Agricultural Regionalization through Measurement of crop concentration in Kushinagar District, Uttar Pradesh

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Abstract

Study area Kushinagar district is situated in eastern part of Uttar Pradesh. Soil of the district is deposited by the Gandak and its tributaries, which is very fertile alluvial soil. Good quality soil and three seasons help to grow three seasonal crops of Rabi, Kharif and Jayad. Many crops like – Wheat, Paddy, Maize, Turmeric, Mustard, Sugar Cane and various vegetable. Here some crops are very dense, then some crops are less dense. With the primacy of one crop, so many other crops are grown simultaneously in one season. Looking at these characteristics of agricultural activities of Kushinagar district we studied crop concentration of the three main crops – Rice, Wheat and Sugarcane here, which shows that

I – Rice production is abundant in all parts of the district but rice concentration in the southern block of the district is high level and rice concentration in the northern block is low level.

II – Such that wheat production is in all parts of the district but wheat concentration in the southern block of the district is high level and in the northern blocks is low level.

III – Such that sugarcane production is in all parts of the district but sugarcane concentration is high level in the northern and eastern part and in the southern and western part is low level.

Key Word – Agricultural Regionalization, Measurement, Crop, Crop Production, Crop Concentration.

Introduction

"Crop concentration specifically refer to the concentration or density of crop in any area or region."

Crop, animal and agricultural-industrial concentration means to find region clearly dominated by that particular steak without overlapping for example paddy region of eastern India and cotton region of black soil. Higher the crop concentration index denotes more interest of farmer to grow the crop. Spatial diversity (variations) of crop concentration quantity is mainly due to the various physical and socio-economic factors like relief, soil, water, money and also technology.

Various qualitative and quantitative techniques and methods are used to calculate the crop concentration. In these quantitative are more appreciated and useful. Some important method are as –

I – First Method

Location Quotient method of Florence, 1948

In this method location quotient or locational coefficient is used to calculate the crop concentration. Formula used is as –

$$\frac{Ec}{En} \div \frac{Tc}{Tn} \quad \text{or} \quad \frac{Ec}{En} \times \frac{Tn}{Tc}$$

Where – Ec = Area of the crop in any state or region.
En = Area of the crop in the country.
Tc = Area under all crops in that state or region.
Tn = Area under all crops in the country.

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This method is very simple to use but results remains vague as many other factors are also reflect the crop concentration in any area or region except area of that crop.

II – Second Method

Chisholm's Method, 1962

Method of crop concentration used by Florence further modified Chisholm in 1962. He modified the formula as –

$$\frac{Ec}{En} - \frac{Tc}{Tn}$$

These difference either may be positive or negative. By adding these positive and negative amount seperalty and dividing them by 100, which can get a coefficient ranges between 0 to 1.

III – Third Method

Bhatia's Method, 1965

Bhatia in 1965 used location quotient method to calculate crop concentration.

Formula – Concentration of 'A' crop =

$$\frac{\text{Area of 'A' crop in regional unit}}{\text{Area of all crops in regional unit}} \div \frac{\text{Area of 'A' crop in the country}}{\text{Area of all crops in the country}}$$

IV – Fourth Method

Jasbir Singh's Method, 1976

To calculate crop concentration in the country Jasbir Sigh, 1976 used this formula. He suggested to use only food crops like Wheat, Rice, Maize, Sugarcane, Jwar and black gram only.

