

A Geographical Analysis of Crop Concentration in Goa

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ABSTRACT: Crop concentration explains which area is best suitable for a particular crop. This paper aims at analyzing the density of different types of crops in a particular region. The study area chosen for analysis is the state of Goa. A detailed discussion is presented on area under individual crops. The secondary data of the year 2010-11 is considered for the study. The crop concentration is quantified with the help of location quotient technique given by S.S. Bhatia and the result is represented in tabular form and by Choropleth maps prepared in Arc GIS tool.

Keywords: *Crop concentration index, Cropping pattern*

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I. INTRODUCTION

Crop concentration refers to the density of a crop in a region. Delineation of crop concentration is significant for agricultural planning and development. It helps us to understand the areas where a particular crop grows well with minimum inputs. For the present study crop concentration of Paddy, cereals, millets/ Pulses and oilseeds, Sugarcane, Coconuts, Arecanuts, Cashewnuts, Vegetables and Garden crops in the state of Goa have been considered. Most of the agricultural activities are rain-fed. The cropping pattern is a dynamic concept. Because a particular region will not have same cropping pattern at all times. The topography, soil, availability of water for irrigation, use fertilizers and pesticides and weather plays an important role in determining the cropping pattern in the study area. Cropping pattern indicates the production of area under various crops at a point of time.

Nearly 70% of the population was involved in agriculture as their full time occupation, at the time of liberation. Paddy was the predominant crop of the State followed by Cashew and Coconut. The cropping pattern is changing today, which is discussed in this paper. The cultivation of horticultural crops is also gaining importance due to the better returns, lower risk and tolerance of these crops for part time farming. In this paper, the study area, database and methodology is described in brief. Crop concentration index is calculated for different crops in various regions of Goa and results are presented in tabular form. Choropleth maps are prepared to show the high, medium and low concentration of crops.

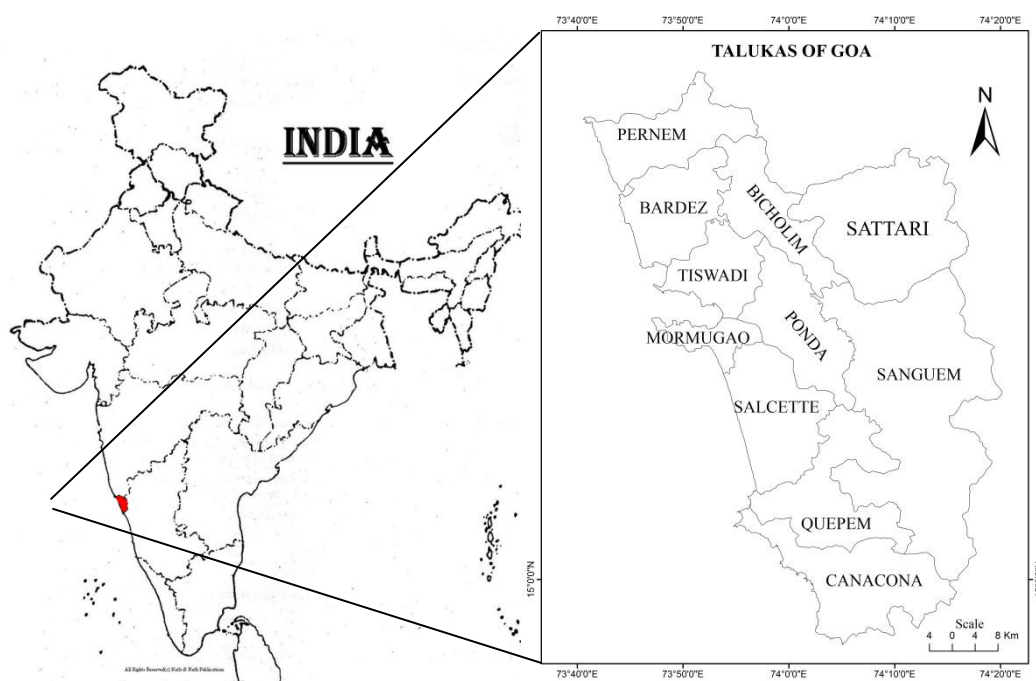
OBJECTIVES

Following objectives have been undertaken for the study

1. To study the concentration of selected crops in the state of Goa.
2. To identify areas of crop concentration on the basis of Bhatia's method.

