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Level of agricultural development in Haryana: A spatial analysis

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Abstract
In the present paper an attempt has been made to find out the spatial variation in the level of agricultural development in Haryana. The spatial variation in the level of agricultural development is determined with the help of several variables such as cropping intensity, irrigation intensity, net area irrigated, agricultural productivity, consumption of chemical fertilizers, number of tractors, and number of pumping sets. The analysis revealed a wide variation in the level of agricultural development in the state. Out of total 21 districts, 13 districts come under the high category of high to very high agricultural development. Karnal and Panipat districts have very high level of agricultural development. But, south and south western parts of the state showed backwardness in almost all the indicators.

Keywords: package technology, agricultural development, cropping intensity, irrigation intensity, crops

Introduction

Agriculture is the main source of livelihood for millions of people in India. It is central to all strategies of planned socio-economic development in India (Khan and Khalil, 2013) [5]. It denotes the quality of agricultural system of a region which mainly includes development in a real strength of cropped land, improvement in farm system, irrigation system, and high yielding improved varieties of seeds, specialization and commercialization of agriculture (Mohammed, 1980) [6]. Agriculture sector is the mainstay of the Indian economy, contributing about 14 percent of national Gross Domestic Product (GDP) and about half of India's population is directly or indirectly dependent on agriculture and allied activities for their livelihood (GOI, 2016) [3]. The pace of economic development of the country has been still continues to be significantly influenced by the pace of its agricultural development (Pal, 1975) [7]. It is an integral part of overall economic development (Tripathi and Prasad, 2009) [8].

Agricultural development is a multidimensional process. The extent of agricultural development cannot be captured on the basis of any single indicator. It is affected by several factors such as size of cultivable area, infrastructural facilities, state of farm technology and a balanced human resource etc. (Jena, 2014) [4]. It is a key element of rural development. There is a legitimate aspiration of the people in rural areas to improve their standard of living and to share the fruits of development.

In Haryana, agriculture is the primary sector of economy and majority of the population is directly or indirectly dependent on agriculture and its allied activities. The agricultural landscape of Haryana has got transformed very fast since the introduction of new agricultural technology in the mid-1960s. It was the package technology in the form of high yielding varieties seeds, chemical fertilizers and farm mechanization. As a result of the new agriculture technology and policies all the parameters of agriculture have undergone significant changes. The state has achieved a remarkable growth in its agricultural sector, which not only has made it self-sufficient in foodgrains production but also has elevated it to the second largest contributor to India's central pool of foodgrain (ESH, 2017) [2]. However, these changes in agriculture are not uniform all over the state. Therefore, the present study attempts to explore the level of agricultural development in the state. The mapping of spatial characteristics of the level of agricultural development provides a rational base for future orientation of agricultural planning.

Objective

To examine the spatial pattern of level of agricultural development in Haryana.

Study Area

The present study pertains to the state of Haryana, covering an area of 44,212 km² in north-western part of India. It is located between 27˚39' N and 30˚55'N latitudes and 74˚27'E and 77˚36' longitudes. According to the census 2011, the population of the state is 25,353,081 with a density of 573 persons per km². It is bordered by Punjab and Chandigarh in the north, Delhi and Uttar Pradesh in the east, Himachal Pradesh in north east and Rajasthan in the south and west (Fig. 1). There are twenty two districts at present in the state. The state is self-sufficient in food production and the second largest contributor to India's central pool of food grains. It is one of the heavily irrigated states of the country with 85 percent cultivated land under irrigation. There is semi-arid monsoon climate found in the state.

