Crop Combination Regions of Jagadhari Block of Yamunanagar District of Haryana

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Abstract

The present paper is an attempt at analyzing the crop ranking and to delineate crop combination regions of Jagadhari Block of Yamunanagar District of Haryana. On the basis of J.C. weaver's method, Which has proved to be an important statistical tool especially in demarcating crop association religions in the field of agricultural geography, in fact crop ranking and nature of crop combinations is helpful in the delimitation of combination of regions and they together work as indicator factors to epitomise the interaction between physical and human elements such as topography, climate, water table, soils, manuring and means of irrigation. "Agricultural condition in a particular regions obviously depict a closely knit cobweb of physical and human milieu" with this view the author has made an attempt at delineating the pattern of crop combination regions of Jagadhari Block by applying "minimum deviation method".

Keywords: Crop Combination, Jagadhari Block

Introduction

Jagadhari Block is the main study area of research which is mainly located in Yamunanagar district of Haryana, Jagadhari Block lies between $30^0 2'27''$ and $30^0 15'59''$ North latitude and $77^0 04'27''$ and $77^0 26'02''$ east longitudes. There are six towns and 166 villages which are administratively grouped in to Jagadhari Block of Yamunanagar of Haryana. The total area of the study area is 378.22 square kilomitres. The study area has humid and sub-humid climate having 1200 to 1500 mms of annual average rainfall. The study area have a total population of 170882 persons (2001census) with a density of 452 persons per square kilometer. The topographical patterns of the study area and its existence to geomorphic process have close relationship with climatic humidity of the recent and past geological periods. River Yamuna Forms its eastern position, which mark a gradual transition to the Ganga- Yamuna plain. The underground water in study area is generally fresh and suitable for domestic as well as irrigational purposes.

Aim of the Study

The main objectives of the present research paper are examined in context of cropping patterns crop combination regions. The study area testifies the drastic changes in cropping patterns during the last 32 years. In this study, an attempt has been made to examine and identify the regional imbalances in cropping pattern since 1970-73. The main objectives are as follows-

1. Demarcated broader geomorphic regions with the help of LISS II and one inch topographical sheets published by Survey of India.
2. Assessed the influence of local topographical variations in the levels of cropland utilization with the help of average area data of various crops during 1970-73 and 1999-2002, assuming regional average as a parameter.
3. Attempted to discover the role and contribution of agricultural land utilization to the understanding of different areas within Jagadhri Block of Yamunanagar district of Haryana.
4. Demarcated the crop combination regions with the help of various techniques to reduce inequalities.

Methodology and Sources of Data

The present research work is mainly based on the data related to the various aspects of natural conditions. Human interferences and agricultural functioning forms influencing the geography of agricultural development in terms of crop combination in a block of newly formed

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district- Jagadhri block of Yamunanagar district of Haryana. The data were processed with help of statistical techniques to achieve accuracy in interpretation.

The present study has been conducted through the following steps:

1. LISS II: quarter inch and one inch topographical sheets or mainly 1:50,000 were consulted to demarcate the broader topographical regions/physiographic regions.
2. Examined the impact of intensity of irrigation, socio- economic factors and technological factors and prevailing soil conditions on the cropping patterns.
3. The unpublished revenue records Lal Kitab- an inventory book maintained by the village patwari of each and every village of study area for the period 1970-73 and 1999-2002 triennials were consulted to obtain land use, irrigation.
4. The published data are collected from Government publications such as census reports. District Gazetteers and assessment reports of Yamunagar district.

The above stated techniques were analyses with the help of statistical methods of agricultural relevance on maps with the help of suitable cartographic techniques. Detailed study of published and unpublished records, documents, and literature were also consulted, which was duly acknowledged in each part of the present study.

Utility of Crop Combination in Agricultural Planning

The studies based on the combination analysis are useful in several ways for agricultural planning e.g.

1. The establishment of crop and livestock combination is essential for an adequate understanding the geography.
2. Various crops and livestock that hold various ranks in the combination. It means which crops are important and what crops are unimportant in a region.
3. The combinations of crops and livestock are composite realities that guide the distributional analysis in relation to the natural conditions and cultural characteristics of an area.
4. Crop and livestock combination are significant to built up a structure of valid agricultural regions.

Crop and livestock combination analysis is also one of the most significant efforts for studying agricultural patterns. It is an important aspect of geographic investigation in agricultural. Geography and is greatly helpful in providing a more comprehensive basis for regional planning of rural areas.

Techniques of Crop Combination Regions

We have tested three techniques for computing the crop combination regions in one hundred and sixty six villages of Jagadhri block of Yamunanagar district of Haryana during 1970-73 and 1999-2002 triennials:

1. John C. Weaver's technique (1954)
2. Kikukazzu Doe's technique (1959) and
3. S.M. Rafiullah's technique (1965)

John's Weaver's Technique (1954)

In order to determine some sharp cut off points for the delineation of crop combination and functional classification of towns, the geographers have applied different statistical techniques and have suitably modified them from time to time.

