

Growth Dynamics of Wheat in Marathwada Region Feasibility Testing of Aeroblast Sprayer

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Abstract

Wheat is the most important of food grain of India. It is the staple food of millions of people which is cultivated during Rabi season. In the present study the compound growth rates and instability were estimated with the help of district wise secondary time series data of thirty years collected from government sources. The results indicate that out of seven districts of Marathwada the area under wheat cultivation of Osmanabad, Beed and Latur district was positive compound growth rate for the period-I (1985-86 to 1999-2000) i.e. 15.21, 7.57 and 3.52 per cent per annum respectively. However, the growth rates were higher side during the period-II (2000-01 to 2014-15) for Beed, Latur and Aurangabad district i.e. 7.62, 6.17 and 4.52 per cent per annum respectively as compared to period-I. It was found to be statistically significant. Whereas, for the overall period the compound growth rate of area and production were positive in all most all the district except Jalna (area : -9.08 & production:- 5.77 per cent per annum) and Parbhani district (area: -4.32 & production: - 1.09 percent per annum). The average area under cultivation of wheat for last thirty year was highest in Parbhani followed by Beed, Aurangabad and Nanded district viz; 417000, 375100, 357500 and 277700 hectares. The coefficient of variation indicates the instability the lowest coefficient of variation for area under wheat cultivation was observed in Nanded district (26.37 percent) for overall period. On the other hand highest coefficient of variation for area was observed in Beed (40.56 per cent) district during the thirty year (1985-86 to 2014-15). The coefficient of variation of the production during the overall period was range in between 38.92 to 67.87 per cent. The area and productivity was indicating stability in wheat crop in all most all the district in Marathwada region. It indicates that the wheat is cultivated traditionally in the region during rabi season. Hence, it is a scope to increase the area under cultivation, especially in Jalna and Parbhani district by providing high yielding varieties and improve technology.

Keywords: Wheat, Instability, CGR and Marathwada region

Introduction

Wheat (*Triticum aestivum*) is a cereal grain, originally from the South West Asia, but now cultivated worldwide. It is most important of food grain of India and it is the staple food of millions of people. Approximately one-sixth of the total arable land in the world is cultivated with wheat. Whereas paddy is mainly cultivated in Asia, wheat is grown in all the all the continents of the world. India is the second largest producer of wheat after China. It compare well with other important cereals in its nutritive value. It has good nutrition at profile with 12.1% protein, 1.8% lipids, 1.8% ash, 2.0% reducing sugar, 6.7 pentose, 59.2% starch good sources of mineral of vitamin and nicotinic acid.

In the world area around 225.62 Million ha. With a production of 685.6 million tonne. The normal world productivity is 3039 kg/ha.

Wheat is grown in India in an area of about 29647 million ha. With a production of 92458 million tonne. The normal national productivity is about 3119 kg/ha. India share out of world production is 13.15%.

In Maharastra during 2012-13 area, production and productivity is 594000 'ha, 875000 Tonnes and 1473 kg/ha respectively.

Objective of the Study

The objectives of the study are:

- 1) To estimate the annual growth rate of area, production and productivity of wheat.

2) To work out the instability during last 30 years.

Review of Literature

Mundinamani *et al.* (1998) work out the growth rates in area, productivity and production of total pulses in general and red grams in particular for Karnataka using time series data. They found that the growth rates of area, productivity and production of total pulses were remained stagnant. District wise analysis showed that the district Bijapur and Gulbarga registered significant positive growth rates in area, productivity and production of total pulses in respect of red gram. The compound growth rate of area, production and productivity of red gram in Bijapur district is 0.45, -3.93, -3.75 and for Gulbarga district 3.99, 2.37, and 5.69 respectively. The contribution of different factor to the growth rates of red gram and total pulses revealed mixed trend.

Chand and Raju (2008) revealed that in a large state like Andhra Pradesh. The study has estimated instability in three major crops before (1981-93) and after (1993-04) the initiation of economic reforms at the state and district levels in Andhra Pradesh. Instability index for area has shown an increase after 1992-93 for rice and cotton and decline in the case of ground nut. It increased from 11.5 to 13.4 in rice and from 17.5 to 18.8 in cotton. The instability status as perceived through the state level data may be vastly different from that experienced at the disaggregate level. The study has concluded that the state level analysis does not reflect complete picture of shocks in agriculture production, and, further, shocks in production underestimates shocks in farm income. They has suggested the need for addressing risks in farm income by devising area-specific crop insurance and other suitable mechanisms. The net effect of fluctuations in production and prices on farm income has depicted that instabilities in area, production, yield and prices do not negate each other. The instability has been found higher in farm income than area, production and prices in all the cases, and it has not changed over time. This underscores the need for addressing risks in farm income by devising area-specific crop insurance or other suitable mechanization.