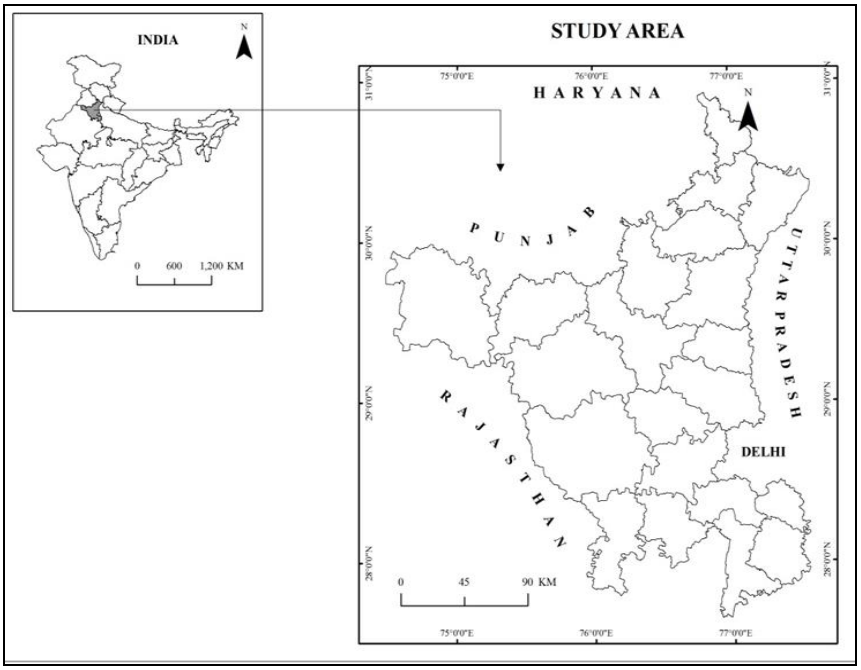

Fig 1: Location of study area.

Data base and methodology

The present study is based on secondary data. The data related to various aspects of agriculture such as as total cropped area (TCA), net sown area (NSA), net area irrigated (NAI), gross area irrigated (GAI), total geographical area (TGA), consumption of chemical fertilizers, tractors, pumping sets have been collected from Statistical Abstracts, Department of Economic and Statistical Analysis, Haryana. The parameters of agricultural development have been computed from the triennium 2010-11, 2011-12 and 2012-13. The triennium average has been taken to smoothen the yearly fluctuations in parameters of agriculture. In the present study seven important indicators have been selected to measure agricultural development such as

- Cropping intensity (percentage ratio of TCA to NSA)
- Percentage of NAI in NSA
- Irrigation intensity (Percentage ratio of GAI to NAI)
- Agricultural productivity (Rs/ha)
- Consumption of chemical fertilizers (Kg/ha NSA)
- Number of tractors per hundred hectare of NSA
- Number of pumping sets per hundred hectare of NSA

$$\text{Cropping Intensity} = \frac{\text{Average Triennium total cropped area}}{\text{Average Triennium net area sown}} \times 100$$

$$\text{Irrigation Intensity} = \frac{\text{Average Triennium Net area Irrigated}}{\text{Average Triennium Gross irrigated area}} \times 100$$

The spatial pattern of agricultural development in Haryana which has been computed in the form of a composite index derived on the basis of the combination of seven agriculture indicators. The z-score is computed by using the following formula:

Z Score (Z_i) = $X-\bar{X}$ / SD

Where

Z_i = Standard score for the i^{th} observation
X_i = Original value of the observation
X = Mean for all the values of X
SD =Standard Deviation of X

Further, the results of the standard score obtained for different indicators were aggregated in order to find out the composite index. All the data have been arranged in descending order of composite standard score. The positive value showed that the high level of agricultural development and negative value showed that the low level of development. The value of the composite scores have been divided into four classes viz; very high, high, medium and low.

Spatial pattern of agricultural development

Cropping Intensity

Cropping intensity refers to the number of crops cultivated in a specific agricultural field during an agricultural year. High cropping intensity shows the higher level of agricultural development. During 2010-13, the intensity of cropping of the state is 185 percent while disparities have been found at the districts level in the state (Fig. 2). The highest cropping intensity has been recorded in Faridabad district (201 percent) followed by Panipat (199 percent) and Karnal (197 percent) districts. It is seen from the figure that the lowest intensity of cropping found in Gurugram (135 percent) followed by Rewari (152 percent) and Mewat (153 percent) districts. Fatehabad, Hisar, Bhiwani and Mahendergarh districts have cropping intensity between 185 to 195 percent. Overall, the cropping intensity is comparatively higher in the north eastern and central part of the state as compared to south and south eastern part of the state. The stringent environmental condition, rugged terrain and lack of irrigation facilities are largely responsible for low agricultural intensity in the southern districts of the State.

