

Beyond Calories: Understanding India's Changing Nutritional Landscape

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SUMMARY

India has achieved substantial progress in agricultural production and food availability over recent decades. However, a steady decline in reported per capita calorie intake across successive National Sample Survey (NSS) rounds has raised concerns, particularly as calorie intake remains a key indicator in global hunger assessments. This apparent paradox has led to questions about whether declining calorie consumption reflects worsening nutritional status or broader structural changes in the population.

This paper examines trends in calorie intake alongside shifts in dietary patterns, Recommended Dietary Allowances (RDA), minimum dietary energy requirements (MDER), and evidence from national surveys such as NNMB and NFHS. Over time, RDA revisions indicate reduced energy requirements due to declining physical activity, urbanization, and mechanization. Concurrently, diets have diversified, moving away from cereal-heavy consumption toward increased intake of milk, fats, fruits, and animal-source foods.

Data show a reduction in the proportion of households consuming below 1800 kcal per capita per day. Moreover, a notable share of individuals reporting lower calorie intake exhibit overweight, obesity, hypertension, and dyslipidaemia, suggesting that lower intake may reflect conscious dietary moderation rather than deprivation. Anthropometric trends further support this, with improvements in adult BMI profiles and reductions in child undernutrition.

The findings indicate that declining calorie intake in India should not be interpreted in isolation as evidence of rising hunger. Instead, it reflects changing energy needs, dietary transitions, and health-driven behavioural shifts. Calorie-based indicators alone are inadequate; a multidimensional approach incorporating dietary quality, anthropometry, metabolic health, and access is essential for accurately assessing nutritional status.

Keywords: Body Mass Index; Calorie intake; Global Hunger Index; Minimum dietary energy requirement; Recommended Dietary Allowance.

BACKGROUND

India has witnessed remarkable transformation in agricultural production, food security systems, and poverty reduction over the past five decades. The country is currently among the top five global producers of food grains, and per capita availability of cereals has increased substantially.

Paradoxically, despite rising food availability and declining poverty ratios, successive rounds of the National Sample Survey (NSS) have documented a gradual decline in per capita calorie intake in both rural and urban areas. Because calorie consumption is widely used as a proxy for hunger in global hunger measurement frameworks, this decline has generated

concern regarding India's position in global hunger rankings.

However, interpretation of calorie intake trends requires contextual understanding. Energy requirements evolve with demographic transition, occupational restructuring, urbanisation, and lifestyle shifts. A decline in calorie intake may not imply worsening nutritional deprivation and instead reflect structural transformation and behavioural adaptation in dietary practices.

This paper examines whether declining per capita calorie intake in India represents worsening hunger or a rational adjustment in dietary patterns corresponding to changing energy requirements and improved diet diversification.

1. RECOMMENDED DIETARY ALLOWANCE (RDA): CHANGING ENERGY NORMS

Recommended Dietary Allowance (RDA) refers to the average daily intake sufficient to meet the requirements of healthy individuals in specific age, sex, and physiological groups. In India, RDAs are periodically revised by the Indian Council of Medical Research (ICMR).

Earlier norms were developed when most of the population engaged in physically demanding agricultural labour. Rapid urbanisation, mechanisation, expansion of service-sector employment, and motorised transport have substantially reduced average physical activity levels and consequently occupational demands have shifted toward sedentary categories.

Table 1. Recommended dietary allowances: Changes

Group	Activity	1973–74	2009–10	2020
Men ≥18 y	Sedentary	2425	2320	~2100
	Moderate	2875	2730	~2550
	Heavy	3800	3490	~3300
Women ≥18 y	Sedentary	1875	1900	~1700
	Moderate	2225	2230	~2050
	Heavy	2925	2850	~2600
	Pregnancy	300	350	300
	Lactation 0–6 m	550	600	500
	Lactation 7–12 m	400	520	400
Children	0–6 months	108	92	~85
	6–12 months	98	80	~75
	1–3 y	1240	1060	~1000
	4–6 y	1690	1350	~1250
	7–9 y	1950	1690	~1550
Boys	10–12 y	2190	2190	~2050
Girls	10–12 y	1970	2010	~1850
Boys	13–15 y	2450	2750	~2550
Girls	13–15 y	2060	2330	~2150
Boys	16–17 y	2640	3020	~2800
Girls	16–17 y	2060	2440	~2250