Formula -

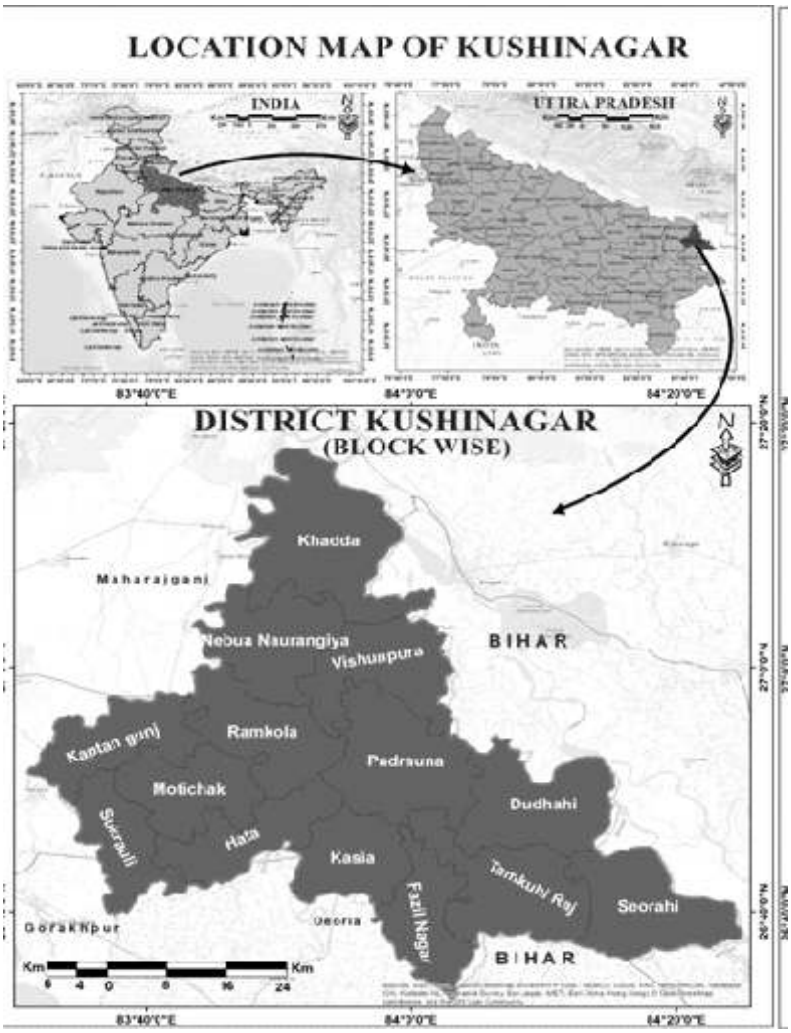
$$C = \frac{Pae}{Par} \qquad Ci = \frac{Pae}{Par} \times 100$$

Where - C = Crop concentration
Ci = Crop concentration exponent
Pae = Percentage of 'A' crop in the cropped area in region or unit.
Par = Percentage of 'A' crop in the cropped area in country.

Agricultural Region – "It is the part of the land having similarities in the crops growing in these region and also it keeps visible variation from nearby region." Region can be easily identified with the help of agricultural regions, but it is very difficult to set its fixed boundary.

In Kushinagar district agricultural regionalization have been done by crop concentration method. This method is used mainly in those regions where life-solidarity agriculture is more common, where most crops are produced to fulfill the daily food needs of the farmers. Here agricultural regions mainly demarcated with the help of ranking and merit of the crops. Indian geographers more dominantly used the food crops for such practices. Here more importance have given to food crops while role of meat, animal husbandry, milk production, poultry considered less important or negligible. This approach was mainly adopted by P.Sen Gupta, S.S. Bhatia, N.P. Ayyar, Prof. Jasbir Singh, M.F. Siddique all had used crop concentration method for agricultural regionalization.

1- Study Area



The district Kushinagar is located in the eastern part of Uttar Pradesh and hold an important position among 75 district of Uttar Pradesh. Kushinagar district is part of the great northern plain (Middle Ganga Plain). It extends between 26o33' N and 27o18' N latitudes and 83o29' E and 84o26' E longitude. It is surrounded by Nepal, Bihar and three district of U.P. That in the north is Nepal country, in the west are Maharaj Gunj and Grorakhpur district. In the south are Deoria and Gopalgunj (Bihar), in the east is west champaran (Bihar) district. The river Gandak delimits district is east boundary and separates west champaran (Bihar) from Kushinagar district. River Choti Gandak delimits district is west boundary and separates Maharaj Gunj district from Kushinagar district. Kushinagar district is located around NH-28 and 20 km. east of Gorakhpur city and covers an area 2906 km2.

1- Objective –

i- To analyze the pattern of main crop (Rice, Wheat, Sugarcane) in Kushinagar district.

ii- To analyze the crop conentnation in Kushinagar district.

iii- To explain the imbalances of agricultural development by Agricultural Regionalization through crop concentration method.

2- Date and Methodology –

There will be used secondary data in this study. Under these circumstances for secondary data, information was collected from district statistical magazine, irrigation department and some information had also been collected from private bodies, block, tehsil level.

Methodology

Both qualitative as well as quantitative techniques and methods are used for calculating crop concentration. In between quantitative methods are more clear and reliable, thus more in use.

In this paper Bhatia's (1965, Page 39-56) method has been used to calculated crop concentration in the study area.

