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## Enhancing Efficiency through Digital Initiatives: A Study on Public Distribution System in India

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### Abstract:

*The Public Distribution System (PDS) is a major food security initiative implemented under the Ministry of Consumer Affairs, Food and Public Distribution, aimed at providing essential food and non-food items at subsidized rates. Under the National Food Security Act, 2013, Priority Households (PHH) receives 5 kg of food grains per person per month at highly subsidized prices. Through the PDS, commodities such as wheat, rice, sugar, and kerosene are allocated to States and Union Territories, with several regions also distributing additional items including pulses, edible oils, iodized salt, and spices. As of 2025, the system covers approximately 80.56 crore beneficiaries, making it one of the largest food distribution networks globally. However, recent findings by CRISIL, based on the 'thali index,' indicate that nearly 50% of rural and 20% of urban populations are unable to afford two balanced meals a day, highlighting persistent food insecurity. This contrasts with the World Bank's Poverty and Equity Brief, drawing on the 2024 Household Consumption Expenditure Survey, which reports a decline in extreme poverty from 16.2% in 2011–12 to 2.3% in 2022–23. In this context, the present study seeks to analyse the challenges that limit the effectiveness of food security initiatives and to examine recent digital reforms undertaken by the government to modernize the Public Distribution System.*

**Keywords:** Public Distribution System, food security, National Food Security Act 2013, Digital initiatives.

### Introduction

The Public Distribution System (PDS) has evolved from a wartime rationing mechanism in the 1940s into a nationwide, welfare-oriented food security system. Over the decades, it has undergone significant reforms,

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transitioning from a universal model to a targeted and increasingly digitalised system aimed at enhancing efficiency, transparency, and accountability. Prior to the 1960s, the system relied heavily on imported foodgrains to meet domestic distribution requirements. To address issues related to pricing and agricultural incentives, the government established the Commission for Agricultural Costs and Prices (formerly the Agricultural Prices Commission) to ensure fair price policies for farmers. In addition, the Food Corporation of India (FCI) was created to strengthen the procurement, storage, and distribution of foodgrains under the PDS.

By the 1970s, the PDS had developed into a universal system, providing subsidised foodgrains to all households irrespective of income. Until 1992, it functioned as a general entitlement scheme without any specific targeting of beneficiaries. In 1992, the Revamped Public Distribution System (RPDS) was introduced to improve access in remote, hilly, tribal, and inaccessible areas. A major shift occurred in 1997 with the introduction of the Targeted Public Distribution System (TPDS), which classified beneficiaries into Below Poverty Line (BPL) and Above Poverty Line (APL) categories. Further strengthening the focus on vulnerable populations, the Antyodaya Anna Yojana was launched in 2000 to cover the poorest households. Initially targeting one crore families, the scheme was later expanded in phases and provided 35 kg of

foodgrains per family per month at highly subsidised prices. The enactment of the National Food Security Act, 2013 marked a significant milestone by making food security a legal right for eligible households. This legislation transformed access to food from a welfare provision into a justiciable right under the law, thereby strengthening the framework of food security in India.

In recent years, the government has undertaken several digital reforms to modernise the PDS and address issues such as leakages, duplication, and inefficiencies. The One Nation One Ration Card initiative enables beneficiaries to access their entitled foodgrains from any fair price shop across the country, thereby ensuring portability and supporting migrant populations. The introduction of electronic Point of Sale (e-POS) devices at fair price shops has facilitated real-time authentication and transaction recording, improving transparency and reducing diversion of foodgrains. Additionally, Aadhaar seeding of ration cards has helped in eliminating duplicate and ghost beneficiaries by linking entitlements to unique biometric identification, thereby enhancing the efficiency and accountability of the system.

### **Objectives of the study**

1. To study the situation of food security in India
2. To outline significant issues related to food security

3. To throw light on the digital initiatives undertaken
4. To provide recommendations to plan and implement better PDS strategies to erase hunger and malnutrition.

### Methodology

The present study is based on secondary data. Relevant information was gathered from a wide range of published and unpublished sources, including book reviews, journal articles, working papers, books, magazines, newspapers, reports, and credible online resources.

### Food Security in India

Food security has remained a central concern of Indian public policy since the eve of independence. Although India occupies a strong position in global food production and export markets, significant challenges persist in ensuring equitable access to food and balanced nutrition for all sections of the population. The 2024 Global Hunger Index, in which India ranks 105th out of 127 countries, highlights the gravity of hunger and malnutrition. Similarly, the State of Food Security and Nutrition in the World (SOFI) estimates that approximately 19.46 crore people (around 13.4%) in India are chronically undernourished. These indicators reflect the persistent issues of food insecurity, malnutrition, and hunger in the country.

