A Geographical Analysis of Agricultural Development Parameters in South-western Haryana

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Abstract

Haryana is an agricultural developed state of India. Infusion of modern technology package played an important role in such an agricultural development. However, due to difference in physical and climatic factors South-western Haryana lacks behind the rest of Haryana in terms of agricultural development. The present study tries to analyze the parameters of agricultural development in this region. To fulfill the need of study secondary data of post economic reform period has been analyzed with the help of linear regression equations and trend lines. Composite index has been used to monitor the combined effect of parameters i.e. cropping intensity, net sown area, consumption of chemical fertilizers and pesticides, and mechanization on agricultural development in South-western Haryana as well as rest of Haryana. The findings of the study revealed that the study region lacks behind the rest of Haryana in terms of all parameters. It is interested to note that except consumption of chemical pesticides the regression coefficient value of all parameters in South-western Haryana is more than rest of Haryana. It indicates that growth rate of all mentioned parameters in study region is much higher than rest of Haryana. Composite index revealed that agricultural development in rest of Haryana is almost stable however, in case of South-western Haryana its value increased from 0.78 to 0.83 from 1990-93 to 2013-16.

Key Words: Trends Line, Composite Index, Agricultural Development, South-western Haryana

Introduction

India keeps its image and position as an agricultural society in the world. In India agriculture provide highest number of employments with respect to all other economic activities. Agriculture sector generate employment opportunities and hence helps in reducing poverty. Acronym of four BRICS countries indicate that a one percent growth in agriculture sector is two to three times more effective in reducing poverty than any other sector (Mishra and Puri, 2015). The agro-climatic conditions of India provide it a sound base of agricultural development. Out of total geographical area (328.7 mha) in India 141.4 mha area falls under the net sown area. In terms of percentage about 43 percent of total geographical land comes under agricultural land (Department of Agriculture, Co-operation and Farmers Welfare, Annual Report 2016-17).

Haryana is one of the most agricultural developed states in India. However, due to difference in terrain, physiographic conditions, climatic factors etc. divide this state into different agro-ecological regions. South-western Haryana is one of such regions in Haryana which has different soil structure, terrain, irrigation facilities. The parameters of agricultural development such as net sown area, irrigation intensity, consumption

of fertilizers and pesticides, intensity of mechanizations etc. are different in this region than rest of Haryana. Out of the above-mentioned parameters irrigation is the most important one. Irrigation is the base of agricultural development and it helps in increasing the intensity of HYV seeds use which further results a growth in fertilizer and pesticide consumption. Assured and sufficient water supply makes the farming viable, stable, diversified and commercially profitable activity. Regulated supply of water whether from ground or surface resources is the basic and most important aspect of future agricultural planning (Singh, 1976). Difference in the parameters of agricultural development results in the difference of agricultural production and productivity. A sound and suitable development of different agricultural development's parameters helps in the growth of a region (Mandal and Dhara, 2012).

Profile of Study Area

The state lies in the north-western part of Indian union. It is bounded by Himachal Pradesh and Punjab in north and north-west, Uttar Pradesh and NCT of Delhi in the east and Rajasthan in the south and south-west. The plain of Haryana is made up of alluvial deposition by Ghaggar and Yamuna rivers. The present study covers the south-western part of the state which include districts i.e. Gurugram (Gurgaon), Nuh (Mewat), Rewari, Mahendragarh, and Bhiwani (Includes Charkhi Dadri District) (Fig. 1). The physiography of this region is distinct than rest of region. It has plains with presence of Aravalli hills and sand dunes. The height of Aravalli hills in this region varies from 225 to 525 meter. This area of state receives less rainfall in comparison to northern part of the state. Sahibi, Indori, Kasonti, and Dohan are the seasonal rivers of this region. The major plant species of this region are xerophyte vegetation.

