# A Systematic Literature Review of the Public Distribution System in India

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## ABSTRACT
In India, the Public Distribution System (PDS) is an important mechanism for guaranteeing food security by supplying critical goods to economically disadvantaged members of society at reduced rates. This study article examines the efficiency and effectiveness of PDS operations. It investigates the historical backdrop and growth of PDS, identifies important stakeholders and their responsibilities, and compares it to similar systems in other Asian nations. The report emphasizes PDS operational issues such as leakages, pilferage, and inefficiencies, as well as an analysis of government spending on food subsidies over time A SWOT analysis helps understand the PDS's strengths, weaknesses, opportunities, and threats. This paper suggests data-driven methods to increase the efficiency and transparency of PDS operations, with the ultimate goal of improving food security while reducing government spending.

## Keywords
Public Distribution System, Food Security, Supply Chain Management, Stakeholder Analysis, SWOT Analysis.

## 1. INTRODUCTION
Public distribution of necessary items has existed in India since before independence [19]. Public Distribution System, with its emphasis on food grain distribution in urban scarcity regions, arose in response to 1960's acute food shortages (APCR, 2011). The PDS for food grains is a chief mechanism used by any government to guarantee that all residents have access to food security. It ensures that essential goods are distributed at subsidized rates to economically deprived members of society. The goal was to offer access to food those who could not afford it. At the same time, securing enough remuneration for farmers helps to sustain food grain supply. The farmer welfare was ensured by purchasing food grain straight from them at the Minimum Support Price (MSP). PDS is within the umbrella of poverty reduction initiatives, namely food security programs [36]. In [37] the authors defined PDS as an in-kind transfer plan for food security under poverty reduction initiatives, in which profits are provided to the poor in the sort of subsidized food grains instead of cash.

PDS is a governmental infrastructure that is administered, regulated, and funded by the government. As a result, it attempts to achieve three social goals: (1) Guarantee equitable compensation for farmers, so supporting agriculture; (2) protecting vulnerable individuals by distributing food grains at accessible rates; and (3) making effective use of tax payer cash. Of the three social aims, determining equitable payment for farmers as sourcing partners is entirely determined by policy design. Since then, the sourcing activity has also tried to provide farmers with protection, rather than strategic procurement from low-cost, high-quality, and trusted vendors. The second and third objectives, which focus on trustworthy customer service and an efficient system, may be addressed through Supply Chain (SC) activities.

Prior to 1992, everyone had access to the PDS, at least in theory if not in reality. The switch from the Revamped Public Distribution System (RPDS) in tribal, desert, hilly, and isolated areas in 1992 to the Targeted Public Distribution System (TPDS) in 1997 was justified, among other things, by corruption and high operating expenses. Based on their economic standing, families were categorized as Above Poverty Line (APL) or Below Poverty Line (BPL) under the TPDS. Through the TPDS, food grain subsidies for BPL households persisted, but those for APL households were progressively reduced. However, this PDS supply chain has a number of flaws, which prevent it from completely contributing to accomplishing the desired goal [38]. The most prevalent issue is losses and wastes [39], which has been brought to light on a regular basis with images of rotting food grains shown on print and broadcast media platforms. Owing to widespread corruption at all levels, leaks and theft are two more frequent flaws in the system.

Despite these flaws, the SC of PDS is a system that has been in operation for more than 60 years and has grown significantly. These strengths have allowed the system to continue operating for so long. Revolutionary developments have occurred over time in a number of communication-related domains, including database administration. If these are properly and scientifically utilised, they provide a wide range of opportunities for the SC of the PDS to develop and improve.

However, there are other dangers as well, such as the growing population and shrinking amount of arable land, which, if unchecked, could negatively impact the distribution system. In order to increase the efficacy and efficiency of the PDS supply

chain, it is necessary to analyse these strengths, weaknesses, opportunities, and threats from a broad viewpoint. Upon more investigation, the most important solution or solutions may also be identified. Assuming a constant external environment, the primary focus of research on the PDS supply chain to far has been on internal environment analysis. This is untrue, though, because of the constantly shifting outside variables that have a big impact on the SC of the PDS. For this reason, a SWOT analysis has been done.