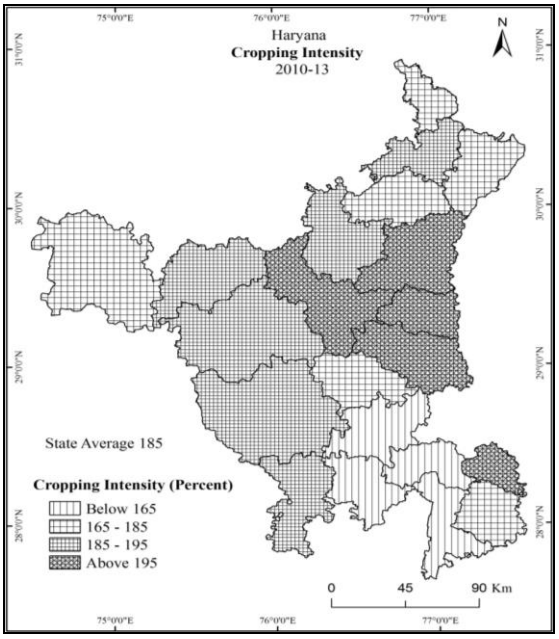

Fig 2: Pattern of cropping intensity in Haryana during 2010-13.

Irrigation Intensity

Fig. 3 showed large variations in the distribution of irrigation facilities among the districts of the state. There is 186 percent irrigation intensity in 2010-13 for the state as a whole. However, it varied from district to district. Hisar district has highest irrigation intensity with 209 percent. It is followed by Faridabad (201 percent), Panipat (199 percent) and Jind (199 percent) districts. Gururgam district had very low gross irrigated area with only 139.72 percent followed by Rewari (143 percent) and Mewat (164 percent) districts. It is evident from the figure that the highest irrigation intensity recorded in the central part of the state and lowest found in the southern part of the state.

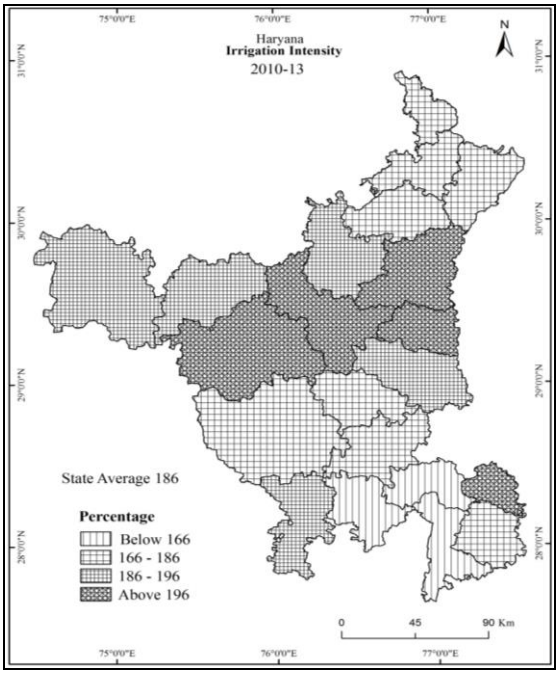

Fig 3: Pattern of irrigation intensity in Haryana during 2010-13.

Fertilizers consumption (kg) per hectares of net sown area

The fertilizer plays an important role in the agricultural development because it provides nutrients to the soil for production of crops which denotes the intensity of agricultural development. The use of fertilizer depends largely on the availability of irrigation facilities and availability of working capital with the farmers for acquiring the purchased inputs. Fig. 4 depicted that the fertilizers consumption per hectares of gross net sown area in the state during 2010-13 is 375 kg. There is a large variation in the consumption of fertilizers among the districts. Kurukshetra district has higher consumption of fertilizers in the state with 616 kg per hectares of net sown area followed by Karnal (565 kg), Palwal (552 kg) and Yamunanagar (522 kg) districts. Lowest consumption of fertilizers is found in Jhajjar (145 kg) followed by Gurugram (168 kg) and Bhiwani (170 kg) districts.