II. STUDY AREA

Goa is geographically located within the latitudes of 14°53'57''N and 15°47'59''N and the longitudes of 73°40'54''E and 74°20'11''E. It occupies an area of about 3701sqkm. Situated between Maharashtra and Karnataka, Goa is bounded on the north by the Terekhol River, surrounded on the south and east by Karnataka while on the west is the Arabian Sea. The State is flanked by the Arabian Sea on the west and Sahyadri Mountains on the east. The state is divided into 2 districts – North Goa and South Goa. There are twelve administrative sub-divisions of Goa known as Talukas. They are Tiswadi, Bardez, Pernem, Bicholim, Sattari, Ponda, Sanguem, Canacona, Quepem, Salcette, Mormugao and Dharbandora. The recently carved out taluka is the Dharbandora taluka from Sanguem taluka and hence the study area taken is of 11 talukas of Goa (Fig.1). The soils, in general are Lateritic. The Agricultural lowlands, especially in the coastal tract are alluvial flats formed through sedimentation along the principle Rivers. The climate is warm and humid with temperatures ranging from 21°C to 36°C. From June to September heavy rainfall is received from south west Monsoon. The average rainfall is 2800 mm.



Source: https://c2.staticflickr.com/4/3172/2890747900_1cf7508332_b.jpg

Source: Author

Fig.1 Location map of the study area (Goa)

III. DATABASE AND METHODOLOGY

The present study is based on the secondary data, which is published in Goa at a glance 2010-11 by Directorate of Planning, Statistics and Evaluation, Panaji- Goa. Bhatia's location quotient method has been used for the calculation of crop concentration. Using this method, regional character of crop distribution is investigated and determined by comparing the proportion of sown area under different crops and ranking them and then by relating the crop density in each of the component areal units of region/ country to the corresponding density of the region/ country as a whole. The following equation is used to determine the concentration of crops in the 11 talukas of Goa. Dharbandora is not considered as a separate areal unit because it is recently carved out from the Sanguem taluka.

Crop concentration index

$$= \frac{\text{Area of x crop in the component areal unit} / \text{Area of all crops in the component areal unit}}{\text{Area of x crop in the entire region or country} / \text{Area of all crops in the entire region or country}}$$

IV. RESULTS AND DISCUSSION

Table.1. Taluka wise crop concentration Index in Goa (2010-11)

Sr. No.	Talukas	Pd	Cpo	Sg	Co	Ar	Ca	Vg	Gc
1	Tiswadi	1.41	0.37	0	0.82	0.01	0.90	2.01	0.52
2	Bardez	1.13	2.54	0.01	0.88	0.07	0.87	0.50	0.39
3	Pernem	0.69	3.15	0.36	0.52	0.03	1.22	1.25	0.33
4	Bicholim	0.78	0.59	0.14	0.65	0.48	1.52	0.96	0.71
5	Sattari	0.27	0.07	1.03	0.40	2.37	2.08	0.19	1.17
6	Ponda	1.20	0.13	0.02	1.08	6.45	0.69	1.09	1.60
7	Sanguem	0.68	0.12	5.61	1.19	0.79	1.27	0.34	1.40
8	Canacona	1.13	0.08	1.18	1.01	0.57	0.88	1.35	1.80
9	Quepem	1.55	0.09	2.79	1.16	0.44	0.61	0.33	1.43
10	Salcette	1.34	0.61	0.03	1.86	0	0.27	1.98	1.31
11	Mormugao	0.85	3.15	0	2.23	0	0.30	0.47	0.77

Source: Calculated and compiled by the author based on Bhatia's crop concentration method by using data from Goa at a glance, by Directorate of Planning, Statistics and Evaluation, 2010-11. *Pd= Paddy, Cpo= Cereals, millets/pulses & oil seeds, Sg= Sugarcane, Co= Coconuts, Ar= Arecanuts, Ca= Cashew nut, Vg= Vegetables, Gc= Garden crops

Taluka wise Crop concentration index in Goa for the year 2010-11 have been calculated and presented in Table 1. Based on this classes of high, moderate and low crop concentration are made and discussed in detail below.

