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The Composition and Affordability of Indian Diets: Analysis of Household Consumption Expenditure Data

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Abstract

India exhibits high and persistent rates of undernutrition and a growing prevalence of micronutrient deficiencies—particularly anemia—as well as overweight and obesity. Addressing this triple burden requires diverse, nutritious diets, yet Indian diets remain limited in diversity and nutritional quality, characterized by heavy reliance on cereals and cereal-based foods. Previous studies have shown that diets consistent with India’s food-based dietary guidelines are unaffordable for a large proportion of the population. Using data from the 2023–24 Household Consumption Expenditure Survey, we characterize dietary composition and food expenditure in India. We then use derived commodity-level prices to provide updated and representative estimates of the cost and affordability of vegetarian and non-vegetarian diets that meet India’s food-based dietary guidelines. We find that Indian diets are high in visible fat consumption and that most protein is derived from low-quality sources, such as cereals, while consumption of nutrient-dense or high-protein foods remains limited even for the richest deciles. We estimate the daily cost of a healthy vegetarian diet at INR 63.6 per consumer unit and a non-vegetarian diet at INR 73.1 at the all-India level. An estimated 31.2% of urban and 56.6% of the rural population would need to increase their current food expenditure to meet the cost of a healthy diet. If instead we compare our costs against the threshold defined by the State of Food Security and Nutrition in the World (SOFI) 2025 report, we find that 8.3% of urban and 32.6% of rural populations cannot afford a nutritionally adequate diet. While social safety nets subsidize cereals, thereby increasing affordability for the poorest, additional items such as spices and cooking fuel raise total costs. We assess these extensions and discuss policy implications.

* Authors listed in alphabetical order; author contributions are provided in the CRediT statement at the end of the paper. We are grateful to Anna Herforth, Carlo Cafiero, Vaishali Bansal, Arjun Jayadev, Himanshu, Vikas Rawal and seminar participants at Azim Premji University, Bangalore, for useful comments that helped shape this paper. We also thank Dr. Bharati Kulkarni and colleagues at the Indian Council of Medical Research-National Institute of Nutrition for patiently answering our many questions. All remaining errors are our own.

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1 Introduction

Despite sustained economic growth over the last two decades, nutrition indicators in India have been slow to improve. The latest round of the Demographic Health Surveys for India—the fifth National Family Health Survey (NFHS-5) in 2019-21—shows persistently high rates of anaemia among children (67.1%) and women aged 15-49 years (57%), and high rates of stunting among children under the age of five (35.5%), numbers that have not improved substantially since NFHS-4 in 2015-16 (IIPS, 2017, 2022). At the same time, India is now facing a growing burden of non-communicable and lifestyle-related diseases such as diabetes, hypertension, and overweight/obesity (India State-Level Disease Burden Initiative Collaborators, 2017; Tandon et al., 2018; IIPS, 2022). Accounting as it does for more than a sixth of the world’s population, any efforts to achieve Sustainable Development Goal 2 to “end hunger, achieve food security and improved nutrition and promote sustainable agriculture” must find a way to move the needle in India.

More generally, but especially for countries like India that are at a stage of their nutrition transition characterised by the ‘double-burden’ of malnutrition, that is, persistent undernutrition coupled with a growing prevalence of overnutrition, improving access to safe and nutritious diets could help reduce the incidence of malnutrition (Hawkes et al., 2020; Masters et al., 2022). Earlier studies have argued that Indian diets are limited in diversity and nutritive value (Sharma et al., 2020), characterized by high levels of saturated fat and low protein intakes (Anjana et al., 2025), with limited intake of high-quality protein sources such as pulses and animal-sourced foods (meat, eggs, dairy). Only 11% of children aged 6-23 months of age achieved a minimum acceptable diet (IIPS, 2022), fewer than 10% of adults consumed at least 4 out of 7 food groups daily, and more than two-thirds of Indians consumed diets deficient in essential micronutrients (Rao et al., 2018). Improving the quality of the diets Indians consume could improve malnutrition, with corresponding returns (Alderman et al., 2016). We provide an updated characterization of the macronutrient composition of Indian diets using consumption survey data from 2023-24.

While there are several reasons for poor quality diets, the affordability of healthy diets is a key concern, especially in recent years, when international food price inflation has reached levels comparable to the 2007-08 and 1973-74 food crises (FAO et al., 2025) (henceforth, the

“SOFI report 2025”). The SOFI report 2025 estimates that 2.6 billion people worldwide cannot afford to purchase a healthy diet, that is, one that meets food-based dietary guidelines. In India, the report estimates that 40.4% of the population, or 586.5 million people, find such a diet unaffordable. While these numbers are large, they represent an improvement compared to earlier estimates (Gupta et al., 2021; Kachwaha et al., 2020; Raghunathan et al., 2021), in part due to the availability of new nationally representative household consumption expenditure survey data.

This paper uses data from the 2023-24 Indian Household Consumption Expenditure Survey (HCES) to provide a detailed characterization of Indian diets. We first present estimates of the monthly per consumer unit expenditure on food, expenditure on meals outside the home, and the contribution of home production to the value of total consumption. We then describe calorie, protein, and fat consumption by sector (rural/urban), MPCE deciles, and other demographics. Finally, we use derived national- and state-level average prices for food items to calculate the daily per consumer unit cost of a healthy diet (CoHD)¹ for rural and urban populations, to highlight where and by how much current diets fall short of the Indian food-based dietary guidelines, and to assess the affordability of these diets.²

Given the paucity of research on diets and their determinants in India, this work is critically important. Previous studies have highlighted the potential of using administrative price data to track the cost and affordability of diets when detailed consumption survey data is not forthcoming (Headey et al., 2024; Narayanan et al., 2024); the current availability of regular and representative consumption survey data after a decade-long hiatus presents new opportunities for detailed analyses. Preliminary analysis of the recent Household Consumption Expenditure Survey (HCES) indicates that average calorie and protein consumption have not changed significantly compared to the 2011–12 National Sample Survey Office’s Consumption Expenditure Survey (NSS-CES). Diets remain heavily cereal-based, particularly among the lower deciles, and protein deficits continue to be substantial, with cereals providing between 43 to 56 percent of overall protein intake among the bottom four deciles for both rural and urban sectors (National Statistical Office, 2025b), though the National Institute of Nutrition (NIN) recommends that

¹Our definition of a healthy diet follows India’s food-based dietary guidelines, not the Healthy Diet Basket used in (FAO et al., 2025). See Section 3 for details.

²We also calculate similar estimates using district-level derived prices, but do not present these in this paper.

no more than one-third of protein should come from cereals. Inequalities in consumption across deciles—whether in calories, proteins, or the quality of protein sources—are pronounced (Sinha, 2025). At the same time, expenditure on processed foods has risen across all expenditure classes. In this context, it becomes increasingly important to examine the affordability of healthier and better-quality foods.

Our estimates using the 2023-24 HCES suggest that issues of diet quality remain paramount. Indian diets fall short of calorie requirements for the lowest four MPCE deciles in both rural and urban areas, but far exceed the recommended visible fat intake, especially among the higher MPCE deciles. Consumption of processed foods and beverages increases steeply with wealth, but the consumption of high-quality proteins—from pulses, eggs, flesh foods, and dairy—does not, with cereals contributing a half or more of all protein consumption even among the richest deciles. Even so, protein shortfalls are far lower than expected, with the bulk of the population meeting or exceeding 60g/consumer unit/day, the recommended daily allowance accounting for low-quality protein sources.

At the all-India level, we find that the daily cost of a vegetarian diet is INR 63.6 per consumer unit, while that of a non-vegetarian diet—one that replaces a portion of pulses with eggs or flesh foods—is higher at INR 73.1. We estimate that 49.1% of the population would have to increase their current food expenditure to meet the cost of the healthy diet (56.6% in rural and 31.2% in urban areas). If instead we use the same methodology as (FAO et al., 2025) and our estimated healthy diet costs, we find that 25.4% of the population cannot afford a healthy diet (8.3% in urban and 32.6% in rural areas). Our estimated cost of a healthy diet lies somewhere in between earlier estimates, with differences attributable at least in part to differing methodologies: varying definitions of a meal, the coverage of price data, and the time period under consideration. These findings suggest the need to enhance our focus on food security and dietary diversity with a strong emphasis on *nutritional* security. For the poorest, this could mean enhancing incomes, supplying nutritious foods through social safety nets, and reducing the cost and availability of healthy foods vis-à-vis unhealthy processed foods. For the richest, current expenditures already exceed the cost of healthy diets, suggesting a strong role for behavior change communication that raises awareness of the need for and components of a healthy, diverse diet along with regulation of unhealthy packaged and ultra-processed foods.

The rest of the paper proceeds as follows: Section 2 describes the data, Section 3 outlines the methods we use for our analyses. Section 4 describes the expenditure on and composition of the average Indian diet, while Section 5 calculates the cost and affordability of a healthy diet that meets India’s food-based dietary guidelines. Finally, Section 6 puts our results in perspective by comparing our estimates with other studies, and concludes with some policy recommendations.

2 Data

2.1 Household Consumption Expenditure Surveys (HCES)

The HCES 2023-24, conducted by the National Statistical Office of the Ministry of Statistics and Programme Implementation, Government of India, is a comprehensive nationally representative survey designed to collect information on household consumption of and expenditure on goods and services ([National Statistical Office, 2025a](#)). The 2023-24 survey covered 2,61,953 households across India (1,54,357 in rural and 1,07,596 in urban areas), with each household visited in three separate monthly visits within a quarter, each time administered with a different questionnaire assessing expenditures on food items, consumable and service items, and durable goods. The three questionnaires were randomly assigned to be administered in all possible sequencing combinations, with a household composition questionnaire capturing household socioeconomic and demographic characteristics administered at the time of the first visit to any household. Recall periods varied across questionnaires and items, ranging from seven days for expenditures on most foods, tobacco, and intoxicants, to 365 days for consumer durables, education, and medical expenditures.

The survey uses a multistage stratified sampling design, with villages or urban blocks as the first stage, and households (18 per first-stage unit) as the second stage. The dataset provides weights derived from the sampling design for the calculation of nationally representative estimates, as well as estimates representative at the state level. Consumption estimates are provided at the per capita level; we convert these to the per consumer unit level for ease of comparison (see below).

2.2 Food conversion tables

Conversion factors for the calorie, protein, and fat content of individual food items in the HCES are taken from the Nutritional Intake in India report ([National Statistical Office, 2025b](#)). These conversion factors enable the analysis of the nutritive content of foods consumed. This report also provides the factors needed to convert household members into consumer units, the unit of analysis for this paper, defined as follows: “A consumer unit is a unit used to measure the energy requirement of a group of persons of different sectors, gender, and age-groups. The following definition of consumer unit was adopted in 2017-18 in consultation with the NIN and the same is used for HCES: 2022-23 & HCES: 2023-24: One Consumer Unit (CU) is equivalent to the amount of energy required, on an average, by an Indian adult man in the age group 20–39 years and weighing 60 kilograms, performing sedentary work.” ([National Statistical Office, 2025a](#)).

The recommended daily calorie requirement for a consumer unit is 2325 kcal per day, estimated using the norm for a reference Indian man aged 18-29 years with a normal body mass index and normal weight performing sedentary work ([National Statistical Office, 2025b](#)).³

2.3 Food-based dietary guidelines for India

We use the Indian Council of Medical Research-National Institute of Nutrition’s (ICMR-NIN’s) food-based dietary guidelines (FBDGs), also known as the ‘My Plate for the Day’ recommendations, which provide food-group-wise calorie targets for a healthy diet ([ICMR-NIN, 2024](#)). These recommendations are based on the norm of 2000 kcal per person per day and provide for both a vegetarian and a non-vegetarian meal. To align these to the consumer-unit-wise calorie, protein, and fat consumption estimates, we rescale the food-group calorie targets to a 2325 kcal per consumer unit per day norm. Table 1 reproduces the recommendations from Tables 1.2a and 1.2b in ([ICMR-NIN, 2024](#)), as well as the rescaled calorie targets.

³The age range referenced for one consumer unit varies slightly in the two definitions given in the main text, but to the best of our knowledge, calorie intake norms do not vary across the working age adult male group used here.

Table 1: Food group-wise calorie recommendations according to ICMR-NIN’s ‘My Plate for the Day’

Food groups	Total energy from each food group/day (kcal) (2000 kcal target)	Total energy from each food group/day (kcal) (2325 kcal target)
Panel A: Vegetarian diet		
Cereals (incl. millets)	~843	~980
Pulses	~274	~319
Milk/curd (ml)	~216	~251
Vegetables + dark green leafy vegetables (DGLV)	~174	~202
Fruits	~56	~65
Nuts & seeds	~181	~210
Fats & oils	~243	~283
Total	~2000	~2325
Panel B: Non-vegetarian diet		
Cereals (incl. millets)	~876	~1018
Pulses	~177	~206
Eggs/chicken/meat	~103	~120
Milk/curd (ml)	~216	~251
Vegetables + dark green leafy vegetables (DGLV)	~184	~214
Fruits	~56	~65
Nuts & seeds	~155	~180
Oils & fats	~243	~283
Total	~2000	~2325

Notes: Column (1) is reproduced from Table 1.2a and Table 1.2b in (ICMR-NIN, 2024). Column (2) is based on authors’ calculations. The number of calories in columns (1) and (2) is an approximation, and column totals may differ slightly from the target.

