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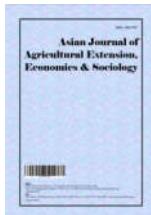
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Study on Profitability of Wheat in Major Wheat Producing States of India

Ankita Sahu^{1*}, Sunil Nahatkar¹, Gourav Kumar Vani¹ and Prasanna Kolar¹

¹*Department of Agricultural Economics and Farm Management, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur-482004 (Madhya Pradesh), India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present study was undertaken with the objective to compare the minimum support price (MSP) with total Cost (C_2) of wheat and also actual yield with break-even yield in major wheat producing states of India. The secondary data were collected from Directorate of Economics and Statistics for the period 2000-01 to 2016-17. The area of study comprises those states which covered >80 per cent of wheat production in India (i.e., Uttar Pradesh, Madhya Pradesh, Punjab, Rajasthan and Haryana). The result of study showed that the difference between MSP and cost C_2 per quintal was found to be positive but fluctuating over the study period (except in the year 2002-03 and 2005-06 in Madhya Pradesh and 2005-06 and 2014-15 in Uttar Pradesh). It can be concluded that wheat growers of the states benefitted more from MSP by cultivation of wheat. The margin of safety was also fluctuating over the period of time in all the five wheat-producing states but gap continuously widening in Madhya Pradesh and Rajasthan revealed that the profitability from wheat was increasing in these states.

Keywords: Minimum support price; profitability; margin of safety.

*Corresponding author: E-mail: ankitasahu9826@gmail.com;

1. INTRODUCTION

Wheat is the second most important cereal crop in India next to rice. The share of wheat in total cereal grain production was 38.47% and shared in the area was 30.35% of the total area under cereal grains during the year 2017-18. Total area of wheat in the country was 293.18 lakh hectares with production of 1035.96 lakh tonnes (2018-19). At present country reached in a surplus position by achieving record production of wheat at 1062.0 lakh tonnes during 2019-20 which was 1020.00 lakh tonnes during 2018-19. In the world, India stood at first rank in wheat area which contributes 12.4 per cent to the total area and in production it occupied second position next to China with 11.5 per cent share and this position is continues for more than a decade [1,2].

1.1 Objective

1. To estimate profit at MSP for wheat in major wheat producing states of India,
2. To estimate margin of safety for wheat in major wheat producing states of India.

1.2 Limitation

The study is based on secondary data collected from published sources. Hence the reliability of the data is confined to the available sources of these data.

1.3 Review of Literature

In agrarian countries, the agricultural prices play an important role in the price structure. Hence the study of price behavior of agriculture commodities, is a crucial requisite of any sound price policy. Minimum Support Price (MSP) is a vital component of Agricultural Price Policy of India. It targets to confirm support price to farmers and reasonable prices to consumers through Public Distribution System (PDS) [3]. It is average price of selected agricultural products, fixed based on average cost of production. Which is recommended by the Commission for Agricultural Costs and Prices (CACP) and fixed by the government of India [4,5]. It's an important tool to protect the agriculture production and cropping pattern of important agricultural commodities because farming community having numerous problems due to natural and market uncertainty. In the cost of cultivation, "C₂ cost" is considered as a related concept for the MSP. This cost includes all actual expenses in cash

and kind, rent for leased in land, and imputed values of the cost of family labour, owned capital assets, depreciation, the interest on fixed and variable capital, the rent for owned. According to Chand, [6], The MSP based on the cost of production has two big advantages. One, it ensures that the producers do not suffer a loss and they get a price that is remunerative. Two, the cost of production also captures the market trend to the extent this trend is reflected in the wage rate and the input prices. As per its terms of reference the CACP takes into account several factors, apart from the cost of production, in formulating the recommendations with respect to the level of MSP. Therefore, the present study was undertaken to compare minimum support price with cost C₂ and also actual yield with break-even yield of wheat production in major wheat-producing states of India.

