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Mono-Culture Agricultural Scenario of Rice and Wheat in Haryana: A District-Wise Study

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Abstract:

There are many reforms took place in Indian agriculture such as, land reforms, green revolution, minimum support price and new economic reforms etc. These agriculture reforms create a new agriculture arrangement of mono-culture of rice and wheat in India as well as in Haryana. Both green revolution and minimum support price are the most responsible factors to develop this new mono-culture scenario of rice and wheat in India. Green revolution enhanced the productivity of almost crops however it is more favourable in rice and wheat. On the other hand minimum support price gave minimum price security for all the crops to farmers but in case of rice and wheat it gave higher price security to the farmers.

Keywords: Agriculture, Arrangement, Mono-culture, growth, Diversification, Acceleration Deceleration

1. Introduction

The new agriculture arrangement has changed overall agriculture scenario in India as well as in Haryana. The present study tries to analysis the impact of this new arrangement on food-grains cropping pattern in Haryana. The paper having three sections, the first section tries to find out the overall changing cropping pattern in Haryana, and second section analysis the extent of area under foodgrains and particular focus on the growing area pattern in wheat and rice in total foodgrains. There are two main seasonal crop in Haryana, one rabi crop and second Kharif crops. In case of rabi crops the area are concentrated in wheat while in kharif crop the whole are concentrated towards to rice. The whole gross cropped area is divided in to four sub-categories, area under food-grains, area under oilseeds, area under total cotton and area under other crops. This trend tries to analysis the diversifying scenario of area under crops in agriculture in Haryana. Letter it is focused on the acceleration and deceleration growth of wheat and rice in total food-grain.

1.1. Objective of the Study

There are three main objective of the study; the first objective of the study is to analysis the broadly diversifying scenario of area under crops. The second objective of the study is analysis the growing mono-culture of rice and wheat in total food-grains. The third objective is to examine the acceleration and deceleration growth rate in area, production and yields of rice and wheat since eighty.

1.2. Data Source

The data of area and production are taken from Statistical Abstract of Haryana and Economics Survey of Haryana. (Different Issues)

1.3. Methodology

A simple percentage methodology is used to analysis the diversification pattern of area under crops. The whole area is divided in to five sub-categories area under total foodgrains, area under oilseeds, area under total cotton, area under Sugarcane and area under other crops. This pattern shows the overall extent of diversification. The second section examines the growing mono-culture of rice and wheat.

Extent of Crop Diversification

Ratio of Area under *ith* crop = $A_c / GCA * 100$

A_c = Area under *ith* Crop

GCA = Gross Cropped Area

Extent of Mono-Culture of Rice and Wheat in total foodgrains = $A_{af} / TCA_f * 100$

A_{af} = Area under *ith* foodgrains Crop

TCA_f = Total food-grains cropped Area

To examine the acceleration and deceleration growth in area, production and yields the following quadric function is apply.

$$\text{Log } y = a + bt + ct^2$$

Where

y is area and production of *ith* crop,

b and c are the coefficient of t

t² shows acceleration and deceleration in growth rate.

2. Agriculture Reform and Cropping Pattern in Haryana

Green revolution and New Economics Reform showed the clear impact on traditional cropping pattern in Haryana. New economic reforms have positive impact on Indian agriculture as well as Haryana. It increase the exports particular in food-grains, by providing low exchange rate; and it increase private investment in agriculture sector. As expected, the liberalisation of Indian economy which had commenced from around the mid- 1980s and accelerated with the launching of full-fledged macro- economic reforms since the early 1990s has improved the incentive framework for agriculture. With the liberalisation of exchange rate and opening up of the economy, the terms of trade for agriculture have shown a significant improvement (Rao C H 2001). It was the first time since independence, when India has been a net exporter of foodgrains consecutively for the last six years, net exports amounting, on an average, to around 1.8 million tonnes per annum [Government of India 2001].