To delineate the crop combination regions in the Middle West (The United States), John. C Weaver employed his popular approach known as Weaver's technique or minimum deviation analysis. It consists of comparing the actual percentages of total cropped area occupied by the different field crops with theoretical distribution in which the cropped area equally divided among the component crops in an enumeration unit. The purpose of this procedure is to establish and designate crop combinations which are established by the most close resemblance to the actual crop percentages of the theoretical distributions. The theoretical distributions are outlined below in Table 7.1 as a basis to determine and identify the number of crops involved in the basic crop combination in each areal unit.

Table 7.1
Theoretical Distribution of Cropped Area by John.C Weaver (1954) Technique

1-Monoculture	One crop accounts for 100.00 percent of the total harvested or cropped area
2-crop combination	One crop accounts for 50.00 percent of the total harvested or cropped area
3-crop combination	One crop accounts for 33.33 percent of the total harvested or cropped area
4-crop combination	One crop accounts for 25.00 percent of the total harvested or cropped area
5-crop combination	One crop accounts for 20.00 percent of the total harvested or cropped area
6-crop combination	One crop accounts for 16.67 percent of the total harvested or cropped area
7-crop combination	One crop accounts for 14.29 percent of the total harvested or cropped area
8-crop combination	One crop accounts for 12.50 percent of the total harvested or cropped area
9-crop combination	One crop accounts for 11.11 percent of the total harvested or cropped area

Keeping in view the foregoing discussion as the theoretical base, the problem is to accurately compare the actual percentages within the individual areal units with the theoretical distributions as outlined in Table 7.1. The variance and standard deviation formulae were selected for this purpose and these may be states as below:

$$1. Variation = \frac{\varepsilon d^2}{n}$$

$$2. standard\ Deviation = \frac{\varepsilon d2}{n}$$

Where 'd' is the difference between the actual percentages in a given regional unit and the percentages in the theoretical distributions: and 'n' is the number of crops in a given combination. Since the formulae to be used is the same in establishing crop. Livestock and enterprise combinations, their applications will be illustrated by reference to crop combination. This procedure has been outlined in Table 7.2. The least sum of the squared deviations and variance, and the lowest standard deviation and co-efficient of variance analysis of cropping patterns in village Sabilpur Jatan of Jagadhri block for the year 1999-2002 is indicative of the magnitude of deviation of the actual percentages from the theoretical distributions (See Table 7.2).

In village Sabilpur Jatan of Jagadhri block, the individual crops have the following percentages of the total cropped area during 1999-2002 triennial:

Paddy	:	36.15	Percent
Wheat	:	32.51	Percent
Sugar Cane	:	21.20	Percent
Fodder	:	7.54	Percent
Oilseeds	:	1.04	Percent
Pulses	:	1.04	Percent
Vegetables	:	0.26	Percent
Cotton	:	0.13	Percent
Gram	:	0.13	Percent
Total	:	100.00	Percent

However, as Weaver has pointed out, since relative rank of the amount of deviation among the various possible combinations was required, and not the actual magnitude of deviations, the square root was not extracted in accordance with the standard deviation formulae. The specially used variation formulae could be expressed as $\sum d^2$ n, where 'n' means the difference between the actual percentages in a given enumeration unit and the appropriate
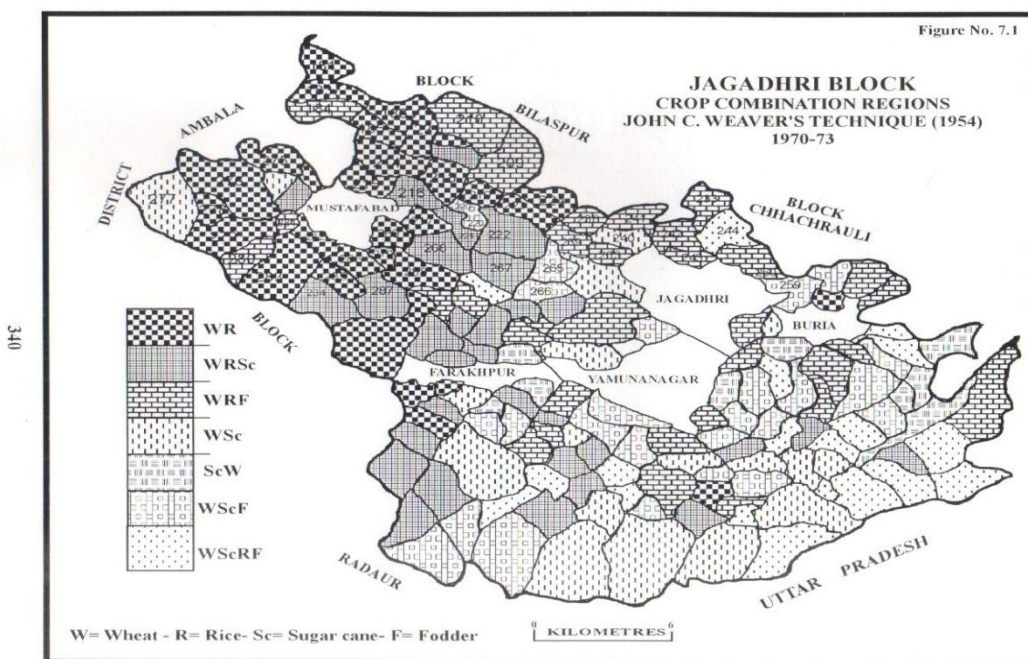
percentages in the theoretical curve, and 'n' is the number of crops combination.

