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SOURCES OF GROWTH IN CEREALS PRODUCTION IN UTTAR PRADESH, INDIA

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Abstract

The study was conducted in the state Uttar Pradesh, which was selected purposively for the present study due to my personal interest. Keeping in mind the agro climatic conditions of the state was divided into nine agro-climatic zones. The methodology used was based on dynamicity of time and regionalization of area, production and yield of major cereal crops grown in Uttar Pradesh *viz*., rice, maize, pearl millet, sorghum, wheat and barley. The study reveals the positive growth in area, production and productivity of rice, wheat and maize whereas other crops showed the mixed trend. The variability was found highest in production followed by productivity and area throughout the years. The total production of cereals as per the study was due to the increase in production, area and its interaction with other factors. The estimation of future requirement shows that we are self sufficient in the case of cereals production and no need to borrow from other state or import for the consumption.

Key words : Cereals, growth rate, variability, decomposition analysis, future projection, demand and supply.

Introduction

Agriculture is the backbone of Indian economy, contributes about 14 per cent to national GDP and providing employment to 54.8 per cent of the total work force. India occupies an important place in production of cereals is predominant by smallholders that are characterized by low level output. Cereals are grown all over the world and account for almost 589 million hectares area and 2619 million tonnes of production with an average productivity of 32.4 q/ha in 2015-16. (Earth Policy Institute, U.S. Department of Agriculture, 2016). India accounted about 104.75 million hectares area and 277.3 million tonnes of production with an average productivity of 20.78 q/ha during 2015-16 is far lower than the global average. The share of Uttar Pradesh in total cereals accounted for 16.13 per cent in area and 19.81 per cent in production with productivity of 24.98 q/ha (2015-16). (Agricultural statistics at a glance 2014, Govt. of India).

In India, cereals production increased annually by 3.22 per cent during fifties mainly because of expansion of area under these crops. During sixties, a low annual growth of 1.72 per cent necessitating large scale imports of cereals. Annual growth 2.08 per cent was recorded during seventies and it was observed as turning period for the India's cereal economy as the path to self-sufficiency was marked by the revolutionary changes in the seed technology, that pushed up productivity level first in wheat and later in rice during the eighties. The decade of nineties could not maintain this pace and annual growth rate fall down to 1.7 per cent and becomes equal to annual population growth.

Keeping in mind the importance of cereals and estimation of its demand and supply and projection, a critical examination of growth, variation, decomposition analysis and constraints related to production, post harvest management and marketing infrastructure among various agro-climatic zones on one hand and the growth of population on other would have paramount importance. An econometric study of the facts during thirty years (1981-82 to 2011-12) will help to determine the future strategies and desirable actions to meet the forth coming challenges in cereal production.

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Materials and Methods

Uttar Pradesh was purposively selected for study area as it rank first in production of cereals. As per National Agricultural Research Project (NARP) classification, the state has been classified into nine agro climatic zones (Ghosh, 1991) *viz*. Western Plain Zone, South Western Semi Arid Zone, Mid Western Plain Zone, Bhabhar and Tarai Zone, Central Zone, Bundelkhand Zone, Eastern Plain Zone, Vindhyan Zone and North Eastern Plain Zone have been taken into account for purpose of present investigation. A period of thirty years from 1981-82 to 2011-12 was taken into account by dividing it into three phases, *i.e.* Phase I (1981-82 to 1990-91),Phase II (1991-92 to 2000-2001) and Phase III (2001-02 to 2011-12) to find out the variation and decomposition analysis.

For the present study, major cereal crops grown in Uttar Pradesh are Rice, Maize, Pearl Millet, Sorghum, Wheat and Barley. Secondary information was collected on various aspects like area, production and productivity of major cereals and was utilized for estimation of growth in area, production and productivity of cereals, variability, decomposition analysis and forecasting through Directorate of Agriculture, Statistics Division, Lucknow, U.P. The collected data were categorized, classified and tabulated as per need and then suitable statistical tools were employed to analyze them.

Compound growth rate

The compound growth rate technique was used for explaining its growth patterns (Saravanadurai and Kalaivani, 2010).

