

**Nutritional Security and Public Distribution System in the State of Goa****\*Prof. Anthony Sathish****\*\*Narendra B. Gaonkar****Abstract**

The centrality of nutrition for better health outcomes is well recognized. The nutritional status of individuals, families, and communities depends on the food they consume. This is in turn determined by the availability, acceptability, and affordability of food. Thus, improving the health of the people requires improving their nutrition through better and more nutritious food. This is where agriculture plays an important role not only as a means of producing diverse, nutritious, safer food that is affordable but also through pathways like improved household access to nutritious food, improved income, women's empowerment (Roy D., 2019). The present paper analyses the determinants of nutritional security in public distribution system in the State of Goa. Further, an attempt is made to study the influence of determinants of food security on the nutritional security among the beneficiaries of public distribution system in the State of Goa. For the purpose of the study the responses from 114 beneficiaries are collected and are analyzed with the statistical tool such as factor analysis and regression analysis. The result indicate that Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains and Availability of food grains are having significant influence on the nutritional security on public distribution system.

**Key words – Public Distribution System, Nutritional Security, Food Security.**

\* Professor in Commerce, H.O.D. PG Department of Commerce and Research, Govt. College of Arts, Science and Commerce, Quepem-Goa

\*\* Assistant Professor in Commerce, Department of Commerce UG, M. E. S. College of Arts & Commerce, Zuarinagar-Goa.

## Introduction

Public Distribution System (PDS) is at the forefront to ensure food security to people. In the pandemic situation that the world is currently in; the safety net in terms of food security can be widened through PDS. The current population of India is **1,384,048,939** as of Monday, October 19, 2020, based on Worldometer elaboration of the latest United Nations data. In the whole of India, out of the total population of 137 crore (United Nations, Worldometers, Info 2020), 80.75 crore citizens (nfsa.gov.in) are covered in PDS. These citizens include the beneficiaries under Antodaya Anna Yojana (AAY) and Priority Households (PHH).

Considering Sustainable Development Goal 2: *End Hunger and Achieve Food Security and Improved Nutrition*, it is imperative to support the production and availability of, and accessibility to, a nutritious diet for the Indian population (Roy D., 2019). Almost 690 million people around the world went hungry in 2019. High costs and low affordability also mean billions cannot eat healthily or nutritiously. As progress in fighting hunger stalls, the COVID-19 pandemic is intensifying the vulnerabilities and inadequacies of global food systems. While it is too early to assess the full impact of the lockdowns and other containment measures, at least another 83 million to 132 million people may go hungry in 2020. If recent trends continue, the Zero Hunger target of the Sustainable Development Goals will not be achieved by 2030.

The present research focuses on influence of determinants of food security on the nutritional security among the beneficiaries of public distribution system in the State of Goa.

## Literature Survey

Literature survey was conducted to explore the area of Public Distribution System and nutritional security.

**Fatima K.P., Mary (1996)**, in a study titled “Public Distribution System in Andhra Pradesh with reference to Kurnool district” attempted to study the procurement, distribution and pricing operations. It was observed in the study a bulk of card holders complain about irregular working hours and working days. It further suggested that the enforcement staff of the civil supplies department must periodically check the working days and working hours and those who violate rules and regulations must be penalized and debarred from dealership. Further, **Naganathan M.**

(1999), in the study titled, 'Evaluation of public distribution system in Tamil Nadu' attempted to study the beneficiaries' reactions of the services rendered by the fair price shops and to identify the determinants of consumer satisfaction. It also focused on investigating the changing importance of the objectives of PDS, the problems, and policy options and measures to achieve the stated objectives through a Delphi study. Based on consumer satisfaction ratio (out of ten variables), only location and distance of fair price shops scored a value greater than one. The customers were not satisfied with attributes of consumer satisfaction like weighing procedure and scale of supply. About 60% of respondents welcomed the idea of setting up all women FPS, mainly because the rations are mostly being drawn by women. Nearly 45.42 per cent of the respondents rated the behaviour of the fair price shop employees as indifferent and 18.75 per cent as rude, whereas only 35.42 percent stated that the behaviour of the staff was courteous.