Comparison of RDAs across **1974, 2010, and 2020** demonstrates a progressive decline in energy requirements for Indian adults across all activity levels. This decline primarily reflects: Reduced physical activity levels due to mechanization and urban lifestyles

Improved estimation of energy needs using **Physical Activity Level (PAL)**–based calculations

Based on these, the average calorie norms used for poverty have been evolved. The **Dr. Alagh Committee** recommended norms of **2400 kcal/day for rural** and **2100 kcal/day for urban** populations. These were subsequently revised by the **Dr. Rangarajan Committee** to **2155 kcal/day for rural** and **2090 kcal/day for urban** populations.

Table 2. Average calorie norm used for poverty line

Committee	Year	Average Calorie norm (Kcal/capita/day)	
		Rural	Urban
Dr. Alagh Committee	1979	2400	2100
Dr. Rangarajan Committee	2011	2155	2090

These revisions were not indicative of declining nutritional needs but were based on: Changes in age distribution, Shifts in occupational patterns, Reduced intensity of physical labour etc.

2. TRENDS IN CALORIE INTAKE AND SHIFT IN CONSUMPTION PATTERN – INTERPRETATION

Following table present details on trend in calorie intake and shift in consumption pattern

Table 3. Trends in per capita calorie intake

NSS Round / Year	Urban	Rural
1972–73	2107	2266
1983	2089	2221
1993–94	2071	2153
1999–2000	2156	2149
2004–05	2020	2047
2009–10	2035	2084

Source: Reports of National Sample Survey Organization, MoSPI

Table 4. Percentage Share of Expenditure on Food (%): Rural and Urban India

NSS Round / Year	Rural (%)	Urban (%)
1993–94	63.2	54.7
1999–2000	59.4	48.1
2004–05	55	42.5
2009–10	53.6	40.7
2011–12	48.6	38.5

Source: Reports of National Sample Survey Organization, MoSPI

Table 5. Percentage Share of Cereals in Consumer Expenditure (%): Rural and Urban India

NSS Round / Year	Rural (%)	Urban (%)
1993–94	24.2	14
1999–2000	22.2	12.4
2004–05	18	10.1
2009–10	15.6	9.1
2011–12	12	7.3

Source: Reports of National Sample Survey Organization, MoSPI

Table 6. Percentage Share of Calorie Consumption from Cereals and non-cereal sources(%): Rural and Urban India

NSS Round / Year	Rural (%)	Urban (%)
1993–94	71.03	58.83
1999–2000	67.55	55.05
2004–05	67.54	56.08
2009–10	64.16	55.01
Non cereal sources (2009 – 10)		
Vegetables and Fruits	6	6
Milk and Milk Products	6	8
Pulses, Nuts and Oilseeds	4	5
Edible Oil	8	11
Meat, Egg and Fish	1	1
Sweets and Sugar	4	5
Miscellaneous	7	9
Total Non-Cereals	36	45

Source: Reports of National Sample Survey Organization, MoSPI

The trend in per capita calorie intake over time indicates a **gradual decline in average calorie consumption** in both rural and urban areas. This decline is observed consistently across successive rounds of National Sample Survey data.

However, this trend should not be interpreted as evidence of worsening food insecurity or nutritional deprivation in isolation. Rather, it reflects a **structural shift in consumption patterns and energy requirements** driven by multiple factors.

First, there has been a significant **reduction in physical activity levels**, particularly due to mechanisation of work, decline in manual labour, increased use of motorised transport, and expansion of sedentary occupations. Lower energy expenditure naturally translates into lower dietary energy requirements, resulting in reduced calorie intake without necessarily implying hunger.