This paper discusses and explains the historical evolution and current state of the PDS in India. It identifies key stakeholders and their roles, compares the PDS with similar systems in other Asian countries, and highlights major operational challenges such as leakages, pilferage, and inefficiencies. The paper also analyzes government spending on food subsidies over time and offers a SWOT analysis to assess the PDS's strengths, weaknesses, opportunities, and threats. Additionally, it proposes data-driven methods to enhance the efficiency and transparency of PDS operations, with the ultimate aim of improving food security while reducing government expenditure.

# 2. RESEARCH QUESTIONS

## 2.1 Comparison with Other Asian Countries

a) What lessons can India learn from the PDS models implemented in other Asian countries to improve its own system?
b) How does the PDS in India compare to similar systems in other Asian countries like Pakistan, Bangladesh, Indonesia, the Philippines, Vietnam, and China?

## 2.2 Stakeholder Analysis

a) What roles do various stakeholders, such as the central government, state governments, Food Corporation of India (FCI), Fair Price Shops (FPS), and beneficiaries, play in the PDS in India?
b) How do state-level disparities impact the effectiveness of the PDS, and what localized strategies could mitigate these disparities?

## 2.3 PDS Operations and Challenges

a) What are the main operational challenges faced by the PDS in India, and what are the root causes of these challenges?
b) How do leakage, pilferage, and wastage affect the efficiency of the PDS supply chain?
c) What are the strengths and weaknesses of the current SC of the PDS, and how can opportunities be leveraged to address existing threats?

## 2.4 Government Expenditure and Financial Efficiency

a) How has government expenditure on food subsidies through the PDS changed over the years?
b) What measures can be taken to improve the financial efficiency of the PDS and reduce high government expenditure on subsidies?

# 3. DATA ANALYSIS

## 3.1 PDSs in Asian Countries

Food security and price stability are addressed by PDS in Asian nations using a variety of forms and tactics. The Commission for Agricultural Costs and Prices (CACP) and the FCI oversee the sourcing and distribution of food grains in India, guaranteeing an MSP for rice and wheat. The system still has leaks and inefficiencies in spite of heavy governmental engagement. Although liberalization attempts have been patchy, Pakistan's Pakistan Agricultural Storage and Services Corporation (PASSCO) stabilizes seasonal price fluctuations and provides wheat to flour mills at constant prices.
Bangladesh uses a ministry-based approach that involves non-governmental organizations and is centred on targeted distribution for disaster relief and poverty reduction. With exclusive control over international commerce, Badan Urusan Logistik (BULOG) of Indonesia has raised rice production and maintained a price range for the grain. The National Food Authority (NFA) of the Philippines sells rice through a variety of channels at regulated prices that are lower than market rates in an effort to safeguard consumers and encourage rice self-sufficiency. Vietnam's shift from parastatal to market-based governance has led to higher output and a notable rise in the number of private merchants. China's system, which focuses on grain acquisition, direct income transfers, and social safety nets, includes the China Grain Reserves Corporation (Sinograin) and the Minimum Living Guarantee Program (dibao).
Table 1 shows the Public Distribution Systems and key features in various Asian countries along with relevant references.

