Agricultural Price Policy, Farm Profitability and Food Security

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Agricultural price policy has come under serious attack recently for recommending support prices higher than what the costs of production warrant, supposedly leading to a distortion of the market, and, therefore, to food deprivation. With an in-depth analysis of costs and returns in rice and wheat, which are the most state-protected crops and underlie the livelihoods of millions of farmers, this paper examines the effectiveness of agricultural price policy in enabling farmers to obtain sufficient profits to promote investment, technology and productivity and thereby to food security. The rising cost of production due to the overemphasis on getting input prices right is a major factor that has led to higher support prices. Another factor is the percolation of volatility in global prices through trade liberalisation. Because of this, wheat support prices had to be hiked steeply in recent years so that sufficient quantities are procured. This has distorted parity between the prices of rice and wheat.

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Agricultural price policy plays an important role in achieving growth and equity in the Indian economy in general, and the agriculture sector in particular. The major underlying objective of the Indian government's price policy is to protect both producers and consumers. Achieving food security at both the national and household levels is one of the major challenges in India today. Currently, the food security system and price policy basically consist of three instruments: procurement prices/minimum support prices (MSPs), buffer stocks and public distribution system (PDS). Agricultural price policy is one of the important instruments in achieving food security by improving production, employment and incomes of the farmers. There is a need to provide remunerative prices for farmers in order to maintain food security and increase the incomes of farmers. There has been a debate on price versus non-price factors in the literature. However, a review of literature shows that they are complements rather than substitutes (Dev and Ranade 1998; Rao 2004, 2006; Schiff and Montenegro 1997).

In the post-reform period, it was viewed that reforms in non-agriculture would shift the terms of trade (ToT) in favour of agriculture and lead to enhancement of private sector investment, which, in turn, would raise growth in agriculture (Singh 1995). The favourable ToT in agriculture have had some impact on agriculture in the post-reform period as the periods of improving ToT like in the early 1990s and more recently after 2004 onwards, witnessed a robust growth in agricultural production in general, and in foodgrains in particular (Dev 2009). However, the slackening of the efforts in non-price factors has affected the growth of production in the recent period (GoI 2008).

Food inflation of around 18%-19% in 2009 is a concern for the poor and vulnerable. Several factors such as shortages in domestic supplies due to a poor monsoon in 2009, the rise in international prices, shortages in global supplies mainly due to diversion of significant foodgrains to biofuels, increase in demand due to higher growth, implementation of the National Rural Employment Guarantee Act and the loan waiver scheme, inefficiencies in the marketing system, speculation, etc, have been responsible for the price rise in cereals, pulses, sugar, fruits and vegetables, milk, etc. An increase in domestic supplies of agricultural production is important to provide food to the poor and others at reasonable prices. An increase in supplies is also necessary for the success of the PDS, which is supposed to be an important instrument for food security at the household level. Prices and supply-side non-price factors can enhance yields and provide higher incomes for the farmers apart from providing food security for the poor.

Agricultural price policy has come under serious attack in recent years for recommending higher support prices than warranted by the costs of production (COP) and supposed distortion of the market, leading to food deprivation. It is also blamed frequently for the spikes in prices of food items that reached their peaks in 2009. Rice and wheat are the most state-protected crops and the millions of farmers are dependent on incomes from these crops, grown in an area of nearly 75 million hectares or more than 40% of the gross sown area. An analysis of costs and returns in these crops gives some idea about the profitability of Indian agriculture and provides insights into the working of price policy.

Against this background, the overall objective of this paper is to examine the effectiveness of price policy in helping farmers get sufficient profits to promote investment, technology and productivity, thereby to the food security of the country. The specific objectives are to find out the trends in the movements of costs, prices and returns in rice[1] and wheat farming to throw light on the impact of price policy on the profitability of farming in two of the most cultivated and consumed food crops in the country. It also tries to bring out the causes that necessitated the recent increases in support prices and their relation to food security of the country.

The data generated under the cost of cultivation scheme (CS) of the Directorate of Economics and Statistics, ministry of agriculture, is used for the analysis in this paper. The data, collected annually under this scheme, covers all the major crops. This mine of data is largely unexplored for policy relevant research and encompasses 9,000 farmers every year. This data helps in analysing the economics of cultivation of different crops as well as to see the effectiveness of macro policies like price policy (Sen and Bhatia 2004; Raghavan 2008). The costs and returns are calculated for all-India using this data to see the emerging trends in profitability. The weights based on area and productions of respective crops are developed to combine the data from states. We have used the area-based weights for all the variables except the COP. The growth rates used are based on semi-log trend and deflation is done using consumer price indices for agricultural labourers of individual states. The study analyses the data for rice and wheat for a period of more than 25 years from 1981 to 2007-08 for all major growing states. However, 2006-07 is the last year for which the data for different states are available for rice and 2007-08 for wheat. The study is divided into two periods, roughly synchronising with the pre- liberalisation and post-liberalisation eras. The first period starts with 1981 and ends with 1992-93 and the second period covers the years from 1994-95 to 2007-08.[2] The costs and other data under the CS data are comparable over time except for a minor change in the valuation of family labour. Since 1991, family labour is now valued at casual labour wages and not those of attached labour. Nevertheless, this does not alter the overall conclusions of the paper.

The rest of the paper is structured into six sections. Section 1 presents the costs in cultivation and production of rice and wheat, while Section 2 gives the movements of MSPs and prices realised. Section 3 examines the relationship among the COP, support prices, prices realised and wholesale prices. Section 4 examines the trends in returns at all-India and across different states and Section 5 brings together all these threads to identify the causes for higher support prices in recent years. Section 6 provides concluding observations.