Formula used is – Index for crop Concentration of crop 'A' =

$$\frac{\text{Area of crop 'A' in the areal unit}}{\text{Area of all crops in the areal unit}} \div \frac{\text{Area of crop 'A' in the district}}{\text{Area of all crops in the district}}$$

In this spatial values are denoted on the map and crop distribution can be easily compared on similar scale. Regions of crops, animals and agricultural industries can be identified easily by this method.Result and

Discussion

(1) Crop concentration of Rice –

More or less all the block produced rice in Kushinagar district. Average crop concentration index of Rice in Kushinagar is about 1.03. The blocks of high crop concentration index in Kushinagar are Fazilnagar (1.46), Sukrauli (1.39), Hata (1.16), Padrauna (1.15) and Kasia (1.15). Where as Khadda (.73) – Lowest, Bishunpura (.75), Dudahi (.77), Ramkola (.83) and Seorahi (.68) are the block with lower crop concentration index of Rice crop.

Main reason for high crop concentration index of Rice is hot-humid climate and socio-economic conditions of the farmers.

Table – 1
Rice Crop Concentration in Kushinagar District (2015)
(In Descending Order)

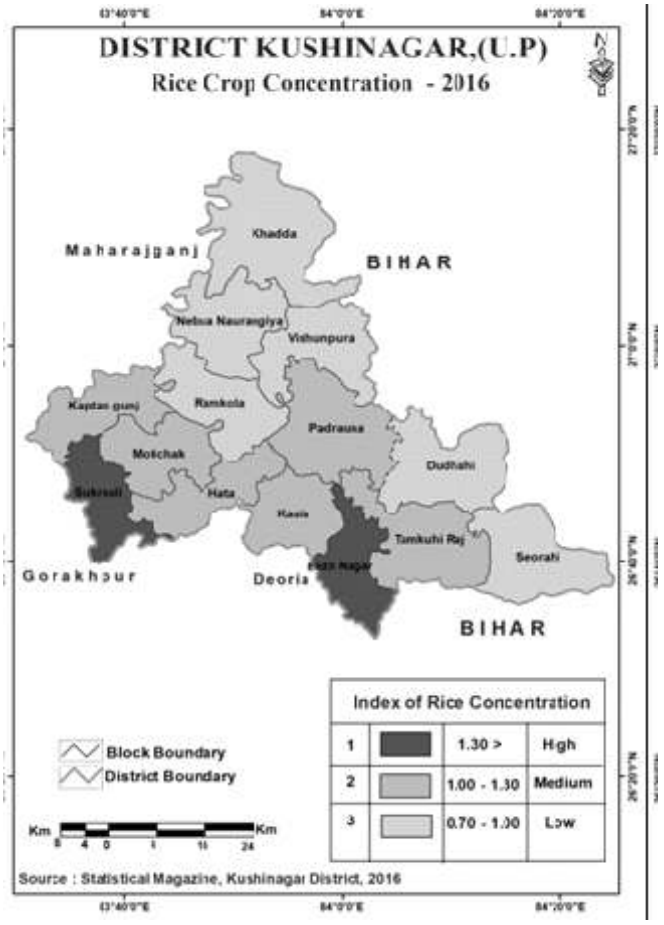
S. No.	Block	Net Sown Area (In hec)	Rice Area (In hec)	Rice Crop Concentration
1	Fazil Nagar	12232	9685	1.46
2	Sukrauli	12846	9667	1.39
3	Hata	13941	8777	1.16
4	Patrauna	22410	13396	1.15
5	Kasia	12238	7625	1.15
6	Kaptangunj	14634	9026	1.14
7	Tamkuhi	14987	9176	1.13
8	Motichak	14080	8305	1.09
9	Nebua Naurangia	16168	8190	.93
10	Seorahi	18195	8532	.86
11	Ramkola	17741	7968	.83
12	Dudahi	16888	7105	.77
13	Bishunpura	18594	7543	.75
14	Khadda	19609	7736	.73
	Total	**225185**	**123321**	**1.03**

Source : Statistical Magazine, Kushinagar District, 2016

Table – 2
Index of Rice crop concentration in Kushinagar District (2015)
(By Group)

S.No.	Rice Concentration Index		Blocks
1	1.30>	High	Fazilnagar, Sukrauli
2	1.00 to 1.30	Medium	Hata, Padrauna, Kasia, Kaptan Gunj, Tamkuri, Motichak
3	.70 to 1.00	Low	Nebua Naurangia, Seorahi, Ramkola Dudahi, Bishunpura, Khadda
Total	Kushinagar 1.03		

Source : Statistical Magazine, Kushinagar District, 2016



(2) Crop Concentration of Wheat –

Wheat is the second important food crop of the study area. All blocks produce wheat here in Kushinagar. Crop concentration index for wheat in Kushinagar district is 1.04. Block wise high index of wheat is Fazalnagar (1.54), Sukrauli (1.54), Tamkuhi (1.19), Kaptangunj (1.17), Motichak (1.17), Hata (1.15), Kasial (1.13) and Padrauna (1.0). Lowest index of wheat concentration is in Khadda block is .68 other are Bishunpura (.74), Nebua Naurangia (.77), Ramkola (.78) and Dudhi (.85).