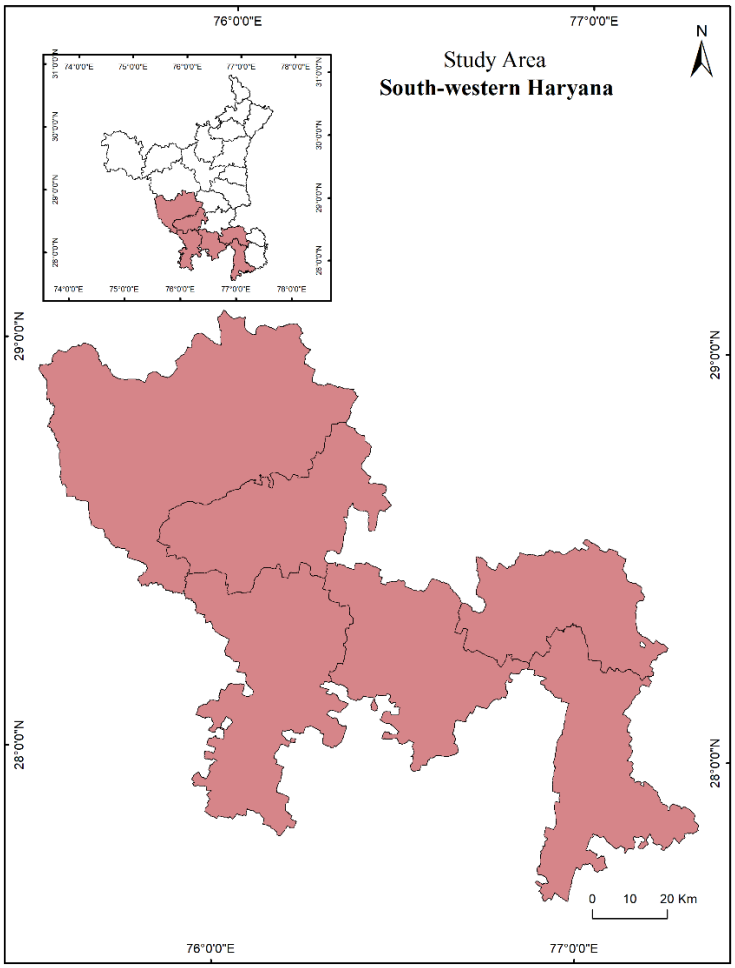

Fig. 1

Objective of the Study

The present study attempts to evaluate the geographical changes in the parameters of levels of agricultural development in the South-western Haryana viz-a-viz rest of Haryana during post-economic reform period.

Material and Methodology

The present study is based on the secondary sources of data which has been collected from statistical abstract of Haryana (Various issues). An attempt has been made to analyze region-wise temporal and spatial development of agricultural inputs in terms of cropping intensity, proportion of net sown area, consumption of chemical fertilizers and pesticides, and mechanization with the help of time series data using linear regression equation. Tables, graphs and trend lines have been used to indicate the change in such parameters over the time period.

Linear Regression Equation:

$$Y = aX + b$$

Here, Y is the dependent variable (Various parameters of agricultural development)

X, is the independent variable (time period)

a, is regression coefficient

b, is intercept value

Further Index value has been calculated to monitor the spatial variation of different factors in the study area with respect to Haryana.

To monitor overall impacts of different parameters of agricultural development composite index has been used.

Results and Discussion

Cropping Intensity

It is the ratio of gross sown area to net sown area in terms of percent. It is an indicator of land use efficiency. The findings from the study reveals that South-western Haryana lags behind the rest of Haryana in terms of growth of cropping intensity (Fig. 2). The slope of this regions depicts that cropping intensity is increasing with greater magnitude than that of rest of Haryana. The intercept value (153.6) reveals that in the beginning of the study period, South-western Haryana was much behind the rest of Haryana. Table 1 shows that during 1990-93 one unit increase in cropping intensity leads to 0.92 and 1.02 units increase in cropping intensity of South-western Haryana and rest of Haryana respectively. However, index value for 2013-16 period depicts that per unit change in cropping intensity is almost same for rest of Haryana.

