International Affairs and Global Strategy
ISSN 2224-574X (Paper) ISSN 2224-8951 (Online)
Vol.51, 2016

Is Rising Food Subsidy Attributed to Poor Food Management? An Empirical Evidence from India

Dr.B.Venkatraja
Assistant Professor of Economics
SDM Institute for Management Development (SDMIMD), Mysore, INDIA
No.1, Chamundi Hill Road, Siddarthanagar, Mysore-570011, India

Abstract
In India, the government subsidy, in particular, food subsidy has increased by manifold in the recent years. The present study aims at identifying factors affecting food subsidies in India. Based on the available little literature the probable factors mainly pertaining to food management have been chosen and a model has been developed for empirical investigation. The model specifies a linear functional relationship food subsidy as dependent variable and factors of food management as explanatory variables. A linear regression model has been estimated to identify to what extent food management factors such as minimum support price, food procurement volume, food distribution costs, buffer carrying costs and off-take quantity of foodgrains affect food subsidy. The results attribute to poor food management for rising food subsidy. Among the explanatory factors minimum support price and off-take quantity have significant impact on the budgetary subsidy. The results have certain policy implications and recommended for targeted distribution and rational pricing policies for food grains.
Keywords: Food subsidy, food management, India

1. Introduction

According to a report released by the Food and Agriculture Organization (FAO) of the United Nations in 2015, India is the home of 194.6 million undernourished people, the highest in the world. The number accounts for 15 percent of total population of India. Since 90s Indian economy is accelerating the GDP growth rate. Higher economic growth has not been fully translated into higher food consumption, let alone better diets overall, suggesting that the poor and hungry may have failed to benefit much from overall growth (FAO, 2015). Under-nourishment has evolved as the major economic challenge to India. To mitigate this chronic problem, the Government of India has launched several food subsidy programs over the years. Food subsidies, in India, are provided to consumption, production and storage. Through Public Distribution System (PDS) food grains are being rationed out to the consumers at highly subsidies prices. Farmers are supported by government procurement and minimum support price for food grains. Government also takes substantial share in the expenses of storing the food grains at Food Corporation of India. Further, over the years rise in food inflation rate is more than rise in income of the people. The bottom class of consumers spends about 65 per cent of total expenditure on food items in rural areas and about 62 per cent in urban areas (NSSO, 2012). This attributes to paramount significance for the provision of food subsidies to the poor segment of the society.

The trend analysis (Table-1) shows that food subsidies have increased significantly in the post-reforms period. In 1990-91, the Central Government disbursed an amount of 2450 crore towards food subsidies. The same has increased to 115000 crore (BE) in 2014-15, accounting for over 47 times increase in the span of two and a half decades. The pressure of the burgeoning food subsidies could also be noted from its increasing proportion to GDP. If food subsidies were 0.43 percent of GDP in 1990-91, it went up to 0.89 in 2014-15. The annual growth rate of food subsidies appears to be uneven marked with fluctuations during 1990-91 to 2014-15. Food subsidies, which increased rapidly during the decade between 1992-93 and 2002-03, remained stagnant between 2002-03 and 2006-07. However, there was unprecedented growth in food subsidies during 2006-07 to 2009-10. Under pressure to consolidate the fiscal position, post 2010, the Government of India, is reforming food subsidies and results are evident from stable annual growth of food subsidies and declining proportion of food subsidies to GDP.

Though food subsidy increased by multiple time, per capital food grains consumption and proportion of under nourished has not declined appreciably. This generates the major question as to why food subsidy rises though impact on hunger is poor. The current study has been taken up to investigate the factors contributing to rapid rise in the food subsidy burden of the government.

