

Research Paper

CHANGES OF CROPPING PATTERN IN KARNATAKA- A Geographical Study**Dr. B.N. Shivalingappa**Department of Studies in Geography,
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Mysore 570006**Dr. D. Mahesha**Department of Studies in Geography,
University of Mysore, Manasagangotri,
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The agriculture sector of Karnataka has undergone wide-ranging changes in terms of ownership of land, cropping pattern, cultivation practices, productivity, and intensity of cultivation. Unlike the other regions in India, the farm front of Karnataka is characterized by extreme diversity in its bio-physical resource base and agro-climatic endowments providing multiple opportunities for raising a variety of crops. It has a wide range of cropping pattern vary widely from region to region and to a lesser extent from one year to another year, there are various ways of utilizing the land intensively.

The present paper is tries to analyze the cropping patterns in the State. Before dealing with the cropping patterns, brief descriptions of land use pattern of the state. Three indicators chosen for the analyzing the cropping pattern of the state which are net area sown, cropping area and cropping productivity. 10 principle crops are analyzed with the help of GIS techniques. The data derived from secondary source.

Key words: Cropping pattern, ranking, crop production, and crop combination.

Introduction

Agriculture still forms the backbone of Indian economy, in spite concerned efforts towards industrialization in last decades. Agriculture contributes a high share of domestic product by sectors in India. Farmers are growing various crops in the field rather than single crop. The physical factors determine the outline of the area of crops, while the socio economic relationships determine their extent and government policy can impact on crop growing like new various crops can be introduced in the place of traditional crops.

Study area

Geographically, the area under study extended from 11o31' to 18o45' north latitude and 74o40' to 78o40' eastern latitude over the south western part of the Indian sub continent, covering an area of about 191791 sq km (i.e. 5.843% of the total geographical area of the country) administratively Karnataka divided 29 (now) districts. Which, 13 districts are situated in northern Karnataka and the rest in its southern part of the state.

Objectives:**The main objectives of the study are:**

The present paper is tries to analyze the cropping patterns in the State. Before dealing with the cropping patterns, brief descriptions of land use pattern of the state. To compare the crop ranking and crop combination regions for two periods i.e. 1998-99 and 2008-09.

Methodology

The present study is based on the secondary data collected through socio economic indicators and Karnataka at a glance. For the present investigation, state is selected as in general and district in particular. Simple statistical method

has used to compute crop ranking (Kendal's method) and weaver's crop combination technique is adopted. In order to assess the crop combination, the following method has been adopted $d = \sum d^2/n$.

Where d is the difference between the crop percentage in a given country/ region or area and the appropriate percentage in theoretical curve is the number of crops in a given combination.

Land use pattern of the state

The general land use pattern of the state has to be seen in the light of it's over all natural and changing socio cultural conditions. Its land use zones including the cultivated land, barren and uncultivated land, land under forest and pasture etc. Human and economic factors have influenced the changes in the cropping pattern of Karnataka. The southern part of the state account for 42.22% of the state's agricultural land of which only 14.00% is irrigated. However of the remaining 57.78 percent which lies in northern parts. Irrigational facilities are available for 20% only. Nearly 11.82 percent of total area is not available for cultivation baring either or put to non agricultural uses and 8.58 falls under other cultivated lands including the permanent grass lands, cultivable waste and miscellaneous tree crops and groves. The fallow land is 9.27 and the net sown 54.69% of which is the area sown more than once i.e. 12.98 percent added.

The northern regions of the state reflect marked pattern contrasts in their spatial crop distributions and thus when north eastern part dominates in the raising of Jower, Bajra, Miza, wheat and pulses and north western part of the state dominate the sugarcane and cotton cultivation. The southern parts of the state reflect the noticeable patterns of crops distribution. It dominates the paddy, Ragi (staple crop of southern Karnataka) and oil seeds.

Agricultural Land use / cropping pattern of the study area

Agricultural land use means land under net sown area, fallow land and uncultivable land excluding fallow land. In the short agriculture land use means a cropping pattern. It means the proportion of area under various crops at a point of time/ yearly sequence and spatial arrangements of crops and fallow on a given area. Cropping pattern is a

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dynamic concept as it changes over space and time. It is clearly influenced by the geographical, social, economical and political factors.

