

A Study of Spatio -Temporal Status of Crop Combination in The Hamirpur District

Abstract

Agriculture is the backbone of Indian economy and important role for the country. The agriculture sector employs nearly half of the workforce in the country. However, it contributes to 17.5% of the GDP. Level of agricultural development of any country is determined by its planning and management. Concept of crop combination provided a significant tool to the geographer and planner for the planning of any region and formulates the policy to the development of agriculture. In the present paper an attempts has been made to demarcate the crop combination regions of agronomic years 1994-95, 2004-2005 and 2014-2015 along with the variations observed.

Keywords: Workforce, Planning, Management and Crop Combination.

Introduction

The cultivation of all crops in any area studies under the crop combination. Cluster of cultivated crops in any area is called the crop combination. The study of crop combination is an important aspect of agriculture geography as it provides a strong basis for agricultural regionalization. The concept of crop combination is a scientific device to study the existing relationship of crops in association with each other and land utilization. Crop combination of any area is determined by its natural (climate, soil, relief etc.) and socio- economic conditions. Crop combination helps to understand the cropping pattern, crop diversification, crop concentration, cropping variation and operation of a given area thus aiding to draw a rough sketch of agricultural topology and provide agricultural regionalization. Weaver (1954) recognized that in generally every farming system several crops are growing in combination and only rarely does a single crop assume complete dominance.

Fist study of crop combination was conducted by J.C Weaver in 1954. In his study he delineates the agriculture region for Middle West region of USA. After that many study was conducted by geographers in all over world. Kikukazu Doi (1959) modified weaver's method, which was used to find industrial structure of Japan. Scott (1957) includes crops as well as animal husbandry, in determining the crops combination. B.L.Johnson (1958) introduced crop association regions in east Pakistan, Thomas (1963) calculated on the basis of difference between the actual and theoretical percentage for all crops in each crop combination.

Objective of the Study

1. To identified spatio -temporal variation of crop combination in the Hamirpur district.
2. To identified the block wise crop combination of the district.

Study Area

The Hamirpur district has been selected as a study area which is lie south west part of utter Pradesh known as 'Bundelkhand region' (Hamirpur is one of the seven districts of Bundelkhand U .P.) the district located between 25°13'N to 26°22'N latitude and 79°07' to 80°22' east longitude the district boundary bounded by Jhansi in the west , Mahoba in the south, Banda in the east and Jalaun, Kanpurand Fatehpur in the north headquarter situated at the bank of Betava and Yamuna. The district is divided in seven development blocks Sarila, Rath Maudaha, Muskara, Sumerpur and Hamirpur .Betwa, Dhasan Chandrawal and Birma are the major rivers of the study area which make drainage system .Yamuna river delimits the northern boundary and ken eastern boundary .Birma river divided the area into almost two equal parts east part and west part flowing from south to northward and join the Betwa river in Muskara block.

