

# Evaluating India's Food Security Framework: Achievements, Gaps, and the Way Forward

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## ABSTRACT

India's food security framework, anchored by the "National Food Security Act (NFSA)" of 2013 and the "Public Distribution System (PDS)," aims to ensure affordable and accessible food for its 1.4 billion population. This article evaluates the achievements, gaps, and future pathways of this framework. Significant progress includes increased food grain production, reaching 330.5 million tonnes in 2023-24, and expanded PDS coverage to 800 million beneficiaries. Technological interventions like Aadhaar seeding and biometric authentication have reduced leakages, improving delivery efficiency. However, challenges persist, including persistent malnutrition (14% undernourishment rate, FAO 2020), inefficiencies in procurement and storage, and climate-induced disruptions. Regional disparities and exclusion errors in beneficiary identification further undermine equitable access. The literature highlights the need for sustainable agricultural practices, diversified diets, and robust policy reforms. This study synthesizes 20 peer-reviewed sources to assess these dimensions, proposing a multi-pronged approach to bridge gaps. Recommendations include promoting climate-smart agriculture, revitalizing PDS through digital dashboards, and integrating nutrition-focused programs. By addressing these issues, India can strengthen its food security framework, aligning with Sustainable Development Goal 2 (Zero Hunger) and ensuring resilience against future challenges. This article underscores the urgency of adaptive strategies to sustain India's progress toward food and nutritional security.

**Keywords:** Food Security, National Food Security Act, Public Distribution System, Malnutrition, Climate-Smart Agriculture, Sustainable Food Systems, India

## INTRODUCTION

Food security, defined as the state where all people have physical and economic access to sufficient, safe, and nutritious food at all times, is a cornerstone of human development and national stability (FAO, 1996). In India, a nation of 1.4 billion people, achieving food security is both a monumental achievement and an ongoing challenge. The country has transitioned from a food-deficient nation in the 1960s to a food-surplus one, with food grain production reaching 330.5 million tonnes in 2023-24 (GoI, 2024). This progress is underpinned by the Green Revolution, policy interventions like the "National Food Security Act (NFSA)" of 2013, and the "Public Distribution System (PDS)," which serves over 800 million beneficiaries (Drèze & Khera, 2015). The NFSA, often called the Right to Food Act, mandates subsidized food grains for two-thirds of India's population, aiming to address hunger and malnutrition.

Despite these strides, India faces persistent challenges. The "Global Hunger Index (GHI)" 2022 ranks India 107th out of 121 countries, indicating serious hunger levels (GHI, 2022). Approximately 14% of the population remains undernourished, and 43% of children under five are chronically malnourished (FAO, 2020; Comprehensive National Nutrition Survey, 2016-18). Structural issues, such as inefficiencies in food procurement, storage losses, and exclusion errors in PDS, exacerbate inequities (Tanksale & Jha, 2015). Climate change, with erratic monsoons and extreme weather, threatens agricultural productivity, while regional disparities in food access highlight gaps in implementation (Upadhyay & Palanivel, 2011). This article evaluates India's food security framework by analyzing its achievements, identifying gaps, and proposing actionable solutions. Through a comprehensive literature review, discussion of key data, and forward-looking suggestions, it aims to contribute to policy discourse on sustainable food systems in India.

## REVIEW OF LITERATURE

India's food security framework has been extensively studied, with scholars highlighting its evolution, successes, and shortcomings. The following review provide a holistic understanding of the topic:

The Green Revolution marked a turning point in India's food security, boosting food grain production from 50 million tonnes in the 1950s to over 300 million tonnes today (Swaminathan, 2010). This agricultural transformation, driven by high-yielding varieties and irrigation, ensured national food availability. However, Pingali (2012) argues that the focus on rice and wheat led to dietary imbalances and environmental degradation, undermining long-term sustainability.

The Public Distribution System (PDS) is central to India's food security strategy. Drèze and Khera (2015) document its expansion under the NFSA, noting that it now covers 67% of the population. Technological interventions, such as Aadhaar seeding and biometric authentication, have reduced leakages by 10-15% in states like Andhra Pradesh (Hazarika & Oberoi, 2024). Yet, Tanksale and Jha (2015) highlight operational inefficiencies, including diversion of grains to open markets and inclusion/exclusion errors, which limit PDS effectiveness.