$Y = a\ b^t$

Where, Y = area, production or yield.

t = time

a = intercept term.

b = 1 + r (constant)

r = compound growth rate

Decomposition analysis

An analysis of growth rate of area, production and productivity of crops indicate the general pattern of growth in production, although this does not evaluate the exact contribution of area and yield to production (Paul *et al*., 2012).

$$\Delta P = A_0 \Delta Y + Y_0 \Delta A + \Delta A \Delta Y$$

Where,

A_0 = Total area under crops in base period

Y_0 = Total yield under crops in base period

ΔP = Average difference in total production during two periods.

ΔY = Average difference in total yield during two periods.

ΔA = Average difference in total area during two periods.

Variability of area, production and productivity

The variability in area, production and productivity of pulses crops of the entire state and across different regions in different phases was worked out by using following technique (Paul *et al*., 2012).

$$\text{Variability} = \text{C. V.} \times \sqrt{1 - R^2}$$

Where,

R^2 is coefficient of multiple determinations.

Projection of supply of cereals : The production of cereals in the state was projected by log linear function (Saravanadurai and Kalaivani, 2010).

$Y = a\ b^t$

Where, Y = production.

t = time

a = intercept term.

b = 1 + r (constant)

r = compound growth rate.

Projection of the demand : The demand projection of cereals depends upon population of the state and was measured through :

Requirement = Population × Minimum Requirement / Day × No. of days in year.

Projection of demand and supply gap : Demand and supply gap depend upon the demand against the supply of cereals. It was calculated by the following formula :

Demand Supply Gap = Total demand ± Total supply.

Results and Discussion

The data presented in table 1 shows the compound growth rate of area, production and yield of rice in state and among the zones. The overall growth rate in area of the state was found to be 1.57 per cent and significant at 1 per cent level of significance. For the state, in phase I and II area growth was positive but significant only in phase II at 0.1 per cent level of significance and phase III it was observed to be negative. Overall growth of area in Zone I, II, III and IV was estimated to be positive by 1.40, 3.77, 1.79 and 0.82 per cent respectively and also significant at 0.1 per cent level of significance.

Positive and significant in Zone V (0.87 per cent) and Zone VII (0.39 per cent) at 1 per cent level of significance. The overall growth rate of production of rice for the state as a whole was positive (2.91 per cent) and significant at 0.1 per cent level of significance and in phase I and II shows growth by 4.47 and 6.64 per cent and significant at 1 and 0.1 per cent level of significance, while phase III registered negative growth by 0.06 per cent. The overall growth observed positive in Zone I, II, III, IV, V and VII by 2.40, 6.47, 2.90, 1.58, 3.03 and 2.88 per cent respectively and significant at 0.1 per cent level of significance and in Zone VIII and IX by 2.76 and 2.90 per cent at 1 per cent level of significance. Similarly, yield growth of rice in the state reflects, increase in yield by 1.13 per cent and significant at 0.1 per cent level of significance, where as growth was positive and in yield in Zone I and III by 1.01 and 1.09 per cent and significant at 1 per cent level of significance. Zone II, IV, VII and IX indicates positive growth by 2.60, 2.14, 2.48 and 2.49 per cent respectively and significant at 0.1 per cent and in Zone IV and VI by 0.75 and 1.37 per cent at 5 per cent.

The growth rate of area, production and yield of maize in state and across the zone is presented in the table 1, shows overall negative area growth by 1.56 per cent and significant at 0.1 per cent level of significance was observed in the state and during the phase I (1981-90), II (1991-2000) and III (2001-2011), it was negative by 0.10, 1.55 and1.59 per cent, respectively. Overall growth was found to be negative and significant in Zone I, III, IV, VIII and IX by 5.33, 6.45, 15.65, 1.09 and 1.15 per cent respectively at 0.1 per cent level of significance. Positive and significant in Zone VI by 2.02 per cent at 0.1 per cent level of significance. The table also indicates production growth of the state as a whole was decreasing by 0.13 per cent, phase wise in the state it was 4.15, 0.13 and -0.12 per cent in I, II and III phase, respectively. The overall growth depicts that zones having negative and significant growth were I, III and IV by 4.54, 3.57 and 13.07 per cent respectively at 0.1 per cent level of significance and positive and significant in Zone V (1.75 per cent) and VI (1.91 per cent). In Zone II it was positive (2.42 per cent) and significant at 0.1 per cent level of significance. Table also depicts growth rate of yield of state was 1.45 per cent and significant at 0.1 per cent level of significance. At state level during phase I, II and III it was observed to be increased by 4.26, 1.71 and 1.50 per cent, respectively. Zone wise, overall growth was positive and significant in Zone II, III, IV and IX by 2.85, 3.07, 3.05 and 2.12 per cent respectively at 0.1 per cent level of significance. Zone I and V indicates positive and significant growth by 0.84 and 1.91 per cent at 5 and 1 per cent level of significance.

