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TEMPORAL CHANGES IN CROP CONCENTRATION OF HARIDWAR DISTRICT

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ABSTRACT

In the present paper cropping pattern in haridwar district is outlined, followed by the discussion on the area under individual crops. Jasbir singh's method is used for concentration of selected crops. There has been a significant variation in the area patterns of the crop concentration in the study region. The indices of crop concentration area calculated from district statistical handbook 2000, 2005, 2010 and 2015, the crop concentration indices for all blocks of the district have been calculated for crops like paddy, wheat, oilseeds, maize, sugarcane, pulses. The spatial variations in the degree of crop concentration area are found to be the result of the different interaction such as physiographic, climatic, hydrological, socio-economic and technological factors in organizational of an area.

1. INTRODUCTION

Crop concentration means the varitions in the density of crop in an area/region at a given point of time (Mazid Hussain, 1965). From a concentration of a specific element of agriculture visually make out that there is a concentration of a recognizable degree of a particular element in an area. Crop, livestock or agriculture enterprise concentration means that different crop, livestock or agriculture enterprises when viewed together super imposition revealed areas where in their regional concentrations do not overlap. For example the areas of rice concentration in eastern India and the areas of bajra concentrations in western Rajasthan do not even partly coincide. Here only a single crop either rice or bajra shows regional concentrations. (Singh, Jasbir and Dhillon, S.S. 1984)

Changes in the pattern of concentration may throw light on the expansion and conctraction of its high-density areas and on the changing core of the crop. The concentration pattern of a crop in an area depends largely on the terrain, temperature, moisture, types of soil, pedagogical conditions and social factors. Each crop has a maximum, minimum and optimum temperature. It has a tendency to high concentration in the areas of ideal agro-climatic conditions become less conducive. The geographers pioneer work of Florence (1948), Chisholm (1962), Bhatia (1965), Jasbir singh (1976) these are the contributors to mark the agriculture region with help of the quotient method.

Florence (1948), Compared the share of a region with that of the entire nation with the help of a location quotient method. Chisholm (1962), Made an attempt to measure the relative regional concentration with the help of co-efficient of localization. Similary Bhatia (1956) used the quotient method to determine the regional concentration of crops. In the present work Jasbir singh's technique has been adopted to identify the regional concentration of crops.

2. STUDY AREA

Haridwar district is situated in south – western part of Uttarakhand state of India. It lies from 29 35' to 30 40' North latitude and 77 43' to 78 22' East longituted and falls in Survey of India Degree Sheet nos. 53 J, F, G and K. It is bounded in the north by Dehradun district, in the east by Garhwal district, in south by Muzaffar nagar and south-west by Bijnor districts of Uttar Pradesh and in west by Saharanpur district of Uttar Pradesh. The geographical area of the district is 2360 sq. kilometers. The shape of the district is rectangular. Topographically the district presents much more varieties of features than any other districts of the Gangetic plain of India.

In the north part of the district are steep hills of the Shivalik chain and below the hills is the submontane and the terai tract. The surface is broken by several rivers and their are many tributaries. The greater portion of the district is open and highly cultivated. On the basis of geology, soils, topography, climate and natural vegetations the district is divided into following five regions;

1) The Shivaliks
2) Bhabhar
3) Terai
4) Roorkee plain
5) Ganga khadar

Haridwar district has been divided into three Tehsils viz. Roorkee, Bhagwanpur and Laksar and six development Blocks namely Roorkee, Bhagwanpur, Laksar, Khanpur, Bahadrabad, and Narsan and comprises 622villages.

Above physical diversities may effect the concentration of crops in Haridwar district. So an enthusiasm arises for the study of crop concentration of wheat, rice, maize, pulses, oilseeds and sugarcane in the district.

3. DATA AND METHODOLOGY

Concentration of crops does not only provide an idea of a regional dominance of particular crop but also play a role of guide to strengthen agricultural economy and land use planning. It goes without saying that the judicious use of land can most definitely help in raising the agricultural production of even those areas that are less fertile. Thus, such an assessment can be useful in reducing the visible inter-regional income disparities in the agricultural sector.

Here an attempt is made to understand crop concentration the district is divided into six blockes and tried to take major crops for the study. Crop concentration is studied with the help of crop concentration index of Jasbir Singh (1976). It reveals the concentration in the six blockes of the Haridwar district for the year of 1999-2000, 2004-05, 2009-2010 and 2014-2015.

