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Short Communication

A Study of Growth Rates of Principal Crops of Andhra Pradesh

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In Andhra Pradesh (the undivided state prior to June 2nd 2014), the total foodgrains (cereals and pulses) production has substantially increased from 99.91 lakh tons in 1980-81 to 155.99 lakh tonnes in 2009-10. Owing to climate change, monocropping and intensification of resources, a shift in cropping pattern from low value crops to high value crops has been noticed. An attempt has been made in this paper to study the growth rates of area, production and productivity of foodgrain crops and other major crops (oilseeds and commercial crops) of Andhra Pradesh.

The secondary data on area, production and productivity of crops were collected for this study from 1980-81 to 2009-10 from different sources, namely Season and Crop Reports, Statistical Abstracts and Handbook of Statistics published by the Directorate of Economics and Statistics, Government of Andhra Pradesh and Agricultural Situation in India, respectively.

The whole period (1980-2010) was divided into two sub-periods i.e., 1980-81 to 1994-95, (pre-WTO) and 1995-96 to 2009-10 (post-WTO) period. The compound growth rates suggested by Dandekar (1980) on a priori consideration were estimated using exponential growth function $Y= AB^t$, where, Y = area (in '000ha)/ production (in '000 tonnes)/yield (in kg/ha), A = constant, B = regression coefficient, and t = time in years starting from the base year 1980-81.

The compound growth rates of area, production and yield of foodgrains were worked out for two periods, viz. 1980-81 to 1994-95, 1995-96 to 2009-10 and overall period (1980-81 to 2009-10) and the results are presented in Table 1. It was found that the nature of growth has not been uniform across different crops and over years.

(i) Cereals

The compound growth rate (CGR) of area and production of sorghum, pearl millet and finger millet were negative and significant at 1% level of significance in period I (-6.20, -4.51; -9.70, -8.40 and -5.10, -3.60, respectively), period II (-7.30, -2.20; -6.20, -4.60 and -6.70, -6.50, respectively) and also overall period (-6.40, -3.60; -7.50, -5.60 and -5.70, -5.0, respectively). Evidently, higher decline in production of pearl millet registered in period I than in period II. This was due to substantial decline in area in period I than in period II. But, the situation was reverse in case of finger millet. That is, higher decline in production of finger millet registered in period II than in period I which was due to substantial decline in period II than in period I.

The production of rice remained stagnant in period II as against significant increase of 2.1% per annum in terms of compound growth rate in period I. This is attributed to the fact that Andhra Pradesh which witnessed a positive growth in the area under production of rice as well as significant rise in productivity per unit of land during the period I had ironical experience of recording stagnation in the period II. Interestingly, rice registered positive growth in production (1.7% CGR per annum) and yield (1.6% CGR per annum) during overall period. Wheat registered negative CGR in respect of area and production (4.4% and -3.8%, respectively) in period I while it remained stagnant in period II. This clearly shows that the period II had no impact on wheat cultivation leading to stagnation in area and production of the crop.

The situation was reverse in case of maize. That is, the area and production of maize registered significantly higher rate of growth in period II (7.10% and 10.4% per annum, respectively). Whereas, the growth rate of area and production was found to be non-significant in period I. This clearly shows that maize had no impact on its cultivation leading to stagnation in area and production of the crop in period I. This could be reflected to the low growth rate in yield in period I. While in the overall period, the growth rates of area, production and yield of maize registered significantly higher (3.7, 7.4 and 3.5%, respectively). Singh and Singh (1991) and Sinha and Thakur (1993) found increasing trend of yield levels in their study.

(ii) Pulses

The compound growth rates of area, production and yield of total pulses registered positive and significant for both the periods and overall periods, though it was observed to be higher in the second period (1.5, 6.3 and 4.9%, respectively) than in the first period (1.0, 3.4 and 2.3%, respectively). The growth rate of area under cultivation of pigeonpea was significantly higher in period I (2.6%) compared to period II (2.1%). Interestingly, the compound growth rate of production and yield registered to be 6.4 and 4.2% per annum in the II period as against stagnation in production and yield levels obtained in I period which was attributed to be strong pull of technological factors benefit pigeonpea in the II period since it was mostly raised as an intercrop with sorghum in Andhra Pradesh. The yield of blackgram remained stagnant in both the periods. The growth rates of area and production of blackgram registered significantly positive (7.9 and 8.6%, respectively) in period I but, significantly negative in area (-1.9%) and non-significant trend in production were noticed in period II. Acharya *et al*. (2013) reported decreasing trend of yield levels of blackgram in their study.