	Wheat	Paddy	Total Pulses	Total Food-grain	Sugarcane	Cotton	Oilseeds	Other Crops
1966-67	16.2	4.2	25.0	76.5	3.3	4.0	4.6	11.6
1970-71	22.8	5.4	23.4	78.0	3.1	3.9	2.9	12.0
1980-81	27.1	8.9	14.6	72.6	2.1	5.8	5.7	13.9
1990-91	31.3	11.2	12.5	68.9	2.5	8.3	8.3	12.0
2000-01	38.5	17.2	2.6	71.0	2.3	9.1	6.8	10.8
2009-10	37.7	18.5	2.0	69.7	1.1	7.8	8.6	12.8

Table 1: Share of Area under Different Crops (in %)

Data Sources1: Statistical Abstract of Haryana (Different Issue)

Table 1, shows that area under wheat, paddy, cotton and oilseeds are increasing continuously; while the area under pulses and sugarcane is decaling continuously since 1966-67. Area under Wheat and rice showed an extreme growth, the area under wheat was 16 percent in 1966-67; which is increased 37.7 percent in 2009-10. The area under Paddy showed drastic growth; which increased from 4 per cent in 1966-67 to 18.5 per cent in 2009-10. Cotton and oilseeds showed a remarkable growth in area. On the other hand pulses showed high declining trends in areas; it was 25 percent in 1966-67 which became only 2 percent in 2009-10. Sugarcane has slightly declining trends over the time periods. Even green revaluation is favourable for agriculture sector in India as well as Haryana, but it has changed the traditional agriculture trends in Haryana. When green revolution was adopted in India during mid-sixty, it has changed the whole cropping trends. The new cropping trend was clear seen in Haryana agriculture. During sixty there was no significant change in cropping pattern but during seventy, a new cropping pattern was seen in Haryana. It shows the success of green revolution particular in wheat and rice in Haryana. Green revolution showed a negative impact on pulses, the area under pluses was declined from 25 per cent to 14 per cent in 1980-81 and letter it became only 2 per cent of gross cropped area in 2009-10.

2.2. Mono-Culture Scenario of Wheat and Rice

In this section the study try to find out the mono-culture scenario of wheat and rice which was slightly emerged after green revolution and extreme emerged after new economic reforms. In this section the study is focus on food-grains only, which try to find out the growing mono-culture of rice and wheat in Haryana. There are many reasons which lead to create a new agriculture arrangement of mono-culture of rice and wheat in Haryana such as green revolution, Minimum support price and urbanization. There are ten foodgrain crop sown in Haryana these are rice, wheat, jawar, bajra, maize, barley, gram, mash, moong and massar on which statistical department of Haryana compile the data. Area under wheat rice and total pulses are analysis separately while the area under jawar, bajra, maize and barley are analysis jointly as the area under other foodgrains crops. The main purpose of this analysis is to examine the growing mono-culture of wheat and rice in total foodgrains. Table 2 showed the changing traditional cropping pattern in foodgrains while table 2.3 showed the mono-culture scenario of wheat and rice in Haryana. The area under wheat and rice are increasing continuously since 1966-67.

	Wheat		Paddy		Total Pulses		Other Food-grain Crops		Total Food-grain	
	Area	%	Area	%	Area	%	Area	%	Area	%
1966-67	743	21.1	192	5.5	1,150	32.7	1435	40.8	3520	100
1970-71	1129	29.2	269	7.0	1,159	30.0	1311	33.9	3868	100
1980-81	1479	37.3	484	12.2	795	20.1	1205	30.4	3963	100
1990-91	1850	45.4	661	16.2	742	18.2	826	20.3	4079	100
2000-01	2355	54.3	1054	24.3	157	3.6	774	17.8	4340	100
2009-10	2452	54.0	1205	26.6	131.6	2.9	748	16.5	4537	100

Table 2 : Area Under foodgrains in (000 Hect.) and ratio of area under crops (in %)

