

DYNAMICS OF CROPPING PATTERNS IN THE HEMAVATHI WATERSHED KARNATAKA STATE

S. Bindumathi, Ph. D.

Guest lecturer, Post-Graduation Department of Geography, Maharaja's college, University of Mysore, Mysore.

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Abstract

The Simple meaning of cropping pattern is the total cultivated area under different crops at a particular time period, where as it explain the spatial variation of the crops in different time periods. The present study is explaining the cropping pattern in the Hemavathi watershed. The main objectives of this paper are to study the total cultivated area under different crops, annual variation and also indies of area under different crops in the study region. For this study the dominated seven crops in the study are considered these crops are paddy, ragi, jower, maize, sugarcane, coffee and tobacco. The study period i.e. 2008- 09 to 2018 -19 cropping data has been used to fulfil the objectives.

Key words: *cropping pattern, Hemavathi watershed, and crop.*



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INTRODUCTION

Cropping pattern define the proportion of various crops in an area of land at specific time period and also indicates the yearly sequence and spatial arrangements of crops and fallows in an area. Rotation of crops is the process of growing different crops in succession, on a piece of land, in a particular period of time. Cultivating the crops is the proportion of area with various crops, inclusive of changes over time and space. Cropping patterns of an area are closely influenced by the climatic, historical and socio-economic condition of the farmers and also terrain, topography, slope, soil condition and availability of water, as well as the pesticides, fertilizers and mechanization.

OBJECTIVES

The main objectives of the present study are:

- To study the annual area variation of crops in the Hemavathi watershed.
- To study the area indices of the major crops in the study region.

