RESEARCH PAPER | GEOGRAPHY | Volume : 4 | Issue : 11 | November 2014 | ISSN - 2249-555X

Crop Combination Regions in Karnataka With Special Reference to Major Edible Oilseeds

KEYWORDS: crop, combination, monoculture, regions, taluks, deviation.

Dr. S.S.Motebennur

Associate Professor and Head,Dept. of Geography ,Karnataka Science College Dharwad Karnataka State

ABSTRACT *The study of crop combination regions constitutes an important aspect of agricultural geography as it provides a good basis for agricultural regionalization. The crops are generally grown in combinations and it is rarely that a particular crop occupies a position of total isolation from other crops in a given area unit at a given point of time. The distribu¬tion maps of individual crops are interesting and useful for planners, but it is even more important to view the integrated assemblage of the various crops grown-in an area unit. For example, the demarca¬tion of India into the rice region or wheat region does not explain the agriculturally significant fact that very often the wheat region also has a rice crop and vice versa, or wheat is often grown with gram, barley, mustard, lentil and peas. For a comprehensive and clear understanding of the agricultural mosaic of an agro-climatic re¬gion and for the planning and development of its agriculture, a sys-tematic study of crop combinations is of great significance.*

INTRODUCTION:

In recent years the concept of crop combination has engaged the attention of geographers and agricultural land use planners. The studies made so far in this field range in approach from topical to regional and vary in extent from small areas of minor political units to the entire country. The different methods applied in the delineation of crop combination regions can be summed up under two headings:

(i) The first method for the demarcation of crop combination regions is the arbitrary choice method, e.g., the first crop only, the first two crops only or the first three crops, etc. The crop combinations delineated on arbitrary choice method are, however, not rational and objective as" by applying arbitration the rest of the crops grown in the area are irrationally excluded without any consideration of their percentage weightage in the total cropped area.

(ii) The second method is developed in terms of variables based on certain differences, which are relative and not absolute. This method being based quantitative statistical approach is more accurate, reliable and scientific as it gives better objective grouping of crops of a region. The statistical techniques about crop combination have been modified suitably by the geographers from time to time.

Weaver (1954) was the first to use statistical technique to establish the Crop combination of the Middle West (USA). In his attempt for the delineation of agricultural regions of the Middle West in the United States, Weaver based his analysis on acreage statistics. Weaver computed the percentage of total harvested cropland occupied by each crop that held as much as 1per cent of the total cultivated land in each of the 1081 counties covered in his work. Excluding a few counties like Houston and Minnesota in which the crop combination was easy to ascertain, other counties showed a complex and confused picture of the percentage, occupied by different crops. It was, therefore, necessary to devise "a rigorous approach that would provide objective constant and precisely repeatable procedure and would yield comparable results for different years and localities". In his work Weaver calculated deviation of the areal percentages of crops (occupying over 1 per cent of the cropped area) for all the possible combinations in the component areal units against a theoretical standard. The theoretical curve for the standard measurement was employed as follows:

Monoculture = 100 per cent of the total harvested crop land in one crop.

2-crop combination = 50 per cent in each of two crops.

3-crop combination = 33.3 per cent in each of three crops.

4-crop combination = 25 per cent in each of four crop.

5-crop combination = 20 per cent in each of five crops.

10-crop combination = 10 per cent in each of I 0 crops.

For the determination of the minimum deviation the standard deviation method was used:

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

Where d is the difference between the actual crop percentages in a given county (areal unit) and the appropriate percentage in the theoretical curve and n is the number of crops in a given combination.

As Weaver pointed out, the relative, not absolute value being significant, square roots were not extracted so, the actual formula used, was as follows;

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

Weaver's method has admirably been accepted and applied for the demarcation of crop combination and agricultural regionalization as its application results into suitable and accurate grouping of crops. The technique, however,

Volume : 4 | Issue : 11 | November 2014 | ISSN - 2249-555X

gives most unwieldy combinations for the units of high crop diversification.