The perusal of the table 1 shows compound growth rate of area, production and yield of pearl millet in the state and across the zones. The growth rate of area under pearl millet was estimated to be 0.02 per cent and at state level it was 1.08 and 0.65 per cent in phase II and III. The growth rate of production of pearl millet is also presented in this table, which indicates overall growth in the state was positive 2.67 per cent and significant at 0.1 per cent level of significance and during phase I, II and III it was found to be positive but significant in only phase III. Zone wise overall growth was found to be positive and significant in Zone II, III and IV by 3.37, 3.42 and 1.53 per cent at 0.5 per cent level of significance, Zone

Table 1 : Compound growth rate of area, production and productivity of cereals in different regions of Uttar Pradesh.

Regions/Zones	Rice (1981-82 to 2011-12)			Maize (1981-82 to 2011-12)			Pearl millet (1981-82 to 2011-12)		
	Area	Prodⁿ	Yield	Area	Prodⁿ	Yield	Area	Prodⁿ	Yield
Zone I	1.4***	2.4***	1.01**	-5.33***	-4.54***	0.84*	-4.49***	-1.96**	2.64***
Zone II	3.77***	6.47***	2.60***	-0.44	2.40***	2.85***	0.62**	3.37***	3.08***
Zone III	1.79***	2.90***	1.09**	-6.45***	-3.57***	3.07***	0.90***	3.42***	2.47***
Zone IV	0.82***	1.58***	0.75*	-15.65**	-13.07**	3.05***	-2.41***	-0.49	1.97**
Zone V	0.87**	3.03***	2.14***	-0.15	1.75*	1.91**	-0.88***	1.53***	2.43***
Zone VI	-1.19**	0.16	1.37*	2.02***	1.91*	-0.10	-0.41	1.18**	1.60**
Zone VII	0.39**	2.88***	2.48***	-1.09***	0.29	0.81	-2.93***	-2.01**	0.95**
Zone VIII	0.37	2.76**	2.38	0.33	0.21	0.11	1.65***	2.80**	1.13
Zone IX	0.40	2.90**	2.49***	-1.15***	0.94	2.12***	-7.61***	-6.12**	1.60***
State	1.57**	2.91***	1.31***	6.43***	6.64***	0.20	-2.65	-0.06	2.66**

Note : Zone I- Western Plain Zone, Zone II- South Western Semi Arid Zone, Zone III- Mid Western Plain Zone, Zone IV- Bhabhar and Tarai Zone, Zone V- Cental Zone, Zone VI- Bundelkhand Zone, Zone VII- Eastern Plain Zone, Zone VIII- Vindhyan Zone, Zone IX- North Eastern Plain Zone, * Significant at 5 per cent, ** Significant at 1 per cent and ***Significant at 0.1 per cent.

VI and VIII at 1 per cent level of significance and negative and significant growth was observed to be in Zone I, VII and IX by 1.96, 2.01 and 6.12 per cent respectively. The growth rate of yield in overall and during different phases in the state was 2.65, 4.13, 3.02 and 3.54 per cent. Zone wise overall growth was found to be positive and significant in all the zones at different level of significance. During the first phase yield growth was estimated to be positive in all the zones, but significant growth was observed in Zone V only.

The perusal of the table 2 indicates overall area growth in the state was observed to be negative (4.34 per cent) and significant at 0.1 per cent level of significance. In the state phase I, II and III, the area growth was observed negative and significant at different levels. Overall zone wise growth rate was found to be negative and significant. Positive and significant growth was only observed in Zone VI. Regarding the production growth, the overall zone wise growth was found to be negatively significant in all the zones. Regarding the yield growth overall and zone wise, it was found positive and significant in Zone I and V. In case of Zone III, IV and IX yield growth rate was positive but in Zone IV, VII and VIII it was observed to be negative. Phase wise yield growth was found to be positive except in Zone IV and VIII during phase I.

