Assessment of Effectiveness of Subsidized Food Grain Distribution in India with Respect to Rice and Wheat

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Abstract

This paper assessed the rationale of public policy intervention in rice and wheat markets in India. Specifically, this study compared the government's economic cost for subsidized distribution of rice and wheat with the domestic market prices to examine the economic viability of the public distribution system. The statistical grouping of domestic market prices of rice and wheat displayed a significant inter-year variation in the recent years from 2007 to 2011. The price increase was much higher for rice than for wheat. The government's economic costs for distribution of rice and wheat through the public distribution system were close to the domestic prices. The paper presents a critical analysis of the government's policy on subsidized grain distribution. Suggestions on government policy and the role of the private sector are explained in the Indian scenario. Furthermore, possibilities for price stabilization in the private food grain market, control over food inflation, and scope for tax revenues for government from the private sector are also discussed.

Keywords : **public distribution system, grain market, economic cost, food inflation, food grain distribution**

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Rice and wheat together are staple foods for the entire population of India. The country ranks second in production of both the crops and contributes about 20.0% and 12.3% to the global share of production of rice and wheat, respectively (United States Department of Agriculture, 2012). Although, India has a huge production potential due to its subsistence demand, most of the food grains produced are utilized for domestic consumption. The domestic market for both rice and wheat has two distinct channels. One is through the subsidized food distribution system, generally known as the public distribution system (PDS) handled directly by the Government of India, and the other is through the private sector.

The private market for food grains in India is highly unorganized and there is not much intervention by the government. On the other hand, the PDS is well organized, with a clear policy framework for assuring reasonable profits to farmers and staple food for the consumers at affordable prices, especially for the low-income people. The government executes logistics of procurement, storage, and distribution of food grains to the needy through Food Corporation of India (FCI), which is the authorized agency for subsidized food distribution in India. Since its establishment in 1965, FCI has been executing the logistics of grain distribution in an organized supply chain format. There are many issues related to economics, technical, and regulatory framework, and are associated with food grain handling and marketing in India, both in the government and in the private sectors. One of the major

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issues debated extensively is the government's spending on subsidized food distribution.

There are other studies, which discuss the issues concerning subsidized food grain distribution in India and comment on the high cost incurred by the government for PDS. Srinivasan and Jha (2001) indicated that the FCI unit costs are higher than the private sectors, and they are constantly increasing. Furthermore, they estimated that FCI per unit storage cost is almost 30% higher ; labor costs are four times higher for rice, and are seven times higher for wheat, and finally, interest payments are four and two and a half times higher for rice and wheat, respectively than they are for private lenders. Sharma (2012) indicated that the minimum support price is one of the major components of economic costs, which accounts for 70% of the government's economic cost of food grains. Taking into consideration the issues discussed in the past and the current marketing strategies adopted by the government and private sectors, this paper aims at examining the government's regulatory mechanism and strategy for subsidized food distribution with respect to rice and wheat.

Specifically, this paper analyzes the effectiveness of the government's economic cost on the PDS compared with the domestic retail and wholesale markets in India. This study brings forth results that would provide better understanding of the price behaviour of private domestic markets for rice and wheat. It would also conclude on the viability of the subsidized grain distribution in the context of the domestic market pricing strategy.

