



# Levels of Agricultural Development in Haryana-2001

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Research Paper—Geography

The present paper is an attempt to analyse the levels of agricultural development in Haryana. Agricultural development in a true sense, denotes the quality of a Agricultural system of a region in term of productivity, efficiency, diversification, quality of produce, commercialization & sustainability consistent with a desired state of agrarian relations and ecological balance (Krishan, 1992). Thus agricultural development is undoubtedly a multi-dimensional concept. In this regard the identification of levels of development demands a judicious choice of indicators. In this case the choice has, however, been completely constrained by availability of data. The following indicators have been selected to represent the levels of agricultural development:

**A) Agricultural Productivity-**

1. Agricultural produce per hectare of NAS (Rupees)

**B) Agricultural Efficiency** 2. Per capital (Rural) agricultural produce (Rupees)

**C) Commercialization**

3. Percentage of gross area sown under commercial crops to total cropped area. 4. Regulated markets per lakh hectare of net area sown.

**D) Land use Efficiency and Diversification**

5. Cropping Intensity

**E) Degree of Equity Biochemical**

6. Net irrigated area as percentage to net area sown. 7. Training intensity 8. Tubewells and pumping sets per 100 hectare of net area sown.

9. Fertilizers consumption in tonnes per '000' hectare of gross area

**Mechanical:** 10. Tractors per '000' hectare of net area sown Note: For absolute figure of these indicators see annexure-1

**Data Source:-**The data used in this study is secondary in nature & has been collected from statistical abstract of Haryana(2001), issued by economic & Statistical Advisor, planning Department, Govt of Haryana.

**Methodology-**The levels of agricultural development have been analysed with help of ten indicators. The focus of study is on the year 2001. The data has been examined for the state at the level of districts. It has been represented through tables & map. Principal Component Analysis Method has been used to assess the relative levels of development. The data regarding all the selected indicators is subjected to this method to derive 'composite scores' of individual districts in terms of the levels of development. The technique involves transformation of the original data set into a new set consisting of general components, the number of which equals to the number of variables in the original data set. The eigen values corresponding to each of the components indicates the explanatory power of the respective components. It is generally seen that the first few components explain a greater part of the total variance in the original data set. Further, the correlation coefficient of each of the component with the variables in the original data set – i.e., the component loadings can be meaningful interpreted only in the case of first few components. Generally, the components having eigen value less than 1 are usually skipped over in the analysis.

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The loadings of the selected components (correlation coefficient between the component and the original values and interpreted very much in a similar way) are used as weights of the standardized values of the given variables for working out component scores corresponding to each of the observation. It may be expressed in the following way (Johnston, 1978).

$$S_{ik} = \sum_{j=1}^n D_{ij} L_{jk}$$

Where,  $D_{ij}$  is the standardized values of observation 'i' on the variable 'j';  $L_{jk}$  is the loading of variable 'j' on the component 'k';  $S_{ik}$  is the score of observation 'i' on component k; and summation is overall 'n' variables.

**Analysis-**For the enquiry into regional disparities in the levels of agricultural development, the first two components have been retained for the analysis. Table 1 presents the eigen values corresponding to each of the selected components. In all the two components explain 61.05 percent of the total variance in the original data sets.

**Table 1. Eigen Values and Variance Explained**

Components	Eigen Values	Variance Explained	Cumulative %age
C1	4.138	43.184	43.184
C2	1.786	17.862	61.046

**Source:** Compiled by the author

Table 2 presents the loading of each of the two components on the selected variables in the original data sets. The loadings are the correlation coefficients between the extracted components and the variables. Second component reveals high positive loading with per capita agricultural produce and cropping intensity. The other loadings are either negatively correlated or insignificant. Thus  $C_2$  is representative of high cropping intensity and per capita agricultural produce. Lastly, it can be concluded that this area has intensive and food-crops dominating agriculture. The per capita agricultural productivity is high largely affected by inputs like irrigation, fertilizer consumption and mechanization.

**Table 2. Components Loadings**

Variables	$C_1$	$C_2$
1	0.73	-0.19
2	0.57	0.67
3	-0.61	0.43
4	0.24	-0.59
5	0.59	0.52
6	0.80	0.43
7	0.29	0.23
8	0.71	-0.44
9	0.94	-0.13
10	0.74	-0.16

Source: Same as given in Table 1

Table 3 presents the scores of each component with overall scores for the 19 observations. The scores of individual components indicate the direction and extent to which an observation is associated with the respective components.