Out of the many approaches to combination study, Weaver's method used in crop combination has been applied largely by geographers. Some have followed this method in demarcating crop and livestock combinations (Scott; 1957; Bennett, 1961; Coppock, 1964) or industry combinations (Johnson and Teufner, - 1968). Others have/ shown its weakness (Rafiullah, 1956; Hoag, 1969) or have tried to present and use it after suitable modifications (Doi, 1959, 1970; Thomas, 1963; Ahmad and Siddiqui, 1967; Husain, 1976; Jasbir singh 1977)

MAXIMUM POSITIVE DEVIATION METHOD

Looking at the inherent weakness of Weaver's method which tends, to include all or most of the crops in the series by which the resultant combination become over generalized, Rafiullah (1956) developed as new deviation method in his work A New Approach to the Functional Classification of Towns. The technique devised by Rafiullah- may be expressed as follows:

$$D = \sqrt{\frac{\sum D^2_p - D^2_n}{N^2}}$$

Where d is the deviation, D_p, is the positive difference and D_n, is the negative difference from the median value of the theoretical curve value of the combination, and N is the number of functions (crops) in the combination. Since it is the relative rank of the value of deviation which is needed, the under root sign may be ignored to save laborious calculations and the formula may be used in the following form:

$$D = \frac{\sum D^2_p - D^2_n}{N^2}$$

The statistical technique advocated by Raffiullah is more accurate, objective, and scientific, and therefore quite popular for the delineation of crop combination regions. This technique has the capacity to handle the highly diversified cropping structures. India has not still come out from situation of subsistence type of farming system. Although irrigation has brought about changes in increased productivity of several types of crops, even then it is not free from menace of droughts and floods and dependency on monsoon rainfall. The Socio-economic structure of farming community is not much changed even after sixty years of Independent India, where agricultural practice and the farmers still depending on it need several plans programs to delineate them. Under such situation it may not be possible to find a Single crop occupying 100 percent area occupied. Therefore Rafiullal's method can be more realistic at its grass root level where 50 percent of land occupied less than one crop while the remaining 50 per cent of land might have been shared by other crops. In general the crop combinations demarcated on the basis of statistical techniques provide a sound base for agricultural planning and development.

OBJECTIVES:

1) To examine the crop combination pattern at taluka level and thereby to know the importance of association of 5 major oilseed crops in the crop combination.

2) Drawing of crop combination map at taluka level for the year 2002-03, based on the Raffiulla's method.

APPROACH AND METHODOLOGY:

The present study of major edible oilseeds cultivation in Karnataka is a part of agricultural geography. The data for only one period i.e. 2002-03 is considered for the analysis of 175 taluks. The published data is obtained from the following offices:

1) District Statistical Office, Dharwad, 2) Department of Economics and Statistics Govt. of Karnataka, Bangalore, 3) Director, Department of Agriculture, Bangalore, 4) Joint Director, Department of Oilseeds, Bangalore, 5) University of Agriculture Science, Dharwad. The taluka wise sown area in the form of percentage under five major edible oilseeds is shown in the form of crop combination map as per Raffiulla's method for the year 2002-03.

MONOCULTURE:

As per Raffiulla's method groundnut & sunflower are cultivated as monoculture in some taluks of Karnataka, where groundnut is found in 4 taluks, viz, Pavagad, Madhugiri, shira, and Shirahatti, while sunflower in six taluks, viz Lingasur, Hiriyur, Koppal, Yalaburga, Kustagi and Ron The actual percentage of land under groundnut cultivation is Pavagad Taluk 80.85%, in Madhugiri Taluk 40.85%, in Sira taluk 39.07% and in Shirahatti taluk 25.87% The actual percentage of land under sunflower cultivation is Lingsur taluk 26.33%, in Hiriyur taluk 23.84%, in Koppal Taluk 20.78%, in Yelburga taluk 19.04%, in Kustagi taluk 17.158% and in Ron taluk 17.08% (refer table-1 and Fig 1).