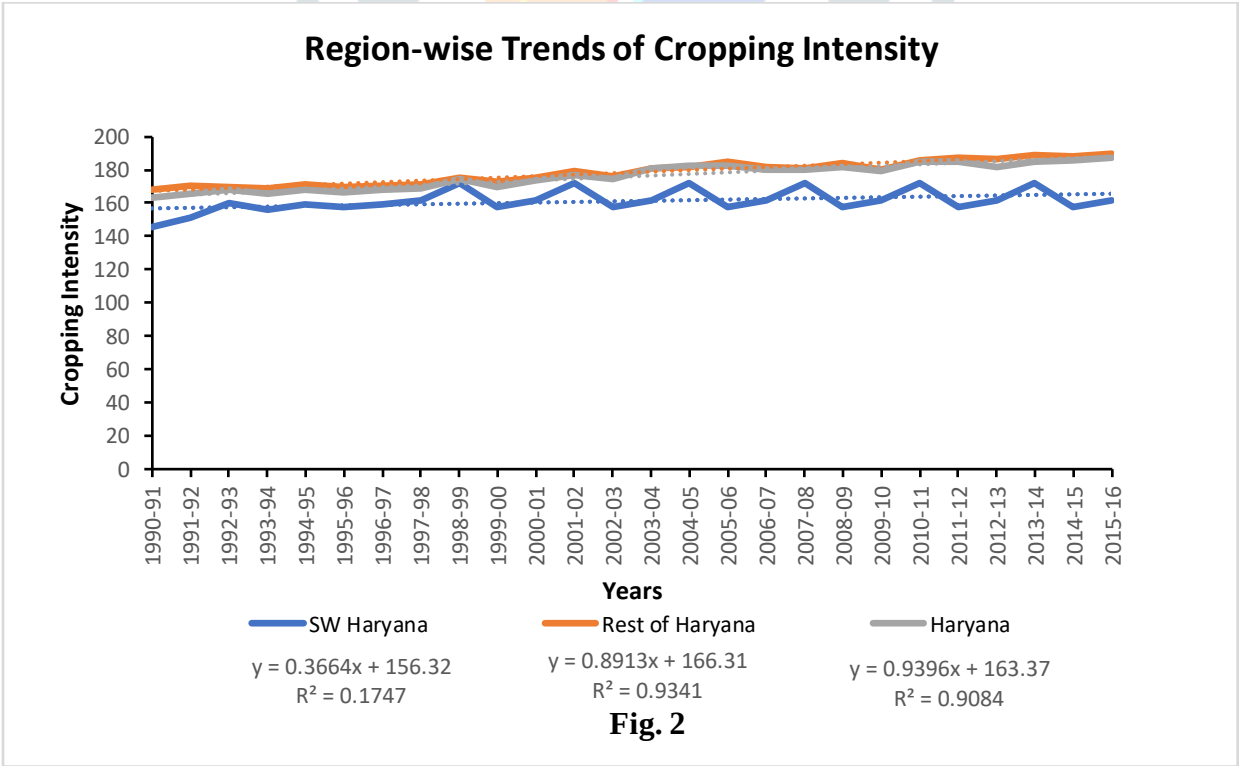

Fig. 2

Table 1	
Index Value of Cropping Intensity	
Region	**Index Value**

	1990-93	2013-16
South-western Haryana	0.92	0.96
Rest of Haryana	1.02	1.01
Haryana	1.00	1.00

Proportion of Net Sown Area

It is the ratio of net sown area to total geographical area in percent. Figure 3 depicts that South-western Haryana has highest regression value while rest of Haryana has negative regression coefficient. It indicates that the study region is still advancing in terms of cropping intensity while rest of Haryana has attained it maximum threshold limit. Table 2 shows the relative position of South-western Haryana and rest of Haryana with respect to Haryana. The findings of the study shows that there is a growth of 0.05 units in the index value of South-western Haryana from 1990-93 to 2013-16, whereas rest of Haryana shows a decline of 0.02 units for the same period.

