



RABI AND KHARIF CROPS; AGRICULTURE PRODUCTION IN HARYANA

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ABSTRACT

KEYWORDS:

Agriculture, rice production, Green revolution, Crops, water and soil

Agriculture is the lifeline of Indian economy. It is still contributing about 16.5 percent to Gross Domestic Product of the economy. India is pre-dominantly an agriculture based country with nearly three-fourth of its population living in rural areas. Indian agriculture is a gamble of monsoon. There are various fluctuations in agricultural production. The basic causes are irregularity in monsoons, recurring droughts and floods which result in sudden rise and fall in the total output.

India's agriculture was backward and qualitatively traditional by nature at the time of independence. Since independence, India has made substantial progress in the agricultural sector in terms of growth in output, yields and area under many crops. After the independence, Indian government has been adopting many strategies for the development of agriculture areas. In this area first achievement got when wheat and rice production increased three to four times during mid-1960s. Reason behind that was the increasing productivity by the used of modern technology and inputs. Indian production and productivity has been increasing since Green revolution with increasing use of synthetics fertilizers, high yielding seeds, expand of irrigations facilities, power and electricity in farm operations. The agriculture production and productivity are directly connected with the advance technology adoption. At that time India was the largest producer of fruits, cashew, nuts, coconuts and milk in the world, the second largest producer of wheat, vegetables, sugar and fish and third producer of rice and tobacco. A stronger growth in agriculture would lead to higher income for farmers, generate more employment opportunities and sharply reduce poverty.

INTRODUCTION

Agriculture sector is a helping hand for the growth engine of the Indian economy as well as for Haryana state economy. At the time of formation of Haryana state, the state economy was predominately rural and agriculture based but now has started the process of moving to an industrial and service economy. The share of agriculture and allied sector in state GDP decreased from 60.7% in 1969-70 to 21.3% in 2006-07 while the share of industries sector increased from 17.6% in 1969-70 to 32.1% in 2006-07 and share of service sector increased from 21.7% to 46.6% during this time period. By 2020, the share of agriculture in total GDP of the country is likely to be decreased to 15% due to faster development of non-agriculture sectors. Composition of state gross domestic products shows that the share of agriculture and allied sector is gradually decreasing, whereas, the share of service sector is continuously increasing.

The income of the farmers has been increasing rapidly due to major crops in Haryana. During the last some

decades, there has been considerable increase in productivity of various agriculture commodities in Haryana. Haryana is contributing tremendously to India's food security. Food production can be sustained only if the progress in development input is assured and natural resource base including water and soil is conserved. The large amount of food that can be produced and highest growth rate strongly depends upon inputs such as irrigation, fertilizers and pesticides. So, higher growth rate in Haryana was largely brought about by increased use of fertilizers, irrigation and pesticides of high productivity varieties in production.

I have selected Haryana state because of prosperous and rich resources endowments. Haryana state provides more than 2/3rd livelihood of the rural areas.

OBJECTIVES OF THE STUDY

- To calculated the compound Growth Rates of Area and Production of Rabi and Kharif crops in Haryana.
- To analyses the Location Quotient of Rabi and Kharif Crops in Haryana.

METHODOLOGY

This study is deals with the Haryana state, which are selected top ten districts and covers the period from 2005 to 2015. We consider top ten districts in Haryana, namely Ambala, Panchkula, Jhajjar, Kaithal, Rohtak, Karnal, Panipat, Sonapat, Yamunagar and Kurukshetra. The present study is based on secondary data. Data related to Area and productions have collected from different statistical abstract of Haryana from 2005 to 2015. The data has complied for the whole study period. For comprehensive study, the period from 2005 to 2015 has been divided in to two phase like phase-I (2005-2010) and phase-II (2010-2015). Crops have been divided in two major types like Kharif and Rabi Crops. Eight major crops Rice, Jower, Bajra, Maize, wheat, Barley, Gram and Sesamum have been selected for the study; these eight crops are 80 percentage in total crops. The data has been analyzed with compound growth rates and Location Quotient method.

Compound growth rates of Area and production of the selected crops have been worked out by fitting exponential function. Using the least square method, the following form of exponential function was used to calculated compound growth rates.

$$Y=AB^t$$

$$\log Y = \log A + \log B + U_i$$

Where, Y = export of the product

A = Constant

B = 1+r

r = Compound growth rate

t = time variable in years (1, 2, ..., 13)

The compound growth rate (r) is equal to (B-1) x 100. In log form B has been calculated by the following formula:

$$\log B = \frac{\sum T \log Y - \sum t \sum \log Y / N}{t^2 - (\sum t)^2 / N}$$

Where; $\bar{T} = t - t$

Linear growth rates have been calculated by employing the formula as under:

$$Y = a + bt$$

Where, Y = Rabi and Kharif crops

a = constant

b = regression coefficient

t = time variable in years (1, 2, ..., 10).