TWO CROP COMBINATION:

Two oilseeds crops Viz Groundnut and sunflower are cultivated as a two crop combination in three taluks of Karnataka, where sunflower and jowar are cultivated in Bagalkot taluk, Groundnut & sunflower are cultivated in challakere taluk and groundnut and cotton are cultivated in Molakalmur taluk. (Refer table 2 and Fig-2)

THREE CROP COMBINATIONS:

The Sunflower as an oilseed crop appears as a three-crop combination in one taluk i.e. Sindhanur, where Paddy and jowar are also cultivated along with sunflower to call this taluk as three crop combination. (Refer Table-3 and Fig 3)

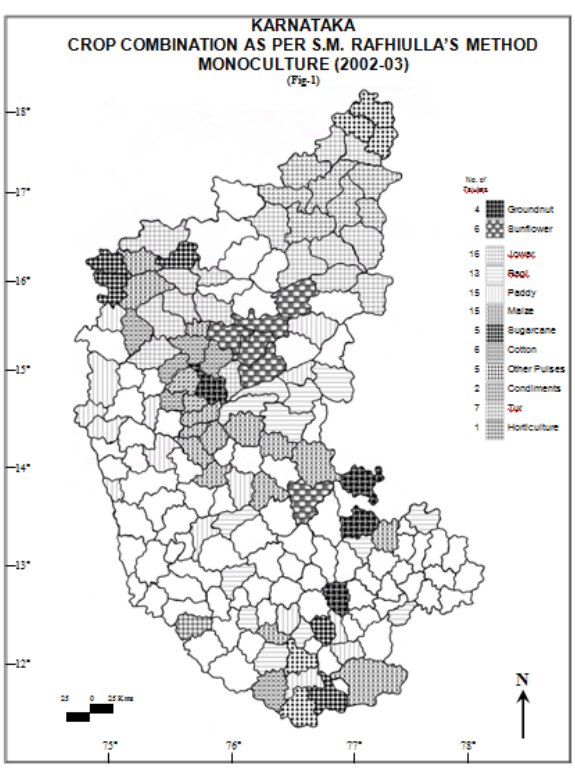
MONOCULTURE

Table 1

Name of crop	No of Taluks	Names of the Taluks
1) Jowar	16	1) Badami 2) Bilagi 3) Mudhol 4) Athani 5)Ramadurga 6)Soundatti 7)B.Kalyan 8) Humnabad 9) Sindagi 10) Dharwad 11) Mundargi 12) Shahapur 13) Shorapur 14) Yadgir 15) Raichur 16) Devadurga
2) Ragi	13	Anekal 2) Bellary 3) Hadagali 4) H.B.Halli 5) Kudalagi 6) Sondur 7) Tarikeri 8) Arakalagudu 9) Belur 10) Bagepalli 11) Pandavapur 12) Hunsur 13) Koratageri

