

RESEARCH ARTICLE



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A REVIEW ON PRODUCTION OF MAJOR CROPS IN RAMANAGARA DISTRICT

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Abstract

Ramanagara is a dry district of Karnataka, which was reconstituted as a separate district from Bengaluru rural in 2007. This region is located in the Cauvery River Basin, primarily agrarian in character with 47% of its total area under agriculture and allied crops. The present study is a review of agricultural profile of Ramanagara district and an assessment of the trends of the production of major agricultural crops of this district over a span of 8 years (2010-2017). Based on the annual reports and other reports published by the government of Karnataka, the secondary data of major crops, its production and productivity has been obtained. Comparative tables have been prepared and the trends of production and productivity of the crops in 2010-11, 2013-14 and 2016-17 has been assessed using bar charts. Secondary Data on Physical parameters has also been obtained from the annual reports for the above years. A correlation analysis has been performed to understand whether the physical factors have any influence on the production and productivity of the major crops. From the results it is understood that there is no significant influence by the physical factors on crop production. Hence several other reasons such as changing land use pattern, decreasing soil fertility, market demand may have the influence on the production of major agricultural crops, which gives a scope of further research in this region.

Keywords: Agriculture; Productivity; Major crops; Soil fertility & Market

Introduction

Agriculture is among the world's largest sectors, employing over one billion people and accounting for 3% of global GDP (FAO, 2016). Agriculture contributes about 12% of the GDP of the State, Karnataka. The primary occupation among the Karnataka rural residents is Agriculture and the farmers and agricultural labourers formed the major work force (56%) of Karnataka (Karnataka Human Development Board (2005). Karnataka is characterized by a typical composition

of most of agro-climatic condition in the country except the snow-clad mountainous region. A major portion of the land in the state falls under semi-arid conditions facing severe agro-climatic and resource constraints. Interestingly, a few patches of high value - high-tech agriculture, emerged in the last two decades also has a sporadic presence in the State. Accordingly, the agriculture in Karnataka is diversified and segmented in many ways. Moreover, Karnataka is one of the few States with the lowest proportion of

their area under irrigation. Majority of farmers here have no other option but to grow low value crops. Under such speckled situation, agricultural sector of the State is growing moderately despite severe climatic and strong resource constraints. (Karnataka Agricultural Policy, 2006). The present study is conducted in of the dry agrarian district of Karnataka i.e., Ramanagara district.

Study Area Description

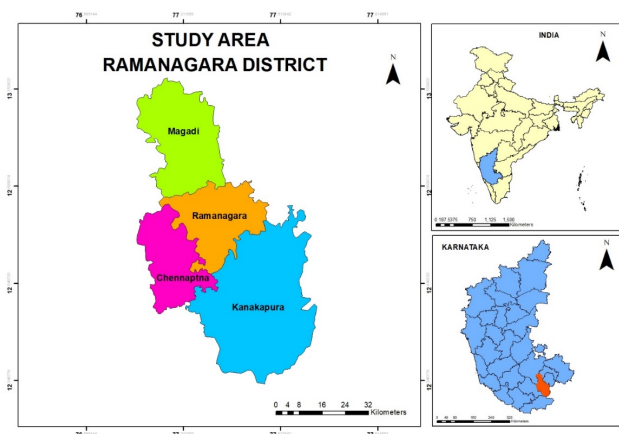


Fig. 1. Study area map

Location

Ramnagara District was a part of Bangalore rural until 2007 and was carved out as separate in September 2007 with Ramnagara as district headquarters. It is geographically located in the south-eastern part of the Karnataka, between the latitude $12^{\circ} 33'$ to $12^{\circ} 58'$ N and the longitude $77^{\circ} 13'$ to $77^{\circ} 25'$ E, at an altitude of 747 ft. MSL.

Administrative Setup

The total geographical area of the district is around 355912 hectares (3576 sq.km). The district is divided into four taluks namely Channapatna, Kanakapura, Magadi and Ramnagara. There are around 18 hoblies (cluster of adjoining villages administered together), 130 gram panchayaths, 4 town/urban agglomerations, 2 municipalities and 823 villages.

Objectives

The specific objectives of the present study are

1. Review of Agricultural profile of Ramnagara District.
2. To assess the trends in the area under cultivation, production and productivity of major agricultural/horticultural crops in Ramnagara District.

3. To determine the influence of physical factors such as total rainfall, temperature and humidity has any influence on the production of the crops.

Data and Methodology

Secondary data has been obtained from various sources such as Annual Reports, District Profiles etc published in various websites. In the present study, the production of major agricultural and horticultural crops in Ramanagara has been extracted from the Annual reports and the trends in production and productivity over 7 years from 2010-2017 has been assessed in the present study with the help of tables and bar graphs. Also the trends of Rainfall, Temperature and Humidity have also been obtained from the annual reports. Further a correlation analysis has been done to identify whether the physical factors such as rainfall, temperature and humidity has any influence on the production of crops.

