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Original Article

The Paradox of Food Insecurity in India: From Surplus to Shortage

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Abstract

Despite achieving self-sufficiency in food grain production, India continues to face a paradox of widespread hunger and malnutrition, raising critical questions about the effectiveness of existing food security interventions. This paper reviews recent secondary data from the National Family Health Survey (NFHS-5, 2019–21), the Global Hunger Index (GHI) 2025, and reports from international organizations such as FAO and the World Food Programme. Globally, an estimated 673 million people experienced hunger in 2024. In India, 35.5% of children under five are stunted, 19% are wasted, and anemia affects 57% of women and 67% of children. India ranks 102nd out of 123 countries in the 2025 Global Hunger Index with a score of 25.8, classified as "serious." Major drivers of food insecurity include poverty, inequality, climate shocks, and governance gaps in food distribution programs. Although large-scale interventions such as the Public Distribution System (PDS) and the Mid-Day Meal scheme reach millions of beneficiaries, challenges remain in terms of efficiency, nutritional diversity, and accurate targeting of vulnerable populations. Addressing food insecurity in India requires a multifaceted approach including strengthening the PDS through improved targeting and reduced leakages, expanding nutrition-focused programs, promoting climate-resilient agriculture, and implementing data-driven policies to better reach vulnerable communities.

Keywords: *Food Insecurity, Malnutrition, Hunger, India, Public Distribution System*

Introduction

Food security means that all people always have access to sufficient, safe, and nutritious food for a healthy life, while food insecurity refers to limited or uncertain access to food. It is measured through indicators like child stunting, undernourishment, and consumption levels, and is essential for sustainable development and well-being. Globally, hunger remains a serious issue, with about 673 million people (8.2% of the population) affected in 2024, driven by factors such as conflict, climate change, and economic instability. Although there has been slight improvement since 2023, hunger levels are still higher than pre-COVID times, with regions like Sub-Saharan Africa and West Asia most affected. In India, despite being self-sufficient in food production, malnutrition remains high. NFHS-5 reports 35.5% of children stunted, 19% wasted, and high anemia levels among children and women. India ranks 102nd in the Global Hunger Index 2025, indicating a serious situation.

These challenges show that food production alone is not enough; effective policies, better nutrition programs, and targeted interventions are needed to reduce hunger and achieve food security.

Figure 1: *Malnourished children symbolizing global hunger. This stark image reflects FAO data that about 673 million people faced hunger in 2024*

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Literature Review

Previous research on food insecurity has examined the issue from multiple perspectives, including global hunger measurement, national food security policies, and the impact of environmental and economic factors on nutrition outcomes. Scholars have also evaluated the effectiveness of India's major food security programs, particularly the Public Distribution System (PDS), nutrition initiatives, and agricultural support policies. Reviewing existing literature helps identify the strengths and limitations of current interventions and highlights research gaps that require further investigation. This section summarizes key contributions from global and Indian studies related to food insecurity.

Global Hunger Studies

Recent global research highlights key issues in measuring and addressing hunger. A study by Lentz et al. (2025), analyzing over 10,000 IPC assessments, found that official estimates may undercount hunger, missing about 20% of food-insecure people due to strict classification criteria. This suggests global food insecurity is likely underestimated.

Martin et al. (2025) noted that although global food production is sufficient (over 2,300 kcal per person daily), the world is still far from achieving SDG 2 (Zero Hunger) due to unequal access and regional disparities.

Additionally, Balamurugan et al. (2026), using Sen's Entitlement Theory across 146 countries, found that urbanization, income, and agricultural land improve food security, while factors like greenhouse gas emissions and some renewable energy shifts may create short-term challenges for food production.

Food Security Research in India

Public Distribution System (PDS) and Nutrition: Studies show mixed outcomes of India's PDS. Shrinivas et al. (2025) found that increased food transfers under the NFSA improved child nutrition, reducing stunting through better income and diet diversity. However, Fledderjohann (2025) found no major improvement in child nutrition in Andhra Pradesh, highlighting limited dietary diversity and gender bias in food distribution. Earlier studies (Kaul, 2018; Kochar, 2005) also suggest that PDS alone cannot improve nutrition without support from health, sanitation, and income policies.

