	75.9	6.8
Himachal Pradesh	31.9	38.1	6.2	13.5	19.4	5.9	29.8	36.0	6.2
Tamil Nadu	58.9	62.9	4.0	38.0	43.5	5.5	51.3	55.9	4.6
Andhra Pradesh	58.3	62.6	4.3	38.9	44.2	5.3	53.4	57.9	4.5
Delhi	10.2	15.1	4.9	15.9	20.1	4.2	15.2	19.5	4.3
Jammu and Kashmir	23.5	25.3	1.8	16.3	23.9	7.6	20.5	24.7	4.2

States	Rural			Urban			Rural + Urban		
	With PDS	Without PDS	Calorie sufficient due to PDS	With PDS	Without PDS	Calorie sufficient due to PDS	With PDS	Without PDS	Calorie sufficient due to PDS
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
Tripura	67.4	71.4	4.0	47.6	52.7	5.1	64.7	68.8	4.1
Meghalaya	75.2	78.7	3.5	24.2	29.9	5.7	67.5	71.3	3.8
Chandigarh	50.3	53.2	2.9	26.4	30.4	4.0	29.4	33.2	3.8
Daman and Diu	39.8	42.7	2.9	14.7	18.9	4.2	29.6	33.0	3.4
Gujarat	39.6	43.2	3.6	18.6	21.0	2.4	32.3	35.4	3.1
Pondicherry	60.8	60.8	0.0	40.1	44.7	4.6	48.0	50.8	2.8
West Bengal	51.9	53.3	1.4	28.0	33.7	5.7	45.4	48.0	2.6
Karnataka	41.9	44.0	2.1	23.8	27.1	3.3	36.4	38.8	2.4
Maharashtra	41.4	43.8	2.4	15.2	17.3	2.1	31.2	33.4	2.2
Rajasthan	19.8	21.6	1.8	14.6	16.0	1.4	18.5	20.2	1.7
Madhya Pradesh	50.2	51.7	1.5	16.2	17.9	1.7	42.0	43.5	1.5
Assam	76.7	78.0	1.3	35.9	38.7	2.8	71.9	73.3	1.4
Manipur	58.2	59.9	1.7	49.8	50.1	0.3	55.8	57.1	1.3
Haryana	33.0	33.8	0.8	35.0	36.9	1.9	33.7	34.8	1.1
Punjab	39.9	40.9	1.0	39.2	40.5	1.3	39.7	40.8	1.1
Uttar Pradesh	36.8	37.8	1.0	19.5	20.7	1.2	33.3	34.3	1.0
Orissa	57.0	57.5	0.5	27.1	29.8	2.7	52.9	53.7	0.8
Bihar	53.0	53.7	0.7	23.5	24.4	0.9	49.3	50.0	0.7
Nagaland	59.9	60.4	0.5	32.2	33.7	1.5	52.2	52.9	0.7
All India	48.7	51.7	3.0	25.4	29.3	3.9	42.7	45.9	3.2

In sum, even when we limit ourselves to calorie sufficiency, the PDS is not having a very major impact. If calorie/nutrition requirements of all are to be assured then either the PDS would have to be revamped, or other mechanisms found.

Chapter 5: Conclusions and Policy Implications

The Directive Principles of State Policy specifically mention food security in the Indian Constitution. According to Article 47, "The State shall regard the raising of the level of nutrition and the standard of living of its people ... as among its primary duties..."

The NSS has provided the basic data for policymakers to study the impact of economic growth on the level of nutrition in the country for the last four decades. However, the lack of computing power with researchers as well as inability to access raw data have traditionally contributed to the sparseness of independent research on nutrition at the national level. With rapid advances in computing power as well as the availability of raw data in the public domain have contributed to the growing literature on poverty in India.

This study is one such product. It facilitates another look into poverty in India. It finds that conventional poverty estimates in India are based on the same raw data that reveals that *almost half of the rural population and a quarter of the urban population belong to households that are calorie deficient.*

There are different ways of judging these figures. One view might hi-light the fact that this is a very poor showing for a country that has for four decades after independence and economic planning not reached the very first milestone of economic development. Another view would focus on the lack of adequate time between the reforms in the mid-eighties and early nineties to show the desired results on nutrition sufficiency. A third might argue that the raw data suffers

from under reporting of consumption. A fourth view might focus on the lack of usefulness of the reforms in ensuring adequate food security. Still another view might call for the failure of the elaborate PDS mechanism in meeting its primary objective.

We believe that there is an element of truth in all of these. Indeed, four decades of an elaborate system of economic planning has not facilitated what was perhaps one of its most important goals. That is an oft-repeated criticism of post-independence economic policy in India, and will not be repeated here. The failure of the economic policy changes in the mid-eighties and early nineties in impacting calorie deficiency is however an important criticism of the reforms; a criticism that we do not subscribe to.