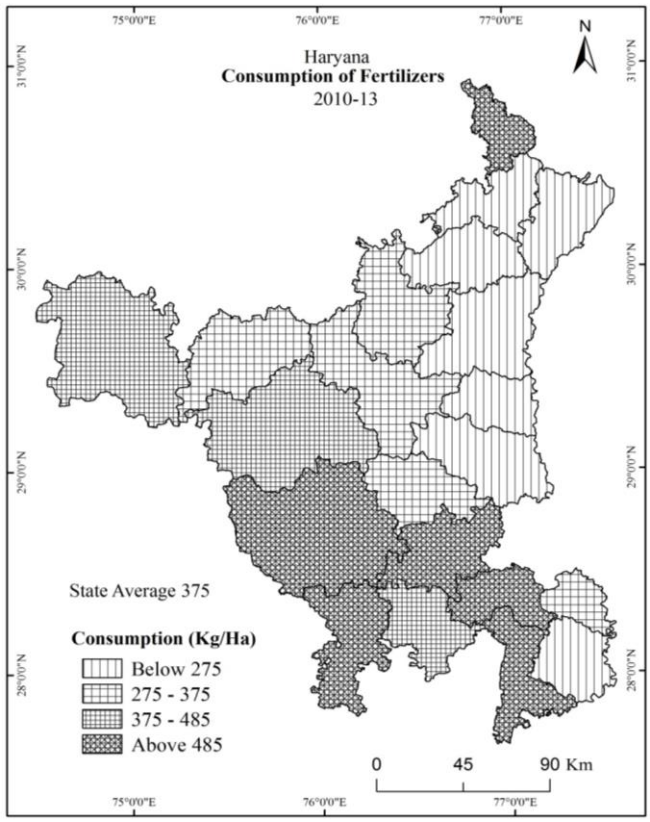

Fig 4: Pattern of consumption of fertilizers in Haryana during 2010-13.

Net area irrigated to net sown area

Irrigation is one of the most important infrastructure for agricultural development. It provides a sure supply of water for most of the agricultural practices. Irrigation formed the base of Green Revolution. Fig. 5 revealed that area under irrigation to net sown area is about 86 percent in 2010-13 for the state as whole. However, it is not uniform all over the state. Kurukshetra, Karnal and Sonipat districts have highest net irrigated area as percentage of NSA with hundred percent. It is followed by Kaithal (99 percent), Panipat (99 percent) and Faridabad (98 percent) districts. Mahendergarh district has very low net irrigated area with only 51 percent followed by Panchkula (56 percent) and Mewat (56 percent) districts.

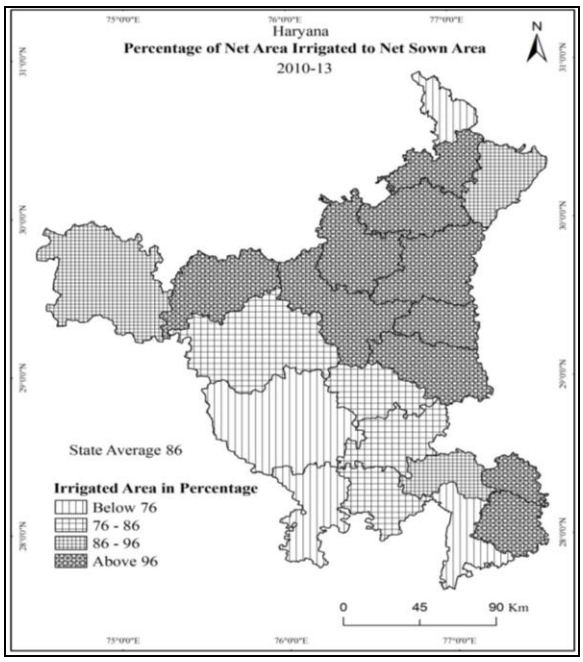

Fig 5: Pattern of percentage of net irrigated to net sown area in Haryana during 2010-13.

