

# GROWTH RATES AND RELATIVE CONTRIBUTIONS OF DIFFERENT COMPONENTS TOWARDS THE PRODUCTION OF COMMERCIAL CROPS IN HARYANA

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## ABSTRACT

An attempt has been made in the present paper to study the growth rates in area, production and productivity of oilseeds, sugarcane, potato and cotton in semi-arid regions of the Haryana State. To measure the relative contributions of area, yield and prices in increase of crop production, decomposition analysis has been carried out. The study is based on secondary data for 1966-67 to 1980-81. The results revealed that among all the commercial crops, only potato registered positive and significant growth rates in area, production and productivity in all the districts representing different zones. In case of oilseeds, growth rates in productivity were positive for all the districts irrespective of negative area and production growth rates in some districts. Hisar observed highest positive growth rate in case of cotton. Growth rates in area as well as production revealed the association and conformity of the area with production for almost all the crops in all the three zones. A significant feature was observed from the decomposition analysis that the decrease in the contribution of area was associated with the increase in percentage share of price component. The analysis revealed that only a combination of increasing the per hectare yield, more area under cultivation and better price would give positive growth impact.

## INTRODUCTION

Formerly a backward state, deficient in food grains, with low rate of literacy and lack of industrial infrastructure, Haryana now occupies the second position among states in terms of per capita income after Punjab. Despite the fact that the state has earned the distinction of being a trend setter in agriculture, it had only 19.53 per cent of the total cropped area under commercial crops in 1980-81 which increased marginally in 1985-86 (19.70 per cent). Few attempts seem to have been made to work out the growth rates for commercial crops in general and under different agro-climate regions in particular. The present study is an attempt to analyze and discuss growth of commercial crops in arid and semi - arid regions of Haryana. specifically :

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- i) to quantify the growth in area, production and productivity of major commercial crops and,
- ii) to measure the relative contributions of area, yield and prices in the increase of crop production.

### MATERIAL AND METHODS

The study was based on the secondary data 1966-67 to 1980-81 obtained from the Statistical Abstracts of Haryana. From the agro-climatic considerations, the state of Haryana could be broadly divided into three regions (Singh and Pandey, 1981). The first region, (Zone A) consists of Ambala, Karnal, Sonapat and a part of Rohtak district, possesses more assured irrigation and relatively more fertile soils. The districts Gurgaon, Mahendergarh and a part of Hisar (Bhiwani) with relatively less irrigation facilities and sandy soils form the dry farming zone (Zone B). Jind, Hisar and Rohtak districts in between these two zones, form the third zone which is superior to dry farming zone (B) but inferior to irrigated and fertile zone (A).

District-wise compound growth rates were worked out by fitting exponential function  $Y = ab^t$  for area, production and productivity of oilseeds, cotton, potato and sugarcane.

To measure the relative contribution of area, yield and prices and their interactions in increase of crop production, the model of Sharma (1977) was used :

$$X = A_0P_0 \Delta Y + Y_0P_0 \Delta A + A_0Y_0 \Delta P + P_0 \Delta A \Delta Y + A_0 \Delta P \Delta Y + Y_0 \Delta A \Delta P + \Delta A \Delta Y \Delta P$$

X was calculated by subtracting  $X_0$  from  $X_n$ .

Where,  $X_n = A_n Y_n P_n$  and

$$X_0 = A_0 Y_0 P_0$$

$A_0$ ,  $P_0$ , and  $Y_0$  are the area, price and yield in the base year (average of triennium 1966-69) and  $A_n$ ,  $Y_n$  and  $P_n$  denote the corresponding values in the current year (average of triennium 1978-81);  $\Delta A$ ,  $\Delta Y$  and  $\Delta P$  denote change in area, yield and prices in current year over the base year.

### RESULTS AND DISCUSSION

Production growth rates of oilseeds declined in zone A. The reason might be explained by the fact that in the irrigated areas of the State (Zone A), oilseed crops are grown only on a minor scale and the lands allocated for the purpose are marginal. On the other hand, the growth rates of area and production for the same crop were found to be positive in the districts comprising zones B and C, representing arid and

Table 1. District-wise growth rates of area, production and productivity of commercial crops in Haryana