On one hand major reforms occurred in the mid-eighties and early nineties. But these reforms were from the very beginning based on arguments associated with the trickle-down theories. That is, with higher economic growth, opportunities and resources would *eventually* trickle down to the lowest economic strata. To expect an instant impact on poverty levels and calorie deficiency would not be fair to the reform process given its orientation.

The soon to be released 55th round of the NSS would therefore provide us with much better data to undertake an analysis of the reforms and their impact on calory deficiency and poverty. The nine year period since the commencement of the reform process provides a long enough gap to study the cause-effect impact on poverty.

Given the fact that reduction of mass poverty has been a primary

objective of economic development policies, poverty levels and its changes over time have been keenly followed. Whereas there had been decline in the poverty incidence during later part of seventies and till 1980s, the post-1991 scenario has been quite confusing. But the main focus of this study is on nutrition, specifically calorie sufficiency. When contrasted with the relatively low poverty incidence, the higher incidence of deficiency in calorie intake is cause for concern.

In this paper, we took up the recalculation of incidence of poverty and also incidence of calorie deficiency in order to check the methodological issues as well as to find a benchmark for future research. (How far these policy changes have influenced the betterment of the poor can be ascertained only when the larger sample data for 2000 becomes available). We also attempted an assessment of the impact of PDS on poverty and food security of the households.

Despite the finding that Indians on the average require fewer calories in the nineties than they did before, the study finds that almost half the rural population and a quarter of the urban population reports consuming fewer calories than they require as per the widely believed norms. Calorie deficiency appears to be highly dependent on the type of commodities being consumed - for instance wheat eaters appear to be less calorie deficient than rice eaters are. Similarly owner cultivators have a lower tendency to be calorie deficient. The study also finds that the PDS is barely touching the tip of the iceberg where helping the worse-off sections are concerned.

Ideally, poverty incidence by the conventional measure (HCR) and calorie deficiency should not be very different from each other. We find that in rural sector the former is lower than the later. In the urban sector, its reverse holds. The possible reason could be that the urban poverty is measured using same poverty line for the entire urban sector comprising of small towns to large cities. Certainly, the smaller towns have closer linkages to rural sector and the prices could be lower in these towns. The higher poverty line tends to over estimate poverty in these towns as opposed to calorie deficiency where prices are not used at all.

The impact of PDS on the incidence of calorie deficiency and poverty does not appear to be significant. The method of adjustment that we used to adjust the average expenditure and calorie consumption might not be robust to capture the true impact. However, our findings do concur with findings of other researchers as far as the role and efficiency of PDS is concerned. Our calculations suggest that the PDS plays a relatively more important role in calorie sufficiency and food security of the households in smaller states. Larger states appear to be using this scheme rather inefficiently.

There are many implications of this study. These can broadly (though imperfectly) be divided into research oriented and policy oriented. We first briefly outline future research areas.

The poverty line needs to be recalculated on the basis of the calorie requirements of a population that has a different age profile from that in the seventies.

The issue of calorie requirement itself needs to be studied again in an in-depth manner. The impact of food preferences on poverty needs to be studied adequately. Specially the lower calorie consumed by rice-eaters has to be studied in an in-depth manner. Social and medical scientists will have to come together for this purpose.

The fact that the poor are clustered leads to a situation where small changes in poverty line norms have a large impact on poverty/calorie deficiency. This also calls into question the desirability of use of a cut off point such as the poverty line. Perhaps a better alternative would be to use a *poverty brink range* - those who are within a range where even if they are above the poverty line can very easily fall back into poverty.

It is evident that there is under-reporting by households on consumption. How much this under-reporting is and what form it takes can be studied using the latest round of the NSS large sample (NSS 55th round) when it becomes available. This round asks questions both related to consumption in the past 30 days as well as the past 7 days - *forgotten consumption* is less likely to play a role in the 7-day consumption query. Moreover *deliberate under-reporting* can be also be corrected for from within the same database. This can be done by exploiting the information on items such as household living conditions, ownership of durables etc.

The use of price indices in poverty calculations brings in another variable through which errors could creep in. For, price indices are also based on certain aggregations and approximations. Moreover, they do not account for changes in quality over time. Our proposal of a re-calculation of the poverty line using the latest available data would help in removing this source of possible errors.

On the policy front, as has also been recommended by others, this work suggests that the current system of operating the PDS is an extremely expensive method that yields little. A more *inclusive* system needs to be developed that can truly impact a large section of the poor and calorie deprived. Food stamps, a restructured PDS only for the economically worse-off, providing a set of commodities that are more in line with local preferences and requirements, are some possibilities. Even here the NSS large sample data can provide great insights into how the PDS or other anti-poverty mechanisms should be structured.

Most important implication of these findings would be on the matter concerning the derivation of poverty line in India and poverty calculations. There is clearly a need to take up this exercise.

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