**Table 1. PDS in Asian Countries**

| Country | PDS | Key Features | References |
|---|---|---|---|
| India | FCI, CACP | MSP for wheat and rice, unlimited procurement, buffer stock maintenance, significant bureaucratic involvement, leakages in PDS | [1][2] [12] |
| Pakistan | PASSCO | Mitigates seasonal price swings, supplies wheat to flourmills at uniform prices, inconsistent liberalization efforts | [3][13] |
| Bangladesh | Ministry-based operations with NGO involvement | Targeted distribution for poverty alleviation, disaster management, price stabilization, government withdrew from direct retail rice trade | [4][5] [14] |
| Indonesia | BULOG | Increased rice production, price band for rice, monopoly control over international trade, unlimited credit access, extensive logistical facilities | [6][7][ 15] |

| | | | |
|---|---|---|---|
| Philippines | NFA | Protects consumers, promotes rice self-sufficiency, sells rice at fixed price below market rate, distributed through various channels | [8][9] [16] |
| Vietnam | Transition from parastatals to market liberalization | Increased production, enhanced technology adoption, reduced subsidies, strengthened private markets, significant growth in private traders | [10] [17] |
| China | Sinograin, dibao | Grain procurement when prices fall, auctions to release grains, direct income transfers, social safety nets, poverty reduction through dibao programs | [11] [18] |

## 3.2 Analysis of Stakeholders in India

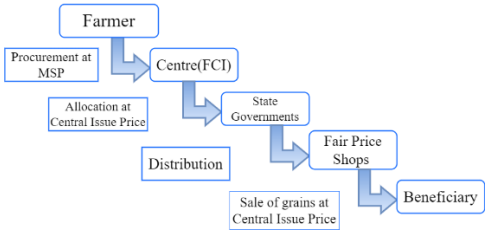


**Figure 1: Flow of Food Grain Distribution in India's PDS [22]**

In India different stakeholders have different responsibilities to play in the PDS of India in order to guarantee food security. Through organizations like the FCI, the central government oversees bulk allocation, storage, transportation, and purchase while establishing supply amounts, quotas, and minimum pricing. State governments oversee FPS, regulate intrastate distribution, identify households below the poverty line BPL, and distribute ration cards. The NFS Act's principal agency, the FCI, is in charge of buying, storing, transporting, and distributing food grains as well as keeping buffer stockpiles. Figure 1 depicts the flow of food grain distribution in India's PDS. Food grain distribution to recipients is handled by FPS owners, who frequently deal with issues including inefficiency and corruption. Despite challenges including inclusion and exclusion mistakes, PDS beneficiaries mostly BPL families receive food security.

**Table 2. Stakeholders Roles**

| Stakeholder | Roles | Key Points | References |
|---|---|---|---|
| Central Government | Sets supply quantities, quotas, and minimum prices; manages procurement, storage, transportation, and bulk allocation | Centralized control through specific institutions and committees; FCI manages procurement and distribution | [19] |
| State Government | Manages allocation within states, identifies BPL families, issues ration cards, supervises FPS | Operational responsibility; varies across states; sets procurement mechanisms and PDS retail prices; ICT implementation | [19][20] |
| FCI | Purchases, stores, transports, distributes, and sells foodgrains | Maintains buffer stocks; primary agency for NFSA; often holds excessive stocks; criticized for inefficiency | [21] |
| FPS | Distributes foodgrains to beneficiaries; supervised by state governments | Owners earn commission; often engage in corrupt practices; reforms suggested to combat profiteering and improve viability | [22][23] |
| Beneficiaries | Receive food security through PDS | Face inclusion and exclusion errors; eligibility based on BPL status; suggestion to use an exclusion approach | [24] |

Table 2 shows the role of stakeholders involved during the process of transporting beneficiaries from beginning to the people.

## 3.3 Problems faced with the distribution of PDS

In India, PDS is a vital system that guarantees millions of people's access to food, yet it is constrained by a number of problems that make it less efficient. The distribution process's inefficiency, which results in major resource leakage and waste, is one of the main issues. The issue is made worse by dishonest and corrupt behaviours that occur at every stage of the SC, from distribution to procurement, which leaves a significant number of the intended beneficiaries without obtaining their fair share. The system's inefficiency is further compounded by logistical issues such inadequate storage facilities, shoddy transportation infrastructure, and delays in the supply of food grains. These problems cause the

government to suffer large financial losses and undermine the PDS's goals.