1 Trends in Costs and Yields

The trends in C2 cost of cultivation (COC) per hectare and C2 COP per quintal and A2 COC for the period 1981-82 to 2007-08 for rice and wheat crops are examined here. The A2 (paid out costs) include the value of hired labour (human, animal, machinery), value of seed (both farm produced and purchased), value of insecticides and pesticides, value of manure (owned and purchased), value of fertiliser, depreciation on implements and farm buildings, irrigation charges, land revenue, cesses and other taxes, interest on working capital and also miscellaneous expenses (artisans, etc) and rent for leased-in land. The C2 costs include paid out costs plus imputed value of family labour, rental value of owned land and interest on value of owned fixed capital assets. There have been debates that rice should be given an MSP as similar to wheat as the costs of both the crops are similar. We examine this issue here by looking at the trends in ratio of rice costs to wheat costs. The total COP per unit of rice and wheat, which include imputed values of land, labour and capital, shown in Table 1, reveal that the unit costs of the former are somewhat lower than those of the latter. However, the situation seems to have changed after 1994-95 and there are several years in which

Table 1: Different Costs in the Production of Rice and Wheat at All-India Level

Years	Rice (Rs)			Wheat (Rs)			Ratio of Paddy Cost to Wheat Cost		
	CoP/ Quintal	CoC/ Hectate	A2 CoC/ Hectare	CoP/ Quintal	CoC/ Hectare	A2 CoC/ Hectare	CoP/ Quintal	CoC/ Hectare	A2 CoC/ Hectare
1981-82	99	2,892	1,705	122	3,260	1,946	81	89	88
1982-83	116	2,824	1,680	125	3,475	2,065	93	81	81
1983-84	108	3,351	1,959	135	3,462	2,039	80	97	96
1984-85	113	3,582	2,107	133	3,752	2,121	85	95	99
1985-86	118	3,718	1,966	123	3,959	2,335	96	94	84
1986-87	124	3,717	2,240	132	4,058	2,391	94	92	94
1987-88	144	4,653	2,828	146	4,826	2,777	99	96	102
1988-89	147	5,704	3,636	168	5,636	3,292	87	101	110
1989-90	172	6,340	3,539	172	5,769	3,361	100	110	105
1990-91	185	6,526	3,734	197	6,872	3,800	94	95	98
1991-92	218	7,884	4,161	204	7,693	4,303	106	102	97
1992-93	238	7,684	3,957	238	8,808	4,823	100	87	82
1994-95	279	11,212	6,369	294	10,990	5,446	95	102	117
1995-96	306	11,207	6,324	318	11,681	6,100	96	96	104
1996-97	338	12,651	6,703	361	13,760	6,927	94	92	97
1997-98	370	13,581	7,246	381	13,236	6,853	97	103	106
1998-99	398	15,495	8,710	383	14,316	7,268	104	108	120
1999-2000	442	16,978	9,275	415	16,459	8,038	106	103	115
2000-01	448	17,365	9,798	450	17,132	8,751	99	101	112
2001-02	469	18,655	10,619	466	17,279	9,058	101	108	117
2002-03	530	19,193	10,949	499	18,837	10,027	106	102	109
2003-04	483	19,583	10,988	498	18,925	10,195	97	103	108
2004-05	529	20,670	11,776	537	19,810	10,975	98	104	107
2005-06	529	21,182	11,845	592	21,847	11,584	89	97	102
2006-07	546	22,059	12,543	586	23,847	12,681	93	93	99
2007-08	NA	NA	NA	617	25,575	13,166	-	-	-

Source: Estimated by the authors based on Commission for Agricultural Costs and Prices (CACP) data at current prices.

the paddy COP per unit exceeded that of wheat. This was particularly noticeable after 1999-2000.

The ratio of paddy COP to that of wheat is lower than the ratio of their COC because of the higher yields in paddy. The ratio of A2 COC of rice to wheat was higher than the corresponding ratio of C2 COC as shown in Table 1. This may be because of the lower imputed values of land, labour and capital in case of paddy compared to wheat. The conclusion is that the costs of rice have been similar to those of wheat since the mid-1990s. The ratio came down to 0.90 and 0.91 in the case of COP in the years 2005-06 and 2006-07. On the whole, the demand that the MSP of rice should be closer or slightly below than wheat, based on the cost data, may need a sympathetic hearing. However, it may be noted that although the cost is a major one, it is not the only one factor in determining MSP.

The growth rates in the real COP declined in the background of a robust gain in per hectare yields in the first period, while these costs went up in real terms in the second period (Table 2). As can be seen from the table, the growth rate in yields (per annum) came down from 2.67% to 0.86% in rice and from 2.54% to 0.52% in wheat in the first and second periods, respectively. The growth in yield outstripped the growth in COC during the 1980s enabling the cost per quintal to go down. The reverse can be noticed for the later period. Another important point to be noted is that the COC has grown at a lower rate in the recent period indicating that the lower profitability might have discouraged farmers to invest in higher use of inputs and technology.

Table 2: Trend Growth Rates of Different Costs and Yields in Rice and Wheat All-India

Period	Rice			Wheat			
	Madhya Pradesh (MP)	Punjab	All-India	Haryana	MP	Punjab	All-India
CoP (Constant Prices)							
1981-82 to 1992-93	2.95	-1.52	-0.13	-6.17	1.77	-2.58	-1.96
1994-95 to 2006-07	3.31	-0.50	1.46	2.08	0.97	0.65	1.41
CoC (Constant Prices)							
1981-82 to 1992-93	4.14	-1.55	2.32	-0.56	3.74	0.55	1.36
1994-95 to 2006-07	-0.51	2.18	1.92	2.21	2.94	1.35	1.96
A2 CoC (Constant Prices)							
1981-82 to 1992-93	4.62	-3.31	3.40	-1.29	4.31	-0.22	0.72
1994-95 to 2006-07	-0.33	2.23	2.15	3.01	2.74	1.22	2.45
Yield (Qtls/ha)							
1981-82 to 1992-93	1.13	-0.10	2.67	3.73	2.46	2.16	2.54
1994-95 to 2006-07	-3.63	2.76	0.86	0.21	2.02	0.87	0.52

The second period extends up to 2007-08 for wheat.
Source: As in Table 1.

