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ABSTRACT

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Crops in Uttar Pradesh

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Recent agricultural price policy is confronted with serious threat from every quarter be it farmer's groups, opposition parties or the consumers/ masses for recommending support prices higher than what the cost of production warrants, leading to market distortions and also agrarian crisis. Focusing upon paddy and wheat, the two most important and state protected crops, this paper tries to investigate the effectiveness of government's recent price policy in sorting out farmer's problems and obtaining enough profits to invest further in technology and achieve higher productivity. The paper utilizing long-term data from CACP commission's reports examines the trends in the costs, prices and returns in producing two major crops viz; rice and wheat with an intention to assess the profitability of cultivating these crops under the current price policy in the state of Uttar Pradesh. The paper is of the opinion that price realized by farmers for selected commodities remain higher than the MSP extended for most of the years under study. Manoeuvring for decentralising the procurement operations and building necessary infrastructure in states like UP is the need of the time. It goes without saying that the price-based support has been a catalyst in increasing the acreage and output of foodgrains but in contrast our analyses showed that there was non-significant effect of MSP on area, yield and procurement through lagged regression and policy formulators should heave for future required efforts.

Trends in MSP and Returns on Cultivation of Wheat and Paddy Crops in Uttar Pradesh

Nomita P. Kumar*

1.   Introduction

Since mid- sixties the Government of India has been using the instrument of minimum support prices to protect farmers against sharp fall of agricultural prices and ensuring profit margins for farmers to avoid distress sale by them. Agriculture price policy has tried to keep in mind the interest of both the consumers and producers. Though MSP is announced for about 30 crops the procurement operation of the government has been largely concentrated on wheat and paddy crops.

MSP (market support prices) is announced by the government on the recommendations of the Agricultural Price Commission later on renamed as Commission for Agricultural Cost and Prices (CACP). MSP is devised after determining the basic total costs incurred i.e. C2, which incorporates all actual expenses incurred in cash or kind, rent for leased land, imputed values of cost of family labour, owned capital assets, depreciation of assets, the interest on fixed and variable capital, etc. Over the years, several parameters have been included and excluded from the list of factors on the basis of which the computation of MSP is done. The method of cost calculation has been a subject of controversy for long on the ground that it does not take all the relevant costs into account.

The National Commission on Farmers (NCF), which was constituted on November 18, 2004 under the chairmanship of Professor M S Swaminathan to look into the issues confronted by the farmers, recommended that the MSP should be at least 50 percent more than the weighted average cost of production (NCF, 2006). For nearly a decade no decision on the recommendation was taken by the government. It was only in the 2018 in the face of the deep agrarian crisis in the country, the Government of India announced its intention to increase the MSP of crops to 1.5 times the cost of production taking A2+FL cost (actual cost plus family labour) as the basis of cost calculation. This has caused a lot of dissatisfaction among political parties and farmer associations who have criticized the government for having failed to implement the recommendation of the Swaminathan Committee to fix MSP on the basis of Cost C2, which also takes into account the rental value of land and interest on capital (Menon 2013).

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It is against this background that this paper seeks to examine the trends in cost of production and MSP of the two major crops i.e. paddy and wheat and returns on cultivation of these crops. For purposes of analysis we have selected the state of Uttar Pradesh, which is the largest producer of foodgrains among states in the country contributing about 20 per cent of all India foodgrain output. Wheat and paddy are the most important food crops in Uttar Pradesh and provide livelihood to millions of farmers. The central point here is whether the farmers are getting a fair return on their cost and what are the trends in their net income. Even if A2+FL covers the cost of production, declining margins are a cause of worry to farmers of the State.

The paper is structured as follows: i.e. in section 2 we discuss different sources of data and the cost concepts used. Trends in cost of production (COP) of paddy and wheat are analysed in Section 3. Section 4 presents trends in MSP and the prices realized by farmers. Section 5, attempts to establish the relationship among COP, MSP, prices realized and wholesale prices in Uttar Pradesh. In section 6, the profitability of cultivation of rice and wheat in Uttar Pradesh is examined. Section 7 examines the impact of MSP on area under these crops, its productivity, procurement and production through lagged regressions and Section 8 summarizes the findings and suggests way forward.

2. Data and Method

The study utilizes the data from cost of cultivation survey as reported in the CACP reports and other official publications. The paper analyses the data for the foodgrains i.e. rice and wheat for a period of last 20 years from 1995-96 to 2015-16 for Uttar Pradesh. The CACP uses three different definitions of production costs, viz. cost A2 (actual paid out cost), cost A2+FL (actual paid out cost plus imputed value of family labour) and cost C2 (comprehensive cost which is comprised of imputed rent and interest on owned land and capital). As is evident, C2 > A2+FL > A2 (Agarwal, 2018). The difference between C2 and A2+FL is substantial, implying that when the formula for determining MSP at cost plus 50 percent is applied, the result will vary significantly depending on which cost is considered for calculation. Anticipated increase in food subsidy bill and adverse effect of higher MSP on inflation are the main considerations behind the government's decision to base MSP on cost A2+FL. On the other hand, it is argued that a rise in MSP would increase production and contain price inflation by bridging the demand-supply gap. Farm Harvest price of a commodity is defined as the average wholesale price, at which the commodity is disposed of by the producer to the trader at the village level during the specified marketing period after the commencement of harvest. The information on Farm Harvest Prices is provided by State Governments after systematically collecting and compiling the data. Different CACP reports provide implicit prices, which are derived for different states based on CS data. Implicit prices are the ratio of value of the output of main product per hectare to the yield

per hectare. It is known that the COP given by the CS data is the data reported by the farmers-which shows the prices realized by the farmers (Dev, 2010).

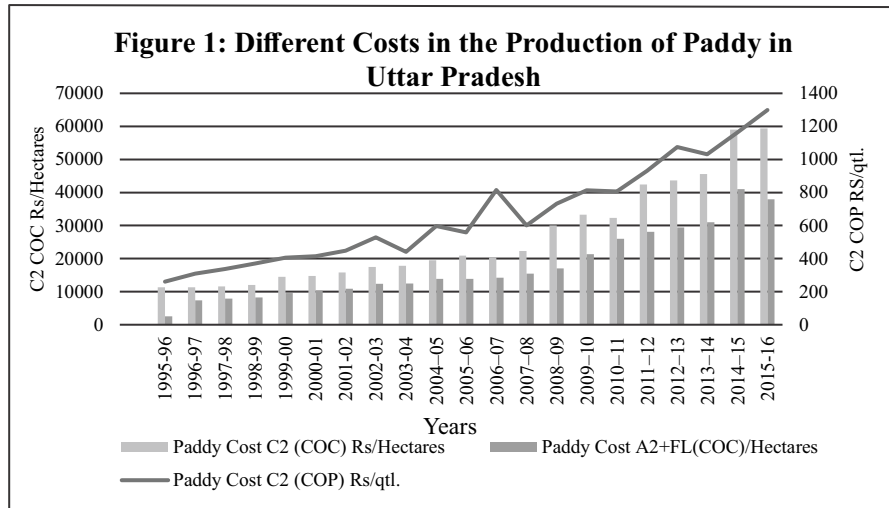## 3. Trends in Costs and Yields of Paddy and Wheat

In this section we have analysed the trends in C2 cost of cultivation (COC), A2+FL cost per hectare and A2+FL cost per quintal for the period 1995-96 to 2015-16 for both paddy and wheat crops in Uttar Pradesh. As pointed out earlier cost A2+FL (paid out costs and family labour) includes the value of hired labour (be it human, animal and machinery), value of seeds (farm produced and purchased), expenses on insecticides and pesticides, expenses on manure (owned and purchased), value of money spent on fertilisers, depreciation of implements and farm building, irrigation charges, land revenue, cesses and other taxes, interest on working capital and also miscellaneous expenses and rent for leased-in land. Cost C2 includes paid out costs plus imputed value of family labour, rental value of owned land and interest value of owned fixed capital assets.