Table-1. Growth of Food Subsidies in India
(1990-1991 to 2014-2015)

Year	Food Subsidy (□ crore)	Annual Growth (%)	As % of GDP
1990-91	2450	-	0.43
1991-92	2850	16.33	0.44
1992-93	2800	-1.75	0.37
1993-94	5537	97.95	0.64
1994-95	5100	-7.89	0.5
1995-96	5377	5.43	0.45
1996-97	6066	12.81	0.44
1997-98	7900	30.23	0.52
1998-99	9100	15.19	0.52
1999-00	9434	3.67	0.49
2000-01	12060	27.84	0.58
2001-02	17499	45.1	0.77
2002-03	24176.45	38.2	1.06
2003-04	25160	4.07	0.98
2004-05	25746.45	2.33	0.88
2005-06	23071	-10.39	0.69
2006-07	23827.59	3.28	0.61
2007-08	31259.68	31.19	0.69
2008-09	43668.08	39.69	0.86
2009-10	58242.45	33.37	1
2010-11	63844	9.62	0.91
2011-12	72822	14.06	0.81
2012-13	85000	16.72	0.84
2013-14*	92000	8.24	0.81
2014-15**	115000	25.00	0.89

Source: Indiastat.com *Revised Estimates ** Budget Estimates

2. Review of Literature

Conceptual and empirical studies were conducted in the past mainly focusing on the financial feasibility and effectiveness of the Government subsidy programs. For instance, Srivastava et.al. (2003) report to Planning Commission of India that per capita state subsidies show a regressive pattern. The report explores that low subsidies are available to residents of low income states and vice-versa. Similar to the results of many other studies, this study reveals that subsidies often promote inefficiencies. Later, Fan and Thorat (2007) review the trends in government subsidies and investments in and for Indian agriculture; develops a conceptual framework and model to assess the impact of various subsidies and investments on agricultural growth and poverty reduction; and, presents several reform options with regard to reprioritizing government spending and improving institutions and governance. The paper draws out that subsidies have proved to be unproductive, financially unsustainable, environmentally unfriendly in recent years, and contributed to increased inequality among rural Indian states. To sustain long-term growth in agricultural production, and therefore provide a long-term solution to poverty reduction, the government should cut subsidies and increase investments in agricultural research and development, rural infrastructure, and education.

There are other studies which specifically probe the factors contributing to rising food subsidies in India. Studies of Sharma (2012) and Saini and Kozicka (2014) are prominent works trying to address whether food management would influence food subsidies. The current study borrows conceptual and empirical framework from these studies. Sharma's (2012) empirical study focused specifically on the issues pertaining to food subsidy in India. This study estimates a regression model to explore the factors determining the food subsidy. From the results it was found that Government-led operational factors contribute largely towards growing subsidy. The study explores that increase in procurement price was the main contributor to increase in economic cost of foodgrains which is responsible for rising food subsidy. Other components, which contributed to food subsidy, included open-ended procurement policy, increase in procurement costs mainly statutory charges by state government on procurement of foodgrains, constant central issue prices and distribution costs. However, there has been an improvement in the efficiency of Food Corporation of India's (FCI) operations. For instance, share of administrative charges of procurement costs, and storage losses have declined during the last decade. Though FCI operates efficiently, it was not sufficient enough to reduce the subsidy. Thus the paper suggested for radical

reforms for improving the efficiency of Government's food management mechanism.

A recent study by Saini and Kozicka (2014) evaluates India's buffer stock policy and the results reveal gaps and inefficiencies buffer stock management. The study questions the economic efficiency of the entire buffer stock operation. The study observes that large quantities of food grains are accumulated in the warehouses of the Food Corporation of India (FCI) and its state agencies. But there is high incidence of undernourishment and food inflation across the country. The study arrives at the inference that poor buffer stock management was straining government. The paper recommends for the efficient food management system rather than providing subsidies.

From the review of limited available literature two inferences could be made. Firstly, the subsidy by itself is economically inefficient and adds fiscal pressure to the government treasury. Secondly, poor food management by the government results in rising food subsidy bill. However, there is a necessity to re-visit whether food management is a crucial determinant of food subsidy. Such re-visit is needed as arriving at any conclusion based on very few past studies may be misleading. Such studies are for different time periods and by applying different methodologies. Hence, the present paper re-investigates empirically by incorporating several probable factors of food management affecting the food subsidy.

3. Objective

The major objective of the study is to re-examine whether factors of food management contribute to widening food subsidies of the Government of India.

4. Research Methodology

4.1 Variables

To investigate the reasons for quick rise in the food subsidy, food management has been considered as the prominent influencing variable factor. Food management is measured by certain indicators which include minimum support price, food procurement incidentals, food distribution costs, central issue price, buffer carrying costs, off-take quantity etc. The selection of variables/indicators was guided by the results of past empirical literature.