Which states are relatively efficient in COP relative to all-India average? The states of HP, AP and Punjab are the efficient producers of rice in the triennium ending 2007 (Table 3). The farmers of AP and Punjab could produce a quintal of rice at 27% and 23% lower cost than that of the all-India average and they have improved the efficiency of production by reducing the COP relative to all-India average during the study period. The obverse is true in case of Assam and Madhya Pradesh (MP) produces rice at 30% higher costs. Also, farmers from Assam and Tamil Nadu are expensive in rice production, which may be impinging seriously on their profitability. Rajasthan, Punjab and Haryana are the efficient producers compared to all-India average for wheat. Here, Jharkhand, West Bengal and Chhattisgarh produce wheat at whopping 87%, 57% and 49% higher cost than all-India.

Table 3: CoP of Different States in Relation to All-India Average for Rice and Wheat
(per quintal, for different triennium)

State	Rice (%)			Wheat (%)		
	TE 1984-85	TE 1996-97	TE 2006-07	TE 1984-85	TE 1996-97	TE 2007-08
Andhra Pradesh (AP)	93	92	73	-	-	-
Assam	88	114	126	-	-	-
Bihar	110	109	96	-	114	102
Chhattisgarh	-	-	94	-	-	149
Gujarat	-	-	-	-	133	100
Himachal Pradesh (HP)	102	-	50	121	130	109
Haryana	111	124	106	103	78	84
Jharkhand	-	-	-	-	-	187
Kerala	-	-	119	-	-	-
Karnataka	92	-	105	-	-	-
MP	102	109	138	95	122	116
Orissa	84	96	104	-	-	-
Punjab	105	96	77	98	92	84
Rajasthan	-	-	-	104	85	77
Tamil Nadu (TN)	-	-	128	-	-	-
Uttar Pradesh (UP)	102	80	96	98	86	87
Uttarakhand	-	-	-	-	-	103
West Bengal	119	117	121	-	-	157
All-India	100	100	100	100	100	100

Source: As in Table 1.

2 Trends in MSPs and Prices Realised by Farmers

In this section, we examine the trends in MSPs and the prices realised by farmers. The CACP reports provide implicit prices which are derived from the CS data for different states. Implicit price is the ratio of value of the output of main product per hectare to the yield per hectare. It is known the COP given by the CS are the reported data by the farmers. In other words, the implicit prices reflect the prices realised by the farmers.

2.1 Changes in MSP

The changes in MSP show that the increase in rice and wheat prices are the highest during the period 2000-01 to 2009-10 as compared to those of earlier decades (Table 4). The rice prices for the common variety increased from Rs 510 to Rs 1,000 (while the wheat prices rose from Rs 580 to Rs 1,080 during this period. In the 1990s, the rate of increase in MSP of rice was lower than that of wheat. The annual changes reveal that the MSP increased significantly in the first few years after the reforms were introduced. Again it rose substantially during 2006-07 to 2009-10. Rice and wheat prices have risen respectively by 62% and 54% during this period.

Table 4: Trend Growth Rates (% Per Year) in MSPs for Rice and Wheat in Real Terms

Period	Rice	Wheat
1981-82 to 1990-91	-0.95	-2.22
1990-91 to 2000-01	0.99	2.23
2000-01 to 2009-10	1.81	1.30

Source: As in Table 1.

The intercrop price parity between rice and wheat shows that the ratio of paddy to wheat increased from 0.89 in 1981-82 to around 1.0 in 1989-90 (Table 5, p 479). It ranged between 0.94 and 1.04 during 1989-90 to 1996-97. The ratio declined significantly in 1997-98 because of a sharp rise in MSP for wheat. The MSP of wheat increased by 25% compared to 12.7% rise for rice in that year. This increase in the form of bonus for wheat distorted the intercrop price parity. It was below 0.90 from 1997-98 to 2007-08. Only in the last two years had the ratio reached 0.90

Table 5: Intercrop Price Parity of MSP

Year	Common Paddy/Wheat	Grade A Paddy/Wheat	Year	Common Paddy/Wheat	Grade A Paddy/Wheat
1981-82	0.89	na	1996-97	1.00	1.04
1982-83	0.86	na	1997-98	0.87	0.94
1983-84	0.87	na	1998-99	0.86	0.92
1984-85	0.90	na	1999-2000	0.89	0.95
1985-86	0.90	na	2000-01	0.88	0.93
1986-87	0.90	0.93	2001-02	0.87	0.92
1987-88	0.90	0.93	2002-03	0.89	0.94
1988-89	0.93	0.98	2003-04	0.89	0.94
1989-90	1.01	1.07	2004-05	0.89	0.94
1990-91	0.95	1.00	2005-06	0.89	0.94
1991-92	1.04	1.09	2006-07	0.89	0.93
1992-93	0.98	1.02	2007-08	0.88	0.91
1993-94	0.94	1.00	2008-09	0.90	0.93
1994-95	0.97	1.03	2009-10	0.93	0.95
1995-96	1.00	1.04			

MSP includes bonus.
Source: As in Table 1.

and beyond. Similar trends can be seen for the ratio of grade A paddy to wheat.

2.2 Trends in Prices Realised by Farmers

Farmers are more concerned with the prices they realise rather than the MSP per se. The ratio of price realised to MSP was higher than 1.0 for rice and wheat almost during the entire period (Table 6). Only in the case of rice, it was lower than 1.0 during 2000-01 to 2003-04. In the subsequent years, the ratio was closer to one. On the other hand, the prices realised by farmers were more than MSP for wheat in all the years (except 2001-02) during the period 1981-82 to 2007-08.

Growth rates of prices realised in real terms show that rice prices had a declining trend in both periods (Table 7), while wheat prices showed a positive growth rate and increased in the second period. In other words, prices realised by wheat farmers have been higher and increasing as compared to that of rice farmers.