For the clear cut picture of the study of crop concentration is made with the help of secondary data obtained from the statistical handbook of Haridwar District is analysed with the help of crop concentration index of Jasbir Singh (1976) is as shown below.

Crop concentration Index C = Pae/ Par

Where,

C - is the crop concentration index.

Pae - is the percentage of crop 'a' to the total harvested area in the enumaration unit.

Par - is the percentage of crop 'a' to the total harvested area in the entire region of state or a country. Such techniques are useful tools in the analysis of crop patterns of any part of the region. And also it reveals that higher the crop concentration index, higher is the level of interest in the production of that crop.

The index value of a crop concentration has been categorized in three classes, viz. i) High, ii) Medium, iii) Low crop Concentration

4. RESULT AND DISCUSSION

The results and discussion related to the changes in the pattern of Crop Concentration in Haridwar district. Crop Concentration refers to the density or areal occupancy of a crop in a region. The occupancy (High, Medium and Low) is determined by the terrain and climate including temperature, humidity, transport facilities and demand of the crop. The present study are discussed under the following sub heads.

Blockwise Crop Concentration Index (CCI) of District Haridwar (1999-2000, 2004-05, 2009-2010 and 2014-2015)

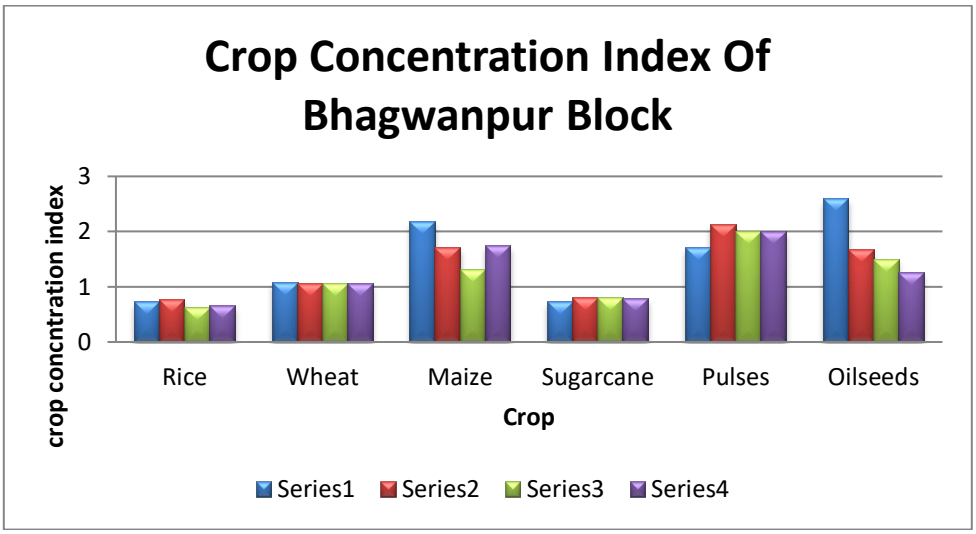
4.1. BHAGWANPUR

Bhagwanpur block is situated in the western part of haridwar district. The crop concentration index shows oilseeds has higher concentration (2.60) in Bhagwanpur block followed by maize (2.18), pulses (1.70), wheat (1.07), sugarcane (0.73) and the rice has lowest crop concentration index (0.72) in 1999-2000 but in 2004-05, the picture has changed i.e.highest CCI is of pulses (2.12), maize (1.71) is at the second step followed by oilseeds (1.66), wheat (1.06), sugarcane (0.79) and again rice has lowest CCI i.e. 0.77. While, in 2009-10, pulses has the higher CCI (2.00) followed by oilseeds and maiz i.e. 1.50 and 1.30 respectively. Wheat and sugarcane has 1.06 and 0.79 CCI and rice has the lowest CI i.e. 0.63. In 2014-15, constantly pulses has higher CCI (2.00) followed by maize (1.75), oilseeds (1.25), wheat (1.05), sugarcane (0.78) and rice has the lowest CCI (0.65) i.e. below 1.00 (Table N. 1 and Fig N. 1).