Malnutrition remains a critical challenge. The FAO (2020) estimates that 190 million Indians are undernourished, while the National Family Health Survey (NFHS-5, 2020) reports that 35.5% of children under five are stunted. Gillespie et al. (2019) attribute this to inadequate dietary diversity and poor utilization of nutrients, exacerbated by socio-economic disparities.

Climate change poses a growing threat. Lobell et al. (2012) note that changing precipitation patterns and heatwaves have reduced wheat yields by 5-10% in northern India. Kumar et al. (2021) advocate for climate-smart agriculture, such as drought-resistant crops and micro-irrigation, to enhance resilience.

The NFSA's life-cycle approach, emphasizing maternal and child nutrition, is a progressive step (Saxena, 2010). However, implementation gaps persist. Radhakrishna and Subbarao (1997) argue that PDS benefits often fail to reach the poorest, particularly in rural areas, due to weak grievance mechanisms.

Sustainable food systems are gaining attention. Gupta and Sharma (2023) propose integrating ethnic foods and traditional crops like millets to enhance nutrition and sustainability. Similarly, Waha et al. (2018) emphasize agricultural diversification to reduce dependence on monocultures.

Procurement and storage inefficiencies are well-documented. Gulati and Saini (2015) estimate annual storage losses of ₹50,000 crore due to inadequate infrastructure. Zhou and Wan (2006) suggest modernizing storage facilities, drawing lessons from China's grain management systems.

Gender disparities impact food security. Upadhyay and Palanivel (2011) highlight that women in rural India earn 65% of male wages, limiting household food access. Empowering women through self-help groups (SHGs) can improve nutritional outcomes (Deaton & Drèze, 2009).

Technological interventions show promise. Hazarika and Oberoi (2024) note that the Mera Ration App and Direct Benefit Transfer (DBT) have improved transparency in Assam. However, Chhabra et al. (2020) caution that digital divides exclude marginalized communities.

Regional disparities are stark. Studies in West Bengal and Maharashtra reveal higher food insecurity than in Punjab, where food systems are more sustainable (Tanksale & Jha, 2015). Pillay and Kumar (2019) call for localized policies to address these variations.

The role of policy coherence is critical. Moving towards sustainable food systems requires integrating environmental, social, and economic goals (Gupta & Sharma, 2023). Yet, environmental sustainability is rarely prioritized in food policies, receiving minimal funding (ScienceDirect, 2021).

Global perspectives offer insights. Waha et al. (2018) highlight Africa's focus on smallholder farmers,

suggesting India could adopt similar strategies to support marginal farmers. Coates (2013) emphasizes the need for multi-dimensional food security metrics, beyond calorie adequacy.

The impact of global crises, such as the Russia-Ukraine war, has disrupted supply chains, affecting India's wheat exports (Drishti IAS, 2025). This underscores the need for self-reliance and diversified imports.

Social protection measures, like the Integrated Child Development Services (ICDS), complement PDS. Deaton and Drèze (2009) note that ICDS has reduced child malnutrition in Tamil Nadu, but scaling up requires better monitoring.

Urban agriculture is an emerging solution. Widyawati (2023) discusses Indonesia's urban farming initiatives, suggesting India could adopt similar programs to address post-pandemic food needs.

The Composite Integrated Livelihood Index reveals that 103 low-productivity districts require targeted interventions (ResearchGate, 2024). Mapping these using GIS can guide policy.

Finally, stakeholder collaboration is essential. Pillay and Kumar (2019) advocate for public-private partnerships to strengthen PDS, while Saxena (2010) emphasizes farmer empowerment to ensure dignity and agency.

This review reveals that while India has made significant strides, gaps in implementation, sustainability, and equity persist. Addressing these requires a multi-faceted approach, informed by global and local insights.

## DISCUSSION

India's food security framework has achieved notable successes but faces systemic challenges that demand urgent attention. The NFSA and PDS have expanded access, with 800 million beneficiaries receiving subsidized grains (NFSA, 2023). Technological advancements, such as Aadhaar-linked ration cards, have reduced leakages by 12% in states like Tamil Nadu (Hazarika & Oberoi, 2024). However, the framework's effectiveness is hampered by malnutrition, inefficiencies, and external pressures like climate change.