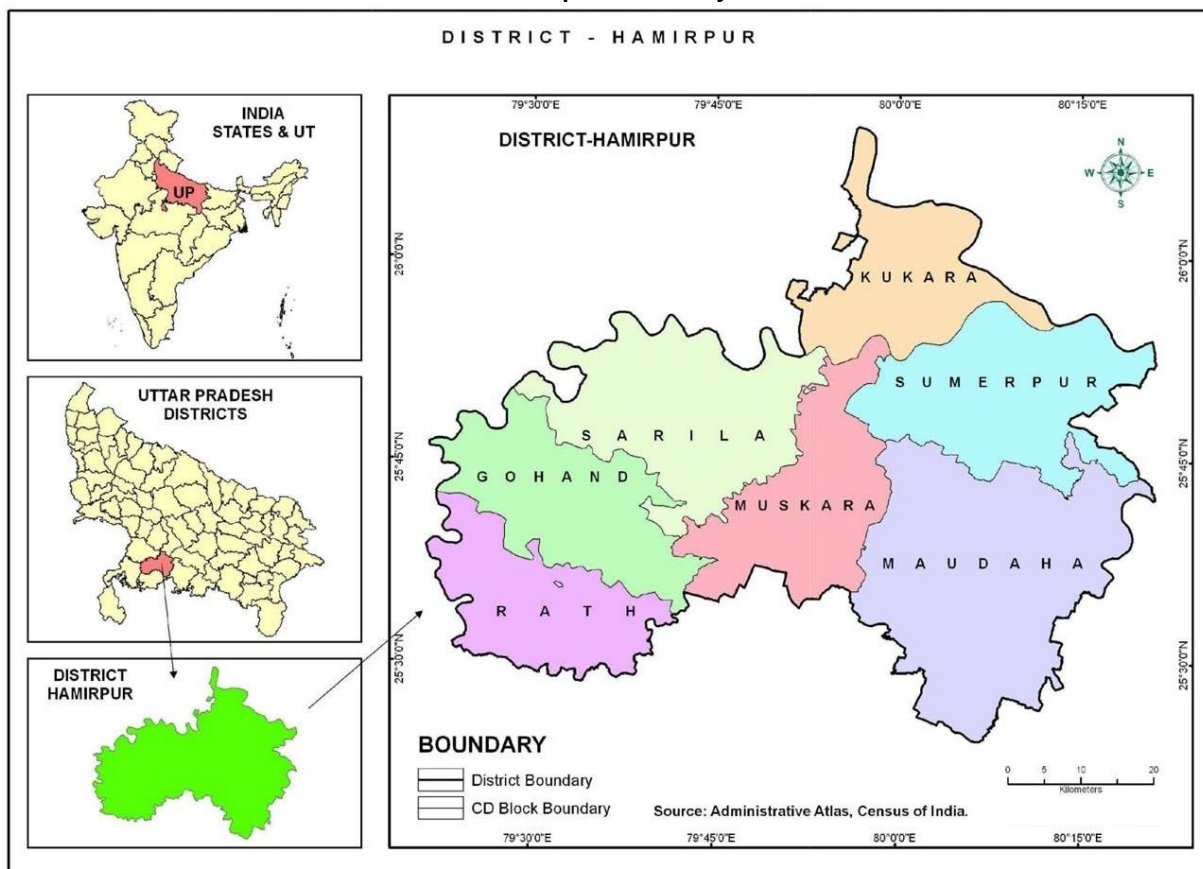


Devendra Kumar

Research Scholar,
Dept. of Geography
T.D.P.G.College,
Jaunpur, Uttar Pradesh, India

The district is the geological part of the southern part of upper Ganga-Yamuna plain.

Location Map of The Study Area



Materials and Method

The present study is based on secondary data collected from the Hamirpur District Statistical magazine year 1994-95, 2004-05 and 2014-15. This study based on weaver's method. This is -

$$D = \sum d^2 / n$$

D = variation of crops

d = difference between theoretical and actual percentage of crops.

n= number of crops

Percentage of gross cultivated land occupied by individual crop will be calculated in order to assess

the relative land occupancy position of each crop. Crops occupying less than one percent of the gross cultivated area have not been included as they occupy an insignificant area. The percentage will be arranged in ascending order and the ranking crops will be marked for delineating crops combination region. Greater is the dominance of crops, lesser is the crop combination. Finally, crop combination map of three period (i.e 1994-95, 2004-05 and 2014-15.) has been generated using the GIS software and by taking number of combinations derived from the lowest values obtained from calculation.