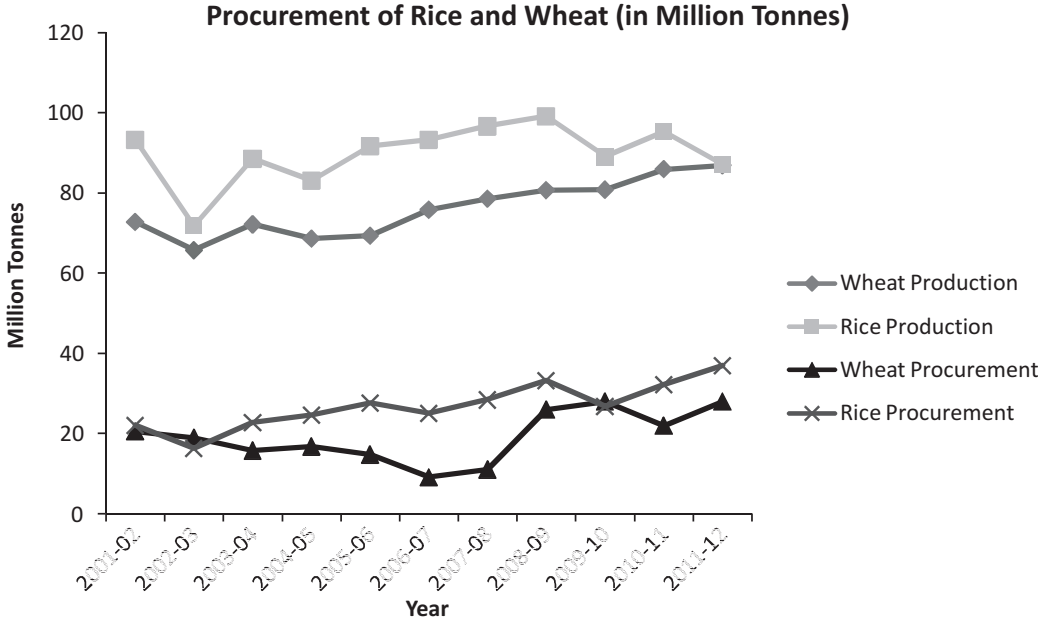
Subsidized Grain Distribution in India: Background, Regulatory Framework, and Review

The government's policy intervention on subsidized food distribution is primarily to ensure food security and achieve economic balance. The strong reason for the government to be committed to its policy is due to a sizable population of India still under poverty and with poor access to staple food. Statistics have revealed that India continues to be the nation with the largest number of people below the poverty line of $1.23/ day. According to the Food and Agriculture Organization of the United Nations (2011), India has 224.6 million undernourished people that comprise of 26% of the global undernourished population. The Planning Commission (2011), Government of India reported that 32% of the Indian population was under the poverty line in 2011, which is about 407 million people. In view of the vulnerable situation of poverty and malnutrition, the Indian government is keen to ensure the availability of staple food to everyone. The system of subsidized food distribution in India has been in place since 1942, when there were concerns of food shortages during World War II.

The FCI functions as a state trading enterprise for procurement of food grains from farmers, storage, processing, and distribution through organized retails at all levels in India. The States' zones (generally called as State Warehousing Corporations or State Civil Supplies Corporation) are operated in the form of corporations and cooperatives with the autonomy of state governments. In many states, the central government's policy is modified according to their local situation, but guidelines are provided in the central policy. Radhakrishnan and Indrakant (1988) indicated that the method of procurement and distribution of grains varies from state to state.

