

SPATIAL VARIATION IN THE LEVEL OF AGRICULTURAL DEVELOPMENT IN HARYANA

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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 study is based on secondary data. Three years (i.e. 2016 to 2019) average data has been used to measure the Agricultural Development. Six indicators(input factors) has been used. Z score and composite score technique has been used to find out the final result. On the basis of composite score, developments of districts have been categorized into four categories i.e. high, medium, low and very low. Out of 21 Districts, 8 districts came under the high level of Agricultural Development. South and Southwestern part of the state showed Low agricultural development.

Keywords: *Agricultural Development, Secondary Data, Average Data, Z Score.*

Introduction

Agriculture is the mainstay of the people of Haryana and the fundamental source of its prosperity. Agriculture is not only an important sector of an economy rather than it feeds others sectors of economy. Agricultural development enhances Social and Cultural Development due to an increase in per capita income (Kazma Khan and Lubna Khalil 2013). Agriculture development is an integral part of overall economic development in the state like Haryana. For Agricultural development it is necessary to increase input like irrigation, fertilizers and others technical technological asset. Availability of such type of Agricultural inputs is not well distributed at village to National level, which responsible to create regional disparity in agricultural development. Haryana state is a major agriculturally dominant state in India. But there is huge variation at district level. Some districts are highly developed and some are less developed. Therefore, it is important to mark up the less developed region (district) and special policy should be made for development. Present paper is an attempt to highlights regional disparities in the level of Agricultural development at district level.

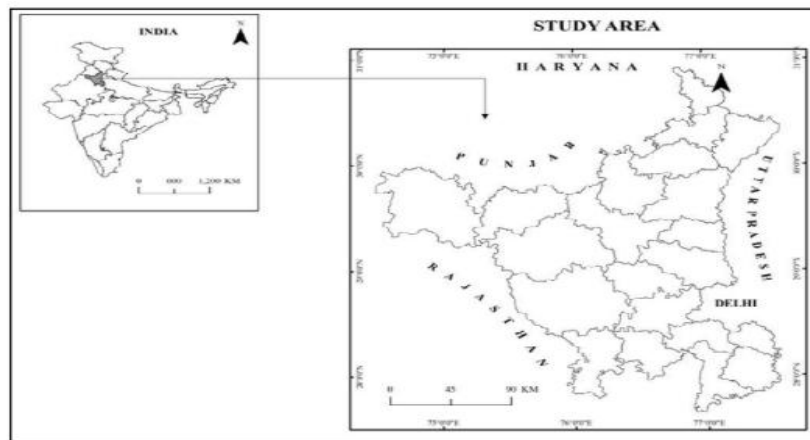
Objectives

- To study the special pattern of Agricultural Development in Haryana State.
- To study the availability of agricultural infrastructure for agricultural development at district level.
- To analyze the regional disparities of agricultural development.

Study Area

Haryana state is situated in North-Western part of India. The total geographical area of State is 44212 sq. km. It is situated between 27°39'N to 30°55'N latitude and 74°27'E to 77°36' longitude. The states of Haryana came into existence on Nov. 1st 1966. It is bounded by Uttar Pradesh in East, Punjab in West, Himachal Pradesh in North and Rajasthan in South. Physio graphically it has a fertile land and is called the "Green Land of India". The study region can be divided into two physiographic regions i.e. (i) Sub-Himalayan Terai and (ii) Indo-Gangetic plain. The climate of state is very hot in summer when temperature reaches 47°C and in winter temperature ranges from 5° to 9°C. There are twenty-two districts in the state at present. Haryana is one of the developed states of India. And the state is very developed in Agriculture. Irrigation and others infrastructural facility in the field of agriculture is more advance.