Addressing these challenges requires a multi-dimensional, multi-level, and multi-stakeholder approach across interconnected sectors such as agriculture,

food distribution, health, and nutrition. The SOFI report further indicates that nearly 74% of the population cannot afford a healthy diet, while about 39% lack access to a nutrient-adequate diet, underscoring the depth of nutritional deprivation.

The enactment of the National Food Security Act, 2013 (NFSA) marked a significant policy intervention aimed at strengthening food security through the Public Distribution System (PDS). The Act guarantees subsidised foodgrains to nearly 75% of the rural and 50% of the urban population, with special provisions for the poorest households under the Antyodaya Anna Yojana.

India's PDS is one of the largest food subsidy programmes in the world, covering approximately 80.67 crore beneficiaries through more than five lakh Fair Price Shops (FPS). It provides essential commodities such as rice, wheat, sugar, and kerosene at subsidised prices. Comparable food security programmes exist in other developing countries, such as Brazil's Fome Zero, Ethiopia's Productive Safety Net Programme, and Bangladesh's Vulnerable Group Development Programme. However, India's PDS remains unparalleled in scale and coverage.

Ensuring adequate stocks of essential foodgrains—particularly rice, wheat, and pulses—is crucial for maintaining food security during crises, including natural disasters and economic disruptions. The

National Food Security Mission (NFSM) plays a vital role in enhancing agricultural production by increasing the area under cultivation and improving crop productivity, particularly for staple crops such as rice, wheat, pulses, and coarse cereals.

Despite these efforts, challenges remain. A continued dependence on imports, especially for pulses and edible oils, poses a risk to long-term food security. Therefore, achieving sustainable food and nutritional security in India requires a holistic and integrated approach that combines effective policy implementation, technological interventions, and active community participation. Strengthening existing programmes and ensuring equitable access to nutritious food can significantly contribute to the goal of zero hunger and improved nutritional outcomes in the country.

#### **Issues Related To Food Security in India**

The Public Distribution System (PDS), despite being one of the largest food security networks in the world, faces several systemic challenges that undermine its effectiveness and impose significant financial and administrative burdens. These issues weaken the intended impact of welfare schemes, restrict access for genuine beneficiaries, and contribute to rising government expenditure. One of the major concerns is leakage and diversion within the system. It is estimated that nearly 28% of

foodgrains are lost due to leakages, resulting in an annual financial loss of around ₹69,108 crore. A substantial portion of grains is diverted during transportation or illegally sold in the open market, with reports indicating that nearly one-third of the foodgrains lifted from the Food Corporation of India (FCI) fail to reach Fair Price Shops.

Another critical issue relates to targeting errors under the Targeted Public Distribution System (TPDS), which suffers from both inclusion and exclusion errors. In many cases, non-poor households obtain ration cards, while genuinely deserving poor households are excluded. Migrant labourers and informal sector workers, in particular, often face difficulties in accessing ration cards, whereas some middle-income urban households continue to benefit from subsidised foodgrains.

Supply chain inefficiencies further aggravate the problem, as weaknesses in storage, transportation, and coordination among agencies lead to delays and wastage. Inadequate warehousing infrastructure contributes to spoilage of foodgrains, while remote and hilly regions frequently experience delayed deliveries, resulting in periodic shortages at ration shops.

In addition, the procurement policies linked to Minimum Support Price (MSP) have encouraged monocropping, particularly of rice and wheat, thereby discouraging crop diversification. This has

long-term implications for nutritional security and environmental sustainability. For instance, states like Punjab and Haryana have increasingly shifted towards water-intensive rice cultivation, leading to a decline in the production of millets and other coarse grains.

The rising food subsidy burden is another major concern. Food subsidy expenditure has increased significantly from ₹21,200 crore in 2002–03 to nearly ₹2 lakh crore in 2024–25, placing considerable strain on the Union Budget. This has also affected the financial position of the Food Corporation of India, as subsidy dues often accumulate due to the large fiscal requirements of maintaining PDS operations.

Finally, regional disparities persist in the functioning of the PDS. The system tends to operate more efficiently in urban areas due to better infrastructure and monitoring mechanisms, whereas rural, tribal, and remote regions face irregular supply and weaker administrative oversight. For example, while urban centres such as Delhi and Mumbai receive regular stock, tribal districts in states like Odisha and Jharkhand frequently experience stock shortages due to transportation bottlenecks.