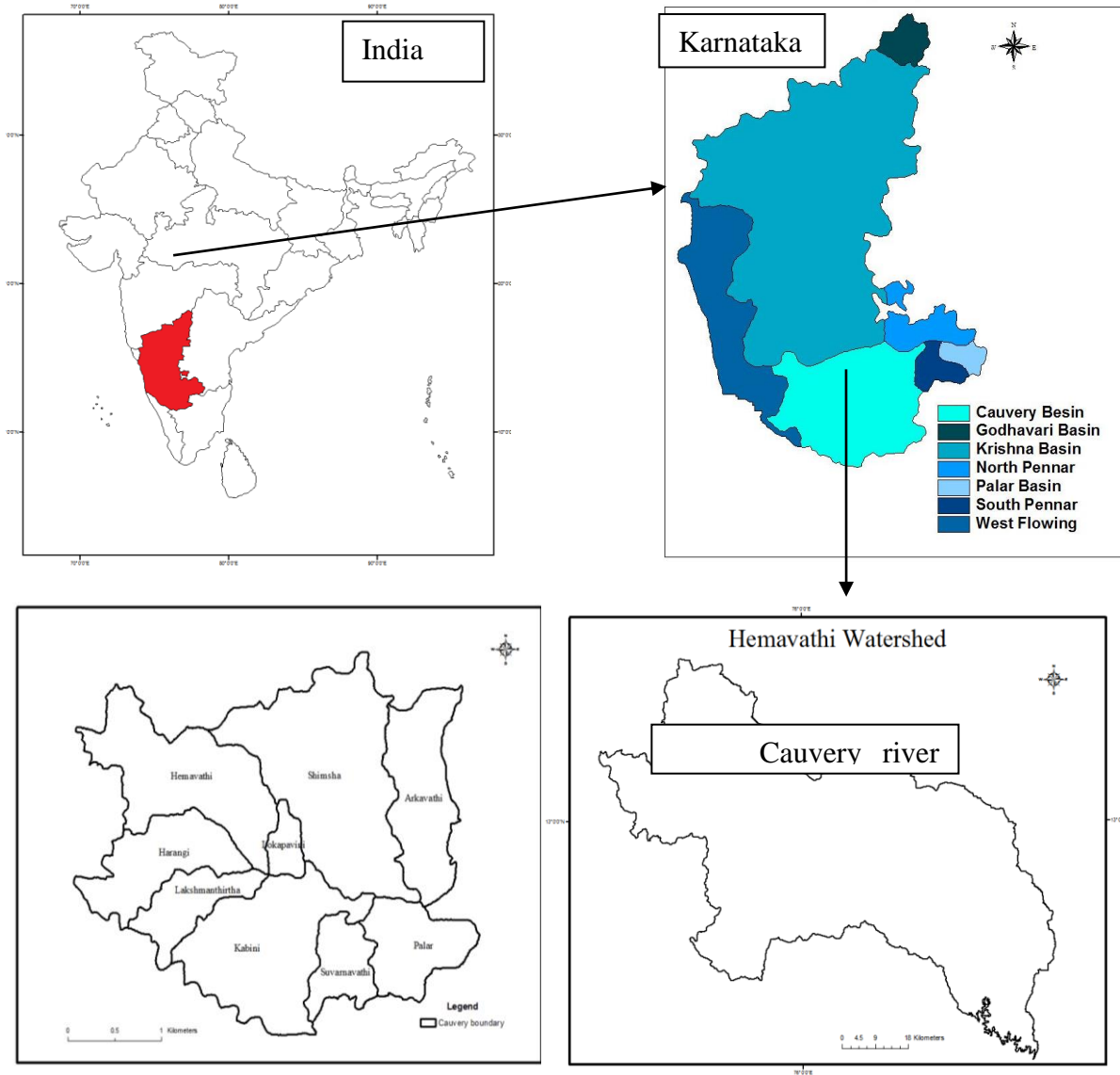
METHODOLOGY

The cropping data was collected from district statistical offices, at Hassan, Mandya, Mysore, Chikkamagalur and Kodagu. This study is concentrate on major crops of the Hemavathi watershed, these crops are paddy, ragi, jower, maize, sugarcane, coffee and Tobacco. From the year of 2015-16 to 2018-19 crops cultivating area was used for full fill the objectives. The study region has been divided into three zones on the basis of climate, rainfall, temperature and elevation.

STUDY REGION

The Hemavathi River is a very important tributary of the Cauvery river. It starts in the Western Ghats at an elevation of about 1,219 meters near Ballala Rayana Durga in the Chikamagalur district of the state of Karnataka and flows through Chikamagalur, Hassan, Mandya and Mysore districts, before joining the Cauvery river near Krishnarajasagara. It is 245 km long and it has a drainage area of about 5,697.65 km². A larger reservoir has been built on the river at Gorur in the Hassan district. In the entire Cauvery basin the Hemavathi watershed is second largest in terms of area.

Map:1 Location map of Hemavathi watershed



ANNUAL AREA VARIATION OF SELECTED CROPS (from 2008-09 to 2018-19)

Table no 1 indicates the annual area variation of selected crops in the study area. Paddy, ragi, jowar, maize, sugarcane, coffee and tobacco are considered as selected crops because these crops shares more than 85 percent of net sown area. It clearly indicates that, both positive and negative changes occurred in the study period.

Paddy

Paddy is the main food crop in the southern part of Karnataka. But, the area under paddy cultivation gradually decreases in the study region. Table no 1 indicates that the area under paddy has decreased in zones one and two.