Table 6: Price Realised in Relation to MSP in Rice and Wheat

Years	Price Realisd (Rs/Quintal)		Ratio of Price Realised to MSP	
	Rice	Wheat	Rice	Wheat
1981-82	121	151	1.05	1.16
1982-83	151	165	1.24	1.16
1983-84	151	160	1.14	1.06
1984-85	145	165	1.06	1.09
1985-86	163	173	1.15	1.10
1986-87	162	175	1.11	1.08
1987-88	191	202	1.27	1.22
1988-89	199	214	1.24	1.24
1989-90	211	221	1.14	1.21
1990-91	221	257	1.08	1.20
1991-92	283	332	1.20	1.48
1992-93	289	345	1.07	1.25
1994-95	363	388	1.07	1.11
1995-96	385	413	1.07	1.15
1996-97	416	531	1.09	1.40
1997-98	429	517	1.03	1.09
1998-99	494	563	1.12	1.10
1999-2000	516	612	1.05	1.11
2000-01	477	586	0.94	1.01
2001-02	484	589	0.91	0.97
2002-03	511	625	0.93	1.01
2003-04	516	626	0.94	1.01
2004-05	557	648	0.99	1.03
2005-06	561	761	0.98	1.19
2006-07	609	898	0.98	1.28
2007-08	na	1,018	na	1.20

na: not available.
Source: See Table 1.

2.3 Regional Disparities in Price Realisation

There are significant regional disparities when we consider the ratio of price realised to MSP. There was a decline in the ratio in the triennium ending 2006-07 at the all-India level and in several states excluding Punjab, HP and Haryana for rice. It was much lower in states like Orissa, Bihar, Assam, West Bengal and UP (Table 8). In the case of Haryana, the ratio was higher by 32% in the same triennium, which means that the realised price is 32% higher than respective support price. The ratio for wheat was much higher than for rice. For example, the realised price for wheat was 22% higher as compared to MSP at all-India level in the TE 2007-08. The higher ratio for wheat is true for all the reported states.

Table 7: Trend Growth Rates of Price Realised in Rice and Wheat (in % per year)

Period	Rice			Wheat			
	MP	Punjab	All-India	Haryana	MP	Punjab	All-India
1981-82 to 1992-93	1.04	-0.92	-0.64	-1.01	-0.07	-1.41	-0.51
1994-95 to 2006-07	0.88	0.50	-0.35	1.74	2.36	1.71	1.71

The growth rates for wheat in case of the second and third periods go up to 2007-08.
Source: See Table 1.

Table 8: Price Realised Relative to MSP in Rice and Wheat in Different States (%)

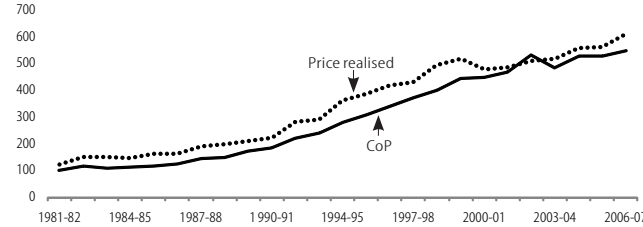
State	Rice			Wheat		
	TE 1984-85	TE 1996-97	TE 2006-07	TE 1984-85	TE 1996-97	TE 2007-08
AP	107	110	104	-	-	-
Assam	103	105	94	-	-	-
Bihar	147	109	86	-	137	121
Chhattisgarh	-	-	102	-	-	138
Gujarat	-	-	-	-	156	124
HP	110	-	127	124	127	121
Haryana	109	122	132	105	111	116
Jharkhand	-	-	-	-	-	-
Kerala	-	-	122	-	-	123
Karnataka	124	-	110	-	-	-
MP	110	110	114	123	135	140
Orissa	116	101	85	-	-	-
Punjab	106	106	107	105	111	116
Rajasthan	-	-	-	119	132	127
TN	-	-	101	-	-	-
UP	103	105	98	106	121	118
Uttarakhand	-	-	-	-	-	112
West Bengal	127	112	95	-	-	109
All-India	115	108	99	110	122	122

Source: See Table 1.

3 Relationship between Costs, Prices Realised and MSP

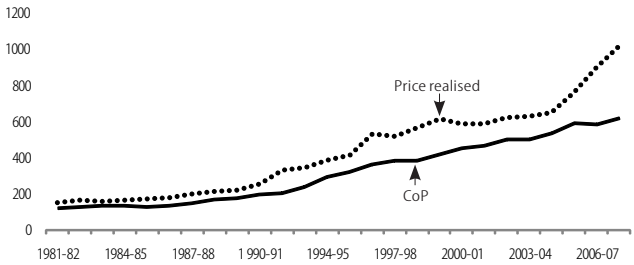
In this section, we compare the trends in costs, realised prices, MSP and wholesale prices. The trends in COP and price realised for rice show that the latter moved faster than the former till around 2000-01 (Figure 1). Later the prices realised were almost similar to the COP without any margin except in 2006-07. On the other hand, the prices realised by farmers for wheat have always been higher than the COP (Figure 2, p 180). Particularly, the margins have been higher since the mid-1990s and more so in the last three years of the study, i e, 2005-06 to 2007-08.

Figure 1: CoP and Price Realised in Rice during 1981-82 to 2006-07
(Rs at current prices)



Source: Calculated using data from CACP Reports.

Figure 2: CoP and Price Realised in Wheat during 1981-2007-08
(Rs at current prices)



Source: Calculated using data from CACP Reports.