Climate Change and Nutrition: Research shows climate change negatively impacts nutrition. Das Gupta et al. (2025) found that rising temperatures reduce consumption of protein-rich foods, especially among poor rural households. Similarly, Carpena (2019) linked droughts to reduced dietary diversity, while Banerjee and Maharaj (2020) found that extreme heat increases risks to child health and survival.

Policy Assessment: According to Oxfam (2026), despite programs like MGNREGS, TPDS, Mid-Day Meals, and ICDS, about one-third of Indians still lack access to a nutritious diet. The report stresses that food security requires a holistic approach, including women's empowerment, education, healthcare, sanitation, and clean water access.

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State/UT	Underweight Children (%)	Wasting (%)	Category
Madhya Pradesh	24.82%	8.19%	High Burden
Bihar	20.98%	9.31%	High Burden
Jharkhand	19.13%	6.68%	High Burden
Uttar Pradesh	~17-20%	~5-6%	High Burden
Karnataka	16.50%	3.18%	Moderate
Telangana	17.00%	5.93%	Moderate
Tamil Nadu	6.29%	3.54%	Low Burden
Kerala	10.18%	3.20%	Low Burden
Goa	1.96%	0.78%	Low Burden

Fig: The Poshan Tracker data (June 2025) provides excellent state-level comparisons that can show regional disparities.

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Previous Policy Analysis

Legal and Governance Frameworks: Suri (2025) highlights that India's National Food Security Act (NFSA) ensures subsidized food to about 80 crore people, but malnutrition remains high, with many children still stunted and wasted. The main issue is the cereal-focused PDS, which provides calories but lacks dietary diversity and micronutrients. Governance challenges like exclusion of migrants and informal workers also persist, despite improvements through digital reforms like Aadhaar.

Program Design and Targeting: Earlier studies (Ahluwalia, 1993; Behrman & Deolalikar, 1987) identified problems such as leakages and poor targeting in PDS and showed that higher income does not always lead to better nutrition, highlighting deeper structural issues.

International Comparisons: Studies from countries like Niger, Bangladesh, and the Philippines show that the success of food or cash transfer programs depends on local conditions, suggesting that India needs context-specific and well-targeted policy designs.

Country	Child Wasting (%)	Child Stunting (%)	Women Anemia (%)
India	18.7%	~37 million affected	53.7% (203 million)
Global Average	~7%	~22%	~30%
Bangladesh	~9%	~28%	~45%
Nepal	~8%	~31%	~35%
Sri Lanka	~15%	~17%	~29%

Fig: According to the SOFI 2025 report, India has the highest wasting rate globally.

Research Methodology

1. **Research Approach**

This study adopts a secondary data analysis approach, commonly referred to as a desk review or narrative literature review. Secondary data analysis involves examining information that has already been collected and published by government agencies, international organizations, and academic researchers. This method is appropriate for studies that aim to synthesize existing knowledge, identify trends across multiple datasets, and develop evidence-based policy insights without conducting primary field surveys.

The research is exploratory and descriptive in nature, focusing on understanding patterns, causes, and policy responses related to food insecurity in India. Rather than testing a specific hypothesis, the study integrates multiple sources of evidence to develop a comprehensive understanding of the factors contributing to hunger and malnutrition. This approach enables the analysis of global trends alongside India-specific conditions, allowing for a broader interpretation of food security challenges.

2. Data Sources

This study uses multiple **secondary data sources** for a comprehensive analysis.

Government Sources: NFHS-5 provides key nutrition data (stunting, wasting, anemia), while NSSO surveys offer insights into food consumption and economic access.

International Reports: Data from FAO, WFP, UNICEF, and WHO provide global and regional information on hunger, nutrition, and public health.

Global Indices: The Global Hunger Index (2025) and IPC datasets help measure hunger levels and food insecurity conditions.

Academic Literature: Peer-reviewed studies (2015–2026) provide evidence on food security, nutrition, and policy effectiveness.

3. Search Strategy and Selection Criteria

Relevant literature was identified through a systematic search across databases like Google Scholar, PubMed, Scopus, Web of Science, JSTOR, and EconLit.