Hasan *et al.* (2008) studied the change and instability in area, production, and yield of two major cereal crops wheat and maize in Bangladesh based on secondary data during 1980-81 to -2003-04 using different statistical techniques. Area and production of wheat has increased satisfactorily. But yield was not increased to meet the demand of the country. In the case of maize, significant increment happened in yield during the study period. Area and production of maize also increased to fulfill the increasing demand of population. Presently, production of maize has increased more rapidly than its area. The growth in area, production, and yield of wheat slightly improved in period-II, whereas the growth rate in area, production, and yield of maize improved

rapidly. Though both of wheat and maize are unstable crops, maize showed very instability in its area and production because of its increasing tendency in the recent years.

Shaheen and Shiyani (2004) worked out the instability in area, production and productivity of fruit crop in Jammu and Kashmir for the period from 1990-91 to 2001-02 by using Cuddy-Della instability index. The result of instability index indicated moderate to high instability in production and productivity for all fruits, except apple, which showed low instability for all three parameter (area, production and productivity) throughout all the period.

Shende, *et.al.* (2010) an attempt has been made to study the growth and instability of major crops in Western Vidarbha. The study was based on the secondary data on area, production and productivity of jowar, cotton and soybean collected from the various government publications. At over all period, the area effect was most stronger factor for increasing production of jowar in all the district and division as whole, except Akola district i.e.305.22 per cent. at overall period, the result clearly indicated that the yield effect was most responsible for production of cotton in all the district of Amravati division as a whole and the area effect was most responsible factor for increasing soybean production in Amravati division i.e.46.98 per cent with positive yield and interaction effect i.e.1.91 and 51.41 per cent respectively.

Methodology

In this study, for the analysis of growth and instability. The period was divided into breakup of 15 years and overall as shown below,

Period I : 1985-86 to 2000-01

Period II : 2001-02 to 2014-15

Overall : 1985-86 to 2014-15

The compound growth rate of area, production and yield for Wheat for each Wheat growing district of Marathwada region were estimated to study the growth. It was estimated with the following exponential model.

$$Y = a b^t$$

$$CGR = [\text{Antilog}(\log b) - 1] \times 100$$

The 't' test was applied to test of significance of 'b'

To measure the instability in area, production and productivity, and index of instability was used as measure of variability. The coefficient of variation (C.V) was calculated by the formula-
Standard Deviation

$$CV(\%) = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

Result & Discussion

Growth Performance in Wheat

The growth performance of wheat pertaining to two periods and overall is discussed separately for each district as under

Table No.1 : District wise Compound growth rates for Marathwada Region.

Period		A.bad	Jalna	Beed	Latur	Osmanabad	Nanded	Parbhani	Marathwada region
I	A	0.98	-3.67	7.57	3.52	15.21**	-0.65	-3.62*	1.93
	P	14.20*	3.10	21.07**	15.89	23.08**	11.20*	12.33**	4.06
	Y	11.81*	7.75**	14.96**	13.59	9.44*	10.06**	14.23**	2.57
II	A	4.52	-22.15**	7.62	6.17**	0.01	3.64	-10.60	2.67
	P	5.66	-30.21**	9.63	3.98	-1.28	2.66	-8.21	5.53
	Y	1.08	-10.44*	1.78	-2.05	-1.32	-0.90	-0.27	3.40
Overall	A	3.49*	-9.08**	8.18**	7.18**	5.90**	3.37**	-4.32**	2.39
	P	10.60**	-5.77	11.52**	9.43**	5.87	8.35**	-1.09	6.03
	Y	6.08**	3.53*	3.28*	2.33	1.62	4.17**	3.90**	3.78

Note: A- Area, P- Production, Y- Yield, * Significant at 5% level and ** Significant at 1% level.

Compound Growth Rate

The district-wise compound growth rates of area, production and productivity of Wheat in Marathwada region for two periods and overall were worked out and presented in Table1. which reveals that, out of seven districts of Marathwada the area under Osmanabad, Beed and Latur district was positive compound growth rate for the period-I (1985-86 to 1999-2000) i.e. 15.21, 7.57 and 3.52 per cent per annum respectively.