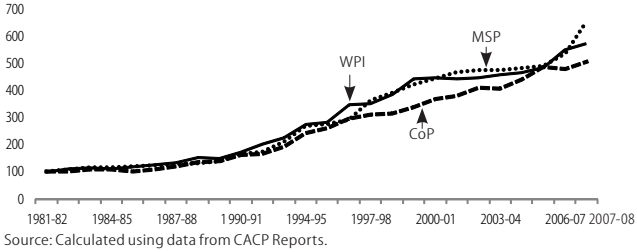
Another issue is growth in COP relative to the respective wholesale price indices (WPI). The WPI for rice increased from 100 in 1981-82 to 478.5 in 2006-07. The index of COP shows that it was moving almost on par with the WPI till 2001-02. In the last five years of the study, i e, 2002-03 to 2006-07, the COP has risen faster than WPI (Figure 3). Here rice farmers were in difficult situation in terms of COP compared to WPI. The index of MSP of rice increased from 100 in 1981-82 to 539.1 in 2006-07. The growth in MSP is almost similar to that in COP till 2001-02 after which spikes in COP are much higher relative to the MSP (Figure 3). As shown later, the increase in MSP in 2007-08 and 2008-09 was much higher than costs and WPI.

Figure 3: Indices of CoP, MSP and WPI in Rice

Source: Calculated using data from CACP Reports.

The index of COP rose from 100 to 505.8 only during the same period for wheat (Figure 4). The WPI, MSP and COP changes were similar till the early 1990s. Thereafter, the MSP and WPI were always higher than COP for wheat, especially after 1997-98. In other words, input costs including imputed costs were lower than output prices for wheat crop and the margins were higher for wheat as compared to rice.

Figure 4: Indices of CoP, MSP and WPI in Wheat



Source: Calculated using data from CACP Reports.

4 Returns to Farming

Ultimately, one has to look at the trends in profitability in order to examine the viability of farming. For this purpose, we have examined the trends in net income (gross value of output (GVO)-cost C2) and farm business income (GVO-cost A2). We also looked at trends in the ratio of gross value of output to C2 cost, the ratio of GVO to A2 cost, which gives the level of margin over total costs and variable costs, respectively.

Table 9: All-India Costs and Returns in Rice and Wheat Per Hectare in Nominal Terms
(in Rs)

Year	Rice				Wheat			
	NI(Rs)	FBI (Rs)	GVO/CoC	GVO/A2 CoC	NI(Rs)	FBI (Rs)	GVO/CoC	GVO/A2 CoC
1981-82	561	1,748	1.19	2.03	558	1,872	1.17	1.96
1982-83	626	1,770	1.22	2.05	828	2,238	1.24	2.08
1983-84	1,058	2,451	1.32	2.25	486	1,909	1.14	1.94
1984-85	898	2,373	1.25	2.13	714	2,173	1.19	2.11
1985-86	1,326	3,078	1.36	2.57	1,152	2,775	1.29	2.19
1986-87	1,049	2,526	1.28	2.13	1,044	2,711	1.26	2.13
1987-88	1,262	3,088	1.27	2.09	1,181	3,230	1.24	2.16
1988-89	1,838	3,906	1.32	2.07	942	3,286	1.17	2.00
1989-90	1,143	3,944	1.18	2.11	1,131	3,540	1.20	2.05
1990-91	1,137	3,929	1.17	2.05	1,400	4,472	1.20	2.18
1991-92	2,026	5,748	1.26	2.38	3,053	6,443	1.40	2.50
1992-93	1,643	5,370	1.21	2.36	2,869	6,854	1.33	2.42
1994-95	3,170	8,014	1.28	2.26	2,757	8,301	1.25	2.52
1995-96	2,686	7,569	1.24	2.20	2,622	8,203	1.22	2.34
1996-97	2,603	8,551	1.21	2.28	4,984	11,818	1.36	2.71
1997-98	1,985	8,320	1.15	2.15	3,876	10,260	1.29	2.50
1998-99	3,513	10,298	1.23	2.18	5,403	12,450	1.38	2.71
1999-2000	2,737	10,440	1.16	2.13	6,161	14,582	1.37	2.81
2000-01	1,389	8,957	1.08	1.91	4,312	12,692	1.25	2.45
2001-02	1,023	9,060	1.05	1.85	3,905	12,127	1.23	2.34
2002-03	-9.0	8,236	1.00	1.75	3,606	12,598	1.19	2.24
2003-04	1,661	10,256	1.08	1.93	3,919	12,801	1.21	2.24
2004-05	1,382	10,277	1.07	1.87	3,215	12,228	1.16	2.10
2005-06	1,561	10,897	1.07	1.92	4,656	15,086	1.21	2.29
2006-07	2,867	12,472	1.13	1.99	9,655	20,982	1.40	2.64
2007-08	na	na	na	na	13,244	25,590	1.52	2.94

NI- Net income; FBI- Farm business income; FL- Family labour
Source: As in Table 1.

The ratios of GVO to costs show that the value of output has been more than all the costs throughout the period for both rice and wheat (Table 9). The averages given in Table 10 show that the ratio of GVO to C2 cost for rice has been maintained around 1.25 till 1995 but declined to 1.17 in 1996-2000 and to 1.07 in 2001-07. If we take the ratio of GVO to A2 cost for rice, gross value of output has been twice to variable costs, viz, A2 cost in most of the years except in the last seven years (Table 10).

Table 10: Ratios of GVO to Costs (Averages)

Period	Rice		Wheat	
	GVO/C2CoC	GVO/A2CoC	GVO/C2CoC	GVO/A2CoC
1981-82 to 1985-86	1.27	2.21	1.21	2.06
1986-87 to 1990-91	1.24	2.09	1.21	2.10
1991-92 to 1995-96	1.25	2.30	1.30	2.45
1996-97 to 2000-01	1.17	2.13	1.33	2.64
2001-02 to 2006-07	1.07	1.89	1.23	2.31
1981-82 to 1992-93	1.25	2.19	1.24	2.14
1994-95 to 2006-07	1.13	2.03	1.29	2.49
1981-82 to 2006-07*	1.19	2.11	1.26	2.33

* The ratios of GVO with C2 and A2 CoC for wheat are 1.27 and 2.40, respectively during 2001-08.
Source: As in Table 1.