2. MATERIALS AND METHODS

The present study had considered all the major wheat-producing states of India, i.e., Uttar Pradesh, Madhya Pradesh, Punjab, Rajasthan and Haryana. The secondary data on the cost C₂, MSP, actual yield, value of main product, total operational cost of wheat pertaining to the last 17 years, i.e., 2000-01 to 2016-17 for selected states, were collected from the Directorate of Economics & Statistics, Ministry of Agriculture website. Based on these data, following parameters were calculated.

Profit at Minimum Support Price (MSP) =
Minimum Support Price (₹ q^{-1}) - Cost C₂ (₹ q^{-1})
Cost C₂ = Cost B₂ + imputed value of family labour.

2.1 Break Even Analysis

The break-even analysis was carried out using cost and price data of wheat for different states. The break-even analysis is used to analyze the potential profitability over expenditure in a market-based agri-business. It is a type of cost-revenue-profit analysis. Break-even point is the volume of production at which total revenue equals the total costs associated with the sale of that product [7,8].

Break-even Yield (q ha^{-1}) =

$$\frac{\text{Fixed Cost} (\text{₹ /ha})}{\text{Average Revenue} (\text{₹ /q}) - \text{Average Variable Cost} (\text{₹ /q})}$$

Where,

Average variable cost (₹ q^{-1})	=	quintal was found to be lower during the period of 2000-01 to 2006-07, but after 2007-08 farmers of Haryana reaped more benefit from MSP by cultivation of wheat. Similarly, the break-even productivity was found to be lower as compared to actual productivity for almost all the years, except during the period of 2005-06, 2014-15 and 2015-16. This indicates that the wheat producers of Haryana were in profit zone except for three years in terms of expenditure incurred and revenue generated from the cultivation of wheat.
<i>Total operational cost (₹ /ha)</i>		
<i>Actual Yield (q/ha)</i>		

Average Revenue (₹ q^{-1}) = Farm harvest price (₹ q^{-1})	=	
<i>Farm Harvest Price (₹ q^{-1})</i>		
<i>Value of main product (₹ /ha)</i>		

Margin of safety (Differential Yield) ($q \text{ ha}^{-1}$) =		
<i>Actual Yield (q/ha)</i>	-	<i>Break-even Yield (q ha⁻¹)</i>

3. RESULTS AND DISCUSSION

3.1 Comparison of MSP with Total Cost (C_2)

The data presented in Table 1 to 5 showed the comparative picture of minimum support prices (MSP) and total cost (C_2) for different wheat producing states of India over the period of time along with estimates on average productivity and break-even productivity and margin of safety. The state wise information on above aspects is provided below.

For the state of Haryana during the last seventeen years, the MSP per quintal was higher than cost C_2 per quintal for wheat production revealing that the wheat producers were protected in terms of total revenue over the total cost incurred (Table1). The profit at MSP per

Data presented in Table 2 shows that the state of Madhya Pradesh during the study period, the MSP per quintal was higher than cost C_2 per quintal, except in 2002-03 and 2005-06. The profit at MSP per quintal was found to be lower from 2000-01 to 2006-07, but after 2007-08 wheat growers of the state were benefiting more over MSP from the cultivation of wheat. It can be observed that the differential yield was negative (Fig. 2) in the beginning year from 2000-01 to 2002-03. Similarly, the break-even productivity was found to be lower as compared to actual productivity after 2002-03, but the drastic change was observed during two years 2014-15 to 2015-16. The data also revealed that the Madhya Pradesh wheat producers were in profit zone except for beginning three years in terms of expenditure incurred and revenue generated from the cultivation of wheat.

