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A GEOGRAPHICAL ANALYSIS OF CROP CONCENTRATION IN AHMEDNAGAR DISTRICT

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ABSTRACT:

The Crop concentration of selected crops was studied in the Ahmednagar District. The fourteen tahsils of the district have been considered for the study. The secondary data of the year 2014-15 have been adopted for the present research. To determine crop concentration, Bhatiya's location quotient technique is used. A change in agricultural land use implies a change in the proportion of the area of different crops. Crop concentration explains which area is best suitable for a particular crop. As such the amount of area involved in change for Ahmednagar District is calculated for major crops and the crops of leading increases and decreased are marked. All the calculated statistical values have been used to prepare as thematic maps which show the spatial pattern of crop concentration. The crop concentration was categorized under four section, like High, moderately high, moderately low and Low. The intensity of land utilization is reflected in the number of crops raised during the year. Among the various determinants of agriculture, it is assumed that irrigation positively affects the intensity of cropping. It is observed from the study area, there is greater variation in the changes in land use and cropping pattern. Among all the crops, jowar is the dominating crop of the district and it is highly concentrated almost in all tahsils of the district.

KEYWORDS: Cropping Pattern, Crop Concentration, arid, land utilization.

1. INTRODUCTION:

Crop concentration means an areal density of individual crop or crop concentration reveals the variation in the density of any crop in the given region at a point of time (Chauhan, 1987). Delineation of crop concentration is essential for the planning and development of agriculture. The cropping pattern of a region is closely influenced by the geo-climatic, socio-economic, historical and political factors (Hussain 1996). Besides technological factors have also played an important role. Cropping patterns also depending on terrain, topography, slope, soils, and availability of irrigation facilities, use of pesticides, fertilizers, and mechanization. It is a dynamic concept because no cropping pattern can beside to be

ideal for all times to a particular region. It changes in space and time intending to meet requirements and is governed largely by the physical as well as cultural and technological factors.

The various geographers applied location quotient methods to work out the degree of the crop concentration in a specific region. The geographer's pioneer work of Chisholm (1962), Bhatia (1965), Jasbir Singh (1976) are the contributors to make the agricultural region with the help of the quotient method. In this research work, Bhatia's method has adopted to measure the index of crop concentration in Ahmednagar district. Jowar was the predominant crop of the district followed by Bajra, wheat, and sugarcane, while Paddy, Pulses, Cotton, Oilseeds, etc. are grown under varying physio-climatic situations of the district. The changes in cropping pattern in a particular period indicate the changes that have taken place in the agricultural development. These changes are brought about by socio-economic influence.

2. OBJECTIVES:

1. To analyses the crop concentration and its variation in Ahmednagar District.
2. To identify areas of crop concentration on the basis of Bhatia's method.

3. STUDY AREA:

Ahmednagar District is an agriculturally pre-dominant district in Maharashtra state. The district is situated partly in the upper Godavari basin and partly in the Bhima basin. It lies between 18°2' to 19°9' N latitudes and 73°9' to 75°5' E longitudes with the total geographical area of 17410.91km^2 (Narke and Kore 2012). Ahmednagar District is the largest district by area in the state of Maharashtra. The district is consisting of 14 revenue tahsils namely Akole, Sangamner, Kopargaon, Rahata, Shrirampur, Nevasa, Shevgaon, Pathardi, Nagar, Rahuri, Parner, Shrigonda, Karjat and Jamkhed.

In Ahmednagar District total cropped area is 1175187 hectares, out of which an area of 394802 hectares (33.59%) is under irrigation (2015). The district is part of western plateau with protruded hills, the micro level division of Deccan Plateau. The district as a whole is an elevated tableland which has been denuded by the Godavari and Bhima rivers.