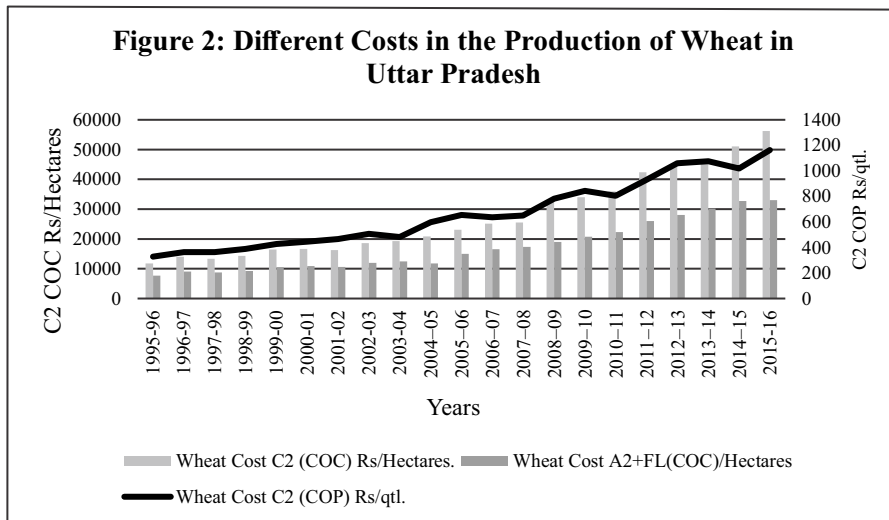**Table 1: Trends in Cost of Production of Paddy and Wheat in U.P.**

Year	Paddy			Wheat		
	Cost C2 (COP) Rs/qtl.	Cost C2 (COC) Rs./Ha	Cost A2+FL (COC)/Ha.	Cost C2 (COP) Rs/qtl.	Cost C2 (COC) Rs/Ha.	Cost A2+FL (COC)/Ha
1995-96	260.70	11311.13	2578.25	328.02	11750.32	7720.69
1996-97	309.20	11300.99	7370.20	362.56	13970.78	8999.80
1997-98	337.91	11596.48	7898.44	362.65	13343.91	8715.47
1998-99	370.68	11988.31	8225.75	388.68	14338.14	9284.26
1999-00	406.32	14474.57	9573.33	426.57	16437.02	10490.17
2000-01	414.84	14760.66	10274.98	445.87	16612.58	10892.93
2001-02	447.37	15844.29	10910.71	465.21	16272.82	10612.20
2002-03	528.88	17490.18	12398.54	507.65	18593.46	11978.83
2003-04	440.56	17812.29	12486.00	482.78	19241.29	12486.30
2004–05	597.81	19520.32	13912.00	597.81	20812.56	11753.10
2005–06	559.19	20860.95	13866.36	654.22	23104.73	14959.95
2006–07	815.41	20338.4	14258.86	635.89	25115.06	16580.64
2007–08	600.73	22301.17	15464.87	651.14	25529.15	17329.02
2008–09	732.62	30004.20	17022.00	782.68	32439.37	18979.38
2009–10	812.97	33297.59	21336.61	842.66	33964.45	20776.26
2010–11	806.87	32299.35	26001.27	803.68	35984.44	22306.96
2011–12	930.55	42383.57	28147.45	930.55	42383.57	26001.27
2012–13	1075.48	43620.87	29436.98	1058.98	44383.07	28062.10
2013–14	1031.23	45617.43	30982.85	1074.57	46415.97	30207.17
2014–15	1163.00	58982.33	40977.39	1018.00	51080.58	32744.41
2015-16	1299.00	59416.44	37912.00	1163.00	56205.93	33003.00

Source: CACP Data on current prices.

Table 1shows the total COP per unit of paddy and wheat, which is a combination of imputed value of land, labour and capital and A2+ FL. The Figure 1 and Figure 2 shows that cost of production C2 (COP) / Qtl., C2 COC /Ha. and Cost A2+FL/ Ha. of both paddy and wheat and we find that these curves are showing continuous rise over the selected period of the study.

Figure 1: Different Costs in the Production of Paddy in Uttar Pradesh

Source: Based on Table 1.

Figure 2: Different Costs in the Production of Wheat in Uttar Pradesh

Source: Based on Table 1.

Analysis of trend growth rates (CAGR) in cost of cultivation (C2COC/Ha.) indicates a sharp increase in the period 2006-12 as compared to the period 1995-2006 for paddy and wheat (Table 2). The A2+FL COC show a decline in both the period for paddy and an increase for wheat for 2006-2012 but later declined during 2013 to 2016 period. The yield rates increased continuously in three periods under consideration for paddy but for wheat it increased from 0.56 per annum to 2.51 percent in 2006 to 2012 but declined to -5.35 percent in the recent times i.e. between 2013 to 2016 for wheat crop which reflects upon the pathetic condition of wheat

growers in Uttar Pradesh. The growth in yield kept pace with the growth in COC during the periods under consideration thus propelling the cost per quintal to plunge down. The reverse scenario could be perceived for the later period. Another important issue that attract our attention is that the COC has currently grown at a higher rate, indicating that the lower profitability which is envisaged would discourage farmers to invest in higher use of inputs and technology thus increasing their distress in the State.

**Table 2: Annual Growth Rates (CAGR) of Costs and Yields
of Paddy and Wheat in Uttar Pradesh**

Years	Paddy	Wheat
C2 COC Rs./Ha		
1995-96 to 2005-06	6.31	7.00
2006-07 to 2012-13	13.56	9.95
2013-14 to 2015-16	14.13	10.04
A2+FL COC/ Ha.		
1995-96 to 2005-06	18.32	6.84
2006-07 to 2012-13	12.84	9.17
2013-14 to 2015-16	10.62	4.53
C2 COP /Qtls.		
1995-96 to 2005-06	7.93	7.15
2006-07 to 2012-13	4.72	8.87
2013-14 to 2015-16	12.23	4.03
A2+FL COP/ Qtls.		
1995-96 to 2005-06	13.14	8.55
2006-07 to 2012-13	8.98	11.36
2013-14 to 2015-16	3.02	7.98
Yield (Qtls/ha.)		
1995-96 to 2005-06	0.04	0.56
2006-07 to 2012-13	2.91	2.51
2013-14 to 2015-16	3.17	-5.35

Source: Based on Table 1.

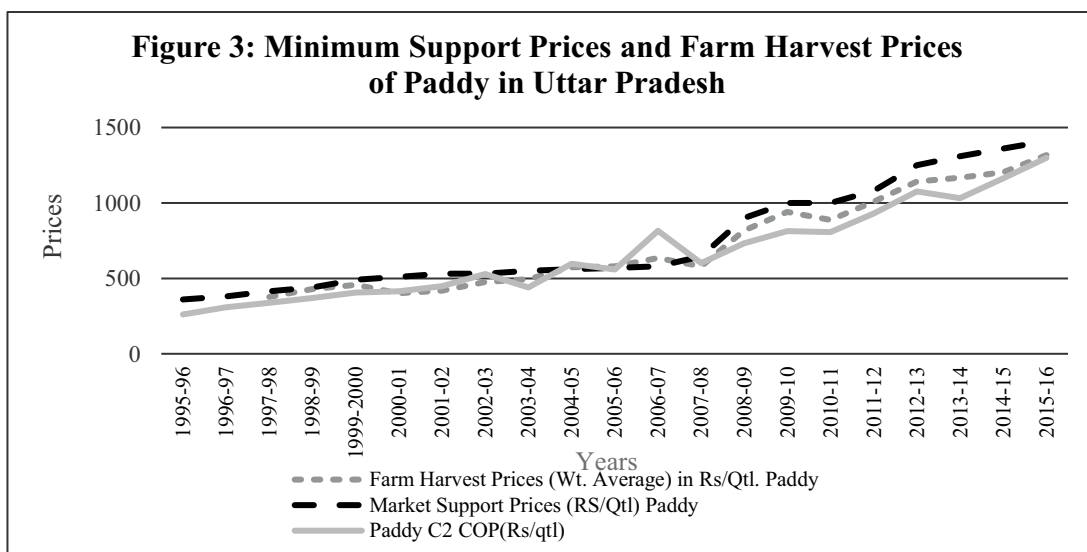## 4. Trends in MSPs, Farm Harvest Prices and Prices Realised by Farmers

Trends in MSPs and the prices realized by farmers in Uttar Pradesh has been analysed in this section. Relationship between administered prices and the prevailing market prices indicates the influence of MSP on different costs involved (Deshpande, 2003).