The profitability of rice seems to have been going down, while wheat farmers improved their profitability during 1981 to 2007. If we consider C2 costs, the rice farmers could get only 9% returns

over their total COP in the TE 2006-07, when the wheat farmers got 26% net returns over costs (Table 9). Significantly, the wheat farmers reaped more than 50% margin over total costs in 2007-08. Though their counterparts in rice cultivation could get 13% margin in 2006-07 and probably slightly higher in the later years, it still is nowhere near that for wheat farmers.

In contrast to rice, the ratio of GVO to C2 cost for wheat increased over time. The ratio increased from 1.21 in 1981-85 to 1.33 in 1996-2000. The ratio of GVO to A2 cost has also risen as compared to the early 1980s. This profitability ratio was around 2.6 in the triennium ending in 2007-08 (Table 10). It may be noted that this ratio for wheat was 2.41 and much higher than that of rice at around 1.9 in the TE in 2006-07.

Table 11: Ratio of Returns to Total Costs in Rice and Wheat in Different States

State	Rice			Wheat		
	TE 1984-85	TE 1996-97	TE 2006-07	TE 1984-85	TE 1996-97	TE 2006-07
AP	1.48	1.59	1.72	-	-	-
Assam	1.3	1.06	0.83	-	-	-
Bihar	1.34	1.1	0.97	-	1.23	1.34
Chhattisgarh	-	-	1.15	-	-	1.1
Gujarat	-	-	-	-	1.41	1.58
HP	1.21	-	1.44	1.14	1.01	1.12
Haryana	1.07	1.06	1.2	1.12	1.37	1.38
Jharkhand	-	-	-	-	-	0.8
Kerala	-	-	1.01	-	-	-
Karnataka	1.48	-	1.19	-	-	-
MP	1.21	1.13	0.92	1.32	1.17	1.37
Orissa	1.27	1.18	0.93	-	-	-
Punjab	1.15	1.19	1.33	1.17	1.21	1.39
Rajasthan	-	-	-	1.3	1.48	1.59
TN	-	-	0.91	-	-	-
UP	1.13	1.29	0.98	1.16	1.3	1.34
Uttarakhand	-	-	-	-	-	1.11
West Bengal	1.19	1.17	0.93	-	-	0.95
All-India	1.26	1.24	1.09	1.19	1.28	1.38

The total costs are represented by C2 CoC.
Source: As in Table 1.

Table 12: Ratio of Returns to Variable Costs in Rice and Wheat in Different States

State	Rice			Wheat		
	TE 1984-85	TE 1996-97	TE 2006-07	TE 1984-85	TE 1996-97	TE 2006-07
AP	1.67	1.95	2.04	-	-	-
Assam	3.06	2.64	1.93	-	-	-
Bihar	3.16	2.24	1.67	-	2.31	2.21
Chhattisgarh	-	-	2.37	-	-	1.85
Gujarat	-	-	-	-	2.48	2.62
HP	2.43	-	3.84	3.62	2.8	2.67
Haryana	1.75	2.23	2.26	1.85	3.04	2.96
Jharkhand	-	-	-	-	-	1.1
Kerala	-	-	1.44	-	-	-
Karnataka	2.8	-	1.9	-	-	-
MP	2.43	2.28	1.8	2.58	2.32	2.81
Orissa	2.21	2.24	1.77	-	-	-
Punjab	1.82	2.18	2.49	1.94	2.31	2.78
Rajasthan	-	-	-	2.41	3.06	3.23
TN	-	-	1.47	-	-	-
UP	2.19	2.84	1.89	1.95	2.47	2.39
Uttarakhand	-	-	-	-	-	0.91
West Bengal	2.23	2.39	1.81	-	-	1.59
All-India	2.14	2.25	1.93	2.04	2.52	2.62

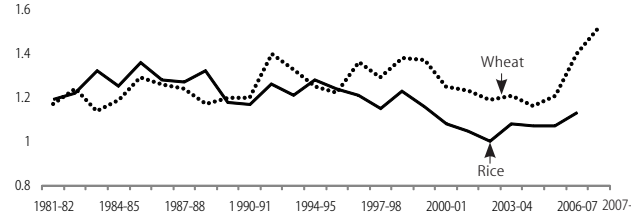
The variable costs are represented by A2 CoC.
Source: As in Table 1.

Profitability across States

The returns over C2 costs show that the states like Assam, Bihar, Karnataka, MP, Orissa, Tamil Nadu, UP, and West Bengal witnessed negative returns for rice in the latest triennium (Table 11). On the other hand, all states covered all costs for wheat except for Jharkhand and West Bengal. The profitability improved for rice in AP, HP, Haryana and Punjab during the study period, while it declined for other states. On the other hand, returns for wheat rose for all the states considered in the study.

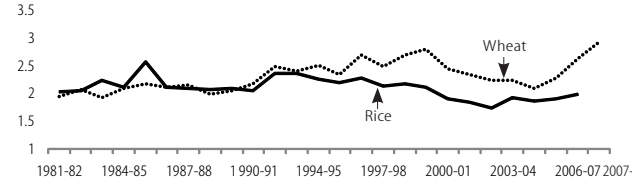
However, all the states cover variable costs (A2) in rice and wheat with the exceptions being Uttarakhand for wheat (Table 12). The situation in Jharkhand is also not remunerative enough to the farming community of wheat. The returns over variable costs for rice are much higher for HP, Punjab, Haryana, Chhattisgarh than other states. The returns for wheat are more than twice over A2 costs for the major wheat producing states. Figures 5 and 6 show that the ratio of returns over total costs (C2) and variable costs were higher for wheat as compared to rice since the mid-1990s.

Figure 5: Ratio of Returns to Total Costs in Rice and Wheat



Source: As in Figure 1.

Figure 6: Ratio of Returns to Variable Costs in Rice and Wheat



Source: As in Figure 1.

The higher profitability for wheat as compared to rice can also be seen in the growth rates of returns in constant prices (Table 13). Rice recorded positive and high growth rates in net income, farm business income and farm investment income in the first period (1981-82 to 1992-93). However, it showed a negative growth rate in all these returns in the second period (1994-95 to 2006-07).

