

Comparative growth rate of agriculture in Indian and Pakistani Punjab

KULDIP SINGH AND T.S. CHAHAL

See end of the article for authors' affiliations

Correspondence to :

KULDEEP SINGH
Department of Forest
and Wildlife,
LUDHIANA
(PUNJAB) INDIA

ABSTRACT

An attempt has been made in this paper to analyze the variation in performance of agricultural sector in post independence period in Indian and Pakistani Punjab. The area under wheat, cotton, sugarcane and maize is higher in Pakistani Punjab as compared to Indian Punjab but under rice it is lower in Pakistani Punjab as compared to Indian Punjab. In case of production of wheat, cotton and maize, it is higher in Pakistani Punjab as compared to Indian Punjab but it is lower in the case of rice and sugarcane. In case of yield of wheat, rice and maize it is higher in Indian Punjab as compared to Pakistani Punjab but it is lower in sugarcane and cotton in Indian Punjab during the period of 2003-04. This primarily happened due to adoption of various technologies at a faster rate in Indian Punjab as compared to its counter part in Pakistani Punjab.

INTRODUCTION

India got partition on religious lines on the eve of Independence in 1947. Just half a century ago, Indian and Pakistani states of Punjab constituted a single state. The communal carnage that accompanied partition affected most of the families on both sides. Three million Hindu and Sikh refugees poured into Indian Punjab and about an equal number of Muslims were uprooted at that time. Such was the large bloody migration in human history that it posed a social and mental challenge to the people of both sides of the Punjabs. The partition was a traumatic experience. The rich fertile lands were left on the Pakistani side. The Britishers built here one of the most extensive canal systems of the world (59,000 km.). The Punjab provided almost laboratory-like conditions of comparability, for they shared virtually identical agro-ecological conditions, a common language and cultural traditions and a legacy of institutions developed under colonial rule. The colonial state left a clear imprint upon the undivided Punjab province. Nineteenth century officials created a framework for its economic growth by constructing modern irrigation systems, which also influenced the course of the region's social history. A number of studies (Prabha, 1969, Ahmad and Chaudhary, 1996; Sultan, 2000; Thukral, 2003 and Sidhu and Bhullar, 2005) have looked into the extent of disparities in agricultural development among the both states in this context. Sidhu and Bhullar (2005) concluded that the growth in agriculture has slowed down

due to stagnation or decline in the growth of productivity of important crops of both the states. Growth in productivity of crops in Pakistani Punjab is higher than that in Indian Punjab in 1990s. However, the productivity of all the crops except cotton was higher in Indian Punjab than in Pakistani Punjab. The productivity of cotton was higher in Pakistani Punjab. Comparative average yield of five major crops in India and Pakistani Punjab, respectively are 4207 and 2500 kg/ha for wheat, 3694 and 1701 kg/ha for rice, 1019 and 549 kg/ha for cotton, 45540 and 48000 kg/ha for sugarcane, respectively and 2982 and 2385 kg/ha for maize during the period of 2003-2004. The present paper makes an attempt to analyze the variation in the performance of agricultural sector in the post independence period in Indian and Pakistani Punjab.

METHODOLOGY

To fulfill the objectives of the study both the primary and secondary data were used. The secondary data were obtained to analyze the area, production and productivity of five crops on both the states. The secondary data were obtained from different published resources such as Statistical Abstract of Punjab, India and Statistical Abstract of Pakistan (Anonymous, 2006).

At the first stage, two districts were randomly selected from each of Indian and Pakistani Punjab States. At the second stage two blocks were randomly selected from each of the selected districts thereby making four

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Table 1: Sample districts, blocks and villages in the selected states					
Indian Punjab			Pakistani Punjab		
District	Blocks/ Tehsils	Villages	District	Blocks/ Tehsils	Villages
Ludhiana	Jagraon	Chakar	Faislabad	Faislabad	52 JB
		Dehraka			444 JB
	Raikot	Kamalpura		Samundari	98 GB
		Talwandi Rai			94 RB
Bathinda	Bathinda	Khaliwala	Tobha Tek Singh	Gojra	Chak No 91JB
		Jandawala			Chak No 520 JB
	Samana	Bibiwala		Tobha Tek Singh	Chak No 251 GB
		Gobindpura			Chak No 120 JB

blocks each in Indian-Pakistani Punjab. At the time of sampling, four villages were selected randomly from each of the selected blocks. In all eight villages were selected from Indian Punjab and also Pakistani Punjab for the purpose of data collection. The details of the selected districts blocks and villages have been given in the Table 1.