**Table No: 1: HEMAVATHI WATERSHED
AREA VARIATION OF SELECTED CROPS (Area in Hectares)**

Zones	Year	Paddy	Ragi	Jowar	Maize	Sugarcane	Coffee	Tobacco
1	2008-09	100	100	100	100	100	0	100
	2009-10	-1001.8	1864.29	472.16	167.15	4753.24	0	1272.2
	2010-11	-19557	8687.73	838.62	730.67	3856.67	0	719.27
	2011-12	-27278	7042.71	1398.76	1255.21	685.6	0	717.99
	2012-13	-10687	4564.52	1142.21	6952.66	7789.95	0	1248.35
	2013-14	-9370.7	-6970.1	498.82	11758.9	7606	0	1515.92
	2014-15	-7722.5	-24316	113.65	15157.5	6843.97	0	1637.95
	2015-16	-7043.6	-21496	12.79	17499.4	4504.77	0	1635.54
	2016-17	-7472.9	-21123	112.69	19319.8	5623.1	0	1721.9
	2017-18	-7789.2	-18689	-87.49	21265.4	7470.49	0	1744.64
2018-19	-10024	-22162	-337.11	20082.7	4769.65	0	2739.74	
2	2008-09	100	100	100	100	100	100	100
	2009-10	-11375	-66.96	32.73	-80.04	146.63	442.65	Nil
	2010-11	-3629.4	-562.1	134.79	803.88	450.44	683.81	29.04
	2011-12	-6935.8	-4048.9	674.99	3164.24	527.48	1935.23	13.85
	2012-13	-6624.5	-5876.2	123.39	5912.95	308.28	2845.39	14.94
	2013-14	-6548.4	-8262	79.14	7771.51	4.23	3941.83	108.25
	2014-15	-5912.6	-11281	73.99	11291	-34.51	3874.21	122.68
	2015-16	-6362.4	-12059	115.48	11182.7	-35.37	17145.6	90.07
	2016-17	-6500	-13089	22.57	11185	-90.8	4285.12	148.38
	2017-18	-7030.7	-14439	64.12	12192.1	-75.97	4405.35	65.27
2018-19	-6359.2	-15626	43.39	11802.1	-173.14	4580.83	362.82	
3	2008-09	100	100	100	100	100	100	100
	2009-10	223.55	14.5	0	-28.56	0	116.11	Nil
	2010-11	-217.1	17.62	0	-31.53	0	319.66	Nil
	2011-12	-570.59	30.58	0	-35.65	0	280.48	Nil
	2012-13	1538.04	-13.06	0	-4.2	0	1133.2	Nil
	2013-14	-1202.3	-24.38	0	-10.51	0	1394.34	21
	2014-15	-1323.5	-47.31	0	42.01	0	1702.51	28.36
	2015-16	-1252.5	-31.32	0	73.53	0	1767.06	31.51
	2016-17	-1204.7	-60.1	0	157.57	0	1799.91	40.96
	2017-18	-1079.6	-61.56	0	126.07	0	2109.39	42.01
2018-19	-972.31	-73.83	0	226.1	0	2440.7	54.41	

Source: Computed by the author.

Maximum decreases were recorded in the year 2011-12 in both the zones, whereas in zone three, the paddy area cultivation increased in the years 2009-10 and 2012-13 and decreased in the remaining years. This is because paddy requires more water but in the study periods gradually rainfall is decreasing although this area is irrigated by Hemavathi and Yagachi dams the water supply from these dams to agricultural crops is gradually decreasing. So the farmers invariably instead of growing paddy they give preference for less water consuming crops like maize and other crops.

Ragi

Ragi is the second most important food crop in this region. In zone one, the ragi area increased from 2009-10 to 2012-13 and in zone three, also, it increased from 2009-10 to 2011-12. From 2012-13 onwards, the ragi cropping area decreased in both the zones. In zone two, the area's growing ragi gradually decreased during the period of study, all though in southern Karnataka ragi is popular food crop this is because the per hectare yield of ragi is less when compare to other food crops as a result farmers prefer to grow other commercial crops.

Jowar

Jowar is third important crop in this area. The jowar crop area clearly indicates that there is a tendency of both increasing and decreasing. In the zone one jowar area increases occurred from 2009-10 to 2015-16. After 2017, the total jowar area cultivation decreased. In zone two, the jowar area increased. The highest positive change is noticed in the year 2011-12 and the lowest positive change occurred in 2016-17.