The results obtained regarding growth rate of area, production and yield of wheat are presented in table 2 indicates the overall growth in area among different zones was found to be positive and significant, only Zone I indicates negative and significant growth. State as a whole the same was also found positive (0.82 per cent) and significant at 0.1 per cent level of significance. Overall growth in production and yield across different zones and the state as a whole was found to be positive and significant at 0.1 per cent level of significance.

Table 2 : Compound growth rate of area, production and productivity of cereals in different regions of Uttar Pradesh.

Regions/Zones	Sorghum (1981-82 to 2011-12)			Wheat (1981-82 to 2011-12)			Barley (1981-82 to 2011-12)		
	Area	Prodⁿ	Yield	Area	Prodⁿ	Yield	Area	Prodⁿ	Yield
Zone I	-14.18**	-11.88**	2.67**	-0.67***	0.75***	1.43***	-3.65***	-1.40	2.34***
Zone II	-9.47***	-6.09**	3.72***	1.23***	2.65***	1.40***	-3.91***	-1.87**	2.12***
Zone III	-12.42**	-11.94**	0.53	0.97***	2.94***	1.94***	-8.48***	-5.30**	3.47***
Zone IV	-10.94**	-11.68**	-0.82	0.55***	2.62***	2.09***	-17.23**	-14.02*	3.87***
Zone V	-3.26***	-1.94**	1.36**	1.22***	3.06***	1.81***	-6.13***	-4.47**	1.76***
Zone VI	4.65***	-3.92***	0.76	0.85***	3.08***	2.20***	-0.43***	1.21**	1.65***
Zone VII	-2.64***	-2.88***	-0.25	0.94***	2.62***	1.66***	-4.77***	2.97***	1.88***
Zone VIII	-0.30	-0.42	-0.11	2.23***	4.82***	2.53***	-2.94***	-2.60**	0.30
Zone IX	-10.81**	-10.28**	0.59	0.55***	2.73***	2.16***	-8.57***	-5.35	3.52***
State	-4.34***	-3.35***	1.03	0.82***	2.61***	1.77***	-4.52***	-2.57**	2.04***

Table 3 : Variability of area, production and productivity of cereals in different zones of Uttar Pradesh (Percentage).

Regions / Zones	Area (1981-82 to 2011-12)	Production (1981-82 to 2011-12)	Productivity (1981-82 to 2011-12)
Zone I	11.29	7.10	13.61
Zone II	4.93	19.88	16.49
Zone III	6.46	21.33	16.17
Zone IV	5.95	17.87	14.58
Zone V	3.03	18.09	16.91
Zone VI	9.47	18.33	13.04
Zone VII	3.10	18.07	16.31
Zone VIII	12.17	32.08	22.96
Zone IX	1.52	19.17	19.80
State	2.23	17.23	15.85

Compound growth rate in area under barley crop is presented in table 2, which explains that overall growth in area was significantly decreased in the state and during the different phases. Across the zones overall growth rate in area was observed to be decreased significantly at 0.1 per cent level of significance. Overall production growth with respect to barley for Uttar Pradesh was found to be negative (2.57 per cent) and significant at 0.1 per cent level of significance. Overall zone wise it was estimated to be negative and significant in Zone II (1.87 per cent), Zone III (5.30 per cent), Zone IV (14.02 per cent), Zone V (4.47 per cent) and Zone VIII (2.60 per cent) at 0.1 per cent level of significance. Zone VI and VII indicated positive and significant growth. Table also indicates growth in yield, for the state as a whole, overall growth was observed positive (2.20 per cent) and

Table 4 : Decomposition Analysis of total cereal production with respect to area, yield and interaction effect in different zones of Uttar Pradesh. (in percentage).