4.2 Data Collection

Data relating to the variables and indicators under study are essentially procured from authentic secondary sources. Reports/publications of the central government departments, RBI data portal and the Government of India data portal - indiastat.com provided required data for the study.

4.3 Tools for Data Analysis

In order to analysis of the collected data, simple statistical techniques like trend analysis, ratio analysis, and percentage analysis are applied. For advanced investigation, linear multiple regression has been estimated.

4.4 Model Specification

In order to investigate the factors contributing to the rising food subsidy, a multivariate model is developed. This model is generated based on the results of past studies in this specific research domain. It has been widely believed conceptually that food management has impact on food subsidy. With the aim of testing such assumed relationship, the current study develops a functional model as stated below:

$$\text{Food Subsidy} = f(\text{Food Management})$$

From the review of literature it appears that minimum support price, procurement volume, distribution costs, buffer carrying costs and off-take quantity are the prominent factors in food management and hence they form explanatory variables in determining the fiscal subsidy. Thus the model estimated under the study could be spelled as:

$$Y = f(X_1 + X_2 + X_3 + X_4 + X_5)$$

Wherein, Y is food subsidy, X_1 is Minimum Support Price (MSP) of food grains, X_2 is Procurement Volume (PV)of food grains by the FCI, X_3 is Distribution Cost (DC) pertaining to food grains, X_4 is Buffer Carrying Cost (BC) of food grains and X_5 is Off-take quantity of food grains .

5. Food Management in India: Major Issues and Concerns

The Government of India is committed to ensure food security and hence procures food grains from the farmers, distributes to the consumers and arranges to hoard. However such verticals of food management are affected by escalating economic costs, stagnant food grain issue prices, poor targeting, increasing procurement of food grains and rising buffer carrying cost. Due to which the food subsidy bill has reached a level that is a significant proportion of the total government expenditure.

5.1 Escalating Economic Costs

It is shocking that the economic cost of food grains (wheat and rice) has increased phenomenally since 2001-02. The annual cumulative rise in the economic cost of wheat was 91 percent in 2014-15 since 2001-02 (Table-2). While, in case of rice, it was 98 percent during the same period. Rising minimum support price/procurement price, increasing procurement incidentals and ever widening distribution costs appear to be attributing factors for escalating economic cost of foodgrains.

Table-2. Economic Cost of Wheat and Rice (□ /quintal)

Year	Wheat	Cumulative Rise (%)	Rice	Cumulative Rise (%)
2001-02	852.94	-	1097.96	-
2002-03	884	3.64	1165.03	6.11
2003-04	918.69	7.57	1236.09	12.21
2004-05	1019.01	18.49	1303.59	17.67
2005-06	1041.85	20.73	1339.69	20.44
2006-07	1177.78	33.77	1391.18	24.28
2007-08	1311.75	45.15	1549.86	35.69
2008-09	1380.58	50.40	1740.73	48.00
2009-10	1424.61	53.59	1820.07	52.56
2010-11	1494.35	58.48	1983.11	61.52
2011-12	1595.25	65.23	2122.94	68.57
2012-13	1752.57	75.09	2304.87	77.14
2013-14	1908.32	83.98	2615.51	90.62
2014-15 (RE)	2047.56	91.28	2817.91	98.36

Source : FCI

One of the prominent factors behind increasing government food subsidies is rise in Minimum Support Price (MSP) (year on year) on both rice and wheat which was very massive during 1990-91 and 2014-15 (Table-3). Although in 90s the procurement price of rice and wheat increased by more than two and half times, its growth was less than 6 percent in the first half of the 2000s decade. Since 2005-06 the government has increased the MSP by more than 135 percent from □570 per quintal to □1360 in 2014-15. Almost in similar trend, MSP of wheat has risen by about 123 percent during the same period.

This comprehensive analysis leads to the inference that a large part of recent spike in food subsidies arise from relatively high MSP. It is noteworthy that in recent years, the MSPs announced by the government for foodgrain procurement are higher than the prices recommended by the Commission for Agricultural Costs and Prices (CACP), resulting in bloated food subsidy bill.