Table 3 showed the mono-culture of rice and wheat in total foodgrains. The area under wheat and rice jointly was 27 per cent in 1966-67 and the area under total pulses was 33 per cent. The area under other foodgrains crops except wheat, rice and pluses was 41 per cent. The trends shows that the area under pluses and the area under the others foodgrains crops except wheat and rice was declining continuously since 1966-67. While the ratio under wheat and rice was sharply increased since 1966-67. The area under wheat and rice jointly was increased from 27 per cent to 81 per cent which showed the growing mono-culture scenario of rice and wheat. The trends shows that the area under pluses and the area under other foodgrains crops such as bajra, jawar, maize and Barley etc. declined continuously. The area under other foodgrains declined from 41 per cent to 16 per cent from 1966-67 to 2009-10. It showed that all these area are shifting towards wheat and rice only.

	Wheat + Paddy	Total Pulses	Other Food-grains Crops	Total Food-grains Crops
1966-67	27	33	41	100
1970-71	36	30	34	100
1980-81	50	20	30	100
1990-91	62	18	20	100
2000-01	79	4	18	100
2009-10	81	3	16	100

Table 3 : Share of area under different food-grains crops (in %) Data Sources 2: Statistical Abstract of Haryana (Different Issue)

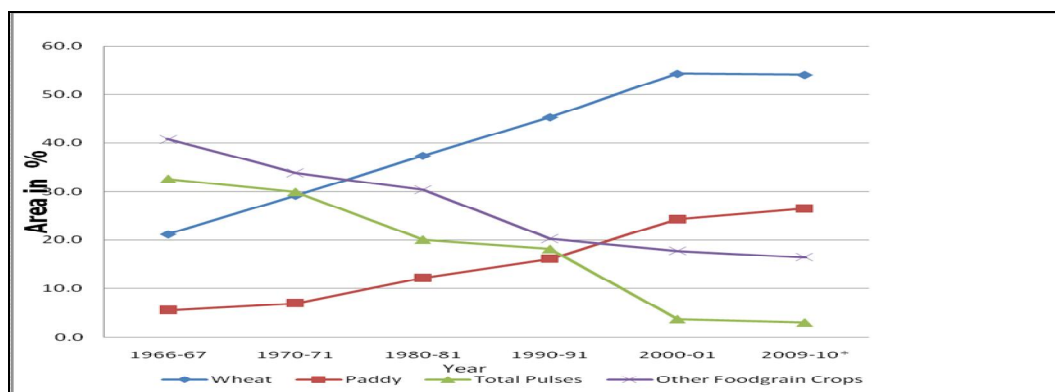


Figure 1 : Share of Area under foodgrains crops Data Sources 3: Statistical Abstract of Haryana (Different Issue)

3. Acceleration and Deceleration Growth in Wheat and Rice

The whole study shows that the area is shifting towards only two crops wheat and rice since 1966-67. It is found that this mono-culture trend of rice and wheat has changed the overall traditional cropping pattern in Haryana. In total foodgrains the ratio of area under wheat and rice which was 27 per cent has increased to 81 percent in 2009-10. So in this section the study analyzes the acceleration and deceleration growth in area and production of wheat and rice only at district-level. Growth rate may be negative, positive or constant. Acceleration and deceleration shows the trend of growth rate. When growth rate is positive, its

¹ Ratio under foodgrains crop = Area under *ith* foograins crop/ Total foodgrains cropped Area *100

trends may be increasing or decreasing. It is the same in cases of negative growth rate. It means when t is positive t^2 may be negative or positive and when t is negative c may be positive or negative.

3.1. To study this trend easily we have divided the results into four categories

- The first category shows a positive growth rate at an increasing rate. In this category coefficient of b and c both will be positive at increasing rates. Y increases monotonically.
- The second category shows positive growth rate at decreasing rates. In this category b will be positive while coefficient of c will be negative.
- In the third category, b is negative and c is positive, which shows that growth rate is negative at decreasing rate rates.
- The fourth category shows negative growth rate at increasing rates. In this category both b and c are negative. y decreases monotonically.