John. C. Weaver's method is mathematically sound and a precise one to the minimum deviation for combination analysis, but it requires much calculation works. Furthermore, Weaver (1954) himself admits that this technique occasionally tends to represent the lowest deviation for a crop combination which includes every crop having as much as one percent of the total cropped area. Such generalized picture results occur in areas of large number of variations or in areas where the first ranking crop is very large.

An attempt is made to calculate crop combination regions in one hundred and sixty six villages of Jagadhri block on the basis of John. C. Weaver's (1954) technique. As a result of the application of the John C. Weaver's (1954) technique seven crop combination regions emerge in the study area during 1970-73. The villages falling into different combination are depicted in Figure 7.1 and five crop combination regions emerge in the study area during 1999-2002 triennial as shown in Figure 7.2 and tabulated in Table 7.3.

Crop Combination Based on Weaver's Method
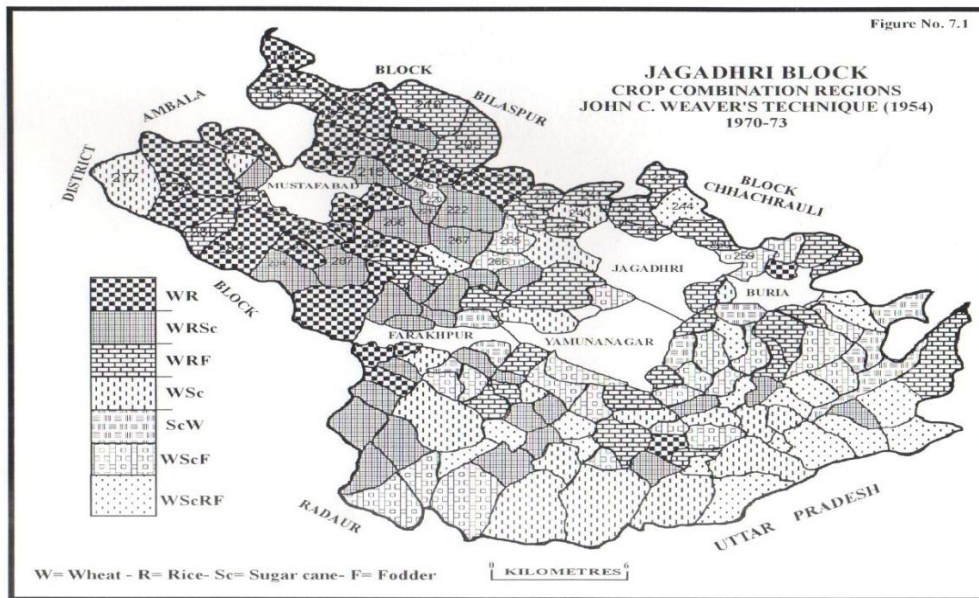**Crop Combination Regions 1970-73**

S.No.	Crop Combination	No. of Villages
1	WR	32
2	WRSC	29
3	WRF	32
4	WSC	18
5	WSCF	09
6	WSCRF	27
7	SCW	19
	TOTAL	166

Figure No. 7.1

JAGADHRI BLOCK
CROP COMBINATION REGIONS
JOHN C. WEAVER'S TECHNIQUE (1954)
1970-73

WR
WRSc
WRF
WSc
ScW
WScF
WScRF

W= Wheat - R= Rice- Sc= Sugar cane- F= Fodder

2394-0344

2455-0817

Crop Combination Regions 1999-2002

S.No.	Crop Combination	No. of Villages
1	WR	23
2	WRF	07
3	WRSC	81
4	WSC	27
5	SCW	28
	TOTAL	**166**

Where-
W means - Wheat,
R means -Refers Paddy,
SC means- demotes Sugar cane and
F means - Green Fodder

Figure No. 7.1

JAGADHRI BLOCK
CROP COMBINATION REGIONS
JOHN C. WEAVER'S TECHNIQUE (1954)
1970-73

W= Wheat - R= Rice- Sc= Sugar cane- F= Fodder

Conclusion

The crop combination based on statistical technique is a significant device to assess dominating position of crops in different parts of the area, and it helps in designating agricultural regions of any areas. The studying hand has revealed that the two crop combination heaving three sets (Wheat- Rice, Wheat –Sugar Cane, Sugar Cane- Wheat) is the most significant which covers 69 villages out of 166 villages of the block in 1970-73 and this sets cover 78 villages out of 166 villages more than 48 percent area of the Jagadhri block.

The study of crop ranking has brought to light the incontrovertible fact that wheat is the most leading crop and it ranks first in whole of the area.

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