Table-3. Minimum Support/Procurement Price of Wheat and Paddy (□/quintal)

Year	Rice	% Change	Wheat	% Change
1990-91	205	10.8	225	4.4
1991-92	230	12.2	280	24.4
1992-93	270	17.4	330	17.9
1993-94	310	14.8	350	6.1
1994-95	340	9.7	360	2.9
1995-96	360	5.9	380	5.6
1996-97	380	5.6	475	25.0
1997-98	415	9.2	510	7.4
1998-99	440	6.0	550	7.8
1999-00	490	11.4	580	5.5
2000-01	510	4.1	610	5.2
2001-02	530	3.9	620	1.6
2002-03	530	0.0	620	0.0
2003-04	550	3.8	630	1.6
2004-05	560	1.8	640	1.6
2005-06	570	1.8	650	1.6
2006-07	580	1.8	850	30.8
2007-08	745	28.4	1000	17.6
2008-09	900	20.8	1080	8.0
2009-10	1050	16.7	1100	1.9
2010-11	1000	-4.8	1170	6.4
2011-12	1080	8.0	1285	9.8
2012-13	1250	15.7	1350	5.1
2013-14	1310	4.8	1400	3.7
2014-15	1360	3.8	1450	3.6

Source: FCI, 2015

Increasing procurement incidentals are another major source of rising food subsidy. Procurement incidentals in the case of wheat increased marginally at an average annual growth rate of 5.5 percent between 2001-02 and 2005-06 (Table-4). In case of rice, procurement incidentals decreased at an annual average of more than 8 percent during the same period. Since 2005-06, the procurement cost of both wheat and rice increased phenomenally. The combined annual growth rate of procurement cost of rice and wheat during 2005-06 and 2013-14 was 28.5 percent in contrary to less than even 1 percent during 2001-02 and 2005-06.

The procurement costs include statutory charges such as market fee, rural development/ infrastructure development cess and VAT and non-statutory charges like dami/arhatia commission, mandi labour charges, cost of gunny bags, handling charges, internal transport and interest charges. An examination of FCI annual data leads to the conclusion that ever increasing mandi charges and cost of gunny bags are the factors behind rising procurement incidentals.

Table-4. Food Procurement Incidentals (□ /quintal)

Year	Wheat	% Change*	Rice	% Change*	Total	% Change*
2001-02	134.68	-	66.81	-	201.49	-
2002-03	137.63	2.2	61.67	-7.7	199.3	-1.1
2003-04	138.2	0.4	30.68	-50.3	168.88	-15.3
2004-05	182.74	32.2	58.48	90.6	241.22	42.8
2005-06	171.2	-6.3	39.12	-33.1	210.32	-12.8
2006-07	180.15	5.2	193.66	395.0	373.81	77.7
2007-08	164.02	-9.0	214.91	11.0	378.93	1.4
2008-09	179.62	9.5	226.87	5.6	406.49	7.3
2009-10	206.88	15.2	288.6	27.2	495.48	21.9
2010-11	212.38	2.7	313.09	8.5	525.47	6.1
2011-12	235.68	11.0	350	11.8	585.68	11.5
2012-13	263.35	11.7	383.76	9.6	647.11	10.5
2013-14	286.41	8.8	463.53	20.8	749.94	15.9

Source: (Basic data): FCI

* Author's calculation

Rising food distribution cost in the recent years adds further pressure on the food subsidy bill of the government. The distribution cost consists of freight, interest, handling and storage charges, transit and storage losses and administrative overheads. During the first half of 2000s, the distribution cost of both wheat and rice increased sharply with a combined annual average growth rate of more than 21 per cent from □246 per quintal to □558 (Table-5). In a contradicting trend, between 2007-08 and 2009-10, the combined distribution cost of rice and wheat decreased by about 10 percent on an average annually. Post 2009-10 until 2013-14, the distribution cost of both the food items shot up. The combined distribution cost has almost doubled from □385 per quintal to □740 during the same period, registering more than 18 percent annual average growth. From the study of FCI report (2014), it appears that rapid increase in food distribution cost is mainly due to high food handling expenses, though freight and interest remain the largest contributing factors.