Maize

In zone one, total maize crop area increased. The highest increase was recorded in the year, 2016-17. In zone two, also, there's an increase, except during the year, 2009-10. Beyond this year, the total area of maize was increased. The highest positive change in the area growing maize crops was found in 2017-18. In zone three, the maize crops in the area increased from 2014-15 to 2018-19 and decreased from 2009-10 to 2012-13. The greatest positive change, in the maize areas was observed in the year, 2018-19. The greatest negative change in the maize area was observed in 2011-12. The lowest negative change in this maize crop area occurred in 2012-13. Totally the area under maize is gradually increasing because it is less labour intensive as well as the use of maize is expanding because the by products

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number from the maize is increasing day by day and also the cost for this crop is relatively less.

Sugarcane

Sugarcane is one of the commercial crops in this region. This crop is concentrated in zone one and zone two. In zone one, the area growing sugarcane has increased in 2012-13, but decreased in 2011-12. In zone two, the sugarcane areas changed both positively and negatively, from 2009-10 to 2013-14. The total area increased after 2013-14. The greatest positive change occurred in the year, 2011-12 and the greatest negative change occurred in the year, 2018-19. In zone one, the total sugarcane cropping areas increased, compared to the sugarcane cropping areas in zone two, this is because zone one has more area under irrigation.

Coffee

Coffee is a dominant crop in zone three, because it is situated in the Western Ghats. The area's growing coffee is increased in zones two and zone three. In zone two, the greatest positive changes were recorded in the year 2018-19. Total areas growing coffee crops gradually increased from 2009-10 to 2018-19 in zones two and three. Mainly because it is one of the income oriented plantation crop the formers in these areas gradually encroached forest land for cultivation of coffee crops.

Tobacco

The total area growing tobacco crops increased in all three zones. In zone one, the highest positive change can be observed in the year, 2018-19 i.e., 2739.74 hectares. In zone three, tobacco cultivation began and continued after 2012-13. This crop was concentrated on, only in Somvarpet taluk.

AREA INDICES OF SELECTED CROPS (from 2008-09 to 2018-19)

The year 2008-09 is considered as the base year for comparing and reviewing areas for the selected crops during the periods under study.

Paddy

The index number, of the paddy areas, was below 100 percent during the period under study. Table 5.5 shows that the indices of paddy areas have decreased up to 28.17 percent in zone one, in the year 2008-09. Below 50 percent indices were observed in the years 2010-11 and 2011-12. In zone two, the area's growing paddy, decreased by 44.43 percent in 2009-10,

whereas, in zone three, the paddy areas decreased by 87.26 percent when compare to the base year.