Regions	Effects	Phase I	Phase II	Phase III	Over all
Zone 1	**Area**	-3.99	-0.05	+2.82	-2.74
	Yield	+8.63	+4.20	+4.39	+5.49
	Interaction	-0.11	-0.06	+0.33	-0.41
	Change in production	Positive	Positive	Positive	Positive
Zone 2	**Area**	-0.11	+11.58	+5.97	+4.24
	Yield	+11.75	+9.30	+10.52	+10.89
	Interaction	-0.38	+2.04	+1.01	+0.74
	Change in production	Positive	Positive	Positive	Positive
Zone 3	**Area**	+2.39	+7.87	+7.13	+3.92
	Yield	+11.46	+8.17	+9.09	+9.23
	Interaction	+0.82	+1.32	+1.18	+0.66
	Change in production	Positive	Positive	Positive	Positive
Zone 4	**Area**	-0.09	+2.88	+1.18	+0.82
	Yield	+5.39	+2.28	+2.28	+3.55
	Interaction	-0.31	+0.30	+0.11	+0.12
	Change in production	Positive	Positive	Positive	Positive
Zone 5	**Area**	+2.14	+9.32	+4.25	+2.69
	Yield	+20.53	+9.48	+25.22	+18.42
	Interaction	+0.66	+1.06	+1.01	+0.47
	Change in production	Positive	Positive	Positive	Positive
Zone 6	**Area**	-1.21	-0.01	+4.75	+0.06
	Yield	+3.02	+3.79	+7.55	+5.09
	Interaction	-0.12	-0.23	+1.72	+0.61
	Change in production	Positive	Positive	Positive	Positive
Zone 7	**Area**	+4.11	+1.76	+9.22	+4.59
	Yield	+17.95	+4.84	+20.84	+15.17
	Interaction	+1.32	+0.13	+2.17	+0.78
	Change in production	Positive	Positive	Positive	Positive
Zone 8	**Area**	+2.52	+2.23	-1.66	+0.23
	Yield	+9.81	+3.29	+2.03	+1.76
	Interaction	+0.55	+0.82	-0.37	+0.45
	Change in production	Positive	Positive	Positive	Positive
Zone 9	**Area**	-1.07	+0.71	+0.79	-0.41
	Yield	+22.03	+16.48	+26.22	+17.33
	Interaction	-0.40	+1.55	+2.30	-0.79
	Change in production	Positive	Positive	Positive	Positive
State	**Area**	+2.94	+35.39	+33.77	+13.65
	Yield	+10.12	+62.39	+109.28	+86.84
	Interaction	+0.95	+5.44	+7.43	+2.38
	Change in production	Positive	Positive	Positive	Positive

significant at 0.1 per cent level of significance except in Zone VIII. During the phase I growth for the state was positive (4.31 per cent) and significant at 0.1 per cent level of significance. Across the zone growth was found to be positive in most of the zones except Zone VIII.

Variability in area, production and yield of cereal crops is presented in table 3, indicates that overall variability of area in the state was estimated to be 2.23 per cent. Overall variability (1981-2011) across the zone was observed to be highest 12.17 per cent in Vindhayan Zone followed by Western Plain Zone (11.29 per cent), Bundelkhand Zone (9.47 per cent), Mid Western Plain Zone (6.46 per cent), Bhabhar and Tarai Zone (5.95 per cent), South Western Semi Arid Zone (4.93 per cent), Eastern plain Zone (3.10 per cent), Central Zone (3.03 per cent) and lowest 1.52 per cent in North Eastern Plain Zone in order of merit.

Overall variability for production during the period of 1981-82 to 2011-12 in the state was 17.23 per cent where as among the zones it was highest 32.08 per cent in Vindhayan Zone followed by that in Mid Western Plain Zone (21.33 per cent), South Western Plain Zone (19.88 per cent), North Eastern Plain Zone (19.17 per cent), Bundelkhand Zone (18.33 per cent), Central Zone (18.09 per cent), Eastern Plain Zone (18.07 per cent), Bhabhar and Tarai Zone (17.87 per cent) and 7.10 per cent in Western Plain Zone in sequence.

The overall yield variability in the state was 15.85 per cent, across different zones it was found to be highest in Vindhayan Zone (22.96 per cent) followed by North Eastern Plain Zone (19.80 per cent), Central Zone (16.91 per cent), South Western Semi Arid Zone (16.49 per cent), Eastern Plain Zone (16.31 per cent), Mid Western Plain Zone (16.17 per cent), Bhabhar and Tarai zone (14.58 per cent), Western Plain Zone (13.61 per cent) and Bundelkhand Zone (13.04 per cent).