3.2. Acceleration and Deceleration Growth in Rice

Rice is the major foodgrains crop of India; even it is not major foodgrains crops of Haryana however Haryana has important place in rice production in India. Rice registered a remarkable growth in area, production and yields after the green revolution. Table 4 shows that there are only four districts, Ambala and Sonapat, Karnal and Kurukshetra in the first category, which show positive growth rate at increasing rate under area of rice during 1980s. It shows positive growth rate at increasing rate; both growth coefficients (b and c) are positive; which shows that the area under rice is increasing at increasing rate. There are six districts - Hisar, Sirsa, Gurgaon, Faridabad, Jind and Rohtak, which registered positive growth rate at decreasing rate in area under rice. No one district comes under the third category. The results show that there are three districts - Bhiwani and Mahendergarh which registered under the fourth category. They show negative growth rate at increasing rate under area. In the case of production, Gurgaon and Jind and Kurukshetra fall into the first category, while Hisar, Faridabad, Ambala, Karnal, Rohtak, and Sonapat are registered in the second category, which showed positive growth rate at decreasing rate. Sirsa and Mahendergarh showed negative growth rate at increasing rate in production.

Area				
Category	Distt. Name	B	C	R2
First	Ambala	0.010*	0.0017*	0.15
	Sonipat	0.049	0.0118	0.57
	Karnal	0.004*	0.006*	0.72
	Kurukshetra	0.014*	0.008*	0.50
Second	Hisar	0.020*	-0.006*	0.78
	Sirsa	0.006*	-0.003*	0.49
	Gurgaon	0.050*	-0.002**	0.55
	Faridabad	0.055*	-0.011*	0.64
	Jind	0.011*	-0.002**	0.29
	Rohtak	0.004*	-0.002*	0.14
Third				
Fourth	Mahendergarh	-	-	-
	Bhiwani	-0.028*	-0.031*	0.74
Production				
First	Gurgaon	0.0089**	0.0002**	0.12
	Jind	0.0098**	0.0014**	0.072
	Kurukshetra	0.001**	0.001*	0.029
Second	Hisar	0.0166*	-0.008*	0.73
	Faridabad	0.0113*	-0.036*	0.67
	Ambala	0.0033*	-0.004*	0.10
	Karnal	0.0014**	-0.002*	0.34
	Rohtak	0.0327*	-0.003**	0.22
	Sonipat	0.041**	-0.009*	0.68
Third				
Fourth	Sirsa	-0.017*	-0.006*	0.56
	Mahendergarh	-	-	-

Table 4 : Acceleration and Deceleration of growth under Rice during 1980-81 to 1989-90

* Significant at 5 percent ** Significant at 10 percent

The growth scenario has changed during 1990-91 to 1999-2000 in area and production of rice. It is found that there are six districts in the first category which show positive growth rate at increasing rate under area of rice; these are Ambala, Karnal, Rohtak, Mahendergarh Bhiwana, Kurukshetra and Sirsa (See Table 5). While there are four districts, Sonipat, Faridabad, Jind and Gurgaon which show positive growth rate in area at decreasing rate (See Table 5). There is no district in the third and fourth categories under area of rice during 1990-91 to 1999-2000. It shows that during 1990s the area under rice is increasing in all the districts in Haryana. Even not in area, production is also increasing in all the districts. There are six districts, Ambala, Karnal, Kurukshetra Rohtak Jind and Hisar which registered positive growth in production at increasing rate, while Sonipat, Faridabad, Sirsa and Gurgaon showed positive growth rate at decreasing rate.