Table-5. Food Distribution Costs (□ /quintal)

Year	Wheat	% Change*	Rice	% Change*	Total Cost	% Change*
2001-02	126.65	-	119.62	-	246.27	-
2002-03	145.51	14.9	157.72	31.9	303.23	23.1
2003-04	169.69	16.6	214.52	36.0	384.21	26.7
2004-05	222.8	31.3	256.51	19.6	479.31	24.8
2005-06	234.54	5.3	272.37	6.2	506.91	5.8
2006-07	269.36	14.8	289.58	6.3	558.94	10.3
2007-08	244.43	-9.3	297.82	2.8	542.25	-3.0
2008-09	245.42	0.4	280.76	-5.7	526.18	-3.0
2009-10	200.37	-18.4	184.92	-34.1	385.29	-26.8
2010-11	217.65	8.6	223.49	20.9	441.14	14.5
2011-12	240.39	10.4	260.74	16.7	501.13	13.6
2012-13	269.81	12.2	287.28	10.2	557.09	11.2
2013-14	350.8	30.0	389.97	35.7	740.77	33.0

Source: (Basic data): FCI
* Author's calculation

5.2 Stagnant Central Issue Price (CIP)

It is pertinent to note that the issue price or sales price of PDS rice and wheat remained unchanged since 2002-03. But, as explored earlier, due to increased procurement costs and distribution costs, economic cost kept on increasing. The increasing gap between the issue price and the economic cost is the subsidy funded by the Government through its budgetary allocation. The issue price of rice for APL card holders is □795 per quintal and for BPL allocation □565 since 2002-03 till date. However, the economic cost of rice increased from □1165 per quintal in 2002-03 to □2818 in 2014-15 (RE), recording almost 142 percent rise. Similarly, though the economic cost of wheat increased by about 132 percent from □884 per quintal to □2048 during 2002-03 and 2014-15, the issue price remained same at □610 and □415 per quintal for APL and BPL families respectively. Since the issue prices were not raised, to meet up with the rising economic cost, the burden on the government in the form of subsidy also increased.

A High Level Committee on Long Term Grain Policy (HLC) constituted by the Department of Food and Public Distribution in its report had recommended that APL price should be reduced to 80 per cent of economic cost and BPL price to 50 per cent of the economic cost excluding statutory levies (GOI, 2003). It is clearly evident that issue prices of both wheat and rice are much lesser than the recommended limit. For instance, in 2014-15, the economic cost of wheat was □2048 per quintal, whereas issue price for APL was □610 per quintal. The issue price covers just 30 percent of the economic cost, remaining 70 percent is funded by the government in the form of subsidy. Similar analogy can be observed even in the case of rice. The issue price of rice was □795 per quintal for APL population against economic cost of □2818 per quintal. This accounts for coverage of only 28 percent of economic cost, leaving 68 percent of subsidy burden. Since 2002-03, the subsidy is constantly increasing with widening gap between ever increasing economic cost and stagnant issue prices.

Table-6. Relative Rise in Central Issue Price (CIP) and Economic Cost

Particulars	Duration	APL		BPL		AAY		Cumulative Rise in Economic Cost (%)
		CIP*	Cumulative Rise (%)	CIP*	Cumulative Rise (%)	CIP*	Cumulative Rise (%)	
Rice	2002-03 to 2014-15	795	0	565	0	300	0	141.9
Wheat	2002-03 to 2014-15	610	0	415	0	200	0	131.6

Sources: Economic Survey 2013-14 & FCI reports
*Rupees per quintal

5.3 Increasing Volume of Foodgrain Procurement and Buffer Carrying Cost

Another sever problem in food subsidy is rising buffer carrying cost over the years. The combined buffer cost of wheat and rice rose from □205 per quintal in 2001-02 to □446 in 2013-14, with an annual average growth of 9 percent (Table-7). This is accounted for constant increase in the government procurement of wheat and rice since 2001-02. The combined volume of procured food grains increased from 42 MT in 2001-02 to 56 MT in 2013-14. Since 2008-09, due to record food grain production, procurement and buffer stock is also increasing, leading to higher buffer cost.