Another important concern is the incorrect identification and inclusion of beneficiaries. When identifying households BPL, the targeted selection method frequently produces inclusion errors that result in assistance being awarded to ineligible households while exclusion errors leave out many worthy families. This inefficient use of resources makes the poor's food insecurity worse. The monitoring and administration of the distribution process are made more difficult by the technological flaws in the system, such as the absence of digitization and data integration across many areas. The PDS still has difficulty achieving its objectives effectively and fairly in spite of the government's introduction of several reforms and technical initiatives. Comprehensive policy measures and strong implementation techniques are needed to address these complex issues and guarantee that the expected benefits of the PDS are realized. Table 3 states the problems existing within the PDS

**Table 3. Problems with PDS**

| Problem | Root Causes | Proposed Solutions | References |
|---|---|---|---|
| Inefficiency in Distribution | Leakage and diversion of food grains | Implementation of food stamps, improvements in targeting subsidies | [25][27] |
| Corruption | Weak administration, fake supply entries, bogus ration cards | Technical and policy reforms, computerization for transparency | [30][33] |
| Operational Inefficiencies | Inefficiency at all stages of Supply Chain | ICT-based interventions, involvement of private actors, hybrid approach for process redesign | [31][34] |
| State-Level Disparities in PDS Effectiveness | Varying state policies and implementation strategies | Localized strategies, tailored policies for different states | [28] |
| Challenges in Ensuring Food Security | Inequitable access, mismanagement, insufficient policy reforms | Policy and technical reforms, leveraging banking and information technologies | [30], [26] |
| Supply Chain Deficiencies | Gaps in logistics, lack of integration, weak stakeholder coordination | ICT solutions, hybrid method for improving supply chain efficiency | [29], [34] |
| High Government Expenditure | Large subsidies, inefficient spending | Improved efficiency, better targeting of subsidies, ICT-based management | [26], [32] |
| Malnutrition and Hunger | Operational inefficiencies in PDS | Addressing inefficiencies, enhancing food distribution strategies, policy reforms | [32], [29] |

## 3.4 Government Expenditure in food subsidies over the years

India's government spending on food subsidies has increased significantly over time, demonstrating the state's dedication to guaranteeing food security for its people. The amount spent includes a number of initiatives targeted at giving the less fortunate members of society access to reasonably priced food grains, mostly via the PDS. Table 4 shows the Government expenditure over the years. A number of variables, such as increased procurement costs, PDS coverage expansion, and inflationary pressures on food prices, are to blame for the rising cost of food subsidies. The cost of subsidies has increased as the government works to keep food affordable, necessitating significant budgetary commitments every fiscal year. Notwithstanding these initiatives, questions about the effectiveness and consequences of food subsidies persist, calling for ongoing analysis and change.

**Table 4. Government Expenditure Over the Years**

| Year | Allocation (in cr) | Expenditure (in cr) | utilization (%) |
|---|---|---|---|
| 2011-12 | 60,573 | 72,822 | 120% |
| 2012-13 | 75,000 | 85,000 | 113% |
| 2013-14 | 90,000 | 92,000 | 102% |
| 2014-15 | 1,15,000 | 1,17,671 | 102% |
| 2015-16 | 1,24,419 | 1,39,419 | 112% |
| 2016-17 | 1,34,835 | 1,10,173 | 82% |
| 2017-18 | 1,45,339 | 1,00,282 | 69% |
| 2018-19 | 1,69,323 | 1,01,327 | 60% |
| 2019-20 | 1,84,220 | 1,08,688 | 59% |
| 2020-21 | 1,15,570 | 4,22,618 | 366% |