Production of wheat is become high quantity in Kushinagar district because Kushinagar district is situated in temperate part of India.

Table – 3
Wheat Crop Concentration Index in Kushinagar District (2015)
(In Descending Order)

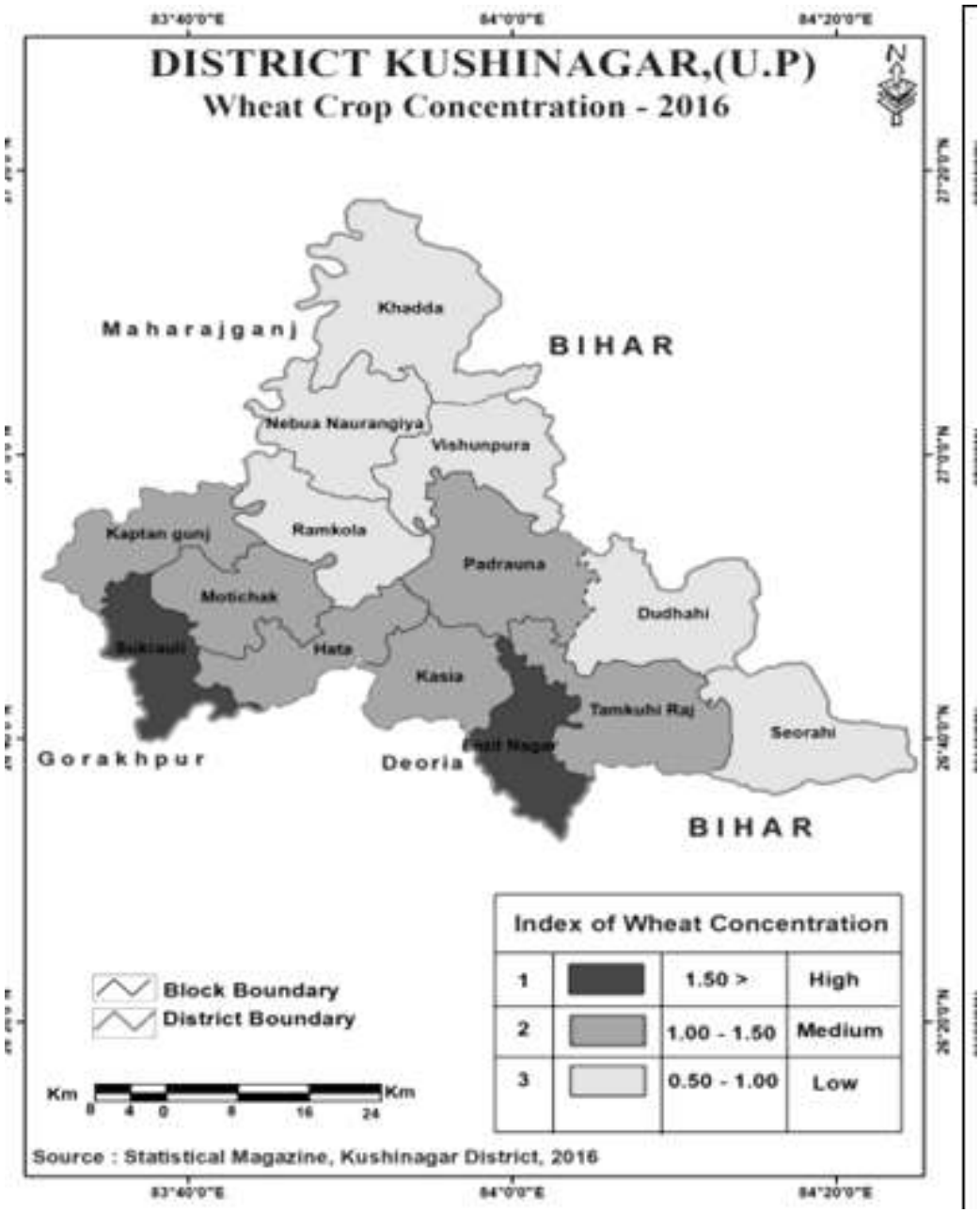
S. No.	Block	Net Sown Area (In hec)	Wheat Area (In hec)	Wheat Crop Concentration Index
1	Fazil Nagar	12232	9645	1.54
2	Sukrauli	12846	10096	1.54
3	Tamkuhi	14987	9115	1.19
4	Kaptangunj	14634	8755	1.17
5	Motichak	14080	8444	1.17
6	Hata	13941	8243	1.15
7	Kasia	12238	7081	1.13
8	Padrauna	22410	11537	1.00
9	Seorahi	18195	7978	.85
10	Dudahi	16808	7399	.85
11	Ramkola	17741	7145	.78
12	Nebua Naurangia	16168	6390	.77
13	Bishunpura	18594	7110	.74
14	Khadda	19609	6805	.68
	Total	**225185**	**116123**	**1.04**