Table-7. Food Procurement (million tonnes) and Buffer Carrying Costs (□/quintal)-Wheat and Rice

Year	Wheat	Rice	Total	% Change*	Buffer Cost	% Change*
2001-02	20.63	22.13	42.76	-	205.52	-
2002-03	19.03	16.41	35.44	-17.1	286.86	39.6
2003-04	15.8	22.9	38.7	9.2	289.02	0.8
2004-05	16.8	24.67	41.47	7.2	303.37	5.0
2005-06	14.79	27.58	42.36	2.1	337.76	11.3
2006-07	9.23	25.11	34.34	-18.9	407.42	20.6
2007-08	11.13	28.74	39.86	16.1	326.77	-19.8
2008-09	22.69	34.1	56.79	42.5	450.41	37.8
2009-10	25.38	32.03	57.42	1.1	405.14	-10.1
2010-11	22.51	34.2	56.71	-1.2	408.42	0.8
2011-12	28.34	35.04	63.38	11.8	426.42	4.4
2012-13	38.15	34.04	72.19	13.9	474.46	11.3
2013-14	25.09	31.85	56.94	-21.1	446.28	-5.9

Source: (Basic data): RBI Handbook on Statistics, 2015 and FCI annual reports.
* Author's calculation

It is pertinent to note that in recent years, the actual stocks of foodgrains are higher than the required norm (refer Tables-8 & 9). For instance, the actual stock of wheat was 18.2 MTs in 2009 as against the norm of 8.2 MTs, creating an excess stock of 10 MTs. By 2014, the actual stock was 19.8 MTs more than the norm. Similar is the case of rice. For the increasing additional stock, proportionately rising buffer stock subsidy has to be earmarked.

Rising procurement and increasing buffer stock is reported because of record foodgrain production over the last half a decade. The study takes us to a paradoxical conclusion that there are mounting food grain stocks and reported deaths of starvation.

Table-8. Foodgrain Buffer Stocks-Norms Vs. Actuals: Wheat (in MTs)

As on January 1st	Buffer Norm	Actual Stock	Excess*	Excess as % of Buffer Norm*
1992	7.7	5.3	-2.4	-31.2
1993	7.7	3.3	-4.4	-57.1
1994	7.7	10.8	3.1	40.3
1995	7.7	12.9	5.2	67.5
1996	7.7	13.1	5.4	70.1
1997	7.7	7.1	-0.6	-7.8
1998	7.7	6.8	-0.9	-11.7
1999	8.4	12.7	4.3	51.2
2000	8.4	17.2	8.8	104.8
2001	8.4	25	16.6	197.6
2002	8.4	32.4	24	285.7
2003	8.4	28.8	20.4	242.9
2004	8.4	12.7	4.3	51.2
2006	8.2	6.2	-2	-24.4
2007	8.2	5.7	-2.5	-30.5
2008	8.2	7.7	-0.5	-6.1
2009	8.2	18.2	10	122.0
2010	8.2	23.1	14.9	181.7
2011	8.2	21.5	13.3	162.2
2012	8.2	25.7	17.5	213.4
2013	8.2	34.4	26.2	319.5
2014	8.2	28	19.8	241.5

Source: (Basic data) Economic Survey 2014-15 & earlier issues.
* Author's calculation

Table-9. Foodgrain Buffer Stocks- Norms Vs. Actuals: Rice (in MTs)

As on January 1st	Buffer Norm	Actual Stock	Excess*	Excess as % of Buffer Norm*
1992	7.7	8.6	0.9	11.7
1993	7.7	8.5	0.8	10.4
1994	7.7	11.2	3.5	45.5
1995	7.7	17.4	9.7	126.0
1996	7.7	15.4	7.7	100.0
1997	7.7	12.9	5.2	67.5
1998	7.7	11.5	3.8	49.4
1999	8.4	11.7	3.3	39.3
2000	8.4	14.2	5.8	69.0
2001	8.4	20.7	12.3	146.4
2002	8.4	25.6	17.2	204.8
2003	8.4	19.4	11	131.0
2004	8.4	11.7	3.3	39.3
2006	11.2	12.6	1.4	12.5
2007	11.2	12	0.8	7.1
2008	11.2	11.5	0.3	2.7
2009	11.2	17.6	6.4	57.1
2010	11.2	24.3	13.1	117.0
2011	11.2	25.6	14.4	128.6
2012	11.2	29.7	18.5	165.2
2013	11.2	32.2	21	187.5
2014	11.2	14.7	3.5	31.3

Source: (Basic data) Economic Survey 2014-15 & earlier issues.
* Author's calculation