However, the growth rate is higher side during the period-II (2000-01 to 2014-15) for Beed, Latur and Aurangabad district i.e. 7.62, 6.17 and 4.52 per cent per annum respectively as compared to period-I. It was found to be statistically significant.

Whereas, for the overall period the compound growth rate of area and production were positive in all most all the district except Jalna (area: -9.08 & production:-5.77 per cent per annum) and Parbhani district (area: -4.32 & production: -1.09 percent per annum). The average area under cultivation of wheat for last thirty

year was highest in Parbhani followed by Beed, Aurangabad and Nanded district viz; 417000, 375100, 357500 and 277700 hectares.

Instability of Wheat

One should not obvious of instability by taking the growth rates only. Because the growth rates will explain only the rate of growth of over the period. Whereas, instability will judge, whether the growth performance is stable or unstable for the period for the pertinent variable.

As seen from the Table No. 2, The coefficient of variation indicates the instability the lowest coefficient of variation for area under wheat cultivation was observed in Nanded district (26.37 percent) for overall period. On the other hand highest coefficient of variation for area was observed in Beed (40.56 per cent) district during the thirty year (1985-86 to 2014-15). The coefficient of variation of the production during the overall period was range in between 38.92 to 67.87 per cent. The area and productivity was indicating stability in wheat crop in all most all the district in Marathwada region.

Table No.2: District wise instability of Wheat in Marathwada region.

	Division & District		Period I			Period II			Overall		
			A	P	Y	A	P	Y	A	P	Y
1)	Aurangabad	CV	22.11	41.30	27.72	33.80	58.58	27.34	32.54	67.87	33.10
		Mean	310.93	322.00	1063.53	404.07	664.87	1537.07	357.50	493.43	1300.30
2)	Jalna	CV	18.79	23.66	19.63	43.24	52.99	31.18	34.29	42.47	34.00
		Mean	296.00	295.27	1018.27	206.33	333.73	1493.27	251.17	314.50	1255.77
3)	Beed	CV	29.46	46.27	29.40	30.71	47.08	24.27	40.56	57.51	26.69
		Mean	278.00	278.20	978.87	472.20	525.93	1072.20	375.10	402.07	1025.53
4)	Latur	CV	22.49	40.40	35.24	19.46	36.59	30.53	31.82	46.11	32.43
		Mean	191.73	201.27	1033.73	312.07	338.87	1101.67	251.90	270.07	1067.70
5)	Osmanabad	CV	37.71	49.15	28.37	21.49	44.52	38.80	31.82	48.37	34.58
		Mean	231.07	218.40	815.00	309.67	295.20	917.87	270.37	256.80	866.43
6)	Nanded	CV	13.53	29.02	24.29	26.17	36.39	20.51	26.37	44.84	25.16
		Mean	239.00	232.53	998.07	316.40	405.67	1279.53	277.70	319.10	1138.80
7)	Parbhani	CV	13.09	31.99	30.40	47.32	46.54	22.81	32.87	38.92	27.30
		Mean	445.87	531.33	1145.53	388.13	493.33	1360.80	417.00	512.33	1253.17

Note: CV- Coefficient of variation (per cent per annum). M- Mean. (Area: 00ha, Production: 00 tonne, Productivity: kg/ha).

Conclusion

The results of this study lead to the conclusion that, the compound growth rate of area and production were positive in all most all the district except Jalna (area : -9.08 & production:-5.77 per cent per annum) and Parbhani district(area: -4.32 & production: -1.09 percent per annum). The average area under cultivation of wheat for last thirty year was highest in Parbhani followed by Beed, Aurangabad and Nanded district viz; 417000, 375100, 357500 and 277700 hectares. The coefficient of variation indicates the instability the lowest coefficient of variation for area under wheat cultivation was observed in Nanded district (26.37 percent) for overall period. On the other hand highest coefficient of variation for area was observed in Beed (40.56 per cent) district during the thirty year (1985-86 to 2014-15). The coefficient of variation of the production during the overall period was range in between 38.92 to 67.87 per cent.

Hence, It is concluded that, wheat appears to the important rabi crop in the cropping pattern of Marathwada region. Therefore, it is very big unit to concentrate of this crop for policy maker and researcher.

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