Volume : 4 | Issue : 11 | November 2014 | ISSN - 2249-555X

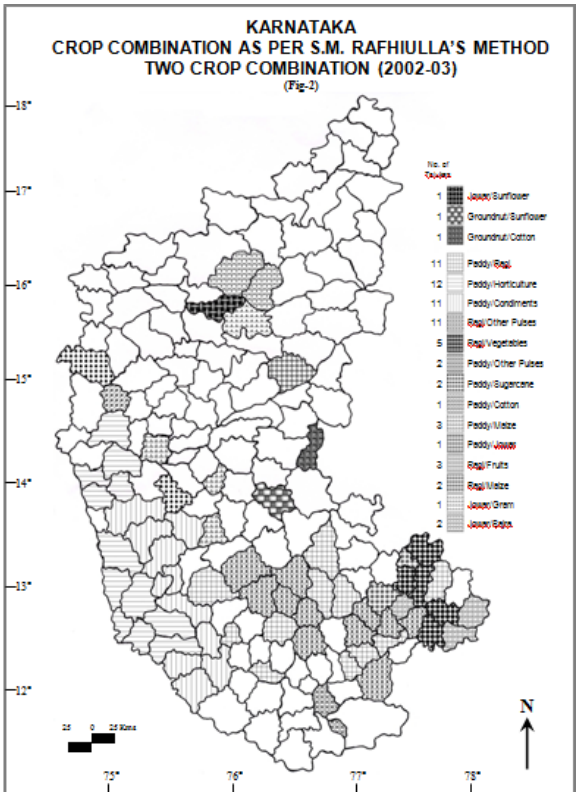
3) Paddy	15	1) Belguam 2) Hospet 3) N.R.Psura 4) Channagiri 5) K.R.Pet 6) Maddur 7) Malavalli 8) Nanjanagudu 9) Manvi 10) Ankola 12) Bhatkal 13) Karawar 14) Mundagod 15) Sura
4) Maize	15	1) Gokak 2) Rayabag 3) Kollegal 4) chitradurga 5) Holalkeri 6) Harapanahalli 7) Honnalli 8) Jagalur 9) Naragund 10) Byadagi 11) Haveri 12) Hirekerur 13) Ranebennur 14) Gouribidanur 15) Piriyapattan
5) Sugarcane	5	Jamakandi 2) Chikkodi 3) Hukkeri 4) Chamarajanagar 5) Mandya
6) GROUND-NUT	4	1) Shirahatti 2) Madhugiri 3) Pavagad 4) Shira
7) SUN-FLOWER	6	1) Hiriyur 2) Ron 3) Koppal 4) Kustagi 5) Yalaburga 6) Lingasur
8) Cotton	6	1) Bailahongal 2) Hubli 3) Navalagund 4) Gadag 5) Shiggam 6) H.D.Kote
9) Other Pulses	5	1) Aurad 2) Bhalki 3) Bidar 4) Gundlupet 5) Mysore
10) Candiments	2	1) Kundagol 2)Savanur
11) Tur	7	1) Afegelpur 2) Aland 3) Chincholi 4) Chitapur 5) Gulbarga 6) Jevargi 7) Sedum
12) Horticulture	1	Sully



TWO CROP COMBINATION
Table-2

Name of the crop	No of Taluks	Names of the Taluks
1) Paddy & Ragi	11	1) Bangalore 2) Channapattan 3) Ramanagar 4) Chikkamagalore 5) Alur 6) C.R. Pattan 7) Chintamani 8) K.R.Nagar 9)Gubbi 10) Kunigal 11) Tumukur
2) Paddy & Horticulture	12	1) Bantwal 2) Beltangadi 3) Mangalore 4) Puttur 5) Kundapur 6) Karkal 7) Udupi 8) Honnavar 9) Kumta 10) Siddapur 11) Sirsi 12) yallapur
3) Paddy & Candiments	11	1) Koppa 2) Mudageri 3) Shringeri 4) Sakaleshapur 5) Madakeri 6) Somavarpet 7)Veerajapet 8)Hosanagar 9) Sagar 10) Shimoga 11) Theerthahalli
4) Paddy & Other Pulses	2	1) Yalandur 2) T.Narasipur
5)Paddy & Sugarcane	2	1) Khanapur 2) Bhadravati
6) Paddy & Cotton	1	1) Haliyal
7) Paddy & Maize	3	1) Harihar 2) Hanagal 3) Shikaripur
8) Paddy & Jowar	1	1) Gangavati
9) Ragi & other Pulses	11	1) Bangalore.N 2) Hoskote 3) Kanakpur 4)Magadi 5)Nelamangal 6)Kadur 7)Arasikeri 8)Nagamangal 9) C.N.Halli 10) Tipatur 11) Turuvikeri
10) Ragi & Vegetables	5	1) Bangarpet 2) chikkaballapur 3) Kolar 4) Malur 5)Shidlaghatta
11) Ragi & Fruits	3	1) Mulubagil 2) Shrinivaspur 3) Devanahalli
12) Ragi & Maize	2	1) Gudibande 2) Doddaballapur
13) Jowar & Gram	1	1) Hunagund
14) Jowar & Bajra	2	1) Bagewadi 20 Muddebihal
15) Jowar & SUNFLOWAR	1	1) Bagalkot
16) GROUNDNUT & SUNFLOWER	1	1) Challakeri
17) GROUNDNUT &Cotton	1	1) Molakalmur