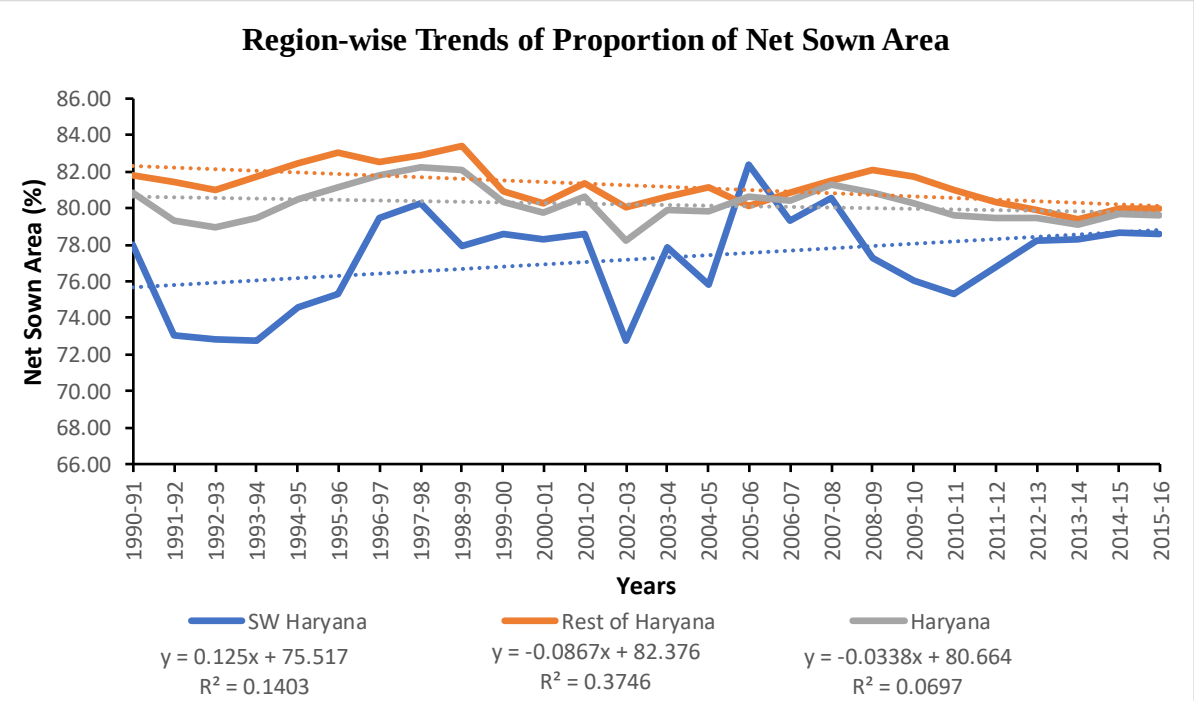

Fig. 3

Table 2		
Index Value of Proportion of Net Sown Area		
Region	**Index Value**	
	1990-93	**2013-16**
South-western Haryana	0.92	0.96
Rest of Haryana	1.02	1.01
Haryana	1.00	1.00

Consumption of Chemical Fertilizers

Chemical fertilizers are the most important parameters of agricultural growth and development. However excessive use of chemical fertilizers has depleted the nutritional status of soil. To increase the yield use of chemical fertilizers has been increasing over the time period (Fig. 4). Consumption of chemical fertilizers in South-western Haryana and rest of Haryana is increasing but the gap in the consumption quantity is widening because of there is high consumption rate in rest of Haryana than that of South-western Haryana. The regression coefficient of rest of Haryana (10.99) is much higher than South-western Haryana (5.93). Table 3 shows that relative position of South-western Haryana and rest of Haryana with respect to Haryana. The findings from the study reveals that South-western Haryana was more than half times behind the rest of Haryana and the position is almost same with a slight increase in the index value during 2013-16.