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Data Base and Methodology

The present paper is based on the secondary source of data. Secondary data is collected from statistical abstract of Haryana from 2016-17, 2017-18 and 2018-19. All data were suitably converted into tables for analysis the agriculture development of the study area. The basic unit of Investigation is district and state as a whole. Statistical tool like percentage and average have been used in the study. Data is processed and represented with the Choropleth Map. The level of Agricultural Development has been determined on the basis of six variables mainly those are input variable, because result (output) is based on input facility. These variables are: -

- X₁** Cropping intensity (percentage ratio of TCA to NSA).
- X₂** Irrigation Intensity (Percentage Ratio of GAI to NAI)
- X₃** Percentage of NAI in NSA
- X₄** Consumption of Chemical Fertilizer (kg/ha NSA)
- X₅** No of pumping sets per hundred hectares of NSA
- X₆** No of Tractors per hundred hectares of NSA

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 six agricultural input indicators. The Z score is computed by using the following formula:

$$Z \text{ Score } (Z_1) = \frac{X - \bar{X}}{SD}$$

Where

Z_1 = Standard Score for the i^{th} observation.

X_1 = Original value of the observation.

\bar{X} = Mean for all the value of X .

SD = Standard Deviation of X .

Composite Z-score has been calculating after calculate the Z score for measuring the agricultural development. The positive value of composite score showed that the high level of Agricultural Development and negative value showed the low level of Agricultural Development. The value has been divided into four classes in very low, low, medium and high.

Spatial Pattern of Development Indicators

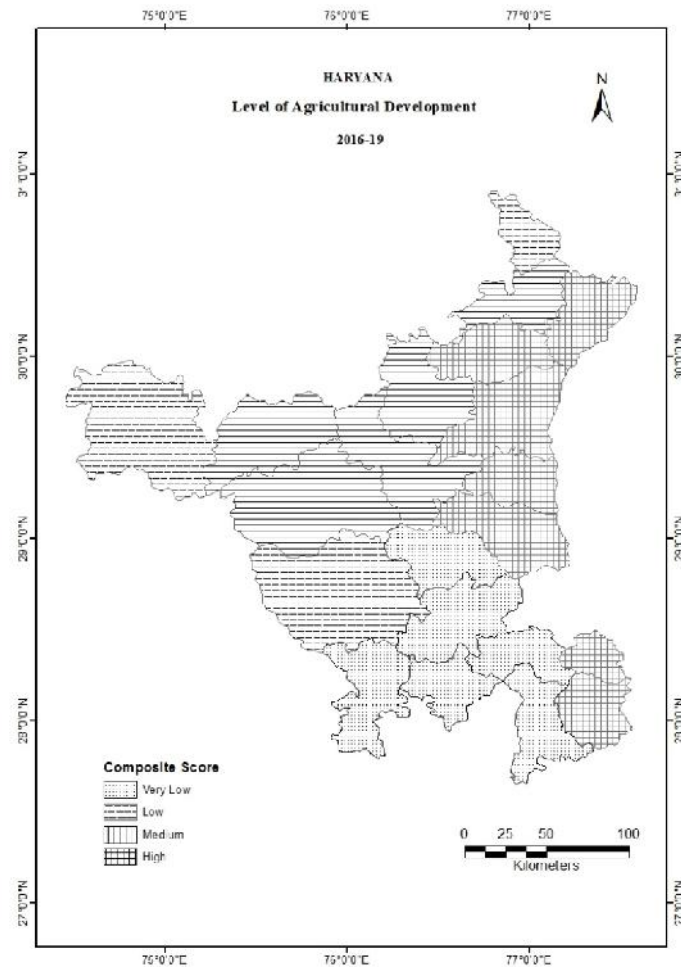
- **Cropping Intensity:** Cropping intensity refers to the numbers of crop cultivated in a specific agricultural field during an agricultural year. It is a good indicator for measuring the agricultural development. During the study period 2016-19, the cropping intensity of the state is 186percent, but there are lot of disparities in district level. Highest cropping intensity has found in Karnal District (197percent) followed by Hisar (195 percent) Panchkula (195). Faridabad and Fatehabad district are 193 percent. Lowest cropping intensity recorded in Rewari, district (156 percent) followed by Gurugram and Jhajjar. 14 District having highest cropping intensity than the state average. Geographical conditions and irrigation facilities effect the cropping intensity and awareness of farmers are also played important role.