Table 1: Crop Concentration Index of Bhagwanpur Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	0.72	0.77	0.63	0.65
2	Wheat	1.07	1.06	1.06	1.05
3	Maize	2.18	1.71	1.30	1.75
4	Sugarcane	0.73	0.79	0.79	0.78
5	Pulses	1.70	2.12	2.00	2.00
6	Oilseeds	2.60	1.66	1.50	1.25

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration



4.2. ROORKEE

Roorkee has higher concentration index of wheat (1.10) in 1999-2000 followed by sugarcane (0.96), rice (0.84) and pulses (0.79). Here, maize and oilseeds are very negligible therefore CCI is also very low i.e. 0.37 and 0.13

respectively. In 2004-05, wheat has again higher CCI (1.03) and rice has (1.00) while sugarcane has (0.88), pulses has (0.75) the remaining crops like maize and oilseeds has very low CCI (0.28) and (0.22), but again CCI has been changed in 2009-10. Here maize has second higher CI (1.00) and wheat has again highest CCI (1.05) followed by sugarcane (0.93), rice (0.86), pulses (0.80) and oilseeds has low CCI (0.25). Wheat shows constantly higher CCI (1.06) in 2014-15. Here the picture has changed i.e. the second higher CCI is of sugarcane (0.92) followed by rice (0.91), pulses (0.66) and oilseeds (0.25) while, maize shows very low CCI (0.07) i.e. below 1.00 concentration index (Table 2 and Fig. 2).

Table 2: Crop Concentration Index of Roorkee Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	0.84	1.00	0.86	0.91
2	Wheat	1.10	1.03	1.05	1.06
3	Maize	0.37	0.28	1.00	0.07
4	Sugarcane	0.96	0.88	0.93	0.92
5	Pulses	0.79	0.75	0.80	0.66
6	Oilseeds	0.13	0.22	0.25	0.25

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration

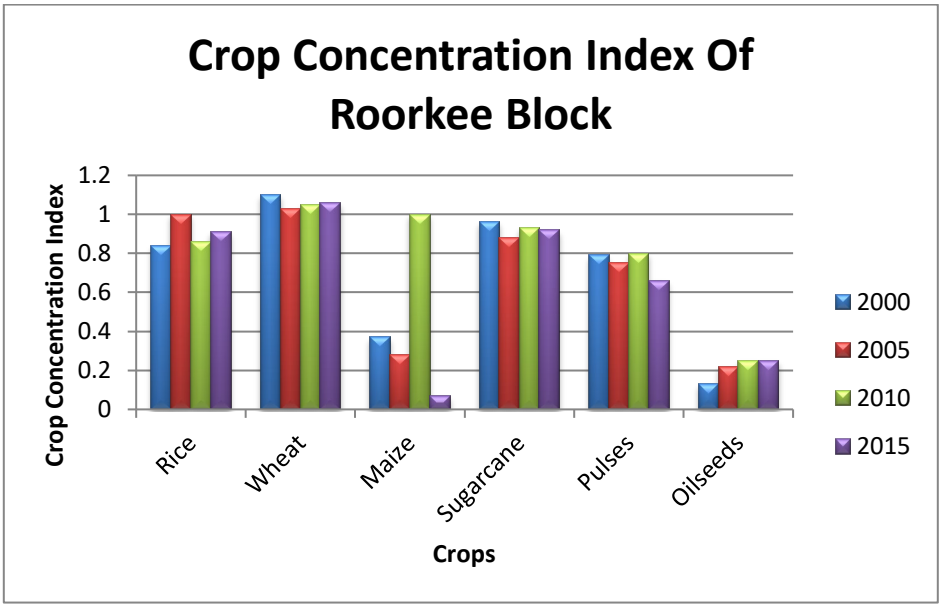


Figure 2: Crop Concentration of Roorkee Block

4.3. NARSAN

Sugarcane and wheat reveals high concentration index i.e. sugarcane (1.20), wheat (0.94) and rice (0.84) and pulses (0.62) in 1999-2000. the other crops like oilseeds (0.08) and maize has no concentration. In 2004-05 sugarcane have the highest CCI (1.09) followed by wheat (1.00), rice (0.87), pulses (0.43) and maize is almost absent. In 2009-10 sugarcane has higher CCI (1.19) and the other crops has low concentration i.e. wheat (0.93), rice (0.69) followed by oilseeds (0.25) and pulses (0.20) have very low CCI. Sugarcane reveals highest CCI (1.25) in 2014-15. The CCI of wheat (0.94), rice (0.73), oilseeds and pulses (0.33), which shows very low concentration index i.e.below 1.00 (Table 3 and Fig 3).