Category	Distt. Name	Area		
		B	C	R2
First	Ambala	0.0144**	0.0006**	0.93
	Karnal	0.0142**	0.0004**	0.84
	Rohtak	0.1301*	0.0059*	0.74
	Mahendergarh	0.051*	0.0099*	0.95
	Bhiwani	0.1937	0.0309	0.86
	Kurukshetra	0.0530*	0.0025*	0.93
	Sirsa	0.0194	0.0034	0.83
Second	Sonipat	0.0589	-0.0058	0.97
	Faridabad	0.0701*	-0.00164**	0.94
	Gurgaon	0.1025*	-0.00686*	0.89
	Jind	0.0462*	-0.00069*	0.94
Third				
Fourth				
1990-91 to 1999-2000 (Production)				
First	Ambala	0.011183*	0.000903**	0.73
	Kurukshetra	0.003175*	0.00854*	0.26
	Karnal	0.00781*	0.00615*	0.38
	Rohtak	0.111896*	0.003432**	0.71
	Jind	0.038978*	0.002877**	0.89
	Hisar	0.039977	0.002997	0.91
Second	Sonipat	0.042577*	-0.00245*	0.91
	Faridabad	0.060902*	0.00036**	0.94
	Sirsa	0.014175*	0.00043**	0.65
	Gurgaon	0.087*	-0.002**	
Third				
Fourth				

Table 5: Acceleration and deceleration growth under rice during 1990-91 to 1999-2000

* Significant at 5 percent ** Significant at 10 percent

The growth scenario of area and production of rice has changed during 2000-01 to 2006-07. During 1990s all the districts registered a positive growth rate in area and production. But during 2000-01 to 2006-07 a few districts showed positive growth rate in area and production. It is found that there are four districts under first category which show positive growth rate at increasing rate (See Table 6). These are Ambala, Karnal, Bhiwani, and Hisar. Sonipat, Sirsa and Faridabad show positive growth rate at increasing rate under area of rice during 2000-01 to 2006-07. There are four districts under the third category which show negative growth rates at increasing rates under area during 2000-01 to 2006-07; these are Gurgaon, Mahendergarh and Jind. Kurukshetra registered negative growth at decreasing rate.

In the case of growth of production, there are five districts which show positive growth rates at an increasing rate; these are Ambala, Panipat, Sonipat, Jind and Hisar. Kurukshetra, Gurgaon and Sirsa show positive growth rates at a decreasing rate in growth of production of rice during the time period. Bhiwani and Faridabad shows negative growth at decreasing rate. Faridabad and Bhiwini Show negative growth at decreasing rate. Mahendergarh shows negative growth at increasing rate during 2000-01 to 2006-07. In terms of yield, Ambala, Sonipat, Rohtak, Jind, Faridabad, and Bhiwani show positive growth at increasing rate while Kurukshetra, Karnal, Gurgaon, Mahendergarh, Hisar and Sirsa show positive growth at decreasing rates from 2000-01 to 2006-07.

Category	(Area)			
	Distt. Name	B	C	R2
First	Ambala	0.0063*	0.0039*	0.49
	Karnal	0.0023*	0.0013*	0.39
	Bhiwani	0.0423*	0.0072*	0.77
	Hisar	0.0106*	0.0044*	0.61
Second	Sonipat	0.0129*	0.0030*	0.68
	Sirsa	0.0028*	0.0162*	0.46
	Faridabad	0.0003*	0.0097	0.21
Third	Rohtak	-0.002**	0.0316**	0.55
	Gurgaon	-0.048**	0.0407**	0.15
	Mahendergarh	-0.020*	0.0321*	0.72
	Jind	-0.006**	0.0137*	0.58
Fourth	Kurukshetra	-0.00238*	-0.0012*	0.68
2000-01 to 2006-07(Production)				
First	Ambala	0.0133**	0.0048*	0.65
	Panipat	0.0114*	0.0006**	0.50
	Sonipat	0.0073**	0.0169**	0.65
	Rohtak	0.0050**	0.0318*	0.79
	Jind	0.0106*	0.0198*	0.62
	Hisar	0.0325*	0.0014**	0.71
Second	Kurukshetra	0.012*	-0.0014*	0.98
	Gurgaon	0.088**	-0.0173**	0.10
	Sirsa	0.028*	-0.0054*	0.95
Third	Faridabad	-0.008*	0.0136*	0.39
	Bhiwani	-0.006*	0.0160*	0.43
Fourth	Mahendergarh	-0.0044*	-0.0076*	0.36