Table 1. Profit at MSP and margin of safety (DY) of wheat crop in Haryana

Year	Minimum Support Price	Cost C_2 ₹ q^{-1}	Profit at MSP ₹ q^{-1}	Actual Yield $q \text{ ha}^{-1}$	Break-even Yield $q \text{ ha}^{-1}$	Margin of Safety (DY)
	₹ q^{-1}					
2000-01	610.00	454.27	155.73	41.93	29.52	12.41
2001-02	620.00	475.97	144.03	41.62	30.46	11.16
2002-03	620.00	477.81	142.19	39.61	33.22	6.39
2003-04	630.00	506.72	123.28	39.93	34.31	5.62
2004-05	640.00	522.87	117.13	39.48	35.55	3.93
2005-06	650.00	577.41	72.59	38.65	40.22	-1.57
2006-07	750.00	588.68	161.32	39.76	27.38	12.38
2007-08	1000.00	673.46	326.54	41.99	25.66	16.33
2008-09	1080.00	716.55	363.45	45.66	27.42	18.24
2009-10	1100.00	832.45	267.55	40.91	35.34	5.57
2010-11	1120.00	773.05	346.95	45.40	29.51	15.89
2011-12	1285.00	850.66	434.34	50.78	31.85	18.93
2012-13	1350.00	1040.78	309.22	41.41	37.32	4.09
2013-14	1400.00	1044.89	355.11	45.26	39.85	5.41
2014-15	1450.00	1240.99	209.01	39.96	45.41	-5.45
2015-16	1525.00	1239.1	285.90	43.09	43.92	-0.83
2016-17	1625.00	1192.13	432.87	49.28	38.07	11.21

Source: Author's calculation based upon data from DES, 2016-17

Table 2. Profit at MSP and margin of safety (DY) of wheat crop in Madhya Pradesh

Year	Minimum Support Price ₹ q ⁻¹	Cost C ₂	Profit at MSP	Actual Yield q ha ⁻¹	Break-even Yield	Margin of Safety (DY)
2000-01	610.00	588.93	21.07	17.20	23.73	-6.53
2001-02	620.00	590.81	29.19	18.44	22.83	-4.39
2002-03	620.00	654.13	-34.13	18.35	26.75	-8.40
2003-04	630.00	568.11	61.89	22.88	21.71	1.17
2004-05	640.00	583.81	56.19	21.79	21.56	0.23
2005-06	650.00	720.77	-70.77	20.30	17.12	3.18
2006-07	750.00	730.32	19.68	22.91	15.88	7.03
2007-08	1000.00	779.37	220.63	23.86	14.86	9.00
2008-09	1080.00	810.25	269.75	23.59	16.40	7.19
2009-10	1100.00	808.48	291.52	25.52	15.77	9.75
2010-11	1120.00	834.21	285.79	28.17	17.05	11.12
2011-12	1285.00	851.95	433.05	33.60	20.19	13.41
2012-13	1350.00	958.95	391.05	33.42	20.30	13.12
2013-14	1400.00	1074.73	325.27	29.98	19.11	10.87
2014-15	1450.00	1127.43	322.57	32.73	28.84	3.89
2015-16	1525.00	1222.47	302.53	30.60	27.31	3.29
2016-17	1625.00	1018.25	606.75	38.42	22.04	16.38

Source: Author's calculation based upon data from DES, 2016-17

Table 3. Profit at MSP and margin of safety (DY) of wheat crop in Punjab

Year	Minimum Support Price ₹ q ⁻¹	Cost C ₂	Profit at MSP	Actual Yield q ha ⁻¹	Break-even Yield	Margin of Safety (DY)
2000-01	610.00	432.06	177.94	47.80	30.95	16.85
2001-02	620.00	455.61	164.39	45.72	31.47	14.25
2002-03	620.00	493.80	126.20	40.66	33.34	7.32
2003-04	630.00	504.24	125.76	40.00	32.13	7.87
2004-05	640.00	494.35	145.65	42.94	34.58	8.36
2005-06	650.00	556.27	93.73	42.05	35.03	7.02
2006-07	750.00	617.11	132.89	42.10	30.93	11.17
2007-08	1000.00	647.95	352.05	46.47	26.57	19.90
2008-09	1080.00	804.80	275.20	39.83	28.16	11.67
2009-10	1100.00	816.89	283.11	41.18	31.03	10.15
2010-11	1120.00	871.74	248.26	42.87	32.80	10.07
2011-12	1285.00	888.55	396.45	49.51	32.87	16.64
2012-13	1350.00	972.25	377.75	45.89	31.09	14.80
2013-14	1400.00	964.29	435.71	50.23	33.43	16.80
2014-15	1450.00	1081.84	368.16	42.88	32.17	10.71
2015-16	1525.00	1083.37	441.63	46.53	32.43	14.10
2016-17	1625.00	1102.62	522.38	49.66	31.87	17.79