Second, dietary preferences have shifted away from **cereal-heavy diets**, which are calorie-dense, towards more **diversified diets** including milk, fruits, vegetables, fats, processed foods, and animal-source products. While this transition may improve diet diversity and micronutrient intake, it often leads to **lower total calorie intake per capita**, as non-cereal foods typically provide fewer calories per unit weight.

3. MINIMUM DIETARY ENERGY REQUIREMENT (MDER)

Minimum Dietary Energy Requirement (MDER) represents the **lowest level of dietary energy intake** necessary to:

- Maintain basal metabolic functions
- Support minimal physical activity
- Prevent weight loss and undernutrition

The **Food and Agriculture Organization (FAO)** commonly uses **~1800 kcal per capita per day** as a threshold for estimating the prevalence of undernourishment at the population level.

However, as emphasized by Professor **P. V. Sukhatme**, energy requirements exhibit substantial **intra- and inter-individual variability**, and rigid cut-offs may misrepresent true nutritional deprivation.

Table below presents results on proportion consuming less than 1800 kcal/ capita / day

This indicates that about 10 – 12% of Indian population consumes less than 1800 calories / capita / day.

The information on who consumes less than 1800 kcal / capita / day is presented in table below

Evidence indicates that a significant proportion of adults consuming less than 1800 kcal/day—particularly in urban areas—exhibit high prevalence of overweight, obesity, hypertension, diabetes, and dyslipidaemia.

Table 7. Proportion of households consuming less than 1800 kcal/capita / day – major states

State	2022 -23		2023 - 24	
	Rural	Urban	Rural	Urban
Andhra Pradesh	11.8	11.8	7.7	9.2
Assam	20.2	12.1	17.2	7.6
Bihar	8.1	5.8	6.9	4.8
Chhattisgarh	19.9	9.2	11.5	8.4
Gujarat	18.6	10.1	17.2	8.7
Haryana	21	14.8	4.8	4.7
Jharkhand	24.5	15.5	18.5	15.8
Karnataka	9.9	9.4	13.3	12.9
Kerala	25.9	25.3	18.5	15.6
Madhya Pradesh	15.3	15.7	12.8	11.7
Maharashtra	21	14.9	16.9	12.6
Odisha	12.2	9.2	9.3	7.6
Punjab	12.7	12	10	5.7
Rajasthan	10.5	9	6.4	4.9
Tamil Nadu	16	12.3	13.6	9.2
Telangana	10.4	7.3	5.1	6.8
Uttar Pradesh	16.7	17.6	15	13.2
West Bengal	9.6	10.2	7.3	10.2
All-India	14.6	12.8	11.7	10.2

Table 8. Profile of adults consuming less than 1800 kcal / capita / day

Biomarkers Male		Urban		Rural	
		Female	Male	Female	Male
Hypertension	HTN (SBP $\geq$ 140 and/or DBP $\geq$ 90)	33.1	22.5	22.2	20.3
Total Cholesterol	$\geq$ 200	23.3	22	NA	NA
Low Density Lipoproteins	$\geq$ 130	24.2	26.3	NA	NA
High Density Lipoproteins	LOW (<40 (Men) and <50(Women))	71.5	83.7	NA	NA
Triglycerides	$\geq$ 150	39.2	28.2	NA	NA
Blood Sugar (mg/dl)	$\geq$ 126	14.1	10.5	7.3	6
Body Mass Index (BMI)					
WHO Classification	Overweight (25-29.9)	28.1	30.4	8.3	11.2
	Obese ($\geq$ 30)	5.7	15.9	0.9	2.5

This suggests that lower calorie intake in many cases reflects **intentional dietary restriction due to health concerns**, rather than inadequate access to food.

