



# A Comprehensive Study on the Impact of the Public Distribution System on Beneficiaries in Karnataka with Special Reference to Tumakuru District

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**Abstract-** The Public Distribution System (PDS) in Karnataka represents one of the most significant welfare interventions aimed at ensuring food security among vulnerable populations. Implemented under the National Food Security Act, the system provides subsidized food grains to millions of households, particularly targeting Priority Households (PHH) and Antyodaya Anna Yojana (AAY) beneficiaries. Karnataka has emerged as a leading state in PDS implementation, serving over 4.5 crore beneficiaries with subsidized rice and other essential commodities. The integration of digital reforms such as e-POS and Aadhaar-based authentication has significantly reduced leakages and improved transparency. This empirical study examines the impact of PDS on beneficiaries in Tumakuru district through a mixed-method approach involving a primary survey of 400 households, 20 Focus Group Discussions (FGDs), and secondary data analysis. The findings reveal high satisfaction levels (85%), improved nutritional security (75%), and measurable economic benefits, including monthly savings of approximately ₹500. Despite these achievements, challenges such as quality concerns, exclusion of migrant populations, and delays in Direct Benefit Transfer (DBT) persist. The study concludes that while Karnataka's PDS model is highly effective, targeted reforms are necessary to enhance inclusivity and efficiency.

**Keywords-** Public Distribution System, Food Security, Tumakuru District, Karnataka, NFSA 2013, Anna Bhagya Scheme, DBT, Welfare Economics.

## I. INTRODUCTION

India's Public Distribution System is one of the largest food security programs globally, designed to provide essential commodities at subsidized rates to economically weaker sections. Over the years, it has evolved from a universal system into a targeted welfare mechanism under the National Food Security Act. Karnataka has emerged as a model state due to its effective implementation, reduced leakage rates, and strong integration of technology. The district of Tumakuru district serves as an ideal micro-level case study due to its diverse socio-economic composition. With a mix of rural and semi-urban populations, significant representation of marginalized communities, and dependence on agriculture, the district reflects the broader dynamics of welfare delivery in Karnataka.

The introduction of the Anna Bhagya Scheme further strengthened food security by providing additional financial support through Direct Benefit Transfer. This study evaluates how these interventions have improved access to food, reduced

poverty, and enhanced the overall well-being of beneficiaries.

## II. RESEARCH OBJECTIVES AND HYPOTHESES

The primary objective of this study is to analyze the impact of the Public Distribution System on beneficiaries in Tumakuru district. The study aims to examine food security outcomes, assess economic benefits, and evaluate the effectiveness of recent reforms such as DBT and digital authentication systems.

The study is guided by three hypotheses. First, it assumes that the PDS in Karnataka achieves high levels of beneficiary satisfaction and utilization. Second, it hypothesizes that the system significantly reduces hunger and improves nutritional outcomes. Third, it posits that leakage levels are considerably lower compared to the national average due to technological interventions.



### III. LITERATURE REVIEW

Previous studies have highlighted both the strengths and weaknesses of the Public Distribution System in India. Early research indicated high levels of leakage and inefficiency, often exceeding 40 percent. However, reforms such as digitization, biometric authentication, and DBT have significantly improved performance.

Studies conducted by the National Council of Applied Economic Research reveal that Karnataka has successfully reduced leakage rates to around 17 percent, which is significantly lower than the national average. Research also indicates that schemes like Anna Bhagya have increased consumption levels and improved nutritional outcomes among beneficiaries.

Despite these advancements, district-level empirical studies remain limited. This research addresses this gap by providing a detailed analysis of Tumakuru district, thereby contributing to the broader literature on food security and welfare economics.

### IV. METHODOLOGY

The study adopts a mixed-method approach combining quantitative and qualitative techniques. The research was conducted across four taluks—Tumakuru, Kunigal, Tiptur, and Koratagere—to ensure a representative sample.

A total of 400 households were selected using stratified random sampling, with equal representation of PHH and AAY beneficiaries. Data was collected through structured questionnaires, which included questions on food consumption, income levels, satisfaction, and access to PDS services.

In addition, 20 Focus Group Discussions were conducted with Fair Price Shop operators to understand operational challenges. Data analysis was carried out using statistical tools such as descriptive statistics, logistic regression, and chi-square tests.

The reliability of the data was ensured through a pilot study, and ethical considerations such as informed consent and confidentiality were strictly maintained.

### V. PDS FRAMEWORK IN KARNATAKA AND TUMAKURU

The Public Distribution System in Karnataka has undergone significant transformation over time. The transition from a universal system to a targeted one under the National Food Security Act has improved efficiency and accountability.