# 4. RESULTS AND DISCUSSIONS

## 4.1 Operational Challenges and Inefficiencies in India's PDS

India's PDS is a critical framework for ensuring food security, but it has long been plagued by significant operational. One of the most persistent challenges is the widespread leakage and diversion of food grains. As mentioned in Table 3, key issues include corruption, weak administration, and logistical shortcomings. As illustrated in Figure 2, the leakage rate was

notably high at 46.7% in 2011-12, reflecting substantial inefficiencies and diversion of allocated resources. By 2012-13, leakage rates were slightly reduced to about 40% due to policy measures, but remained problematic. The implementation of the National Food Security Act (NFSA) and increased digitization led to a more significant drop in leakage rates to approximately 37.4% by 2014-15 [42]. Reforms such as Aadhaar-based authentication further reduced leakage rates to around 25.9% in 2016-17, as noted in the chart, showing the positive impact of technological interventions [43]. By 2018-19, leakage rates had decreased to around 20%, largely due to the expansion of digital reforms like Direct Benefit Transfers (DBT) and digitized ration cards [44]. The COVID-19 pandemic brought about an unprecedented improvement in leakage rates, dropping to below 15% in 2020-21, thanks to real-time monitoring and enhanced biometric systems [44].

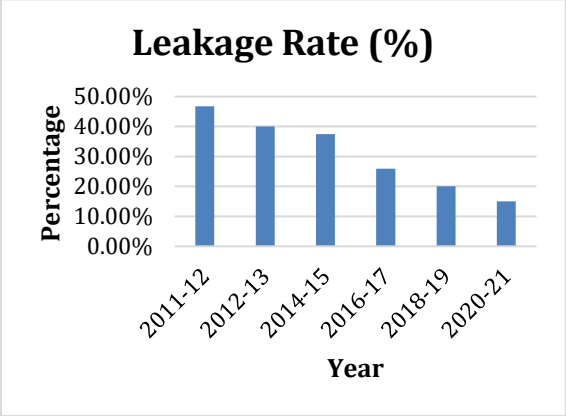


**Figure 2: Leakage Rates Throughout the years**

## 4.2 Budget Dynamics and Government Roles in PDS Financial Management

Table 2 lists the various important responsibilities that different stakeholders play in Indian PDS. The central government manages bulk allocation, storage, transportation, and purchase while establishing supply amounts, quotas, and minimum pricing. State governments are in charge of FPS oversight, ration card issuance, identification of BPL families, and intrastate allocation. States differ in how well PDS implementation works, depending on local laws and administrative effectiveness. Table 4 illustrates how government spending on food subsidies has changed dramatically over time. The allocation has consistently gone up, although spending frequently goes above budget, with usage rates in 2020–21 ranging from 59% to an astounding 366%. The COVID-19 pandemic raised the requirement for food security, which is shown in the 2020–21 surge. This shows that the system is capable of handling catastrophes, but it also emphasizes the need for improved financial planning, optimizing resource allocation, cutting down on leaks, and better targeting subsidies are all necessary to increase financial efficiency. These objectives can be met with greater efficiency by using technology for budget management and spending alignment with allotted funds. Figure 3 shows the yearly allocation of food grains vs expenditure.

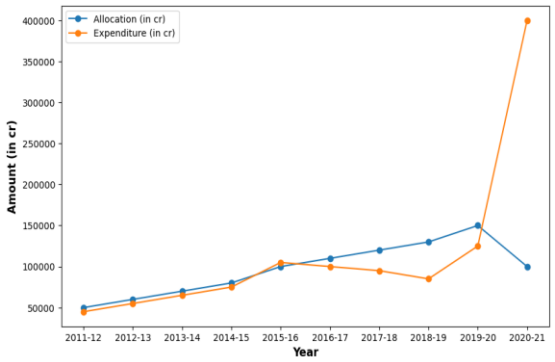


**Figure 3: Yearly Allocation vs Expenditure**

## 4.3 Cross-National Insights and Lessons for India

To enhance the effectiveness of India's PDS, it is advantageous to draw insights from the systems implemented by other Asian nations. Table 1 offers a comprehensive overview of various PDS across different countries. Based on table 1s, the following table has been derived to provide a clearer understanding of the insights relevant to improving India's system.