3 Methods

3.1 Estimating the cost of a healthy diet

The Cost of a Healthy Diet, or CoHD, is the least-cost way of meeting national food-based dietary guidelines (FBDGs) ([Herforth et al., 2020, 2022, 2023, 2025](#)). In India, these are the ‘My Plate for the Day’ guidelines described above. The CoHD is easier to calculate than other measures of cost of diets based on nutrient adequacy ([Bai et al., 2021](#); [Chastre et al., 2007](#)), but also has other advantages: first, that it is closer to the way people make decisions about food (i.e., we choose foods, not nutrients), and second, it uses national FBDGs which account for diet preferences, so the method tends to yield realistic-looking diets that broadly meet nutrient requirements.

The first step in estimating the CoHD requires estimating how much of each food item one would need to purchase to meet the FBDGs. The ‘My Plate for the Day’ specifies the food-group-wise calorie target, for example, 56 kcal per person per day from fruits. Using the calorie conversion table in the NSS Nutritional Intake in India report ([National Statistical Office, 2025b](#)), we convert the target calorie numbers into quantities for each food item. For example, if 1 kilogram of mangoes provides 419 kcal, then we would need to consume 133g of mangoes to obtain 56 kcal, the daily target for fruits.

We then use estimates of the edible fraction for each food—that is, the amount of a raw food that can be consumed—to calculate how much of each food would need to be purchased to meet the calorie requirement for the corresponding food group. For most grains, pulses, and dairy items, this edible fraction is 1 or close to 1. For vegetables and fruits, we typically discard the stem, peel, and pit, so the edible fraction can be considerably less than 1. We use rough estimates of edible fractions to all foods in the HCES dataset, drawing on previous work in India ([Raghunathan et al., 2021](#)) and South Asia ([Dizon et al., 2019](#)). For mangoes, the edible portion we use is 0.71, indicating that 100g of mangoes purchased yield about 71g of edible mango. In our example, therefore, we would need to purchase 187g of mango to consume 133g and meet the 56 kcal target for fruits.

Once we have the target quantities for each food item, the next step is to estimate the cost of purchasing these target quantities. From the HCES 2023-24 data, we can back out household-level prices for each food item from the total consumption quantities and the total consumption

value (in Indian rupees (INR)⁴). Since household-level prices can reflect other characteristics (for example, richer households can buy in bulk for a lower per unit rate, poorer households might buy lower quality food items at a lower rate etc) we use the weighted average of these household-level derived prices at the state- and national-levels as the average price for a given food item in a given state or all-India respectively. This exercise is conducted separately for rural and urban areas within these geographies. Using these prices and the target quantities calculated in the first step, we estimate the cost of meeting the target quantity for each food item in the HCES.

Next, we identify the lowest-cost items in each food group. We do this at the state-, and national levels, for both rural and urban areas separately. Since India’s FBDG advocates for dietary variety in cereals, pulses, and vegetables (ICMR-NIN, 2024), we retain the two lowest-cost items in these food groups and take the average cost across these. For fruits, dairy, dark green leafy vegetables (DGLV), nuts and seeds, and edible oils, we retain the cheapest item only. Since India’s FBDGs provide separate guidelines for vegetarian and non-vegetarian meals (see Table 1), we follow the same procedure for these foods, selecting the least-cost item from among eggs, chicken, fish, and meat.

Finally, adding the costs of these least-cost items across food groups gives us the CoHD, or the least cost way of meeting the FBDGs.

We note a caveat to the CoHD calculation. Some items in the HCES questionnaire—eggs, and fruits like bananas, oranges, pineapples—are listed in numbers rather than in grams. (National Statistical Office, 2025b) reports calories, protein and fat per number of these items. In the case of fruits such as banana, orange and pineapple, it is not clear how to interpret the numbers in (National Statistical Office, 2025b), since they do not align with the estimates per unit or per 100 g of the Indian Food Composition Tables (Longvah et al., 2017). Given this ambiguity, we have taken the numbers for these fruits as given, assuming an edible portion of 1. However, in the case of eggs, there appears to be a clear discrepancy—the calories noted as per unit (i.e., per egg) match almost exactly the calories per 100g according to the Indian Food Composition Tables (Longvah et al., 2017). For now, we present two sets of estimates: (1) with our best guess at a corrected calorie conversion assuming an egg of average size (44g), (2) with

⁴At the time of writing, 1 USD = 90.06 INR

the (possibly incorrect) calorie conversion as given in (National Statistical Office, 2025b). The first set of estimates is provided in the main text, since we believe these are the correct ones to use. The other is provided in the Appendix.

Our method differs slightly from the methodology for estimating the cost of healthy diets used in SOFI report 2025 (FAO et al., 2025). First, the SOFI methodology uses a global standard diet, the ‘Healthy Diet Basket’ (Herforth et al., 2022, 2025), which was developed from ten quantified FBDGs (taking the most recent available within major regions of the world) and 30 semi-quantified food guides from all regions (Herforth et al., 2025). Since India is one of the relatively few countries that has its own quantified FBDGs (ICMR-NIN, 2024), we use these FBDGs instead of the Healthy Diet Basket, an approach that has been used before (Herforth et al., 2024). The definition of food groups and the recommended number of kcal per food group differ slightly between both sets of guidelines (Table 2). For example, the SOFI methodology groups potatoes and other starchy foods in the “starchy staples” food group, while the Indian FBDGs include potatoes and sweet potatoes as vegetables. The Indian FBDG specifies that one of the vegetables consumed should be a DGLV, and recommends diversity in cereals, vegetables, and pulses. Second, we standardize all estimates at the per consumer unit level, accounting for differences in age and sex composition across households. In contrast, the SOFI methodology relies on per capita norms and does not adjust household-level estimates for demographic composition. Third, the SOFI report (and also FAOSTAT and the World Bank DataBank) uses prices from the World Bank International Comparison Program (ICP), while we use prices derived from individual-level consumption expenditure data.

Table 2: Comparison of the Healthy Diet Basket with NIN’s ‘My Plate for the Day’

SOFI report: Healthy Diet Basket		This paper: India FBDGs	
Food group	kcal	Food group	kcal
Starchy staples	1160	Cereals	~1018
Vegetables	110	Vegetables*	~214
Fruits	160	Fruits	~65
Animal source foods (dairy, flesh foods)	300	Milk/curd	~251
Legumes, nuts, seeds	300	Eggs/chicken/meat	~120
		Pulses	~206
		Nuts and seeds	~180
Oils and fats	300	Oils and fats	~283
Total	2330	Total	~2325

Source: Authors’ comparison of diet standards in (FAO et al., 2025) and (ICMR-NIN, 2024).

Notes: To assess affordability in this paper we use the non-vegetarian cost of a healthy diet (CoHD), though we present cost estimates for both vegetarian and non-vegetarian diets. For the vegetarian CoHD, the eggs/chicken/meat food group is excluded and quantities of other food groups are adjusted accordingly. The (FAO et al., 2025) approach uses a Healthy Diet Basket (Herforth et al., 2025). Since India has its own FBDG tailored to local diets and needs, we use the Indian FBDG in our analysis. The kcal values in the table are the food-group-wise recommended calorie amounts in each set of recommendations.

* Includes green leafy vegetables and other non-leafy vegetables.

3.2 Estimating affordability of healthy diets

To assess the affordability of the healthy diet among the population, the CoHD must be compared with some measure of expenditures, or income (Herforth et al., 2020). In this paper, we provide several estimates of affordability. First, we compare the CoHD with the average per consumer unit current food expenditure estimated from the HCES data. We then provide two sets of comparisons that reproduce the methodology used in the SOFI 2025 report (FAO et al., 2025), which defines the unaffordability of a healthy diet as “the ability of a household or of an individual to pay the amount of money needed to acquire the least-cost combination of locally available foods that meet the requirement for a healthy diet, after having accounted for the portion of their income they have to reserve for acquiring all basic needs other than food” based on (Bai et al., 2024).

In the SOFI report, the unaffordability of a healthy diet is estimated for each country i as follows: A daily per capita cost threshold, r_i is computed, combining the cost of the healthy diet (c_i) and the basic cost of non-food needs for the income-bracket j the country belongs to, η_j .

$$r_i = c_i + \eta_j \quad (1)$$

η_j is, in turn, estimated by multiplying World Bank international poverty line for the relevant country income classification (p_j) by a share of total expenditure to be reserved for non-food basic goods and services (s_j).

$$\eta_j = p_j \times s_j \quad (2)$$

Since India is a low- and middle-income country, the SOFI report defines s_j as the share of total non-food essential expenditure reported by the second quintile of the income distribution. The cost threshold so calculated is then compared with the country-specific income distributions to estimate the proportion of the country’s population whose income falls below that threshold.

To compare our estimates of affordability to those in the SOFI report, we use \$4.2 PPP as the poverty line,⁵ the purchasing power parity (PPP) exchange rate of INR 20.73 to 1 USD

⁵The SOFI report uses the poverty line of \$ 3.65 PPP for lower-middle-income countries. We replace these with the updated World Bank poverty line, see <https://blogs.worldbank.org/en/opendata/the-world-bank-s-new-global-poverty-lines-in-2021-prices>

(World Bank, 2024), and the non-food expenditure share of the second-lowest quintile from the HCES to arrive at a threshold of MPCE for each state and for rural and urban areas separately. We estimate affordability using this threshold in two ways: using the SOFI report estimated CoHD, and using our own estimates of the CoHD.

For each of these comparisons, we first compare the CoHD faced by a household (CoHD \times number of consumer units in the household) with the relevant threshold, and then categorize households into those that can and cannot afford the CoHD. This is done at the state level, as well as for rural and urban areas separately. We then estimate affordability proportions for the total population, taking household size into account.

We now turn to our results.

4 Indian diets: expenditure and composition

4.1 Monthly per consumer unit food expenditures

Table 3 shows the monthly per consumer unit food expenditures for the rural and urban sectors and by sector-wise occupation. In rural areas, the monthly per consumer unit consumption expenditure (MPCE) is INR 4431, and the monthly per consumer unit food expenditure is INR 2084 (47.0% of the MPCE). Monthly per consumer unit food expenditures are lowest among agricultural casual labourers (INR 1917) and highest among those with regular wage or salary jobs in non-agricultural sectors (INR 2412) and those not employed (INR 2479). In urban areas, the MPCE is considerably higher at INR 7707, and food expenditure is only 39.7% of the MPCE, at INR 3059. Monthly per consumer unit food expenditure is lowest among casual labourers (at INR 2457) and highest among those who report not being employed (INR 3891). Monthly per consumer unit food expenditures exhibit considerable variation across states, with Chhattisgarh reporting the lowest food consumption expenditure (INR 1538 per consumer unit per month) and Chandigarh the highest (INR 5432 per consumer unit per month) (Table A.1).

Food consumption expenditure also varies considerably across caste groups. Scheduled Tribes (STs) have the lowest monthly food consumption expenditure, at INR 1909 per consumer unit, followed by Scheduled Castes (SCs) at INR 2154 and Other Backward Castes (OBCs) at INR 2351. Other caste groups report a monthly food consumption expenditure of INR 2731

per consumer unit.⁶

Figure 1 and Figure 2 present the MPCE, monthly per consumer unit consumption expenditures and the food expenditures in rural and urban areas as a percentage of the MPCE. MPCE deciles are calculated separately for rural and urban areas. Three things are evident from these figures: first, total MPCE and monthly per consumer unit food expenditures are higher in urban than in rural areas in every decile; second, that monthly per consumer unit food expenditure as a fraction of total MPCE declines as total MPCE increases; and third, that the rate of decline is slightly sharper in urban areas than in rural areas. These patterns accord with our expectations.