The rationale of the MSP is to ensure that farmers are not compelled to sell their produce below support prices either due to exploitation by large market players or due to bumper harvest. It is well known that cost of production inter alia, provides the base for setting the MSP. Generally,

three considerations are kept at the back of mind while setting the level of MSP of different crops, taking cost of production of respective crops into consideration. First consideration is that the MSP should usually be above the paid-out costs (Cost A2+ cost of family labor). Secondly, farmers should normally obtain prices that entails enough margins over their full cost of production which incorporates the value on imputed rent of owned land and capital (i.e. cost C2). Thus, to ensure this, the MSP is normally fixed at a level thus delivering reasonable margins to farmers above their C2 cost of production in different states. Lastly, in doing so it is always kept in mind that MSP should be above the paid-out cost (A2 cost + cost of family labour) thus providing an umbrella which protects our farmers against actual loss.

Farm Harvest price of a commodity is defined as the average wholesale price, at which the commodity is disposed of by the producer to the trader at the village level during the specified marketing period after the commencement of harvest. The information on Farm Harvest Prices is provided by State Governments after systematically collecting and compiling the data.

Different CACP reports provide implicit prices, which are derived for different states based on CS data. Implicit prices are the ratio of value of the output of main product per hectare to the yield per hectare. It is known that the COP given by the CS data is provided by the farmers-which shows the prices realized by the farmers (Dev, 2010).

Figure 3: Minimum Support Prices and Farm Harvest Prices of Paddy in Uttar Pradesh

Source: Based on Table 1.

A comparative analysis between MSP, farm harvest prices and prices realized by farmers of paddy indicates that MSP has always been higher than the prevailing prices except in the year 2004-05 to 2007-08. It is understood that only some farmers with large holdings are taking advantage of the scheme. It can be observed that the increase in the MSP of wheat could not have any impact on the prevailing market prices and market arrivals of wheat in the APMC

mandis as the Farm Harvest Prices was always higher except in the current years after 2008-09 when MSP is seen to override. The increase in these prices has been quite steady and kept pace with the increase in MSP as shown by Deshpande (2003).

Figure 4: Minimum Support Prices and Farm Harvest Prices of Wheat in Uttar Pradesh
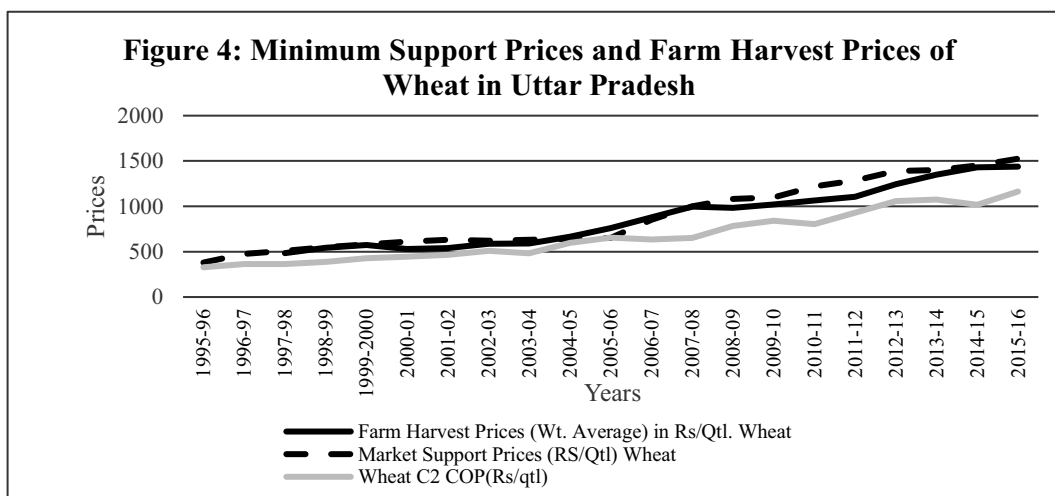
Source: Based on Table 1.

The trends in procurement prices of rice and wheat show the support prices witnessed much higher increases after the 1995-96 as compared to earlier period. The literature suggests that till the beginning of economic reforms procurement prices were based entirely on domestic factors i.e. COP of crops. With the advent of economic reforms, the gap between MSP and international prices increased and government's effort to integrate the domestic economy with international economy led to hike in MSP to reduce the emerging gaps.

The section explores the trends in MSP and shows that the increase in wheat and rice prices are higher during the period 2005-06 to 2015-16 as compared to the changes in the earlier period i.e. 1995-96 to 2005-06 (Table 5).

Figure 5: Annual Change (%) in Market Support Prices of Wheat and Paddy in Uttar Pradesh
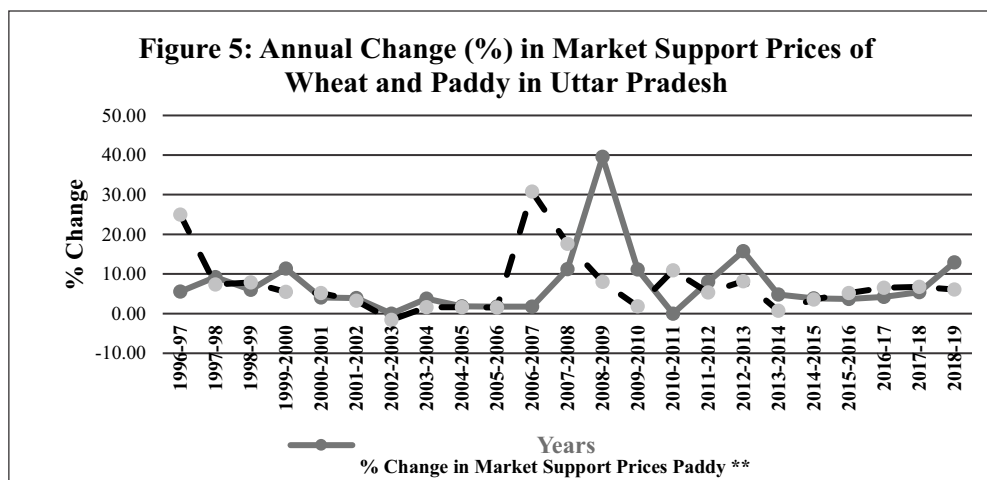
Source: Based on Table 1.

Table 4 shows that the prices of wheat increased from Rs. 380 to Rs.1840 during 1995-96 to 2015-16. The prices of common rice (paddy) increased from Rs. 360 to Rs. 1750 during this period. In 1996-97 the rate of increase in MSP of paddy was higher as compared to wheat. During 2005-06 the annual increase in MSP was higher for wheat as compared to paddy but then in 2008-09 the increase of paddy picked up only to fall again in 2009-10 and further plunged in 2010-11 below wheat MSP. Again, the growth rate picked up in 2012-13 both for rice and wheat and continued to increase thereafter for wheat and paddy till registered an increase in 2018-19. Actually, there are three distinct periods-1995-96 to 2005-06 (when growth was around 5 percent); 2005-06 to 2012-13 (sudden rise) and 2012-13 to 2017-18 (again hovered around 5 percent). The compound growth rate of paddy was calculated as 5.22 per cent per annum while that of wheat was 5.07 per cent per annum. Thus, growth in paddy MSP was more than that of wheat crops during all the three periods.