Table 3: Crop Concentration Index of Narsan Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	0.84	0.87	0.69	0.73

2	Wheat	0.94	1.00	0.93	0.94
3	Maize	0.004	0.00	0.00	0.00
4	Sugarcane	1.20	1.09	1.19	1.25
5	Pulses	0.20	0.43	0.20	0.33
6	Oilseeds	0.08	0.22	0.25	0.33

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration

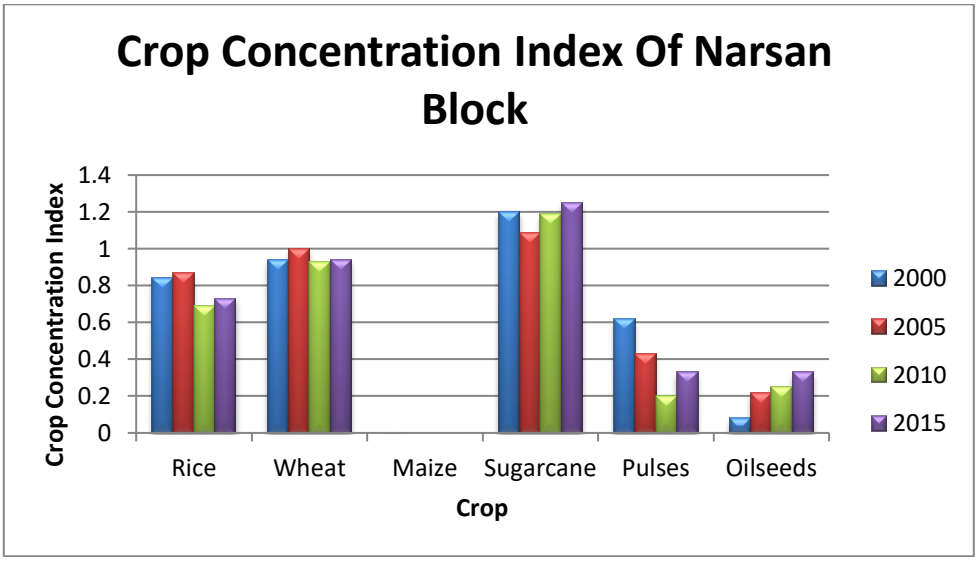


Figure 3: Crop Concentration of Narsan Block

4.4. BAHADRABAD

Bahadrabad block has very high concentration index of maize (2.06) followed by oilseeds (1.43), rice (1.35), wheat and pulses have high CCI (1.08), Here sugarcane has very low concentration index (0.66) i.e. below 1.00 in 1999-2000. In 2004-05, maize has very high concentration index (2.71) followed by oilseeds (1.66), rice (1.32), wheat (1.08) have higher CCI and other crops pulses and sugarcane have low concentration index i.e. (0.93) and (0.80). But in 2009-10 there is abrunt change in CCI i.e. oilseeds has high concentration index (1.66) followed by maize and pulses have (1.40), rice (1.23), wheat (1.08) and sugarcan has low CCI (0.81) respectively. Here, the picture has changed in 2014-15 i.e. maize has highest CCI (2.00) followed by oilseeds (1.41), pulses (1.33), rice (1.19), wheat (1.09) and sugarcane has low CCI (0.79) i.e. below 1.00 (Table 4 and Fig 4).

Table 4: Crop Concentration Index of Bahadrabad Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	1.35	1.32	1.23	1.19
2	Wheat	1.08	1.08	1.08	1.09
3	Maize	2.06	2.71	1.40	2.00
4	Sugarcane	0.66	0.80	0.81	0.79
5	Pulses	1.08	0.93	1.40	1.33
6	Oilseeds	1.43	1.66	1.66	1.41