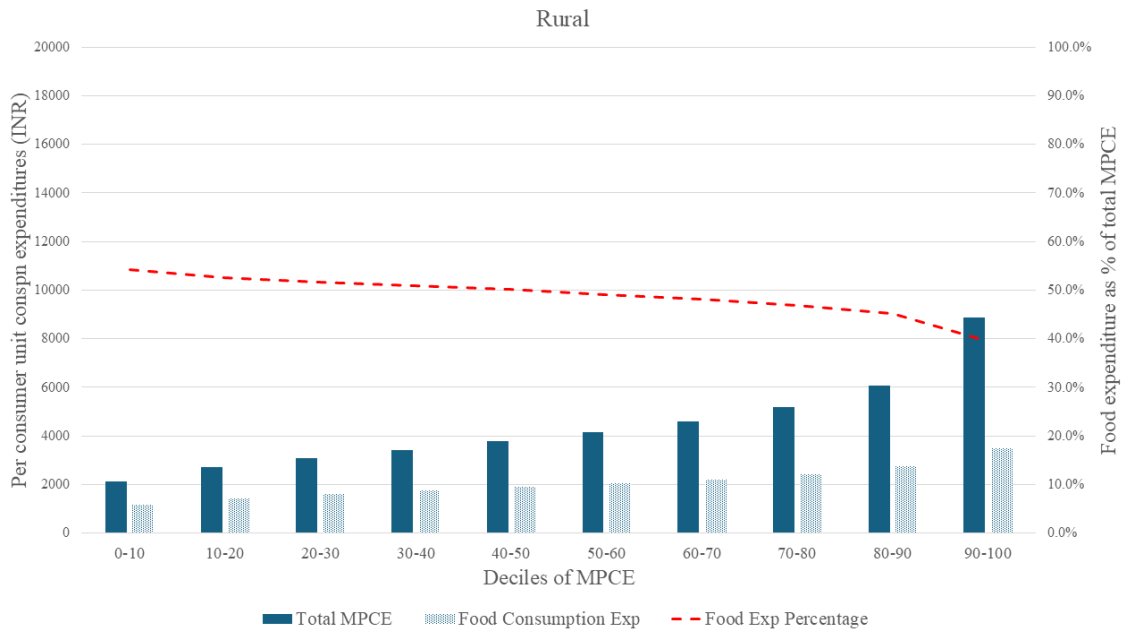
⁶The ‘others’ category is assumed to be dominated by General caste groups. A small percentage of households (0.28%) do not report their caste; we do not report their food consumption expenditure.

Table 3: Monthly per consumer unit food expenditures by sector and occupation

	Monthly per consumer unit Food expenditure (INR)
Rural (MPCE = 4431)	2084
<i>By rural occupation:</i>	
Casual labour in agriculture	1917
Casual labour in non-agriculture	1953
Self-employment in agriculture	2007
Regular wage/salary earning in agriculture	2046
Self-employment in non-agriculture	2191
Regular wage/salary earning in non-agriculture	2412
Not employed	2479
Urban (MPCE = 7707)	3059
<i>By urban occupation:</i>	
Casual labour	2457
Self-employment	2915
Regular wage/salary earning	3227
Not employed	3891

Notes: Authors' calculations from the 2023–24 Household Consumption Expenditure Survey (HCES) data. MPCE denotes monthly per consumer unit consumption expenditure.

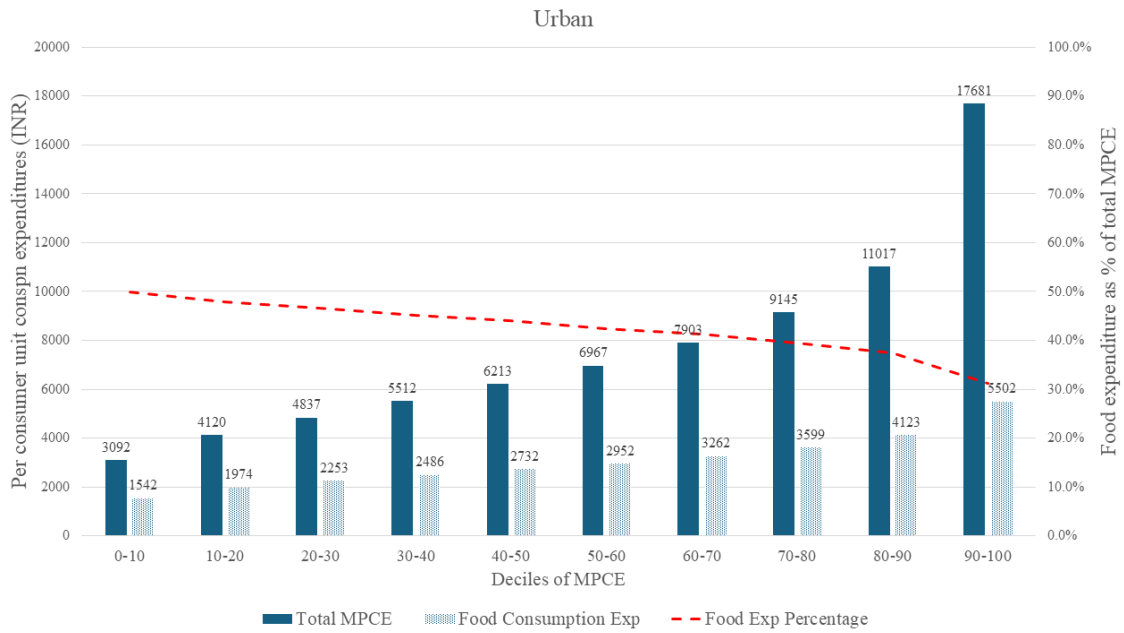
Figure 1: Total MPCE and monthly food consumption expenditures by MPCE deciles, rural areas



The HCES provides imputed values for home production. Using these values, home production accounts for less than 20% of total food consumption expenditure nationally, 8.6% in urban and 17.4% in rural areas. This varies by occupation; for those rural residents reporting their main source of income as self-employment in agriculture, home production accounts for 21.2% of the value of total consumption, while it is between 11 and 14% for other rural occupations.

The bulk of food expenditures come from other sources, even in rural areas. Some portion of this is from complete meals purchased outside the home or from packaged processed foods. The growing consumption of processed foods even in rural areas is of concern, since these foods tend to be high-salt and high-fat. Nationally, the average monthly expenditure per consumer unit on purchased prepared meals is INR 251; higher in urban areas at INR 403 (5.2% of urban MPCE) than in rural areas, where expenditures on meals outside the home is only INR 187 (4.25 of rural MPCE). This includes prepared snacks like samosas. Expenditure on processed packaged foods, like chips, is lower, at INR 173/consumer unit/month nationally (INR 247 in urban and INR 142 in rural areas). As Figure 3 shows, total expenditure on food outside the home remains roughly stable as a proportion of the total food expenditure in each decile in rural areas, fluctuating between 14 and 17%; expenditure on prepared meals and packaged processed foods also doesn't fluctuate much by wealth. In urban areas, in contrast, expenditure on food

Figure 2: Total MPCE and monthly food consumption expenditures by MPCE deciles, urban areas



outside the home varies substantially by MPCE deciles, from 14.6% in the lowest to 32.8% in the richest decile. The bulk of this comes from prepared meals, which constitute 8.3-23.7% of total food expenditures.

Overall, consumption from own production and on foods purchased outside the home taken together constitute $\sim 31 - 34\%$ of total food expenditures in rural and $\sim 22 - 40\%$ in urban areas. The bulk of food expenditure is from raw foods purchased and prepared at home.

4.2 Calories, protein, and fat consumption

Figure 5 presents the per consumer unit calorie consumption for rural and urban areas against the benchmark of 2325 kcal/day. On average, calorie consumption is 2378 kcal/consumer unit/day in rural areas, and 2468 kcal/consumer unit/day in urban areas. Unlike food expenditures, calorie consumption is fairly evenly matched across rural and urban areas, however, we do see some variation across deciles of the MPCE. For the bottom four deciles in rural areas, calorie consumption is, on average, lower than the benchmark; the same is true of the bottom four deciles in urban areas. Overall average calorie consumption varies considerably by state (Table A.2), with Meghalaya reporting the lowest average calorie consumption at 2121 kcal/consumer unit/day, and Sikkim the highest at 3281 kcal/consumer unit/day.

Figure 3: Expenditure on meals outside the home as a proportion of total food expenditure, rural areas

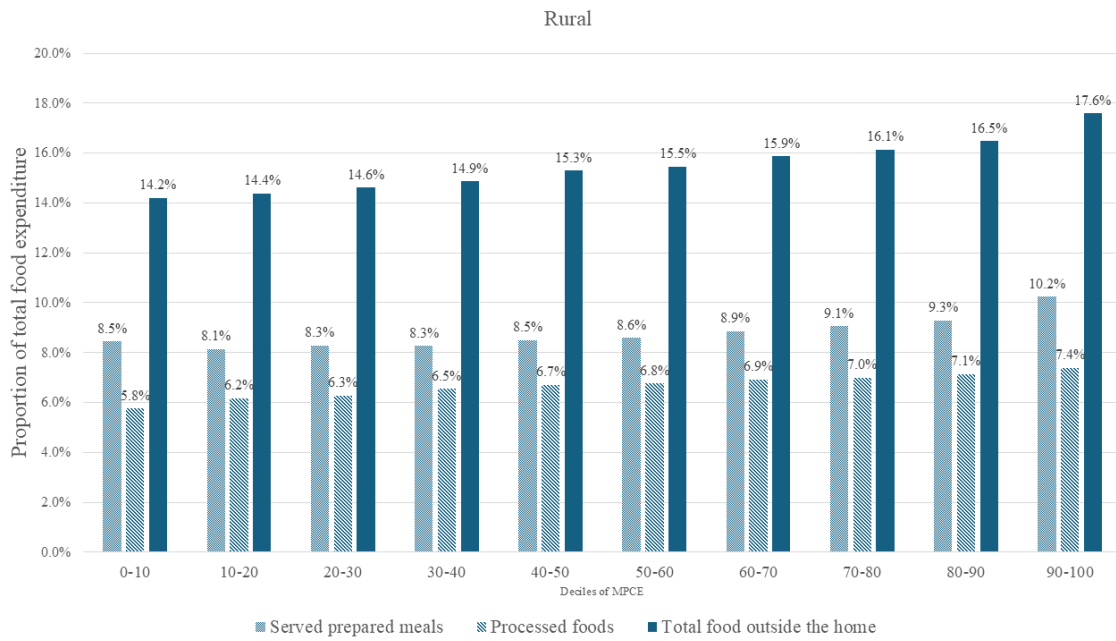


Figure 4: Expenditure on meals outside the home as a proportion of total food expenditure, urban areas

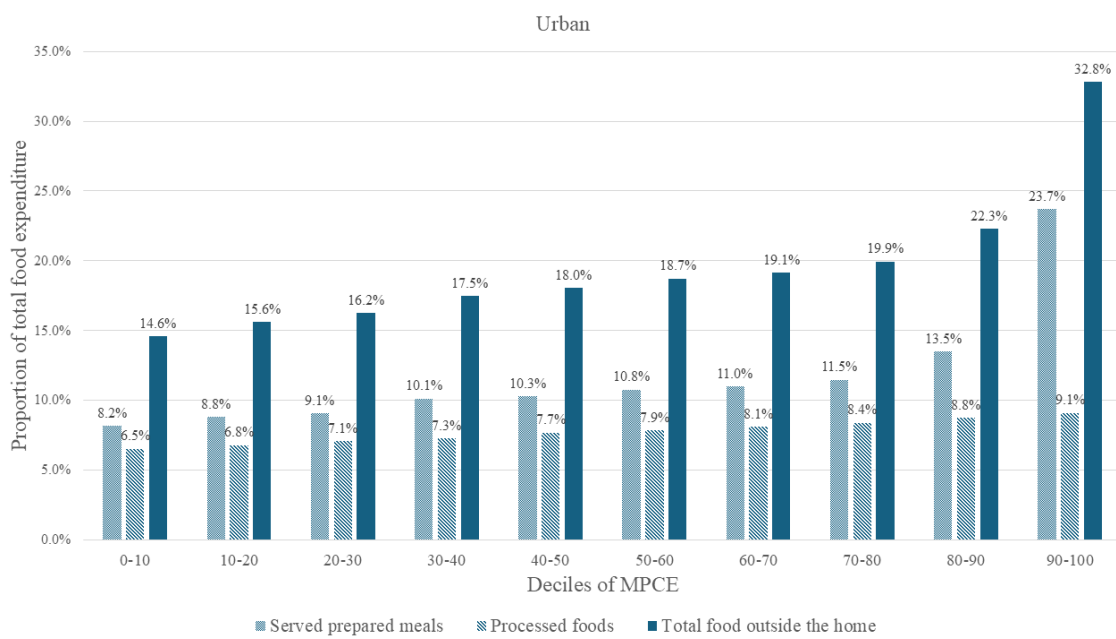
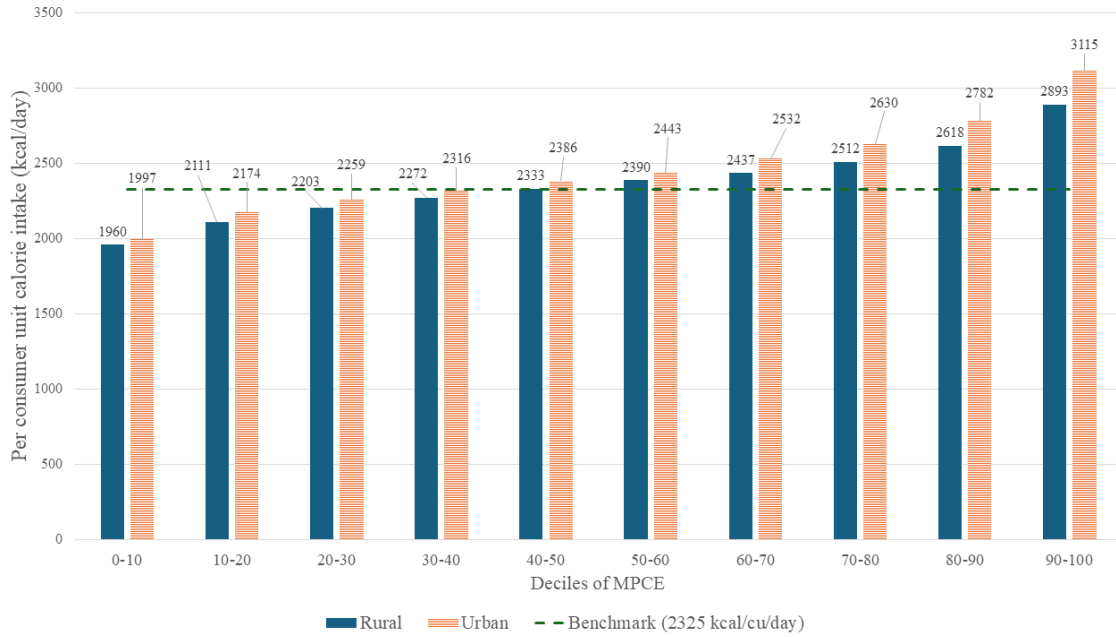


