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## Impact assessment of minimum support prices (MSP) on agriculture in Punjab: An analytic approach

Vikrant Dhawan, JM Singh and Kashish

### Abstract

The present study was undertaken to examine the impact of minimum support prices on cropping pattern and trends in minimum support prices (MSP) for important crops in Punjab. The data pertaining to area under all the crops and minimum support prices (MSP) of major crops were collected from various secondary sources. The study revealed that the minimum support prices (MSP's) have made an immense impact on the cropping pattern in the Punjab state as the area under wheat and paddy crops, which was 40.50 and 6.90 per cent of gross cropped area (GCA) in 1970-71, increased to 44.67 and 38.93 per cent in 2016-17. In spite of these increases, the area under pulses, maize, bajra and oilseeds declined drastically, during the same period. Thus, paddy-wheat crop rotation became predominant at the cost of maize, other cereals, oilseeds and pulses in the state. The regression analysis brought out that with one per cent increase in lagged minimum support price (MSP), the area under wheat and paddy crops increased by 0.12 and 0.48 per cent, respectively whereas for cotton crop, with one per cent increase in lagged MSP, the area decreased by 0.06 per cent. This decline in area under cotton crop was due to severe incidence of pests on this crop during the nineties. Lastly, it was inferred that Punjab agriculture has reached at a point of stagnation and there is a need for various Government initiatives such as to ensure farmers by assured prices and marketing of competing crops of paddy and wheat, farmer awareness camps, demonstrations of new farm technologies and input subsidies for other crops which can make a way out for the farmers from paddy-wheat monoculture and this can be helpful in diversification of Punjab agriculture.

**Keywords:** Agricultural price policy, cropping pattern, MSP, Paddy-wheat monoculture

### Introduction

Agriculture in Punjab has witnessed many a changes since mid-sixties. It has gone through the process of mechanisation and commercialization under the impact of green revolution. Punjab, being the epicentre and front runner of green revolution has experienced phenomenal growth in farm output and played a key role in the development in the Indian economy. Increased productivity brought economic benefits to farmers but also led to the establishment of Wheat-Rice Cropping Pattern (WRCP) as the main agricultural system of Punjab which more recently has become reliant on underground water resources, agricultural machinery, chemical fertilisers and pesticides. However, the WRCP has been, and remains the first choice of farmers (Singh, 2011) [5]. Introduction of high yielding varieties, particularly in case of wheat and paddy and procurement of these by Food Corporation of India and other state agencies at the Minimum Support Price/ Procurement Prices announced by the Government of India contributed to solve the problem of food crisis to a large extent (Acharya, 1997) [1]. The Commission for Agricultural Costs and Prices (CACP) announces the minimum support price (MSP) for the major agricultural crops in India following the detailed scientific procedures keeping in view the important factors responsible for growth and welfare of society at large. Of late, it is being increasingly felt that the present agricultural price policy has affected a bias in favour of the major cereal crops, namely wheat and rice. Not only the cropping pattern has undergone a significant change over time, the use of modern inputs has also increased while it has discouraged the use of traditional inputs (Kataria and chahal, 2004) [4]. The state of Punjab is a pretty good example in this case.

Farmers with large size holding may be considered fortunate to reap the advantage of the present minimum support price policy as they have relatively large marketed surplus but farmers with small size of holding who cannot afford heavy investment on irrigation structure and have relatively very small marketed surplus fail to get the adequate benefits of minimum support price policy of the Government and the modern agricultural technology that demands bigger investments. In the light of the above said facts, it was considered appropriate to conduct a study which would attempt to answer such questions as to whether the minimum support price policy of the Government of India has made any impact on the shift in cropping pattern in Punjab over time.

### Materials and Methods

The present study was based on secondary data. The data on area under major crops in Punjab and minimum support prices (MSP) from 1965-66 to 2011-12 were collected to fulfill the objective of the study. The minimum support price (MSP) data were collected from the reports of the Commission for Agricultural Costs and Prices, Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers' Welfare, Government of India, New Delhi whereas the data on area under major crops were collected from Statistical Abstracts of Punjab.