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration

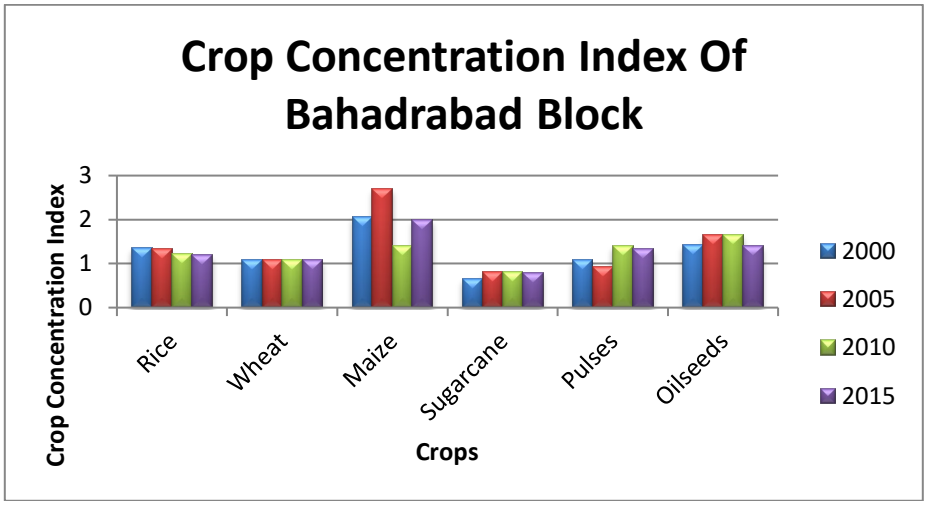


Figure 4: Crop Concentration of Bhadrabad Block

4.5. LAKSAR

In laksar block sugarcane has higher CCI (1.45) followed by wheat, rice, pulss, oilseeds and maize has low CCI i.e. 0.85,0.80, 0.79, 0.60 and 0.25 respectively in 1999-2000. But in 2004-05, sugarcane and oilseeds has higher concentration i.e. (1.35) and (1.00) followed by wheat (0.87), rice (0.76), pulses (0.68) while maize has very low concentration (0.11). There has been changed in 2009-10, maize has very high concenctration index i.e. (2.00) followed by sugarcane (1.23), oilseeds (1.08), rice (1.06) have high CCI i.e. above 1.00 and remaining other crops pulses (0.80) and wheat (0.93) have low CCI. In 2014-15, oilseeds has the higher CCI (1.33) followed by sugarcane (1.24) and rice (1.00) concentration index and remaining other crops has CCI below 1.00 (Table 5 and Fig 5).

Table 5: Crop Concentration Index of Laksar Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	0.80	0.76	1.06	1.00
2	Wheat	0.85	0.87	0.93	0.91
3	Maize	0.25	0.11	2.00	0.25
4	Sugarcane	1.45	1.35	1.23	1.24
5	Pulses	0.79	0.68	0.80	0.33
6	Oilseeds	0.60	1.00	1.08	1.33