Keywords: Terms such as food security, malnutrition, PDS, NFSA, child stunting, Global Hunger Index, and climate change in India were used.

Inclusion Criteria: Studies (2015–2026), in English, from peer-reviewed journals, government, or international reports, relevant to food security.

Exclusion Criteria: Opinion pieces, non-peer-reviewed sources, unrelated clinical studies, and non-English publications were excluded.

4. Analytical Framework

The analysis in this study is guided by Amartya Sen's Entitlement Theory (1981). According to this framework, hunger and famine are not primarily caused by a lack of food availability but by failures in people's ability to access food through legitimate economic and social mechanisms.

Sen identified several types of food entitlements, including:

- **Production-based entitlements:** food obtained through farming or agricultural production
- **Trade-based entitlements:** food obtained through market exchange
- **Labor-based entitlements:** food obtained through wages or employment
- **Transfer entitlements:** food obtained through government programs, social support, or aid

This framework is particularly relevant for India because the country produces sufficient food overall, yet many individuals still experience hunger due to poverty,

inequality, and limited access to food distribution systems. Government programs such as the Public Distribution System (PDS), Integrated Child Development Services (ICDS), and Mid-Day Meal (MDM) scheme can be interpreted as mechanisms designed to strengthen food entitlements for vulnerable populations.

Using this theoretical framework, the study analyzes how structural factors—such as poverty, climate shocks, and policy implementation—affect people's ability to access adequate nutrition.

5. Data Analysis Method

The study uses **thematic synthesis** to analyze the literature in four steps:

1. **Familiarization:** Reviewing all studies to understand key findings.
2. **Coding:** Identifying and labeling information on causes, impacts, and policies.
3. **Theme Development:** Grouping codes into themes like global trends, India's situation, causes, and policies.
4. **Synthesis:** Combining findings to explain food insecurity and evaluate policy effectiveness.

6. **Limitations of the Study**

Several limitations should be acknowledged.

First, the study relies entirely on secondary data, which means the analysis depends on the accuracy and completeness of previously published datasets. Second, some datasets, such as NFHS-5 (2019–21), may not fully capture recent developments following the COVID-19 pandemic and recent economic shocks.

Third, the review only included English-language publications, which may exclude relevant studies published in regional Indian languages. Fourth, publication bias may influence available literature, as studies reporting significant findings are more likely to be published.

Finally, national-level statistics may mask significant **regional disparities** in food security across states, districts, and social groups within India.

7. **Ethical Considerations**

This study relies exclusively on secondary data obtained from publicly available sources. As no human participants were involved and no primary data were collected, institutional ethical approval was not required. All sources have been appropriately cited to acknowledge the contributions of the original researchers and organizations.

Global Food Insecurity Trends

1. **Global Hunger Statistics**

Global hunger has been rising since 2014 due to economic, environmental, and geopolitical challenges. The number of undernourished people increased from about 650 million pre-COVID to 673 million (8.2%) in 2024.

Food insecurity affects a much larger population—around 2.3 billion people (28%) faced moderate to severe food insecurity in 2024, including 319 million in severe conditions needing urgent aid.

Despite slight improvements, hunger levels remain higher than pre-pandemic levels due to inflation, supply disruptions, and conflicts, making the goal of Zero Hunger by 2030 difficult to achieve.

2. **Regional Differences**

Food insecurity varies widely across regions. Africa is the most affected, with over 20% of its population (around 307 million people) facing hunger due to poverty, climate shocks, political instability, and weak agricultural systems.

Western Asia is also experiencing rising hunger levels, affecting about 12.7% of the population, mainly due to conflicts, economic crises, and disruptions in food production and trade.

In **Southern Asia** (including India), undernourishment has slightly improved to 6.7%, but still impacts around 323 million people because of high population and ongoing poverty.

These differences show that hunger is uneven globally and depends on economic conditions, governance, and environmental factors.

3. **Key Global Causes of Food Insecurity**

Global food insecurity is driven by three major factors:

1. Conflict and Displacement: Wars and political instability disrupt agriculture, supply chains, and livelihoods, forcing people to lose access to food and income.

