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Crop Combination Region of Ausgram Gram Panchayet in West Bengal, India

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Abstract:
This paper is analysed the crop combination region in Ausgram Gram Panchayet of Purba Bardhaman District in West Bengal. Bardhaman district is known as 'Dhaner Gola' of West Bengal. There are 11 villages of our study area of Ausgram Gram Panchayat. These are Ausgram, Ausgram chak, Alefnagar, Bannabagram, Bahamanpur, Barchatra, Karatia, Kunjanagar, Purbatati, Ramchandrapur and Warishpur. Agriculture is the dominant economic activity of the study area. Rice, Potato, Mustard, Til, Wheat, Jute, Sugarcane are the main crops cultivated in the study area. The ranking of crops analysis by J.C. Weaver's(1954) minimum deviation method. There are three cropping seasons in the study region, namely Kharif, Rabbi and summer. During 2014-2015 monocrop combination present in only Ausgram chak while two crop combinations present in Kunjanagar and Warishpur where as Three crop combination was found in Ausgram and Bahamanpur, while four crops combination found in Barchatra and Purbatati , five crop combination was found in Alefnagar, Bannabagram, Ramchandrapur and Karatia was found six crop combination during study period.

Key words: Crop Combination, Crop Combination Region, Least Deviation Method.

Introduction:

The study of crop combination is an important aspect in Agriculture Geography. In this paper an attempt has been made to analyse the crop combination at Ausgram Gram Panchayat in the district of Purba Bardhaman of West Bengal. Agricultural crop combination in any region depends on physical, climate and socio-economic conditions. Crops are generally grown in combination (Weaver, 1954). The study of crop combination of any region has gained importance in geographical study. It helps in understanding the cropping pattern and crop concentration in particular area. The concept of crop combination is a scientific technique to study the existing spatial relationship of crops association with other crops. In recent years, this concept gains much attention and became an important fact among Geographers and Agricultural planners.

Study Area:

The study area, Ausgram Gram Panchayat is located in the middle part of Purba Bardhaman district in West Bengal. It is lies between $23^{o}12'28''$ North and $23^{o}17'14''$ North latitudes and $87^{o}50'30''$ East to $87^{o}54'32''$ East longitude. It covers an area of 112 sq.km. And has a total population of 21904 as per census data 2011 in which 11147 are male males and 10757 are females. The study area received an average annual rainfall 150cm. and average temperature ranges between $20^{o}C$ to $32^{o}C$. Out of 6756 hectare of geographical area, 5828.93 hectare land is available for cultivation. As the economy is primarily based on agriculture, its generalization, diversification, crop rotation, cropping pattern, crop population is totally revolving around the only land available. Clay, clay-loam, loam, loamy-sandy etc. soil provide a vivid scope to explore the cultivation potentialities.The present study area consists of 11 villages in which 4 are backward. The land of this area generally fertile and grows good crops of rice, potato, mustard, til etc. The soil in this region ranges from alluvial soil to sandy and clayey soil.

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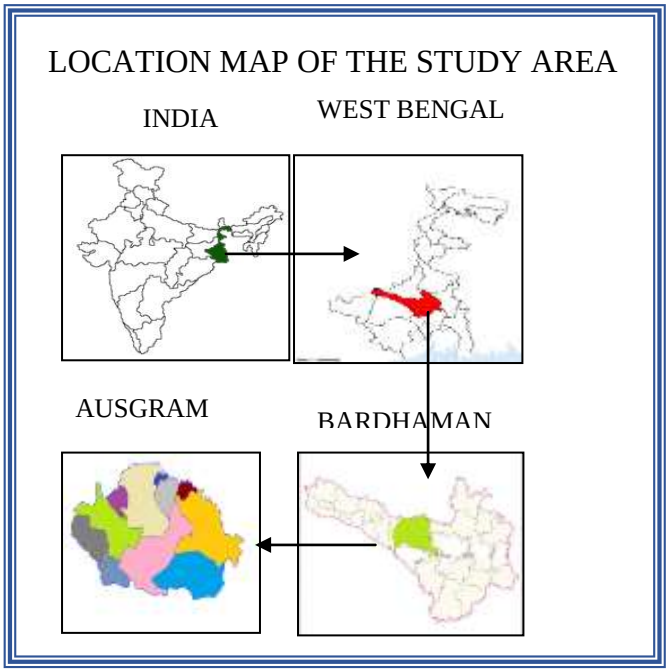

Objective of the study:

- To study the crop combination of the study area.
- To study the regional variance in the crop combination of study area.