The net sown area in Karnataka is normally about 11.2 million hectares. Only 24 percent of the arable area is under irrigation, so most of the cultivable area depends on the occurrence and distribution of pre-monsoon and southwest monsoon precipitation. The cropping pattern of Karnataka is dominated by crops planted during the Kharif southwest monsoon season (June to October). Normally, 65 percent of the net sown area is planted with crops during Kharif depending on pre-monsoon and southwest monsoon rains. Similarly, about 30 percent and 5 percent of the area is sown during Rabi, the northeast monsoon season (November to March) and the summer season (April to June), respectively, depending on the quantum of residual moisture.

The agricultural land in Karnataka is 65.83 percent of the total geographical area. Which includes 54.69 percent area of the net sown area and 12.98 percent area is shown more than once. Cropping pattern of the state is typical that the food crops cover most of the cultivated area. In the state, food crops occupy largest area which is 75.55 percent of the total net sown area in 2008-09. Which paddy is leading crop followed by Jower, Maize and other food grains that occupy a small proportion of area. Paddy is the main kharif crop. Which is grown from June to October through the state; it is also as grown as a rabbi season with the help of irrigation facilities in few districts of the state.

Jower, Bajra other main kharif crops whereas as Ragi and small millets come next and or grown on a limited area. (Ragi is major crop I south Karnataka than the other food crops) among non food/commercial crops sugarcane is the dominated which is 8.72 percent to net area sown of the state.

Rainfall Pattern in Karnataka

Two-thirds of Karnataka's geographical area is arid or semi-arid. Out of 30 districts, 19 districts are drought prone with annual normal rainfall of less than 750 mm. The normal annual rainfall of the state is 1,139 mm, received over 55 rainy days. Of the annual rainfall, 71 percent is received during the Kharif season, 17 percent during the Rabi season, and the remaining 12 percent during the pre-monsoon season. Because rainfall is highly variable over space and time and irrigation is limited, agricultural production is correspondingly variable. Even during the good rainfall years, at least 25 percent of the taluks [district subdivisions] in the state are affected by uneven distribution of rainfall, and even the assured rainfall areas like the coastal region can experience drought-like conditions.

Ranking Crops

The result of the first method showing cropwise ranking of Karnataka state both period of 1988-99 and 2008-09 (Rice, Jower, Miza, Tur and minor millets have not changes their ranking first second, third, sixth and tenth) among 10 crops, five crops are retained their ranking position both period of time which are Rice, Jower, Miza, Tur and minor millets. But remaining crops have shows the slightly changes their ranking both positive and negative. Ragi and other pulses crops had 4 and 5th rank in 1998-99 but they have been changed visa versa in 2008-09. Bengal gram crop production was 9th and it move 7th position in 2008-09. Bengal Bajra and wheat crops are moved from 7 and 8 to 8th and 9th ranking respective periods.

Table

In both the study periods, Rice had the first ranking crop in the whole region of southern part of the state. Among

this rice about 48.28 percent in 1998-99 while it is 37.93 percent in 2008-09 of the total cropped area. The rainfall and irrigational facilities are plays important roles in rice distribution.

Table 1 Crops Production and Ranking in Karnataka

Crops	Cropping production			Crop ranking		
	1998-99	2008-09	Changes	1998-99	2008-09	Changes
Rice	3716730	3719138	+0.06	1	1	-
Jower	1790741	1819011	+6.73	2	2	-
Miza	1603392	3254082	+102.94	3	3	-
Ragi	1402162	1496631	+6.73	4	5	-1
Other pulses	383565	413817	+7.88	5	4	+1
Tur	289326	484598	+67.49	6	6	-
Bajra	251885	356242	+41.43	7	8	-1
Wheat	210763	260974	+23.82	8	9	-1
Bengal gram	175345	367032	+108.97	9	7	+2
Minor millets	28170	17033	-39.53	10	10	-

Source: State at a Glance and the crop ranking Computed by Author

This above table shows crop wise production on Karnataka from 1998-99 and 2008-09, due to increase of irrigational facilities innovative developments and technologies out of ten crops, 9 register increase in their production. Among these 2 crops have registered more than 100 percent increased trend which are Bengal gram and Miza and only one crop which is Minor millets has shows the negative growth (39.53).