Location quotient: The location quotient is a simple and most widely used measure of regional crop. It is defined as the ratio of the share of acreage under a particular crop in the district to the share of that crop in the state total cropped acreage. The result reveals the degree of regional specialization in each crop. It is calculated as:

$$LQ_{ij} = A_{ij} / A_j / A_i / A$$

Where,

LQ_{ij} = Location quotient of ith crop in jth district

A_{ij} = Acreage of ith crop in jth district

A_j = Gross cropped acreage in jth district

A_i = Acreage of ith crop in jth state

A = Gross cropped acreage in the state.

A value of location quotient equal to unity ($LQ_{ij} = 1$) indicates that the state and district proportions of a crop are equal, whereas a value below ($LQ_{ij} < 1$) means that the districts is less specialized than the state. A value of quotient in excess of unity ($LQ_{ij} > 1$) indicates that the crop studied is more important or specialized in the district in relation of its importance at the state level.

RESULTS AND DISCUSSION

The furnished results related to the compound growth rate of Area and production of the selected crops and also the Location Quotient of Rabi and Kharif crops in Haryana has been discussed through following tables.

Table 1 Compound Growth Rate of Area Crops in Haryana

Kharif Crops	PHASE-1 (2005-10) CGR (%)	PHASE-2 (2010-15) CGR (%)
Rice	63.06	0.69
Jowar	2.72	-6.72
Bajra	-1.57	-10.30
Maize	47.26	-3.58
Rabi Crops		
Wheat	1.56	7.63
Barley	8.34	-2.42
Gram	-8.31	-10
Sesamum	-5.59	0

Source: Author's calculations

Table 1 explains about the Compound Growth Rate of Area crops in Haryana in phase-1(2005-2010) & phase-2(2010-15). From phase-1 result, it can be revealed that maximum CGR is noticed in case of Rice Area(63.06%) due to the acquisition of new inputs and technology and minimum growth rate in Bajara Area (-1.57 %) due to the less demand in market in the Kharif crops. Rabi crops of the phase-2 shows that the highest CGR has been noticed in case of Barley Area (8.34 %) and the crop like Gram(-8.31 %) has showed lower CGR. In the phase-2, Kharif crops are included i.e. Rice, Jower, Bajara and Maize. The maximum CGR has been noticed in the case of Rice (0.69%) and minimum CGR has

been noticed in case of Bajara (-10.30 %). In the whole study period, rRce has the highest position and Bajara has the lowest postion. CGR of Rabi crops in phase-2. Wheat (7.63%) has maximum CGR in phase-2. Sesamum has minimum CGR phase-2.

Table 2 shows that the CGR of production crops in Haryana phase-1(2005-2010) and phase-2(2010-2015). From the result, it can be seen that the maximum CGR is noticed in case of Jowar(8.45%) reason behind that is advancement technology and les CGR in Bajra(-33.33%) in the phase-1 of Kharif crops. On the other hand, CGR of Barley (11.64%) is the highest and minimum CGR in the case of Sesasum

production (-3.04%) in the Rabi crop during the phase-I. In the phase-II Rice production has shown maximum CGR with the value 2.94% and minimum growth rate has noticed in case of Bajara (-10.75%) in the Kharif crop. But CGR of Rabi crops has been negative during the phase-II. There are many reasons which have increased the production of major crops

like consumption of fertilizers and due to apply of new inputs technology. Few favoured position of rice-wheat cropping system is given more preferences in the North India due to the plain area. But some crops have decreasing growth rates because of partial apply of new inputs technology and without better resources management if our management is good, then result also better.

Table 2 Compound Growth Rate of Production Crops in Haryana

Kharif Crops	PHASE-1 (2005-10) CGR (%)	PHASE-1 (2010-15) CGR (%)
Rice	2.58	2.94
Jowar	8.45	-7.31
Bajra	-33.33	-10.75
Maize	-6.30	-1.08
Rabi Crops		
Wheat	3.45	-2.21
Barley	11.64	-4.18
Gram	-2.95	-17.52
Sesamum	-3.04	0

Source: Author's calculations

Table 3 Location Quotient of Kharif Crops in Haryana

Name of Crops → Districts	RICE		JOWAR		BAJRA		MAIZE	
	Phase-1	Phase-2	Phase-1	Phase-2	Phase-1	Phase-2	Phase-1	Phase-2
Ambala	0.95	1.54	0	0	0.021	0.029	2.69	2.77
Panchkula	0.45	1.02	2.07	0.31	0.2	0.29	4.03	8.04
Yamunagar	0.89	1.61	0	0	0.07	0.03	2.12	2.28
Kurukshetra	1.01	1.82	0	0	0.34	0.79	0.01	0.49
Kaithal	0.49	1.68	0	0	0.21	0.14	0.01	0
Karnal	0.99	1.76	0	0	0.05	0.02	0.23	0.25
Panipat	0.93	0.67	0	0	0.04	0.02	0.02	0
Sonipat	0.65	1.27	3.61	2.23	0.42	0.47	0.44	1.11
Rohtak	0.32	0.79	10.18	6.96	1.17	0.89	0.31	1.52
Jhajjar	0.26	0.59	10.26	5.4	1.8	1.74	0.11	0.21