Source: Author's calculation based upon data from DES, 2016-17

For the state of Punjab during the last seventeen years, the MSP per quintal was higher than cost C₂ per quintal. The profit at MSP per quintal was found to be positive but fluctuating over the study period. It was the highest in 2016-17, indicating that farmers of Punjab reap more benefit over MSP from the cultivation of wheat. Similarly, the break-even productivity was found to be lower as compared to actual productivity for all the years. The drastic change in the differential yield was

noted (Fig. 2) during the period of 2002-03 to 2005-06. The increasing trend in difference between MSP and cost C₂ was observed (Fig. 1) for this state revealing that the farmers of Punjab reaped more benefit from wheat cultivation during last four years over the base years. This analysis revealed that wheat producers of Punjab were in profit zone in terms of expenditure incurred and revenue generated from wheat cultivation.

Table 4. Profit at MSP and Margin of Safety (DY) of wheat crop in Rajasthan

Year	Minimum Support Price ₹ q ⁻¹	Cost C ₂	Profit at MSP	Actual Yield q ha ⁻¹	Break-even Yield	Margin of Safety (DY)
2000-01	610.00	507.84	102.16	29.20	22.51	6.69
2001-02	620.00	464.62	155.38	35.16	30.39	4.77
2002-03	620.00	482.15	137.85	33.05	30.88	2.17
2003-04	630.00	499.37	130.63	32.99	21.98	11.01
2004-05	640.00	480.19	159.81	32.95	20.10	12.85
2005-06	650.00	528.7	121.30	33.76	21.14	12.62
2006-07	750.00	568.12	181.88	36.46	18.33	18.13
2007-08	1000.00	649.77	350.23	33.39	17.42	15.97
2008-09	1080.00	683.58	396.42	37.19	19.23	17.96
2009-10	1100.00	709.16	390.84	34.87	19.98	14.89
2010-11	1120.00	666.87	453.13	39.56	19.68	19.88
2011-12	1285.00	825.94	459.06	41.34	24.08	17.26
2012-13	1350.00	913.28	436.72	41.57	22.83	18.74
2013-14	1400.00	997.52	402.48	40.98	25.41	15.57
2014-15	1450.00	1156.25	293.75	34.58	33.39	1.19
2015-16	1525.00	1185.07	339.93	37.54	31.21	6.33
2016-17	1625.00	1172.27	452.73	42.23	31.98	10.25

Source: Author's calculation based upon data from DES, 2016-17

Table 5. Profit at MSP and Margin of Safety (DY) of wheat crop in Uttar Pradesh

Year	Minimum Support Price ₹ q ⁻¹	Cost C ₂	Profit at MSP	Actual Yield q ha ⁻¹	Break-even Yield	Margin of Safety (DY)
2000-01	610	445.87	164.13	32.59	27.95	4.64
2001-02	620	454.65	165.35	31.08	27.05	4.03
2002-03	620	507.65	112.35	30.70	33.41	-2.71
2003-04	630	482.78	147.22	34.01	32.02	1.99
2004-05	640	597.81	42.19	29.29	45.27	-15.98
2005-06	650	654.22	-4.22	28.59	37.94	-9.35
2006-07	750	635.89	114.11	31.92	23.94	7.98
2007-08	1000	651.14	348.86	33.29	17.82	15.47
2008-09	1080	769.84	310.16	34.99	28.33	6.66
2009-10	1100	832.96	267.04	33.68	31.91	1.77
2010-11	1120	803.68	316.32	36.81	29.66	7.15
2011-12	1285	930.55	354.45	37.52	36.57	0.95
2012-13	1350	1042.66	307.34	34.43	32.72	1.71
2013-14	1400	1054.26	345.74	34.58	31.34	3.24
2014-15	1450	1502.89	-52.89	25.88	108.86	-82.98
2015-16	1525	1423.25	101.75	31.99	51.26	-19.27
2016-17	1625	1260.47	364.53	39.03	34.80	4.23

