

A STUDY OF CROP COMBINATION REGIONS IN THE DISTRICT OF MURSHIDABAD, WEST BENGAL

Ananya Chakraborty*

ABSTRACT

The Crop Combination analysis technique identifies and locates areas sharing significant proportion of crops at higher rank, thus helps to understand the agricultural mosaic, cropping pattern, crop concentration, cropping variation, crop diversification and operation of a given area thus aiding to draw a rough sketch of agricultural topology and provide agricultural regionalization. Murshidabad district of West Bengal is mostly based on agriculture and is occupied by different crops, which requires agricultural planning. In the present paper an attempt has been made to demarcate the crop combination regions of agronomic years 1996-97 and 2006-2007 along with the variations observed. The author has purposively selected Rafiullah's Maximum Positive Deviation method of 1956, which though has lengthy calculation, is more accurate, objective and scientific in delineation of crop combination regions. In the atmosphere of major crop generalization in Murshidabad, a tendency of more combination of major crop can be smelt. The crop combination of Murshidabad is only restricted upto four crops.

Key Words: Crop combination, maximum positive deviation method, agronomic year, agricultural planning.

INTRODUCTION

The investigation for cultivation of a geographical area, which selects various agricultural elements and studies it collectively, is the combination analysis (Singh et al. 2004). Crop combination is a technique used to establish the boundaries of agricultural region based on statistical comparison of acreages (Siddhartha et al. 2003). Weaver brought it in to being to delimit the agricultural region against the concept of monoculture like Cotton Belt, Wheat Belt etc. A single crop does not occupy the total gross cropped area of a region in a calendar year. The study of crop combination region, furnishes the relative position of crops on regional scale. It provides spatial predominance of combination crops paving the emergence of crop regions. It minimizes the chances of oversimplified generalization (Mohammaad 1978) and will also provide a basis for agricultural regionalization. Both qualitative methods i.e. arranging or ranking of crops in hierarchical order and quantitative methods like the arbitrary choice method or the standard deviation method, or the maximum positive deviation method etc. are applied. Spatial and temporal pattern of crop combination provide knowhow for the contemporary and the changing pattern of inter crop struggle. Murshidabad, where most of the population is somehow involved in agriculture, the present technique is beneficial to the planners as it entertains propulsive economic agricultural planning over uneconomical cropping system.

Hence, judicious planning is economically remunerative as in addition of providing effective productivity, it supports soil fecundity by logical crop rotation. For the betterment and sustainability of the district, through agriculture, commercialization of agriculture with ecological balance is necessary as agriculture is the only option left.

STUDY AREA

Lying between 23°43'30" and 24°50'20" north latitudes and 87°49'17" and 88°46' east longitude, Murshidabad is the northern most district of the Presidency Division of West Bengal. With an area of 2143 square miles, the district has 26 blocks. The district has two agro-climatic zones viz. old alluvial zone and new alluvial zone. Out of 532.5 thousand hectare of geographical area, 399.01 thousand hectare land is available for cultivation. As the economy is primarily based on agriculture, its generalization, diversification, crop rotation, cropping pattern, crop combination is totally revolving around the only land available. Clayey-loam, loam, loamy-sandy etc. soils provide a vivid scope to explore the cultivation potentialities. The gross cropped area is 976200 hectare against the net-cropped area of 398700 hectare thus raising the cropping intensity to 249% in the district (2007-08).

OBJECTIVES

- To have a comparative study of crop combination regions for the cropping year of 1996-1997 and 2006-2007.
- To understand the cropping pattern of various blocks of the district.
- To show the reasons behind limited variations in results between 10 years of gap.

*Guest lecturer, Berhampore College, Murshidabad, West Bengal

MATERIALS AND METHOD

The present study is based on secondary data collected from the Murshidabad District Statistical Handbook of years 1996-1997 and 2006-2007 provided by Bureau of Applied Economics & Statistics, Government of West Bengal.

For the delineation of crop combination regions in Murshidabad district, Rafiullah's (1956) Maximum Positive Deviation Method has been performed.

The expression is:
$$d = \frac{\sum D_p^2 - \sum D_n^2}{N^2}$$

Where, d= deviation

Dp = positive deviation from medial value of crop combination

Dn = negative deviation from median value of crops

N = number of crop combination

Greater is the dominance of crops, lesser is the crop combination. In positive deviation method, the differences of the actual values are calculated from the mid values of the theoretical standard, thus giving the wanted critical combination unlike others. There is no arbitrary selection; the maximum variance of combination will be sorted from the calculation derived from data.

Finally, choropleth map of two time period (i.e. 1996-97 and 2006-07) has been generated using the GIS software and taking number of combinations derived from the highest values obtained from calculation.