Volume : 4 | Issue : 11 | November 2014 | ISSN - 2249-555X

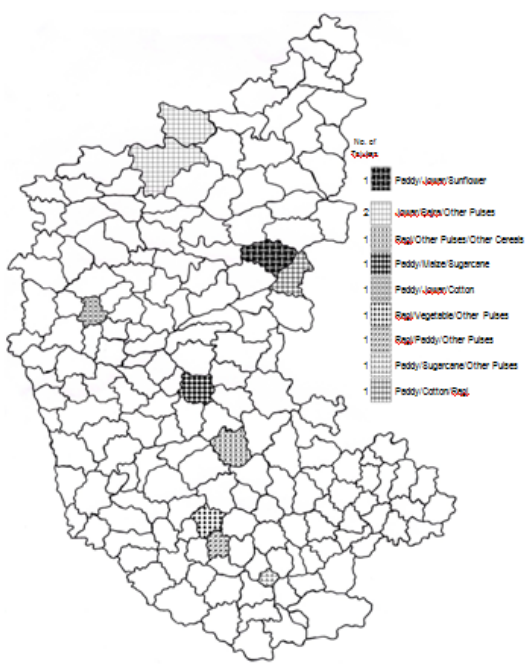


THREE CROP COMBINATION
Table –3

Name of the Crops	No of Crops	Name of the Taluks
1) Paddy/Cotton/Ragi	1	1) Shiraguppa
2)Jowar/Bajra/ Other Pulses	2	1) Bijapur 2) Indi
3) Ragi/Other Pulses/ Other Cereals	1	1) Hosadurga
4) Paddy/Maize/ Sugercane	1	1) Davanageri
5) Paddy/ Maize/ Cotton	1	1) Kalaghatagi
6) Ragi/Vegetable/ Other pulses	1	1) Hassan
7) Ragi/Paddy/ Other Pulses	1	1) H.N.Pura
8) Paddy/ Sugarcane/ Other Pulses	1	1) Shrirangapattan
9) Paddy/Jowar/ SUNFLOWER	1	1) Sindhanur

CONCLUSION

It is suggested here to note that 9.17% of fallow land can be brought under agriculture with due emphasis on oilseed crops. Similarly 8.22% of land which is as uncultivated land can also be brought for the use of agriculture. The intensity of irrigation encourages the farmers to cultivate more number of crops in a year such as rice, groundnut, sunflower, etc. In such situation it is interesting to under line that these crops may consume less water than sugar cane cultivation, while the total number of crops grown will add to more income of the farmer and it may be suitable to farmers for diversified needs than that of sugar cane cultivation. Therefore, this research advocates for oilseeds cultivation in suitable taluks of Karnataka. Groundnut and sunflower have been cultivated as mono culture, where groundnut is found in 4 taluks, while sunflower is found in 6 taluks. The groundnut and sunflower are cultivated as two crop combinations in three taluks. The sunflower and jowar are cultivated as two crop combination in one taluk, while groundnut and cotton in another one taluk. The sunflower as an oilseed crop is cultivated as a three crop combination in one taluk, where paddy and jowar are cultivated in this taluk. Therefore, if the importance of oilseed crops is very well understood by the farmers, in terms of its money value and higher per hectare yield, then oilseeds can be cultivated in suitable taluks as monoculture / two crop combinations, whereby Karnataka can contribute still higher share of production of oilseeds to gross production of Indian edible oil. The groundnut and sunflower crops when they are cultivated as monoculture in some taluks of Karnataka which is quite natural and necessary to see that, these two crops (groundnut and sunflower) and remaining three types of major oilseed crops can also be cultivated as mono crop in such taluks (respective taluks) provided conducive situations and conditions are met with, as a result of which Karnataka can boost the area and production of oilseed crops. Similarly two crop combination and three crop combination under particular oilseed crops also need care for the increased cultivation of oilseed crops and thereby such taluks can contribute to the growth and production of oilseed crops.



