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“THE IMPACT OF CLIMATE ON AGRICULTURE IN KARNATAKA: A CASE STUDY OF RAICHUR DISTRICT”

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ABSTRACT: -

The present study made an attempt on environmental impact of agriculture is the effect that different farming practices have on the ecosystems around them, and how those effects can be traced back to those practices. The environmental impact of agriculture varies based



on the wide variety of agricultural practices employed around the world. Ultimately, the environmental impact depends on the production practices of the system used by farmers. The connection between emissions into the environment and the farming system is indirect, as it also depends on other climate variables

such as rainfall and temperature. There are two types of indicators of environmental impact: "means-based", which is based on the farmer's production methods, and "effect-based", which is the impact that farming methods have on the farming system or on emissions to the environment. The environmental impact of agriculture involves a variety of factors from the soil, to water, the air, animal and soil variety, people, plants, and the food itself. Keeping in view the present paper tries to overcome from the problem and achieve eco-friendly agriculture development in the study area.

KEYWORDS: Climate Change, India, Agriculture, Irrigation Etc.

INTRODUCTION :

Karnataka is one of the developed Indian states placed above the median level of social and economic development. The growth and structure of Karnataka economy have undergone dramatic changes since the introduction of the new economic policy in 1990s. The economy has registered an impressive average annual growth rate of over 8.2 per cent during 2000-01 to 2010-11 with a major share of this high growth coming largely from the booming service (tertiary) sector. With structural change, the share of agriculture and allied sector in the Gross State Income (at 2004-05 prices) declined from 30.8 per cent in 2000-01 to 16.22 per cent in 2010 -11, while the share of the industry increased only marginally from 23.9 per cent to 28.61 per cent. However, the contribution of the service sector increased significantly from 45.3 per cent to 55.17 per cent between 2000-01 and 2010 -11. The structural changes observed in the state economy are largely in line with the changes evident at the national level.

Considering the fact that the overall economy has been greatly influenced by the tertiary sector with an anticipated decline in the contribution of the agricultural and allied sectors to state income, the structural transformation should have substantially transferred people dependent on agriculture to non-agricultural sector.

However, this has not happened both at the state and national levels. According to the 2011 Population Census, out of 23.5 million total workers, about 14.92 million workers (56.7 per cent) depend on the agriculture and allied sector for employment in the state of Karnataka. A decline in income share combined with a large dependent workforce on agriculture has hindered productivity gains in this sector over time. Further, despite considerable efforts made by the state government to augment the irrigation potential, area irrigated to gross cropped area has remained low at 34 per cent.

The green revolution technology introduced in the late 1960s in the form of new seeds cum chemical fertilisers had greatly helped to increase crop production in the State. This was made possible with a higher public investment in agricultural research, education and training, irrigation and other infrastructures. However, the technological gains could not spread evenly across regions and crops in the state due to diverse agro-climatic conditions and varying natural resource endowments. The growth performance of the agricultural sector has also been varied with wide fluctuations. Meanwhile, there were concerns on stagnation in production and productivity of crops during 1980-81 to 1989-90. Karnataka's agriculture as a whole is growing in terms of income generation from the mid-nineties. This is mainly due to improvement in yield rates and to a smaller extent, due to shift in cropping pattern to high valued crops. In spite of significant advances in industrial and service sectors, agriculture continues to be the largest provider of employment and livelihood both at the national and state levels. Since ancient times agriculture is the main occupation in the state.

At present also it provides means of livelihood to 69 per cent of the total working population and 60 per cent of the state's economy. An Expert Committee constituted by the State Government in 1993 had concluded that investments made in agriculture during 1980s were not optimally utilised to sustain the growth momentum witnessed during the seventies. While analysing the impediments to agricultural growth, Deshpande (2004) contended that both public and private investments have not adequately been made in the backward regions particularly in the un-irrigated plateau zone of Northern Karnataka and that of Southern Karnataka to spur the growth process. There is also empirical evidence to suggest that productivity growth measured by Total Factor Productivity (TFP) declined during the eighties.

