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Trends analysis of cost of cultivation of major cereals in Uttar Pradesh

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Abstract

The total geographical area of Uttar Pradesh is 24,093 thousand ha, out of total geographical area nearly 16,598 thousand ha. (67 percent) is net sown area. Nearly half of the population living in area is engaged with agriculture for their livelihood. The fertile endo-gangetic plains land is suitable for the cultivation of cereals. Cost of cultivation is important to know about the farm efficiency and farm profitability. To study the growth rate of cost of cultivation forte period of 2004-05 to 2018-19 of major cereal namely Paddy, Wheat, Maize and Barley, compound annual growth rate was calculated. The highest growth rate in cost of cultivation was recorded in maize followed by paddy and lowest was recorded for barley.

Keywords: area, cost of cultivation, compound annual growth rate, population

Introduction

Uttar Pradesh is a state, which is located at northern part of India. The State situated between 23°52'N to 31°28'N latitude and 77°30'E to 84°39' E longitude and is bordered by Uttarakhand in the north, Haryana, Delhi & Rajasthan in the west, Madhya Pradesh in the west and south west, Chhattisgarh in the south and Bihar in the East. The total geographical area of Uttar Pradesh is 24,093 thousand ha, out of total geographical area nearly 16,598 thousand ha. (67 percent) is net sown area. Uttar Pradesh is 4th largest area wise state in India (Tiwari, 2015) ^[1]. Total 199.81 million peoples (16.5% of India's total population) are living in the state out of which nearly 29 per cent peoples are living below poverty line (Agricultural Statistics at a glance, 2019) ^[2]. Nearly 47% population directly engaged with agriculture for livelihood. The state is dominated by small and marginal farmers. Due to the fertile Indo-gangetic plains in its geographical area, the state is suitable for the cultivation of a dozen of cereals. Cereals are cultivated in in large area of the Uttar Pradesh. The major cereals like paddy, wheat, maize and barley nearly 28% of India's wheat and 12% of paddy is produced by the state.

Cereals are edible seed of Gramineae family which is concentrate source of carbohydrate, major source of energy, proteins, vitamins and minerals. Generally cereals are cheap to produce, easy to store and transport and not deteriorate the quality if it is stored after dry. Because of the above mentioned reasons Uttar Pradesh is very famous for his rice-wheat cropping system. The total area under food grain in 2018-19 was 123.94 MH and production was 284.95 MT, in which Uttar Pradesh contributed 19.49 MH area (15.73%) and 54.63 (19.17%) in total food grain of the country (Agricultural Statistics at a glance, 2019) ^[2]. In the same lines the total area covered and production of paddy was recorded as 43.79 MH and 116.42 MT in 2018-19. Uttar Pradesh shares about 13.12 per cent area (5.75 MH) and 13.34 per cent (15.54 MT) production in the total area and production of paddy in India. The area covered by wheat in year 2018-19 was 29.14 MH and recorded production was 102.19 MT in India. Uttar Pradesh contribute 9.54 MH (32.74%) area and 32.75 MH (32.04%) production in the total area and production of the country. In the same line, the area coverage and production of Maize and Barley was recorded as 9.18 MH, 27.23 MT and 0.47 MH, 1.45 MT in year 2018-19. The total share of area and production of Maize and barley was recorded as 7.98 per cent (0.73MH), 5.63per cent (1.53MT) and 31.63 per cent (0.47 MH), 31.36 per cent (1.45MT). Cost of cultivation refers the total cost incurred by the farmer in cultivation of crops in a unit area. It is the best suited measure to know about the farm efficiency and farm profitability. The changing agriculture scenario from traditional to modern is led to change in the farm efficiency because efficient input use and modern practices. Regarding this an attempt is made to know the growth rate in cost of cultivation in Major cereals namely Paddy, Wheat, Maize and Barley in Uttar Pradesh.

Methodology

Fifteen years' (2004-05 to 2018-19) time series data on cost of cultivation of Paddy, Wheat, Maize and Barley was collected from Directorate of Economics and Statistics, Ministry of Agriculture and Farmers welfare for the purpose. The data was collected and analysed for Uttar Pradesh. Compound Annual Growth rate (CAGR) was computed to inspect the growth rate in cost of cultivation. The compound growth rate has been determined by using the following exponential function