Source: Author's calculation based upon data from DES, 2016-17

For the state of Rajasthan during the study period, the MSP per quintal was higher than cost C₂ per quintal. The difference between MSP and cost C₂ per quintal was found to be lower from the period of 2000-01 to 2006-07, but after 2007-08 wheat growers of the state were benefiting over MSP from the cultivation of wheat. Similarly, the break-even productivity was found to be lower as compared to actual productivity for all

the years. The differential yield was found (Fig. 2) to be higher from the period of 2003-04 to 2013-14 and 2016-17. The data revealed that the gap between actual and break-even yield was widening and wheat producers of the Rajasthan were in profit zone in terms of expenditure incurred and revenue generated from wheat cultivation. The increasing trend in difference between MSP and cost C₂ was observed (Fig. 1)

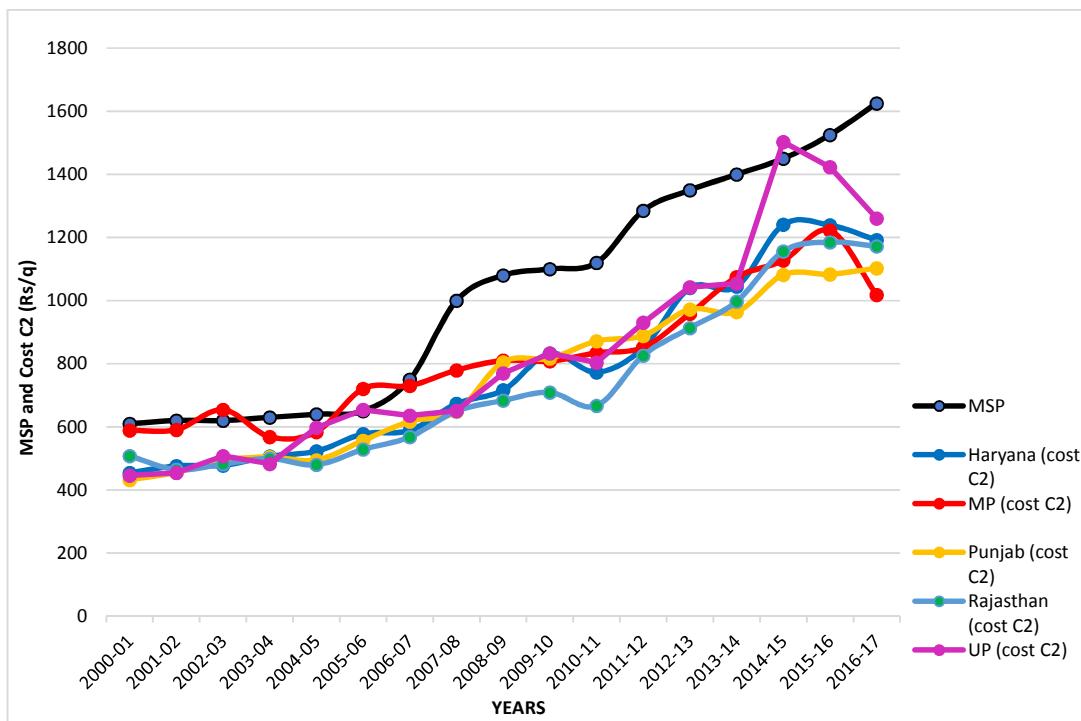


Fig. 1. Comparison of MSP and cost C₂ of wheat in different states of India

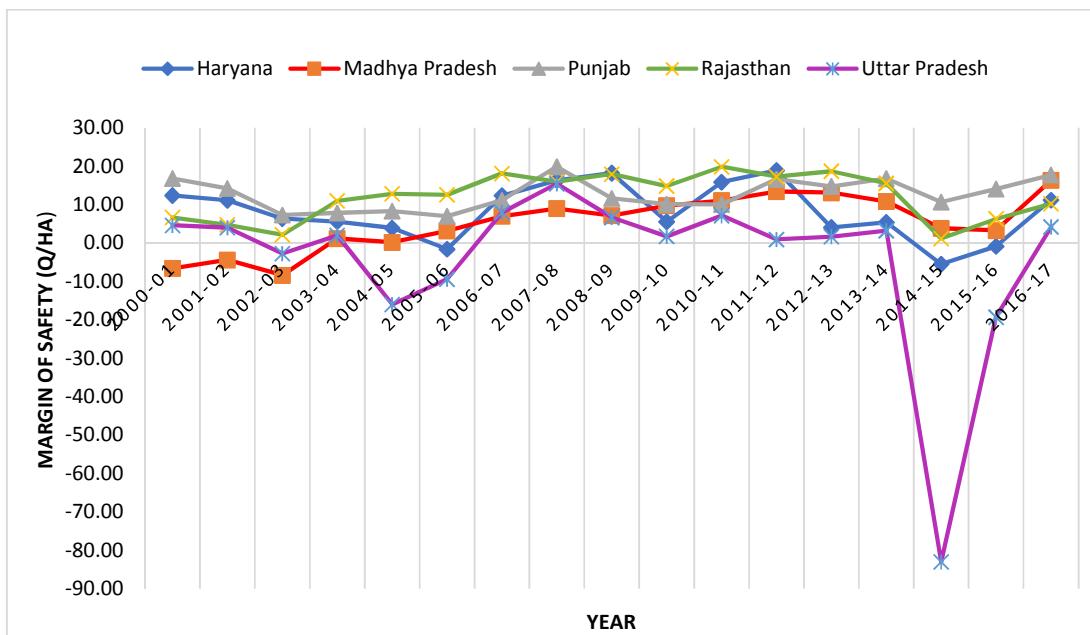


Fig 2 Margin of safety (DY) of wheat in different states of India

for this state revealing that the farmers of Rajasthan are reaping more benefit from wheat cultivation during last two years over the initial years.

For the state of Uttar Pradesh during the study period, the MSP per quintal was higher than cost C₂ per quintal, except in the year 2005-06 and 2014-15. The profit at MSP per quintal was found