### Analytical techniques

**Compound growth rates:** The compound growth rates were calculated by fitting the exponential function to data related to minimum support prices of major crops of the Punjab state.

$$Y = ab^t$$

Y = dependent variable

A = constant term

B = (1+r), regression coefficient

R = (b-1)\*100, Compound growth rate in percentage

T = time variable

**Regression analysis:** To examine the impact of minimum support prices on cropping pattern, the time period taken for the major crops was 1965-66 to 2016-17 depending on the availability of data. A log linear model regression was selected using explanatory variable on the basis of goodness of fit ( $R^2$ ) for which equation becomes as under:

$$\log A_t = b_0 + \sum_{i=1}^n b_i \log X_i + U$$

Where,

$A_t$  = Area at time (t year)

$b_0$  = Intercept

$X_1$  = Lagged minimum support price (t-1 year)

U = error term

### Results and Discussions

#### Minimum support prices (MSP) of major crops in Punjab

The price policy adopted during the sixties provided the minimum support prices (MSP) as an assurance to farmers to grow a particular crop without any risk in its price fluctuation. The minimum support price for paddy increased from Rs 51 per quintal to Rs 510 per quintal in the year 2000-01 and was Rs 1590 per quintal during the year 2017-18. For wheat crop, the minimum support price was Rs 76 per quintal in 1970-71, while in the year 2000-01, it was Rs 580 per quintal. Recently, it was Rs 1735 per quintal during the year 2017-18. In cotton crop also, minimum support price was Rs 304 per

quintal in 1980-81 which increased to Rs 1625 per quintal in 2000-01 and was Rs 4320 per quintal in the year 2017-18. The compound growth rate of paddy was calculated as 7.43 per cent per annum while that of wheat was 6.73 per cent per annum. In case of cotton crop, the compound annual growth rate was 6.50 per cent per annum. Thus, growth in paddy MSP was more than that of cotton and wheat crops.

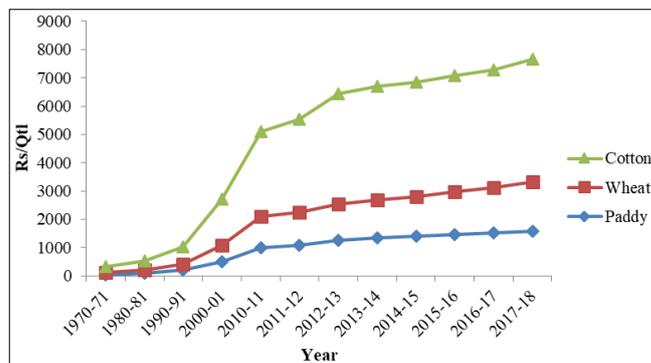
**Table 1:** Minimum support prices (MSP) of major crops in Punjab (Rs/quintal)

Year	Paddy	Wheat	Cotton
1970-71	51	76	210*
1980-81	105	117	304
1990-91	205	215	620
2000-01	510	580	1625
2010-11	1000	1100	3000
2011-12	1080	1170	3300
2012-13	1250	1285	3900
2013-14	1345	1350	4000
2014-15	1400	1400	4050
2015-16	1450	1525	4100
2016-17	1510	1625	4160
2017-18	1590	1735	4320
CAGR (%)	7.43	6.73	6.50

**Source:** CACP (various reports).

Note: \* -Denotes MSP of cotton crop which were available from 1975-76 onwards and growth rate were calculated from 1975-76 to 2017-18 for this crop.

The continuous increase in MSP for these crops resulted in the development of agriculture sector very well as farmers 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 1 shows the upward trend in minimum support prices for these crops over the years.



**Fig 1:** Minimum support prices (MSP) of major crops in Punjab

#### Compound annual growth rates (CAGR) of minimum support prices

The compound growth rates of minimum support prices for paddy, wheat and cotton crops have been given in Table 2. In case of paddy crop, maximum growth in MSP was seen during 1990-91 to 1999-00 (9.65 %) while increase was minimum during the period 1980-81 to 1989-90 (5.46 %) and in overall, MSP increased at 7.81 per cent per annum. Similarly, in case of wheat crop also, growth in MSP was highest during the period 1990-91 to 1999-00 (10.44 %) while it was minimum during the period 1980-81 to 1989-90 (4.51 %) and was 6.81 per cent during an overall scenario (1970-71 to 2017-18). In case of cotton crop, growth in MSP was highest during 1990-91 to 1999-00 (10.04 %) and was minimum during 2000-01 to 2017-18 (5.16 %). Thus, growth

in MSP of paddy, wheat and cotton crops were maximum during the period 1990-91 to 1999-00 while, it was less during other decades as shown in the table. The increase in prices of these crops resulted in good economic benefits to the farmer's and encouraged the wheat- rice cropping pattern in Punjab. Minimum support prices (MSP) of paddy crop showed an increase of 6.73 per cent per annum during period (1970-71 to 1979-80) to 9.65 per cent per annum during 1990-91 to 1999-00 and then further to 8.11 per cent per annum during 2000-01 to 2017-18.