$$Y=AB^t$$

Where,

Y= The variable for which growth rate is calculated

t = Time variable

B= The regression coefficient

A= intercept

The log form of the above exponential equation is expressed as

$$\text{Log (Y)} = \text{Log (a)} + t \text{Log (b)}$$

The compound growth rate percentage (r%) can be expressed as

$$r \% = [\text{Antilog}(\log B) - 1] * 100$$

Result and Discussion

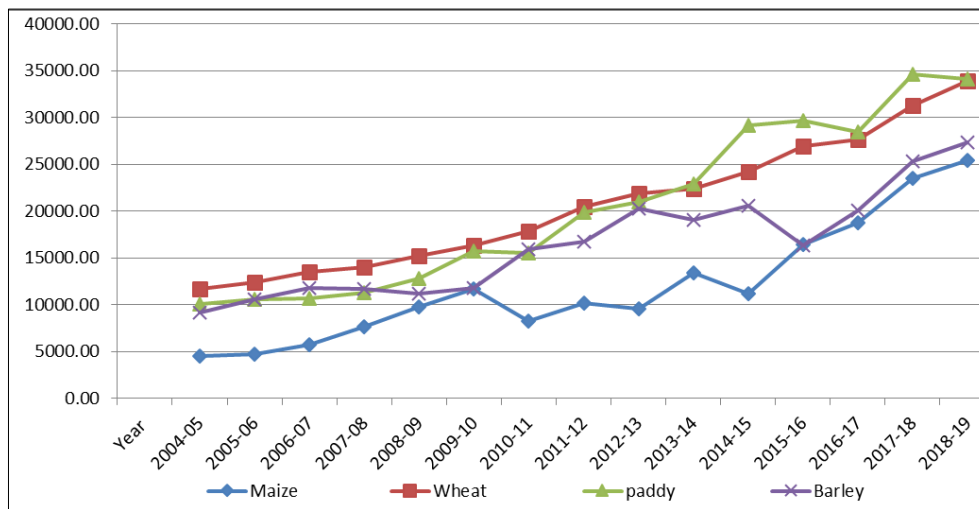


Fig 1: Temporal Trend of cost of cultivation of cereals in Uttar Pradesh

Uttar Pradesh state witnessed drastic change in cost of cultivation of major cereals during last decades. The cost of cultivation of wheat recorded gradual increase from 2004-05 to 2014-15 after which the cost of cultivation recorded decline. The cost of cultivation of paddy was recorded lower than wheat from 2004-05 to 2013-14, but the cost of cultivation hiked from year 2014-15 to 2018-19 instead of

2016-17, the above finds was also supported by Pushpa *et al.*, 2017^[7].

Maize was the most profitable crop in Uttar Pradesh as its production and productivity shows a massive increase but the cost of cultivation recorded lowest during 2004-05 to 2018-19. Barley recorded continuous increase in area from 2009-10 to 2014-15.

Table 1: Compound annual growth of Cost of cultivation major cereal in Uttar Pradesh region

CAGR of Cost of Cultivation of Major Cereal in Uttar Pradesh				
Year	Maize	Wheat	Paddy	Barley
2004-05	4541.32	11648.25	10020.45	9139.13
2005-06	4685.77	12342.56	10605.02	10559.63
2006-07	5703.82	13512.26	10635.02	11803.41
2007-08	7659.30	13971.15	11323.80	11701.80
2008-09	9812.72	15188.77	12834.99	11215.14
2009-10	11642.53	16331.17	15690.98	11814.16
2010-11	8274.64	17806.69	15490.64	15879.24
2011-12	10134.22	20430.17	19867.22	16721.64
2012-13	9569.98	21846.68	21001.71	20253.06
2013-14	13375.28	22375.77	22884.43	19109.28
2014-15	11152.48	24254.03	29137.86	20595.45
2015-16	16445.42	26916.80	29679.37	16295.13
2016-17	18793.96	27630.18	28483.47	20032.67
2017-18	23521.07	31243.77	34648.37	25292.98
2018-19	25409.78	33960.38	34124.39	27312.82
TE	22574.94	30944.78	32418.74	24212.82
Anti	1.119308029	1.079813789	1.105091858	1.073666746
CAGR	0.119308029	0.079813789	0.105091858	0.073666746
CAGR (%)	11.93	7.98	10.50	7.36

Maize, Wheat, Paddy and Barley are the most important crops in Uttar Pradesh state. Indo-gangetic plain zone have the ample potential for the cultivation of cereals. The table shows the CAGR of cost of cultivation cereals namely Maize, Wheat, Paddy and Barley. The data revealed that the maize recorded the highest growth in cost of cultivation (11.93%) followed by Paddy (10.50%) during the study period. 7.98 per cent growth rate and 7.36 per cent growth rate was recorded in case of wheat and barley.

Fragmentation of land, substitution of labour to mechanical and chemical technology are the reasons behind increasing cost of cultivation (Deininger K. *et al.* 2015) ^[6]. Increase the cost of cultivation can be due to increase the value of in the fixed cost (Land revenue, rental value of land etc.) and variable cost (fertilizer cost, labour cost, seed treatment cost, Irrigation, harvesting etc.)

Conclusion

Paddy, Wheat, Maize and Barley are the important crop in Uttar Pradesh. The trend analysis shows that wheat recorded gradual increase in the cost of cultivation and Maize recorded lowest cost of cultivation during the study period. The compound annual growth rate of cost of cultivation recorded highest for maize (11.93%) and lowest for Barley (7.36%). It need to take an important step towards minimize the cost of cultivation to dream come true of doubling the farmers income.

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