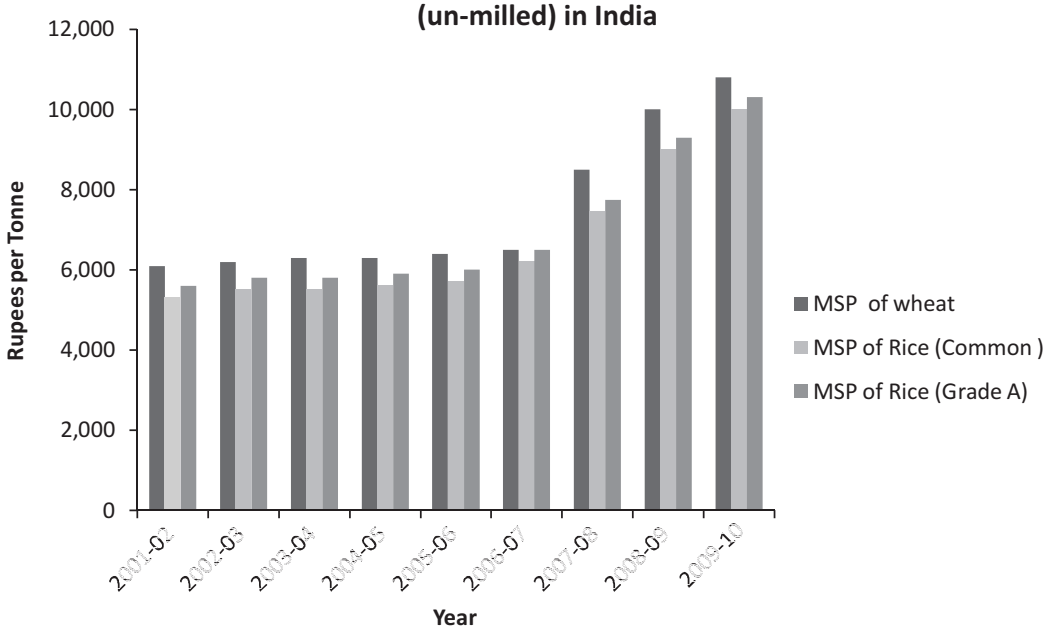
According to the Department of Food and Public Distribution, Government of India (2012), around 32.3 million tonnes of rice from the total production of 95.3 million tonnes and 22.0 million tonnes of wheat from the total production of 85.9 million tonnes were procured by the government during the year 2010-11. The government incurs procurement and logistics costs of the staple food grains distribution to the targeted consumers. The government fixes the minimum support price (MSP) of food grains at which procurement is made from the farmers. The central issue price (CIP) of food grains is at which food grains are sold under different government schemes. The difference between the economic cost of logistics and central issue price is the amount contributed by the government as food subsidy. The economic costs include MSP, procurement incidentals, processing and distribution costs, and additional expenses due to losses and damages. The Department of Economic Affairs, Ministry of Finance, Government of India (2011) reported that during the financial year 2010-11, the Indian Government incurred a food subsidy of ₹ 629.3 billion.

Figure 1. All India Production and Government's Procurement of Rice and Wheat (in Million Tonnes)



Source: Ministry of Agriculture, Government of India (2012).

Figure 2. Government's Minimum Support Price for Wheat and Rice (un-milled) in India



Source: Ministry of Agriculture, Government of India (2012)

Trends in Government's Procurement and Pricing Policy of Rice

There are a wide range of rice varieties cultivated in India to meet the preferences of varied consumers. For government procurement purposes, rice is classified into two categories, common (length to breadth ratio less than 2.5) and Grade A (length to breadth ratio more than 2.5). The government fixes the prices for both the categories based on the costs of production as estimated by India's Commission on Agricultural Costs and Prices (CACP).

The annual average procurement of rice (un-milled) from farmers (2001-02 to 2004-05) showed an inter-year variation and gradual increase in the procurement from year to year (Figure 1). There was an increase by 7.6% in the annual average procurement of rice by the government from the first 5 years (2001-02 to 2004-05) to the second 5 years (2007-08 to 2011-12) of the past decade. Acharya, Chand, Birthal, Kumar, and Negi (2012) indicated that there was a considerable inter-year variation in the scale of procurement of rice by the government and an increasing trend was seen during the last 16 years.

Prior to every cropping season, the central government announces a MSP for each food grain handled by the Food Corporation of India. The MSP is fixed based on the recommendations of the CACP. The MSP is the mechanism used for price stabilization of food grains and income support for farmers. Jha, Srinivasan, and Landes (2007) indicated that producer price policy has played an important role in supporting the growth of India's wheat and rice output since the 1970s. The trend in MSP for both common and Grade-A rice (un-milled) showed a gradual increase in prices during the beginning years of the decade from 2001-02 to 2005-06 (Figure 2).

For the two consecutive years (2002-03 and 2003-04), the procurement price remained unchanged. Whereas, from 2006-07 to 2009-10, the MSP for rice showed a sharp increase in the year to year trend. The MSP for rice was almost doubled in 2009-10 as compared with 2001-02. It is also observed that the MSPs of common and Grade-A rice is not much different from each other. The difference is only about ₹ 300 to ₹ 350 per tonne. This hike in the MSP during the recent years encouraged the farmers to grow more rice even in the areas where rice is not consumed as staple food. For instance, rice is not a major crop in the states of Punjab and Uttar Pradesh, but their rice production has increased considerably over time since the late 1970s due to the operation of strong market incentives for farmers. These two states together contribute about one-third of the total production of rice in India (Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, 2012).