Source: Author's calculations, Note : Phase-1(2005-2010), Phase-2(2010-2015)

Table 3 shows that the specialization of Kharif crop in Haryana districts. Maize crop have specialized in Panchkula and Ambala districts during the first phase. The districts of Kurukshetra (0.1) and Karnal (0.1) are remaining less specialized in Maize crop during the first phase. On the other hand, minimum location quotient of Jowar crop in five districts (Yamunagar, Kurukshetra, Kaithal, Karnal and Panipat). In these districts's soil condition is not favourable for the Jowar crop. Maize crop also have specialized in the 2nd phase. Rice

crop remain specialized in districts of Kurukshetra, Kaithal and Ambala in the 2nd phase. In the 2nd phase, Jowar crop is also less specialized. Maize crop does it best in Panchukala and Ambala districts throughout the whole study period. The district of Rohtak and Jhajjar remain specialized in Bajara & Jowar crops also throughout the entire period. The district of Rohtak and Jhajjar represent arid to semi-arid climate, slight sloping to undulating plains and substantial rain fold crop land.

Table 4 Location Quotient of Rabi Crops in Haryana

Name of Crops →	WHEAT		BARLEY		GRAM		SESAMUM	
	Phase-1	Phase-2	Phase-1	Phase- 2	Phase-1	Phase-2	Phase-1	Phase- 2
Ambala	1.38	0.89	0	0.13	0.02	0.08	0	3.14
Panchkula	1.3	0.87	0.19	0	0.67	0.28	0.15	0
Yamunagar	1.46	0.94	0	0.14	0.05	0.1	1.04	0.34
Kurukshetra	1.35	0.86	0	0	0.03	0.01	0	0
Kaithal	0.75	0.9	0	0	0.01	0.01	0.3	0
Karnal	1.36	0.88	0.06	0.0067	0.03	0.01	0.33	0.47
Panipat	1.45	0.93	0.06	0.04	0.02	0	0	0
Sonipat	1.59	0.99	0.26	0.06	0.02	0	0.46	0
Rohtak	1.59	0.99	1.08	1.56	0.29	0.32	0.67	0.59
Jhajjar	1.49	0.95	2.23	2.9	0.25	0.25	0.21	0.29

Source: Author's calculations

Note: Phase1 (2005-10), Phase2 (2010-15)

The location Quotient of Rabi Crops (Wheat, Barley, Gram and Sesamum) is presented in table 4. The results show that wheat not only specialized in Rohtak but also remains at the maximum with quotient values of 1.59 and 0.99 during phase-1 and phase -2 respectively. Due to increase in irrigation facilities, availability of large operational holdings and plain areas in Rohtak. Other districts having specialization in wheat crops include Sonipat, Jhajjar, Yamunagar, Ambala, Karnal and Kurukshetra in the whole study period. Jhajjar district have specialization in Barley crops with location quotient values of 2.23 & 2.9 during period phase-1 & phase-2 respectively. Sesamum crop has minimum specialization in the whole study period. Kaithal district has less specialization in all crops in the phase-1 and phase-2.

CONCLUSION AND SUGGESTIONS

From the foregoing discussion, it emerges that the growth in area of major crops in the state revealed mixed trend. Except jowar, bajra and wheat all other crops recorded a growth in area during the study period. There has been growth in the use of crucial inputs like irrigation, chemical fertilizer and high yielding variety seeds. From the results it may be concluded that the future scope for increasing output in the state through expansion of area is limited. That means the policy makers should not depend upon expansion of area and production crops for increasing agricultural production in the state.

- There is an urgent need to increase crop production, particularly the food-grain production which will become inevitable in view of population growth and for that adoption of new technology in the form of HYVs and chemical fertilizers on large scale is necessary. Government should implement drives for this purpose.
- The knowledge of location quotient crops should provide useful information to policy makers and planners for development of district-wise crop potential map as envisioned in the 12 five years plan.
- Government should maintain area crop, production and productivity at desirable levels. Government should adopt appropriate price policy so that the growers/farmers obtain remunerative prices for their production.

- There is a need to ensure increase in area under irrigation, better weather forecasts and other drought-proof measures such as involved drought resistant crop types. The new high yielding crop varieties are capital intensive.
- Requirements of heavy investment which is beyond the capacity of majority of the Haryana's farmers who are primarily small farmers. The benefits of these high yielding varieties were reaped by the large or progressive farmers. This has resulted in unequal distribution of income. These imbalances are still increasing between the poor farmers and rich persons. Government should be correct.
- Haryana needs to take a strong stand and make policies to strengthen the agricultural sector which will determine the economic future of India.
- Government should provide to delay free and corruption-free transactions facilities for a smooth and effective delivery of economic progress to the peoples.
- Fertility of land is decreasing day by day due to more use of fertilizers and pesticides. Changes in crop rotation are necessary conditions for protection of land fertility. Most of the farmers are ignoring the crop rotation so; government should provide incentives to farmers for the adoption of crop rotation for sustainable agriculture development.

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