**Table 2:** Compound annual growth rates (CAGR) of minimum support prices (Per cent/annum)

Year	Paddy	Wheat	Cotton***
1970-71 to 1979-80	6.73**	4.53**	5.82**
1980-81 to 1989-90	5.46**	4.51**	8.05**
1990-91 to 1999-00	9.65**	10.44**	10.04**
2000-01 to 2017-18	8.11**	7.52**	5.16**
1970-71 to 2017-18	7.43**	6.73**	6.50**

\*\* indicates statistical significance at 5 per cent level; and ns indicates non-significant values.

\*\*\* CAGR were calculated from 1975-76 to 2017-18 for cotton crop.

### Impact of minimum support prices on cropping pattern

The price policy adopted during the sixties provided the instrument of minimum support prices not only as a guard against the lower side fluctuations in prices but also as an incentive to grow a particular crop and maneuver the cropping pattern. This is achieved by ensuring a steady increase in the MSP price level over the years. It was designed to provide assurance to the farmers about the expected prices during the next season. In other words, MSP as an instrument of price policy provided a rational basis for price expectations to the farmers. In the present study, in order to see the impact of MSP on cropping pattern of the state, a single variable regression equation with area under a particular crop as dependent variable and lagged MSP as an independent variable was carried out. The results of the regression analysis have been given in Table 3.

**Table 3:** Regression coefficients of Cobb-Douglas production function for major crops in Punjab

Particulars	Wheat	Paddy	Cotton
Intercept	7.40* (0.07)	4.85* (0.22)	6.78* (0.17)
MSP <sub>t-1</sub> (X <sub>i</sub> )	0.12* (0.01)	0.48* (0.04)	-0.06** (0.03)
R <sup>2</sup>	0.70	0.81	0.14
Adj. R <sup>2</sup>	0.69	0.80	0.11

Note: \* Indicates statistical significance at 1% level, \*\* indicates statistical significance at 5% level; and figures in the parentheses are Standard Errors.

It can be seen from the Table that coefficient of multiple determination (R<sup>2</sup>) came out to be 0.70, 0.81 and 0.14 for wheat, paddy and cotton crops, respectively. This showed that R<sup>2</sup> explained 70, 81 and 14 per cent variation in the dependent variable i.e. area under wheat, paddy and cotton crops. The effect of lagged minimum support prices (MSP) of wheat and paddy on area has shown a significant and positive effect whereas for cotton crop, the lagged minimum support price showed a negative but significant effect. The results show that with one per cent increase in minimum support price (MSP) in the previous year, the corresponding area increased by 0.12 and 0.48 per cent in wheat and paddy crops whereas in cotton crop, with one per cent increase in MSP, the area decreased by 0.06 per cent. This shows that the lagged minimum support

price has made a positive and significant impact on increase in area under paddy and wheat crop in the next year. However, in cotton crop, area declined not because of MSP but it was due to some other factors i.e. cotton crop is confined to Sri Muktsar Sahib, Bathinda, Faridkot and Ferozepur (including Fazilka) districts where due to severe incidence of *American Bollworm* during end 90's, there was decline in area under cotton crop. So, in the present analysis, the lagged MSP of cotton has negative impact on the area under cotton.

### Conclusion and suggestions

Effective price policy through significant increase in minimum support prices (MSP) particularly for wheat and paddy coupled with relatively better production technology available has driven the state agriculture at remarkable rate and resulted into the emergence of paddy and wheat crops as the most secure and profitable ones in the state. It clearly reveals that paddy- wheat crop rotation became predominant at the cost of maize, other cereals, oilseeds and pulses in the state. The results also showed that lagged minimum support prices (MSP) have made positive and significant impact on change in cropping pattern in the Punjab state. Punjab agriculture has reached at a point of stagnation. So, in order to make region's agriculture sustainable, stress should be given on those crops which require less water. Paddy- wheat crop rotation should be diverted to other crops like maize, fodder, vegetables, pulses and oilseeds so that the water resources and soil health can be saved. Extension efforts should be further strengthened for adoption of tensiometers, laser levelling of fields, bed planting and emphasis on growing water saving crops are some of the steps which should be taken on priority basis. 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 and this can be helpful in diversification of Punjab agriculture.

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