PADDY

Paddy locally called 'Bhath' is the principle crop grown in Goa as it is the staple food of the people of this region. Goa is a heavy rainfall region, having hot and humid climate which is an ideal condition for cultivation of paddy. It accounts for 29.46% of the total cropped area. Fig.2 shows the concentration of paddy in the study area. High concentration (above 0.86) is observed in six talukas viz. Tiswadi, Bardez, Ponda, Canacona, Quepem and Salcette. Moderate concentration (0.43- 0.85) is observed in four talukas viz. Pernem, Bicholim, Sanguem and Mormugao. Low concentration (< 0.42) is seen in Sattari taluka.

CEREALS, MILLETS/PULSES AND OILSEEDS

It accounts for about 6.69% of the total cropped area. Fig.3. shows the concentration of Cereals, millets/ Pulses and Oilseeds in the study area. High concentration (above 2.06) is observed in Bardez, Pernem and Mormugao. Low concentration (< 1.02) has been observed in eight talukas. They are Tiswadi, Bicholim, Sattari, Ponda, Sanguem, Canacona, Quepem and Salcette talukas.

SUGARCANE

Sugarcane locally called 'Ooss' is a cash crop grown in Goa. An ideal soil should be fertile, well drained with a good organic matter content and water holding capacity. It accounts for about 0.58% of the total cropped area. Fig. 4 shows the concentration of sugarcane in the study area. High concentration (above 3.76) is observed in only one taluka i.e. Sanguem taluka. Moderate concentration (1.88- 3.75) is observed in Quepem taluka. Talukas with Low concentration (< 1.87) are Tiswadi, Bardez, Pernem, Bicholim, Sattari, Ponda, Canacona, Salcette and Mormugao.

COCONUTS

The coconut palm is essentially a tropical tree. Since coconut has high salt tolerance, flooding by sea water is not a limiting factor. It accounts for about 16.26% of the total cropped area. Fig.5. shows the concentration of coconuts in the study area. High concentration (above 1.24) is observed in two talukas i.e. Salcette and Mormugao talukas. Moderate concentration (0.62- 1.23) has been observed in seven talukas i.e. Tiswadi, Bardez, Bicholim, Ponda, Sanguem, Canacona and Quepem talukas. Low concentration (< 0.61) has been observed in Pernem and Sattari talukas.

ARECANUTS

It accounts for 1.08% of the total cropped area. Fig.6. shows the concentration of Arecanuts in the study area. High concentration (above 4.32) is observed in Ponda taluka. Moderate concentration (2.16- 4.31) is observed in Sattari taluka. Low concentration (< 2.15) is observed in nine talukas viz. Tiswadi, Bardez, Pernem, Bicholim, Sanguem, Canacona, Quepem, Salcette and Mormugao.

CASHEWNUTS

Cashewnut locally called 'Caju' can be grown in a wide range of soils but it does not perform well in soils where there is water logging. Hill slopes are most suited for cashew plantation. It accounts for about 35.23% of the total cropped area. Fig.7. shows the concentration of Cashewnut in the area. High concentration (above 1.22) is observed in Pernem, Bicholim, Sattari and Sanguem talukas. Moderate concentration (0.61- 1.21) is observed in five talukas viz. Tiswadi, Bardez, Ponda, Canacona and Quepem. Low concentration (< 0.60) has been observed in Salcette and Mormugao.