Figure 5: Per consumer unit calorie consumption (in kcal) by MPCE deciles in rural and urban areas

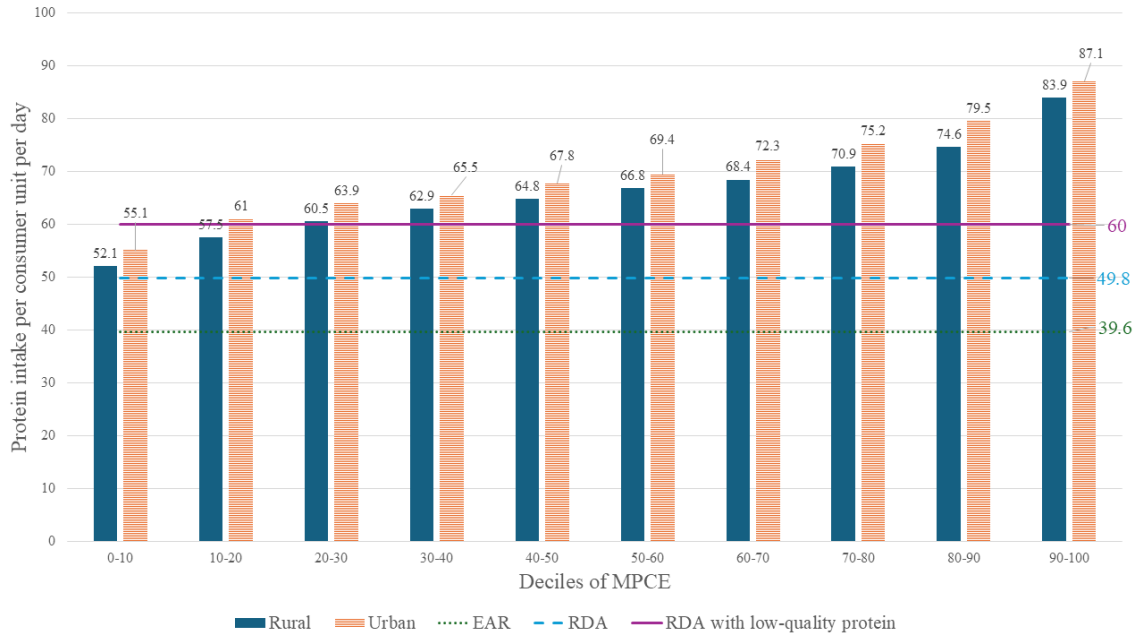


According to (ICMR-NIN, 2020), the Estimated Average Requirement (EAR) for protein is 0.66 g/kg/day and the Recommended Daily Allowance (RDA) is 0.83g/kg/day.⁷ For people consuming low-quality protein, such as that deriving largely from a cereal-based diet, the RDA is 1g/kg/day. For our consumer unit—an adult male weighing 60 kilograms—the EAR would be 39.6g/day, while the RDA level would be 49.8g/day. If the bulk of the protein comes from low-quality sources, the RDA would increase to 60g/day.

Figure 6 shows the estimated protein consumption in grams per consumer unit per day for rural and urban areas, along with the EAR and the RDA under standard assumptions and under the assumption of low-quality cereal-based sources of protein. Average protein consumption in all deciles of MPCE in both rural and urban areas is above both the EAR and the RDA under standard assumptions. Even when using the higher RDA benchmark, all but the bottom two deciles in rural and all but the bottom decile in urban areas appear to be consuming more than 60 g of protein per consumer unit per day. Our estimates of protein consumption are in line with earlier studies in the Indian context (see, for example, Swaminathan et al. (2012) and

⁷From (ICMR-NIN, 2024), “The mean of the nutrient requirements distribution is called the Estimated Average Requirement (EAR) and the 97.5th percentile of the requirement distribution is called the Recommended Daily Allowance (RDA).” The EAR is to be used for planning the nutrient requirements for healthy individuals, while the RDA is intended for deficient individuals.

Figure 6: Per consumer unit protein consumption (in gms) by MPCE deciles in rural and urban areas



(Minocha et al., 2017)).

Even though the overall protein consumption is high compared to earlier estimates, the contribution of low-quality sources of proteins far outweighs that of higher-quality protein from pulses, dairy, eggs and flesh foods. Table 4 shows how the source of protein consumption varies across rural and urban areas and across deciles of MPCE within each sector. Three things stand out from this table. First, the contribution of low-quality sources to overall protein consumption is high, close to or exceeding 50% (considerably higher than the 33% NIN recommends as the upper limit on the contribution of low-quality sources), but declines as we move up the deciles of MPCE. It is also slightly higher for rural areas than urban areas. Second, the contribution of pulses to overall protein consumption is low and does not change much across deciles or even across rural and urban areas. Third, the contribution of eggs, fish, meat and dairy (animal-sourced foods) to overall protein consumption is also low, between 10 and 20%, but, unlike pulses, rises quite sharply across MPCE deciles. Interestingly, we do not see substantial differences between rural and urban areas in the contribution of animal-sourced proteins to overall protein consumption.

Table 4: Sources of protein, rural and urban areas

Rural areas				
	Protein Source (%age of intake)			
Decile	Cereals	Pulses	Egg/Fish/Meat	Dairy
0-10	56.5	8.5	9.6	6.4
10-20	52.8	8.4	10.1	8.3
20-30	51.1	8.5	10.5	9.2
30-40	49.4	8.6	11.1	9.8
40-50	47.9	8.6	11.6	10.4
50-60	46.6	8.6	12.1	11.2
60-70	44.9	8.6	12.9	11.6
70-80	43.2	8.8	13.5	12.5
80-90	40.7	8.9	14.6	13.3
90-100	36.2	9.1	17.3	14.4
Overall avg.	46.1	8.7	12.7	11.0
Urban areas				
	Protein Source (%age of intake)			
Decile	Cereals	Pulses	Egg/Fish/Meat	Dairy
0-10	52.8	8.8	12.2	8.8
10-20	47.3	8.8	12.8	10.5
20-30	44.4	9.2	13.7	11.4
30-40	43.0	9.2	13.9	12.2
40-50	41.0	9.4	14.6	12.7
50-60	39.7	9.5	15.2	13.1
60-70	37.4	9.4	15.7	13.6
70-80	36.0	9.7	15.7	14.2
80-90	34.1	9.7	15.9	14.9
90-100	30.1	9.5	16.2	14.8
Overall avg.	40.0	9.4	14.8	12.9

Table A.3 shows the distribution of protein consumption across states. Once again, there's considerable variation, with protein consumption crossing 80g/consumer unit/day (a third above the RDA limit assuming low-quality sources of protein) in seven states or union territories—Lakshadweep, Goa, Chandigarh, Sikkim, Andaman & Nicobar, Himachal Pradesh and Kerala—but only 59.4 g/consumer unit/day in Meghalaya and 60.8 g/consumer unit/day in Jharkhand. However, even relatively poorer states like Uttar Pradesh (at 63.3 g/consumer unit/day) and Bihar (at 72.8 g/consumer unit/day) have average consumption above the 60g/consumer unit/day threshold.

How has the consumption of calories and proteins changed over time? Table 5 presents the average calorie and protein consumption in 2011-12, based on the NSS 68th round ([National Sample Survey Office, 2014a](#)), compared to the HCES 2023-24 numbers. This table is based on the Nutritional Intake in India reports ([National Sample Survey Office, 2014b](#)) and ([National Statistical Office, 2025b](#)). Substantial changes in survey methodologies (including in the list of items included in the two surveys) complicate the comparison of the NSS 2011-12 with the HCES 2023-24, so these changes over time should be viewed as indicative only. We see a slight decline in average per capita calorie consumption in rural areas and a slight increase in urban areas. Per consumer unit calorie consumption declines substantially from 2011-12 to 2023-24 in both rural and urban areas. It is not clear how much of this is because of change in population composition and how much is attributable to the change in survey methodologies. We see similar trends in protein consumption as well, with the average protein consumption per capita improving slightly and the per consumer unit protein consumption declining substantially between the two years. It is reassuring to see that the share of protein coming from cereals, low-quality sources, has decreased substantially from 58 to 45.9% in rural and 49 to 38.7% in urban areas, pointing to an improvement in the quality of proteins even as other aspects of diet quality remain a concern.

Table 5: Change in daily intake of calories and protein over time

	Daily intake per capita				Daily intake per consumer unit			
	Rural		Urban		Rural		Urban	
	2011–12	2023–24	2011–12	2023–24	2011–12	2023–24	2011–12	2023–24
Calories (kcal)	2223	2212	2206	2240	2752	2383	2700	2472
Protein (gms)	60.7	61.8	60.3	63.4	74.8	66.6	73.8	69.9
Share of protein from cereals (%)	58.0	45.9	49.0	38.7	58.0	45.9	49.0	38.7

Notes: Authors' calculations from ([National Sample Survey Office, 2014b](#)) and ([National Statistical Office, 2025b](#)).

Lastly, we investigate the average consumption of fats. ([Food and Agriculture Organization of the United Nations and World Health Organization, 2024](#)) recommends that, in adults, a minimum of 15-30% of calories consumed per day should come from fats. Assuming fat energy content of 9 kcal/g and taking the 2325 kcal/day recommendation, one consumer unit should consume between 38.75 and 77.5 g of fats per day. We estimate the national average per consumer unit total fat consumption at 68.4g/day; and though this is somewhat higher in urban areas at 76.9 g/day than in rural areas, where fat consumption is 64.9g/day (Table 6), both rural and urban fat consumption is well within the specified limits. Fat consumption varies by caste groups (not shown in the table), with STs consuming 58.1 gms/consumer unit/day, SCs 65.3g/consumer unit/day, OBCs 68.8g/consumer unit/day, and other caste groups consuming the highest quantities of fat on average, at 74g/consumer unit/day. Fat consumption also increases steeply across MPCE deciles, with the richest deciles in both rural and urban areas consuming twice as much fat per consumer unit per day as the poorest decile.

For a healthy diet, ([ICMR-NIN, 2024](#)) distinguishes between *non-visible* sources of fat, those that are integral components of foods such as nuts and seeds or animal-sourced foods, and *visible* fat, such as cooking oil, ghee and butter, that is, fats and oils that are added to foods during cooking or at the time of eating. While adequate consumption of nuts, oilseeds, and other foods should provide the amount of fat needed for essential bodily functions, visible fat is almost universally used in food preparation, so ([ICMR-NIN, 2024](#)) provides recommendations on the amount of such fat that can be consumed per person per day. Adult women or men with sedentary lifestyles should consume between 20 and 30g of visible fat daily. Those engaged in moderate or heavy physical activity can consume more: between 40 and 50g of visible fat for adult men, and between 30 and 40 g of visible fat for adult active women.

We estimate the amount of visible fat in an average Indian diet. The HCES records the fat content of all foods, including served prepared meals and processed foods. For these composite foods, it is not clear how to separate visible fats from those inherent to the raw foods themselves. Thus, we calculate a lower bound on visible fat content by only including fat content of the recorded quantities of cooking oils, ghee, or butter. Even so, our estimates suggest that visible fat consumption is far higher than recommended (Table 6). Importantly, our estimates of visible fat consumption exceed 30g/day for all but the lowest three deciles in rural areas and the lowest

decile in urban areas. Actual visible fat consumption is likely to be even higher once processed foods and prepared meals are accounted for. In the richest MPCE deciles in both rural and urban areas, visible fat consumption is 42.2g/day in rural and 47.6g/day in urban areas, which is 1.5-2 times the recommended amount. Interestingly, visible fat as a proportion of total fat consumption declines with wealth, with the lowest MPCE deciles consuming $\sim 58\%$ of total fat from visible fats, compared to $\sim 46\%$ in the richest MPCE deciles. However, in both rural and urban areas, visible fat consumption accounts for *at least* 45% of total fat intake in every MPCE decile.

Table A.4 shows the variation in fat consumption across states: the north-eastern states of Nagaland, Meghalaya, Manipur and Assam have comparatively lower fat consumption of less than 52g/consumer unit/day, while Chandigarh and Sikkim have the highest fat consumption, at more than 100g/consumer unit/day.