Results and Discussion

Review of Agricultural Profile of Ramanagara District

A preliminary review of agricultural profile in terms of agro-climatic and ecological conditions, weather, drainage system, farming systems irrigation systems and soil type has been done for Ramanagara district which are as follows:

Agro-Climatic Zone

The state of Karnataka comprises around 10 Agro-Climatic zones. The Ramanagara district falls under Zone 5 i.e., Eastern Dry Zone. It is situated in Deccan plateau with 80% area having an altitude of 800 to 900 meters above MSL. It is primarily agrarian in character with 47 per cent of its geographic area under agriculture and allied crops. The zone is essentially a dry farming zone. The livelihood of a large proportion of the population therefore, depend upon the way in which rainfed is managed.

Agro-ecological situation

Ramanagara district has a semi-arid climate. The duration of monsoon, seems to be shrinking with the first three months in the year receiving very little rainfall in recent times. The rainfall distribution has two peaks, one during May and another during September. It is characterized by erratic and uneven distribution. Predominantly the tube wells/ bore wells are the major source of irrigation in the district except in Kanakapura and Channapatna Taluk where canal irrigation is available for 2000 and 117 ha respectively. There are about 38,002 ha of land being irrigated through borewells. Lift irrigation is available for 122 ha of land.

Weather

The average rainfall is around 823mm and the normal rainy days around the year may be approximately 63 days. The north-west and south east monsoon onsets on 1st week of June and 3rd week of October, and cesses on 2nd week of October and 2nd week of November respectively. December to March will be the winter season and April and May will be the peak summer season.

Drainage

The entire area of Ramanagara District is a part of Cauvery Basin. The major tributaries of Cauvery River draining the district are the Arkavathi and the Shimsha Rivers. The overall drainage pattern of Ramnagara district can be described as Semi-dendritic to dendritic.

Farming systems

As Ramanagara is a dry-region, majority of farming systems such as Ragi based cropping system, Ragi and pulse cropping system, Pulse based cropping system, Oil seeds based cropping system, Pulse and oil seed based cropping system, Integrated Farming System were rain fed. On the other hand farming systems Coconut based cropping system, Arecanut based cropping system, Banana based cropping system, Mango based cropping system, Vegetable based cropping system, Floriculture, Integrated Farming System, Protected cultivation were irrigated.

Soil Resources and Type

Clay Soil, Loamy Soil, Red Sandy Loam soil were the soil types of Channapatna taluk. Whereas Gravelly Clay Soil, Red Sandy Loam Soil were found in Kanakapura region. The Magadi region consists of Loamy Soil, Gravelly Clay soil and Red Sandy Loam Soil. Ramanagara taluk is characterized by Red Sandy Loam Soil, Gravelly Clay Soil. The major nutrients such as phosphorous and potassium and micro-nutrients such as zinc, boron were pre-dominantly deficient in this region.

Assessment of trends in Production and Productivity of Major Crops

From the reports, it is observed that Ragi, Paddy, Field-Bean, Red Gram were identified as the major field Crops cultivated in Ramanagara district whereas, Ground-nut and Sesame seeds are the major oil seeds grown in this district. Mango, Banana, Tomato, Coconut and Arecanut are the major plantation and Horticultural crops grown in this region. Cultivation of mulberry is the major cash crop that generates considerable revenue to Ramanagara District. A comparative result were shown in Table 1.

Trends in Production and Productivity with respect to Area under Cultivation

From the results it is identified that, Ragi has been cultivated in an area of around 76,562 ha in 2010-11 and is gradually decreased to 70,289 ha in 2016-17, whereas the production has increased from 1,381,49 MT to 1,66,230 over a period of 7 years and so is the productivity 1,082 kg/ha to 2,382 kg/ha. Ramnagara is a dry region with limited irrigation facilities; it is obvious that the area under the cultivation of Ragi is the highest, as ragi is a rain-fed crop which can survive in dry area of Ramnagara district. On contrast the area under cultivation of paddy had shrunk from 8,050 ha to 4,468 ha over the period of 7 years, and so were the production and productivity has shown a decreasing trend from 24,210 MT and 3,138kg/ha to 14,437 MT and 2,676kg/ha respectively over the period of 7 years. The double fold decrease in the area under production of paddy may be due to the erratic rainfall in the past decade and limited irrigation facilities, as paddy are a water demanding crop during its growing season. Similarly for Field Beans, Red Gram, Horse Gram, and oil seeds such as Ground nut and sesame, the area under cultivation, production and productivity show a decreasing trend over the period of seven years. In case of Horticultural crop and, the area under cultivation and production of Mango, Tomato and Arecanut was found increased over the years from 2010, whereas Banana and Coconut showed a decreasing trend. In case of Mulberry cultivation, it showed an increase in the area under cultivation, whereas data is not available for production and productivity of mulberry.