Table 2 Changes of crop ranking In Karnataka

	I Rank			II Rank			III Rank			IV Rank		
	1998-99	2008-09	Changes	1998-99	2008-09	Changes	1998-99	2008-09	Changes	1998-99	2008-09	Changes
Rice	14	11	-3	6	8	+2	0	5	+2	1	1	1
Ragi	6	5	-1	5	5	-	3	3	-	1	2	+1
Jower	4	2	-2	5	5	-	5	5	-	3	3	-
Miza	5	10	+5	6	7	+1	6	5	-1	3	4	+1
Tur	-	1	+1	1	1	-	1	-	-1	-	2	+2
Wheat	-	-	-	-	-	-	2	1	-1	3	2	-1
Other pulses	1	-	+1	3	3	-	5	6	+1	8	7	-1
Bengal gram	-	-	-	-	-	-	-	-	-	1	6	5
Minor millets	-	-	-	-	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-	-	-	-	-

Source: Computed by Author

The table showing district wise ranking of all ten crops in Karnataka have been indicated in table 2 and figures both periods of time of 1998-99 and 2008-09. both these reveal that the first ranking crops in 30 districts have changed in 12 districts, and second ranking crops changed in three while third and fourth ranking crops have changed in 6 and eleven districts respectively. The results are indicated it is no less interesting to find first ranking crops changing to fourth rank position and such other changes. The 24 percent crop ranking positions have been affected between 1998-99 and 2008-09 in various districts.

The analysis based on district wise ranking in the state of all individual crops on production basis is indicated in Annexure 2 for both reference years along with their respective scores. It is clear that the district with less score is reflective of very high production and vice versa.

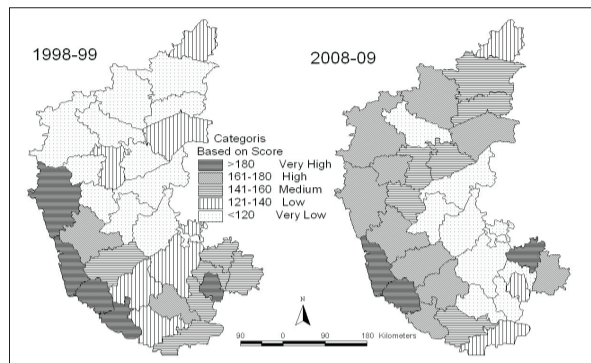
The district wise total scores have been categorized into very low, low, medium, high and very high score for 1998-99 and 2008-09 after calculating the state average (viz., 143.30 and 150.37 respectively). The map – shows that in all 16 districts in Karnataka register change in their ranks. Among the districts of Karnataka 8 districts are not changing their positions which are C. Durga, Davangere, Bagalkot and Bellary (Very High) Bidar (High) Shimoga (low) D. Kannada and Udupi (very low). Remaining districts are

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changes both positive and negative ranks.

The changes shows shift of districts from very high categories to medium and even low which indicate of the rise in crop production, category from high to very high being reflective of falling crop production in district wise changes are clearly discernible from fig 01.

Fig 1 Ranking on Total Crop Production Scores in Karnataka



Crop combination

Weavers method of crop combination has been adopted in present study to compute crop ranking regions at district level and interpret. The method, however, gives the most unwieldy combination for the units of high crop specification according to his method to identify 7 crop combinations out of 10 crops. Among the district of Karnataka 9 districts have been not changes their crop combination in one decade, which are Dakshina Kannada, Udupi, Kodagu and Uattar Kannada (monoculture) Hassan Chitradurga (Four crop combination) Chamarajanagar (Six crop combination) Belgaum and Bijapura (Seven crop combination). Table and figures are illustrating the crop combination of the state.

Monoculture or single crop regions

During 1998-99, there were 5 districts for monoculture (Dakshina Kannada, Udupi, Kodagu Uattar Kannada and Shimoga) and the crop was paddy. But during 2008-09, except Shimoga all the districts are maintained their crop combination. No districts were under Ragi crop in 1998-99, but in 2008-09, Kolar and Bangalore districts are came under the monoculture crop of Ragi due to the significantly usage for staple food in Karnataka particularly in southern part.