- **Irrigation Intensity:** There are large variation in the distribution of irrigation intensity. The state as a whole found 190 irrigation intensity during the study period. But district level it varies from 148 percent in Rewari district to 237 percent in Bhiwani district. Seven districts have high irrigation intensity than the state average. These districts are Bhiwani, Mahendergarh, Karnal, Hisar, Sonipat, Fatehabad and Kurukshetra.
- **Fertilizer Consumption Kg/hac. of net sown Area:** The fertilizer plays an important role in the agricultural development because it provides nutrients of agriculture. Use of fertilizer is very important indicator for measuring Agricultural development. It is best input for increasing agriculture productivity. Out of three main objects of green revolution (Water, high yielding variety seeds, fertilizer) fertilizer is one of them. The fertilizer consumption per hectares of nets own area in the state during study period is 403 kg per hectare. But at district level there is a huge variation. it is varied from 68 kg / hectare to 771 kg/ per hectare. Highest consumption of fertilizer is found in Yamunanagar (771 kg) followed by Palwal and Kurukshetra and lowest consumption found in Gurgaon 68 kg/hac.
- **Net Irrigated Area to Net Sown Area:** Irrigation facility in Haryana is very good condition. it is also necessary for state like Haryana due to its geographical condition and low rainfall to improve their irrigation facilities for agriculture advancement. The area under irrigation to net sown area is about 89.8 % during study period. But it is not uniform all over the state. It is varied from 52 % in Mahendergarh to 100% in Gurgaon followed by Panipat.
- **Tractors per 100 hectares of net sown area:** Tractors are modern Technical input in Agricultural Sector which has multipurpose uses like tilling as well as means of transportation for transporting agricultural output to the market (Yadav A. 2018). Use of tractor found variation at district level. It varies from 5 in Mahendergarh and Mewat to 13 in Jhajjar District.
- **Number of Pumping Sets per 100 Hectares of Net Sown Area:** During the study period there are 24 pumping set per 100 hectares of net sown area found in Haryana. It varies from 12 to 42 at district level. Highest pumping sets found in Sonipat District and lowest found in Ambala District.

Spatial Pattern of Agricultural Development

Agricultural development is the multidimensional process. It is a key element of rural development. There is a legitimate aspiration of the people of rural area to improve their standard of living and to share the fruits of development. The primary objective of Agricultural Development is usually to increase the growth of Agricultural output. It is a requisite of an economic growth. Nevertheless, the utilization of Agricultural potential and the level of development attained vary from district to district on the basis of composite score of six indicators.

- **Very low level of Agricultural Development (below -0.25):** - There are six districts under this category. There are Jhajjar (-0.3), Rohtak (-0.48), Mahendergarh (-0.58), Mewat(-0.70), Gurugram (-0.87) and Rewari (-0.95). Rewari district found lowest Agricultural Development among all the districts of Haryana. In these districts four to five indicators are found negative value after calculating Z score out of the six indicators. All these districts are adjoining each other and all are found in southern part of the state. This is semi-arid zone.
- **Low level of Agricultural Development (-0.25 to 0.00):** -Three districts falls in this category. These categories are Bhiwani (-0.25), Panchkula (-0.25) and Sirsa (-0.12). Panchkula district falls in Shivalik Range and this district have hilly and uneven Terrain. In this reason the district had found in low Agricultural Development. Sirsa and Bhiwani falls in semi-arid zone.
- **Medium Level of Agricultural Development (0 to 0.25):** - Five districts found in this category. These districts are Ambala (0.09), Hisar (0.09), Fatehabad (0.09), Kaithal (0.15) and Jind(0.17). In these five districts, three districts are borderline of low level of Agricultural Development. Out of five district onedistricts found in Northern part, two districts found in western part and Kaithal and Jind found in Central part of state and have in better position.
- **High Level of Agricultural Development (Above 0.25):** -seven districts fall in this high level of Agricultural Development category out of 21 districts. These are Faridabad (0.31), Kurukshetra (0.48), Panipat (0.66) Yamunanagar(0.69), Palwal (0.75), Sonipat (0.85) and Karnal (0.87), Fatehabad and Palwal found in South Eastern of State and other districts found in eastern and northern part of state. In these district's irrigation facility is much better than other districts. Karnal district found in highest Agricultural Development followed by Sonipat.