VEGETABLES

It accounts for 3.72% of the total cropped area. Fig.8. shows the concentration of Vegetables in the study area. High concentration (above 1.22) is observed in Tiswadi, Pernem, Canacona and Salcette talukas. Moderate concentration (0.61- 1.21) is observed in Bicholim and Ponda. Low concentration (< 0.60) is observed in Bardez, Sattari, Sanguem, Quepem and Mormugao.

GARDEN CROPS

It accounts for 6.98% of the total cropped area. Fig.9. shows the concentration of Garden crops in the study area. High concentration (above 1.00) is observed in six talukas viz. Sattari, Ponda, Sanguem, Canacona, Quepem and Salcette. Moderate concentration (0.50- 0.99) is observed in Tiswadi, Bicholim and Mormugao. Low concentration (< 0.49) is observed in Bardez and Pernem taluka.

TALUKA WISE CROP CONCENTRATION IN GOA

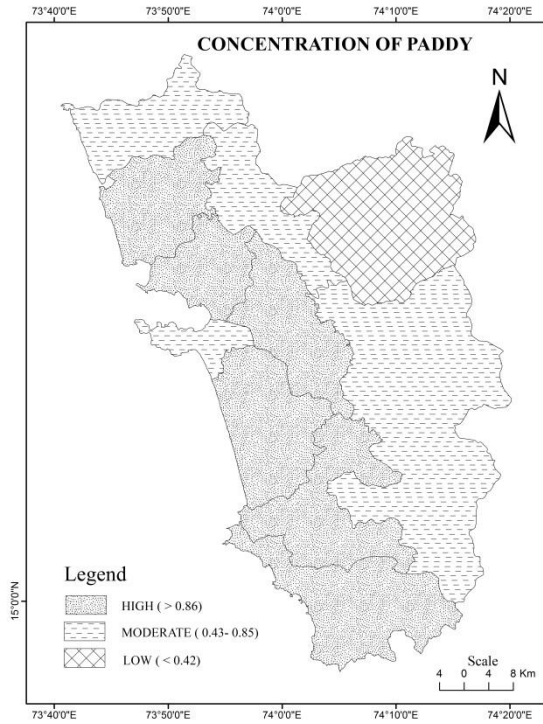


Fig.2

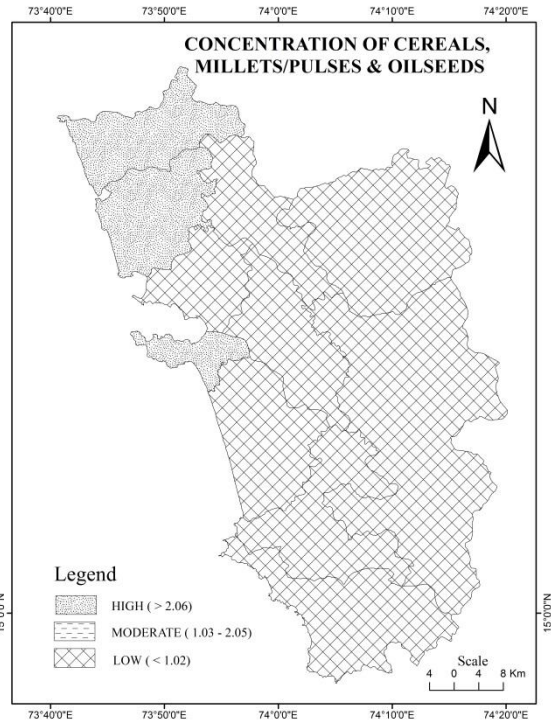


Fig. 3

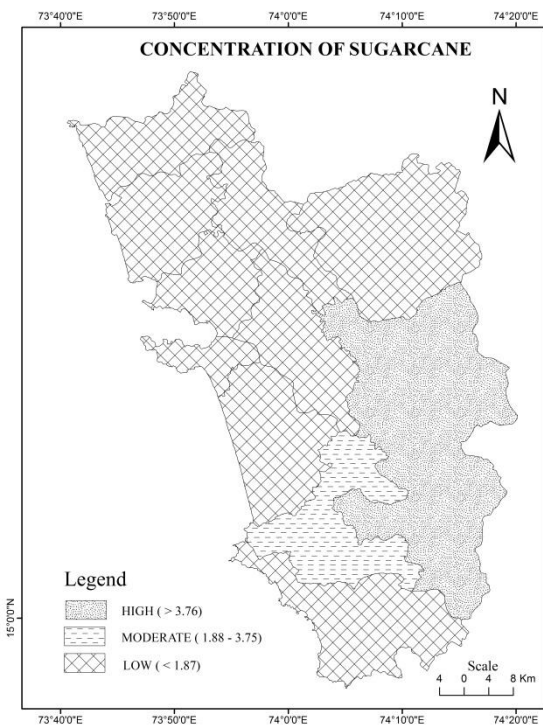


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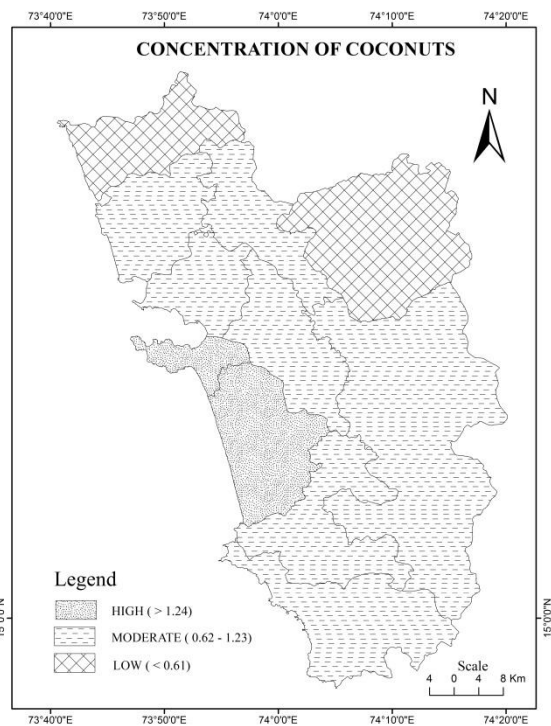


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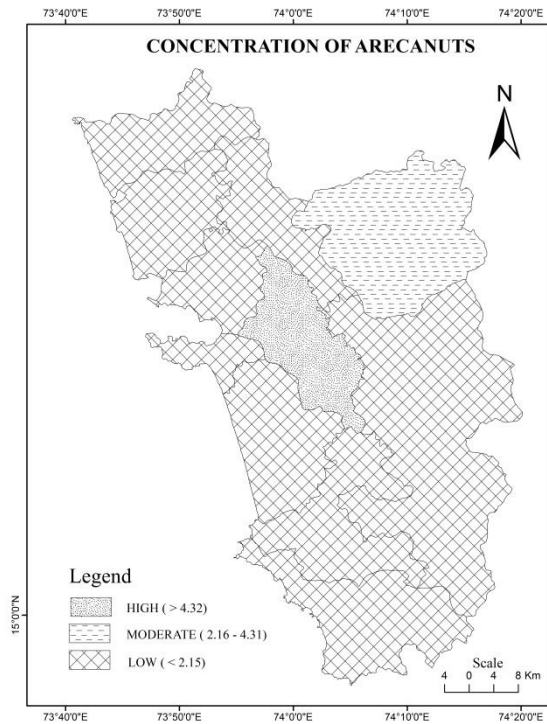