Table 6 : Acceleration and deceleration of growth under Rice during 2000-01 to 2006-07

* Significant at 5 percent ** Significant at 10 percent

3.3. Acceleration and Deceleration Growth in Wheat

The study finds that green revolution, new agriculture reforms and minimum support price are more favourable in case of wheat in area and production in all the districts. The minimum support (procurement) prices of wheat, for example, were raised by 45 per cent within a period of three years ending 1999-2000 [Commission for Agricultural Costs and Prices 2000]. The result shows that there are four districts under first category which show positive growth rate at increasing rate under area during 1980-81 to 1989-90. These are Gurgaon, Mahendergarh, Ambala, and Karnal. There are five districts which show positive growth rate at decreasing rate: Hisar, Sirsa, Bhiwani, Faridabad and Rohtak. Jind show positive growth rate at increasing rate. Kurukshetra and sonipat recorded negative growth rate at decreasing rate under area during the same time period. In the case of production there are six districts viz. Bhiwani, Faridabad, Mahendergarh, Ambala, Karnal and Rohtak which shows positive growth rate at increasing rate. While Hisar, Sirsa, Gurgaon, Jind, Kurukshetra, and Sonipat show positive growth rates at a decreasing rate of production. Even in some districts such as Jind Kurukshetra and Sonipat, the area under wheat is decreased but after that the production of wheat is increased which shows that the productivity is increasing. There is no district in which the production of wheat is declined during 1980s.

Wheat	1980-81 to 1989-90 (Area)			
Category	Distt. Name	B	C	R2
First	Gurgaon	0.008**	0.0086*	0.13
	Mahendergarh	0.0122**	0.0109**	0.14
	Ambala	0.0127**	0.0136**	0.11
	Karnal	0.0126**	0.0134**	0.11
Second	Hisar	0.0180*	-0.0019*	0.82
	Sirsa	0.0582*	-0.0098*	0.32
	Bhiwani	0.0156*	-0.0015**	0.52
	Faridabad	0.0122*	-0.0041**	0.90
	Rohtak	0.0070**	-0.0068**	0.09
Third	Jind	-0.0007*	0.0018*	0.08
Fourth	Kurukshetra	-0.0045**	-0.0043*	0.71
	Sonipat	-0.0090**	-0.0050*	0.60
1980-81 to 1989-90 (Production)				
First	Bhiwani	0.0322*	0.0012**	0.84
	Faridabad	0.4949*	0.4949**	0.49
	Mahendergarh	0.0209*	0.0051**	0.69
	Ambala	0.0162*	0.0009**	0.48
	Karnal	0.0293*	0.0123*	0.16
	Rohtak	0.0245*	0.0007**	0.76
Second	Hisar	0.0377*	-0.0008**	0.86
	Sirsa	0.031*	-0.0025*	0.80
	Gurgaon	0.0111*	-0.0030*	0.47
	Jind	0.0293*	-0.0017*	0.80
	Kurukshetra	0.0251*	-0.0020*	0.89
	Sonipat	0.0069*	-0.0033*	0.35
Third				
Fourth				

Table7: Acceleration and deceleration growth under Wheat during 1980-81 to 1989-90

* Significant at 5 percent ** Significant at 10 percent

After adopting new economic reforms in India, the exports of foodgrains were increased particular of wheat. The new economic reforms showed direct impact on cropping pattern in Haryana. During 1990-91 to 1999-2000, there are six districts which show positive growth rates at increasing rate under area of wheat: Ambala, Karnal, Rohtak, Mahendergarh, Bhiwani, and Gurgaon. Five districts show positive growth rate at decreasing rate, these are Sonipat, Faridabad, Jind, Hisar, and Sirsa. Kurukshetra is only district which is under third category. There is no district under fourth category in case of area.