Tractors per 100 hectares of net sown area

Tractors are modern technical inputs in the agricultural sector which has multipurpose uses like tilling as well as means of transportation for transporting agricultural output to the market. Fig. 6 showed that there are 1.31 tractors per 1000 hectares of net sown area in the state during 2010-13. Palwal district is at the top position in the availability of tractors which is 14 per 1000 hectares of NSA followed by Faridabad (12 tractors) and Jhajjar (11 tractors) districts. On the other extreme there is Panipat district with low availability of such infrastructure facilities i.e. only 2 tractors followed by Mahendergarh (4 tractors) and Mewat (4 tractors) districts.

The number of this infrastructure in Ambala, Panchkula, Yamunanager, Kurukshetra and Rohtak districts ranged between 8-10 tractors. In case of Kaithal, Gurugram, Rewari, Hisar and Fatehabad districts the number of tractors ranged between 6-8.

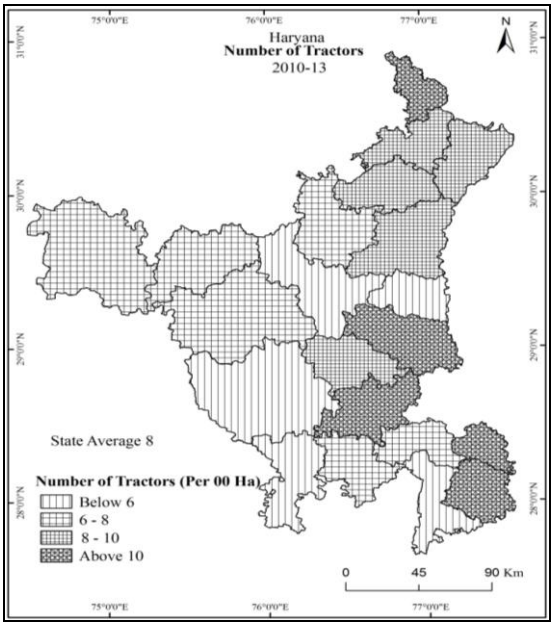

Fig 6: Pattern of consumption of fertilizers in Haryana during 2010-13.

Number of pumping sets per 100 hectares of net sown area

During 2010-13, there are 21 pumping sets per hundred hectares of net sown area recorded in the state (Fig. 7). Kurukshetra district has highest concentration of pumping sets per hundred hectares of net sown area. It is followed by Panipat (35), Faridabad (32) and Gurugram (31) districts. Hisar district showed less concentration of pumping sets with 9 and followed by Bhiwani and Rohtak (9 in each) districts.

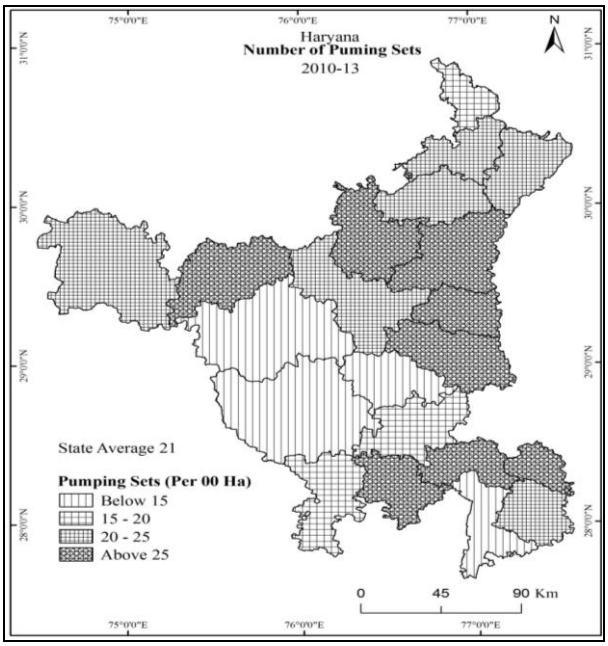

Fig 7: Pattern of number of pumping sets in Haryana during 2010-13.