Table 6: Estimated daily fat intake by wealth deciles, rural and urban areas

Decile	Rural			Urban		
	Total Fat (g/cu/day)	Visible fat (g/cu/day)	Visible fat propn (%)	Total fat (g/cu/day)	Visible fat (g/cu/day)	Visible fat propn (%)
0-10	43.6	25.6	58.9	51.6	29.9	57.9
10-20	51.1	28.1	55.1	61.5	33.4	54.4
20-30	55.3	29.7	53.7	66.7	35.5	53.2
30-40	58.9	31.1	52.8	70.2	36.9	52.6
40-50	62.1	32.1	51.8	73.8	37.7	51.1
50-60	65.4	33.2	50.9	77.7	39.7	51.0
60-70	68.3	34.2	50.1	81.6	40.2	49.2
70-80	72.4	35.3	48.8	86.5	41.9	48.4
80-90	78.1	36.9	47.2	93.4	44.6	47.8
90-100	91.7	42.2	46.1	103.9	47.6	45.8
Overall	64.9	32.9	50.7	76.9	38.9	50.6

Notes: Authors' calculations. Visible fat refers to fat coming from the recorded quantities of cooking oils, ghee, or butter. It does not account for visible fats included in served prepared meals or other processed foods, since the amount of visible fat content is unknown. Therefore, it is likely to be an underestimate of the total amount of visible fat consumed.

5 The cost and affordability of a healthy diet (CoHD)

5.1 Estimating the CoHD

Table 7 presents our estimates of the cost of a healthy diet across Indian states, for both rural and urban areas. Overall, at the all-India we estimate that it would cost INR 63.6 per consumer unit per day to purchase a vegetarian diet that meets the Indian FBDGs, with this cost slightly higher in urban areas (at INR 68.3 per consumer unit per day) than in rural areas (at INR 60.9 per consumer unit per day). For consumers purchasing a non-vegetarian diet that meets Indian FBDGs, the national average costs are INR 73.1 per consumer unit per day, INR 77.6 in urban and INR 70.6 in rural areas. Since FBDGs typically account for local diet composition and preferences, and since the CoHD does not select on nutrient or calorie values but on least-cost within food groups, least-cost diets tend to look like the kinds of diets people actually consume. Table A.5 shows the two most commonly recurring items in a least-cost diet nationally (the specific items would vary by state, the nationally aggregated commonly occurring items are presented here as an illustration); as one can see from this table, the least-cost diet is familiar: rice and wheat, split gram and besan, milk (liquid and condensed or powdered), potatoes and peas, palak (spinach) and other leafy vegetables, groundnuts and cashewnuts, bananas and other dry fruits, eggs and buffalo meat, and refined and mustard oils.⁸

It is evident from the tables that the cost of a healthy diet varies considerably across states. To see this more clearly, Figure 7 depicts the state-wise variation in the CoHD. Darker colours represent a higher CoHD. As the figure shows, the patterns in variation are roughly the same for the vegetarian and non-vegetarian CoHD – southern and north-eastern states have higher CoHD, as does Gujarat in the west. A healthy diet is relatively cheaper in the states in the central belt—Rajasthan, Madhya Pradesh, Jharkhand, Uttar Pradesh, Bihar and Odisha—indicating lower food prices or possibly lower quality foods within the same food groups.

How different is actual expenditure from what people would need to spend to meet the

⁸Since eggs appear almost universally as the cheapest non-vegetarian food, the nutrient values used for eggs matter for our estimates of the non-vegetarian CoHD. If we use the (assumed incorrect) nutrient composition for eggs as provided in (National Statistical Office, 2025b), then the cost of a non-vegetarian diet is *lower* than that of a vegetarian diet, estimated at INR 66.8 per consumer unit per day nationally, INR 64.2 for rural and INR 71.3 for urban areas. Table A.6 provides the variation across states of this alternate CoHD. For reasons discussed above in Section 3, we believe the estimates we provide in the main text are correct.

healthy diet requirements? Table 8 presents the per consumer unit average expenditures nationally by food group against the cost that would need to be incurred (using national prices) to meet the Indian FBDGs. Average expenditures are lower than the CoHD amounts for cereals, pulses, dairy, vegetables, DGLV, nuts and seeds, and eggs and flesh foods (for the non-vegetarian CoHD), and only exceed the CoHD amount in the case of fruits and edible oils. However, actual expenditures also include substantial expenditures on spices, salt and sugar, beverages and processed foods, items not included in the CoHD recommendations. Table A.7 and Table A.8 present the same comparison for rural and urban areas, respectively.

Table 7: The estimated cost of a healthy diet, across states in rural and urban areas

State	Cost of a vegetarian healthy diet (2023-24 INR)			Cost of a non-vegetarian healthy diet (2023-24 INR)		
	Overall	Rural	Urban	Overall	Rural	Urban
Andaman & Nicobar	93.3	91.4	95.0	106.1	104.9	106.9
Andhra Pradesh	64.0	64.4	63.1	73.0	73.4	72.0
Arunachal Pradesh	80.3	79.7	81.7	91.7	91.0	93.1
Assam	70.9	68.1	76.0	81.7	79.0	86.3
Bihar	54.1	53.8	57.4	63.2	64.9	66.4
Chandigarh	74.3	74.0	74.3	82.6	82.2	82.5
Chhattisgarh	51.1	44.9	59.2	60.1	54.0	68.1
Dadra Nagar Haveli & Daman & Diu	66.8	65.5	67.2	77.0	75.9	77.2
Delhi	62.8	52.8	62.9	72.6	62.4	72.7
Goa	78.9	80.2	77.5	88.0	89.5	86.4
Gujarat	65.7	59.5	68.9	75.4	69.2	78.6
Haryana	62.6	59.3	68.3	74.9	72.6	79.6
Himachal Pradesh	62.3	61.6	61.7	72.6	72.0	72.1
Jammu And Kashmir	61.6	60.7	65.0	71.2	70.3	74.3
Jharkhand	56.9	56.0	59.8	67.3	66.4	70.2
Karnataka	68.3	63.8	70.7	77.3	72.8	79.7
Kerala	76.0	75.4	76.5	84.5	83.9	85.0
Ladakh	64.1	63.0	68.4	70.6	69.7	74.6
Lakshadweep	98.3	93.4	99.5	108.5	102.8	110.0
Madhya Pradesh	52.4	50.8	58.0	62.7	61.1	68.6
Maharashtra	64.9	61.2	68.4	74.0	70.5	77.4
Manipur	74.4	73.2	78.1	87.4	86.1	91.1
Meghalaya	74.4	73.7	78.1	85.4	84.8	88.8
Mizoram	82.5	85.5	81.4	94.2	97.2	93.4
Nagaland	81.2	78.3	87.3	91.1	88.4	96.8
Odisha	53.7	53.0	57.3	64.0	63.3	67.7
Puducherry	76.4	76.9	75.9	83.7	83.9	83.3
Punjab	62.7	61.6	63.4	72.7	71.4	73.7
Rajasthan	55.2	54.0	59.0	66.9	66.0	70.1
Sikkim	82.7	82.9	82.2	98.5	100.2	95.6
Tamil Nadu	74.7	72.8	76.7	82.7	81.0	84.6
Telangana	70.0	65.9	75.7	78.6	74.6	84.4
Tripura	71.0	70.5	72.7	82.6	82.2	84.0
Uttar Pradesh	55.8	54.2	60.2	66.3	64.5	70.6
Uttarakhand	61.5	61.7	64.3	70.4	70.4	73.5
West Bengal	61.3	59.2	62.9	70.0	67.9	71.5
All India	63.6	60.9	68.3	73.1	70.6	77.6

Notes: Authors' calculations. The composition of a vegetarian and non-vegetarian healthy diet is given in Table 1. Calculations for the non-vegetarian diet assume the weight in grams of an average sized egg and adjust calorie conversions accordingly. See text for details.

Figure 7: Cost of a healthy diet, across states

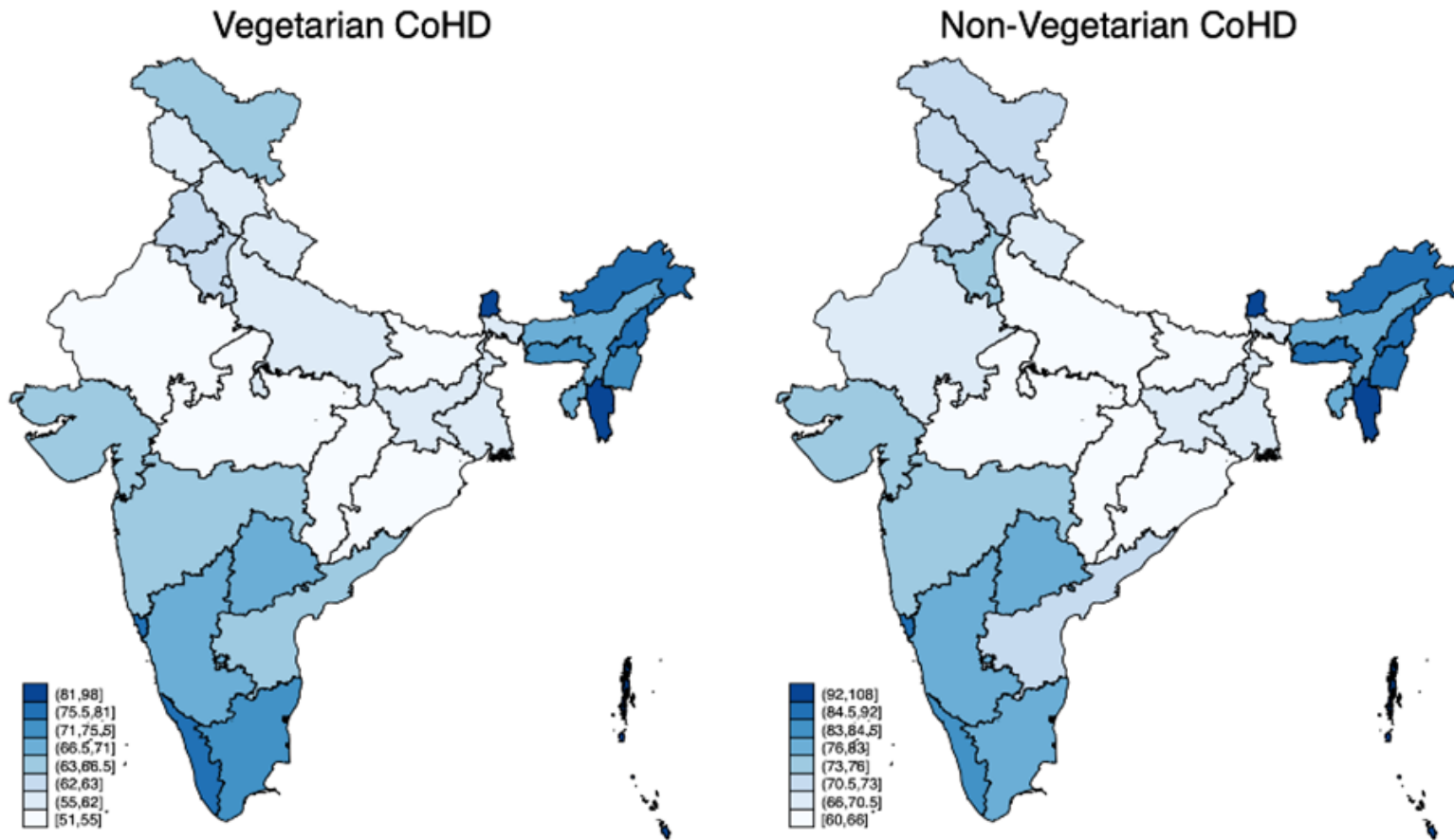


Table 8: Average expenditure by food group against the cost of components of a healthy diet, national estimates

Food Group	Average expenditure on food (in 2023-24 INR)	Cost of a Healthy Diet (in 2023-24 INR)	
		Vegetarian	Non-vegetarian
Cereals and cereal substitutes	8.1	11.9	12.4
Pulses	3.2	8.6	5.6
Dairy*	11.4	14.6	14.6
Vegetables	8.2	8.0	8.5
DGLV	0.6	5.6	5.9
Fruits	4.7	3.2	3.2
Nuts and seeds	1.4	7.6	6.6
Egg and flesh foods	8.0	n/a	12.5
Oils and fats	5.4	4.0	4.0
Spices & garnishes**	6.7	n/a	n/a
Salt and sugar	1.4	n/a	n/a
Beverages	4.5	n/a	n/a
Processed foods	14.1	n/a	n/a

Notes: Authors' calculations. The composition of a vegetarian and non-vegetarian healthy diet is given in Table 1. Calculations for the non-vegetarian diet assume the weight in grams of an average sized egg and adjust calorie conversions accordingly. DGLV = dark-green leafy vegetables. *: Expenditure on dairy includes other milk products, like ice-cream and lassi. While lassi would normally be included in the CoHD, the HCES only records the value of lassi consumption with no corresponding quantities, so we excluded this from our calculations. **: Spices and garnishes include turmeric, dry chillies, cumin, coriander powder, ginger, garlic, tamarind, black pepper etc., as well as foods used as garnish like lemon, fresh chillies and fresh coriander. See text for details. n/a = not applicable.