Table 1 : Compound growth rates (% per annum) of area, production and yield of foodgrain crops in Andhra Pradesh

Crop	Sub-period I 1980-81 to 1994-95			Sub-period II 1995-96 to 2009-10			Overall period 1980-81 to 2009-10		
	A	P	Y	A	P	Y	A	P	Y
Paddy	0.13	2.1**	2.1***	-0.2	1.7	1.72***	-0.01	1.7***	1.6***
	(0.037)	(0.053)	(0.027)	(0.062)	(0.074)	(0.021)	(0.050)	(0.062)	(0.025)
Ragi	-5.1***	-3.6***	1.5***	-6.7***	-6.5***	1.21	-5.7***	-5.0***	0.5
	(0.021)	(0.045)	(0.032)	(0.025)	(0.060)	(0.115)	(0.030)	(0.060)	(0.084)
Jowar	-6.2***	-4.51***	1.8**	-7.3***	-2.2**	5.49***	-6.4***	-3.6***	2.9***
	(0.030)	(0.071)	(0.060)	(0.051)	(0.062)	(0.050)	(0.042)	(0.072)	(0.070)
Bajra	-9.7***	-8.4***	1.5	-6.2***	-4.6**	1.28	-7.5***	-5.6***	1.9***
	(0.032)	(0.070)	(0.067)	(0.090)	(0.140)	(0.092)	(0.075)	(0.115)	(0.080)
Wheat	-4.4***	-3.8**	2.7	-0.9	2.7	3.60**	-1.0**	-0.1	1.4***
	(0.065)	(0.131)	(0.110)	(0.072)	(0.123)	(0.091)	(0.084)	(0.137)	(0.103)
Maize	-0.2	2.2	2.56*	7.1***	10.4***	3.0***	3.7***	7.4***	3.5***
	(0.020)	(0.010)	(0.090)	(0.041)	(0.080)	(0.063)	(0.080)	(0.180)	(0.080)
Pigeonpea	2.6***	4.2	2.4	2.1***	6.4***	4.2**	2.5***	6.7***	3.4***
	(0.041)	(0.290)	(0.110)	(0.052)	(0.140)	(0.105)	(0.045)	(0.223)	(0.105)
Black gram	7.9***	8.6***	0.6	-1.9*	-1.5	0.2	2.3***	2.0**	-0.2
	(0.070)	(0.150)	(0.108)	(0.072)	(0.095)	(0.066)	(0.116)	(0.160)	(0.087)
Total pulses	1.0***	3.4***	2.3***	1.5**	6.3***	4.9***	1.3***	4.0***	2.7***
	(0.020)	(0.042)	(0.045)	(0.038)	(0.067)	(0.062)	(0.030)	(0.063)	(0.060)
Total foodgrains	-1.9***	1.1*	4.3***	0.005	2.8***	2.9***	-0.8***	1.8***	3.2***
	(0.020)	(0.042)	(0.024)	(0.028)	(0.064)	(0.038)	(0.030)	(0.055)	(0.034)

***, **, * are significant at 1, 5 and 10% probability level, respectively
Note: Figures in parenthesis indicate Standard Error (SE±)

Non-food grain crops

Oilseeds

The compound growth rates of area, production and yield of groundnut and also total oilseeds registered significantly positive in period I. While these were negative or stagnant in period II (Table 2). Decline in area under groundnut and unfavourable terms of trade after the economic reforms were responsible for decline in production in period II. Increase in production of total oilseeds in period I was due to the expansion of area. This was corroborated with the findings of Singh and Dhaliwal (1993). Whereas, the growth rates of these three components were found to be substantially higher in case of sunflower in period I than in period II while moderate in overall period.