Trends in Government's Procurement and Pricing Policy of Wheat

Unlike rice, the trends in procurement of wheat by the government all over India from 2001-02 to 2011-12 shows an irregular pattern (Figure 1). In the beginning years of the past decade, a decreasing trend in the government's procurement of wheat is observed. Whereas, in the period from 2008-09 to 2011-12, an increasing trend is seen. Acharya et al. (2012) indicated that the government's wheat procurement has been higher in the recent years as compared to the beginning years of the past decade.

The government's procurement price for wheat showed a similar trend as in the case of rice. A marginal increase in MSP of ₹100 per tonne was observed from year to year in the beginning of the decade from 2001-02 to 2006-07 (Figure 2). For the years 2003-04 and 2004-05, the MSP remained unchanged at ₹ 6300 per tonne. However, there was a sudden hike in the MSP of wheat by ₹ 2000 per tonne in 2007-08 (from 2006-07). Furthermore, the increase in MSP of wheat continued with an increase of ₹ 1500 per tonne in 2008-09 from the previous year, and by ₹ 800 per tonne in 2009-10 from 2008-09. Sharma (2012), in his study, indicated that the annual growth rate in MSP increased from 1.2% in the first half of the last decade to 10.6% during 2006-07 to 2011-12 in case of wheat, and 1.8% and 12.1% in case of rice (common) during the corresponding periods. The study pointed out that the massive increase in MSP has led to a rapid rise in food subsidies in the country.

Distribution of Rice and Wheat Through the Public Distribution System (PDS)

Both wheat and rice are distributed all over India through fair price shops (Ghosh, 2010). From the year 1997, the government revamped the PDS and introduced the targeted public distribution system (TPDS). This system aims at distributing subsidized rice, wheat, and other essential commodities through a nation-wide network of fair price shops directed to help the low-income consumers. The TPDS distributes food grains based on the level of poverty. There are three categories of consumers based on the poverty level namely: above poverty line (APL), below poverty line (BPL), and the poorest of the poor (PoP). The government fixes the food grain prices based on the income profile of the consumers. The Essential Commodity Act (ECA) established in 1955 regulates that the

Table 1. Central Issue Price for Wheat and Rice through TPDS (Last Adjusted in July 2002)

Year	PDS Issue Price for Wheat (₹ Per tonne)			PDS Issue Price for Milled Rice (₹ Per tonne)			
	APL	BPL	AAY	APL		BPL	PoP
2001/02 to 2010-11	8,300	4,150	2,000	Common	Grade A	Common	Common
				7,950	8,300	5,650	3,000

APL - Above Poverty Line, BPL - Below Poverty Line and PoP - Poorest of the Poor
Source: Ministry of Finance, Government of India, Economic Survey 2010-11.

commodity prices through government purchases, licenses, and permit limits the movement of food grains. The Government of India announces the central issue price (CIP) for food grains based on the income level of individual families. In turn, the state governments fix the final prices either lesser than the CIP or not more than ₹ 0.50 per kilogram above the CIP. Since July 2002, the CIP for both rice and wheat has remained unchanged (Table 1).

Government's Economic Cost on Subsidized Food Distribution: Rationale, Background, and Review

The government's economic cost or subsidy refers to the cost incurred by the government towards procurement, storage, transport, processing and distribution, carrying grain reserves, and funds for FCI administration and less the revenue from commodity sales. According to the Financial Report of FCI 2009-10, a total food subsidy of 428.7 billion rupees for 2009-10 consisted of ₹ 229.8 billion on 19.8 million tonnes of rice distribution, ₹ 140 billion on 16.6 million tonnes of wheat distribution, and ₹ 58.5 billion for carrying costs on the buffer stocks of 10.3 million tonnes treated as reserve stock in 2009-10, and the cost of reserves was ₹ 5679 per tonne. The total food subsidy in 2009-10 was more than double of the level in 2001-02.