A list of all farming households was prepared for each of the selected village along with the size of the operational holdings. All the farming households in a village were further classified into small (<2 ha), medium (2 to £ 4 ha) and large (³ 4 and above) farming households based on the operational households. Finally the primary data were collected from 120 farming households in Indian Punjab and 80 farming households in Pakistani Punjab. The growth rate of area, production and productivity of different crops were worked out by compound growth rate methods.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been presented under following heads:

Growth in area, production and yield:

The compound growth rates for area, production and yield of five major crops in the Indian Punjab and Pakistani Punjab from 1980-81 to 1990-91 and 1991-92 to 2003-04 were worked out and presented in Table 2 and 3.

Compound growth rate of area, production and yield of major crops in Indian Punjab:

The information presented in Table 2 relates to Indian Punjab, figures show that wheat, rice and cotton achieved positive and significant growth rates in production at 4.17, 6.41 and 8.47 per cent, respectively in period I which slowed down to 1.54, 2.78, and -4.67 per cent per annum correspondingly in period II. The results further revealed that the production of maize was negative (6.69 per cent) in period I which rose to 1.76 per cent during the second period. The growth rates of area and yield of these crops were estimated to be 1.21 and 2.92 per cent for wheat, 5.18 and 1.17 per cent for rice, 3.80 per cent each for cotton, 2.00 and 0.53 per cent for sugarcane during Period I. The same for maize it was estimated to be -5.97 and

Table 2: Compound growth rate of area, production and yield of major crops in Indian Punjab during 1980-81 to 2003-04									
Crops	Period I			Period II			Overall		
	1980-81 to 1990-91			1990-91 to 2003-04			1980-81 to 2003-04		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Wheat	1.21*** (6.05)	4.17*** (7.56)	2.92*** (15.47)	0.46*** (4.67)	1.54*** (3.84)	1.10*** (3.04)	0.61*** (10.14)	2.53*** (12.36)	1.91*** (10.97)
Rice	5.18*** (10.02)	6.41*** (6.39)	1.17 ^{NS} (1.83)	2.11*** (8.24)	2.78*** (8.71)	0.74** (2.67)	3.17*** (16.31)	3.99*** (14.66)	0.82*** (5.66)
Sugarcane	2.00 ^{NS} (1.54)	2.39 ^{NS} (1.86)	0.53 ^{NS} (0.82)	2.41 ^{NS} (1.70)	1.64 ^{NS} (1.08)	-0.75 ^{NS} (2.01)	2.06*** (4.22)	1.91*** (3.73)	-0.09 ^{NS} (0.52)
Cotton	3.80 ^{NS} (1.56)	8.47*** (3.52)	3.80 ^{NS} (1.69)	-7.92*** (6.97)	-4.67 ^{NS} (2.10)	-0.70 ^{NS} (0.32)	-1.23 ^{NS} (1.37)	-0.43 ^{NS} (0.42)	1.17 ^{NS} (1.44)
Maize	-5.97*** (12.28)	-6.69*** (5.54)	-0.73 ^{NS} (0.50)	-1.37*** (4.77)	1.76 ^{NS} (1.83)	3.30*** (3.90)	-3.52*** (12.59)	-1.40** (2.48)	2.22*** (5.23)

Source: Statistical Abstract of Punjab (India) 2006

Figures in parentheses indicate the Standard Errors.

** and *** indicate significance of values at P =0.05 and 0.01, respectively

NS: Non-significant

-0.73 per cent in Period I. The growth rates of area and yield of these crops were 0.46 and 1.10 per cent for wheat, 2.11 and 0.74 per cent for rice, -7.92 and -0.70 per cent for cotton, 2.41 and 0.75 per cent for sugarcane, and -1.37 and 3.30 per cent for maize during period II.

The compound growth rates of yield for sugarcane and cotton crops were non-significant during Period II. It shows that there was no improvement in the yield of these crops during this period. The compound growth rate of production of sugarcane which was 2.39 during Period I decreased to 1.64 in period II. The area of sugarcane which was 2.00 per cent per annum in the Period I, increased at the rate of 2.41 per cent in period second. So the production of sugarcane went on decreasing due to no improvement in the yield which decreased from 0.53 to -0.75 per cent. The decline in the production of maize was due to the decline in the area (-5.97) and yield (-0.73) per cent during Period I.