**Table No: 2: HEMAVATHI WATERSHED
INDICES OF AREA UNDER SELECTED CROPS (2008-09 to 2018-19)**

Zone	Year/Crops	Paddy	Ragi	Jowar	Maize	Sugarcane	Coffee	Tobacco
1	2008-09	100	100	100	100	100	Nil	100
	2009-10	97.37	103.14	192.49	103.46	195.03	Nil	1199.35
	2010-11	48.5	114.63	264.27	115.51	177.11	Nil	1125.19
	2011-12	28.17	111.86	374	126.65	113.7	Nil	1123.29
	2012-13	71.86	107.69	323.74	247.63	255.75	Nil	1879.17
	2013-14	75.33	88.26	197.71	349.68	252.07	Nil	2260.52
	2014-15	79.67	59.03	122.26	421.84	236.83	Nil	2434.44
	2015-16	81.46	63.78	102.5	471.57	190.06	Nil	2431
	2016-17	80.33	64.41	122.07	510.23	212.42	Nil	2554.08
	2017-18	79.49	68.51	82.87	551.54	249.35	Nil	2586.49
2018-19	73.61	62.66	33.97	526.43	195.35	Nil	4004.73	
2	2008-09	100	100	100	100	100	100	100
	2009-10	44.43	99.69	111.65	98.53	140.16	102.97	129.04
	2010-11	82.27	97.37	147.98	114.82	223.39	104.6	113.87
	2011-12	66.12	81.02	340.28	158.34	244.5	113.05	114.94
	2012-13	67.64	72.46	143.92	209.02	184.45	119.15	208.28
	2013-14	68.01	61.28	128.17	243.3	101.15	126.53	222.68
	2014-15	71.12	47.12	126.33	308.19	90.55	126.08	190.07
	2015-16	68.92	43.47	141.1	306.2	90.32	127.9	248.38
	2016-17	68.25	38.65	108.03	306.24	75.13	128.47	248.63
	2017-18	65.65	32.32	122.82	324.81	79.19	129.65	168.27
2018-19	68.93	26.75	115.44	317.62	52.57	130.83	460.87	
3	2008-09	100	100	Nil	100	100	100	100
	2009-10	98.15	110.22	Nil	94.57	Nil	100.45	Nil
	2010-11	98.21	112.42	Nil	94	Nil	101.25	Nil
	2011-12	95.28	121.55	Nil	93.22	Nil	101.1	Nil
	2012-13	87.26	90.8	Nil	99.21	Nil	104.44	Nil
	2013-14	90.04	82.82	Nil	98	Nil	105.47	121
	2014-15	89.04	66.65	Nil	92.01	Nil	106.68	128.36
	2015-16	89.63	77.92	Nil	86.01	Nil	106.93	131.51
	2016-17	90.02	57.64	Nil	70	Nil	107.06	140.96
	2017-18	91.06	56.61	Nil	76	Nil	108.27	142.01
2018-19	91.95	47.96	Nil	56.96	Nil	109.57	154.41	

Source: Computed by the author.

Ragi

Indices of the ragi areas were registered above 100 percent from 2009-10 to 2012-13 in zone one, whereas in the remaining years, it was below 100 percent. In zone three, the

index number was above 100 percent in the periods of 2009-10 to 2011-12, whereas in zone two, it is recorded below 100 percent during the study periods.

Jowar

In zone one, indices of the jowar areas recorded below the 100 percent mark from 2017-18 and 2018-19, whereas it was above 100 percent, in the remaining years. In the zone two, the index number of jowar areas was not below 100 percent during the study period. The highest indices number of jowar areas was recorded in the year 2011-12 and the lowest indices number was recorded in the year 2016-17 i.e., 340.28 percent and 33.97 percent respectively.

Maize

In zone one, the index number of maize areas was not below 100 percent during the study period, whereas in zone two it is below 100 percent in the year, 2009-10. The remaining years show above 100 percent. The highest index number was recorded in the year, 2017-18. In zone three, indices of area under maize were recorded below 100 percent during the study periods.

Sugarcane

In zone one; sugarcane is one of the most dominant crops. The index number for sugarcane areas was not decreased below 100 during the study periods. The highest positive index number was recorded in the year 2012-13. In zone two, the index number for sugarcane areas was below 100 percent, from 2014-15 to 2018-19, whereas, it was registered above 100 percent, in the remaining years.

Coffee

The index number for coffee areas gradually increased during the study period (2008-09 to 2018-19) in zone two and zone three because these two zones are having favourable conditions for coffee cultivation.

Tobacco

The index number for tobacco areas was not below 100 percent during the study period in all the three zones. The highest indices number was recorded in the year, 2018-19 in the three zones.

CONCLUSION:

There has been remarkable variation in areas of different crops. All cropped areas indicate increases and decreases in their areas from 2008-09 to 2018-19. In the zone one maize, sugarcane and tobacco crops recorded positive increase compare to base year. Paddy crop recorded native decreased in the all zones. In zone two jower, coffee and tobacco crops recorded positive increase and in the zone three coffee and tobacco crops recorded positive changes in the study period. While compare the all zones the highest positive change can observed in the crops of coffee, maize and tobacco and highest negative change is recorded in the crop of paddy and ragi. This changes is indicate the famers are gradually decreases to cultivate the traditional crops they are practices to cultivate the commercial crops, because from the traditional crops they will get less income compare to the commercial crops.

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