Theoretical value for various crop combinations

Type of combination	Area of total cropland devoted to each crop
Monoculture	100 % of total cropland
2 crop combination	50% devoted to each 2 crops
3 crop combination	33.33% devoted to each 3 crops
4 crop combination	25% % devoted to each 3 crops
5 crop combination	20% devoted to each 5 crops
6 crop combination	16.66 % devoted to each 6 crops
7 crop combination	14.28 % devoted to each 7 crops
8 crop combination	12 .5% devoted to each 8 crops
9 crop combination	11.11% devoted to each 9 crops

(Table 1)
Block wise Crop combination of Hamirpur district 1994-1995

Block Name	Single Crop	Two Crop	Three Crop	Four Crop	Five Crop	Six Crop	Seven Crop	Crop Combination
Kurara	3832	348	194	167	167.5	162	165	G W J M A P
Sumerpur	4096	325	165	143	144	149	148	G W J M A
Sarila	4218	623	186	106	84	84.7	97	G J W P M
Gauhand	4290	476	108	90	117	124	140	P W G J
Rath	3561	283	171	170	194	194.5	192	P W G J
Muskara	5312	568	132	47	33	43	58	W G P M
Maudaha	4436	470	84	84.7	103	110	126	G W M
Total district	4977	528	165	82	62	77	85	G W P M J

Source – based on data from - district statistical magazine Hamirpur district year -1994-95
G=Gram ,W= wheat, J= Jwar, U=Urad , M=Masur,P=Pea, S=Sarson, T=Til, MO=Mong A = als

(Table 2)
Block wise Crop combination of Hamirpur district 2004 -05

Block name	Single crop	two crop	three crop	four crop	five crop	six crop	seven crop	Crop combination
Kurara	4129	472	136	116	127	121	118	G W M J
Sumerpur	3562	254	177	160	157	158	166	G W U J M
Sarila	4443	837	288	133	86	69.04	69.26	G M J W P
Gauhand	5358	546	112	27	29	49	61	W P G U
Rath	4998	481	95	46	60	74	83	W P U G
Muskara	4505	477	87	34	49	68	82	W G U P
Maudaha	5209	449	46	85	102	110	135	M G W
Total district	5035	533	146	77	57	106	64	G W M U P

Source – based on data from - district statistical magazine Hamirpur district year- 2004-
G=Gram ,W= wheat, J= Jwar, U=Urad , M=Masur,P=Pea, S=Sarson, T=Til, MO=Mong

(Table 3)
Block wise Crop combination of Hamirpur district 2014-15

Block name	Single crop	two crop	three crop	four crop	five crop	six crop	seven crop	Crop combination
Kurara	4337	266	157	134	132	135	134.5	W G M S T
Sumerpur	3751	259	76	143	163	166	166.6	W G T
Sarila	4548	532	183	103	83	78	78.5	W G T P M J
Gauhand	3716	694	257	126	125	120	116	W G P T M J
Rath	3042	257	88	131	160	175	187	W T G
Muskara	3083	455	168	120	128	149	162	W P G T
Maudaha	4607	406	33	58	75	88	114	W T G
Total district	3917	431	118	137	120	108	119	W G T P M U

Source – based on data from - district statistical magazine Hamirpur district, 2015-16.

G=Gram , W= wheat, J= Jwar, U=Urad , M=Masur,P=Pea, S=Sarson, T=Til, MO=Mong

Discussion

In this paper crop combination was observed for the year 1994-95, 2004-05 and 2014-15 in Hamirpur district. Weaver's method are identified three four five and six crop combinations region but no one monoculture combination and two crop combination region are observed in the study area.

Monoculture crop combination

No one block observed monoculture crop combination in the district in any agrarian year.

Two crop combination

No one block observed two crop combination in the district in any agrarian year.

Three crop combination

In 1994-95 only Maudaha block have three crops combination Gram+Wheat + Masur among the seven blocks. in 2004-05 also Maudaha block have three crop combination masur+gram+ wheat . And three blocks Sumerpur, rath and Muadaha have

recorded three crop combination in 2014 -15 agrarian year given in (table3).

Four crop combination

In 1994-95 three blocks (Gahand, Rath and Muskara) have recorded four crop combination, given in the (table 1). in 2004-05 four blocks(kurara, gauhand ,rath and muskara) have four crop combination . Only Muskara block have four crop combination Wheat +Pea +Gram +Til in the year 2014-15.