6. Factors Affecting Food Subsidy

The descriptive analysis in the previous section throws light on the different food management factors influencing food subsidy in India. However, they are indicative. Conclusion based on them may not be reliable. To validate the outcome of descriptive analysis an empirical investigation has been carried out. At the outset, food subsidy is affected by several factors. Based on the discussion in the previous section and results of previous studies (George, 1996; Sharma, 2012 for instance), it has been assumed that food subsidy is affected by poor food management. Food management is measured by a set of indicators which include minimum support price, foodgrain procurement volume, foodgrain distribution costs, foodgrain buffer carrying costs and off-take

quantity of food grains. The estimating model used to examine the impact of such variables on food subsidies is:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Wherein,
Y = Food Subsidy (dependent variable)
a = Intercept of Y which is constant
β_1, β_2, β_3, β_4,& β_5 =Beta coefficients of X_1, X_2, X_3, X_4 & X_5 (explanatory variables) respectively
X_1 = Minimum Support Price (MSP) of foodgrains (+)
X_2 = Procurement Volume (PV)of foodgrains by the FCI (+)
X_3 = Distribution Cost (DC) pertaining to foodgrains (+)
X_4 = Buffer Carrying Cost (BC) of foodgrains (+)
X_5 = Off-take quantity of foodgrains (-)
e = error term

As per the theoretical framework, Minimum Support Price, Procurement Volume, Distribution Cost and Buffer Carrying Cost have positive impact on food subsidy. The beta coefficient of these explanatory variables must be preceded by positive sign. Whereas, off-take quantity of foodgrains has negative impact on the food subsidy indicating that higher the off-take quantity of foodgrains, lower the food subsidy and vice-versa. Hence, in this case the expected sign for the beta coefficient of this explanatory variable is negative.

Inorder to examine the impact of the selected explanatory variables on the food subsidy, multiple linear regression equation has been estimated for annual time series data from 2001-02 to 2013-14 and the estimates are reported in Table-10.

The regression estimation results indicate that 98 percent variation in food subsidies is explained by the model (Adj R^2 = 0.98). The goodness of fit of the model is tested and validated by Durbin-Watson test (for auto correlation), F- test and VIF test (for collinearity). Among the explanatory variables, minimum support price and off-take quantity have significant impact on food subsidy bill of the Government of India. However, the coefficient of foodgrain off-take quantity has positive sign, which was theoretically not expected. Similarly, coefficient of buffer cost has negative sign, which was again contrary to the predictions. In the case of procurement volume and distribution cost, coefficients are positive as expected, indicating that rise in volume of foodgrain procurement and increase in foodgrain distribution cost cause mounting food subsidies. The results show that among the explanatory variables, minimum support price is the most influential factor in determining food subsidy.

Table-10. Regression Results of Factors Affecting Food Subsidy in India

Particulars	Coefficients	Std. Error	t value	sig	VIF
Intercept	-50400.4	7674.812	-6.567	0.00	-
MSP	66.796	11.181	5.974	0.001*	9.854
PV	219.397	231.131	0.949	0.374	7.033
DC	17.175	14.498	1.185	0.275	3.086
BC	-51.023	28.954	-1.762	0.121	5
Off	765.337	154.129	4.966	0.002*	2.203
R^2	0.989	-	-	-	-
Adj R^2	0.981	-	-	-	-
D-W	2.349	-	-	-	-
F	123.455	-	-	0.00	-

* Significant at 1 percent

7. Conclusion and Policy Implications

From the results it is evident that factors of food management have significant impact on food subsidy allocation of the Central Government and thereby affects national economic efficiency. It has been proved by several studies that long term subsidies would de-motivate the labour supply, labour productivity and lead to unemployment. Beneficiaries of the subsidy continue to be dependent on the government for livelihood which further adds to the fiscal burden of the Government. Thus, subsidy by itself is economically inefficient. As poor food management causes rising food subsidies which in turn has fiscal impact on the Government exchequer and affects long run growth sustainability of the people, following broad policy actions could be recommended for better food management.

Firstly, since MSP significantly impacts food subsidy, it is essential to have a scientific methodology to fix minimum support price which is currently lacking. Though the Commission for Agricultural Costs and Prices (CACP) recommended standard MSPs for food procurement, it has been noted that the Government purchased foodgrains at much higher prices than the prices recommended by the CACP. If the Government follows the CACP recommendations, huge amount of subsidy could be reduced.