RESULTS AND DISCUSSION**Computing crop combination regions**

Combination Analysis in geographical studies requires distributional analysis to shape crop geography. It is used to evaluate adequacy or inadequacy in the essential agricultural landscape (Khan, 1998). Combination is more common than a crop occupying particular isolation in a given areal unit and a cropping year. The technique is used to identify and locate areas sharing significant proportion of crop at higher rank. As it can delineate rice, wheat etc. producing areas, it is also known as regional distribution analysis.

An attempt has been made to show the changes in the crop combination regions, during the periods of 1996-1997 and 2006-2007. Investigations show that not much significant change has been observed. The environmental constraints owing to geomorphic situations, soils and climate have put the limit on diversified agricultural productivity. Rafiullah's method has identified mono, two, three and four crop combinations in study area. Farmers grow numerous crops in the field rather than single crops. From the Table-1, it is clear that rice is the main primary crop, except that of Raninagar I, Domkal, Jalangi etc.

Monoculture (One crop combination)

Thirteen out of twenty-six blocks have the monoculture of rice, jute and wheat crops covering considerable cultivated area of the district in the reference year 1996-97. These eight blocks have monoculture of rice. Three blocks have wheat monoculture and two blocks have jute monoculture. The favourable rainfall, soil and irrigation facilities have also led to the cultivation of rice and jute, which requires much stagnant water for growth and dry season for harvest. Kandi, Khargram, Barwan, Bharatpur I, Bharatpur II, Bhagawangola II, Nabagram and Raninagar II all have rice as mono crop combination. Bhagawangola I, Domkal, Jalangi have wheat monocrop combination. Lalgola had a mono crop combination of jute.

In 2006-07, fifteen blocks of Murshidabad have generalized themselves in monoculture of rice, and jute crops, with rice covering a considerable acreage of the district. Among these, ten blocks have rice as monoculture staple and five has jute. The recent past folds of 2001 have led many farmers to opt for rice and jute that can stand in water-filled fields. Monocrop combination of rice is practiced in Hariharpara, Kandi, Khargram, Bharatpur I, Bharatpur II, Suti II, Raghunathgang II, Sagardighi, Bhagawangola I and Bhagawangola II. Lalgola, Msd-Jiaganj, Raninagar I while Raninagar II has jute as monocrop combination (Figure-1).

Two crop combination

In 1996-97, ten blocks of Murshidabad have two-crop combination of rice and jute, jute and wheat, rice and mustard, even rice and musur. Berhampore, Beldanga-I, Beldanga-II, Suti-I, Suti-II have dominance of rice and jute as two crop combination. Nowda has jute and rice combination. Farakka has rice and musur, while Sagardighi has rice and mustard as dominant crop combination. Raghunathgang-I has rice and wheat as both cereal crop combination. Raninagar-I has dominance of jute and wheat.

Table-1: Comparative Study of Crop Combination Regions of Blocks of Murshidabad for Cropping Years of 1996-97 and 2006-07

Delineation of Crop Combination Regions of Blocks of Murshidabad for the cropping year of 1996-1997 and 2006-2007							
SL no.	Name of Block	1996-1997			2006-2007		
		Values	crop combination	Types of crops	Values	crop combination	Types of crops
1	Berhampore	211.869	2 Crop	R+J	132.812	2 Crop	R+J
2	Beldanga-I	233.799	2 Crop	R+J	144.169	2 Crop	R+J
3	Beldanga-II	339.509	2 Crop	R+J	79.979	2 Crop	R+W
4	Nowda	338.48	2 Crop	J+R	511.335	4 Crop	R+J+W+Ms
5	Hariharpara	297.2	1 crop	J	342.44	1 Crop	R
6	Kandi	1351.592	1 crop	R	1294.7	1Crop	R
7	Khargram	1608.361	1 crop	R	1088.87	1 Crop	R
8	Burwan	990.109	1 crop	R	703.98	3 Crop	R+Ms+P
9	Bharatpur-I	1517.073	1 crop	R	959.082	1 Crop	R
10	Bharatpur-II	1522.87	1 crop	R	1243.85	1 Crop	R
11	Farakka	215.351	2 Crop	R+Mu	127.047	3 Crop	R+K+Ms
12	Samserganj	121.0415	3 crop	R+J+W	209.854	2 Crop	J+Ms
13	Suti-I	203.29	2 Crop	R+J	140.632	2 Crop	R+Ms
14	Suti-II	262.72	2 Crop	R+J	620.149	1 Crop	R
15	Raghunathgang-I	442.964	2 Crop	R+W	246.093	2 Crop	R+W
16	Raghunathgang-II	209.845	3 Crop	R+W+J	516.925	1 Crop	R
17	Sagardighi	629.725	2 Crop	R+Ms	226.057	1 Crop	R
18	Lalgola	270.043	1 crop	J	368.89	1 Crop	J
19	Bhagawangola-I	272.3655	1 crop	W	451.966	1 Crop	R
20	Bhagawangola-II	291.0436	1 crop	R	257.702	1 Crop	R
21	Msd-Jiaganj	93.907	3 Crop	R+J+W	401.521	1 Crop	J
22	Nabagram	792.872	1 crop	R	584.99	2 Crop	R+W
23	Domkal	187.7913	1 crop	W	365.016	1 Crop	J
24	Jalangi	299.1447	1 crop	W	92.7991	3 Crop	J+W+R
25	Raninagar-I	103.574	2 Crop	J+W	219.584	1 Crop	J
26	Raninagar-II	520.916	1 crop	R	678.133	1 Crop	J