Out of a total of 21 districts in the state, eleven districts have high pumping sets than state average. Ambala, Yamunanagar, Karnal, Palwal and Jind districts fall under the range of 20-25 pumping sets. Panchkula, Jhajjar Mahendergarh and Fatehabad districts have medium concentration of pumping sets fall under the range of 15-20 pumping sets.

Agricultural productivity

Agricultural development is closely related to the productivity of land in terms of values of output. Productivity is a function of a variety of factors including physical, social, economic and technological (Bhatia, 1968) [1]. During 2010-13, agricultural productivity in terms of Rs. per hectare of net sown area of the state is around Rs.101364 (Fig. 8). Like other variables, large spatial variations have been observed in agricultural productivity in the state.

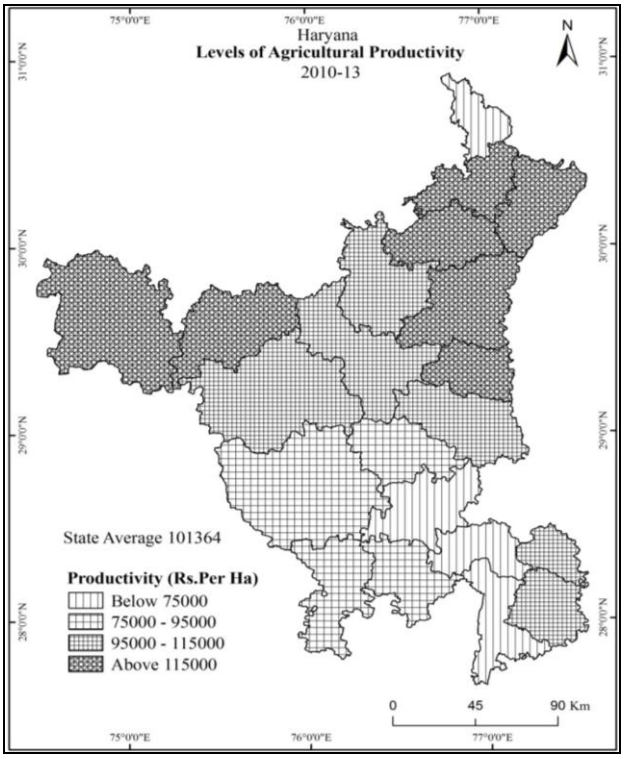

Fig 8: Pattern of levels of agricultural productivity in Haryana during 2010-13.

Ambala district has highest agricultural productivity in terms of Rs. per hectare with 122834 followed by Fatehabad (121451 Rs. per ha), Karnal (118692 Rs. per ha), Panipat (118692 Rs. per ha) and Kurukshetra (117180 Rs. per ha) districts. Gurugram district has recorded lowest productivity with Rs. 68461 per hectare. It is followed by Mewat (Rs.73027), Panchkula (Rs.74368), Mahendergarh district (Rs. 78479) and Rewari (Rs. 79952) districts. Out of a total of 21 districts in the state twelve districts have higher agricultural productivity than state average. Other districts like Palwal, Faridabad, Jind, Hisar, Sonipat and Kaithal have productivity between Rs.95000 to 115000 per hectare of NSA. Mahendergarh, Bhiwani, Rewari and Rohtak districts have high productivity ranges between 75000-95000 Rs. per hectare.

Level of agricultural development

Fig. 9 revealed that level of agricultural development is not uniform in Haryana. The very high level of agricultural development has been recorded in Karnal district (0.93) and Panipat district (0.87). Out of a total of 21 districts in the state, eleven districts fall under the high level of agricultural development. Bhiwani, Rohtak and Mahendergarh districts come under medium category of agricultural development. Jhajjar, Rewari, Gurugram and Mewat districts fall under the low level of agricultural development. It has been observed that Karnal district is most agriculturally developed district whereas least agriculturally developed is Gurugram district.