2. Climate Extremes: Droughts, floods, and heatwaves reduce crop production and harm livestock, threatening food availability and rural livelihoods.

3. Economic Shocks and Inflation: Events like COVID-19 and geopolitical conflicts have increased food prices, making it difficult for low-income populations to afford nutritious food.

Food Security in India

India's food security landscape presents a complex paradox. Although the country has achieved self-sufficiency in food grain production and experienced steady economic growth, large segments of the population continue to face hunger, malnutrition, and limited access to nutritious diets. The problem is not only related to food availability but also to economic access, nutritional diversity, and social inequality.

1. **Hunger Statistics in India**

India has one of the largest undernourished populations globally, with about 190 million people affected (FAO, 2016). Despite increased food production, hunger persists due to poverty, unequal distribution, and lack of nutritious diets.

In the Global Hunger Index 2025, India ranks 102 out of 123 countries with a "serious" score of 25.8, reflecting ongoing challenges in both food quantity and quality.

Progress in reducing hunger has slowed in recent years due to economic disruptions, climate impacts on agriculture, and rising food prices.

2. **Nutrition Indicators**

Despite economic growth, India faces serious nutritional challenges:

- **Child Stunting:** 35.5% of children under five are stunted, indicating long-term undernutrition.
- **Child Wasting:** Around 19% are wasted, showing acute malnutrition—among the highest globally.
- **Anemia:** About 57% of women and 67% of children suffer from anemia due to micronutrient deficiencies.

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These figures show that India's problem is not just lack of food, but also "hidden hunger"—deficiency of essential nutrients.

3. **Poverty and Diet Affordability**

Economic inequality is a key driver of food insecurity in India. Despite growth, over 10% of the population lives below the poverty line, with rural households especially vulnerable due to dependence on rain-fed agriculture and unstable incomes.

Diet affordability is a major issue—about 39% of Indians lack a nutritionally adequate diet, and nearly 74% cannot afford a healthy, balanced diet.

As a result, many rely on cheap staples like rice and wheat, leading to poor dietary diversity and persistent malnutrition, especially among low-income groups.

4. **Summary of India's Food Security Challenge**

India faces a food security paradox—despite sufficient food production and economic growth, hunger and malnutrition persist due to poverty, unequal distribution, low diet affordability, and lack of nutritious food access.

While child stunting has improved, child wasting and anemia remain high, highlighting serious nutritional gaps.

This shows the need for integrated policies that focus not just on food availability, but also affordability, nutrition quality, and reducing social inequality.

Causes of Food Insecurity in India

Food insecurity in India is driven by multiple interrelated factors rather than a single cause. Although the country produces sufficient food grains at the national level, many households still struggle to access adequate and nutritious diets. The persistence of hunger is closely linked to poverty, structural agricultural challenges, climate-related risks, health conditions, and policy implementation gaps. These factors interact to create persistent cycles of undernutrition and food insecurity.

1. **Poverty and Economic Inequality**

Poverty is a major cause of food insecurity in India, with over 10% of people living below the poverty line and limited ability to afford nutritious food. Low-income households spend most of their income on food but rely mainly on cheap staples like rice and wheat, leading to "hidden hunger" due to lack of nutrients.

Socioeconomic inequalities worsen the issue, as marginalized groups such as SCs, STs, and women face limited access to resources, education, and opportunities, increasing their risk of hunger and malnutrition.

2. **Agricultural and Structural Constraints**

Agriculture is vital to India's food system, but several structural issues limit its effectiveness. Most farms are small and fragmented, reducing productivity and investment in modern techniques. Many farmers rely on rain-fed agriculture, making crops vulnerable to irregular monsoons and poor irrigation facilities.

Key challenges include soil degradation, limited access to credit and quality inputs, and high post-harvest losses due to weak storage and transport systems.

These problems lower both food production and farmers' incomes, contributing to overall food insecurity.

3. **Climate Change and Environmental Pressures**

Climate change is an increasing threat to India's food security, as extreme weather disrupts agriculture and rural livelihoods.

- **Droughts:** Reduce crop yields and livestock productivity (e.g., Maharashtra).
- **Floods:** Damage crops and displace communities (e.g., Assam, West Bengal).
- **Heatwaves:** Lower agricultural output during critical growing periods.