Source: Calculated and Compiled by author. Crop Combination after Rafiullah's method. Based on block wise area under major crop for the cropping years of 1996-97 and 2006-07.

In 2006-07, seven out of twenty-six blocks have two-crop combination. Berhampore and Beldanga-I have a combination of rice and jute. Beldanga-II, Raghunathgang-I and Nabagram has cereal crop combination of rice and wheat. Suti-I has rice and mustard as dominant crop combination. Samserganj has jute and mustard as two crop combinations (Figure-1), which shows that culture of two crop combinations, has lessened.

Three crop combination

Three blocks carry the courtesy of three crop combination among twenty six blocks of the respective district for the year 1996-97. Only Samserganj, Raghunathgang-II and Msd-Jiaganj had the respective combination. Samserganj had a combination of rice, jute and wheat. Raghunathgang-II is dominated by a combination of rice, wheat and jute.

In 2006-07, three blocks of Murshidabad have combination of three crops. They are Burwan, Farakka, and Jalangi respectively. Burwan has crop combination of rice, mustard and potato. While Farakka has dominance of rice, khasari and mustard combination, Jalangi has crop combination of jute wheat and rice. Burwan, Jalangi

and Farakka once having one crop and two crop combination respectively are now included in three crop combination (Figure-1).

Four crop combination

No such crop combination has been observed for the agronomic year 1996-1997.

While in the cropping year of 2006-2007, Nowda has bagged rice, wheat, jute and mustard in its four crop combination (Figure-1). Compiled data of the base year reveals that the respective block had two crop combinations in the relevant year. This indicates the desire of cultivators to opt for other combination.

CROP COMBINATION REGIONS IN MURSHIDABAD DISTRICT OF WEST BENGAL (1996-1997 AND 2006-2007)