Commercial crops

Intriguingly, the compound growth rates of area, production, yield of sugarcane registered stagnant in both the periods. The growth rates of area and production of cotton were significantly positive in period I as against stagnant in period II. The growth rate of yield of cotton was found to be significantly positive (4.5% per annum) in period II while stagnant in period I. In overall period, the growth rates of area, production and yield of cotton were significantly positive and better (ie. 4.1, 4.9 and 1.9% per annum, respectively). In case of tobacco, the growth rates of all the three components remained stagnant in both the periods except yield in period II which emerged as significant and positive (2.9% per annum). Fruits and vegetables fared better in period II than in period I in terms of compound growth rates of area, production and yield. The increase in area under fruits and vegetables in period II is due to the state's policy of promoting horticulture as a measure of risk minimization under schemes like Andhra Pradesh Micro Irrigation Project (APMIP) and National Horticulture Mission (NHM). While,

their production performance is due to stimulus given by Government of India through NHM. In overall period, higher growth rate of production of vegetables was attributed mainly due to yield effect while it was due to area effect in case of fruits. The negative trend or stagnation in area under sugarcane and tobacco in the second period might be attributed to several seasons viz., (i) price consciousness and economic rationality on the part of the farmers to allocate a portion of their land to better remunerative crops like fruits, vegetables, etc. (ii) risk of failure of crops (coarse cereals, such as, sorghum, pearl millet, finger millet, etc) due to vagaries of monsoon/rainfall and its distribution.

There is an immense need to take up productivity enhancing measures like varietal improvement, improved cultural practices, and distribution of planting material and pests & disease control measures in case of foodgrain and oilseed crops in general and in finger millet, blackgram and groundnut in particular.

Table 2 : Compound growth rates (% per annum) of area, production and yield of non-foodgrain crops in Andhra Pradesh

Crop	Sub-period I 1980-81 to 1994-95			Sub-period II 1995-96 to 2009-10			Overall period 1980-81 to 2009-10		
	A	P	Y	A	P	Y	A	P	Y
Groundnut	4.5***	5.5***	0.9	-2.4***	-5.6	4.2	-0.2	-1.7	0.9
	(0.040)	(0.088)	(0.060)	(0.053)	(0.290)	(0.288)	(0.085)	(0.234)	(0.205)
Sunflower	40.7***	47.2***	4.6***	1.96	4.5***	2.5*	14.3***	17.2***	2.4***
	(0.204)	(0.160)	(0.010)	(0.104)	(0.094)	(0.073)	(0.362)	(0.380)	(0.088)
Total oilseeds	4.7***	6.2***	1.4	-1.34**	0.9	2.2	0.7**	1.3**	0.6
	(0.030)	(0.074)	(0.055)	(0.042)	(0.140)	(0.122)	(0.070)	(0.129)	(0.096)
Sugarcane	0.4	1.7	-0.3	-0.10	0.2	0.3	0.7**	2.0***	0.3**
	(0.050)	(0.075)	(0.028)	(0.054)	(0.069)	(0.028)	(0.052)	(0.074)	(0.029)
Cotton	4.5***	6.1***	1.2	1.50	5.2	4.5***	4.1***	4.9***	1.9***
	(0.085)	(0.113)	(0.109)	(0.070)	(0.296)	(0.076)	(0.084)	(0.217)	(0.093)
Tobacco	-1.6	0.4	-1.1	-0.1	2.9	2.9***	-1.2**	0.8	2.1**
	(0.065)	(0.123)	(0.258)	(0.150)	(0.130)	(0.061)	(0.112)	(0.126)	(0.186)
Fruits	4.7***	8.5***	3.6***	6.2***	9.7***	3.2*	6.4***	7.2***	0.7
	(0.016)	(0.021)	(0.026)	(0.039)	(0.104)	(0.111)	(0.037)	(0.083)	(0.097)
Vegetables	3.7***	5.9***	2.0***	5.4***	8.4***	3.1***	4.1***	7.9***	3.0***
	(0.039)	(0.062)	(0.046)	(0.029)	(0.047)	(0.040)	(0.037)	(0.060)	(0.044)

***, **, * are significant at 1, 5 and 10% probability level, respectively

Note: Figures in parenthesis indicate Standard Error (SE±)

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