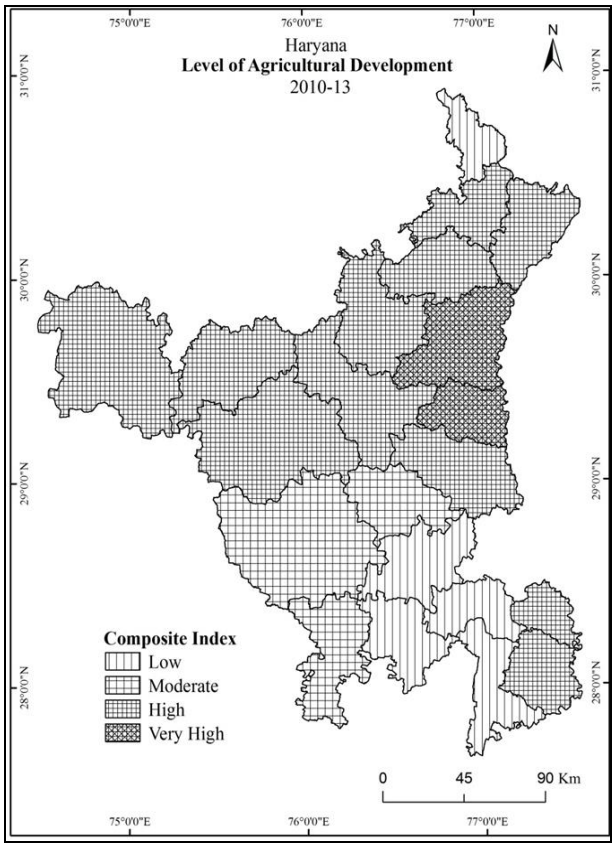

Fig 9: Pattern of level of agricultural development in Haryana during 2010-13.

Conclusion

The study revealed that there is a large inter-district variation in the level of agricultural development in Haryana. The north, north western and central parts of the state have far advanced compared to other parts of the state in almost all the indicators of agricultural development. Out of total 21 districts, 13 districts come under category of high to very high level of agricultural development. But, south and south western parts of the state showed backwardness in almost all the indicators. The north part except Panchkula, north western and central part of the state under high level of development. The south and south western parts have low level of agricultural development. The stringent environmental condition, rugged terrain and lack of irrigation facilities are largely responsible for low agricultural development in the south and south western districts of the State. Overall, it has been observed

that Karnal is the most agriculturally developed district in Haryana whereas least agriculturally developed is Gurugram district.

References

1. Bhatia SS. A New Approach to Measure Agricultural Productivity in Uttar Pradesh, Economic Geography. 1968; 93:244-60.
2. ESH. Economic Survey of Haryana 2016-17, Department of Economic and Statistical Analysis, Haryana, 2017.
3. GOI (Government of India). State of Indian agriculture, Government of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare Directorate of Economics and Statistics, New Delhi, 2015-16.
4. Jena D. Agricultural Development Disparities in Odisha: A Statistical Study. American Review of Mathematics and Statistics. 2014; 2(1):45-53.
5. Khan K, Khalil L. Spatio-Temporal Analysis of Agricultural Development A Block-Wise Study of Dehradun District. International Journal of Geography and Geology. 2013; 2(3):24-35.
6. Mohammed A. Regional imbalances in levels and growth of agricultural productivity - a case study of Assam. The Geographer. 1980; 1(8):35-52.
7. Pal MN. Regional disparities in the level of development in India, Indian Journal of Regional Sciene. 1975; 7(1):35-52.
8. Tripathi A, Prasad AR. Agricultural Development in India since Independence: A Study on Progress, Performance, and Determinants, Journal of Emerging Knowledge on Emerging Markets. 2009; 1(1):63-92. s