**Table 3. Component Scores**

Districts	$C_1$	$C_2$	Overall Score
Ambala	0.67	-0.25	2.44
Panchkula	-1.08	-2.42	-9.03
Yamuna Nagar	0.54	-0.87	0.76
Kurukshetra	1.48	0.16	6.68
Kaithal	0.86	0.45	4.52
Karnal	1.69	-0.37	6.63
Panipat	1.62	-0.67	5.78
Sonipat	0.67	-0.68	1.67
Rohtak	-0.36	-0.32	-2.14
Jhajjar	-0.59	-0.72	-3.84
Faridabad	-0.31	-0.24	-1.77
Gurgaon	-0.97	-0.66	-5.38
Rewari	-0.96	-0.08	-4.29
Mahendragarh	-1.34	0.50	-4.89
Bhiwani	-1.62	0.41	-6.25
Jind	0.03	1.18	2.25
Hisar	-0.55	1.43	0.19
Fatehabad	0.09	1.77	3.57
Sirsa	0.11	1.38	2.96

Source: Same as given in Table 1

To indicate the comparative levels of development, the overall scores have been categorized into following four categories as given in table 4

**Table 4 Haryana: Levels of Agricultural Development, 2001**

Category (Overall Score)	No. of Districts	Names of Districts
High(Above 5)	3	Kurukshetra, Karnal, Panipat
Moderate(0-5)	8	Fatehabad, Sirsa, Ambala, Jind, Sonapat, Yamuna Nagar, Kaithal, Hisar
Low(-5 to 0)	5	Faridabad, Rohtak, Jhajjar, Rewari, Mahendragarh
Very Low(Below -5)	3	Gurgaon, Bhiwani, Panchkula

Source: Same as given in Table 1

Accordingly, the state has been divided into four zones:

- i) Zone of high development (above 5)
- ii) Zone of moderate development (0 – 5)
- iii) Zone of low development] (-5 to 0)
- iv) Zone of very low development (below 5)

**Zone of high level of development (Above 5)**-This zone includes the districts of first category and comprised of three districts (Kurukshetra, Karnal and Panipat) as mentioned earlier. All the districts falling in this zone are favourably endowed with physical and consequently institutional, organisational and technological factors. If we examine the rainfall distribution in Haryana it ranges from 100 cm in the north east to less than 25 cm in the south west. The 50 cm isohyets divides the state into almost two equal parts, the west and the east. The latter is agriculturally more productive. And this zone of highest development falls in this region only. Not only it receives a higher amount of rainfall but also its underground water is sweet. Nevertheless it does require irrigation for an assured crop.

Secondly this zone of Haryana is covered largely by old alluvial deposits, comprising coarse, light fine loam. This type of soil is more productive, being deep and well drained, it quickly responds to irrigation. It is capable of producing a variety of crops such as wheat, Rice, sugarcane and cotton. The soil in these areas is compact and stiff because of the addition of silt over years by canal water. It is less granular and has a low water-holding capacity. The moderate permeability characteristic of this soil linked with

intensive irrigation has led to water logging in the vicinity of the canals. But after reclamation of land in these water logged areas, they provide very fine pans for rice cultivation.

**Zone of Moderate level of Development (0 to 5)**-This belt is comprised of the districts adjoining to first zone and western Haryana. The soils of this area come under Khaddar, Bhangar, Nardok, Naili assessment circles. These soils are light loamy and moderately heavy soils. The proportion of silt and clay components in silty loam is higher reduces its water-holding capacity. The soil is difficult to work upon when dry and tillage needs more drought power per unit area. It gives good yields under efficient soil management and proper irrigation. A variety of crops can be raised on these soils. With irrigation and Moderate amount of rainfall crop yields are high. The intensity of rainfall and availability of suitable underground water irrigation facility is inferior in this area as compared to the first zone (highly developed).

**Zone of Low level of Development (-5 to 0)**-This belt covers the districts of southern and central Haryana covering five districts namely Faridabad, Rohtak, Jhajjar, Rewari and Mahendragarh. The soil cover is salty in these districts having undulating slope i.e. Rohtak and Jhajjar. The underground water is brackish/saline. Returns from these soils do not generally justify heavy investment in fertilizers. The relatively sandy loam belt covers northeast part of Mahendragarh, Rewari except its central part, parts of Faridabad. Sandy loam is found in central Rewari, the medium and moderately heavy soils in areas of Faridabad. Most of these soils being capable of retaining moisture are the best soil for dry farming, i.e. barani cultivation. The sandy loam is granular and porous. It has a near crumb structure which is considered effective for plant growth. Having more proportion of sand than silt and clay it has an ideal degree of both permeability and water holding capacity. The soil gives good response to irrigation, though, it needs the help of modern practices to build up. With spray irrigation

or a moderate rainfall seed germination is rapid and crop yields are high on these soils. The soils in these areas are generally easily ploughed and capable of producing a variety of crops.

**Zone of Very Low of Development (Below -5)**-This zone spreads over Gurgaon, Bhiwani district and tracts of Siwalik hills.