### **Recent Digital Initiatives**

In recent years, the Government of India has introduced several digital and administrative reforms to enhance the efficiency, transparency, and accountability of the Public Distribution

System (PDS). One of the key initiatives is Aadhaar seeding of beneficiaries, which links ration cards with unique biometric identification under Aadhaar, thereby ensuring proper identification, eliminating duplicate or ghost beneficiaries, and reducing inclusion and exclusion errors under the TPDS. The digitisation of ration cards has further enabled online verification of beneficiary data, tracking of monthly entitlements, and real-time monitoring of distribution.

Another significant reform is the end-to-end computerisation of the supply chain, which facilitates digital tracking of foodgrains from procurement centres managed by the Food Corporation of India (FCI) to state depots and ultimately to Fair Price Shops (FPS), thereby reducing diversion and leakages. This has been complemented by GPS tracking of foodgrain transport vehicles, which helps monitor movement, prevent route deviations, and minimise delays or pilferage during transit.

At the distribution level, the introduction of electronic Point of Sale (e-PoS) devices has enabled biometric authentication of beneficiaries at FPS outlets, ensuring transparency and accurate record-keeping of transactions. In addition, smart ration cards have been introduced in several states as secure electronic cards that store beneficiary details and biometric data, reducing the risk of counterfeiting and fraudulent claims.

Further strengthening transparency, SMS-based monitoring systems have been implemented to notify beneficiaries about the dispatch and arrival of foodgrains at FPS outlets, thereby promoting public oversight. Online grievance redressal mechanisms, including state portals and toll-free helplines, allow beneficiaries to register complaints and track their resolution, enhancing accountability within the system. The role of community participation has also been emphasised through social audits, wherein local communities, self-help groups (SHGs), and non-governmental organisations (NGOs) monitor the functioning of FPS outlets and report irregularities.

In addition to technological interventions, several policy measures have been adopted to improve nutritional outcomes and reduce systemic errors. Some states have expanded the food basket under PDS by including pulses, edible oils, iodised salt, and fortified foods to address nutritional deficiencies. Others, such as Tamil Nadu and Kerala, have implemented near-universal PDS models to minimise targeting errors and ensure broader coverage. Furthermore, pilot initiatives on Direct Benefit Transfer (DBT) aim to transfer food subsidies directly into beneficiaries' bank accounts, thereby reducing inefficiencies associated with storage and transportation, although these are being implemented cautiously due to concerns about market access and price fluctuations.

## Recommendations

The Public Distribution System (PDS) can be strengthened by enhancing transparency, reducing leakages, and improving targeting through technology-driven and policy-oriented reforms. Strengthening storage, transportation, and procurement mechanisms will further ensure efficiency, sustainability, and equitable access to foodgrains.

A key priority is the adoption of end-to-end digitalisation across all stages of the supply chain. Comprehensive computerisation, GPS-based tracking of foodgrain movement, and biometric authentication through electronic Point of Sale (e-POS) devices can significantly minimise leakages and improve accountability.

Diversification of the food basket is equally important to address nutritional security. Including millets, pulses, and fortified foods under the PDS would not only improve dietary diversity but also reduce excessive dependence on rice and wheat, thereby promoting sustainable agricultural practices.

Further, strengthening storage and logistics infrastructure is essential. This includes modernising warehouses, expanding scientific storage facilities such as silos, and improving last-mile delivery mechanisms, particularly in rural, tribal, and remote regions where supply disruptions are more frequent.

Improving targeting and inclusion mechanisms is another critical area.

Regular updating of beneficiary databases, effective integration of biometric identification systems such as Aadhaar, and ensuring portability through initiatives like One Nation One Ration Card can help include migrant and vulnerable populations while reducing exclusion and inclusion errors.

### Conclusion

As reported by the World Food Programme, India continues to face significant food and nutritional insecurity despite sustained growth in foodgrain production. The country ranks 102 out of 123 in the 2025 Global Hunger Index, with key malnutrition indicators remaining above acceptable thresholds: approximately 35% of children under five are stunted, 19% are underweight, and anaemia affects nearly 57% of women of reproductive age. These figures highlight the persistence of “hidden hunger” and nutritional deprivation.

In this context, a reformed and nutrition-sensitive Public Distribution System (PDS) is essential to bridge the gap between food availability and nutritional outcomes. Future policy interventions must focus on strategic targeting, fiscal sustainability, and diversification of the food basket to ensure balanced nutrition. Strengthening digital reforms, improving supply chain efficiency, and addressing regional disparities will further enhance the effectiveness of the system. Ultimately, achieving food security in India is not

merely a matter of ensuring food distribution but of guaranteeing equitable access to nutritious food. Ensuring dignity in food access requires a shift from quantity-based approaches to nutrition-oriented strategies that prioritise the well-being of all sections of society.

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