In Tumakuru district, the PDS covers approximately 3.5 lakh ration cards, with a majority belonging to Priority Households and Antyodaya categories. The district operates around 200 Fair Price Shops, ensuring accessibility for beneficiaries.

Technological innovations such as e-POS machines and Aadhaar authentication have played a crucial role in reducing leakages and improving transparency. These measures have enabled real-time monitoring and improved service delivery.

### VI. BENEFICIARY PROFILE

The demographic profile of beneficiaries indicates that the average household size is around five members. A majority of beneficiaries are engaged in agricultural labor, with a significant proportion falling below the poverty line.

Marginalized communities, including Scheduled Castes and Scheduled Tribes, constitute a large share of the beneficiaries. Women-headed households also form a significant proportion, highlighting the gender dimension of food security. Accessibility to Fair Price Shops is relatively high, with most beneficiaries residing within two kilometers of a shop. Regular usage patterns indicate a high dependence on PDS for meeting basic food requirements.

### VII. IMPACT ASSESSMENT

#### Availability and Uptake

The study reveals that a large proportion of households receive their full entitlement of food grains. The introduction of the Anna Bhagya scheme has significantly increased uptake levels, indicating improved accessibility and affordability.

Statistical analysis shows that income and distance from Fair Price Shops influence utilization patterns. Larger households tend to rely more on PDS, while higher-income households show relatively lower dependence.

#### Quality and Satisfaction

Overall satisfaction levels are high, particularly with respect to pricing and quantity. However, concerns regarding quality persist, with some beneficiaries reporting issues such as poor grain quality and storage problems.

#### Nutritional Impact

The PDS has contributed significantly to improving nutritional security. A majority of beneficiaries report that the system ensures at least one full meal per day, thereby reducing hunger and malnutrition.



### **Economic Impact**

The economic benefits of PDS are substantial, with households saving approximately ₹500 per month. These savings are particularly significant for low-income households, enabling them to allocate resources to other essential needs.

## **VIII. QUALITATIVE INSIGHTS**

The qualitative findings highlight the importance of PDS as a safety net for vulnerable populations. Beneficiaries describe the system as a crucial support mechanism during times of economic distress.

However, challenges such as exclusion of migrant workers, quality concerns, and administrative delays were also reported. Fair Price Shop operators emphasized the need for better infrastructure and streamlined processes.

## **IX. COMPARATIVE ANALYSIS**

Karnataka's PDS performance is superior to the national average in terms of leakage reduction and beneficiary satisfaction. Tumakuru district, in particular, demonstrates effective implementation and high levels of utilization.

## **X. CHALLENGES AND BARRIERS**

Despite its success, the PDS faces several challenges. These include leakage due to ghost beneficiaries, exclusion of migrant populations, quality issues, and delays in DBT payments.

Lack of awareness about entitlements and administrative inefficiencies further limit the effectiveness of the system. Addressing these challenges is essential for improving service delivery.

## **XI. POLICY ANALYSIS AND REFORMS**

The Karnataka government has implemented several reforms to strengthen the PDS, including digital authentication and direct benefit transfers. These measures have improved transparency and reduced corruption.

However, further improvements are needed in areas such as quality control, portability of benefits, and grievance redressal mechanisms.

## **XII. RECOMMENDATIONS**

The study recommends expanding AI-based monitoring systems to improve efficiency and reduce leakages. Implementing portable ration cards can ensure inclusion of migrant workers.

Improving quality testing and strengthening grievance redressal mechanisms will enhance beneficiary satisfaction. Public awareness campaigns can also play a crucial role in ensuring that beneficiaries fully understand their entitlements.

## **XIII. CONCLUSION**

The Public Distribution System in Karnataka, particularly in Tumakuru district, has made significant contributions to food security and poverty alleviation. The integration of technology and targeted welfare schemes has improved efficiency and reduced leakages.

However, achieving universal food security requires addressing persistent challenges such as quality issues, exclusion errors, and administrative inefficiencies. With appropriate reforms, Karnataka can further strengthen its position as a model state in food security.

The economic argument is strengthened by computational modelling, location-based clustering, fuzzy decision reasoning and welfare-oriented analytical perspectives [8]-[11]. These sources support the use of evidence-based and data-oriented economic interpretation. Recent policy and institutional sources further support the discussion on economic change, digital transformation and inclusive development [12]-[14].

The study highlights that economic transformation must be assessed through inclusive growth, access, welfare impact and institutional effectiveness. Data-based and computational approaches can strengthen economic interpretation, but policy conclusions should remain sensitive to local realities and beneficiary-level differences.

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