Source : Statistical Magazine, Kushinagar District, 2016

Table – 4
Wheat Crop Concentration Index in Kushinagar District (2015)
(By Group)

S.No.	Wheat Concentration Index		Blocks
1	1.50>	High	Fazilnagar, Sukrauli
2	1.00 to 1.50	Medium	Tamkuri, Kaptan Gunj, Motichak Hata, Kasia, Padrauna
3	.50 to 1.00	Low	Nebua Naurangia, Seorahi, Ramkola Dudahi, Bishunpura, Khadda

Source : Statistical Magazine, Kushinagar District, 2016



(3) Crop Concentration of Sugarcane –

Sugarcane is the cash crop. formers of Kushinagar earn amount of money by sugarcane production. Highest crop concentration index for sugarcane is in Khadda block (1.61) and lowest is in Fazilnagar block which is only .30 . Other blocks are Nebua Naurangia (1.35), Seorahi (1.31), Bishunpura (1.19), Ramkola (1.17), Padrauna (.93), Dudhi (.93), Sukrauli (.62), Hata (.77), Kasia (.79), Kaptangunj (.85), Tamkuhi (.86) and Motichak (.91) .

Table – 5
Sugarcane Crop Concentration Index in Kushinagar District (2015)
(In Descending Order)

S. No.	Block	Net Sown Area (In hec)	Sugarcane Area (In hec)	Sugarcane Crop Concentration Index
1	Khadda	19609	9788	1.61
2	Nebua Naurangia	16168	6770	1.35
3	Tamkuhi	18195	6414	1.31
4	Bishunpura	18594	6875	1.19
5	Ramkola	17741	6450	1.17
6	Padrauna	22410	6495	.93
7	Dudahi	16888	4906	.93
8	Motichak	14080	3990	.91
9	Seorahi	14987	4018	.86
10	Kaptangunj	14634	3890	.85
11	Kasia	12238	3030	.79
12	Hata	13941	3345	.77
13	Sukrauli	12846	2484	.62
14	Fazil Nagar	12232	1170	.30
	Total	**225185**	**71100**	**.97**

Source : Statistical Magazine, Kushinagar District, 2016

Table – 6
Sugarcane Crop Concentration Index in Kushinagar District (2015)
(By Group)

S.No.	Sugercane Concentration Index		Blocks
1	1.50>	Very High	Khadda
2	1.00 to 1.50	High	Nebua Naurangia, Seorahi, Bishunpura, Ramkola
3	.50 to 1.00	Medium	Padrauna, Dudahi, Motichak, Tamkuri, Kaptan Gunj, Kasia, , Hata, Sukrauli
4	<.50	Low	Fazilnagar

Source : Statistical Magazine, Kushinagar District, 2016

Table – 6
Sugarcane Crop Concentration Index in Kushinagar District (2015)
(By Group)

S.No.	Sugercane Concentration Index		Blocks
1	1.50>	Very High	Khadda
2	1.00 to 1.50	High	Nebua Naurangia, Seorahi, Bishunpura, Ramkola
3	.50 to 1.00	Medium	Padrauna, Dudahi, Motichak, Tamkuri, Kaptan Gunj, Kasia, , Hata, Sukrauli
4	<.50	Low	Fazilnagar

Source : Statistical Magazine, Kushinagar District, 2016

Conclusion

Block wise study of Kushinagar district shows us that in a block where the crop concentration index of a crop is high, there is more production of that crop and the amount of other crops decreases. For example – The crop concentration index of wheat and rice are highest in Fazilnagar and Sukrauli, therefore, wheat is grown under Ravi and Rice under Kharif respectively high amount and other crops are grown here in small quantities. Similarly, the crop concentration index of sugarcane is highest in Khadda block, due to which the production of sugarcane is higher here and less production of other crop.

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