Conclusion

The study concluded that there is a high level of inter district variation in the level of Agricultural Development in Haryana. The north-east and south eastern part of the state have high level of Agricultural Development. Seven districts found in high Agricultural Development Kaithal, Jind, Hisar, Fatehabad and Ambala district having medium level of development. South part of state and one district from western part and one District from Northern part of state falls in very low and low level of Agricultural Development. Geographical conditions, lack of irrigation facility and lack of modern technology have been affecting the Agriculture Development in Southern Part of state. Overall, it has been observed that karnal district is the most agriculturally developed in Haryana and whereas least agricultural development found in Gurugram district.

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Table 1: Agriculture Development in Haryana

Name of Districts	Cropping Intensity	Irrigation Intensity	NAT/ NSA	Fertilizers kg/ hac of NSA	Tubewell per 100 hectares of NET Sown Area	Tractor per 100 hectare of Net Sown Area
	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
Ambala	191	187.9	96.3	458	12	9
Bhiwani	188q	237	65.2	201	14	6
Charkhi Dadri*	-	-	-	-	-	-
Faridabad	193	188.4	96.9	268	17	11
Fatehabad	193	192.4	97.9	420	19	8
Gurugram	159	159.8	100	68	23	8
Hisar	195	199.8	87.9	315	22	8
Jhajjar	162	154.6	95	218	29	13
Jind	189	189.2	98.1	439	32	6
Kaithal	191	184.5	99.8	433	28	7
Karnal	197	201.8	98.1	590	35	10
Kurukshetra	189	190.8	99.1	605	26	10
Mahendergarh	189	202.7	52	294	15	5
Mewat	170	183.3	64.6	257	15	5
Palwal	191	188	98.9	692	28	12
Panchkula	195	169.9	82.5	73	18	11
Panipat	189	181.5	100	552	33	12
Rewari	156	148.5	96.1	442	18	6
Rohtak	167	162.6	96.3	330	22	9
Sirsa	188	189.9	96	393	18	7
Sonipat	177	197	99.8	570	42	12
Yamunangar	184	188.2	96.9	771	30	11

Source: Statistical Abstract of Haryana 2016-17 to 2018-19.

* Average of three years (2016-17, 2017-18, 2018-19)

*Charkhi Dadri- data not available

Table 2: Agriculture Development on the Basis of Composite Mean Z Score

Name of Districts	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	Composite Score
Ambala	0.64	0.12	0.2	0.32	-0.79	0.06	0.09
Bhiwani	0.40	2.73	-1.04	-1.07	-1.32	-1.17	-0.25
Charkhi Dadri	-	-	-	-	-	-	-
Faridabad	0.80	0.15	0.22	0.71	-0.92	0.87	0.31
Fatehabad	0.80	0.36	0.26	0.11	-0.65	-0.35	0.09
Gurugram	-1.92	-1.37	0.34	-1.80	-0.12	-0.35	-0.87
Hisar	0.96	0.75	-0.13	-0.46	-0.25	-0.35	0.09
Jhajjar	-1.68	-1.64	0.15	-0.98	0.68	1.69	-0.3
Jind	0.48	0.19	0.27	0.22	1.08	-1.17	0.17
Kaithal	0.64	-0.06	0.34	0.18	0.55	-0.76	0.15
Karnal	1.12	0.86	0.27	1.04	1.48	0.46	0.87
Kurukshetra	0.48	0.28	0.31	1.12	0.28	0.46	0.48
Mahendergarh	0.48	0.91	-1.56	-0.57	-1.19	-1.57	-0.58
Mewat	-1.04	-0.12	-1.06	0.77	-1.19	-1.57	-0.70
Palwal	0.64	0.13	0.30	1.59	0.55	1.28	0.75
Panchkula	0.96	-0.83	0.35	-1.77	-0.79	0.87	-0.25
Panipat	0.48	-0.21	0.34	0.83	1.22	1.28	0.66
Rewari	-2.16	-1.97	0.19	0.23	-0.79	-1.17	-0.95
Rohtak	-1.28	-1.22	0.2	-0.37	-0.25	0.06	-0.48
Sirsa	0.40	0.23	0.19	0.03	-0.79	-0.76	-0.12
Sonipat	-0.48	0.60	0.34	0.93	2.42	1.28	0.85
Yamunangar	0.08	0.14	0.22	2.02	0.81	0.87	0.69

(Computed by Author).