The continuous increase in MSP for these crops resulted in the development of agriculture sector as famers were getting assured prices for their produce and they were encouraged to invest in new technology to increase the yield and also to get good economic returns. The figure above shows the upward trend in minimum support prices for these two crops over the years.

**Table 3: Annual Growth Rates (% per Year) in MSPs
for Paddy and Wheat in Real Terms**

Years	Paddy	Wheat
1995-96 to 2005-06	4.79	4.49
2005-06 to 2012-13	13.07	7.78
2012-13 to 2017-18	5.22	5.07

Source: Based on Table 1.

This section also examines the prices which the farmers have realized as compared to MSP (including bonus declared by the State government). The implicit prices are derived from the cost of cultivation scheme (CS) data and show the ratio of value of output of main product per hectare to the yield per hectare. This implicit price also reflects upon the prices which farmers realizes. Farmers are more concerned about the prices which is realized by them rather than the MSP per se (Tripathi, 2014). The prices realized by farmers are best represented by the implicit prices received by the farmers, which is the ratio of the value of output to average yield. The ratio of price realized to MSP was higher than 1.0 for paddy in all the years. Prices realized by farmers for wheat as compared to MSPs was higher than 1.0 for the years except in 2001-02 and 2010-11, 2011-12, 2012-13 and 2013-14 only to pick up in 2014-15 (Table 4). As it was

the case with the MSPs, it is found that the prices realized both for paddy and wheat witnessed high growth trajectory during the entire period.

**Table 4: Prices Realised by Farmers in Uttar Pradesh
in comparison to MSP of Paddy and Wheat**

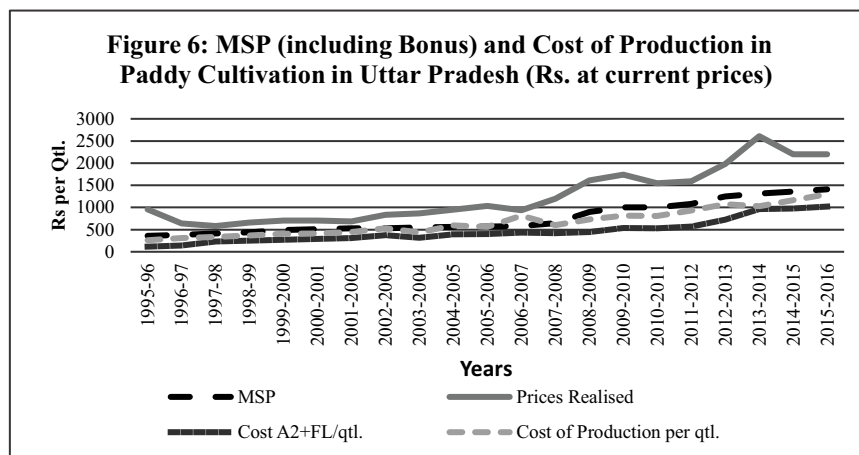| Years	Prices Realised (Rs/Quintal)		Market Support Prices		Ratio of Price Realised to MSP	
	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat
1995-96	438.02	470.0	360.0	380.0	2.67	1.24
1996-97	639.2	612.3	380.0	475.0	1.68	1.29
1997-98	581.3	608.1	415.0	510.0	1.40	1.19
1998-99	661.9	684.0	440.0	550.0	1.50	1.24
1999-00	706.8	685.2	490.0	580.0	1.44	1.18
2000-01	707.5	647.7	510.0	610.0	1.39	1.06
2001-02	687.2	624.1	530.0	630.0	1.30	0.99
2002-03	836.8	695.0	530.0	620.0	1.58	1.12
2003-04	865.3	705.9	550.0	630.0	1.57	1.12
2004-05	951.6	727.0	560.0	640.0	1.70	1.14
2005-06	1036.7	726.8	570.0	650.0	1.82	1.12
2006-07	937.2	800.6	580.0	850.0	1.62	0.94
2007-08	1199.3	999.5	645.0	1000.0	1.86	1.00
2008-09	1609.2	1188.9	900.0	1080.0	1.79	1.10
2009-10	1742.6	1171.0	1000.0	1100.0	1.74	1.06
2010-11	1546.2	1203.5	1000.0	1220.0	1.55	0.99
2011-12	1591.9	1270.6	1080.0	1285.0	1.47	0.99
2012-13	1983.0	1305.0	1250.0	1390.0	1.59	0.94
2013-14	2609.4	1386.3	1310.0	1400.0	1.99	0.99
2014-15	2199.5	1524.5	1360.0	1450.0	1.62	1.05
2015-16	2201.9	1739.1	1410.0	1525.0	1.56	1.14

Source: Based on Table 1.

Trend growth rates of prices realized in nominal terms show that prices of paddy as well as wheat registered growth in both the periods, though growth rates were much higher in the second period i.e. 2006-07 to 2012-13 (Table 5). The prices realized by farmers for wheat also showed a positive trend for both the periods but almost doubled in the later period.

An analysis of trends in COP and prices realized by our farmers in Uttar Pradesh highlights that the prices realized were moving faster than the COP in cultivating paddy throughout the period under consideration (Figure 6). As Figure 6 shows in case of paddy MSP was above COP except in 2013-14. Till 2006-07 MSP and COP was found moving almost at par with less margin enjoyed by paddy farmers but after that their margin grew till 2012-13 only to plunge down below COP. But in 2014-15 once again farmers enjoyed positive margins.
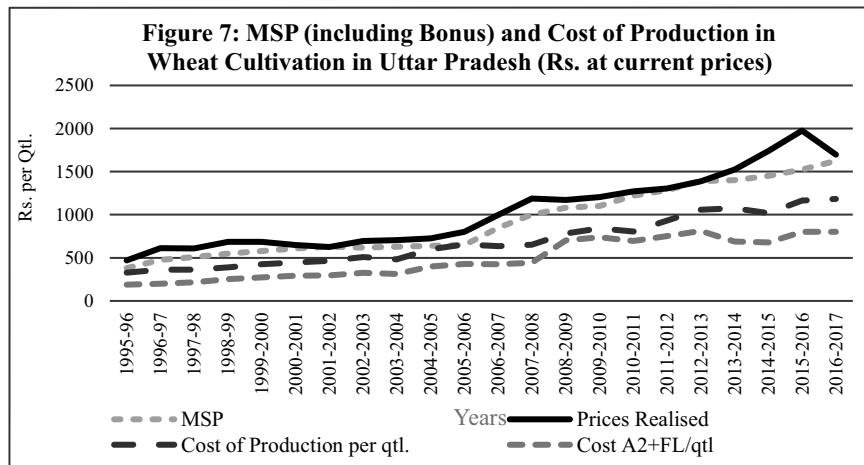
**Table 5: Annual Growth Rates in Prices Realised
by Paddy and Wheat Farmers(in % per year)**

Year	Paddy	Wheat
1995-96 to 2005-06	3.34	3.00
2006-07 to 2012-13	10.42	7.24
2012-13 to 2017-18	1.44	7.43

Source: Based on Table 1.

Figure 6: MSP (including Bonus) and Cost of Production in Paddy Cultivation in Uttar Pradesh (Rs. at current prices)

Source: Based on Table 1.