	Zone A			Zone B			Zone C			State
	Karnal	Ambala	Gurgaon	Mahendergarh	Jind	Hisar	Rohriak			
<b>Oilseeds</b>										
Area	-8.08*	-2.10	-5.25	5.80*	4.36	5.06	2.47	0.58		
Production	-7.15*	-1.53	-1.26	5.85*	5.50*	6.39	4.47	2.06		
Productivity	1.02	1.50	4.24*	12.55	2.95	1.26	2.01*	1.48		
<b>Sugar cane</b>										
Area	-1.83	3.40*	0.30		2.24	-1.80	0.67	0.34		
Production	0.66	5.92*	-0.18	@	0.47	-6.49*	-1.16	-0.06		
Productivity	1.20	2.48*	0.57		-1.88	-4.75*	11.10	-0.48		
<b>Potato</b>										
Area	8.33*	23.26*	2.20	@	12.42*	10.33*	3.45*	11.55*		
Production	7.25*	5.96*	1.43		7.75*	14.13*	8.50*	12.90*		
Productivity	1.65*	1.74*	2.74*		0.44	3.15*	4.28*	1.44		
<b>Cotton (American)</b>										
Area	-16.91*	-15.52*	-6.81*	@	0.28	6.42*	-5.87*	4.95*		
Production	8.15*	-4.07*	-23.5		1.98	8.37*	-6.89*	7.28*		
Productivity	-5.77*	-3.75*	2.48		1.34	1.84*	-1.26	1.68*		
<b>Cotton (Desi)</b>										
Area	-1.85*	2.09	-1.74	@	2.08*	1.84	-3.59*	1.06		
Production	0.75	6.37*	-26.46		4.96*	0.79	-1.91	1.12		
Productivity	2.46*	3.50*	-3.78		2.77*	-1.01	2.90*	0.73		

\* Significant at 5 per cent level

@ Less than 50 hectares/tonnes

semi-arid regions. This is due to the fact that among oilseeds, rapeseed and mustard are the main rabi crops of the abovesaid zones due to soil and water condition. Gurgaon district was the exception in zone B as both the area and production growth rates were negative.

Negative growth rates for area and production of oilseeds in different zones were somewhat compensated by the positive productivity growth rates, significant only in Rohtak and Gurgaon districts representing arid conditions. Obviously, the productivity of oilseeds was almost stagnant in all the districts in different zones.

The fertile and irrigated zone (A) observed positive production and productivity growth rates in sugarcane, though these were significant only in Ambala district. The zone B (arid) represented by Gurgaon district observed negative production and productivity growth rates. The growth rates for area, production as well as of productivity were found to be negative in Hisar district (zone C, semi-arid) but not in Rohtak and Jind districts. This was due to wide variations even within the zone itself.

Potato was the only commercial crop which observed the positive and significant growth rates in area, production and productivity in all the districts comprising the whole State irrespective of climatic variations among the zones.

Both the zones A and B experienced negative growth rates in area, production and productivity of American cotton, but zone C exhibited significantly positive growth rates.

In case of desi cotton, however, the growth rates of area, production and productivity were positive in zone A and C except the negative growth rates in Karnal district (zone A) and negative growth rates for area and production in Rohtak district (zone C).

#### Decomposition Analysis

Area and other factors individually and collectively affected the trend of production of oilseed in Hisar, Jind and Mahendergarh districts representing semi-arid (zone C) and arid (zone B) conditions, respectively (Table 2). In rest of the districts price factor individually contributed more than other components. A similar situation had also been observed in case of sugarcane.

In case of Potato also it was the area factor ( $A_c$ ) which contributed the most followed by price ( $P_c$ ) and area-price interaction ( $A_cP_c$ ). In case of American cotton, area factor (individually) was found to be more powerful in all the zones except Jind district (zone C) where yield factor was more pronounced followed by area factor. The interaction turned out to be negatively influenced in almost all the zones.

Price factor contributed the most towards total increase in the production of desi cotton, followed by yield factor in all the three zones except in Hisar district (zone C) where yield factor was negative. Area factor ( $A_c$ ) individually and jointly with yield ( $A_c Y_c$ ) and with yield and price ( $A_c Y_c P_c$ ) contributed negatively in Rohtak (semi-arid) and Karnal (irrigated) districts.

But for technical constraints such as the availability of irrigation, fertilisers and pesticides etc., more profits in a crop are likely to bring more area under it. The higher relative price of the crop and yield determine the profitability of a crop. Increase in both variables should rationally increase the acreage allocation in favour of respective crops. The interactions turned out to be negatively influenced mainly for sugarcane and desi cotton in Rohtak and Karnal districts and for oilseeds in Gurgaon and Karnal districts. The relative prices have increased but area conspicuously reduced. The decrease in the contribution of area was invariably associated with the increase in the percentage share of price component.