Long-term issues like groundwater depletion, soil degradation, and changing rainfall patterns further threaten sustainability, especially for small farmers dependent on agriculture.

4. **Health, Sanitation, and Nutrition Linkages**

Food security is closely connected to health and sanitation conditions. Poor access to clean drinking water, sanitation facilities, and healthcare services can reduce the body's ability to absorb nutrients even when food is available.

For example, diarrheal diseases—often linked to unsafe water and poor hygiene—reduce nutrient absorption and worsen malnutrition among children. Undernourished individuals are also more susceptible to infections, creating a cycle of illness and undernutrition that is difficult to break.

Improvements in sanitation, healthcare access, and maternal health services are therefore essential components of broader food security strategies.

5. Policy and Governance Challenges

India has several food security programs, but policy and implementation challenges reduce their impact.

- **Public Distribution System (PDS):** Provides subsidized food, but still faces leakage issues (around 22%) despite digital reforms.
- **Cereal-focused policies:** Emphasis on rice and wheat ensures calories but limits dietary diversity and nutrition.
- **Exclusion errors:** Vulnerable groups like migrants and informal workers often lack access to benefits.

These issues weaken the overall effectiveness of food security efforts.

Causes of Food Insecurity in India

Food insecurity in India is a multidimensional problem driven by a complex combination of economic, agricultural, environmental, health, and governance factors. These drivers operate at different levels—individual, household, and institutional—and often reinforce one another. As a result, hunger and malnutrition persist even in a country that produces sufficient food grains at the national level. Understanding these underlying causes is essential for designing effective policies and interventions.

1. **Poverty and Inequality**

Poverty is the primary cause of food insecurity in India, with over 10% of people below the poverty line and many vulnerable to economic shocks. Limited income restricts access to nutritious food, and about 74% of Indians cannot afford a healthy diet, leading to reliance on cheap staples and "hidden hunger.". Social inequalities worsen the problem, as SCs, STs, and women face barriers in resources

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and opportunities, and gender bias in households often leads to unequal food distribution.

2. **Agricultural Constraints**

Despite food grain self-sufficiency, India's agriculture faces key structural challenges:

- **Small and fragmented land holdings:** Limit productivity, income, and use of modern technology.
- **Dependence on monsoons:** Rain-fed farming makes crops vulnerable to irregular rainfall and droughts.
- **Input and credit constraints:** Limited access to quality seeds, fertilizers, and affordable loans.
- **Poor soil health:** Reduces long-term agricultural productivity.
- **Post-harvest losses:** Lack of storage, transport, and cold-chain facilities leads to significant food wastage.

These issues reduce both food availability and farmers' incomes, affecting overall food security.

3. **Climate Change and Environmental Pressures**

Climate change is increasingly recognized as a major threat to food security in India. Agriculture in the country is highly sensitive to climate conditions, and extreme weather events are becoming more frequent and severe.

Droughts in states such as Maharashtra, Rajasthan, and Karnataka significantly reduce crop yields and livestock productivity. Floods, particularly in states like Assam and Bihar, destroy standing crops and displace rural populations. In addition, heatwaves during key crop growth stages can reduce agricultural output, especially for temperature-sensitive crops such as wheat.

Long-term environmental trends also pose serious risks. Groundwater depletion, especially in northwestern India, threatens the sustainability of irrigation-based agriculture. At the same time, soil degradation, deforestation, and loss of agrobiodiversity have reduced the resilience of farming systems.

These environmental pressures directly affect food production and rural livelihoods, making smallholder farmers particularly vulnerable to food insecurity.

4. **Health and Sanitation Factors**

Food insecurity is strongly linked to health and sanitation. Even when food is available, poor hygiene and healthcare can prevent proper nutrient absorption.

Lack of clean water and sanitation leads to diseases like diarrhea, which reduces nutrient intake and causes undernutrition, especially in children. Repeated infections weaken immunity, creating a cycle of illness and malnutrition.

Maternal health also plays a key role anemia and poor nutrition in mothers lead to low-birth-weight babies, continuing the intergenerational cycle of malnutrition.