But, there is lack of research evidence to show whether declining productivity growth in the crop sector has reversed during the recent years. This is particularly important from the point of view of renewed efforts made by the state government through various developmental programmes for accelerating growth in the agricultural sector. This, in fact forms the motivation to estimate and analyse trends in total factor productivity of important crops in the state of Karnataka. From the policy perspective also, it is important to assess and understand the determinants of cropping pattern so as to take appropriate initiatives for accelerating agricultural output growth. More specifically, its estimates total factor productivity growth of major crops in Karnataka.

REVIEW OF LITERATURE:

Amiya (1963): Studies about inter-state differences in cropping pattern and productivity under hypotheses that technical condition and production and structure and relationship of market prices determine the pattern use of the farm. The major conclusion of the study were that analysis showed a positive relationship between increase in area and increase in yields, and the knowledge of price was necessary for resource allocation.

Meenakshi Malya (1963) analysed the relation between urbanization and cropping pattern based in primary data, which were collected using multistage random sampling method. The study concluded by finding that main feature, which influenced the cropping pattern, was good market centre with well-connected roads and facilities

A study by Muthaiah (1963) about the economics of cropping pattern in India for cotton tracts was based on secondary data. Analysis showed that there was a shift of land from cotton in favor of groundnut in the recent years due to the relatively higher price prevailing for that crop.

Shah (1963) Studying cropping pattern in relation to irrigation was major objectives as to how irrigation led to expansion area, replaced cultivation of inferior crops by superior and led to greater monetization of

agriculture. Profitability of one-crop versus another depends both on relative yield and price levels of crops concerned. None of the above studies talks about Impact of cropping pattern changes on agricultural development

Savale (1966) studied about intensive development approach to agricultural development with special emphasis on role of irrigation and cropping pattern in agricultural development. Changes in cropping pattern were affected in course of time due to changes in technology, price structure and other factors. The study revealed that the net return/ acre realized from the crops play an important role in bringing out changes in cropping pattern. Optimum production plans were worked out using linear programming technique.

John (1967) analyzed the impact of cropping pattern on agricultural output based on secondary data on Indian agriculture. Changes in output were explained by the changes in area, price and yield rate of individual crops. The conclusion was that the total change due to cropping was the sum of pure effect and interaction effect caused by cropping pattern change.

Todkari G.U, Suryawanshi S.P, Suryawanshi M.V.and Patil B.D. (2010) 'Agriculture Land use Pattern in Solapur District of Maharashtra' This study is based on secondary data collected from secondary records An Endeavour is made here to study crop combination regions in Solapur District for year 2004-2005. By computing crop ranks and crop combination in Solapur District has identified ten crop combinations.

V. Kalaiselvi (2012) 'Patterns of crop diversification in Indian scenario' using secondary data the main objectives under consideration were the crop production and economic scenario, crop diversification in the Indian perspective and pattern of crop diversification in India. Market infrastructure development and certain other price related supports also induce crop shift. Often low volume high-value crops like spices also aid in crop diversification.

STATEMENT OF THE PROBLEM:

The present study is made an attempt to sketch the cropping pattern and agricultural development in Raichur district of Karnataka state. It has weak economic base and has remained highly backward in the state. Large number of workers is working in agriculture, therefore to know the production of both commercial and non-commercial cropping pattern, in Raichur. The cropping pattern is dominated by food crops, like Tur, Jawar, Paddy and Wheat are the major crops.

Cotton is the commercial crop produced in the area, therefore, study aims to know changes shift in area both in commercial and non-commercial crops and level of production and thereby impact on income.

SIGNIFICANCE OF THE STUDY:

Several studies on Karnataka state, agriculture somehow or other concentrated on certain specific areas like the land utilization pattern and cropping pattern and the analysis of the specific related to area, production and productivity growth, particularly food crops and non-food crops like Tur, Rice, Jawar, Bajra, Cotton, and Sugarcane. The research studies conducted here and there specified some specific issues of the cultivation of crops and the impacts on them due to the occurrence of price changes, relative attractiveness of some crops on account of relative low cost and high profit. The earlier exercises of research on the cropping pattern front of Raichur district of Karnataka state agricultural situation attempted the issues separately and the conclusions derived thereon.

OBJECTIVES OF THE RESEARCH

Based on the Review and study of works related to the present research following objectives are formulated for the study:

1. To study the production of major crops in Karnataka and study area.
2. To examine the changes in productivity into its constituent force like irrigation.
3. To study the changes in cropping pattern of the study area.
4. Suggestions for growth of agriculture in the study area.