Our estimates of CoHD are lower than the estimates of thali prices as provided by (CRISIL Market Intelligence & Analytics, 2024) and (Ghatak and Kumar, 2024). While we cost India’s food based dietary guidelines, these other estimates consider composite meals that meet some, but not all, nutrient needs, but also use different calorie and other benchmarks. For example, the CRISIL vegetarian thali comprises wheat flatbread (roti), vegetables (onion, tomato and potato), rice, pulses, yoghurt, and salad, while their non-vegetarian thali has the same elements, except pulses, which are replaced by chicken (broiler). Dark green leafy vegetables and nuts and seeds are entirely missing, and the diet emphasizes potatoes as the main vegetable, which NIN recommends should only be consumed in small quantities and along with other vegetables. (Ghatak and Kumar, 2024) cost a *khichdi* meal comprising rice, lentils, okra, oil and onions (again missing several key nutritious food groups), assuming only 1800 kcal per person per day, and estimate costs using prices from the Government of Kerala website only.

A more relevant comparison would be to other papers that have also used the CoHD and ICMR-NIN FBDGs in India, though these papers also differ in the guidelines used, time period studied, and in the coverage of the price data, both in terms of the breadth of commodities and geographies. (Raghunathan et al., 2021) use rural wage and price data from 2001-2011 and estimate the 2011 CoHD at INR 50.7 in 2011 prices, or approximately INR 85-87 in 2023-24 prices. This analysis was based on the earlier NIN guidelines from 2011 (National Institute of Nutrition, 2011). (Narayanan et al., 2024) use NIN’s 2023 guidelines and urban prices to estimate the CoHD, and find a much lower cost of around INR 40 per person per day in 2018 prices, or approximately INR 52-53 in 2023-24 prices. However, their analysis uses a limited set of commodities and administrative prices for a relatively small set of districts only, which might account for differences. Finally, (Chauhan et al., 2024) use 2023 primary survey data from rural areas of one district in Bihar, Nalanda, to estimate a CoHD of INR 56 per person per day. We believe our analysis—based on data that is large-scale, nationally representative, and at the household level, with a comprehensive set of commodities—provides more robust estimates at the all-India and state levels. Table 9 provides the full comparison of our estimates against other attempts to quantify the cost of a diet.

Table 9: Comparisons of our CoHD estimates with the literature

	Daily costs of a diet (in 2023-24 INR)	
	Rural	Urban
Our estimates (CoHD)		
Vegetarian	60.9	68.3
Non-vegetarian (w/ corrected egg)	70.6	77.6
non-vegetarian (w/ incorrect egg)	64.2	71.3
Other authors' estimates*		
(CRISIL Market Intelligence & Analytics, 2024)	56.2 (vegetarian)	104 (non-vegetarian)
(Ghatak and Kumar, 2024)	83.2	
(Raghunathan et al., 2021)	85-87	
(Narayanan et al., 2024)	n/a	52-53
(Chauhan et al., 2024)	56	
FAOSTAT	75.33 (2023); 81.06 (2024)	

Notes: Authors' calculations and cited references. *: Composite meals are defined in different ways by each of these authors, complicating exact comparisons. We refer the readers to the text for details.

5.2 Affordability of the healthy diet

From a policy perspective, it is important to assess how many people can afford a healthy diet that follows the ICMR-NIN guidelines. To answer this, Table 10 compares the non-vegetarian CoHD against several thresholds (see Section 3.2 for details): current reported expenditure on food, and two benchmarks that use the threshold for unaffordability as given in (FAO et al., 2025) (based on (Bai et al., 2024)); one calculated using the costs as given in (FAO et al., 2025),⁹ and the second calculated using the costs we estimate in this paper.

If we consider current food expenditures (at the all-India, rural, and urban levels, as appropriate) as the benchmark, we find that 56.6% of the population in rural areas and 31.2% in urban areas currently spend less on food than they would need to spend to meet the recommended diet guidelines. Nationally, slightly under half (49.1%) of Indians will not be able to meet the ICMR-NIN guidelines if they do not increase the amount they spend on food. This is a reasonable estimate of unaffordability, given that the proportion of food expenditure to total consumption expenditure is already high, at 47% in rural and 40% in urban areas on average. People might simply not be able to increase the amount they spend on food.

Current food expenditures, however, account for income constraints as well as other factors, like people’s tastes and preferences or their understanding of the composition of a healthy diet. Therefore, we compare our estimates of the per capita non-vegetarian CoHD against two other thresholds. Using the SOFI report threshold and their estimated costs, 42% of rural, 9.9% of urban, and 32.4% of the national population are unable to afford a healthy diet. If instead we use the SOFI report threshold but our estimated costs, 32.6% of rural, 8.3% of urban, and 25.4% of the national population would not be able to afford a healthy diet.

As might be expected, the affordability percentages vary considerably by state. Tables A.9, A.10 and A.11 present the affordability estimates by state for the same three benchmarks given above.

One final—though extreme—comparison can be made with total consumption expenditure. Our estimates suggest that 0.7% of urban and 3.1% of rural populations (for a national average of 2.4%) have a current total consumption expenditure that is lower than the CoHD. This alone

⁹Since our data spans 2023 and 2024, we use a SOFI estimated CoHD of INR 78.2, which is the average of the CoHD reported in 2023 (INR 75.33) and in 2024 (INR 81.06).

amounts to approximately 35 million individuals, a sobering fact.

5.3 Extensions

The CoHD is the minimum daily expenditure one would have to incur to purchase foods in the quantities required to meet the food-based dietary guideline. However, the CoHD does not include additional costs, such as the cost of spices and fuel, nor does it account for subsidized or free food provision or for consumption from own production. In section 4.1, we show that home production is only a small component of overall food expenditures, even in rural areas. However, the other two remain valid extensions to the CoHD. In particular, given that almost two-thirds of the population have access to cereals through India's Public Distribution System (PDS) for free or at negligible prices, it is important to estimate how much the CoHD and affordability estimates change once those transfers are accounted for.

Table 10: The affordability of a healthy diet using different thresholds

	% Population for whom CoHD is above:		
	Current food expenditure (1)	SOFI report threshold (SOFI estimated costs) (2)	SOFI report threshold (our estimated costs) (3)
Rural	56.6	42.0	32.7
Urban	31.2	9.9	8.3
All India	49.1	32.4	25.4

Notes: Authors' calculations. The SOFI report refers to (FAO et al., 2025). Column (2) uses the cost of a healthy diet and the unaffordability threshold for India as reported in (FAO et al., 2025). Column (3) uses the unaffordability threshold from (FAO et al., 2025), but the cost of a non-vegetarian diet as estimated in this paper. In each case, we compare the household-level daily CoHD against the relevant threshold, and then categorize households into those that can and cannot afford a healthy diet. We then estimate the proportion of the total population that cannot afford the healthy diet, taking household size into account. See Section 3 for details.

5.3.1 Accounting for the costs of fuel and spices

We compute an estimate of the daily cost of fuel and spices per day based on the Thalinoemics chapter of the 2020 Economic Survey ([Government of India, 2020](#)). We use the benchmark quantities of spices—turmeric, salt, dry chillies, coriander, mixed spices, ginger and garlic—used to prepare vegetables, pulses, and non-vegetarian foods provided in Table A of ([Government of India, 2020](#)) as follows: 0.2g turmeric, 0.5g dry chillies, 1g salt, 0.5g coriander powder for the vegetable preparation; 0.2g turmeric, 0.2g salt, 0.2g dry chillies, 1g cumin/mustard seeds for pulses; and 0.1g turmeric, 0.2g dry chillies, 0.5g salt, 0.2g coriander powder, 0.1g mixed spices, 0.5g ginger, 0.5g garlic for the non-vegetarian component. We exclude tomato, onion and edible oils, since these appear in the other food groups considered for the CoHD estimation. Thalinoemics used the outdated 2011 NIN FBDGs, so the recommended quantities of vegetables, pulses, and eggs and flesh foods differ from what we use in this paper. To keep things simple we do not scale the quantities of the spices, but include all three in the calculation of additional costs for a non-vegetarian healthy diet, and only the spices for vegetables and pulses in the additional costs for a vegetarian healthy diet. We also double the quantities to estimate the daily additional cost of these spices.

We also estimate the additional expenditure on fuel, following the approach used in ([Government of India, 2020](#)). We take the monthly expenditure on fuel and firewood at the household level, divide it by 30 to get the household-level daily cost, and then by the number of consumer units in the household to get a per consumer unit daily cost of fuel. This implicitly assumes that the amount of fuel used scales linearly with the number of consumer units in the household.

According to our calculations, the addition of spices and fuel costs raises the cost of the non-vegetarian healthy diet by INR 9.5 nationally; INR 9.0 in rural and INR 10.6 in urban areas. About two-thirds of this additional cost coming from fuel, INR 6.1 in rural and INR 7.4 in urban areas.

5.3.2 Accounting for social safety net transfers

We also update the CoHD estimates to account for PDS transfers of cereals, mainly rice and wheat, which constitute the majority of transfers under this scheme.¹⁰ To provide an upper bound on the subsidy amount, we assume universal coverage of the PDS and that every person receives their full entitlement of 5 kg cereal per month. Taking the quantities of a reference cereal as provided in (ICMR-NIN, 2024)—302g per consumer unit for a 2325 kcal non-vegetarian diet—the overall recommended cereal quantity per month is approximately 9kg per consumer unit.¹¹ The PDS accounts for more than half of this cereal allocation. Adjusting for this in-kind subsidy reduces the cost of a non-vegetarian diet by INR 6.3 in rural and INR 7.2 in urban areas.

5.3.3 Adjusted affordability estimates

To illustrate how these extensions affect affordability, we re-estimate the proportion of population that cannot afford a healthy diet, using current food expenditure as the threshold. Table 11 provides five sets of affordability estimates. Column (1) is the base case, reproduced from Column (1) of Table 10. Subsequent columns add spices, fuel, and in-kind PDS transfers.

If we include the cost of spices only, the proportion of the population who cannot afford the CoHD increases to 53.4% nationally, while including spices and fuel raises this proportion to 61.8%. Accounting only for the PDS reduces the proportion of the population that cannot afford the CoHD based on current food expenditure to 40.8%; adding spices but not fuel to this raises this proportion to 45.4%. Finally, Column (6) accounts for PDS, spices *and* fuel—doing this results in 54.7% of the population not being able to afford a healthy diet, 62.4% in rural and 36.5% in urban areas.

¹⁰The PDS provides for non-cereal items, such as sugar, kerosene and occasionally pulses, with variation across states. However, the main component of the program is cereals, of which rice and wheat are the most common.

¹¹Ideally one would follow the method described above, of estimating the quantities of each cereal based on the kcal recommendations. But the PDS allows for several cereals with differing energy content. To simplify things, we use the quantity conversion as given and cost the remainder of the cereal component at the average price of the two lowest-cost cereals.

Table 11: Affordability of the CoHD, accounting for spices, fuel, and in-kind transfers from the PDS

% Population who cannot afford CoHD, using current food expenditure as benchmark									
	No adjustments (base case)	Adjusted to account for PDS	Adjusted to account for spices	Adjusted to account for PDS and spices	Adjusted to account for spices and fuel	Adjusted to account for PDS, spices and fuel			
Rural	56.7	48.0	61.3	53.0	69.6	62.5			
Urban	31.2	24.1	35.1	27.8	43.9	36.6			
All India	49.2	40.9	53.5	45.5	61.9	54.8			
% Population who cannot afford CoHD, using the SOFI threshold and our costs as benchmark									
	No adjustments (base case)	Adjusted to account for PDS	Adjusted to account for spices	Adjusted to account for PDS and spices	Adjusted to account for spices and fuel	Adjusted to account for PDS, spices and fuel			
Rural	32.7	28.3	35.4	30.7	40.4	36.0			
Urban	8.3	6.6	9.4	7.5	11.8	9.8			
All India	25.4	21.8	27.6	23.8	31.9	28.2			

Notes: Authors' calculations. Column (1) reproduces the base case in column (3) of Table 10. Subsequent columns adjust affordability estimates for the addition of PDS in-kind transfers, spices, and fuel. See section 5.3 for more details.

6 Discussion

We use data from the Household Consumption Expenditure Survey 2023-24 to characterize Indian diets, estimate the cost of meeting the recommendations for a healthy diet, and estimate the proportion of the population that is unable to afford such a diet. We find that rural and urban monthly per consumer unit food expenditure is 39-47% of total expenditure, and shows considerable variation both by occupation and by caste groups. As we move up the MPCE deciles in both rural and urban areas, food expenditures fall as a proportion of total expenditures, but remain close to 40% in the richest deciles of rural areas. The richest decile in urban areas, in comparison, spends a little over 30% of total income on food.