Figure 7: MSP (including Bonus) and Cost of Production in Wheat Cultivation in Uttar Pradesh (Rs. at current prices)
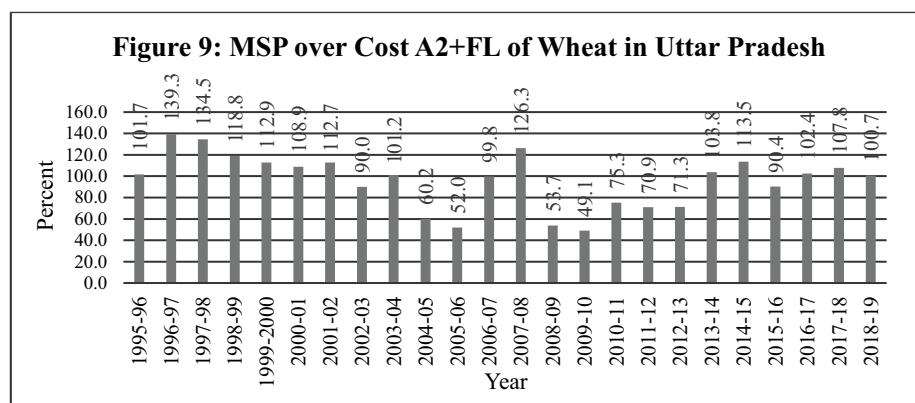
Source: Based on Table 1.

The prices realized by farmers for wheat have always been higher than COP except in 2001-02, 2011-12 and 2012-13 when it touched MSP. The growth of MSP relative to COP of wheat is shown in Figure 7. Till 2012-13, wheat farmers enjoyed MSP higher than COP, but after 2012-13 the difference between MSP and COP narrowed down. This is an important finding and is the outcome of recent policy changes. Since MSP is weighted average of cost in major producing states the margins may differ from state to state.

Figure 8: MSP over Cost A2+FL of Paddy in Uttar Pradesh

Percent (y-axis): 0.0, 50.0, 100.0, 150.0, 200.0, 250.0

Values by year:
- 1995-96: 209.8
- 1996-97: 172.1
- 1997-98: 79.9
- 1998-99: 72.9
- 1999-2000: 82.5
- 2000-01: 76.7
- 2001-02: 72.3
- 2002-03: 41.1
- 2003-04: 75.2
- 2004-05: 42.0
- 2005-06: 42.7
- 2006-07: 34.6
- 2007-08: 54.8
- 2008-09: 103.1
- 2009-10: 86.3
- 2010-11: 88.1
- 2011-12: 89.2
- 2012-13: 73.1
- 2013-14: 36.3
- 2014-15: 39.1
- 2015-16: 38.2
- 2016-17: 40.7
- 2017-18: 44.5
- 2018-19: 56.4

Years (x-axis)
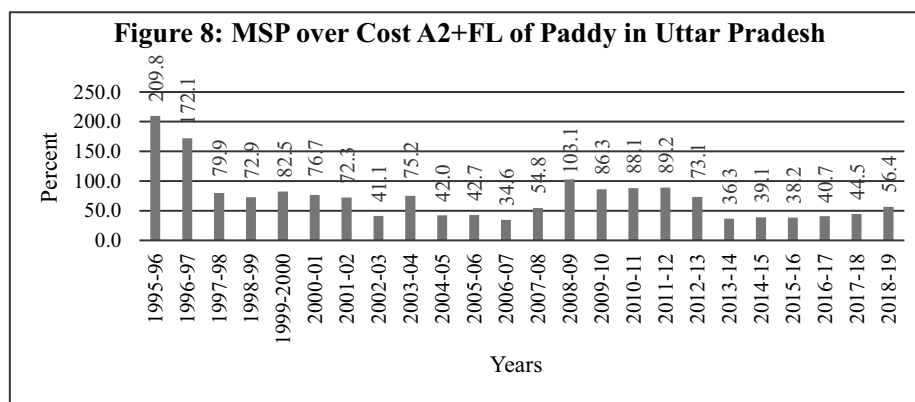
The figure below show how MSP delivered by Government in the State of Uttar Pradesh for Paddy and Wheat were above Cost A2+FL which showed continuous decline (Percentage terms) from 209 percent in 1995-96 and declined to 56.9 percent in 2018-19 for paddy thus depicting increasing plight of paddy farmers pointing towards increasing crisis in Uttar Pradesh agriculture. Story is a bit different for wheat growers where the MSP over Cost A2+FL for wheat was 139.03 percent in 1996-97 but declined to 49.1 percent in 2009-10 and further registered increase in 2018-19 to 100.7 percent of the Cost A2+FL.

Figure 9: MSP over Cost A2+FL of Wheat in Uttar Pradesh

Percent (y-axis): 0.0, 20.0, 40.0, 60.0, 80.0, 100.0, 120.0, 140.0, 160.0

Values by year:
- 1995-96: 101.7
- 1996-97: 139.3
- 1997-98: 134.5
- 1998-99: 118.8
- 1999-2000: 112.9
- 2000-01: 108.9
- 2001-02: 112.7
- 2002-03: 90.0
- 2003-04: 101.2
- 2004-05: 60.2
- 2005-06: 52.0
- 2006-07: 99.8
- 2007-08: 126.3
- 2008-09: 53.7
- 2009-10: 49.1
- 2010-11: 75.3
- 2011-12: 70.9
- 2012-13: 71.3
- 2013-14: 103.8
- 2014-15: 113.5
- 2015-16: 90.4
- 2016-17: 102.4
- 2017-18: 107.8
- 2018-19: 100.7

Year (x-axis)

Under procurement policy of the Government of India, foodgrains are offered by farmers and stocks are purchased at Minimum Support Price (MSP) by the State Government i.e. Food Corporation of India (FCI) for Central Pool, within the stipulated time period and in compliance to the prescribed specifications. However, if producer i.e. the farmer gets better price as compared to the offered MSP by the government, they are free to sell their produce in open market i.e. to private trader/ anyone. This procurement of foodgrains by the government agencies has a novel intention to provide remunerative prices to tillers of the field refraining

them to resort to distress sale and providing reasonable prices to the consumers. It aims to service the National Food Security Act (NFSA) along with other welfare schemes offered by the Government so that foodgrains are supplied to the poor and needy at subsidised prices and to procure buffer stocks of foodgrains ensuring foodgrain security. Although, the procurement operations have been implemented in Uttar Pradesh but as stated by Deshpande (2003) it remained largely confined to few pockets of western region of the State- which provided large marketable surplus but what about the masses who are not able to sell their produce to procurement agencies. There has been sharp change in relative shares of paddy and wheat procurements. Rice procurement has by and large been above wheat procurement during the entire period in Uttar Pradesh (Figure 10).

Table 6: Procurement and Production of Rice and Wheat in Uttar Pradesh (LakhTonnes)

Year	Procurement (Lakh Tonnes)		Production (Lakh Tonnes)		Procurement as Percent of Production	
	Rice	Wheat	Rice	Wheat	Rice	Wheat
1995-96	**	**	97.88	210.77		
1996-97	9.1	2.61	111.97	232.87	8.13	1.12
1997-98	10.73	6.18	116.78	221.47	9.19	2.79
1998-99	8.68	21.41	108.26	227.81	8.02	9.40
1999-2000	14.21	12.62	126.33	255.51	11.25	4.94
2000-01	11.74	15.45	116.79	251.68	10.05	6.14
2001-02	19.36	24.46	128.56	254.98	15.06	9.59
2002-03	13.6	21.11	95.96	237.48	14.17	8.89
2003-04	25.54	12.13	130.22	255.67	19.61	4.74
2004-05	29.71	17.41	95.59	225.14	31.08	7.73
2005-06	31.51	5.6	111.33	235.74	28.30	2.38
2006-07	25.59	0.49	109.12	260.27	23.45	0.19
2007-08*	28.91	5.46	117.8	256.79	24.54	2.13
2008-09	40.08	31.37	130.97	285.54	30.60	10.99
2009-10	29.01	38.82	117.94	277.77	24.60	13.98
2010-11	25.54	16.45	119.92	300.01	21.30	5.48
2011-12	33.55	34.61	140.22	318.92	23.93	10.85
2012-13	22.86	50.63	144.16	313.32	15.86	16.16
2013-14	11.27	6.82	146.32	303.81	7.70	2.24
2014-15	16.98	22.67	132.42	200.55	12.82	11.30
2015-16	29.1	7.97	124.34	268.74	23.40	2.97
2016-17	23.54	36.99	144.71	349.71	16.27	10.58

Source: Different Report of Agricultural Statistics at a Glance, Directorate of Economic and Statistics, Ministry of Agriculture and Farmer's welfare.