Data base and Methodology:

The present study is based on primary and secondary data sources. Primary data was collected at house hold survey through questionnaires. The secondary data obtained from socio-economic review, district cencus, were processed and presented by statistical and cartographic techniques. The crop data has been computed with the help of Weaver's technique of crop combination. This is expressed as:

$$SD = \sqrt{\frac{\Sigma d^2}{n}}$$

[Where, d= Difference between actual crop percentage in the study region and the percentage in the theoretical distribution. n= number of crops in the given combination.]

The result of the crop combination is presented by the choropleth method.

Result and Discussion:

Crop Combination region are delineated here on the basis of methods given by J.C. Weaver (1954). The most important and popular approach is presented by Weaver for delineating the complex structure of agricultural region of Middle West in the USA in 1954. In the study area the percentage of crop area to the total crop area has taken under consideration. The present study area has identified monocrop, two crops, three crops, four crops, five crops and six crop combinations.

Table-1: Crop combination region according to J. C. Weaver's method of Ausgram Gram Panchayet (2014–15)

Village	Values (Hectares)	Crop combination	Types of crop
Ausgram	1032.13	3	R, P, M
Ausgram Chak	40.42	1	R
Alefnagar	1013.12	5	R, P, M, W, T
Bannabagram	947.57	5	R, M, P, T, J
Bahamanpur	230.97	3	R, P, S
Barchatra	343.26	4	R, W, M, P
Karatia	923.67	6	R, M, P, J, T, S
Kunjanagar	93.3	2	R, P
Purbatati	146.89	4	R, M, P, T
Ramchandrapur	812.17	5	R, P, M, S, T
Warishpur	245.43	2	R, P

Computed by Author

[Abbreviation – R: Rice, P: Potato, M: Mustard, W: Wheat, J: Jute, T: Til, S: Sugarcane]

Crop Combination analysis is one of the important tools particularly applied by the agricultural geographers. According to J.C. Weaver (1954) the ideal theoretical distribution of crop monoculture is one crop account for 100 percent of total cropped area. For two crop combination it is 50 percent for each crop, for three crops it is 33.33 percent, for four crops it is 25 percent, for five crops it is 20 percent , for six crops it is 16.6 percent and so on. The Variance and SD formula are used to accurately compose the actual percentage within the individual region unit by theoretical distribution. The formula is stated as follows-

$$d = \frac{\Sigma d^2}{n}$$

(Where, d = difference between the actual crop percentage in a given area and the appropriate percentage in the theoretical curve; n= the number of crops in a given combination). In the present study area Rice 49%, Potato 21%, Mustard 16%, Til 7%, Jute 6% are cropped from cultivated area. Apply the Weaver formula, we find that the ptesent study area which crop combination region. The crop combination table given as follows-

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Table-2: Crop Combination Region of Ausgram Gram Panchayet (by J. C. Weaver's method)

Types of crop combination	Mono-culture	Two crop		Three crop			Four crop				Five crop				
Theoretical % (A)	100	50	50	33.33	33.33	33.33	25	25	25	25	20	20	20	20	20
% of crop land occupied (B)	49	49	21	49	21	16	49	21	16	7	49	21	16	7	6
Deviation (d) [A – B]	51	1	29	-15.7	12.3	17.3	-24	4	9	18	-29	-1	4	13	14
d^2	2601	1	841	246.5	151.3	299.3	576	16	81	324	841	1	16	169	196
$\sum d^2$	2601	842		697.1			997				1223				
$d = \frac{\sum d^2}{n}$	2601	421		232.36			249.25				244.6				

Computed by author

In the table no.2, five crops deviation are calculated. The deviation of the actual percentages from the theoretical curve is seen to be the lowest for a three crop combination which is 232.36. This result established the identity and the number of crops in the basis combination for the study area as rice-potato-mustard.