The climate of the district is characterized by a hot summer and general dryness except during the monsoon season. The average annual rainfall in the district is 583.5 mm. The distribution of rainfall is very uneven. The rainfall decreases as one proceeds towards east. Seasonal variation in temperature is quite large. From March onwards is a period of a continuous increase in day temperatures, the nights remaining comparatively cool. The soil of the district can broadly be classified into three groups viz. black, red and laterite soils, which provide a vivid scope to explore the cultivation potentialities. (DCH-2001)

4. METHODOLOGY:

The present study is based on the secondary data obtained from the Socio-Economic abstract of Ahmednagar District (2014 -15). Various thematic maps related to crop combination and cropping patterns were prepared with the help of GIS. In order to determine the tahsilwise study of crop concentration, Bhatia's method has been used.

Crop concentration (Bhatia's method)

Crop Concentration Index = (a/b) / (A/B)

Where, a is the area of crop 'a' in the component areal unit, b is the area of all crops in the component areal unit, A is the area of crop 'a' in the entire region and B is the area of all crops in the entire region.

In the post field stage study related different data are analysis through statistical tools and techniques and represented by suitable diagrams. Here, the higher index values represent a high level of crop concentration and low values show the low concentration of crop.

5. CROP CONCENTRATION:

Table 1

Tahsil wise crop concentration Index in Ahmednagar District (2014-15)

Crops	Crop Concentration Index 2014-15										
	Paddy	Wheat	Jowar	Bajra	Maize	Pulses	Sugarcane	Vegetables	Cotton	Oilseeds	Fodder
Akole	25.62	0.99	0.02	1.12	1.81	1.25	1.14	1.92	0.00	2.51	1.34
Sangamner	0.00	1.37	0.38	4.69	1.61	0.96	0.73	1.09	0.20	0.77	2.31
Kopargaon	0.00	1.24	0.12	0.84	3.89	0.88	2.15	0.79	0.63	4.25	1.29
Rahata	0.00	1.37	0.23	1.18	2.30	1.03	2.51	0.27	0.22	3.59	1.58
Shrirampur	0.00	1.76	0.39	0.40	2.24	1.36	1.64	0.95	0.44	3.16	1.39
Nevasa	0.00	1.53	0.26	0.56	0.84	1.30	2.59	0.97	1.68	0.62	2.38
Shevgaon	0.00	0.35	0.78	1.06	0.11	0.78	1.45	0.67	3.75	0.06	0.66
Pathardi	0.00	0.79	0.88	1.69	0.00	0.96	0.64	0.81	3.08	0.32	0.26
Nagar	0.00	0.75	1.77	0.44	0.22	1.00	0.14	1.32	0.12	0.35	0.48
Rahuri	0.00	2.11	0.70	0.97	0.74	1.78	0.58	1.48	0.65	0.58	1.93
Parner	0.00	0.92	1.80	0.41	0.02	0.97	0.00	1.58	0.00	0.15	0.66
Shrigonda	0.00	0.96	1.44	0.26	0.73	0.70	1.16	1.91	0.14	0.01	0.79
Karjat	0.00	0.73	1.73	0.61	1.56	0.50	0.60	0.69	0.27	0.04	0.46
Jamkhed	0.00	0.34	1.59	0.28	0.28	1.05	0.08	0.08	2.24	0.49	0.45

Source: Calculated and compiled by the author based on Bhatia's crop concentration method

Paddy Concentration:

Paddy crop is an important food grain that is cultivated in the rainy season (Kharif season) in Ahmednagar District. Moderate temperature and high rainfall require for paddy cultivation. In 2015 area under Paddy cultivation was 10930 hectares (0.93%) which are located in Akole tahsil. During the year 2015,paddy was cultivated in Akole tahsil only and showing high concentration (> 19.2) values. Paddy cultivation was totally absence in other tahsils. Overall cultivation of paddy crop neglected from other tahsils and it is concentrated only in Akole tahsil. This tahsil receives1058mm annual rainfall in monsoon season and slightly hot and normally humid climate is ideal for paddy cultivation. Also, the physical environment of this tahsil was suitable for paddy cultivation. So it is an important crop among other cereals (Fig.No.1).