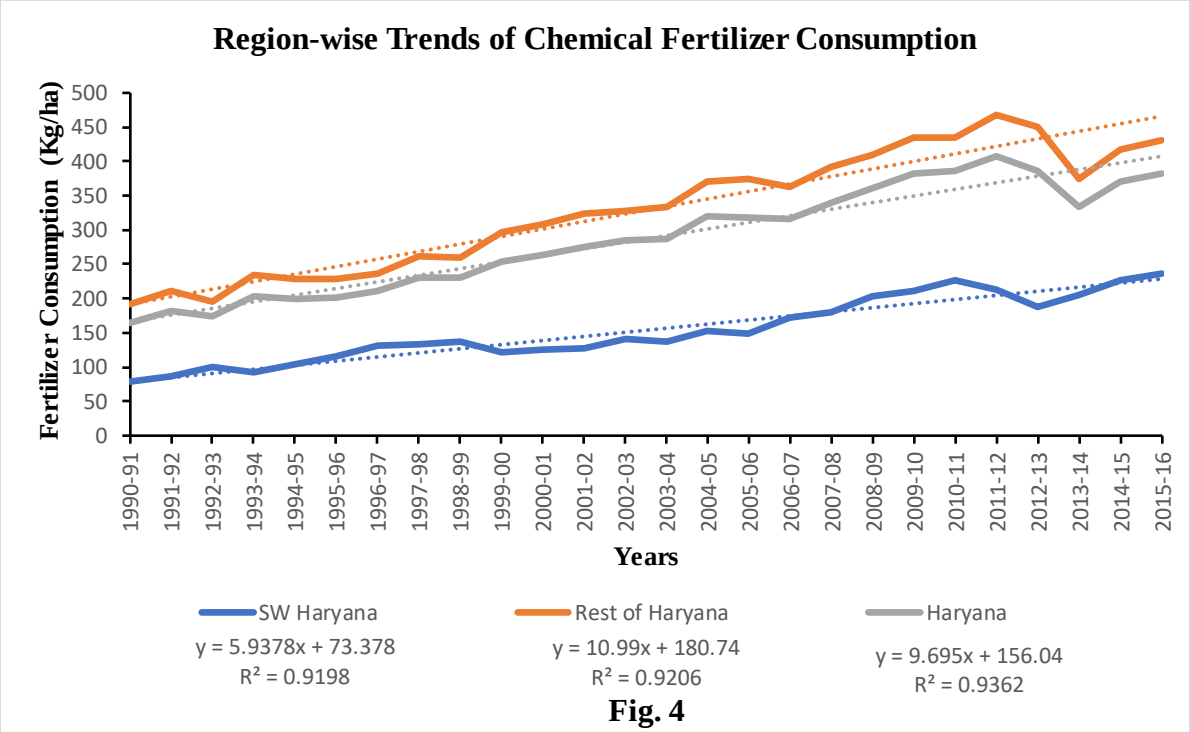

Fig. 4

Table 3

Index Value of Chemical Fertilizer Consumption

Region	Index Value	
	1990-93	2013-16
South-western Haryana	0.51	0.62
Rest of Haryana	1.15	1.13
Haryana	1.00	1.00

Pesticides Consumption

Figure 5 shows the region-wise trends of pesticides consumption. The regression coefficient value of both South-western Haryana as well as rest of Haryana shows a decline in consumption of pesticides over the time period. It is interesting to note that decline in the pesticide consumption is higher for rest of Haryana than that

of South-western Haryana. Table 4 shows that South-western Haryana is showing decline in index value of pesticide consumption from 0.41 to 0.39 with respect to Haryana while on the other hand rest of Haryana shows a negligible increase for the same.