**Table 5. Insights for India's PDS Reform**

| Country | PDS | Lessons for India |
|---|---|---|
| **India** | FCI, CACP | Focus on reducing inefficiencies and leakages; improve logistical and bureaucratic management. |
| **Pakistan** | PASSCO | Emphasize price stabilization and consistent supply management. |
| **Bangladesh** | Ministry-based operations with NGO involvement | Enhance targeted assistance and reduce bureaucratic overhead; involve NGOs for better reach. |
| **Indonesia** | BULOG | Improve logistical capabilities and consider monopoly control in specific areas to stabilize prices. |
| **Philippines** | NFA | Maintain regulated prices through multiple distribution channels; support consumer protection. |
| **Vietnam** | Transition from parastatals to market liberalization | Consider market liberalization and private sector engagement to drive efficiency and growth. |
| **China** | Sinograin, dibao | Combine grain procurement with direct income transfers and social safety nets to address poverty. |

Table 5 outlines how India can adopt reform techniques by learning from the public distribution systems of other countries. It highlights key strategies like reducing inefficiencies, improving logistical management, and involving the private sector and NGOs to enhance India's PDS efficiency.

## 5. CONCLUSION AND FUTURE SCOPE

The PDS in India for many years, has been essential to guaranteeing food security and aiding the socially and economically disadvantaged groups. The system has several difficulties while playing such a crucial function, such as operational discrepancies across governments, corruption, leaks, and inefficiency. These problems make it more difficult for the PDS to fulfil its commitments. Comparing India's PDS model to that of other Asian countries shows that, although there are certain issues in common, the country also has certain advantages that may be used to its benefit. The implementation of tailored distribution methods, augmented private sector engagement, and technological leverage are potential strategies to improve the PDS's efficiency and transparency, based on insights from nations such as China, Bangladesh, and Indonesia. Many of the inefficiencies that now exist may be addressed by improving cooperation among various parties, putting strict monitoring in place, and guaranteeing responsibility. Solutions based on information and communication technology (ICT), such as computerization and biometric verification, can enhance targeting and lessen corruption. Improved administration of subsidies and policy changes that promote private sector involvement can also make a major impact on the system's effectiveness. Its efficacy may be greatly increased by addressing its operational inefficiencies, utilizing technology innovations, studying global best practices, and guaranteeing successful stakeholder participation.

India can ensure that it achieves its objective of guaranteeing food security for all of its population, especially the most vulnerable, by concentrating on these regions and strengthening the PDS.

The future scope of research on India's PDS presents several promising avenues for further exploration, with significant implications for policy reforms and practical applications. Firstly, in-depth studies on the impact of technological interventions, such as the use of digitalization, blockchain for SC transparency, and AI for predictive analytics, can offer valuable insights into improving the operational efficiency of the PDS. Additionally, examining the effectiveness of Direct Benefit Transfers (DBTs) and their role in reducing corruption and leakages in food distribution could help identify best practices for policy implementation. Secondly, there is a need to investigate the potential of public-private partnerships within the PDS framework, particularly in logistics and distribution, to enhance operational efficiency and reduce costs. Further research could also explore the benefits of decentralized approaches that are tailored to local needs, potentially providing innovative solutions to address state-level disparities in PDS performance. Finally, policy-oriented studies focusing on comprehensive reforms, such as integrating the PDS with other social safety net programs, improving cross-state coordination, and developing uniform standards for monitoring and evaluation, could help establish a more robust framework for the system. Practical applications of these findings could involve piloting new distribution models or technology-driven solutions in selected states, thereby creating a scalable roadmap for nationwide implementation. By addressing these areas and incorporating global best practices, India can strengthen the PDS and ensure that it remains an effective tool for guaranteeing food security for all, especially the most vulnerable populations.

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