Wheat Concentration:

Wheat is an important cereal grain in Ahmednagar District. It is mainly a winter crop (Rabi crop) and it requires a moderately cool temperature with moderate rainfall. In 2015 area under Wheat crop was 108415 hectares (9.23%) of total cultivable land. High concentration (1.67-2.11) of wheat was observed in Shrirampur and Rahuri tahsil while moderately high concentration (1.22-1.67) was experienced in Sangamner, Rahata, Kopargaon and Nevasatahsil. Moderately low concentration (0.78-1.22) was observed in Akole, Parner, Shrigonda and Pathardi tahsil. The rest of the tahsil has low

concentration (< 0.64) of the wheat crop. Overall it is observed that wheat crop was highly concentrated in the Northern part of the district rather than Eastern parts (Fig.No.1).

Jowar Concentration:

Jowar is a major crop in the district, and it occupied more than 37% area of total sown area. Jowar is also an important grain crop that can grow in Kharif and Rabi seasons. It can be grown in a variety of soil but the clayey loam soil rich in humus is ideal for it. Also, it can be grown in moderately high temperatures and low rainfall, thus it can be grown in the arid region. In 2015, the area under jowar crop was 443778 hectare (37.76%) of total cultivable land. High concentration (1.35-1.80) of jowar was observed in Nagar, Parner, Shrigonda, Karjat, and Jamkhed tahsil. Moderately low concentration (0.47-0.91) was experienced in Rahuri, Shevgaon and Pathardi tahsil. The rest of the tahsil has low concentration (< 0.47) of Jowar crop. Overall it is observed that jowar has highly concentrated in the Southern part of the district rather than the Northern part. Except for Akole tahsil, Ahmednagar district received very low rainfall and most of the parts facing an arid type of climatic conditions, so farmers prefer to Jowar crop (Fig.No.1).

Bajra Concentration:

Bajra is the second largest crop after jowar in Ahmednagar District. It can be grown on a wide variety of soils and it comes up well in warm weather and dry climate. Usually, bajra is grown in those areas where it is not possible to grow sorghum because of high temperature and low rainfall. In 2015, the area under the bajra crop was 85666 hectares (7.29%) of total cultivated land. High concentration (3.6-4.7) of bajra was observed in Sangamner tahsil. Moderately low concentration (1.4-2.5) was experienced in Pathardi tahsil. The rest of the tahsil has low concentration (< 1.4) of bajra crop. In 2015, only one tahsil a has high concentration of bajra and other tahsils have a low concentration (Fig.No.1).

Maize Concentration:

Maize is grown under divergent physical conditions. Maize is grown in temperatures between 18°C and 27°C and annual rainfall between 60 cm to 110 cm. But it is also grown in areas having rainfall of about 40 cm. Maize grows in a wide range of soils, ranging from temperate podzols to the leached red soils. During 2015, the area under maize crop 36351 hectares (3.09%) of total cultivated land. High concentration (2.92-3.89) of maize was observed in Kopargaon tahsil only while moderately high concentration (1.95-2.92) was experienced in Rahata and Shrirampur tahsil. Moderately low concentration (0.97-1.95) was observed in Akole, Sangamner, Shrigonda and Karjat tahsil. The rest of the tahsil has low concentration (< 0.97) of Maize crop. Overall maize crop showing an increasing trend in cultivation but its proportion amongst all crops has very low and it is highly concentrated in the North-West part of Ahmednagar District (Fig.No.1).

Pulses Concentration:

In Ahmednagar District variety of pulses such as gram, tur, mug, black gram and watana etc. are cultivated kharif season.In 2015 area under pulses116639 hectares (9.93%) of total cultivated land. High concentration (1.46-1.78) of Pulses was observed in Rahuri tahsil while moderately high concentration (1.14-1.46) was experienced in Akole, Shrirampur and Nevasa tahsil. Moderately low concentration (0.82-1.14) was observed in Sangamner, Kopargaon, Rahata, Pathardi, Nagar, Parner and Jamkhed tahsil. The rest of the tahsil has low concentration (< 0.82) of pulses. The total area under pulses observed very low during the period of investigation. Pulses are highly concentrated in the middle and north parts of the district (Fig.No.1).