Table Crop combination regions in Karnataka during 1998-99 and 2008-09

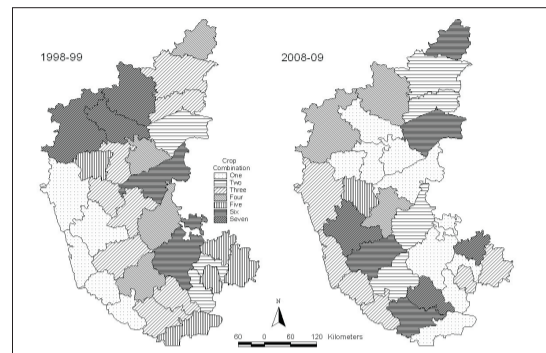
	Districts	Districts
Monoculture or single crop regions	5	6
Double crop combination regions	3	3
Three crop combination regions	8	3
Four crop combination regions	4	5
Five crop combination regions	5	9
Six crop combination regions	2	1
Seven crop combination regions	3	3

Source: Computed by Author

Double crop combination regions:

For both the study period each 3 districts have two crop combinations. Two districts in Karnataka have combination of Ragi with other pulses (Bangalore and Ramanagara); Raichur district had Jower and paddy in 1998-99. Chikkaballapura, Shimoga, and Mandya district have shown two crop combination which Ragi and Miza, Paddy and Miza, Paddy and Ragi in 2008-09.

Fig 2 Crop Combination Region in Karnataka During 1998-99 & 2008-09



Three crop combination

Three crop combinations cover 7 districts in 1998-99 and only 3 districts in 2008-09, in this combination following crop have entertained i.e. Miza, Rice, Jower, Wheat, other Pulses, Tur and Ragi. Davangere and Haveri have found three crop combination where Miza, Ragi and Jower. Chikkamagalore, Mandya and Mysore Have found with Rice, Ragi and other pulses, Jower wheat and other pulses in Gadag. Jower, Tur and other pulses in Gulburga during 1998-99. In 2008-09, Chikkamagalore, and Mysore districts with Ragi, Paddy and other pulses, Bidar district with other pulses, Tur and Jower crop combination.

Four crop combination

For both study period, each 4 districts had four crop combinations with Ragi, Miza, Jower, Other pulses, Tur, Bengalgram and rice have included. Among these Jower and other pulses in three districts, Paddy, Ragi and Miza and Bengal gram in four districts, Bajra only one district which is Raichur in 2008. Chitrdurga, Bidar Koppal and Haveri districts were showed in four crop combinations in 1998-99, Chitrdurga and Hassan retained their crop combination in both period of time.

Five crop combination

It was observed in five districts in 1998-99, among these 4 districts have in southern Karnataka and only one district in northern part which is Dharwad and nine districts marked with above combination in 2008-09. Bagalkot and Gadag districts have included this combination in northern part.

Six crop combination

In this combination all 10 crops are included in different mode; six crop combination is obtained in 2 districts in 1998-99 which are Tumkur and Bellary. This combination shifted to Haveri districts in 2008.

Seven crop combination

Belgaum and Bijapur Districts have been demonstrated 7 crop combination regions in both period of time. Bagalkot district was 7th crop regions in 1998-99, which is moved to fifth crop combination in 2008-09 and Davangere is 7th in 2008-09, it was three crop combination 1998-99, because of extension of irrigated land and increase of net area sown.

As mention above the crop combination for whole region was total different in decade. During 1988-99 there was 4.16 percent land under Benagal gram and 7.91 percent land under Miza its total food cropped area. While 2008-09, an increase the percentage land under Bengalgram and Miza i.e. 7.68 and 14.13 percent respectively. This shows the great variation of changing crop land use this increase is due to the increasing demand of food and fodder crops respectively.

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Conclusion

During the period of 1998-99 and 2008-09, the irrigated land increased from 26.31 lack hectars to 33.33 lack hectars, despite many irrigational projects Karnataka still continues to irrigate 48.29 percent of its land by well, 31.65% by canals only 6.6 percent by tanks and 13.42 percent by others source hence the crop production is shows the increased manner.

During the entire period of one decade from 1998-99 to 2008-09 the average gross cropped are increased and decreased all crops time to period of the state.

In case of ranking of crops first ranking crops in Karnataka in paddy, in second ranking crop Jower, Maize and Ragi prefers in third ranking.

Weaver's method has identified seven crop combinations in study region.

Paddy has mono culture has found in give districts in 1998-99 and six districts have shown monoculture in 2008-09 of districts 4 in paddy and 2 in Ragi crops Maize crop has highly increased in the state and minor millet has highly decreased.

Physical as well as socio-economic factors have influenced for cropping pattern of the state.

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