Wheat	(Area)			
Category	Distt. Name	B	C	R2
First	Ambala	0.0104	0.0016	0.60
	Karnal	0.0008*	0.0073*	0.39
	Rohtak	0.007*	0.005*	0.62
	Mahendergarh	0.0344*	0.0055	0.71
	Bhiwani	0.0307	0.0002**	0.96
	Gurgaon	0.0019	0.0001	0.76
Second	Faridabad	0.0113*	-0.0045*	0.57
	Hisar	0.0071*	-0.0004*	0.67
	Jind	0.007*	-0.001*	0.84
	Sirsa	0.0125	-0.001*	0.97
	Sonipat	0.0158	-0.0011*	0.92
	Third	Kurukshetra	-0.0081**	0.0109*
Fourth				
1990-91 to 1999-2000 (Production)				
First	Ambala	0.01045*	0.0016*	0.60
	Karnal	0.0008**	0.0073*	0.49
	Rohtak	0.0135*	0.0032*	0.65
	Mahendergarh	0.0344*	0.0055*	0.71
	Bhiwani	0.03072	0.0002**	0.96
Second	Sonipat	0.0125*	-0.0062*	0.58
	Faridabad	0.0143*	-0.0026*	0.96
	Gurgaon	0.0313*	-0.0013*	0.92
	Jind	0.0129*	-0.0016*	0.78
	Hisar	0.0147	-0.0013*	0.95
	Sirsa	0.0075*	-0.0038	0.74
Third	Kurukshetra	-0.00646*	0.012346*	0.41
Fourth				

Table 8: Acceleration and deceleration growth under wheat during 1990-91 to 1999-2000

* Significant at 5 percent ** Significant at 10 percent

In the case of production, Ambala, Karnal, Rohtak, Mahendergarh and Bhiwani show positive growth rate at increasing rate while Sonipat, Faridabad, Gurgaon, Jind, Hisar and Sirsa registered positive growth rate increasing rate. Kurukshetra shows negative growth rate at increasing rate during 1990-91 to 1999-2000. There is no district under fourth category, during 1990s all the districts shows positive growth rate except Kurukshetra in area and production.

Wheat Category	(Area)			
	Distt. Name	B	C	R2
First	Karnal	0.0025*	0.0001**	0.69
	Sonipat	0.0001**	0.0033*	0.87
	Hisar	0.0017*	0.0011*	0.57
	Sirsa	0.0026*	0.0019*	0.27
Second	Ambala	0.0070*	-0.0006*	0.91
	Kurukshetra	0.0047*	-0.0022*	0.92
Third	Rohtak	-0.0109	0.0027*	0.95
	Gurgaon	-0.0008**	0.0087*	0.87
	Mahendergarh	-0.0163*	0.0012*	0.92
	Bhiwani	-0.0083	0.0014**	0.52
	Jind	-0.0002**	0.0001**	0.03
fourth	Faridabad	-0.010*	-0.0057*	0.57
2000-01 to 2006-07 (Production)				
First	Ambala	0.0019*	0.0002*	0.36
Second				
Third	Kurukshetra	-0.0014**	0.0003	0.10
	Karnal	-0.0026*	0.0028*	0.95
	Sonipat	-0.0020*	0.0015*	0.25
	Rohtak	-0.0173*	0.0010**	0.93
	Gurgaon	-0.0054*	0.0051*	0.74
	Mahendergarh	-0.0132*	0.0024*	0.91
	Bhiwani	-0.0088**	0.0012	0.56
	Hisar	-0.0040*	0.0008**	0.39
Fourth	Faridabad	-0.0155**	-0.0076**	0.70
	Jind	-0.0044*	-0.0001**	0.74
	Sirsa	-0.0079*	-0.0005**	0.50