Sugarcane Concentration:

Sugarcane is a long duration crop and requires 10 to 14 months to mature, depending upon the geo-climatic conditions. It requires 75-150 cm rainfall and an average 21º to 27ºC temperature for better growth. In 2015 area under Sugarcane129069 hectare (10.98%) of total cultivated land. High concentration (1.94-2.59) of Sugarcane was observed in Nevasa, Kopargaonand Rahatatahsil while moderately high concentration (1.29-1.94) was experienced in Shrirampur and Shevgaon tahsil. Moderately low concentration (0.65-1.29) was observed in Akole, Sangamner and Shrigonda tahsil. The rest of the tahsil has a low concentration (< 0.65) of Sugarcane. Sugarcane was highly concentrated in the Northern part of the district where irrigation can be possible (Fig.No.2).

Vegetables Concentration:

Various types of vegetables grown in the Ahmednagar District, such as Onion, Potato, Tomato, Brinjaletc. In 2015, an area under Vegetables61093 hectare (5.20%) of total cultivated land. High concentration (1.46-1.92) of Vegetables was observed in Akole, Rahuri, Parner and Shrigonda tahsil while moderately high concentration (1.00-1.46) was experienced in Sangamner and Nagar tahsil. Moderately low concentration (0.54-1.00) was observed in Kopargaon, Shrirampur, Nevasa, Shevgaon, Pathardi and Karjat tahsil. The rest of the tahsil has low concentration (< 0.54) of Vegetables. Overall vegetables occupied a very low area but it is showing increasing trend during the investigation period (Fig.No.2).

Cotton Concentration:

Cotton is an important natural fiber crop of the district and it is cultivated in Northern and Eastern parts of the district. In 2015 area under Cotton 89547 hectare (7.62%) of total cultivated land. High concentration (2.81-3.75) of Cotton was observed in Shevgaon and Pathardi tahsil while moderately high concentration (1.88-2.81) was experienced in Jamkhed tahsil. Moderately low concentration (0.94-1.88) was observed in Nevasa tahsil. The rest of the tahsil has very low concentration (< 0.94) of Cotton. Cotton cultivation has occupied very low area because of required soil suitability is not available in the district (Fig.No.2).

Oilseeds Concentration:

Groundnut, soyabean and sunflower are important oilseeds cultivated in Ahmednagar District. In 2015 area under oilseeds55683 hectare (4.74%) of total cultivated land. High concentration (3.2-4.2) of oilseeds was observed in Kopargaon and Rahata tahsil while moderately high concentration (2.1-3.2) was experienced in Akole and Shrirampur tahsil. The rest of the tahsil has low concentration (< 1.1) of oilseeds. Oilseeds concentration observed in the northern part of the district (Fig.No.2).

Fodder Concentration:

Fodder cultivation is important for Dairy farming and farmers have grown fodder for feeding to their livestock. In 2015 area under Fodder38016 hectares (3.23%) of total cultivated land. High concentration (1.85-2.38) of Fodder was observed in Sangamner, Nevasa and Rahuri tahsil while moderately high concentration (1.32-1.85) was experienced in Akole, Rahata, Shrirampur tahsil. Moderately low concentration (0.79-1.32) was observed in Kopargaon tahsil. The rest of the tahsil has low concentration (< 0.79) of Fodder. It was highly cultivated and almost cover northern part of the district, where irrigation modes of available (Fig.No.2).

6. CONCLUDING REMARKS:

The spatial variation in the degree of crop concentration area are found to be a result of different interaction such as physiographic, climatic, hydrological, socio-economic and technological factors in the organizational effect of the study region. The northern part of the Ahmednagar District has great potential for the development of modes and means of irrigation in the Godavari basin. This can change the structure of the cropping pattern and crop concentration. Hence North-West part of the district was a variety of crops grown in combination such as cereals, sugarcane, pulses and fodder but North-East part of the district was moving to develop as a cotton belt. The remaining part of the Ahmednagar District is highly favorable for growing a large number of jowar and bajra crops. Economically the cost benefits of these crops are very low. So, it adversely affects the economic condition of farmers and also the degree of crop concentration of that region. Moreover, an eco-sustainable proper agricultural planning scheme needs to be designed for better agricultural cropping output.

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