### CONCLUSIONS AND POLICY IMPLICATIONS

The area, its productivity and farm price of any crop need to be so managed that targetted increase in output is achieved in a zone. So far, gains of green revolution have been confined only to foodgrain crops, especially wheat and rice which are largely grown in districts representing irrigated and fertile zone. The districts representing arid zone have yet to realize the benefits of green revolution. The high yield and location specific varieties of seeds, availability of assured irrigation, fertiliser and plant protection inputs should also be made available to commerical crops like cotton and oilseeds which are largely grown in arid areas. A lucrative price declared in advance may support increased land allocation and cropping intensity.

So far the area is concerned, statistics reveal that Haryana has already reached a point where there is a very limited scope for increasing cultivable area. Out of the total reported area (according to village papers) of 43.21 lakh hectares, the net sown area was 36.5 lakh hectares in 1985-86. The area sown more than once was 52.46 per cent of the net area sown in 1984-85 compared to 21.8 per cent of all India level. Increasing cropping intensity and bringing uncultivable wasteland under cultivation besides being increasingly costly investments, belong to long range planning of area while an appropriate price can be adjusted in short time provided the basis information on cash factors is available. A suitable policy, therefore, should be such as to be capable of developing these major areas that lead to increased production of commercial crops.

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Year	Area (ha)	Yield (kg/ha)	Price (Rs/kg)	Value (Rs)	Yield effect	Price effect	Area effect	Total effect
1974	1000	1000	1000	1000000	0	0	0	0
1975	1014	1014	1014	1014000	14	14	14	42
1976	1028	1028	1028	1028000	28	28	28	84
1977	1042	1042	1042	1042000	42	42	42	126
1978	1056	1056	1056	1056000	56	56	56	168
1979	1070	1070	1070	1070000	70	70	70	210
1980	1084	1084	1084	1084000	84	84	84	252
1981	1098	1098	1098	1098000	98	98	98	294
1982	1112	1112	1112	1112000	112	112	112	336
1983	1126	1126	1126	1126000	126	126	126	378
1984	1140	1140	1140	1140000	140	140	140	420
1985	1154	1154	1154	1154000	154	154	154	462
1986	1168	1168	1168	1168000	168	168	168	504
1987	1182	1182	1182	1182000	182	182	182	546
1988	1196	1196	1196	1196000	196	196	196	588
1989	1210	1210	1210	1210000	210	210	210	630
1990	1224	1224	1224	1224000	224	224	224	672
1991	1238	1238	1238	1238000	238	238	238	714
1992	1252	1252	1252	1252000	252	252	252	756
1993	1266	1266	1266	1266000	266	266	266	798
1994	1280	1280	1280	1280000	280	280	280	840
1995	1294	1294	1294	1294000	294	294	294	882
1996	1308	1308	1308	1308000	308	308	308	924
1997	1322	1322	1322	1322000	322	322	322	966
1998	1336	1336	1336	1336000	336	336	336	1008
1999	1350	1350	1350	1350000	350	350	350	1050
2000	1364	1364	1364	1364000	364	364	364	1092
2001	1378	1378	1378	1378000	378	378	378	1134
2002	1392	1392	1392	1392000	392	392	392	1176
2003	1406	1406	1406	1406000	406	406	406	1218
2004	1420	1420	1420	1420000	420	420	420	1260
2005	1434	1434	1434	1434000	434	434	434	1302
2006	1448	1448	1448	1448000	448	448	448	1344
2007	1462	1462	1462	1462000	462	462	462	1386
2008	1476	1476	1476	1476000	476	476	476	1428
2009	1490	1490	1490	1490000	490	490	490	1470
2010	1504	1504	1504	1504000	504	504	504	1512
2011	1518	1518	1518	1518000	518	518	518	1554
2012	1532	1532	1532	1532000	532	532	532	1596
2013	1546	1546	1546	1546000	546	546	546	1638
2014	1560	1560	1560	1560000	560	560	560	1680
2015	1574	1574	1574	1574000	574	574	574	1722
2016	1588	1588	1588	1588000	588	588	588	1764
2017	1602	1602	1602	1602000	602	602	602	1806
2018	1616	1616	1616	1616000	616	616	616	1848
2019	1630	1630	1630	1630000	630	630	630	1890
2020	1644	1644	1644	1644000	644	644	644	1932
2021	1658	1658	1658	1658000	658	658	658	1974
2022	1672	1672	1672	1672000	672	672	672	2016
2023	1686	1686	1686	1686000	686	686	686	2058
2024	1700	1700	1700	1700000	700	700	700	2100
2025	1714	1714	1714	1714000	714	714	714	2142
2026	1728	1728	1728	1728000	728	728	728	2184
2027	1742	1742	1742	1742000	742	742	742	2226
2028	1756	1756	1756	1756000	756	756	756	2268
2029	1770	1770	1770	1770000	770	770	770	2310
2030	1784	1784	1784	1784000	784	784	784	2352