**Kundannavar B. S. (2000)**, in the study "Public Distribution System and Food Security in Karnataka; a case study Dharwad taluka" tried to analyze the working of public distribution system in selected villages of Dharwad taluka and Dharwad city. From the field investigation the researcher proves that public distribution system is popular among poor both in urban and rural areas. The researcher aimed to reduce the bureaucratization in the distribution process. He was of the opinion that coupon or food stamps could be utilized in any retail store. This would avoid administrative problems. He also recommended that panchayat raj institutions should be more actively associated with public distribution system. **Sujata (2000)**, in study titled, 'Management of public distribution system in India with special reference to Haryana' focused to examine the level of benefits that the rural and urban dwellers are able to get from the system of public distribution. The study also aimed at critically analyzing and evaluating the operating efficiency of the PDS. The major decisions in the organisational and administrative setup of the PDS were issue of ration cards, commodity coverage, periodicity of purchases, the PDS' issue prices and quality of its supplies. Management structure of the PDS at the national level included the policy formulation, fixing of objectives, strategy for procurement and distribution of food grains to states. Administrative arrangements to run the PDS directly affects the operational and viability of these retail outlets. The study reveals that though, prime objective of FPS dealers in running this business, as revealed by the study is 'Profit' yet majority of the dealers are not satisfied with the profit margins allowed to them by the government. Some dealers conceded that corruption at

the supervisory staff level compel them to indulge in black-marketing and other malpractices creating hurdles in providing better services to their customers. The study also concluded that the extent of benefits derived by the people particularly the poor from the PDS is quite low. In the year 2005, **Rao S.B.**, in the study titled “Optimization of Public Distribution System in Chittoor District of Andhra Pradesh; a System Approach”, aimed at designing an optimized distribution system of PDS of Chittoor district. The findings of the study predicted that the quantitative techniques usage is varying among hierarchy levels, age groups and functional levels. Further, **Jadhav R.J., Mudalkar P.K. (2013)** in the study “Smart Card Based e-PDS System” suggested system of smart card based e-PDS which successfully finishes user’s requirement by providing instant information. According to the researcher the proposed system fulfils all the set objectives of PDS.

### **Identification of Research Problem**

The literature reveals that a number of studies are been undertaken across the country in the area of public distribution system. The studies have covered various aspects of public distribution system. Some of the thrust areas of the previous studies focuses on problems such as lack of government supervision, irregular supply from government, unavailability of information at fair price shops etc. The studies carried out in the past further reveals that the major focus of the public distribution was on ensuring the food security. However, in the last decade, the major concentration is now shifting towards nutritional security.

In the present study the attempt has been made to study the determinants of nutritional security in public distribution system in the State of Goa. Further, this present research aims to study the influence of determinants of food security on the nutritional security among the beneficiaries of public distribution system in the State of Goa.

### **Objective of the Study**

1. To explore the determinants of nutritional security in public distribution system in the State of Goa.

2. To study the influence of determinants of food security on the nutritional security among the beneficiaries of public distribution system in the State of Goa.

## **Research Methodology**

### **Universe and sample size**

- **Universe**

The state of Goa comprising of 1328324 beneficiaries of public distribution system has been considered as the Universe.

- **Sample size**

For the purpose of the study, the sample size of 114 beneficiaries of public distribution system in Goa has been conveniently selected and studied.

### **Scope of the Study**

The study is limited to area pertaining to state of Goa. It is also based on beneficiaries' feedback.

### **Sources of Data**

The study is based on the data collected from both primary and secondary sources.

- **Primary Data**

The primary data is collected from 114 beneficiaries of PDS, conveniently selected for the study from the state of Goa.

- **Secondary Data**

The secondary data has been mainly collected from the various internet resources.

### **Period of the Study**

The period of study is the period of survey i.e. from 1<sup>st</sup> September 2020 to 31<sup>st</sup> October 2020.