The reasons for the increasing trend in the food subsidy have been discussed in various studies. Sharma (2012) indicated that between 2006-07 and 2011-12, the food subsidy in India increased three fold. The reasons he indicated are steep increase in the MSP, accumulation of stocks of grains, rising economic costs of food grains, high purchase of grains, and constant issue price. Furthermore, he highlighted that the MSP accounts for 70% of the FCI's economic costs; the share of procurement incidentals and distribution costs is about 30%. Gulati, Sharma, and Kahkonen (1996) estimated that FCI suffered losses ranging from 29% for rice and 68% for wheat ; whereas, private traders earned profits of 9 to 10%.

Dual Price Policy for Rice and Wheat

Besides the government's subsidized grain distribution in India, a huge private market channel exists for both rice and wheat. Private grain trade in India is highly unorganized, and there is not much intervention by the government. However, restrictions are placed on export of food grains. The Indian government does not allow the private sector for futures trading. Based on the supply situation of domestic market, export of grain is allowed with minimum export price basis. From the total production of around 181.2 million tonnes of both rice and wheat, 54.3 million tonnes was utilized by the government for public distribution during the year 2010-11, rest of the production was utilized for private domestic market, farmers' own consumption, seed, feed, and exports (Department of Food and Public Distribution, Ministry of Consumer Affairs, 2012).

A dual price policy is established at both the points; procurement of food grains from farmers and consumer purchase. The government fixes procurement price based on the estimated cost of production, and sale price is based on the recommendation of the Commission on Agriculture Costs and Prices. Whereas, the private market price for procurement is fixed based on the negotiations between farmers and traders, and the sale price is based on the logistics costs and location and size of the market. The private grain marketing channel involves many players

and middle men. Handling of food grains in gunny bags and lack of improved storage and transportation facilities leads to huge loss of food grains and quality deterioration in the post-harvest phase. Due to several levels of handling by middle men and intermediaries, the consumer price is escalated to a large extent.

With these background discussions on logistics of subsidized and private domestic food grain market in India, the present study analyzed the price behaviour of the domestic market for both rice and wheat. Furthermore, a comparison was made between the government's economic cost on PDS for rice and wheat with the private domestic market prices. Though the procurement of food grain from farmers is done by both the government and private agencies at similar prices, the quality of grain available in the private retail market varies significantly. Pal (2011) indicated that PDS suffers from irregular and poor quality of food grain made available through fair price shops (FPS). The private market produces are always high priced, which the low-income people cannot afford to buy. However, the middle and upper class consumers - who are not entitled for PDS, and consumers preferring better quality produce - are affected by this price discrimination. This study examined the statistical significance in difference between domestic market prices and the government's economic cost for retailing through PDS with respect to rice and wheat.

Methodology

Monthly average prices of domestic retail and wholesale markets for rice and wheat from the year 2002-03 to 2011-12 were collected from the FAO price tool database. This research was conducted at the University of Manitoba during the period from April 2012 to April 2013.

The prices of four zonal markets such as: Delhi, Mumbai, Chennai, and Patna were taken, and the average of 12 months from January to December was treated as annual average price. The net economic cost of subsidized distribution of rice and wheat by the government was calculated for the concurrent period for three different consumer categories: above poverty line (APL), below poverty line (BPL), and poorest of poor (PoP). The economic cost in case of individual consumer category was compared with the domestic retail and wholesale prices. The PDS economic cost constitutes adding of procurement price, procurement incidentals, processing cost (for rice), distribution costs, and subtracting the issue price. The annual average costs and prices provided by the Food Corporation of India were considered for computing the PDS-Net Economic Cost (PDS-NEC) as given in the Table 2.

Statistical Analysis : For examining price behaviour of rice and wheat in the domestic retail and wholesale markets, statistical grouping was done by using least significant difference (LSD) technique using Proc GLM of SAS software. For comparing domestic retail and wholesale prices of rice and wheat with the PDS economic cost, paired *t* - test was performed using PROC TTEST of statistical analysis software (SAS Version SAS 9.1.3, SAS Institute Inc. Cary, NC, USA).