Table 13: Trend Growth Rates of Returns to Farming in Rice and Wheat in Real Terms

Period	Rice			Wheat			
	MP	Punjab	All-India	Haryana	MP	Punjab	All-India
Net income							
1981-82 to 1992-93	n.c	2.06	1.00	17.01	-4.03	5.17	5.81
1994-95 to 2006-07	n.c	7.15	-31.53	0.79	10.07	6.15	2.37
Farm business income							
1981-82 to 1992-93	1.06	0.71	2.56	6.96	0.93	3.59	3.67
1994-95 to 2006-07	-5.35	3.87	-1.15	1.30	5.06	3.14	2.05

nc: Not calculated as the state witnessed negative returns during this period.
The second period and the overall period go up to 2007-08 for wheat.
Source: See Table 1.

The growth rates of rice in farm business income were similar to those of wheat in the first period. However, the major point of distress for paddy farmers is that the returns over paid-out costs

also declined in the second period at 1.15% per annum. On the other hand, the growth rates in profitability for wheat recorded positive growth rates of more than 2% in both net income and farm business income in the second period also. In spite of similar growth rates for yields, the profitability for wheat is much higher than that of rice. This could be partly due to better realisation of prices for wheat. At the state level, the growth rates in returns for rice in Punjab rose in the second period, while MP showed negative returns in the same period. The growth in rice for Punjab has risen in spite of the decline in yields for the second period, and this may be because of the high level of yields even with some decline and higher price realisation relative to the support prices. In the case of wheat, the growth rates for MP increased, while those of Haryana declined in the second period. Although the growth rates in returns declined for wheat in Punjab, they were nearly 3% per annum in farm business income and above 2% for net income in the second period.

Table 14: Projected CoP and MSP: Rice and Wheat (1999-2000 to 2009-10)

Years	Rice			Wheat		
	Projected C2 Cost per qtl (in Rs)	MSP (in Rs)	MSP over Cost (%)	Projected C2 Cost per qtl (in Rs)	MSP (in Rs)	MSP over Cost (%)
1999-2000	400.6	520	29.8	415.9	550	32.2
2000-01	429.3	540	25.8	448.7	580	29.3
2001-02	471.7	560	18.7	478.9	610	27.3
2002-03	505.2	560	10.9	483.3	620	28.2
2003-04	525.2	580	10.5	496.8	630	27.0
2004-05	530.9	590	11.1	515.6	640	24.1
2005-06	557.6	600	7.6	541.5	700	29.3
2006-07	569.5	650	14.1	573.6	850	48.2
2007-08	595.0	775	30.3	624.5	1000	60.1
2008-09	619.0	930	50.2	648.6	1080	66.5
2009-10	644.9	1030	59.7	741.0*	1100	48.4

* Refers to modified cost C2 including transportation, insurance premium and marketing charges.
Source: Various reports of CACP.

The data on costs and returns of crops from the cost of CS are available with a lag, and therefore, actual cost data for the years 2008-09 and 2009-10 are not available to compare with MSP data. Therefore, we have used the projected cost data which is used by CACP for recommending MSPs (Table 14). As can be seen from the table, the margin over cost declined over time for rice from 30% in 1999-2000 to 7.6% in 2005-06. But, the margin of MSP over cost for rice rose significantly from 14% in 2006-07 to nearly 60% in 2009-10. As compared to rice, the margins of MSP over C2 cost have been much higher for wheat except in 2009-10. The margin for wheat over cost was around 67% in 2008-09. Therefore, it can be said that the recent increases in support prices have the effect of ameliorating the distress of rice farmers.

5 Increased Role of Price Policy

Agricultural price policy was earlier meant to mitigate the impact of any undue rises in prices on the vulnerable sections of the population. After the formation of the Agricultural Price Commission, it has always tried to maintain a balance between the interests of consumers and producers. Nevertheless, the limits of price policy in achieving these goals are recognised by the government and other non-price interventions are used primarily for the purpose. While a large network of the PDS ensures cheap food to the needy with appropriate levels of subsidy from time to time, many policy initiatives have been put in place to make farming profitable enough for farmers to invest sufficiently in technology for improving productivity per unit of land so that food security is not threatened. The policy aimed at encouraging higher production and that the resultant food produce should be available at lower prices. Both higher production and cheap food are considered necessary for food security. Thus, price policy remained subservient to the overall societal goal of poverty reduction on the whole until the new economic policies were introduced.

The higher emphasis and reliance on price policy in the 1990s altered the situation drastically,[3] as price interventions to the relative exclusion of non-price interventions marked the new regime as pointed out by Sen (2001). As a consequence, the earlier policy of "low-input and low-output" prices shifted to "high-input and high-output" prices (Acharya 1997). On the other hand, public investments on irrigation, research, extension and other related infrastructure went down from 3.4% of agricultural gross domestic product in the early 1980s to 1.9% in 2001-03. Though private investments increased initially, it later stopped flowing due to the operation of complementarity between public and private investments, by the late 1990s. Technology development, dissemination and adoption received a major setback due to this.

As a result of this policy shift, growth rates in yields have gone down and eventually the COP started rising. These rising costs necessitated higher support prices to sustain the long-run margin of 20% over total costs. The analysis in the paper brings out this phenomenon clearly. The MSPs in real terms declined in the 1980s and still returns to farming did continue to be sufficient for the farming community. This is because the COP of both rice and wheat fell during that period as productivity improved at more than 2.5% per annum and outstripped growth in COC. On the other hand, the COP rose at the rate of nearly 1.5% per annum in both the crops during the 1990s and beyond, making rising MSPs necessary to help the farmers maintain the same incomes.

It is important to note here that these higher support prices are meant to compensate the slowdown in yield growth and the consequent increase in COP that is the result of dwindling non-price interventions through public investments. In this situation, if the MSPs are not hiked sufficiently as in case of rice in the late 1990s and early years of the new millennium, margins would have gone down and distress would have spread. The analysis in the paper shows that farm business income in real terms declined by 1.15% per annum for rice farmers. To sum up, the farming community is not necessarily better off as a result of higher support prices, as these prices are meant to compensate for the rising COP in the absence of yield increasing public investments.