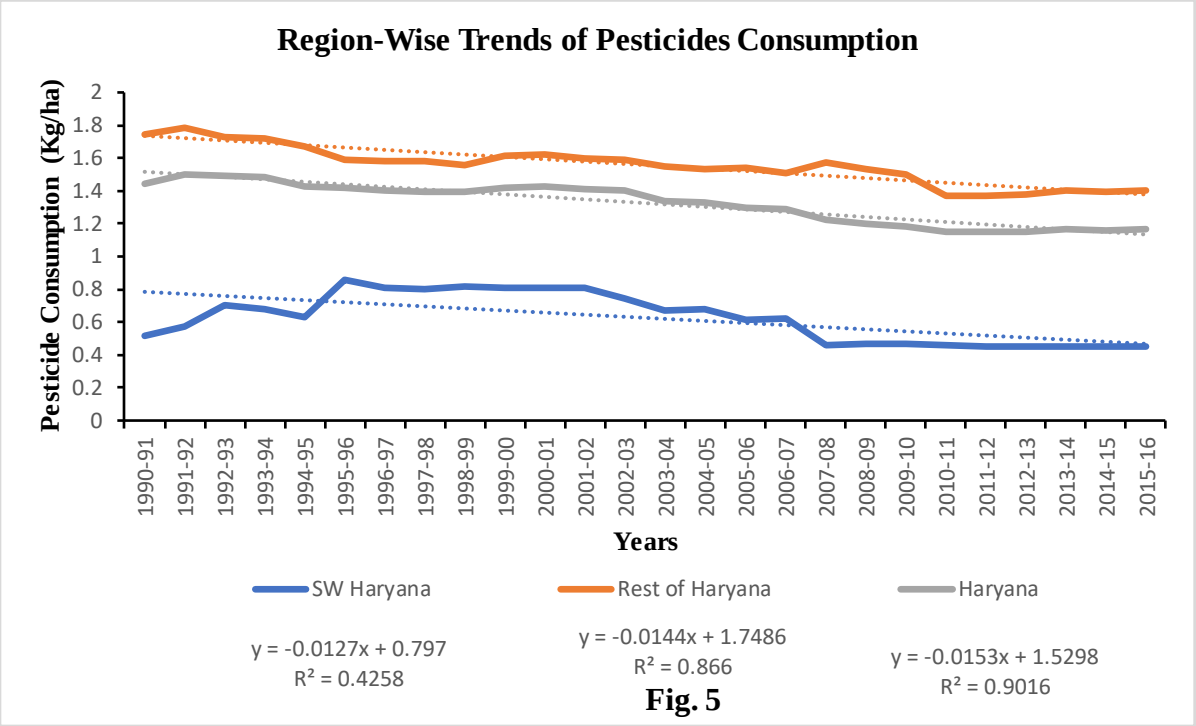

Fig. 5

Table 4

Index Value of Pesticide Consumption

Region	Index Value	
	1990-93	2013-16
South-western Haryana	0.41	0.39
Rest of Haryana	1.18	1.21
Haryana	1.00	1.00

Mechanization

Mechanization is a multidimensional factor which influence the decision at farm level like crop selection, farm management, release of surplus labour etc. The region-wise trends of number of tractors per thousand hectares has been depicted by figure 6. The results of the study shows that rest of Haryana has higher regression coefficient value (1.98) than that of South-western Haryana (1.57). It indicates that growth rate of mechanization in rest of Haryana is more than South-western Haryana. During 1990-93 the index value for South-western Haryana was 0.58 which increased to 0.84 during 2013-16. On the other hand, index value for rest of Haryana was 1.13 and 1.05 during 1990-93 and 2013-16 respectively (Table 5).