### **Data Analytical Tools**

The collected data has been analyzed by using the following statistical tools;

1. Factor Analysis
2. Regression Analysis

### Hypothesis

Ho: There is no significant influence of determinants of food security on the nutritional security among beneficiaries of public distribution system.

### Discussion and Analysis

The data from beneficiaries on various determinants of food security influencing the nutritional security in public distribution system is analyzed by carrying out factor analysis. To test the reliability of the data, the following value is reported;

**Table No.1 - Reliability Statistics**

Cronbach's Alpha	No. of Items
.874	19

*Source: Computed from Primary Data*

The above Table No.2 shows Cronbach's Alpha for Reliability Statistics for 19 variables on difficulties faced by PDS Beneficiaries on Public Distribution System as 0.874. The minimum Cronbach's Alpha value accepted for internal consistency of the data is 0.70. The Cronbach's value of 0.874 for 19 variables is considered strong to judge the internal consistency of the data. Further, the adequacy of data for carrying out factor analysis is determined through Kaiser-Meyer-Olkin (KMO) Test. The test measures the sampling adequacy for each variable in the model. KMO statistic is a measure of the proportion of variance among the variables.

**Table No.2 - KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.825
Bartlett's Test of Sphericity	802.995
	136
	.000

*Source: Computed from Primary Data*

KMO values between 0.8 and 1 indicate that the data is adequate for carrying out factor analysis. The KMO value of 0.825 reported in Table No.3 signifies that data is adequate.

**Table No. 3 - Rotated Factor Matrix**

	Prominent Factors					
	Cooperation from Fair Price Shop Owner	Affordability and adequacy of foodgrains	Availability of foodgrains	Operational Efficiency	Cleanliness and Hygiene	Access to Fair Price Shop
The Timing of Fair Price Shop is well regulated	.812					
The attitude of the Fair Price Shop dealer is co-operative	.711					
I receive all the entitled Actual Quota of food grains on my visit to fair price shop	.652					
There is up-to-date Provision of information at Fair Price Shop	.640					
The food grains through fair price shops are affordable to me to purchase at the prices decided by the government.		.787				
The prices of the food grains offered through fair price shops are decided by keeping in mind the capacity of beneficiaries to survive to meet their daily needs.		.767				
I find the food grains supplied due to COVID19 through Fair Price Shop are Adequate to my family		.742				

The fair price shops in Goa distribute food grains in variety.			.873			
Quality of foodgrains at Fair Price Shop is good			.670			
The working hours of Fair Price Shop are convenient			.534			
The Behaviour of Fair Price Shop owner is courteous			.502			
Fair Price Shop is found open whenever I visit it to get food grains				.765		
There is accurate weightment at Fair Price Shop				.603		
There is Cleanliness and hygiene at Fair Price Shop					.764	
There is no Difficulty to travel to the Fair Price Shop to access food grains						.813
The Duration of Visit to Fair Price Shop is manageable						.577
<b>Eigen Values</b>	<b>5.691</b>	<b>2.025</b>	<b>1.372</b>	<b>1.289</b>	<b>1.129</b>	<b>1.011</b>
<b>Variance</b>	<b>31.615</b>	<b>11.249</b>	<b>7.622</b>	<b>7.159</b>	<b>6.274</b>	<b>5.616</b>
<b>Cumulative Variance</b>	<b>31.615</b>	<b>42.863</b>	<b>50.485</b>	<b>57.644</b>	<b>63.918</b>	<b>69.534</b>

*Source: Computed from Primary Data*

The result of Varimax with Kaiser Normalization has given six factors. The above factors have been named as, Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains, Availability of foodgrains, Operational Efficiency, Cleanliness and Hygiene and Access to Fair Price Shop.



The above Table No. 3 explains the total variance explained for all 19 variables comprising of six prominent factors of food security influencing nutritional security in public distribution system at 60.649% of total variance with six Eigen values i.e. 5.691, 2.025, 1.372, 1.289, 1.129 and 1.011. All these Eigen values are greater than one. This depicts the existence of six major factors. Further, according to the variables under each factor; these prominent factors are used for additional analysis.