We also assess the composition of Indian diets. Average per consumer unit calorie consumption is 2378 kcal/day in rural and 2468 kcal/day in urban areas, above the recommended 2325 kcal/consumer unit/day. However, these averages mask considerable variation across MPCE deciles; for the bottom four deciles in both rural and urban areas the calorie consumption is lower than the benchmark. The poorest are still not able to meet their daily calorie threshold. All but the lowest two deciles in rural and the lowest decile in urban areas consume more than 60g of protein per consumer unit per day, the RDA assuming low-quality protein sources. Protein deficiency does not appear to be a problem, but the source of protein remains a concern, with more than half of all protein consumption coming from cereals and only a small fraction from high-quality sources like pulses, eggs, fish, meat or dairy, even in the highest MPCE deciles. The contribution of cereals to overall protein consumption is more than the recommended threshold of one-third (33.3%) for all rural deciles and all but the two richest urban deciles. Finally, while the national average fat consumption falls within the recommended 15-30% of daily energy, fat consumption increases steeply across MPCE deciles and the top two rural and top five urban deciles consume more than the recommended amount of total fat daily. Visible fat consumption is about half of total fat consumption, and is greater than the recommended amount for almost all deciles in urban and all but the poorest three deciles in rural areas. High fat content is a matter of considerable concern, given the rise in overweight and obesity prevalence over recent years. Our estimates do not account for fat coming from prepared meals or from processed foods, and as a result, are likely to be substantially lower than the actual average consumption.

In addition to characterizing existing diets, estimating the cost and affordability of a healthy diets can assist policymakers in designing interventions to improve dietary diversity and, in turn, nutrition and health outcomes. In this paper, we use the cost of healthy diet, which is the least-cost way of meeting a country’s food-based dietary guidelines. We estimate CoHD for vegetarian and non-vegetarian diets, and for urban and rural areas, using the average prices at the state- and national-level. We estimate the cost of a vegetarian healthy diet at INR 62 per consumer unit per day, and for a non-vegetarian diet at INR 71.4 per consumer unit per day at the all-India level.

The CoHD is most useful when used to provide an estimate of how affordable healthy diets are. Using different cut-off thresholds, we find that 25% to 49% of the Indian population cannot afford a healthy diet. This is comparable to (though somewhat lower than) other estimates of affordability in the Indian context ([Raghunathan et al., 2021](#); [Gupta et al., 2021](#)), though once again direct comparisons are not always possible. While a similar exercise could be carried out using the unit data from the 2011-12 Indian Consumption Expenditure Survey, the precursor to the HCES data we use in this paper, changes in the methodology between CES 2011-12 and the HCES 2022-23 and HCES 2023-24 render these datasets incomparable.

While the estimates of the cost of a healthy diet and their comparisons with various thresholds used in the literature are important for policy, the CoHD represents the least-cost way of attaining the healthy diet, without accounting for other factors that affect food costs. We explore two extensions: first, we include the cost of spices and fuel, which serves to increase our estimates of the daily costs of preparing a healthy diet. Second, we account for the free cereals provided to the poor under the PDS, which serves to reduce the cost of the healthy diet by subsidizing one key food group. If we account for the PDS, spices and fuel costs, 54.7% of the population would need to increase their current food expenditures to meet the cost of a healthy diet.

The CoHD is limited in another way, which is that it abstracts from tastes and preferences, a crucial part of how we eat. Rice-eating communities in the south and east of India will not switch to consuming wheat just because wheat is cheaper. It is possible to incorporate preferences into the estimation of the CoHD, in what is known as the CoHD-FP (“food preference weighted”). Using data from Myanmar, ([Mahrt et al., 2022](#)) show that doing so raises the CoHD by about

25%. Such an exercise could take the analysis forward for the Indian context.

What are the implications of our analysis for policy? The focus on nutrition and on a diet that meets nutritional requirements represents a departure from the traditional focus of food policies—both globally and in India—which have prioritized calorie sufficiency through staple grains such as rice and wheat. While our results show that the calorie sufficiency goal remains elusive for the poorest MPCE deciles, policy attention needs to expand to include a focus on nutrition security, thereby enabling good quality and diverse diets for all. There are several pathways through which this can be achieved. Improving household incomes, by enhancing employment and wages, would have a direct impact on consumption expenditure and affordability. Enhancing social safety net transfers, such as those provided through PDS, school meals, and the Integrated Child Development Scheme (ICDS), to meet food security *and* nutrition goals would provide critical support for the poorest. Many have recommended expanding the diversity of these transfers by including pulses in the PDS, eggs and fruits in school meals, and so on, and some individual states have experimented with these additions. Undertaking these reforms at the national level, however, would require specific efforts to ensure availability, and establish cold-chains and improve storage and transportation arrangements.

Increasing the availability of healthy foods is another way of addressing dietary shortfalls. At present, the average expenditure on nutritious foods like pulses, vegetables, nuts and seeds, eggs and flesh foods is below the minimum expenditures required to meet the healthy diet requirements. Understanding the determinants of the spatial variation in prices and factors affecting the availability of vegetables and fruits throughout the year is an essential step in this regard. Availability of these foods could be enhanced through agriculture policies that support the production of nutritious foods, along with support to farmers for cereal production. Presently, India is import-dependent for pulses and edible oils, resulting in price volatility and the inability for domestic policy to control prices.

Importantly, there is a strong role for information and behavior change communication along with other policy changes. Our results show that the richest MPCE deciles in both rural and urban areas are already spending more than they need to in order to meet the healthy diet requirements, but the allocation of this expenditure is less than optimal, resulting in high-fat, cereal-heavy diets, and limited protein consumption from high-quality sources. Information on

the importance of a diverse diet and its composition is necessary, even if not sufficient. The good news is that as part of the flagship national nutrition mission, or POSHAN Abhiyaan, the Indian government has already invested heavily in social and behavior change communication, suggesting that the necessary framework and manpower exists and can be leveraged.

Regulatory practices can help increase the costs of unhealthy foods relative to healthy foods, especially for ultra-processed foods, which are linked to a deterioration in diet quality and diet-related chronic disease ([Monteiro et al., 2025](#)). Even as a large proportion of Indians are unable to afford a least-cost healthy diet, the expenditure on processed and packaged foods has been increasing over time, with the share of beverages and processed foods in total expenditure increasing from 15% in 2011-12 to 21% in 2023-24 in rural areas and from 21% to 28% in urban areas. Consumption of processed foods and meals away from home—typically rich in salt and fats—is more common among the richer MPCE deciles and in urban areas but has been increasing across all deciles. Fiscal and regulatory policies such as “sin-taxes” on high-sugar, high-oil, or high-salt foods, front-of-package labeling, restricting sale of unhealthy ultra-processed foods close to places that adolescents frequent, and regulating advertisements have been shown to be effective in changing behavior and raising awareness in other contexts (for example, ([Cobiac et al., 2024](#); [Salgado Hernández et al., 2023](#); [Arellano-Gómez et al., 2023](#); [Dillman Carpentier et al., 2020](#))). The 2025 Lancet report on ultra-processed foods addresses policies to reduce their consumption and exhorts countries to adopt policies that can help promote healthier diets ([Scrinis et al., 2025](#)).

Our work shows that Indian diets remain deficient and insufficiently diverse. With the slow improvement in nutrition indicators over the last few decades and the health and other costs of ill-health, we can no longer afford to be complacent. The regular tracking of the cost of a healthy diet and of the composition of Indian diets is critical, as are urgent steps towards enhancing the demand for and affordability of healthy foods.

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CRedit statement

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Appendix

Table A.1: State-wise monthly per consumer unit expenditure on food

State	Monthly per consumer unit food consumption expenditure (INR)
Andaman & Nicobar	4203
Andhra Pradesh	2755
Arunachal Pradesh	3447
Assam	2306
Bihar	2165
Chandigarh	5432
Chhattisgarh	1538
Dadra & Nagar Haveli & Daman & Diu	3029
Delhi	3663
Goa	4729
Gujarat	2694
Haryana	3150
Himachal Pradesh	2883
Jammu and Kashmir	2698
Jharkhand	1727
Karnataka	2705
Kerala	3019
Ladakh	3207
Lakshadweep	3738
Madhya Pradesh	1822
Maharashtra	2327
Manipur	2479
Meghalaya	2310
Mizoram	3389
Nagaland	2924
Odisha	1899
Puducherry	3647
Punjab	2883
Rajasthan	2392
Sikkim	5401
Tamil Nadu	3038
Telangana	3039
Tripura	3262
Uttar Pradesh	1921
Uttarakhand	2555
West Bengal	2231

Notes: Authors' calculations from the 2023–24 Household Consumption Expenditure Survey (HCES). INR denotes Indian Rupees.

Table A.2: Estimated daily average calorie intake (in kcal per consumer unit per day), by state

State	Overall	Rural	Urban
Andaman & Nicobar	2518	2451	2619
Andhra Pradesh	2495	2491	2504
Arunachal Pradesh	2546	2466	2942
Assam	2251	2216	2546
Bihar	2556	2539	2719
Chandigarh	2970	2558	2992
Chhattisgarh	2486	2453	2619
Dadra & Nagar Haveli & Daman & Diu	2575	2393	2670
Delhi	2417	2309	2420
Goa	2907	2742	3029
Gujarat	2376	2258	2536
Haryana	2556	2542	2579
Himachal Pradesh	2828	2813	2968
Jammu and Kashmir	2605	2610	2587
Jharkhand	2257	2228	2376
Karnataka	2400	2336	2515
Kerala	2316	2266	2370
Ladakh	2568	2509	2897
Lakshadweep	2624	2593	2636
Madhya Pradesh	2261	2245	2305
Maharashtra	2254	2206	2319
Manipur	2438	2388	2599
Meghalaya	2121	2086	2339
Mizoram	2496	2343	2686
Nagaland	2173	2092	2399
Odisha	2559	2543	2643
Puducherry	2457	2403	2484
Punjab	2493	2436	2588
Rajasthan	2611	2611	2612
Sikkim	3281	3171	3622
Tamil Nadu	2429	2339	2536
Telangana	2607	2539	2697
Tripura	2694	2656	2871
Uttar Pradesh	2265	2255	2301
Uttarakhand	2441	2414	2519
West Bengal	2431	2433	2424

Notes: Authors' calculations.

Table A.3: Estimates of protein intake (g/consumer unit/day),
across states

State	Overall	Rural	Urban
Andaman & Nicobar	81.2	78.2	85.9
Andhra Pradesh	70.9	70.7	71.5
Arunachal Pradesh	71.3	68.7	84.2
Assam	62.9	61.6	73.9
Bihar	72.8	72.3	78.1
Chandigarh	90.9	77.1	91.6
Chhattisgarh	63.8	62.6	68.4
Dadra & Nagar Haveli & Daman & Diu	71.2	64.9	74.5
Delhi	69.1	65.9	69.2
Goa	92.6	88.8	95.5
Gujarat	61.4	58.7	65.3
Haryana	72.1	71.8	72.7
Himachal Pradesh	80.7	80.4	83.3
Jammu and Kashmir	76.2	76.0	77.1
Jharkhand	60.8	59.5	66.3
Karnataka	67.2	65.1	71.0
Kerala	80.2	78.9	81.6
Ladakh	79.4	77.6	89.6
Lakshadweep	99.4	85.9	104.6
Madhya Pradesh	62.8	62.1	64.8
Maharashtra	61.9	60.1	64.2
Manipur	68.6	66.9	74.0
Meghalaya	59.4	57.8	69.4
Mizoram	68.7	64.2	74.3
Nagaland	74.7	70.0	88.0
Odisha	67.5	66.8	71.0
Puducherry	71.3	69.2	72.4
Punjab	71.8	70.2	74.4
Rajasthan	73.3	73.5	72.5
Sikkim	90.1	86.3	101.9
Tamil Nadu	67.3	64.8	70.3
Telangana	71.3	69.3	74.0
Tripura	79.8	78.0	88.3
Uttar Pradesh	63.3	63.0	64.7
Uttarakhand	69.4	68.6	71.6
West Bengal	69.7	68.8	71.9

Notes: Authors' calculations.

Table A.4: Estimated fat intake (in g/consumer unit/day), across states

State	Overall	Rural	Urban
Andaman & Nicobar	75.1	70.3	82.5
Andhra Pradesh	72.5	71.6	74.6
Arunachal Pradesh	58.2	54.7	75.2
Assam	51.7	49.5	70.2
Bihar	67.6	66.3	80.1
Chandigarh	110.7	93.6	111.6
Chhattisgarh	56.4	53.2	69.3
Dadra & Nagar Haveli & Daman & Diu	74.9	61.4	81.9
Delhi	84.7	81.1	84.8
Goa	87.2	79.9	92.6
Gujarat	86.3	77.7	98.1
Haryana	89.5	88.3	91.6
Himachal Pradesh	82.9	82.0	90.3
Jammu And Kashmir	76.6	75.3	81.7
Jharkhand	51.7	48.6	64.3
Karnataka	72.9	69.6	78.8
Kerala	62.7	62.4	63.1
Ladakh	84.3	81.5	99.4
Lakshadweep	62.6	60.8	63.3
Madhya Pradesh	66.0	64.0	71.9
Maharashtra	72.0	67.8	77.7
Manipur	50.3	49.5	53.0
Meghalaya	49.8	47.6	63.3
Mizoram	72.6	67.2	79.3
Nagaland	43.0	38.7	54.9
Odisha	51.8	49.7	62.5
Puducherry	89.6	84.7	92.1
Punjab	83.1	79.9	88.5
Rajasthan	81.9	80.9	84.7
Sikkim	101.4	94.9	121.6
Tamil Nadu	70.4	66.2	75.4
Telangana	72.0	68.4	76.9
Tripura	62.6	61.0	69.9
Uttar Pradesh	63.9	61.9	71.5
Uttarakhand	69.9	67.7	76.3
West Bengal	58.1	55.3	64.8

Notes: Authors' calculations.