Table 9. Trend in nutritional status of adults according to BMI

Age Group	Survey Year	Male				Female			
		N	BMI <18.5	BMI 18.5–24.9	BMI $\geq$ 25.0	N	BMI <18.5	BMI 18.5–24.9	BMI $\geq$ 25.0
18–34 yrs	1975–79	13334	62	37.3	0.7	11399	49.4	49.3	1.2
	1996–97	5900	47.1	50.4	2.5	10117	49.9	46.7	3.4
	2010–12	9432	38.8	54.5	6.8	14009	39.7	52	8.3
35–59 yrs	1975–79	11503	55.1	42.1	2.8	8550	54.1	41.4	4.6
	1996–97	5231	41.1	53.2	5.6	6219	43.3	47	9.7
	2010–12	10539	30.1	57.1	12.8	13834	29.9	52.1	18
$\geq$ 60 yrs	1975–79	2472	62.8	34.7	2.5	1806	63	33	4
	1996–97	1613	53.4	42	4.5	1660	50.9	41.3	7.8
	2010–12	4108	41.9	49.4	8.7	4313	37.5	47.6	14.8
Pooled	1975–79	27310	59.1	39.1	1.8	21756	52.4	44.9	2.8
	1996–97	12744	45.4	50.5	4.1	17996	47.7	46.3	6
	2010–12	24079	35.5	54.7	9.7	32156	35.2	51.5	13.3

Source: Trends in body mass index, nutrient intake and nutritional status of rural adults in India: National Nutrition Monitoring Bureau survey findings (1975–2012)

4. NUTRITIONAL STATUS

Table below present trend in nutritional status of adults and children. It is observed that there has been consistent improvement into the nutritional status over time both for children and adults. This is in spite of a declining trend in nutritional intake which is not a paradox as the nutritional norm have also undergone change as well as there is shift in the dietary pattern in favour of high-quality food.

Table 10. Trend in nutritional status of children

Key Theme / Indicator	NFHS-5	NFHS-4	NFHS-3	NFHS-2
Underweight (weight-for-age)	32.1	35.8	40.4	42.7
Stunted (height-for-age)	35.5	38.4	44.9	51
Wasted (weight-for-height)	19.3	21	22.9	19.7

5. CONCLUSION

Declining per capita calorie intake in India does not, by itself, signify deterioration in nutritional status or an increase in hunger. Instead, it reflects structural transformations in occupational patterns, lifestyle behaviours, and dietary preferences that have collectively altered both energy requirements and consumption choices.

Over the past five decades, recommended dietary energy requirements have been revised downward in response to reduced physical activity levels, mechanization of labour, and improved estimation of physiological needs. Concurrently, consumption patterns have diversified away from cereal-dominated diets toward higher intake of milk, fats, fruits, vegetables, and other non-cereal foods. Such dietary shifts, while often associated with lower total calorie intake, can improve diet quality and micronutrient adequacy.

Evidence from national surveys further indicates sustained improvement in key nutritional indicators. Adult undernutrition, as measured by low BMI, has declined substantially over time, while child underweight and stunting rates have shown consistent reduction across successive NFHS rounds. Moreover, a notable proportion of individuals consuming fewer than 1800 kcal per capita per day exhibit overweight, obesity, hypertension, and metabolic risk factors, suggesting that reduced calorie intake frequently

reflects intentional dietary moderation linked to health awareness rather than constrained food access.

These findings underscore the limitations of using calorie intake alone as a proxy for hunger or nutritional deprivation in a rapidly transitioning society. Calorie-based thresholds, particularly when derived from historical norms anchored in high-physical-labour contexts, may overestimate the prevalence of undernourishment if interpreted without accounting for contemporary lifestyle and epidemiological realities.

A more nuanced and multidimensional approach to hunger assessment is therefore essential. Such an approach should integrate dietary diversity, anthropometric outcomes, metabolic health indicators, and socioeconomic access to food alongside calorie intake. This would enable more accurate identification of populations experiencing genuine nutritional vulnerability and ensure that policy responses are appropriately targeted.

In contemporary India, lower reported calorie intake increasingly reflects evolving lifestyles, changing energy needs, and health-conscious dietary behaviour rather than widespread hunger. Recognising this distinction is critical for interpreting national trends, informing policy, and contextualising global hunger assessments.

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