Table 2. Components of PDS Net Economic Cost

Component	Basis of Calculation
Procurement Price (MSP)	Government's procurement price of food grains from farmers based on the recommendations of Commission of Agriculture Costs and Prices.
Procurement Incidentals	Statutory charges such as market fee, rural development/infrastructure development cost, and VAT.
	Non-statutory charges like commissions cost of gunny bags, labour and transport charges, administrative costs, handling and storage costs, and interest.
Distribution Costs	Handling expenses, storage charges, freight costs, interest charges, administrative overheads, transit, and storage losses.
Issue Price	Fixed by the Central government (remains same from 2002-03 - till date)
PDS Net Economic Cost	(MSP + Procurement Incidentals + Distribution Costs) - (Issue Price)

Source: Adapted from Sharma (2012)

Table 3. LSD Grouping of Year Wise Mean for Domestic Retail and Wholesale Prices of Rice and Wheat

Year	Average Domestic Retail Price for Rice (₹ Per Quintal)	Average Domestic Wholesale Price for Rice (₹ Per Quintal)	Average Domestic Retail Price for Wheat (₹ Per Quintal)	Average Domestic Wholesale Price for Wheat (₹ Per Quintal)
2002	1070.29a±7.33	908.37a±24.29	924.13a±11.98	806.39a±19.30
2003	1060.06a±9.12	912.06a±25.42	928.94a±20.21	826.84a±20.64
2004	1087.58a±34.92	965.1b±41.39	949.27ab±27.37	845.84ab±31.83
2005	1141.23b±25.70	1024.63c±16.10	974.73b±34.90	883.66b±34.31
2006	1186.42b±49.77	1109.58d±27.99	1230.98c±95.24	1102.06c±95.32
2007	1329.17c±76.92	1159.95e±61.33	1350.71d±40.57	1208.59d±54.34
2008	1639.1d±76.32	1428.65f±77.59	1414.4e±13.07	1295.39e±20.59
2009	1784.27e±73.34	1573.98g±114.92	1508.08f±87.61	1379.64f±102.06
2010	2036.08f±98.97	1803.9h±75.55	1724.21g±60.82	1553.39g±55.92
2011	2232.42g±78.63	1950i±41.15	1812.69h±47.13	1541.05g±72.18
Least Significant Difference	49.61	47.44	42.04	47.32

One Quintal = 100 kg. Note: The mean values with same alphabets within each feature indicate that they were not significantly different at the 5% level of significance.

Results and Discussion

Price Behaviour of Rice and Wheat at Domestic Retail and Wholesale Markets in India : The means of all India monthly domestic retail and wholesale prices for both rice and wheat from the year 2002 to 2011 were subjected to statistical grouping. The least significant difference (LSD) was calculated using the error mean square and critical value of *t*. The results of year to year comparison of means are shown in the Table 3. The mean values with same alphabets within each feature indicate that they are not significantly different at the 5% level of significance. In general, the retail and wholesale prices of both rice and wheat showed an increasing trend from 2002 to 2011. In both the retail and the wholesale prices of rice and wheat, the inter year variation was not much significant during the first 5- year period from 2002 to 2006. Whereas, the inter year variations in prices of both retail and wholesale markets displayed a significant difference during the last 5 year period from 2007-2011.

The average rate of increase in prices from first the 5 - years (2002-2006) to the last 5 - years (2007-2011) was more for rice than for wheat. An increase of 9.2% in retail price and 7.2% for wholesale rice price was seen. For wheat, on the other hand, the retail price increased by a meagre 0.8%, and the wholesale price decreased by 1.4% for the concurrent period. Reason for a high rate of increase in the average prices of both retail and wholesale prices of rice in the recent years may be due to an increase in the processing costs. The processors are shifting to hi-tech and energy consuming machinery from conventional processing units for quality improvement of rice based on consumer preferences.