Table A.5: Commonly occurring foods in the least-cost diet (aggregated across states)

Food Group	Minimum Cost Item 1	Minimum Cost Item 2
Cereals and cereal substitutes	Rice	Wheat
Pulses	Gram: split	Besan/Gram products
Dairy	Milk (Liquid)	Milk (condensed, powder)
Vegetables	Potato	Peas
DGLV*	Palak/other leafy vegetables	
Fruits	Bananas	Other dry fruits (apricots, figs etc)
Nuts and seeds	Groundnut	Cashewnut
Egg and flesh foods	Eggs	Buffalo meat
Oils and fats	Refined oil	Mustard oil

Notes: Authors' calculations. The items listed here are the most commonly occurring items in each food group in the least-cost diet, across states and rural/urban. Individual state-level least-cost diets will differ. DGLV = dark-green leafy vegetable. *: The HCES only lists one DGLV, which is palak (spinach) and other leafy vegetables.

Table A.6: Cost of a healthy diet, using uncorrected egg conversion values

State	Cost of a Healthy Diet		
	Overall	Rural	Urban
Andaman & Nicobar	98.0	96.5	99.3
Andhra Pradesh	67.1	67.5	66.1
Arunachal Pradesh	83.8	83.1	85.4
Assam	74.5	71.7	79.2
Bihar	58.0	57.7	61.5
Chandigarh	76.6	76.3	76.5
Chhattisgarh	54.3	48.2	62.3
Dadra & Nagar Haveli & Daman & Diu	70.4	69.1	70.7
Delhi	65.9	55.8	66.0
Goa	81.5	82.9	79.9
Gujarat	69.0	62.8	72.2
Haryana	67.1	64.4	72.2
Himachal Pradesh	65.6	65.0	65.2
Jammu And Kashmir	64.7	63.9	67.9
Jharkhand	60.5	59.5	63.4
Karnataka	71.3	66.9	73.8
Kerala	78.2	77.6	78.7
Ladakh	64.8	63.9	68.7
Lakshadweep	101.2	95.6	102.7
Madhya Pradesh	56.0	54.4	61.7
Maharashtra	67.9	64.3	71.4
Manipur	79.5	78.3	83.2
Meghalaya	78.2	77.5	81.7
Mizoram	86.4	89.3	85.6
Nagaland	84.0	81.3	89.9
Odisha	57.4	56.7	61.1
Puducherry	78.3	78.6	77.8
Punjab	66.1	64.9	67.0
Rajasthan	59.6	58.5	63.1
Sikkim	88.6	89.5	87.0
Tamil Nadu	77.0	75.3	78.9
Telangana	72.9	68.9	78.7
Tripura	75.2	74.7	76.7
Uttar Pradesh	59.4	57.7	63.7
Uttarakhand	64.1	64.1	67.1
West Bengal	63.9	61.8	65.4
All India	66.8	64.2	71.3

Notes: Authors' calculations. The composition of a vegetarian and non-vegetarian healthy healthy diet is provided in Table 1. See text for details. This table uses the conversion factors for eggs as given in (National Statistical Office, 2025b), which we believe are incorrect.

Table A.7: Average expenditure across food groups, against the cost of a recommended diet (rural areas)

	Average expenditure on food	Cost of a Healthy Diet	
		Vegetarian	Non-vegetarian
Cereals and cereal substitutes	7.4	11.1	11.5
Pulses	3.0	8.4	5.5
Dairy*	11.8	14.1	14.1
Vegetables	7.7	7.5	8.0
DGLV	0.6	5.2	5.5
Fruits	1.1	7.5	6.4
Nuts and seeds	3.9	3.0	3.0
Egg and flesh foods	7.4	n/a	12.6
Oils and fats	4.9	4.0	4.0
Spices & garnishes**	6.1	n/a	n/a
Salt and sugar	1.3	n/a	n/a
Beverages	3.6	n/a	n/a
Processed foods	11.0	n/a	n/a

Notes: Authors' calculations. The composition of a vegetarian and non-vegetarian healthy diet is given in Table 1. Calculations for the non-vegetarian diet assume the weight in grams of an average sized egg and adjust calorie conversions accordingly. DGLV = dark-green leafy vegetables. *: Expenditure on dairy includes other milk products like ice-cream, lassi. **: Spices and garnishes include turmeric, dry chillies, cumin, coriander powder, ginger, garlic, tamarind, black pepper etc., as well as foods used as garnish like lemon, fresh chillies and fresh coriander. See text for details. n/a = not applicable.

Table A.8: Average expenditure across food groups, against the cost of a recommended diet (urban areas)

	Average expenditure on food	Cost of a Healthy Diet	
		Vegetarian	Non-vegetarian
Cereals and cereal substitutes	10.0	13.0	13.5
Pulses	3.7	8.9	5.8
Dairy	17.0	15.7	15.7
Vegetables	9.4	8.8	9.3
DGLV	0.7	6.4	6.8
Fruits	2.1	7.9	6.8
Nuts and seeds	6.4	3.4	3.4
Egg and flesh foods	9.6	n/a	12.2
Oils and Fats	6.6	4.1	4.1
Spices & garnishes	8.0	n/a	n/a
Salt and sugar	1.5	n/a	n/a
Beverages	6.9	n/a	n/a
Processed foods	21.7	n/a	n/a

Notes: Authors' calculations. The composition of a vegetarian and non-vegetarian healthy diet is given in Table 1. Calculations for the non-vegetarian diet assume the weight in grams of an average sized egg and adjust calorie conversions accordingly. DGLV = dark-green leafy vegetables. *: Expenditure on dairy includes other milk products like ice-cream, lassi. **: Spices and garnishes include turmeric, dry chillies, cumin, coriander powder, ginger, garlic, tamarind, black pepper etc., as well as foods used as garnish like lemon, fresh chillies and fresh coriander. See text for details. n/a = not applicable.

Table A.9: Statewise affordability estimates, using current food expenditures as the benchmark

State	Proportion of the population for whom the CoHD is above their current food expenditures		
	Rural	Urban	Total
Andaman & Nicobar	38.1%	20.1%	30.8%
Andhra Pradesh	35.1%	22.0%	31.0%
Arunachal Pradesh	45.1%	17.8%	40.5%
Assam	67.3%	23.5%	62.5%
Bihar	45.6%	23.1%	43.5%
Chandigarh	5.2%	0.3%	0.5%
Chhattisgarh	73.5%	54.9%	69.7%
Dadra & Nagar Haveli & Daman & Diu	60.6%	11.6%	28.2%
Delhi	7.3%	9.7%	9.6%
Goa	10.1%	2.3%	5.6%
Gujarat	53.0%	15.5%	36.9%
Haryana	25.9%	18.0%	23.0%
Himachal Pradesh	31.0%	13.8%	29.2%
Jammu & Kashmir	41.0%	32.8%	39.3%
Jharkhand	80.2%	50.0%	74.2%
Karnataka	52.2%	30.7%	44.2%
Kerala	42.4%	33.9%	38.2%
Ladakh	31.2%	25.0%	30.3%
Lakshadweep	47.2%	37.2%	40.0%
Madhya Pradesh	70.2%	45.6%	63.7%
Maharashtra	70.5%	39.1%	56.9%
Manipur	68.1%	48.6%	63.3%
Meghalaya	74.3%	34.2%	68.8%
Mizoram	56.7%	19.9%	39.9%
Nagaland	60.9%	25.3%	51.3%
Odisha	66.3%	37.7%	61.6%
Puducherry	12.3%	8.6%	9.8%
Punjab	29.9%	12.7%	23.3%
Rajasthan	45.7%	33.6%	42.7%
Sikkim	19.4%	1.4%	14.8%
Tamil Nadu	48.6%	28.1%	39.1%
Telangana	38.2%	19.5%	30.1%
Tripura	25.1%	7.9%	22.0%
Uttar Pradesh	67.3%	44.3%	62.5%
Uttarakhand	44.1%	23.0%	38.6%
West Bengal	59.4%	36.9%	52.7%
All India	56.7%	31.3%	49.2%

Notes: Authors' calculations. CoHD is for the non-vegetarian diet, as defined in Table 1. See Section 3 for details.

Table A.10: Statewise affordability estimates, using the SOFI methodology and SOFI costs as the benchmark

State	Proportion of the population for whom the CoHD is above the SOFI threshold using SOFI costs of a healthy diet		
	Rural	Urban	Total
Andaman & Nicobar	12.7%	1.4%	8.1%
Andhra Pradesh	12.9%	5.1%	10.5%
Arunachal Pradesh	12.1%	2.2%	10.4%
Assam	44.8%	6.5%	40.6%
Bihar	46.3%	18.9%	43.7%
Chandigarh	0.0%	0.3%	0.3%
Chhattisgarh	80.4%	28.3%	69.8%
Dadra & Nagar Haveli & Daman & Diu	36.1%	1.5%	13.3%
Delhi	0.6%	1.9%	1.9%
Goa	4.4%	0.1%	1.9%
Gujarat	40.1%	3.4%	24.4%
Haryana	11.7%	3.3%	8.6%
Himachal Pradesh	13.1%	1.3%	11.9%
Jammu & Kashmir	27.1%	8.6%	23.1%
Jharkhand	72.0%	27.1%	63.0%
Karnataka	24.7%	6.9%	18.1%
Kerala	7.6%	3.3%	5.5%
Ladakh	30.4%	11.4%	27.4%
Lakshadweep	8.7%	8.2%	8.3%
Madhya Pradesh	58.9%	16.6%	47.7%
Maharashtra	41.6%	8.2%	27.2%
Manipur	25.2%	5.7%	20.4%
Meghalaya	38.0%	2.3%	33.0%
Mizoram	12.2%	0.2%	6.7%
Nagaland	17.6%	1.0%	13.2%
Odisha	61.9%	20.5%	55.2%
Puducherry	0.1%	2.2%	1.5%
Punjab	7.0%	2.1%	5.1%
Rajasthan	31.6%	11.4%	26.6%
Sikkim	3.5%	0.0%	2.6%
Tamil Nadu	9.7%	2.0%	6.1%
Telangana	7.0%	0.8%	4.3%
Tripura	4.0%	0.1%	3.2%
Uttar Pradesh	56.1%	20.3%	48.5%
Uttarakhand	21.8%	5.0%	17.4%
West Bengal	52.7%	20.2%	43.1%
All India	42.0%	9.9%	32.4%

Notes: Authors' calculations. CoHD is for the non-vegetarian diet, as defined in Table 1. See Section 3 for details.

Table A.11: Statewise affordability estimates, using the SOFI methodology but our costs as the benchmark

State	Proportion of the population for whom the CoHD is above the SOFI threshold, using our estimated costs:		
	Rural	Urban	Total
Andaman & Nicobar	18.8%	2.8%	12.3%
Andhra Pradesh	10.7%	4.1%	8.6%
Arunachal Pradesh	17.4%	3.6%	15.1%
Assam	45.7%	8.3%	41.6%
Bihar	32.9%	11.9%	30.9%
Chandigarh	0.0%	0.3%	0.3%
Chhattisgarh	59.1%	21.9%	51.5%
Dadra & Nagar Haveli & Daman & Diu	34.3%	1.5%	12.7%
Delhi	0.0%	1.3%	1.3%
Goa	5.1%	0.7%	2.6%
Gujarat	30.7%	3.4%	19.0%
Haryana	9.1%	3.4%	7.0%
Himachal Pradesh	10.2%	0.9%	9.3%
Jammu & Kashmir	21.1%	6.9%	18.1%
Jharkhand	62.7%	23.2%	54.8%
Karnataka	20.6%	7.1%	15.6%
Kerala	9.3%	4.5%	6.9%
Ladakh	19.9%	10.7%	18.5%
Lakshadweep	17.7%	16.3%	16.7%
Madhya Pradesh	42.0%	11.6%	34.0%
Maharashtra	34.5%	8.1%	23.1%
Manipur	29.8%	10.0%	25.0%
Meghalaya	45.2%	4.0%	39.5%
Mizoram	21.3%	1.0%	12.0%
Nagaland	23.0%	2.0%	17.3%
Odisha	48.2%	15.5%	42.8%
Puducherry	0.4%	2.9%	2.1%
Punjab	5.3%	1.4%	3.8%
Rajasthan	22.8%	8.2%	19.2%
Sikkim	8.1%	0.0%	6.1%
Tamil Nadu	11.1%	2.7%	7.2%
Telangana	5.9%	2.1%	4.2%
Tripura	5.1%	0.2%	4.2%
Uttar Pradesh	41.3%	15.8%	35.9%
Uttarakhand	17.1%	4.6%	13.8%
West Bengal	42.3%	16.2%	34.6%
All India	32.7%	8.3%	25.4%

Notes: Authors' calculations. CoHD is for the non-vegetarian diet, as defined in Table 1. See Section 3 for details.