The second major factor driving higher support prices is the operation of market forces in a liberal and open trade regime. Price policy faces different challenges in such a scenario. For example, low production can coincide with low prices with

liberalised imports and exports. When the international market prices are higher and rising as a result of a supply shock, domestic prices of the respective commodity shoot up and procurement of sufficient quantities to the required levels to ensure food security becomes difficult. Therefore, the government will have to offer higher prices[4] as happened in 1997 and 2007 and 2008 in the case of wheat, making the gross margin more than 50%. The pulls and pressures of democracy and farmer lobbies make it impossible to roll back these prices without very high political costs, even if global prices recede considerably. The forced unidirectional movement of support prices also has an advantage in that assured prices and continuity in price structure can only stimulate supply response for agricultural commodities.

The result of these higher support prices is that it hurts the consumers and has an adverse impact on poverty reduction.[5] It was estimated by Parikh et al (2003) that a 10% increase in MSPs of wheat and rice leads to a decline in overall GDP by 0.33%, increase in aggregate price index by 1.5%, reduction in investments by 1.9% and has a minuscule impact on agricultural GDP. They also conclude that the bottom 80% of the rural and all of urban population is worse off. The experience of the past few years clearly reveals that the option of trade for food security has limited scope in view of the huge demands of a large population of the country. This means that the balance between price and non-price interventions has to be struck as in earlier decades. Therefore, non-price interventions through public investments have to be accelerated to reduce the COP, and thereby, the need for higher support prices. Also, a system of variable tariffs has to be implemented to insulate domestic prices from the impact of higher volatility in international food market.

6 Concluding Observations

Agricultural price policy has been largely successful in playing a major role in regard to providing reasonable level of margins of around 20% over total costs to the farmers of both rice and wheat. In turn, it seems to have encouraged farmers' investments in yield increasing technology and in increasing production and enabling sufficient procurement for buffer stocks and providing physical access to food by achieving and maintaining self-sufficiency. The need to supply food to the PDS and various poverty alleviation programmes has also been increasing at a faster rate. The price policy could help in procuring 43 mt in TE 2008-09 compared to a mere 13 mt in TE 1982, providing buffer stocks for an offtake of 38 mt in TE 2008-09, which is a steep increase over just 14 mt in TE 1982. These huge tasks of production, procurement and distribution would not have been possible without the efficient working of the country's price policy. The country is, by and large, insulated from supply shocks because of its operation. For example, the prices of cereals increased by only 20% while they spiked by 150% in the international market during 2005-08. This does not mean that there are shortcomings in its working, but only to highlight the fact its utility far outweighs any such problems to be rectified.

Nevertheless, agricultural price policy does face some new challenges in the current period with reduced non-price interventions in the form of public investments and also the percolation of some of the global price volatility through open trade. In fact, the analysis in this paper shows that these two are mainly responsible for higher support prices. The trend of declining COP with higher growth in yields got reversed in the 1990s and beyond and they went up to nearly 1.5% per annum for rice and wheat. The returns over paid-out costs for rice farmers also declined at 1.15% per annum in real terms leading to distress. This declining profitability seems to have discouraged them from increasing spending on yield augmenting technology as shown by the relatively declining growth rate of COC.

The price intervention in enhancing MSPs for wheat in 1997-98, 2006-07 and 2007-08, keeping in view the fact that the market prices were higher, has distorted the intercrop price parity between rice and wheat. Though the COP is similar for these two crops since the mid-1990s, the wheat MSP has been 14% higher than that of paddy since then. Since 2000-01, rice farmers have also suffered from lower price realisation than the respective MSPs, lower (7%) returns over total costs compared to 27% in wheat and a higher growth in COP compared to the wholesale price indices between 2002-03 and 2006-07. On the whole, the analysis presented in the paper shows that there is some merit in the argument that the MSP of rice should be closer or slightly below that of wheat. The recent hikes in support prices for rice are therefore justified against this background.

The averages tend to mask regional variations and the impacts of price policy in a vast country like ours with divergent climatic conditions. The COP is higher than the all-India average in some of the poorer states due to low productivity and prices realised do not cover all costs. But the price realisation does cover variable costs and leaves a reasonable margin over that in all the states. At the same time, the prices realised cover all costs in states producing efficiently at low cost.

To sum up, a higher emphasis has to be given to non-price interventions through public investments to supplement price policy measures.[6] They can help in increasing yields, reduce the exclusive reliance on prices for farm profitability and food security, and also hasten poverty reduction, as the history of poverty reduction in the country shows that the proportion of the poor declined at faster rates when food prices are low.[7] Decentralising the procurement operations by building necessary infrastructure in states like UP, Bihar, MP and Orissa is critical in achieving

equity in this regard. Also, price support operations need to be extended to other crops like pulses and oilseeds to stimulate their production. The storage capacities at present for buffer stocks are sufficient to store less than 30 mt, while the actual needs often go beyond 50 mt. Therefore, measures to increase the storage capacities have to be initiated immediately and at the same time the quality of the stored grain needs to be given equal importance by upgrading the technology.

NOTES

1 Rice and paddy are used interchangeably in the paper. Whenever we use rice it refers to paddy.

2 1993-94 is excluded from analysis as too few surveys were done that year.

3 Rao (2001) provides a detailed exposition of the changes in the agricultural price policy.

4 It is also documented by some scholars. See for example Chand (2010).

5 Sen (1999) explains vividly the vicious circle of low public investments, low yield growth, higher support prices, lower poverty reduction in the 1990s quite well.

6 Several scholars have argued for yield increasing growth path for agricultural development to reduce an adverse impact on the poor (Dantwala 1986; Krishnaji 1990; Rao 1994).

7 See for a detailed exposition Dev and Ranade (1998) and Dev and Ravi (2007).

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