It was also found that production grew at the rate of 2.53 for wheat 3.99 for rice, 1.91 per cent sugarcane over the entire period from 1980-81 to 2003-04. The growth rates of area and yield of these crops were 0.61 and 1.91 per cent for wheat, 3.17 and 0.82 per cent for rice, 2.06 and -0.09 per cent for sugarcane, respectively. So the contribution of area was relatively more than that of yield in rice and sugarcane where as for wheat and maize, yield contribution towards the production growth was relatively higher.

A sub-period analysis of compound growth rates in respect of area, production and yield of different crops showed that all the crops, *i.e.*, wheat, rice, cotton, sugarcane and maize failed to achieve significant production growth rate in Period II *i.e.* 1990-91 to 2003-

2004.

The production of rice and sugarcane has increased due to the expansion of area and the production of wheat, cotton and maize which increased due to the expansion of yield per annum.

Compound growth rates of area, production and yield of major crops in Pakistani Punjab:

The data presented in Table 3 relate to Pakistani Punjab and figures show that wheat, rice and cotton achieved positive and significant growth rates in production at 2.89, 0.12 and 14.73 per cent per annum, respectively in Period I which rose to 3.10, 6.82, and slowed down to 0.73 per cent per annum correspondingly in Period II. The growth rates of area and yield of these crops were 1.22 and 1.64 per cent for wheat, 1.69 and -1.69 per cent for rice, 3.77 and 10.56 per cent for cotton in Period I and these were 0.87 and 2.54 per cent for wheat, 2.97 and 3.38 per cent for rice, 0.21 and -0.75 per cent for cotton, respectively per annum in Period II and also the growth rates of cotton was non-significant in the period II. It shows that there is improvement in the yield of wheat and rice crops during this period and no improvement in the yield of cotton during this period.

The compound growth rate of sugarcane which was -2.49 during Period I turned positive (3.99 per cent) in Period II. The area of sugarcane decreased by 2.55 per cent per annum in the Period I. But in Period II, it increased at the rate of 2.42 per cent due to improvement in the productivity in the II Period. The non-significant growth rate of production of maize was 0.04 per cent which was due to the negative growth rate of the area (-0.072 per cent) in Period I. But in Period II, the production of maize

Table 3: Compound growth rate of area, production and yield of major crops in Pakistani Punjab during 1980-81 to 2003-04

Crops	Period I			Period II			Overall		
	1980-81 to 1990-91			1990-91 to 2003-04			1980-81 to 2003-04		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Wheat	1.22*** (6.90)	2.89*** (3.46)	1.64 ^{NS} (1.94)	0.87*** (8.40)	3.10*** (8.20)	2.54*** (8.16)	0.97*** (20.18)	3.27*** (16.94)	2.39*** (12.77)
Rice	1.69*** (4.94)	0.12 ^{NS} (0.27)	-1.69*** (3.74)	2.97*** (14.63)	6.82*** (19.59)	3.38*** (14.74)	2.17*** (18.54)	3.48*** (9.05)	1.30*** (4.65)
Sugarcane	-2.55*** (3.82)	-2.49*** (3.01)	0.077** (0.125)	2.42*** (4.95)	3.99*** (5.36)	2.31*** (5.14)	1.09*** (3.44)	2.40*** (5.56)	1.56*** (7.46)
Cotton	3.77*** (9.83)	14.73*** (4.80)	10.56*** (3.75)	0.21 ^{NS} (0.914)	-0.73 ^{NS} (0.765)	-0.75 ^{NS} (0.76)	2.10*** (9.40)	4.18*** (4.37)	2.10*** (2.66)
Maize	-0.072 ^{NS} (0.28)	0.04 ^{NS} (0.081)	0.116 ^{NS} (0.302)	2.51*** (8.69)	8.48*** (11.02)	5.73*** (10.79)	1.19*** (6.95)	4.26*** (8.27)	2.99*** (8.66)

Source: Statistical Abstract of Punjab (Pakistan) 2006

Figures in parentheses indicate the Standard Error

** and *** indicate significance of values at P=0.05 and 0.01, respectively

NS: Non-significant

grew at the rate of 8.48 per cent per annum, due to the major contribution of yield factor, which grew at the rate of 5.73 per cent per annum, whereas the growth in area was only 2.51 per cent for the same period.