Influence of Physical Factors

The physical factors such as rainfall, temperature and humidity have an important influence growth of crops. For example, the rainfall around 1500-3000mm and temperature around 27 degree C is optimal requirement during the growing season of rice which will enhance the production of rice and its yield. Similarly for coconut, 1000 mm of rainfall and 27 degree C will be optimum. For Banana, 2000-2500 mm and 27-35 degree C of temperature and rainfall is required. For Mango, 850-1000mm and 24-30 degree C of rainfall and temperature is required. Likewise, various crops require various physical conditions on its growing season for better yield. Poor/erratic rainfall, extremes of temperature obviously will affect the production. The average rainfall, temperature and humidity for the year 2010-11, 13-14, 16-17 has been shown in Table 2.

Correlation Analysis

In the context of physical factors influencing the production and productivity of the crops, a correlation analysis has been performed and the results are shown in Table 3 and Fig 2.

From the results of the correlogram, it is identified that there is a positive correlation with the area under cultiva-



Table 1. Area under Cultivation, Production and Productivity of Major Crops of Ramanagara district.

		Area (ha)			Production (MT)			Productivity (kg/ha)		
		2010-11	2013-14	2016-17	2010-11	2013-14	2016-17	2011-12	2013-14	2016-17
Field Crops & Oil Seeds	Ragi	76562	73570	70289	138149	138294	166230	1804	1879	2382
	Paddy	8050	5224	4468	24210	16710	14437	3138	3007	2676
	Field-Bean	7021	7000	7000	7021	7280	3945	1000	1040	768
	Ground Nut	7334	7802	5626	6520	6647	4604	890.37	851	1134
	Sesame	6392	5600	1934	2876	2621	1860	449.93	468	299
	Red Gram	4167	4300	5030	4167	4472	1444	1000	1041	452
	Horse Gram	8288	4800	1066	5603	3245	1030	1352	1076	893
Horticultural crops	Mango	21086	22177	23357	221729	221770	223570	10300	10000	10000
	Banana	4396	3499	3410	133820	81060	84744	30400	23170	24850
	Tomato	1265	1120	1195	29681	25590	26851	23500	22850	22470
	Coconut	25641	24674	23500	2685.1	2588	2494	10000	10000	9801
Sericulture	Areca	2226	2315	3280	2827	2888	3990	1300	1250	1220
	Mulberry	10123	15536	16141	NA	13594.14	12949	NA	NA	NA

Source: District at a Glance Ramanagara district.

Table 2. Month-Wise Temperature, Rainfall and Humidity of Ramnagara District (2010-2017)

	Rainfall (mm)			Avg. Temperature (degree C)			Avg. Humidity (%)		
	2010-11	2013-14	2016-2017	2010-11	2013-14	2016-2017	2010-11	2013-14	2016-2017
January	0.00	0.00	0.90	20.90	20.90	22.55	56.00	58.28	61.66
February	0.00	0.00	0.00	23.05	23.05	24.75	45.00	49.23	57.45
March	4.30	7.60	31.60	25.65	25.65	27.25	39.50	46.55	56.44
April	71.53	71.60	30.80	27.50	27.50	28.80	47.50	54.18	58.55
May	110.12	100.90	278.40	27.50	27.50	28.15	56.00	57.80	66.05
June	53.20	93.80	32.40	26.15	26.15	25.80	68.00	54.50	71.56
July	88.35	54.70	41.50	24.00	24.00	24.65	73.50	70.73	71.06
August	112.15	108.00	213.10	24.00	24.00	24.75	72.50	72.78	73.60
September	190.12	253.40	320.70	23.85	23.85	24.85	70.00	67.88	74.12
October	110.03	86.40	213.70	23.45	23.45	24.70	71.50	69.75	72.84
November	199.53	29.30	5.00	21.85	21.85	23.35	72.00	68.20	70.49
December	0.70	2.80	12.10	20.50	20.50	22.20	62.50	62.58	66.97
Total/Mean	859.03	808.50	1180.20	24.03	24.03	25.15	60.50	60.70	66.73

Table 3. Correlation Analysis

	Area	Production	Productivity	Total Rainfall	Mean Temperature	Average Humidity
Area	1.00	0.55	-0.14	-0.03	-0.03	-0.03
Production	0.55	1.00	0.32	-0.01	-0.01	-0.01
Productivity	-0.14	0.32	1.00	-0.01	-0.02	-0.02
Total Rainfall	-0.03	-0.01	-0.01	1.00	0.99	0.99
Mean Temperature	-0.03	-0.01	-0.02	0.99	1.00	1.00
Average Humidity	-0.03	-0.02	-0.02	0.99	1.00	1.00