Volume : 4 | Issue : 11 | November 2014 | ISSN - 2249-555X

REFERENCE

➢ Agasimani C. A, Hosmani M. M. & Ravishankar G. (1993) "Prospects of groundnut cultivation in rice follows in coastal sandy soils in Uttara Kannada district in Karnataka". National Seminar on Oilseeds Research & Development in India; status and strategies, Indian Society of Oilseeds Research, Hyderabad, PP-160. | ➢ Agrawal P. C. (1990) "Oilseeds in India: Perspective for 2001 A.D." Oxford and IBH Publishing Co., Pvt. Ltd., New Delhi, Bombay, Calcutta. | ➢ Aslam Mahmood (1977)"Statistical methods in geographical studies", Rajesh Publication New Delhi. | ➢ Basu M.S. (1993)" Sustainability in production of groundnut" Research & development strategies for oilseed production in India, published by ICAR Delhi. | ➢ Bhatia B.M. (1988) "Indian Agriculture; A policy perspective" SAGE publication, New Delhi. | ➢ Das P.C. (1997) "Oilseed crops of India" Kalyani publishers Ludhiana, New Delhi, Noida, Hyderabad, Chennai, Culcatta. | ➢ Dixit P.K. (1982) "Supply response of groundnut in Karnataka: An econometric evidence" M.Sc. thesis unpublished Dept of Agri. Economics UAS Bangalore. | ➢ Goutam O. P.(1980) "Hand book of Agriculture" Published by Indian council of Agricultural Research, New Delhi. | ➢ Majid Husain (1996) "Systematic Agricultural Geography" Rawat Publications Jaipur, New Delhi, Bangalore, Hyderabad, Guwahati. | ➢ Mathur P.N., N.K Sanghi & G. Apprarao (1993) "Front line demonstrations in oilseeds" Research & Development strategies for oilseed production in India, Published by I.C.A.R New Delhi. | ➢ Nizam Jafar (1993) "Genetic improvement of oilseed crops", Ukaza publications, Shalivahan Nagar, Hydrabad, A.P | ➢ Patel G.N & Agarwal N. L (1994) "Growth & instability in Production of Groundnut in Sourastra region of Gujarath", Agricultural situation in India, 49 (3) PP-171-174. | ➢ Ramanaia Y.V (1995): "Perpesctive of the sustainable development of agriculture in Andrapradesh State" Vol. No.33 Deccan geographer pp-18-19. | ➢ Satpathy D (1982) "Improved practices for increasing the stability crop production in dry lands of Orissa" Paper presented at the first research-cum-development forum of Indian Council of Agriculture Research, held at TARI New Delhi, during April 1982. | ➢ Sarup S. Mahajan V.K & Pandey R.K (1997) "Trends growth & technological change in oilseeds in Karnataka" Agricultural situation in India 54(5) PP-251-253. | ➢ Sharma T.C. (1999) "Technological Change in Indian Agriculture" A regional perspective. Ravat Publications Jaipur & New Delhi. | ➢ Shenoi P. V. (1988) "Oilseeds situation in India" Department of Agriculture Research & Education and Indian Council of Agricultural Research, Ministry of Agriculture, New Delhi. | ➢ Verma K.K (1982) "Agricultural growth of major edible oilseed crops in India", Agricultural Situation in India 32(5): 277-280 |