5. **Governance and Policy Issues**

Despite large-scale programs, governance and implementation issues limit India's food security efforts.

PDS Challenges: Leakages, diversion, and inefficiencies persist, with about 22% of grains not reaching beneficiaries even after digital reforms.

Cereal-Centric Policies: Focus on rice and wheat ensures calories but reduces production and consumption of nutritious foods like pulses and millets.

Exclusion Errors: Migrants, informal workers, and homeless people often miss benefits due to lack of documentation.

Administrative Gaps: Weak grievance systems and limited capacity reduce program effectiveness.

These issues highlight the need for better governance, targeting, and policy reforms.

Impacts and Consequences of Food Insecurity

Food insecurity in India has far-reaching consequences that extend beyond immediate hunger. Its effects influence physical health, cognitive development, economic productivity, and social stability. These impacts reinforce cycles of poverty and underdevelopment, affecting both individuals and the broader national economy.

1. **Child Malnutrition**

Children are the most affected by food insecurity, as proper nutrition is essential for growth and brain development. In India, 35.5% of children are stunted and 19% are wasted, indicating serious undernutrition.

Malnutrition leads to permanent physical and cognitive damage, including poor growth, low learning ability, and reduced academic performance. Nutrient deficiencies also weaken memory and problem-solving skills.

Additionally, malnourished children have weak immunity, making them more prone to diseases like diarrhea and pneumonia, creating a cycle of illness and undernutrition that increases child mortality.

2. **Health Problems**

Food insecurity leads to poor health outcomes at all life stages. Malnutrition weakens immunity, increasing disease risk, while micronutrient deficiencies like anemia affect 57% of women and 67% of children in India.

Maternal malnutrition is especially harmful, leading to low-birth-weight babies who face higher risks of stunting and illness.

India also faces a double burden of malnutrition—undernutrition in poor populations and rising obesity in urban areas due to unhealthy processed foods—resulting in diseases like diabetes and heart problems.

3. **Economic Productivity Loss**

Food insecurity has major economic impacts. Malnourished individuals have lower physical strength and productivity, leading to reduced income, especially in labor-intensive jobs.

Childhood undernutrition also affects long-term outcomes, as it lowers education levels and cognitive skills, reducing future earning potential.

At the national level, malnutrition decreases overall productivity and increases healthcare costs, costing India billions annually through reduced workforce efficiency and weaker human capital 9

4. **Social Instability**

Food insecurity can also contribute to broader social challenges. In rural areas, repeated crop failures and agrarian distress often force households to migrate to cities in search of employment. Many migrants end up living in

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informal urban settlements where food insecurity remains high due to unstable income and rising living costs.

In extreme situations, widespread hunger and agricultural distress can contribute to social unrest, protests, and political instability. Farmers facing crop losses, rising debts, and declining incomes have organized demonstrations in several parts of India.

Beyond these economic and political effects, food insecurity also affects psychological well-being. The inability to provide sufficient food for one's family can cause stress, anxiety, and social stigma, undermining overall quality of life and community stability.

Government Policies and Interventions

To address hunger and malnutrition, the Government of India has implemented several large-scale social welfare and nutrition programs. These initiatives aim to improve access to food, enhance nutritional outcomes, and support vulnerable populations. Major interventions include the Public Distribution System (PDS), the National Food Security Act (NFSA), school feeding programs such as Mid-Day Meal/PM POSHAN, and national nutrition initiatives like POSHAN Abhiyaan.

1. **Public Distribution System (PDS)**

The Public Distribution System (PDS) is a key food security program in India, providing subsidized rice and wheat to over 800 million people through fair price shops. It ensures basic calorie needs and acts as a safety net for low-income households.

Recent reforms like Aadhaar linkage, ePoS devices, and One Nation One Ration Card (ONORC) have improved transparency and access, especially for migrants.

However, issues such as leakages, administrative inefficiencies, and limited nutritional diversity (cereal-focused supply) still reduce its overall effectiveness.

2. **National Food Security Act (NFSA)**

The National Food Security Act (NFSA), 2013 provides the legal framework for India's food security system. The Act guarantees subsidized food grains to 75% of the rural population and 50% of the urban population, thereby covering a large share of the country's population.

