STUDY OF GROWTH, INSTABILITY AND SUPPLY RESPONSE OF COMMERCIAL CROPS IN PUNJAB: AN ECONOMETRIC ANALYSIS

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ABSTRACT

Agriculture is the predominant sector of Indian economy as a source of Indian economy as a source of income, employment and export earnings In this context, an effort is made here to examine the changes in the composition and growth of commercial crops like cotton, sugarcane and oilseeds in Punjab. This study also analysis the factors responsible for determining the area and production under these crops, which can be used by the policy makers for bringing about desired changes in the crop.

***Keywords*:** Agriculture, Growth, Commercial crops, production

INTRODUCTION

Agriculture is the predominant sector of Indian economy as a source of Indian economy as a source of income, employment and export earnings. Indian agriculture has made considerable progress in the production of food grains especially of wheat and rice during the last three decades. The performance has not been good in respect of oil seeds, fibers, pulses etc. Commercial crops play a significant role not only in the domestic sector but also in the external trade. These crops contribute significantly to the growth of the Indian economy by meeting the domestic requirements of oils, fiber and sugar as well as earning foreign exchange through exports or import substitution. Their significance has further grown recently due to liberalization and globalization of Indian economy since 1991.

Agriculture is the key to the overall development of the state economy which contributed as much as 17.5 (Q) percent to Gross State Domestic Product at constant prices (1993-94) during 2009-10. As per 2010 census around 37.0 percent of the working population of the state is employed in this sector. Scope of increase in area under agriculture has reached at a saturation level as 98.8 percent of cultivable land in the state is already under plough. The agriculture production can only be increased to some extent through enhanced cropping intensity, change in cropping pattern, improvement in seeds of high yielding varieties, cultivation practices and with the availability of better post harvest technology etc. State Govt. is trying to reorient agriculture through diversification policy and other measures.

OBJECTIVES

The specific objectives of the study with respect to the Punjab agriculture were:-

1. To study the composition of agriculture of Punjab.
2. To study the growth in areas, production and yield of crops in Punjab.
3. To study the instability in crops.

RESEARCH METHODOLOGY

The objectives of the study required an in depth analysis of area, Production and productivity of cotton, sugarcane, oilseeds and their competing crops like wheat and paddy. Time series analysis was done to understand the temporal changes in the area and production and identify the factors affecting them. To achieve objectives, the study employed two main analytical methods as:

a) Trend analysis

b) Area and supply response

Data collection

The time series data on area, yield and production of important crops of Punjab were taken from the various issues of the statistical Abstract of Punjab. The data on the level of use of modern technological inputs like area under high yielding seeds, consumption of chemical fertilizers. Irrigated area, etc. were also collected to examine their impact on production of commercial crops the data pertained to the agricultural year 1965-66 to 2009-10.

Table 1. Yield of different crops in Punjab (1965-66 to 2009-10)

Year	Rice	Wheat	Total cereals	Total pulses	Ground nut	Rape-Seed & mustard	Total Oil seed	Desi Cotton	American cotton	Sugar cane	Potato
1965-68	1172	1157	1434	728	1111	462	821	274	338	3214	14733
1972-75	2118	2278	2052	776	993	800	791	309	416	4955	10791
1978-81	2750	2747	2610	679	990	644	783	245	356	5482	19044
1982-85	3091	3103	2983	666	1020	915	850	190	312	6292	19687
1990-93	3156	3599	3341	697	909	1000	924	290	540	5990	19633
2004-06	3304	4069	3697	833	1000	1163	1285	296	481	6176	19242

Note: The average yield of each crop has been worked out by taking three years average at each point of time.

Source: Various issues of Statistical Abstracts of Punjab.