Fig. 6

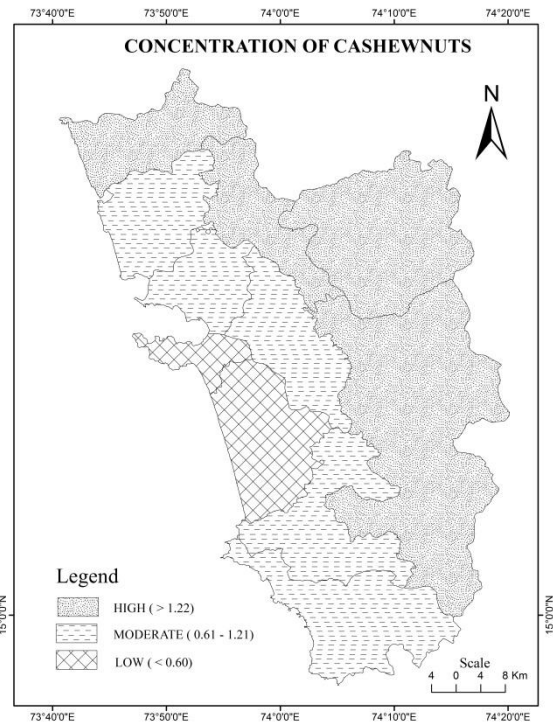


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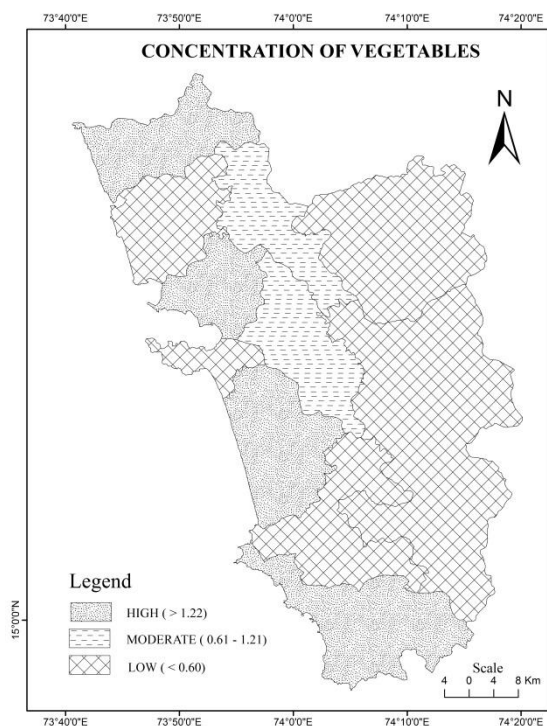


Fig. 8

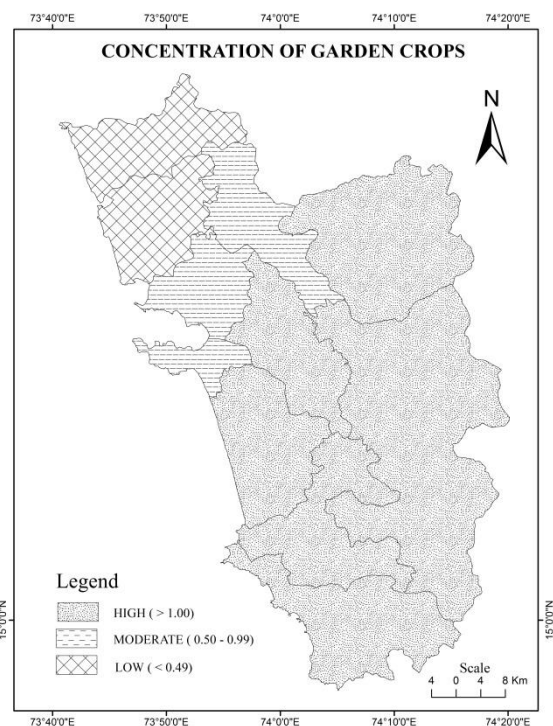


Fig. 9

V. CONCLUSION

Bhatia's (1965) method made it possible to measure the regional concentration of crops. With this the areas that have some significance with regard to the crop distribution within the region could be identified and differentiated. Crop concentration of various crops paddy, cereals, millets/pulses and oil seeds, sugarcane, coconut, Arecanuts, cashew nuts, vegetables and garden crops were calculated. Higher percentage of cropped land is covered by cashew nuts (35.23%) as cash crop followed by staple food crop paddy with 29.46%. Higher concentration of Cashewnuts is in hilly regions of Bicholim, Sattari, Sanguem and Pernem taluka.

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