Gurgaon is covered by sandy loams and moderately heavy soils. The underground water is brackish/saline. Largest area of Bhiwani district is comprised by sandy stretches which comes under category of culturable waste land. Sand dunes are found on massive scale. The region resembles the treeless undulating deserts and is locally known as Bagar. This is the area where engineers may face great difficulties in the extension and implementation of irrigation plans bearing heavy costs. Irrigation in this area is a crying need, first as a protective

measure because of the meager and unreliable rainfall, second to remove the socio-economic imbalance and third, as the soil has otherwise a good agricultural potentials. This tract can be regarded as the underdeveloped zone in terms of agricultural development. High rainfall variability, inadequate supply of water for irrigation, poor adoption of mechanization and persistence of subsistence economy are the major constraints for agricultural development in this zone. Fig. 1 presents a visual impression regarding regional disparities in the levels of agricultural development.

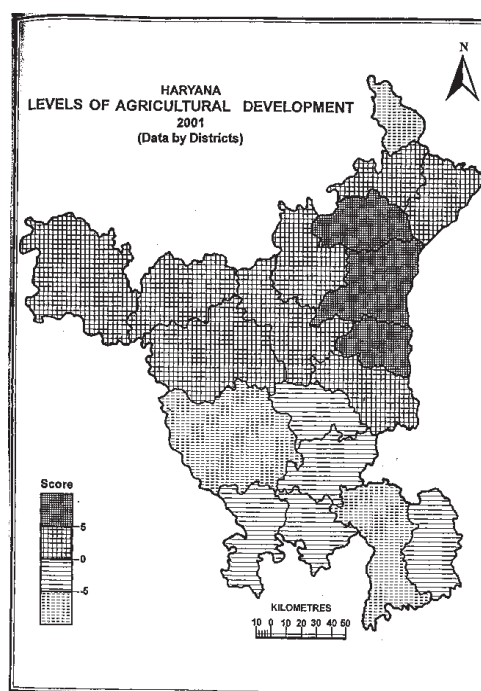
**CONCLUSION**-The regional disparities in the level of agricultural development of Haryana

are clearly reflected in regional differences in soil cover and irrigation facilities. These two factors are ultimately responsible for differences in adoption of mechanization and fertilizer consumption. It also affects the agricultural productivity, cropping intensity and ultimately the levels of agricultural development. Overall, it can

be said that the level of agricultural development is more affected by physical factors.

Regarding agricultural development, Haryana can be regionalized into two broad regions : (i) Upper (Northern Region) and (ii) the lower (Southern Region). The Northern part is again comprised of two types of areas (i) having high level of agriculturally highly developed areas covering Kurukshetra, Karnal and Panipat Districts. The overall score value in all these districts is above 5; (ii) moderately developed areas covering eight districts namely –

Ambala, Yamuna Nagar, Kaithal, Jind, Sonapat, Hisar, Fatehabad and Sirsa. The overall score values in these districts ranges between 0 to 5. Similarly, the southern region is also having two types of areas: (i) areas with low level of development covering five districts i.e. Rohtak, Jhajjar, Mahendragarh. The overall score value in this area lies between -5 to 0; (ii) areas having very low level of development. Only two districts namely Bhiwani and Gurgaon are included in this category. The overall score value in these districts is below -5. Broadly speaking, agricultural development is partially successful particularly in northern parts of the state.



**Annexure-1 Raw Data with Absolute Values**

Districts	Indicators									
	1	2	3	4	5	6	7	8	9	10
Ambala	53	114	9	6	183	86	184	183	162	70
Panchkula	35	49	7	10	148	42	146	160	111	34
Yamuna Nagar	50	114	23	6	154	82	165	213	232	88
Kurukshetra	55	166	8	5	184	100	184	246	239	81
Kaithal	37	139	2	4	193	96	194	256	196	53
Karnal	49	144	3	5	183	100	183	314	318	72
Panipat	54	102	4	5	187	100	187	303	252	91
Sonepat	49	84	5	2	158	99	155	240	244	70
Rohtak	41	77	16	2	151	78	166	140	146	74
Jhajjar	29	61	11	1	148	76	151	226	89	78
Faridabad	25	77	6	3	166	73	190	157	132	74
Gurgaon	37	67	15	4	154	39	232	164	86	43
Rewari	31	65	33	2	160	70	157	233	106	47
Mahendragarh	28	72	34	3	175	77	120	136	92	26
Bhiwani	28	85	26	2	156	52	175	72	54	40
Jind	20	125	11	3	194	93	195	172	136	56
Hisar	42	130	33	2	172	84	185	82	115	51
Fatehabad	37	180	28	3	182	95	186	125	155	57
Sirsa	43	196	14	2	166	90	174	88	157	59
Average	39.11	107.74	15.16	3.68	169.16	80.63	175.21	184.74	159.05	61.26
SD	10.59	42.80	10.96	2.14	2.14	18.92	23.77	70.69	70.12	18.35
CV	27.07	39.73	72.28	57.97	1.26	23.44	13.57	38.27	44.09	29.95

**Source:** Statistical Abstract of Haryana, (2001) issued by Economic and Statistical Adviser, Planning Department, Government of Haryana.

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