Table 9 : Acceleration and deceleration of growth under wheat during 2000-01 to 2006-07

* Significant at 5 percent ** Significant at 10 percent

Table 9 show that there are four districts which show positive growth rate at increase rate under area of wheat, these are Karnal, Sonipat, Hisar and Sirsa. While Ambala and Kurukshetra show positive growth rate at increasing rate at decreasing rate. Five districts viz Rohtak, Gurgaon, Mahendergarh, Bhiwani, and Jind show negative growth rate at decreasing rate. Faridabad is the only district which shows negative growth rate at decreasing rate under area of wheat during 2000-01 to 2006-07. In case of production the performance is not satisfactory; Ambala is the only district which shows positive growth rate at increasing rate except this district. Kurukshetra Karnal, Sonipat, Rohtak, Gurgaon, Mahendergarh, Bhiwani and Hisar register negative growth rate at an increasing rate, while Faridabad, Jind and Sirsa show negative growth rate at decreasing rate during 2000-01 to 2006-07.

4. Conclusion

Haryana agriculture sector has improved sharply after the adoption of new technology during mid sixties. It has enhanced area, production and productivity of almost crops. But after green revolution and new economic reforms were adopted in India, the whole scenario has changed. The one main reason was green revolution has increased the productivity all the crops but it was more successful in rice and wheat. After adopting new economic reforms, lots of new economic changes took place in Indian economy. The main reason was the low exchange rate of Indian Rupees in international market and it has increased Indian's foodgrains in world market. The second one minimum support price introduced by the government and this minimum support price gave better security to rice and wheat. All this changes creates a new agriculture scenario of Mono-Culture of rice and wheat. It is finds that the area under wheat, paddy, cotton and oilseeds are increasing continuously; while the area under pulses and sugarcane is decaling continuously since 1966-67. Area under Wheat and rice showed an extreme growth, the area under wheat was 16 percent in 1966-67; which is increased 37.7 percent in 2009-10. The area under Paddy showed drastic growth; which increased from 4 per cent in 1966-67 to 18.5 per cent in 2009-10. Cotton and oilseeds showed a remarkable growth in area. On the other hand pulses showed high declining trends in areas; it was 25 percent in 1966-67 which became only 2 percent in 2009-10. Green revolution showed a negative impact on pulses, the area under pluses was declined from 25 per cent to 14 per cent in 1980-81 and letter it became only 2 per cent of gross cropped area in 2009-10. The area under total foodgrains is increasing continuously since 1966-67 but it was concentrated towards wheat and rice after new economic reforms. There are ten foodgrain crop sown in Haryana these are rice, wheat, jawar, bajra, maize, barley, gram, mash, moong and massar on which statistical department of Haryana compile the data. The area under wheat and rice jointly was 27 per cent in 1966-67 and the area under total pulses was 33 per cent. While the ratio of area under wheat and rice of total foodgrains area was sharply increased since

1966-67. The area under wheat and rice jointly was increased from 27 per cent to 81 per cent from 1966-67 to 2009-10, which showed the growing mono-culture scenario of rice and wheat. The area under other foodgrains declined from 41 per cent to 16 per cent from 1966-67 to 2009-10. It showed that all these area are shifting towards wheat and rice only. It is find that after green revolution the area and production is increased in both crops in rice and wheat at increasing rate; even this trend was increased during 1990s and this trend became the mono-culture of rice and wheat. The period of 1980's has been good from the point of view of acceleration in growth of area and production for rice and wheat in most of the districts in Haryana. During 1990's, there are acceleration in the area and production of rice in majority of the districts. In case of wheat, the area, production accelerating during 1990's. During 2000-01 to 2006-07 the new trends was seen in wheat. All a few districts registered accelerating growth rate at increasing rate, while during 1990s almost the districts was accelerating growth rate in area and production of wheat.

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