Comparison Between Domestic Market Prices and Net Economic Costs of Subsidized Distribution for Rice and Wheat : A comparative analysis of domestic retail prices of zonal markets (Delhi, Mumbai, Chennai, and Patna) from the year 2002-03 to 2011-12 with the net economic cost (NEC) incurred by the government towards the Public Distribution System (PDS) for the concurrent period was carried out. The results of the comparison of means of retail prices and PDS-NEC using paired *t* - statistics are discussed as follows :

Domestic Retail Price Versus PDS Economic Cost of Rice and Wheat : The domestic retail market price of both rice and wheat differed significantly at the 5% level from the PDS-NEC of distribution for all categories except for wheat distribution to PoP (Table 4). The retail prices for both rice and wheat were higher than the PDS-NEC

Table 4. Comparison Between Domestic Retail Price and PDS Net Economic Cost

Consumer Category	Probability of greater *t* at 5% level of significance (Rice)	Probability of greater *t* at 5% level of significance (Wheat)
Above Poverty Line	0.0001*	0.0002*
Below Poverty Line	0.0002*	0.0041*
Poorest of Poor	0.0061*	0.1033**

*Significant at 5% level **Non-significant at 5% level

Table 5. Comparison Between Domestic Wholesale Price and PDS Net Economic Cost

Consumer Category	Probability of greater *t* at 5% level of significance (Rice)	Probability of greater *t* at 5% level of significance (Wheat)
Above Poverty Line	0.0001*	0.0009*
Below Poverty Line	0.0010*	0.0245*
Poorest of Poor	0.0338*	0.0553**

*Significant at 5% level **Non-significant at 5% level

incurred by the government in case of all consumer categories. However, the non-significant difference existed in case of distribution of wheat for PoP, a marginal amount of ₹ 2.35 per kg was more in domestic retail price than the PDS-NEC in real term. In case of distribution of rice to PoP, the difference between retail price and PDS-NEC was statistically significant; the difference in real term was more by ₹ 5 .49 per kg in the retail market.

In case of BPL, the retail market price was higher by ₹ 8.14 per kg for rice and ₹ 4 .50 per kg for wheat than the PDS-NEC. For APL category, the retail market price was higher by ₹ 10.43 per kg for rice and ₹ 6.45 per kg for wheat. The reason for higher prices of rice and wheat in the retail market is due to lack of price control over the domestic retail market by the government, and several intermediaries in the supply-chain act as price takers at different levels. Furthermore, due to lack of proper technologies and infrastructure for grain handling in India, huge grain losses occur. These losses are compensated by the retailers by altering the consumer prices.

Many studies have commented on the poor grain handling and related monetary losses in India. Naik and Kaushik (2011) indicated that 60 to 70% of food grains produced in India are stored at the home level in indigenous storage structures. Singh (2010) mentioned that the monetary losses due to improper storage and handling accounts for more than ₹ 50,000 crores per year.

The soaring food grain prices in India are evident. The price trends discussed in this paper show that the prices for rice more than doubled in both retail and wholesale markets in the 10 year period (from 2002 to 2011). The wheat price showed an increase of 49% in retail and 46% in the wholesale market for the concurrent period.

↳ **Domestic Wholesale Prices Versus PDS Economic Cost of Rice and Wheat :** A comparative analysis of domestic wholesale prices of zonal markets (Delhi, Mumbai, Chennai, and Patna) from the year 2002-03 to 2011-12 with the net economic cost (NEC) incurred by the government towards the public distribution system (PDS) for the concurrent period was carried out. The results of the comparison of means of wholesale prices and PDS-NEC using paired *t* - statistics are discussed as follows:

The domestic wholesale market price of both rice and wheat differed significantly at the 5% level from the PDS-NEC of distribution for all categories except for wheat distribution to PoP (Table 5). The wholesale prices for both rice and wheat were higher than the PDS-NEC incurred by the government in case of all consumer categories. However, the differences were non-significant for the distribution of wheat for PoP. A marginal difference of ₹ 0.98 per kg was observed in the domestic wholesale price than in the PDS-NEC in real term. However, a non-significant difference existed in case of distribution of wheat for PoP. In case of rice, though the difference between wholesale price and PDS-NEC of distribution to PoP was statistically significant, the difference in real term was only ₹ 3.75 (per kg) greater in the wholesale market price compared with the PDS-NEC. In case of BPL,

the wholesale market price was higher by ₹ 6.40 per kg for rice and ₹ 4.50 per kg for wheat than the PDS-NEC. For the APL category, the wholesale market price was higher by ₹ 8.70 per kg and ₹ 5 .07 per kg for rice and wheat, respectively.