Five crop combination

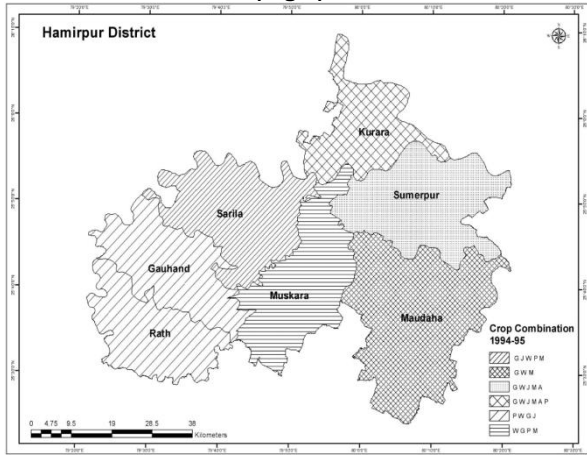
In 1994-95 and 2004-05 two blocks sumerpur and sarila have five crop combination Gram+ Wheat+ Jwar+ Masur+ Arhar, Gram +Jwar +Wheat +Pea+ Masur. And only one block kurara among the seven blocks of the district have five crop combination Wheat+ Gram+ Masur +Sarson +Til in 2014-15.

Six crop combination.

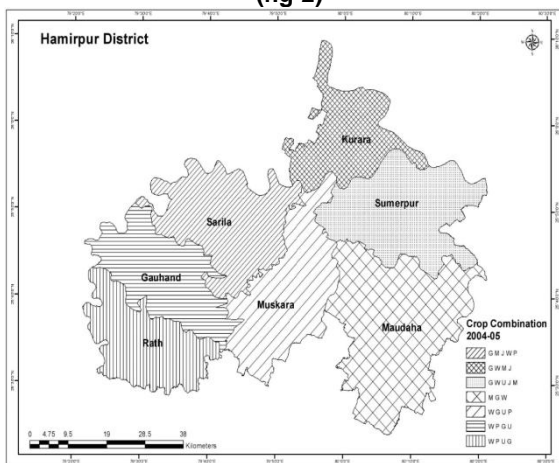
In 1994-95 only one block kurara among the seven blocks of the district have six crop combination

given in (table1). In 2004-05 two blocks sumerpur (table2) and sarila and in 2014-15sarila and Gauhand have six crop combination among the seven blocks of the study area given in (table2).

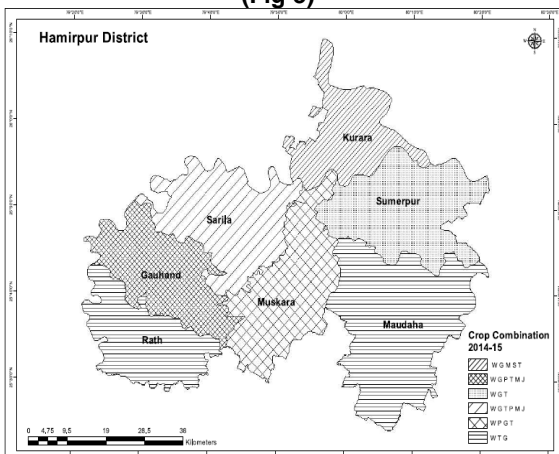
Spatio-temporal Crop combination in Hamirpur (Fig.1)



(fig-2)



(Fig-3)



Conclusion

With the application of Weaver's method vivid crop combinations are identified in the blocks level in the perspective year1994-95, 2004-05and 2014-15. According to this method two-six crop combination are identified but no one mono and two crop combination regions observed in any block. The analysis reveals that Farmers cultivate numerous crops (food grain, pulses and oilseed) in the all blocks but wheat, gram, masur, til,and pea are the major crops. A disparity of ten years shows not much change in crop combination as expected due to globalization. There are great possibilities to agricultural development with the adequate resources government needs to encourage irrigation facilities, technological, improving soil quality, promote the cash crops, vegetable and setup micro food possessing unites to promote agriculture productivity and farmers socio - economic level.

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