Figure 10: Procurement of Rice and Wheat as Percent of Production in Uttar Pradesh
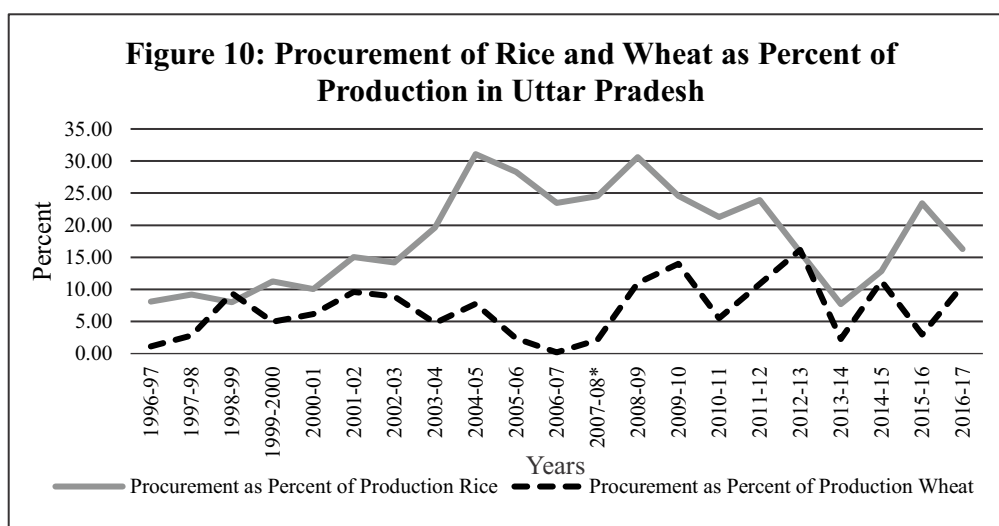
Source: Based on Table 1.

What is important is the low proportion of procurement of wheat and paddy in the state of Uttar Pradesh. Wheat has been below 10 per cent in most of the years and paddy below 20 per cent. Thus, few farmers benefit from procurement directly and they are the large and medium farmers- who benefits as compared the marginal and small farmers who dominate the farming community.

5. Analysis of Profitability in Crop Cultivation

We now turn to the analysis of profitability of crop cultivation which may be measured in terms of trends in net income which is derived by deducting cost C2 and farm business income i.e. gross value of output (GVO) minus cost A2 as is done by Dev and Rao (2010). Farm business income as defined by Dev and Rao (2010) states that it is Gross Value of Output (GVO) minus Cost A2. Table 6 shows trends in net income and farm business income. The table shows that the value of output has been more than cost A2 throughout the period of study both for paddy and wheat in Uttar Pradesh. However, the margin has been fluctuating from year to year. This is reflected in fluctuations in farm business income. However, the GVO has been lower than cost C2 in many years for both the crops which is reflected in negative net income in these years. The situation has been quite adverse to farmers during the period 2010-11 to 2015-16 particularly in the years 2014-15 and 2015-16. The ratio of GVO to Cost A2 as well as Cost C2 has witnessed a downward shift over the period indicating declining profitability of cultivation.

**Table 7: Costs and Returns in Rice and Wheat per Hectares
in Nominal Terms (in Rs).**

Year	Paddy (Rs.)				Wheat (Rs.)			
	Net Income	Farm Business Income	GVO/C 2 COC	GVO/A2 +FL COC	Net Income	Farm Business Income	GVO/C2 COC	GVO/A2+ FL COC
1995-96	6561.01	15293.89	1.58	6.93	-258.41	3771.22	0.98	1.49
1996-97	2256.4	6187.19	1.20	1.84	2560.86	7531.84	1.18	1.84
1997-98	878.55	4576.59	1.08	1.58	2011.84	6640.28	1.15	1.76
1998-99	865.51	4628.07	1.07	1.56	3111.44	8165.32	1.22	1.88
1999-00	968.46	5869.7	1.07	1.61	2769.35	8716.20	1.17	1.83
2000-01	-773.43	3712.25	0.95	1.36	1031.26	6750.91	1.06	1.62
2001-02	-1295.68	3637.9	0.92	1.33	919.81	6580.43	1.06	1.62
2002-03	-2085.28	3006.36	0.88	1.24	-585.5	6029.13	0.97	1.50
2003-04	1060.31	6386.6	1.06	1.51	452.88	7207.87	1.02	1.58
2004-05	-526.86	5081.46	0.97	1.37	-2641.62	6417.84	0.87	1.55
2005-06	-1475.2	5519.39	0.93	1.40	-2401.56	5743.22	0.90	1.38
2006-07	-1059.57	5019.97	0.95	1.35	2591.85	11126.27	1.10	1.67
2007-08	3808.51	10644.81	1.17	1.69	7748.97	15949.10	1.30	1.92
2008-09	3723.85	16706.05	1.12	1.98	2656.38	16116.37	1.08	1.85
2009-10	3680.67	15641.65	1.11	1.73	384.13	13572.32	1.01	1.65
2010-11	4159.83	10457.91	1.13	1.40	3544.94	17222.42	1.10	1.77
2011-12	-3318.22	10917.9	0.92	1.39	459.71	16842.01	1.01	1.65
2012-13	4843.73	19027.62	1.11	1.65	213.56	16534.53	1.00	1.59
2013-14	13536.67	28171.25	1.30	1.91	995.80	17204.60	1.02	1.57
2014-15	-12131.92	5873.02	0.79	1.14	-15654.42	2681.75	0.69	1.08
2015-16	-6285.44	15219	0.89	1.40	-1159.93	22043.00	0.98	1.67

Source: As in Table 1.

In case of wheat the ratio of GVO to C2 cost increased overtime from 0.98 in 1995-96 to 1.22 in 1998-99. Ratio of GVO to C2 cost declined in 2002-03, 2004-05, 2005-06, 2011-12 and to 0.69 in 2014-15. The profitability ratio to C2 cost was around 1.08 in 2015-16 which was higher than that of paddy (Figure 9). Even profitability ratio of wheat in terms of variable cost (A2 cost) is also higher for wheat as compared to paddy (Figure 6). Higher profitability for wheat as compared to paddy can be gauged from the growth rates of returns to farming of these two dominant crops in Uttar Pradesh. Both Paddy and wheat showed a negative growth rates in net income from cultivation in both the period under consideration. The story for farm business income generated from cultivating both paddy and wheat show, growth trends in both the period.

We also calculated net income at constant prices to see the improvement in real economic condition of farmers of paddy and wheat in Uttar Pradesh. This exercise helped us to examine the viability of farming by calculating net income (gross value of output (GVO) – cost C2). The Figure

Figure 11: Ratio of Returns to Total Costs in Paddy and Wheat in Uttar Pradesh
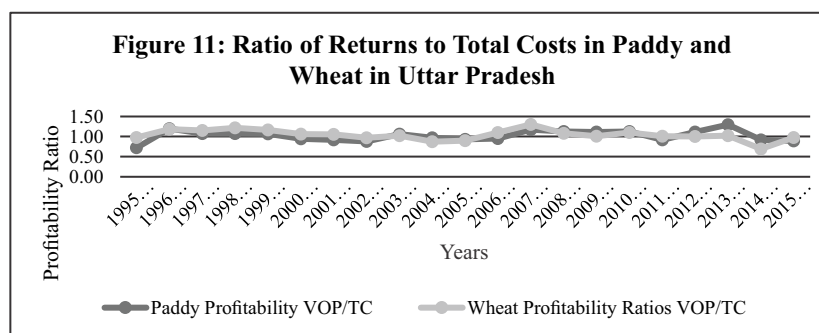
Source: Based on Table 7.