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration

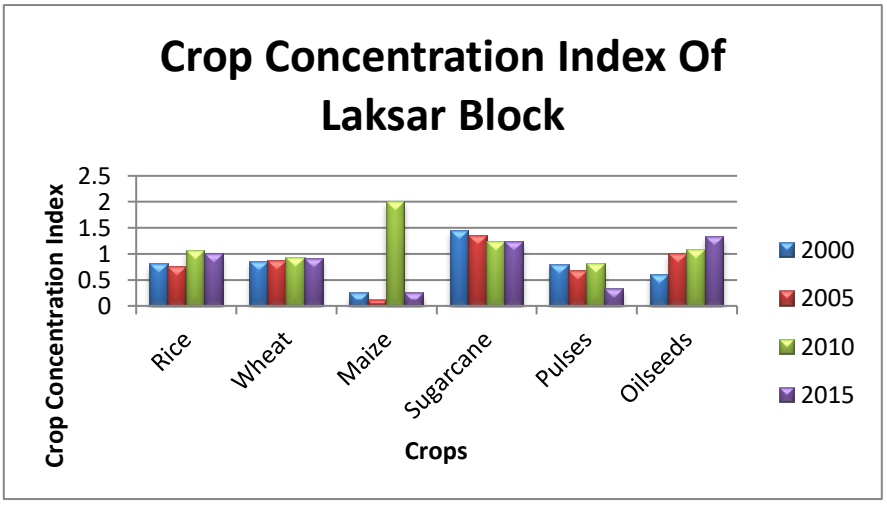


Figure 5: Crop Concentration of Laksar Block

4.6. KHANPUR

In 1999-2000, The Khanpur block has higher CCI is of rice (1.72) followed by sugarcane (1.30). Maize has very low (0.006) concentration and remaining other have below 1.00. In 2004-05, rice, sugarcane and oilseeds have high concentration index i.e. 1.36, 1.35 and 1.00 respectively. Among other crops maize has no CCI are others have low CCI. Rice has higher CCI (1.97) followed by sugarcane (1.15) in 2009-10. Similarly, maize has no concentration index while other have low CCI. In 2014-15, rice has the higher CCI (1.90) followed by oilseeds (1.50) and sugarcane (1.17) concentration index while others have below 1.00 (Table 6 and Fig 6).

Table 6: Crop Concentration Index of Khanpur Block

Sr. No.	Crop	1999-2000	2004-05	2009-10	2014-15
1	Rice	1.72	1.36	1.97	1.90
2	Wheat	0.80	0.80	0.81	0.80
3	Maize	0.006	0.00	0.00	0.00
4	Sugarcane	1.30	1.35	1.15	1.17
5	Pulses	0.58	0.43	0.60	0.26
6	Oilseeds	0.26	1.00	0.91	1.50

Crop Concentration Index: Below 1 = Low Concentration
Above 1 = High Concentration
Above 2 = Very High Concentration

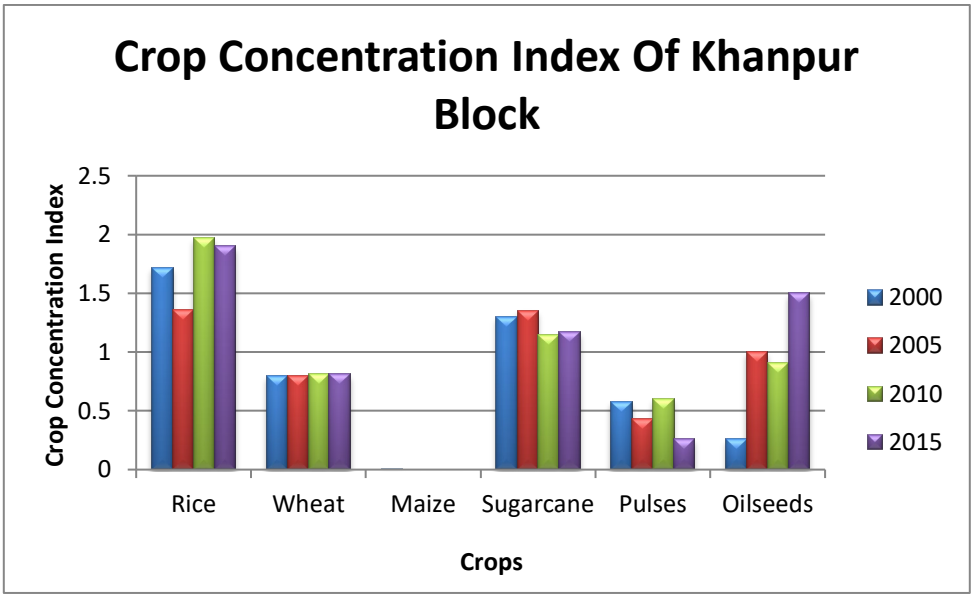


Figure 6: Crop Concentration of Khanpur Block

5. CONCLUSION

Crop Concentration of various crops are studied in six blocks of Haridwar District like Bhagwan, roorkee, naresan, bahadrabad, laksar and khanpur during the year of 1999-2000, 2004-05, 2009-10 and 2014-15. This Crop Concentration is categorized under three section has Low (Below 1.00), Medium (1.00-2.00) and High (Above 2.00). Bhagwanpur block has medium to high Crop Concentration with crop like Maize, Pulses and Oil seeds. Roorkee is majorly concentrated in Wheat and Narsan on Sugarcane. Particular Bahadrabad block has medium to high concentration with Maize, oilseeds and pulses while rice CCI is higher than wheat CCI. Laksar is mainly concentrated in Sugarcane and Oilseeds while, The Khanpur block is on Rice and Sugarcane. Particular Haridwar District, Wheat and Sugarcane is the most dominant crops, but no one blocks founded in high Crop Concentration.

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CONFLICT OF INTEREST

None.

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