### Regression Analysis

After carrying out exploratory factor analysis on 19 variables, six prominent factors were extracted. These three factors are Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains, Availability of foodgrains, Operational Efficiency, Cleanliness and Hygiene and Access to Fair Price Shop. These three factors are further regressed to find the influence on nutritional security in public distribution system.

**Table No. 4: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.717 <sup>a</sup>	.515	.488	.5544

a. Predictors: (Constant), Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains, Availability of foodgrains, Operational Efficiency, Cleanliness and Hygiene and Access to Fair Price Shop.

b. Dependent Variable: Nutritional Security

**Source: Computed from Primary Data**

The model summary in Table No.4 depicts adjusted R-square at 0.488. This shows that independent variables and the dependent variable of unwillingness to visit Fair Price Shop has a strong relationship. The regression model explains 48.8% influence of independent variables on dependent variable.

**Table No.5 – ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	34.897	6	5.816	18.920	.000b
Residual	32.893	107	.307		
Total	67.789	113			

a. Dependent Variable: Nutritional Security

c. Predictors: (Constant), Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains, Availability of foodgrains, Operational Efficiency, Cleanliness and Hygiene and Access to Fair Price Shop.

**Source: Computed from Primary Data**

The Table No. 5 shows that the above multiple regression analysis model is significant at 5% level of significance.

**Table No.6: Result of Coefficients for Nutritional Security**

Model	Unstandardized		Standardized		
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	3.579	.052		68.921	.000
Cooperation from Fair Price Shop Owner	.227	.052	.293	4.355	.000
Affordability and adequacy of foodgrains	.391	.052	.505	7.500	.000
Availability of foodgrains	.309	.052	.399	5.922	.000
Operational Efficiency	.077	.052	.100	1.481	.142
Cleanliness and Hygiene	.049	.052	.064	.945	.347
Access to Fair Price Shop	-.020	.052	-.026	-.380	.704

a. Dependent Variable: Nutritional Security

**Source: Computed from Primary Data**

The multiple regression equation is as follows;

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \varepsilon \text{ (Douglas Montgomery, Peck, \& Vinning, 2012).}$$

Where;

$Y$  = dependent variable

$\beta_1, \beta_2, \dots, \beta_n$  = Coefficients of the variables

$X_1, X_2, \dots, X_n$  = Known Variables

The dependent and independent variables are as follows;

Dependent Variable: Nutritional

Independent Variables:

- Cooperation from Fair Price Shop Owner ( $X_1$ )
- Affordability and adequacy of foodgrains ( $X_2$ )
- Availability of foodgrains ( $X_3$ )
- Operational Efficiency ( $X_4$ )
- Cleanliness and Hygiene ( $X_5$ )
- Access to Fair Price Shop ( $X_6$ )

Therefore, the regression equation from table-6 is;

$$Y = 3.579 + 0.227 X_1 + 0.391 X_2 + 0.309 X_3$$

The above estimated coefficients represents that the factors identified through exploratory factor analysis on nutritional security of PDS in the State of Goa are having positive influence. The coefficient values of  $X_1$ ,  $X_2$  and  $X_3$  are significant at 5 % level of significance. The coefficient value of  $X_4$ ,  $X_5$  and  $X_6$  are insignificant. Since the p-values for  $X_1$ ,  $X_2$  and  $X_3$  are less than 0.05 at 5% level of significance the null hypothesis  $H_0$  is rejected in respect of Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains and Availability of foodgrains.

From the above analysis it is clear that the Cooperation from Fair Price Shop Owner, Affordability and adequacy of foodgrains and Availability of foodgrains has to be looked into greater detail to improve upon the nutritional security.

## Conclusion

In addition to food security which is ensured with the enactment of National Food Security Act 2013, nutritional security is of paramount importance to country like India and to the whole of world in general. Moreover, the report of the United Nations Children's Fund (UNICEF) 2020, urges for the transformation of food systems to reduce the cost of nutritious foods and increase the affordability of healthy diets. The area of affordability, adequacy and availability of foodgrains has to be looked into to enhance the nutritional security to the beneficiaries of public distribution system operating in a country.

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