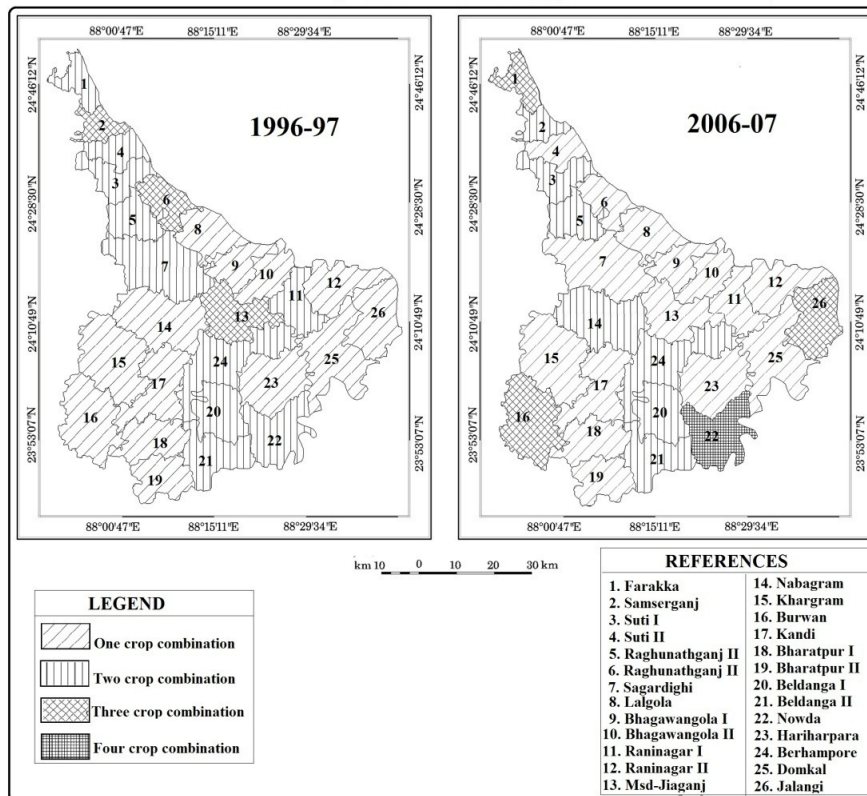


Figure - 1

A CRITICAL STUDY OF CROP COMBINATION REGIONS IN MURSHIDABAD DISTRICT

A tendency of specialization of rice is clear. Wheat, which in the last decade had occupied second position in monoculture followed by jute, has smoothly swiped away its position leading way to the rise in jute monoculture. With rice dominating in monoculture of 2006-2007 time periods, jute has only bagged a few blocks for itself. Farakka, Suti-II, Nowda and Sagardighi with two crop cultures in cropping year of 1996-1997, have changed its combination in the period 2006-2007. While, Suti-II and Sagardighi have restricted to monoculture in 2006-2007, Farakka has three crop cultures and Nowda have diversified to four crop combination. Figure-1 shows that, Samsanganj, Raghunathganj-II and Msd-Jiaganj, in 1996-1997 were dominated by three crop combination and did not remain the same in the cropping year of 2006-07. Samsanganj, Raghunathganj-II and Msd-Jiaganj which had three crop combinations in the year of 1996-1997, could not retain to its initial combination latter. While Raghunathganj-II and Msd-Jiaganj have shifted to monoculture, Samsanganj has come down to two crop combination in 2006-2007. On the other hand, Burwan and Jalangi, which had mono crop combination and Farakka had two crop combination; all have opted to three crop combination. Interestingly, Nowda has shown variation totally skipping from two crop combination to four crop combination.

A trend of pulse cultivation has been observed during the cropping year of 2006-2007. Gram, musur, maskalai, khasari clearly depict the advent of cultivation of more pulses in Murshidabad. The area under pulse cultivation rose from 23963 in 1996-97 to 46031 hectare in 2006-2007, i.e. almost twice than the base year's area. The productivity index of pulses rose from 2.17 to 2.63, thus, bears the fact of the present findings. To add base, the Compound Annual Growth Rate (CAGR) of 2.47 percent has been noticed from 1980-1981 to 2007-2008 (Mondal et. al. 2010). Til, linseed and barley which were not included as major crops by the District Statistical Handbook of Murshidabad, 1996-1997; has been included in the same handbook published in the year 2007.

This clearly indicates a tendency to include more types of crops such that diversification can merge with generalization. Inclusion of potato is also found in three crop combination of Burwan block. The total potato producing area of the district rose from 0.87% to 1.28%. It has been further revealed, oilseed acreage which was limited to 2680 hectare in 1996-97, rose to an unbelievable record of 14513 hectare. Thus more than five times increase in acreage is noticed. Wheat, a monocrop in Bhagawangola I, Domkal and Jalangi escaped from monoculture in the cropping year of 2006-2007. But still, somehow it has retained itself by having 16.82% of district percent acreage in 2006-2007; which was 16.53% in 1996-1997. The total rice acreage for the respective district rose from 338460.2 hectare to 357275 hectare only. Barley has positioned itself as major crop in District Statistical Handbook, 2006-2007 with .026% share in district acreage.

CONCLUSION

A disparity of ten years shows not much change in crop combination as expected due to globalisation. Though in 1996-97, the crop combination was restricted to three crops, the scenario was not changed much in 2006-07, with only Nowda having four crop combination and rest revolving round one, two and three crop combination. The main cause for a generalization tendency is due to the district's flood prone nature. Lying in the region where rivers spread their distributaries in their lower course, the region is often flooded resulting in fresh silt deposits. In one hand, such deposits suit best for monocrop or two crop cereal combinations, these can to some extent withstand in the aforesaid calamity. Also may be somewhere a fear seeds for restriction from diversity. The farmers do not believe in 'no risk, no game' and thus hardly ever attempt for diversification in even better conditions. Moreover, a tradition of rice and jute cultivation persists which provides support to generalization. A block wise disparity persists, which clearly indicates the scope of diversity. Nevertheless, a change can be seen which can pave the way to a better combination.

REFERENCES

- Husain M. 1996. Systematic Agricultural Geography, Rawat Publications, New Delhi.
- Khan N. 1998. Quantitative Methods in Geographical Research. Concept Publishing Company, New Delhi, pp. 51-55.
- Mandal T.K. and Roychowdhury P.2010. Pulses Cultivation in West Bengal: A District Level Analysis in Journal of Interacademia, Vol.14 (4), pp. 445-462.
- Mohammad A. 1978. Studies in Agricultural Geography, Rajesh Publication, New Delhi.
- Rafiullah S.M. 1956. A New Approach to Functional Classification of Town. Geographer 12, pp.40-53.
- Siddhartha K. and Mukherjee S. 2003. A Modern Dictionary of Geography. Kisalaya Publication Pvt. Ltd., New Delhi, p.117.
- Singh J. and Dhillon S. 1984. Agricultural Geography, Tata McGraw hill publishing company Ltd. New Delhi, pp. 112-113.
- Todkari G.U. 2012. A Study of Crop Combination in Solapur District of Maharashtra. Journal of Crop Science, Vol. 3, Issue-1, pp.51-53.