It was also found that wheat, rice, cotton, sugarcane, and maize achieved positive and significant growth rates in production at the rate of 3.27, 3.48, 4.18, 2.40 and 4.18, respectively over the entire period of 1980-81 to 2003-2004. The growth rates of area and yield of these crops were 0.97 and 2.39 per cent for wheat, 2.17 and 1.30 per cent for rice, 1.09 and 1.56 per cent for sugarcane, 1.19 and 2.99 per cent for maize and 2.10 and 4.18 per cent for cotton, respectively. Therefore, the contribution of area was relatively more than that of yield towards production growth in case of rice whereas for wheat, cotton, maize and sugarcane, yield contribution was relatively higher.

A sub-period analysis of compound growth rates in respect of area, production and yield of five crops showed that the production of wheat and rice grew due to the major growth in their yield levels but in case of sugarcane the values of area factor remained high. Thus the growth rates of cotton was non-significant in Period II.

The findings in this section reveal that there has been a skewed growth in the production of different crops during the last 25 years due to technological bias. The growth of agriculture production in the Pakistan Punjab state has been more in the case of cotton. The yield levels of wheat, sugarcane, rice and cotton have decreased but in the case of maize, it started increasing.

Comparison analysis of growth rate in Indian and Paskistani Punjab:

The perusal of Table 2 and 3 revealed that the growth in yield of wheat crop was significant in Indian Punjab which was 2.92 per cent per annum as compared to 1.64 per cent per annum (non-significant) in Paskistani Punjab during the period I. In Indian Punjab the production grew due to the major contribution of yield whereas in Paskistani Punjab production grew due to the major contribution of area fact on in Period I.

In case of rice, the production grew due to the major contribution of area which grew at the rate of 5.18 per cent per annum in Indian Punjab. In Paskistani Punjab the CGR for the production of rice turned to be non-significant during the period I. The CGR of for sugarcane in area, production and yield variable turned to be non-significant in Indian Punjab whereas in Paskistani Punjab the production of sugarcane declined at the rate of 2.49 per cent per annum due to the major decline in area which declined at the rate of 2.55 per cent per annum during the Period I.

In the case of cotton the CGR of production turned out to be highly significant but the CGR of area and yield turned to be non-significant during the period I for Indian Punjab whereas in Paskistani Punjab the production of cotton grew at the rate of 14.73 per cent per annum due to the major contribution of yield factor. The CGR of yield turned to be 10.56 per cent per annum.

In the case of maize, the Indian Punjab followed highly declaration in it area and production during period I whereas for Paskistani Punjab, the coefficient of CGR for area, production and yield of maize crop turned out to be non-significant.

During the period II, the production of wheat crop followed positive trend due to the chief contribution of yield factor in both Indian as well as Paskistani Punjab.

In case of rice, the growth in production was observed to the major role of area factor in Indian Punjab whereas in Paskistani Punjab the production grew due to the major response of yield factor.

In case of sugarcane, the coefficient of area, production and yield of sugarcane turned to be non-significant in Indian Punjab whereas in Paskistani Punjab, the production grew at the rate of 3.99 per cent per annum whereas area grew at the rate of 2.42 per cent per annum and yield grew at the rate of 2.31 per cent per annum.

The CGR of area for cotton crop showed highly declaration for Indian Punjab whereas in Paskistani Punjab the CGR of area, production and yield turned out to be non-significant during the Period II.

In case of maize, the Indian Punjab followed in its area declined at the rate of 1.37 per cent and yield grew at the rate of 3.30 per cent per annum during the Period II. Whereas far as Paskistani Punjab, the coefficient of CGR for area production and yield of maize crop turned out to be significant. In Paskistani Punjab production grew due to the major contribution of the yield factor.

Overall analysis of Period I and II showed that in the case of wheat the CGR of production was 2.53 per cent per annum whereas in Paskistani Punjab it was 3.27 per cent per annum. In both the Punjab, the major contribution of yield factor was noticed. In the case of rice the CGR of production for Indian Punjab was higher than Paskistani Punjab. In case of sugarcane, the production of this crop totally grew due to the growth in its area in Indian Punjab whereas in Paskistani Punjab the production grew to the growth in its yield. In case of cotton, the coefficient area, production and yield for Indian Punjab turned to be non-significant whereas in Paskistani Punjab the production grew at the rate of 4.18 per cent per annum due to the contribution of area and yield factor. In case of maize, the production declined due to the major declaration

in 3.52 per cent per annum whereas growth in yield was observed in Indian Punjab. In Pakistani Punjab, the production of maize grew at the rate of 4.26 per cent per annum due to the chief contribution of yield factor which grew at the rate of 2.99 per cent per annum.

Authors' affiliations

T.S. CHAHAL, Institute of Development and Planning,
AMRITSAR (PUNJAB) INDIA

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