Under the NFSA, eligible households receive 5 kilograms of food grains per person per month at highly subsidized prices. The Act also integrates other nutrition programs such as the Mid-Day Meal scheme and the Integrated Child Development Services (ICDS), ensuring that children, pregnant women, and lactating mothers receive nutritional support.

By recognizing access to food as a legal entitlement, the NFSA represents a major step in strengthening India's social protection system.

3. **School Feeding Programs: Mid-Day Meal and PM POSHAN**

The Mid-Day Meal (MDM) scheme, launched in 1995 and later renamed PM POSHAN, is the largest school feeding program in the world. The program provides free cooked meals to more than 100 million schoolchildren in government and government-aided schools every day.

The primary objective of the scheme is to improve the nutritional status of children while simultaneously encouraging school enrolment, attendance, and retention. Studies have shown that school feeding programs not only improve child nutrition but also contribute to better educational outcomes.

Recent reforms have focused on improving nutritional quality through food fortification, inclusion of vegetables and pulses, and the development of school nutrition gardens.

However, implementation challenges such as variations in meal quality, hygiene issues, and administrative inefficiencies still exist in some regions.

4. **POSHAN Abhiyaan (National Nutrition Mission)**

POSHAN Abhiyaan, launched in 2018, is a national initiative aimed at reducing stunting, wasting, anemia, and low birth weight in India. The program focuses on improving maternal and child nutrition through better coordination among various health, nutrition, and sanitation services.

The mission operates through the Integrated Child Development Services (ICDS) network of Anganwadi centres. These centres provide supplementary nutrition, growth monitoring, health check-ups, and nutrition education to pregnant women, lactating mothers, and young children.

POSHAN Abhiyaan also promotes the use of digital monitoring systems and real-time data dashboards to track progress and identify areas requiring intervention. In addition, nutrition awareness campaigns encourage behavioural changes related to diet, hygiene, and childcare practices.

(Refer to the figure below.)

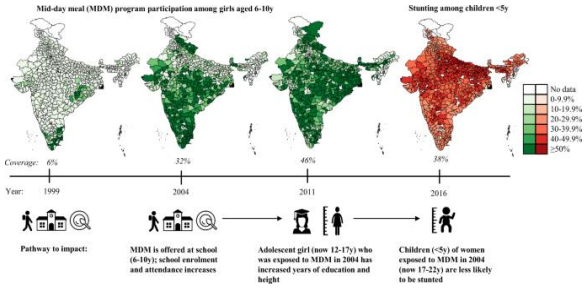

Figure: *Child stunting and the coverage of the Mid-Day Meal (MDM) in India. The MDM program coverage among girls is depicted on the left maps (1999, 2004, 2011); the frequency of child stunting is shown on the right chart (2016). Later stunting was lower in states with higher early MDM coverage.*

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Discussion / Comparative Analysis

1. **Interpreting India's Food Security Situation**

The study highlights a paradox in India's food security—despite sufficient food production and large distribution systems, malnutrition remains high, with 35.5% stunting, 19% wasting, and widespread anemia. India's low Global Hunger Index ranking reflects this gap between food availability and nutrition.

Key insights include:

- **Access issue:** Poverty and inequality limit nutritious diets, with 74% unable to afford a healthy diet.
- **Policy limitation:** Focus on cereals ensures calories but not micronutrients.
- **Program gaps:** Schemes like PDS and Mid-Day Meals have wide reach but limited nutritional impact due to implementation issues.

Overall, policies must shift from food quantity to quality, accessibility, and effective delivery.

2. **International Comparisons**

International experiences offer useful lessons for India's food security:

Brazil (Zero Hunger): Combined cash transfers (Bolsa Família), support for small farmers, and school feeding programs, improving both access to food and nutrition outcomes.

Bangladesh: Reduced child stunting through focus on women's education, maternal healthcare, sanitation, and nutrition awareness.

Other Countries (Vietnam, Sri Lanka): Achieved better outcomes through strong investments in health, education, and sanitation.

These examples show that **food security requires integrated approaches**, not just food production but also social development and nutrition-focused policies.