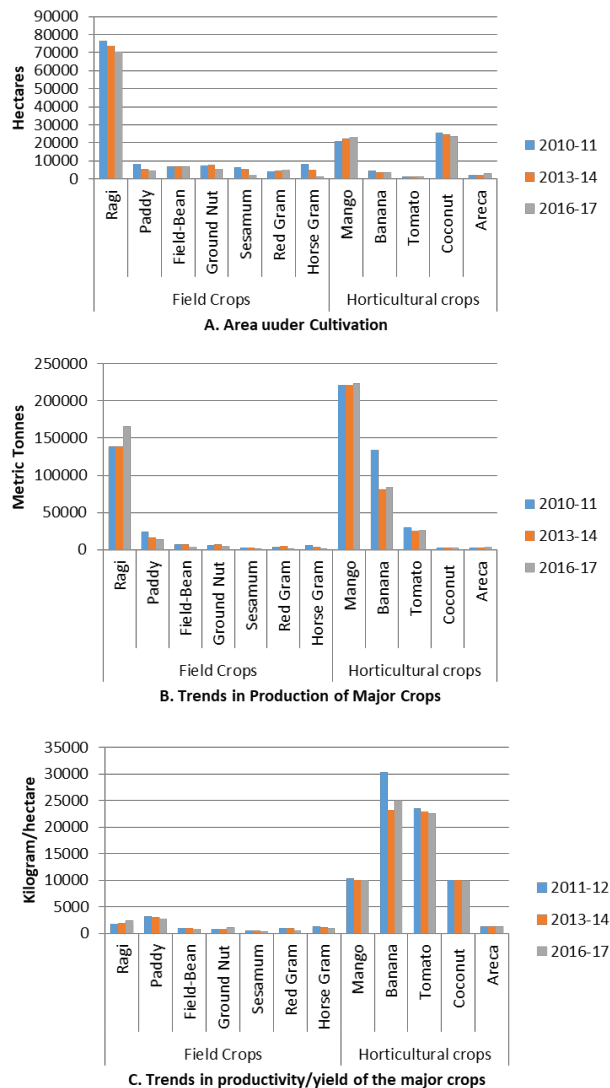


Fig. 2. Area under Cultivation, Trends in Production and Productivity of Major Crops of Ramnagara District

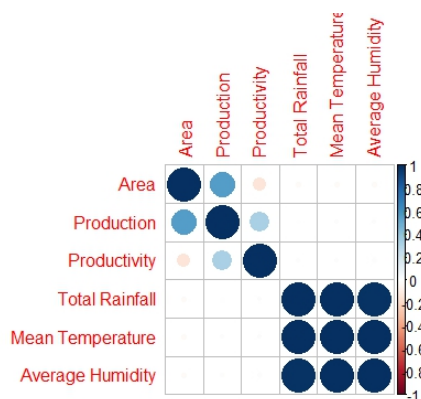


Fig. 3. Correlogram showing the correlation between each other and physical factors such rainfall, temperature and humidity

tion and productivity, which is an obvious relationship. The physical parameters such as rainfall temperature and humidity show a strong correlation with each other. However there is no significant correlation among the physical parameters and the production and productivity of the crops. Hence the increase and decrease in production may be influenced by other factors such as increasing urbanisation; loss of agricultural lands for developmental projects may lead to reduction in the area under cultivation which obviously effects the production of crops. On the other hand market demand for certain crops might be growing high which leads to increase in the production by all means to meet out the growing demand.

Conclusion

The present study is an assessment of agricultural production of major crops in Ramnagara district from the period of 2010-2017. From the results it is identified that, major crops such as paddy, pulses and oil seeds shows a decreasing trend in the production and yield whereas horticultural crops such as Mango, Tomato and Arecanut shows an increasing trends in the production and yield. Ramnagara is well known for its sericulture, and is nicknamed Silk Town and Silk City. The silk produced in this region forms the input for the famous Mysore Silk. Ramnagara is the largest market for silk cocoons in Asia. In this context, the mulberry production and yield has increased over the period of 8 years from 2010-17. The present study might be useful information, for agricultural planning to increase the production and yield. Ramnagara being a dry-region with semi-arid type of climate needs more attention on irrigation services and planning on rain-fed cropping system. Further, the use of agricultural lands for other purposes, soil infertility due to increased use of chemical fertilizers, growing demand for various crops are the other few reasons which influences the crop production, which gives the scope for future research towards increasing the agricultural productivity of Ramnagara Region.

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