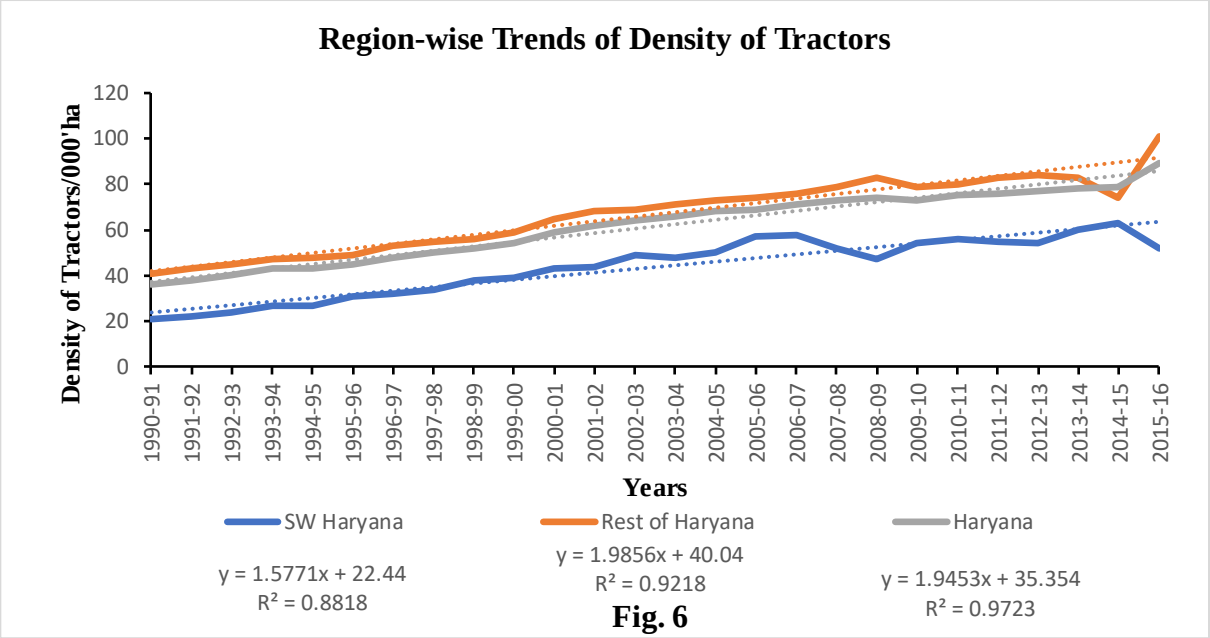

Fig. 6

Table 5		
Index Value of Density of Tractors		
Region	**Index Value**	
	1990-93	**2013-16**
South-western Haryana	0.58	0.84
Rest of Haryana	1.13	1.05
Haryana	1.00	1.00

Levels of Agricultural Development

Table 6 shows the value of composite index for South-western Haryana and rest of Haryana with respect to Haryana. In terms of level of agricultural development index value of South-western Haryana has been increased from 0.78 to 0.83 during the study period. However, rest of Haryana shows no change with respect to time as well as Haryana. It indicates that rest of Haryana has attained its threshold limit of agricultural development on the basis of parameters taken in the study much earlier than that of South-western Haryana.

Table 6		
Composite Index of Parameters of Agricultural Development		
Region	**Index Value**	
	1990-93	**2013-16**
South-western Haryana	0.78	0.83
Rest of Haryana	1.06	1.06
Haryana	1.00	1.00

Conclusion

Cropping intensity is an indicator of agricultural land use efficiency and seems to be improving in South-western Haryana during post economic reform period. It has increased faster in the study region than rest of Haryana over the time period. Overall proportion of net sown area is higher in South-western Haryana than rest of Haryana. Consumption of chemical fertilizer is an indirect indicator of irrigation development and direct indicator of agricultural production and yield. The study reveals that there is a significant difference in the chemical fertilizer in South-western Haryana and rest of Haryana. Due to better irrigation facilities chemical fertilizers consumption was much higher in rest of Haryana during the initial phase of study period. However, with passes of time its consumption is also increasing in South-western Haryana. The consumption of pesticides also follows same pattern of fertilizers consumption but with decline rate. Mechanization influences the agricultural productivity by various ways including reduction in the harvesting gap between two crops. The study reveals that rest of Haryana is in better position than South-western Haryana in terms of number of tractors per thousand hectares.

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