Computing Crop Combination Regions:

The study of crop combination regions constitutes an important aspect of agricultural geography as it provides a good basis agricultural regionalization. Weaver's method has admirably been applied for the demarcation of crop combination regions band agricultural regionalization as it application results into suitable and accurate grouping of crops.

Monoculture:

One out of eleven villages at Ausgram Gran Panchayat have monoculture of Rice crop covering considerable (Above-90%) cultivated area of the region in the reference year 2014-2015. Ausgram chak is found monoculture of the study area. Alluvial soil, high railfall, plain topography is suitable for cultivation of rice. The cultivation of rice in this study area requires more stagnant water for growth and harvest in dry season.

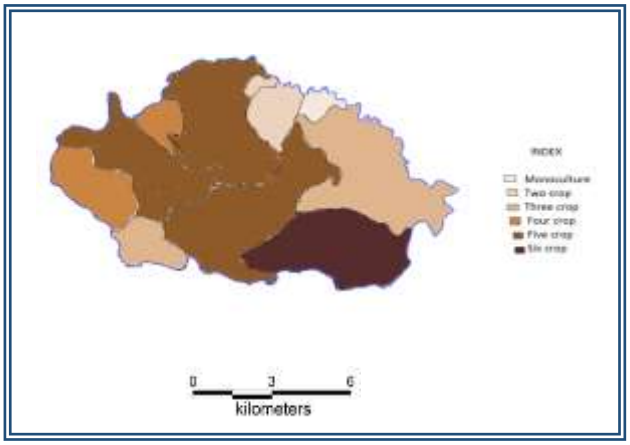
Two crops:

In 2004-2005, two villages of Ausgram Gram Panchayat have two crop combination of rice-potato and rice-sugarcane. Kunjanagar has dominance of rice and popato as two crop combination. Ausgram chak has rice and sugarcane combination.

Three crops:

Two villages carry of three crop combination among eleven villages of the respective Gram Panchayat for the year of 2014-2015. Ausgram and Bahamanpur have the respective combination. Ausgram have crop combination of rice, popato, mustard and Bahamanpur have crop combination of rice, potato and sugarcane.

Fig-1: Crop combination region of Ausgram Gram Panchayet (2014 – 2015)



Four Crops:

Three villages of Ausgram Gram Panchayat have four crop combination. Barchatra has bagged rice, potato, wheat and mustard in its four crop combination. Purbatat and Warishpur both have crop combination of rice, potato, mustard and til.

Five crops:

The five crop combination is observed in three villages of the study area. Alefnagar, Bannabagram and Ramchandrapur were experienced by five crop combinations. The rice is the dominant crop, the largest coverage of rice stands as first, followed by potato, mustard, til and jute. The favourable environmental condition has been found to the suitable for this predominant crop. The plain topography, alluvial types of soil, irrigation facilities are also favourable for the cultivation of rice, potato, mustard etc. in this region.

Six crops:

Six crop combinations are found in Karatia village of the study area in reference year 2014-15do. The dominant crop of this village is Rice followed by potato, Mustard, jute, Til, sugarcane. Due to the fertile land, proper irrigation facilities, soil, rainfall and temperature are favourable for cultivation of rice, potato, jute, sugarcane, til etc. in this study area.

Conclusion:

The study of crop combination is of greater significance. In recent years, the concept of crop combination has enjoyed the attention of geographers and agricultural land use planners. The study of crop combination is an important aspect in Agricultural Geography. Rice, potato, mustard, jute, sugarcane and til are the crops cultivated in this region. The application of Weaver's methods shows the realistic picture of crop combination. Three Crop Combination regions has found with rice, potato and mustard in study area. Monoculture is in one village out of eleven villages in our study area. Two crop combinations are found in two villages. Three and four crop combination both is found two villages in the study area. Five crop combination are found in three villages and only one village is covering with six crop combination. The availability of irrigation facilities and the soil favoured more number of crops cultivation in this region.

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