to be positive, except these two years but fluctuating over the study period. Fig 1. shows that it was the highest in 2016-17, indicating that farmers of Uttar Pradesh reap more benefit over MSP from wheat cultivation. Similarly, the break-even productivity was lower than actual productivity for most of the years, except during the years 2002-03, 2004-05, 2005-06, 2014-15 and 2015-16. This indicates that the wheat producers of Uttar Pradesh were in profit zone except for five years in terms of expenditure incurred and revenue generated from the cultivation of wheat.

4. CONCLUSION

Wheat is the second most important cereal crop in India after rice. The comparative picture of minimum support price (MSP) and cost C_2 of wheat leads to conclude that the wheat producers of these five states were in profit zone except for some years in terms of expenditure incurred and revenue generated from the cultivation of wheat. It was also found that margin of safety (differential yield) was fluctuating over the period of time in all the five wheat-producing states but gap continuously widening in Madhya Pradesh and Rajasthan revealing that the profitability from wheat was increasing in these states.

POLICY IMPLICATIONS

Looking to overall results of the study it was found that wheat production is profitable but still there is potential to increase profit of farmers if the wheat is sold above MSP without any procurement support by the state/central government.

Therefore, study on export potential of Indian wheat and nature of competition among competing countries for export of wheat needs to be undertaken along with recommendation for special price support for quality and durum wheat, as it is given for fine rice and basmati rice.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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