The result from the table 4 exhibits that the overall situation of the state as a whole indicated an increase in production during the Phase I, Phase II, Phase III contributing 2.94, 35.39, 33.77 and 13.65 per cent respectively. The yield effect estimated to be 10.12, 62.39, 109.28 and 86.84 per cent in the respective phases. Among the zones it was seen that Western Plain Zone and North Eastern Plain Zone reflected negative area effect i.e 2.74 and 0.41 per cent and positive area effect 5.49 and 17.33 per cent. In rest of the zones the positive effect under area and yield was observed contributing in South Western Semi Arid Zone (+4.24 per cent and +10.89 per cent), Mid Western Plain Zone (+3.92 and +9.23 per cent), Bhabhar and Tarai Zone (+0.82 per cent and +3.55 per cent), Central Zone (2.69 per cent and 18.42 per cent), Bundelkhand Zone (+0.06 per cent and +5.09 per cent), Eastern Plain Zone (+4.59 per cent and +15.17 per cent) and Vindhayan Zone (+0.23 per cent and +1.76 per cent), respectively.

Table 5 : Projection of population and population density of Uttar Pradesh.

Year	Population (crores)	Population density
1981	10.60	440
1991	13.20	548
2001	16.61	689
2011	19.98	828
2012	20.34*	843*
2013	20.71*	859*
2014	21.09*	875*
2015	21.47*	891*
2016	21.86*	907*
2017	22.26*	924*
2018	22.66*	941*
2019	23.08*	959*
2020	23.50*	977*
2021	23.92*	995*
2022	24.42*	1016*

Note : * stands for Estimated value.

Table 6 : Cereals demand and supply in Uttar Pradesh as per minimum recommendation of WHO (400 gm/ day).

Year	Supply (million tonnes)	Demand (million tonnes)	Demand Supply Gap (million tonnes)
1981	20.79	15.47	+5.32
1991	31.34	19.27	+12.07
2001	40.75	24.25	+16.5
2011	46.65	29.17	+17.48
2012	47.29*	29.69*	+17.6*
2013	48.30*	30.23*	+18.07*
2014	49.32*	30.79*	+18.53*
2015	50.37*	31.34*	+19.03*
2016	51.44*	31.91*	+19.53*
2017	52.53*	32.49*	+20.04*
2018	53.65*	33.08*	+20.57*
2019	54.78*	33.69*	+21.09*
2020	55.95*	34.31*	+21.64*
2021	57.13*	34.92*	+22.21*
2022	58.29*	35.56*	+22.73*

Note : * stands for Estimated value.

The data presented in table 5 depicts that the population of the state in 1981 was 10.60 crores with population density of 440 person/km^2, which increased

to 13.20 crores with population density of 548 person/ km^2 in 1991. It became 16.61 crores (2001) and it recorded 19.98 crores in 2011. The estimated population of Uttar Pradesh during 2012 to 2022 was calculated by annual compound growth rate of 1.82 per cent would be constant for projection period. The population in 2012 was estimated to be 20.34 crores with population density of 843 person/km^2, which increased to 24.42 crores in 2022.

It is clear from the data presented in table 6, that the production of cereals in 1981, 1991, 2001 and 2011 was 20.97, 31.34, 40.75 and 46.65 million tonnes against the demand of 15.47, 19.27, 24.25 and 29.17 million tonnes respectively. It was also noticed that the demand supply gap reveals the surplus of 5.32, 12.07, 16.50 and 17.48 million tonnes in the respective years. The demand and supply for cereals was estimated was estimated over time, and result reveals that the supply of cereals in 2012 was 47.29 million tonnes increased to 58.29 million tonnes in 2022 and its demand from 29.69 million tonnes to 35.56 million tonnes by 2022. The supply demand gap shows the increased surplus of 17.60 to 22.73 million tonnes during the period of 2012 to 2022. It indicates self sufficiency in production of cereals. The surplus amount of cereals may be used to export or maintain as buffer stock for the emergency period.

Conclusion

The present study indicated that in Uttar Pradesh, the wheat holds good performances in absolute terms among the other cereal crops. But the compound growth rate reveals that the rice was found to be positive and recorded a highest growth rate among other cereal corps in terms of area of cultivation, production and yield in Uttar Pradesh over the study period. Eventhough, the fact that rice was found to obtain highest in terms of growth performance of area of cultivation, production and yield among other cereal crops. The future projection shows that we are self sufficient in case of demand of cereals as per the requirement of cereals by the population.

Competing interests

The authors have declared that no competing interest exists. This manuscript is neither published nor submitted for publication in some other journal or book.

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