11 highlights that the economic condition of farmers of paddy and wheat growers were stable till 2006-07 and thereafter the situation changed. The net income of paddy growers increased continuously and peeked in 2013-14, but the condition of wheat growers suffered losses in 2014-15. The deplorable condition of farmers can be gauged from the Figure 12 and Figure 13

Figure 12: Trend in Net Income of Paddy and Wheat Farmer in Uttar Prdaesh

Figure 13:Trend in Farm Business Income of Paddy and Wheat Farmers in Uttar Pradesh
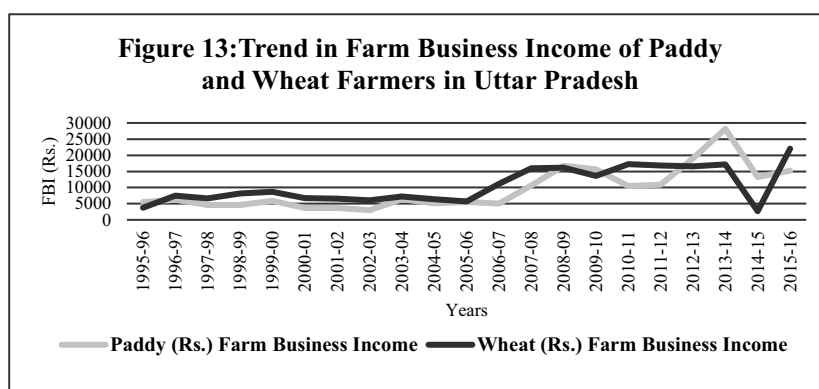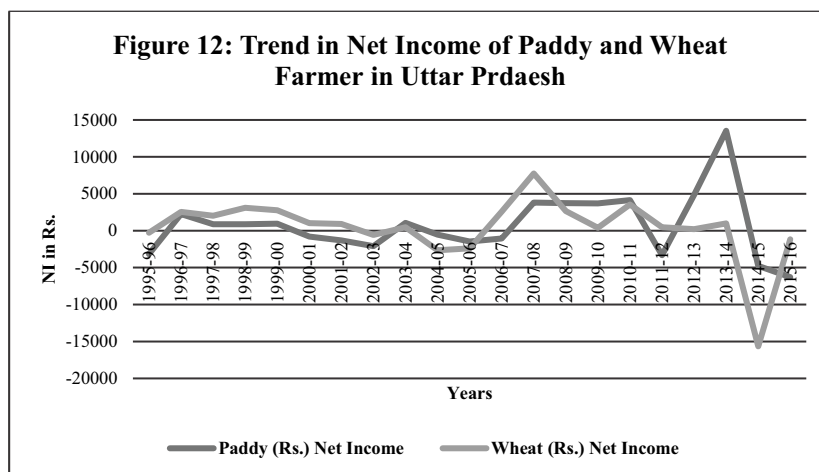
Source: Based on Table 7.

7. Impact of MSP on Area under the crop, its Productivity, and its Procurement through Lagged Regression

The present section aims to analyze the impact of Agricultural Price Policy (MSP) i.e. impact of MSP on area under crops, its productivity/yield, and procurement of major food crops i.e. Paddy and Wheat by government agency in Uttar Pradesh. The data on prices and procurement of major food crops were collected and analyzed growth by using CAGR (Compound Annual Growth Rate), trends by using linear trend equation, effectiveness of the price policy (MSP) was examined by the comparing FHP from MSP through graphs to examine whether market prices were higher or lower than the minimum support prices in earlier sections. To study the impact of lagged Minimum Support Prices (MSPs) on the area under the crop, its productivity/ yield, its production and its procurement through government agencies, linear regression equations have been fitted. The price policy introduced the instrument of Minimum Support Prices to restrain downward fluctuations in prices but also act as an incentive towards growing a particular crop and maneuver the cropping pattern. Such maneuvering in cropping pattern, procurement and increase in yield can be obtained by steadily increasing MSP price of different crops over the period. This increase in MSP was designed to provide protective shield to the farmers about the expected prices during the forthcoming season for growing a particular crop and support them from distress sales and to procure food grains for public distribution leading to food security for the masses. In other words, MSP as an instrument of price policy provided a rational basis for price expectations to the farmers (Deshpande and Naik, 2002). Here a simple time-series one variable regression equation was applied with area under a particular crop as dependent variable and lagged Minimum Support Prices as an independent variable was carried out. The underlying hypothesis is that the MSP prevailing in a previous year, influences the area allocation decision during the current year under the crop concerned (Deshpande and Naik, 2002). Similar to Deshpande and Naik (2002), this is a time-series context it was necessary to eliminate the trend effect by introducing 't' for time variable. The specification of the equation is as follows:

$$Y_t = \alpha + \beta 1 \ MSP_{t-1} + \beta 2 \ tt + \varepsilon$$

Where Y_t = Area at time t (in an alternative formulation productivity/ yield and procurement as dependant variables are taken in place of Yt)

MSP_{t-1} = Lagged minimum support price at t-1 year

tt = Proxy for time trend

ε = Stochastic error term

α = Constant

$\beta 1 \ \& \ \beta 2$ = Regression coefficients

Table 8: Regression Results

Crop	Constant	MSPt-1	Time	Adjusted R Square
Regression Results with Area as Dependent Variable				
Wheat	8835099**	-116.095*	63820.9**	0.86
	(88.26)	-(0.37)	(3.41)	
Paddy	5582444**	-295.875**	39691.19*	0.31
	(49.75)	-(0.76)	(1.80)	
Regression Results with Yield as Dependent Variable				
Wheat	24.547	0.004	-0.008	0.21
	(11.37)	(0.61)	-(0.02)	
Paddy	18.454	0.006	-0.155**	0.45
	(22.99)	(2.16)	-(0.98)	
Regression Results with Procurement as Dependent Variable				
Wheat	-2.910*	0.0483	-1.885	0.29
	-(0.34)	(1.80)	-(1.18)	
Paddy	22.741**	-0.054**	3.647**	0.86
	(8.50)	-(5.85)	(6.92)	

Note: * Indicates statistical significance at 5% level; ** Indicates statistical significance at 10% level; and figures in the parentheses are t values.

The results of the above exercise have been presented in Tables 8, for the selected crops and with alternative formulations and the coefficient of multiple determination (R2) came out to be 0.86 and 0.31 for wheat and paddy crops, respectively. This showed that R2 explained 86 and 31 per cent variation in the dependent variable i.e. area under wheat and paddy crops. The effect of lagged minimum support prices (MSP_{t-1}) of wheat and paddy on area has shown a significant and negative effect whereas for time showed a positive but significant effect. The results show that with one per cent increase in minimum support price (MSP) in the previous year, the corresponding area decreased by -0.116 and -0.295 per cent in wheat and paddy crops respectively. This shows that the lagged minimum support price has not made any significant impact on area of wheat and paddy crop in the next year. Clearly, MSP does not help in deciding the area allocation under the crop during the next season. The area decisions in the case of major crops of wheat and paddy do not seem to depend on MSP.

But MSP is acting positively on procurement of wheat but negative for paddy. The lagged relationship with area as well as procurement and yield does not indicate the role of MSP as an incentive price and therefore, it seems only to serve as a psychological support in the case of price collapse and not as an instrument of price incentive as envisaged. Hence, in food crops, area declined not because of MSP but it was due to some other factors i.e. food crop is confined there was decline in area under food crop due to either going for diversification to horticulture crops or diversifying to animal husbandry.

So, in the present analysis, the lagged MSP of food crops has negative impact on the area under food crops.

8. Conclusion and the way forward

This paper examined the role of state intervention for procurement of paddy and wheat through declaration of MSP and its impact on farm income. The paper highlights that net returns are declining, and agrarian distress is percolating in the agricultural sector of Uttar Pradesh. In fact, the analysis in this paper shows that challenges of the current periods in terms of non-price intervention by supporting public investments and also matching the price volatility due to globalization rendered our farmers prone to competition. These two are mainly responsible for higher support prices. With the advent of economic reforms, the gap between MSP and international prices increased and government's effort to integrate the domestic economy with international economy led to hike in MSP to reduce the emerging gaps. These analysis reveals that MSP is acting as a psychological support rather than a price incentive instrument in Uttar Pradesh.