Conclusion and Suggestions

From the results presented in this study, it is evident that the domestic market prices of rice and wheat are very high, and the price hike in recent years is the reason for food inflation in India. At the same time, the government's economic costs on subsidized grain distribution were close to the domestic prices in case of distribution of food grains to the PoP category. For BPL and APL categories of people, statistically, the government's net economic costs were greater than the domestic prices. In real terms, however, the differences were marginal. The other distinct reasons for the government's high economic costs are the steady increase in the procurement prices and constant issue prices since 2002 to 2011.

The comparisons made in this study have not considered a comprehensive data set for the government's actual expenditure on subsidized food grain distribution. Obtaining real-time data on government's actual expenditure on administration, losses due to grain handling, man power, state governments' share, and other such things were not attempted. The government's economic cost was taken as a gross average of fixed costs and prices. The private domestic market prices considered for this study are, however, based on the real time prices. The government procures food grains from farmers with a minimum consideration on specification, grade, and quality. For wheat, all wheat varieties are treated under a single category ; whereas for rice, the government follows two categories, common and Grade A. Pooling of grains irrespective of variety and quality coupled with poor handling and processing results in poor quality of grain output for the public distribution system. The grain distributed in PDS seems to be much inferior to the grain distributed by private players.

An alternate strategy for improving upon the current status may be that the government considers dropping food distribution on its own and out sources to private agencies for procurement and distribution of food grains. This will result in an economically sound method of food grain distribution, and will improve the quality of food grains in PDS. The government can hold price controls and allow the private sector for negotiations, keeping maximum upper limits. This would also bring price stabilization in the private domestic market. The middle and upper class consumers, who are not entitled for PDS grains, will also be benefitted through such price stabilization. Furthermore, it would also be a possible measure for reducing food inflation in India.

A simple modification in the government's regulatory framework could bring huge improvements both in food grain quality and in logistics. Furthermore, the government could earn revenue through taxes from private sector operations. The public-private partnership strategy in grain marketing is successful in many developed countries. The countries having a well established grain handling system such as Australia and Canada have recently eliminated their State Trading Enterprises (STEs) and expect a better market structure in the absence of their STEs. The Indian government may consider dropping the existing monopoly for food grain distribution and may go for a public-private partnership trade for its public distribution system. This strategy may be implemented on a pilot-scale mode initially to see the economic viability and quality improvements and then could be extended widely based on the performance.

The primary objective of the government is to ensure food security for the country through efficient and effective procurement and distribution. The policy implications on food security underwent significant transitions over the past decades since 1943, when India starved due to a deficit of staple food. During the period between 1940s and 1970s, before the commencement of the Green Revolution, India struggled to feed its own population. Remarkably, during the year 1965-66, the situation was unmanageable, and around 74% of the food grain distributed was imported under the PL-480 agreement.

The impact of Green Revolution resulted in surplus grain production. The Government set State Trading Enterprise, the FCI for procurement and distribution under the public distribution system. Since then, the food situation is manageable, and we are even able to maintain the buffer and export the surplus production. However,

the food policy framed for ensuring food security has remained unchanged over decades; the quality of food grains distributed through PDS is not up to the appreciable level, and the economic viability of the food grain supply chain is also questioned. There is a strong need for revamping the policy so as to maintain an economically viable supply chain and also for maintaining the food grain quality. This study aimed to ascertain the economic cost of food grain logistics with respect to public distribution of rice and wheat, and compared the economics of handling by the government agency with the private market grain prices.

Limitations of the Study and Scope for Further Research

Though the study attempted to bring many inferences on the policy impacts on subsidized food grain distribution in India, it did not make a comprehensive analysis of the policy impact from the farmer's perspective. The study has limitations in interpreting data on cost of production at the farm level; this limitation is due to constraint in time and funds available for conducting the study.

The study has revealed a number of findings on public policy interventions on subsidized grain handling systems in India. So, a study may be carried out for evaluating the efficiency of private sector interventions, as the private sector plays a vital role in grain handling. A research may be carried out for evaluation of technical components of grain handling systems in India, and a comparison with proven systems, like the ones in Canada, would be indispensable. A similar study may also be conducted for pulses and oilseeds.

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