Secondly, the food distribution cost should be reduced by cutting down mainly freight costs which have major impact on the food subsidy. In view of this, the Government may shift from the current system of central pooling and central distribution of foodgrains to local procurement and local distribution. This may be at the taluk or district level.

Thirdly, from the study it is noted that there is a wide gap between the economic cost and issue price of foodgrains. In order to bridge the gap and relive the burden of subsidy, the Government must implement the recommendations of the High Level Committee on Long Term Grain Policy (HLC), 2003. The Committee recommended that APL price should be raised to 80 per cent of economic cost and BPL price to 50 per cent of the economic cost excluding statutory levies. Implementation of this recommendation would address the grievance of APL absorbing the subsidies and ensuring better targeting.

Fourthly, the Government should re-design its PDS network to avoid leakages and malpractices which eat away a large part of Government resources. For better targeting, the PDS subsidy to the BPL customers to be given under Direct Benefit Transfer (DBT) scheme to their bank accounts linked to aadhar, similar to LPG subsidy delivery mechanism. Through local administrations, the BPL status of the customers should be tested and validated.

Bibliography

Fan, S., Gulati, A. & Thorat, S (2007). Investment, subsidies, and pro-poor growth in rural India, IFPRI Discussion Paper 716. International Food Policy Research Institute, Washington, D.C.

FAO (2015). State of Food Insecurity in the World, Food and Agriculture Organisation, United Nations, retrieved from: http://www.fao.org/3/a-i4646e.pdf

FCI (2012). Annual Report 2011-12 and earlier issues, Food Corporation of India, New Delhi.

FCI (2015). *Annual Report 2014-15 and earlier issues*, Food Corporation of India, New Delhi.

George, P.S (1996). Public Distribution System, Food Subsidy and Production Incentives, *Economic and Political Weekly*, September 28, 1996, pp. A-140-A-144.

GoI (2003). *Economic Survey 2002-03 – Report of the High Level Committee on Long Term Grain Policy*, Department of Economic Affairs, Ministry of Finance, Government of India.

Government of India (2012). Foodgrains Bulletin, May 2012 and earlier issues, Department of Food and Public Distribution, Ministry of Consumer Affairs, Food and Public Distribution, PP. 27-28.

Government of India (2013). Twelfth Five-year Plan (2012-2017), Volume II: Economic Sectors, Planning Commission, New Delhi, India

Government of India (2013*)* Report of the Working Group on the Fertiliser Industry for the Twelfth Plan (2012-13 to 2016-17), Department of Fertilisers, Ministry of Chemicals and Fertilisers, New Delhi, India.

Government of India (2015*). Economic Survey 2014-15 and earlier issues*, Ministry of Finance.

http://www.moneycontrol.com

Jena, Jasoda and Nayak, Chittaranjan (2014). Subsidies and Fiscal Deficit in Post Reforms India, *MANTHAN: Journal of Commerce and Management,* Vol.1(1), pp.59-73.

Kelkar Committee Report (2012). *Report of the Committee on Roadmap for Fiscal Consolidation*, Ministry of Finance, New Delhi, India

NSSO (2012). *Key Indicators of Household Consumer Expenditure in India, 2009-10 NSS 66th Round* July 2009 to June 2010 and Earlier Issues, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Govt. of India.

PMEAC (2012). *Economic Outlook 2012/13*, Economic Advisory Council to the Prime Minister, New Delhi, August 2012.

Reserve Bank of India (2015). *Handbook of Statistics on Indian Economy*, https://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy

Saini, Shweta and Marta Kozicka (2014). Evolution and Critique of Buffer Stocking Policy of India, working paper 283, Indian Council for Research on International Economic Relations, retrieved from: http://icrier.org/pdf/Working_Paper_283.pdf

Sharma, Vijay Paul (2012). Food subsidy in India: Trends, causes and policy reform options. Working Paper 2012-08-02. IIM, Ahmedabad.

Srivastava, D. K.; C. Bhujanga Rao; Pinaki Chakraborty and T. S. Rangamannar. (2003). Budgetary Subsidies in India: Subsidising Social and Economic Services, National Institute of Public Finance and Policy for Planning Commission, Government of India. Retrieved from: http://planningcommission.nic.in/reports/sereport/ser/stdy_bgdsubs.pdf

www.indiast.com