The continuous increase in MSP for these crops resulted in the development of agriculture sector as famers were getting assured prices for their produce and they were encouraged to invest in new technology to increase the yield and also to get good economic returns. An analysis of trends in COP and prices realized by our farmers in Uttar Pradesh highlights that the prices realized were moving faster than the COP in cultivating paddy throughout the period under consideration. The growth of MSP relative to COP of wheat shows that till 2012-13, wheat farmers enjoyed MSP higher than COP, but after 2012-13 the difference between MSP and COP narrowed down. This is an important finding and is the outcome of recent policy changes. An ideal environment for such a scenario is when market prices are higher than support prices.

As a result of policy shift, growth rates in yields have gone down for wheat ultimately leading to rise in cost of production but for paddy yields show increasing trends. Under these reform paradigm- shift was observed due to government's slashing the subsidies on major inputs thereby leading to increase in the input prices and reducing the profitability. Analyses in this paper highlighted that these challenges lead to higher support prices. The trend of ever-increasing COP pointed towards ever increasing pressure on the farmers of paddy and wheat of Uttar Pradesh. The returns in terms of profitability showed declining trends only to pick up again in 2005-06 and again declined thus pushing government to take a serious note and further increasing MSP. This declining profitability have discouraged the farmers of the State to

increase investment on yield augmenting technology which got reflected by relatively declining growth rate of COC. The analysis presented in the paper reflects that continuous increase in COP due to declining non-price interventions have led to higher and higher MSP. In case such hike in MSP was not done the margins realised by famers would have been crisis laden. The COP remained high due to low productivity and hence prices realised do not cover all costs except variable costs and leaves a reasonable margin to obtain coverage by the State.

Effective price policy through significant increase in minimum support prices (MSP) particularly for wheat and paddy was thought of to provide large profits and result into the emergence of paddy and wheat crops as the most secure and profitable crops in the state. The results also showed that lagged minimum support prices (MSP) have made non- significant and negative impact on change in cropping pattern in our State. UP's agriculture has reached at a point of stagnation and to make region's agriculture sustainable, stress should be given to those crops which require less water. Government initiatives should be there to ensure farmers by giving assured prices and marketing of competing crops of paddy and wheat. Besides, farmer awareness camps, demonstration of new farm technologies and input subsidies for other crops can make a way out for the farmers from paddy-wheat monoculture to diversification of agriculture to other crops, viz; oilseeds, vegetables, pulses etc.

To sum up, emphasis should be laid on non-price interventions via public investments as a supplement to price policy which has been emphasised by several scholars for increasing yield growth path to achieve agricultural development and reduce an adverse impact on the poor (Dantawala, 1986; Krishnaji, 1990; Rao, 1994). It can help in increasing yields, reduce the exclusive reliance on prices for farm profitability and food security, and hasten poverty reduction (Dev and Ranade, 1998; Dev and Ravi, 2007). Manoeuvring for decentralising the procurement operations and building necessary infrastructure in states like UP is the need of the time. It goes without saying that the price-based support has been a catalyst in increasing the acreage and output of foodgrains but in contrast our analyses showed that there was non-significant effect of MSP on area, yield and procurement through lagged regression and policy formulators should heave for future required efforts. Bathlla and Kumar (2019) noted that the misconceived policy framework has made farming non-remunerative and squeezed farmers' income mainly due to manifold increase in the price of inputs vis-à-vis output (Bathla and Kumar, 2019). Government initiatives are required to generate awareness and demonstrate new farm technologies and inputs subsidies for cultivating other crops which may diversify farmers of paddy-wheat monoculture and this can be helpful in diversification in Uttar Pradesh.

References

1. Agarwal, Kabir (2018): "Why MSP at 1.5 Times Costs is Another Empty Promise for Farmers", 24 February, available on https://thewire.in

2. Bathla,Seema and Anjani Kumar (2019): "Agrarian Crisis: Direct Transfer more efficient, effective than input subsidies", in https//www.financialexpress.com> OPINION on12th, February.

3. Bhalla Surjit (2019): "Tax and Expenditure Reforms- a dream beginning by Modi Government", in Financial Express, February 2.

4. Chaterjee, Shoumitra and Devesh Kapoor, (2016): "Understanding Price Variation in Agricultural Commodities in India: MSP, Government Procurement, and Agriculture Markets"in India Policy Forum, July 12-13.

5. Dantawala, M. L. (1986): "Technology, Growth and equity in agriculture" in John W Mellor and Gunvant M Desai, (eds), Agricultural Change and Rural Poverty (Delhi): Oxford University Press).

6. Deshpande R. S. (2003): "Impact of Minimum Support Prices on Agricultural Economy" (consolidated report), Agriculture Development and Rural Transformation Unit, Institute of Social and economic Change, Bangalore, December.

7. Deshpande and Naik, (2002): "Impact of Minimum Support Prices on Agricultural Economy: A Study in Karnataka", Agricultural Development and Rural Transformation Unit, Institute for Social and Economic Change, Banglore, December, 2002.

8. Dev S. Mahendra and Ajit Ranade, (1998): "Rising foos Prices and Rural Poverty: Going Beyond Correalations", Economic Political Weekly, 33 (39): 2529-36.

9. Dev S. Mahendra and C. Ravi, (2007): "Poverty and Inequality: All India and States, 1983-2005", Economic and Political weekly, 42 (6): 509-21.

10. Dev Mahendra S. and N Chandrashekhar Rao (2010): "Agricultural Price Policy, Farm Profitability and Food Security', in Economic and Political weekly, Vol. XLV, Nos 26 & 27, June, 26.

11. Dev S. Mahendra and Ajit Ranade, (1998): "Rising foods Prices and Rural Poverty: Going Beyond Correalations", Economic Political Weekly, 33 (39): 2529-36.

12. Dev S. Mahendra and C. Ravi, (2007): "Poverty and Inequality: All India and States, 1983-2005", Economic and Political weekly, 42 (6): 509-21.

13. Dhawan V. Singh J. M. and Kashish (2019): "Impact assessment of Minimum Support

Prices (MSP) on Agriculture in Punjab: An Analytic Approach". Journal of Pharmacognosy ans Phytochemistry, www.phytojournal.com (February 14-16, 2019)

14. Haque T (2018): "India's Unhappy Farmers- Opting for C2 costs works for both farmers and the government", Business Today, May 6.

    https://www.businesstoday.in/magazine/issue/may62018.

15. Jain,Anmol (2018): "Minimum Support price Hike", in Economic and Political Weekly, Vol. LIII No. 33, August, 18, Letters.

16. Kasturi Kannan (2018): "How have real incomes from paddy and wheat farming changed in the last five years?" in The Wire, September, 08.

17. Krishnaji, N (1990): "Agricultural Proceolicy: A Survey with Reference to Indian Foodgrain Economy", Economic and Political weekly, 25 (26); A-54- A-63.

18. Menon Sreelatha (2013): "The growing irrelevance of a MSP- Govt's calculations do nothing for farmers, Business Standard.com, New Delhi, January 21, 2013 00:53 IST.

19. Mishra, Subhash (2018): "UP Government doesn't buy most crops on minimum support price 'bonanza list'", in Times of India, TNN, July,7, 2018.

https//timesofindia.indiatimes.com/toireporter/author-subhash-mishra-479236025.cms

20. Roy, Shantanu (2018): "Will Increasing Minimum Support Price Cure Indian Agriculture?" in EPW Engage, March, 2018.

21. Rao, C. H. Hanumantha (1994): Agricultural Growth, Rural Poverty and Environmental Degradation in India (New Delhi: Oxford University Press).

22. Sabnavis Madan (2018): "Let's not overstate the case of MSP", in Financial Express, July, 2018.

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