Table 2. CGR of area (A), Production (P) and Yield (Y) of crops in Punjab (1968-69 to 2009-10) (Percent per annum)

Crop \ Period	1968-69 to 1981-82			1981-82 to 2009-10			1968-69 to 2009-10		
	A	P	Y	A	P	Y	A	P	Y
Wheat	2.48**	4.71**	2.17**	0.49**	2.82**	2.37**	1.69**	4.30**	2.56**
Paddy	11.55**	17.92**	5.69**	3.36**	4.02**	0.63	7.51**	10.33**	2.62**
Sugar Cane	-3.69**	-0.21	3.60**	2.54	2.40	-0.11	-0.57	1.05*	1.65**
Desi Cotton	-2.35*	-4.95**	2.91**	-1.91	1.29	3.38*	-5.20**	-5.23**	-0.08
American Cotton	7.70**	6.96**	-1.04*	1.70*	5.39**	3.61*	3.88**	5.48**	1.40**
Ground nut	-6.06**	-5.42**	0.67	-16.24**	-15.04**	1.32	-12.49**	-12.57**	.086
Rapeseed & Mustard	.45	1.71	1.17	-2.72	–0.65	2.19**	-1.17	1.66*	2.89**

Note: **,* significant at 1 and 5 percent level of significance

Analysis of data

Tables were constructed to examine the shifts in area, productivity (yield) and production of commercial crops over time in the state. The percentages were calculated to estimate the proportional (relative) changes in their area to the total cropped area of the state.

Trend Analysis

For studying the trends in area, production and productivity of commercial crops the whole period was further divided into two sub periods. The sub periods are bounded as early green revolution period from 1968-69 to 1981-82 termed as Period I and late green revolution from 1981-82 to 2009-10 as Period II.

The commercial growth rates (CGR) of the selected parameters for two periods i.e., Period I (1968-69 to 1981-82) and Period II (1981-82 to 2009-10) were calculated by fitting the following equation.

Where

Y=ABt

Y= area, production or yield of the crop

A= constant

t= time period

B= coefficient to be estimated

The CGR was calculated as:

r= (B-1) x 100 = compound growth rate (in percent)

The significance of 'r' was tested by working out t-value as under:

't'= r SE(r)

Where't' follows student's t- distribution with (n-2) degrees of freedom. For examining instability, the area, production and yield data were deter ended for each time period separately using exponential equations. The instability measure (I) was constructed based on residuals. It is also denoted as coefficient of variation and is expressed in percentage terms.

Instability measures=

$$\frac{1}{\overline{\log y}} \sqrt{\frac{\sum_{i=1}^{n(\log yt - \log Yt)^2}}{n-2}} \times 100$$

CONCLUSION

Commercial crops play a significant role not only in the domestic sector but also in the external trade. These crops contribute significantly to the growth of the Indian Economy by meeting the domestic requirements of oils, fiber, and sugar as well as earning foreign exchange through exports or import substitution. The analysis brought out that cereals dominated the cropping pattern in the state. Wheat occupied 42.09 percent and paddy occupied 28.45 percent of the cropped area in the triennium of 1994-97, where as commercial crops put together accounted for only 13.74 percent of the cropped area. The share of wheat and rice in the cropping pattern has increased over time whereas that of commercial crop declined. Low level of profitability and instability in their yield were the main factors which were found to be responsible for fall in their area and production.

REFERENCES

1. Aggarwal N L and Petal G N (1994) Growth and instability in production of groundnut in saurashtra region of Gujrat agriculture situation in India 49:171 -174

2. Anonymous(1987) Edible oilseeds: Growth and supply behaviour in India. Agriculture Situation In India 40:623-625.
3. Bansil P C (1990) Agricultural Stastistical Compendium VOL O. Techno Economics Research Institute, New Delhi.
4. Bhalla G S and Hazell P (1997) Food Grains demand in India to 2020 –A preliminary exercise Economics and Political weekly 32:A150- A154.
5. Chamola S D and Hasija R C (1981) Oil seed production. *Yojana 25:24-25*
6. Dhindsa K S and Sharma Anju (1997) A regional analysis of growth and supply response of pulses- A study of Punjab. *Indian J Agri Econ 52:87-100*.
7. Jain K K(1984) Structural Distribution of Operational Holdings in Different Zones of Punjab. *Indian Journal of Agricultural Economics* 39(2): 251-258
8. Sharma P K and Gulati A (1990) Prices, Procurement and Production: an analysis of wheat and rice. *Economic And Political Weekly* March 31,1990.