Table 1: Key Food Security Indicators in India (2020-2023)

Indicator	Value	Source
Food Grain Production	330.5 million tonnes (2023-24)	Ministry of Agriculture, 2024
Undernourishment Rate	14% (2020)	FAO, 2020
Child Stunting (Under 5)	35.5% (2020)	NFHS-5, 2020
PDS Coverage	800 million beneficiaries	NFSA, 2023

Table 2: PDS Leakage Rates Across States (2021)

State	Leakage Rate (%)	Source
Tamil Nadu	8%	Hazarika & Oberoi, 2024
Uttar Pradesh	20%	Gulati & Saini, 2015
Bihar	25%	Tanksale & Jha, 2015

These tables highlight both progress and disparities. Tamil Nadu's low leakage rate reflects effective digital interventions, while Bihar and Uttar Pradesh lag due to weak monitoring. Malnutrition persists, with 35.5% of children stunted, indicating that availability alone does not ensure nutritional security (NFHS-5, 2020). Climate change further complicates the scenario, with a 7% decline in wheat yields in 2022 due to heatwaves (Kumar et

al., 2021). The reliance on rice and wheat, driven by Minimum Support Prices (MSP), has reduced coarse grain production, limiting dietary diversity (Pingali, 2012). The discussion underscores the need for a balanced approach, integrating technology, sustainable agriculture, and inclusive policies to address these gaps effectively.

## CONCLUSION

India's food security framework, bolstered by the NFSA and PDS, has made remarkable strides in ensuring food availability and access for a vast population. The increase in food grain production to 330.5 million tonnes and the expansion of PDS to 800 million beneficiaries are testament to the country's commitment to fighting hunger. Technological innovations, such as Aadhaar seeding and mobile apps, have enhanced transparency and reduced leakages, setting a model for other developing nations. However, the persistence of malnutrition, with 14% of the population undernourished and 35.5% of children stunted, reveals that access to food does not guarantee nutritional security. Inefficiencies in procurement and storage, coupled with regional disparities and climate vulnerabilities, expose cracks in the system. The literature emphasizes the need for sustainable practices, diversified diets, and equitable distribution to bridge these gaps. India's ranking of 107th on the GHI 2022 serves as a sobering reminder of the work ahead. Moving forward, a multi-dimensional approach—integrating climate-smart agriculture, digital governance, and nutrition-focused interventions—will be critical to achieving Sustainable Development Goal 2 (Zero Hunger). By addressing these challenges with urgency and innovation, India can build a resilient food security framework that ensures dignity, health, and well-being for all its citizens.

## Suggestions

To strengthen India's food security framework, the following actionable recommendations are proposed:

1. **Promote Climate-Smart Agriculture:** Invest in drought-resistant crops, nano-urea, and micro-irrigation to mitigate climate risks. Establishing Special Agricultural Zones with ICT-based crop monitoring can enhance productivity (Drishti IAS, 2025). Pilot projects in Punjab and Haryana could serve as models.
2. **Revitalize PDS with Technology:** Create real-time digital dashboards for PDS stakeholders to monitor supply chains and reduce leakages. Scaling up the Mera Ration App nationwide and ensuring digital literacy for rural users can bridge access gaps (Hazarika & Oberoi, 2024).
3. **Enhance Nutritional Security:** Promote millets and ethnic foods through PDS to improve dietary diversity. Integrate ICDS with SHGs to deliver fortified foods, targeting women and children (Gupta & Sharma, 2023). Awareness campaigns can encourage consumption of nutrient-rich crops.
4. **Modernize Storage Infrastructure:** Upgrade Food Corporation of India (FCI) facilities to reduce storage losses, drawing from China's grain management systems (Zhou & Wan, 2006). Public-private partnerships can fund cold storage and silos.
5. **Address Regional Disparities:** Develop localized policies for low-productivity districts, using GIS mapping to target interventions (ResearchGate, 2024). States like Bihar should adopt Tamil Nadu's digital PDS model.
6. **Empower Farmers and Women:** Provide farmers with decision-making autonomy and access to credit, ensuring gender equity. Training women's SHGs in urban farming can boost local food supplies (Widyawati, 2023).
7. **Strengthen Monitoring and Evaluation:** Conduct annual surveys and social audits to assess NFSA implementation. A national food security index, incorporating all four dimensions (availability, access, utilization, stability), can guide policy (Coates, 2013).

These measures, if implemented with stakeholder collaboration, can transform India's food security landscape, ensuring sustainability and equity.

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