3. **Lessons for India**

Comparative analysis suggests several important lessons for improving food security in India.

First, policies must move beyond cereal-focused distribution systems and promote greater dietary diversity, including pulses, fruits, vegetables, and fortified foods. Second, integrating food distribution with income support or cash transfer mechanisms could improve household purchasing power and dietary choices. Third, strengthening implementation systems—through digital monitoring, better targeting, and transparent grievance mechanisms—can improve the effectiveness of large-scale programs.

Finally, improvements in food security must be accompanied by investments in women's empowerment, sanitation, healthcare, and education, as these factors strongly influence nutritional outcomes.

4. **Implications for Future Policy**

India has already established a strong foundation through programs such as the PDS, NFSA, PM POSHAN, and POSHAN Abhiyaan. However, further progress requires better integration of these programs with broader social and agricultural policies. Strengthening nutrition-sensitive agriculture, expanding climate-resilient farming practices, and improving access to diverse and affordable diets will be critical for reducing hunger and malnutrition in the long term.

By combining large-scale food distribution programs with lessons from international best practices, India can make significant progress toward achieving the goal of zero hunger and improved nutritional security.

Research Gaps Identified

Despite extensive research on food security in India, several important gaps remain in the existing literature. Identifying these gaps is essential for improving future research and designing more effective policies to address hunger and malnutrition.

1. **Limited Evaluation of PDS Impact**

Although the Public Distribution System (PDS) has been widely studied in terms of coverage and implementation, limited research has examined its long-term effects on nutritional outcomes. Most studies focus on food distribution efficiency rather than improvements in health indicators such as child growth, maternal nutrition, or dietary diversity. Future research should conduct longitudinal and impact-based studies to better understand how sustained access to subsidized food influences nutrition and well-being.

2. **Hidden Hunger and Micronutrient Deficiency**

Existing research primarily focuses on calorie intake and visible indicators such as stunting and wasting. However, micronutrient deficiencies—often referred to as hidden hunger—remain less studied, despite their major impact on health and cognitive development. Further research is needed to evaluate the prevalence of deficiencies in iron, vitamin A, iodine, and other essential nutrients, as well as the effectiveness of interventions such as food fortification and dietary diversification.

3. **Climate Resilience Strategies**

Climate change poses increasing risks to agricultural production and food security in India. However, there is limited empirical evidence on which climate adaptation strategies are most effective for protecting food systems and farmer livelihoods. Future studies should examine the impacts of crop diversification, drought-resistant crops, improved irrigation systems, and climate-resilient farming practices on food availability and nutrition outcomes.

4. **Regional and Demographic Disparities**

Food insecurity in India varies significantly across regions, states, and social groups, but available data often lacks sufficient disaggregation. More research is needed to understand how hunger affects different communities, particularly marginalized groups such as Scheduled Castes, Scheduled Tribes, migrant workers, and urban poor populations.

5. **Program Integration**

India operates multiple food and nutrition programs, including the PDS, Integrated Child Development Services (ICDS), PM POSHAN, and POSHAN Abhiyaan. However, limited research has examined how these programs interact with each other and whether integrated approaches could improve nutrition outcomes. Future studies should explore the potential synergies between food distribution, health services, and social protection programs.

Conclusion

This study finds that food insecurity remains a major global issue, with around 673 million people affected in 2024 despite improvements in production and economic growth, while in India a paradox exists where food grain self-sufficiency coexists with high malnutrition—35.5% of children are stunted, 19% wasted, and anemia affects a majority of women and children—reflected in its low Global Hunger Index ranking; key causes include poverty, inequality, agricultural and climate challenges, poor sanitation, and governance gaps in programs like PDS, PM POSHAN, and POSHAN Abhiyaan, whose effectiveness is reduced by leakages and limited dietary diversity; the study suggests strengthening PDS through better targeting and diversified food baskets, promoting nutrition-sensitive agriculture like millets and pulses, and adopting an integrated approach linking food security with health, sanitation, education, and women's empowerment, while future strategies should focus on data-driven policymaking, learning from national and global best practices, and enhancing climate resilience to ensure sustainable progress toward zero hunger and improved public health.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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