HYPOTHESES OF THE RESEARCH

Following are the major Hypotheses for the present research;

1. Irrigation is positively related to cultivate the land.
2. The impact of technology is positive in the determination of agriculture output growth in the study area.

RESEARCH METHODOLOGY

For the present Research a research method containing data collection and analysis was followed. Both the primary and secondary data is used. The primary data is collected from the farmers and the secondary data from the journals books, reports published and unpublished Thesis etc.

The collected data is arranged in a tabular form. Some simple statistical techniques such as percentage and average have been used to draw the conclusion. The research method involved following steps.

Method of Data collection

The study is based on primary data collected through interview schedule, from the sample respondents i.e., the farmers of Sindhanur and Deodurga taluks in the sample random of selection. The local languages are used while taking information from the respondents. In order to get accurate information a schedule was proposed before starting the personal interview

Sampling Design

For the purpose of analysing the dynamics of cropping pattern in dry zones of Karnataka, the state of Karnataka was chosen as the primary unit with dry agro-climatic zones as the sub-units.

Selection of Taluka's

For the present study, two taluka's alone have been selected from each taluk. Albanoor Boppur, Channahalli and Buddinni villages from Sindhanur taluk. Arakera Masarakal Jalahalli and Gabbur Villages from Deodurga taluk have been selected on the basis of the following criteria. The level of total area under all crops, as highest two taluka's have been selected.

Table-1.1 Sample Size from the Selected Villages

Taluks	Selection of Villages	No of Farmers	Samples Farmers
Deodurga	1. Arakera	750	37
	2. Masarakal	302	15
	3. Jalahalli	423	22
	4. Gabbur	550	26
			Total=100
Sindhanur	1. Albanoor	409	20
	2. Boppur,	805	40
	3. Channahalli	609	30
	4. Buddinni	190	10
			Total=100
02 Taluks	08 Villages	4038	200
Total 5 % of Farmers interviewed out of 4038 total Farmers			

Selection: for the field Survey

The primary data were collected from 200 sample farmers of the eight selected villages using the interview method by the researcher. For the purpose of collecting data from the sample household, an

exhaustive interview schedule had been prepared and canvassed.

Data analysis & Tools used:

Data Analysis is a process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. All the data collected were fed to computer and calculated by using SPSS package, accordingly percentage, Chi-Square test were followed. Necessary charts/ graphs/ tables, etc. are also prepared.

All the data collected were fed to computer and calculated by using SPSS package, accordingly percentage, Chi-Square test were done. Necessary charts/ graphs/ tables, etc are prepared.

Table 2.1 Showing Family Size of the Respondents

Sl. No.	Family size	Taluks		Total
		Deodurga	Sindhanur	
1.	Up to 4 members	26 (26.0%)	14 (14.0%)	40 (20.0%)
2.	5 – 6	53 (53.0%)	58 (58.0%)	111 (55.5%)
3.	7 – 8	18 (18.0%)	15 (15.0%)	33 (16.5%)
4.	9 and above	3 (3.0%)	13 (13.0%)	16 (8.0%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=105.320

DF=3

α =.000

Field survey 2016

Table 2.1 shows that 40 (20.0%) respondents had four members in their family, 111 (55.5%) respondents had 5-6 members in their family, 33 (16.55%) had 7-8 members in their family and remaining 16 (8.0%) respondents had family size of more than 9 members in the study area. Thus majority of the farmers were having medium size family with 5-6 family members (mostly husband and wife parents and 2-3 children)

Table 2.2 Showing Age of Respondents

Sl. No.	Age group	Taluks		Total
		Deodurga	Sindhanur	
1.	21-30	15(15.0%)	14 (14.0%)	29 (14.5%)
2.	31-40	46 (46.0%)	58 (58.0%)	104 (52.0%)
3.	41-50	24 (24.0%)	26 (26.0%)	50 (25.0%)
4.	50 above	15 (15.0%)	2 (2.0%)	17 (8.5%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=88.920

DF=3

α =.000

Field survey 2016.

Purpose of this table is to know the age group of respondents. Table 5.2 shows that 29 (14.5%) of farmers were in the age group of 21-30 years, 104 (52.0%) respondents were in the age group of 31-40, 50 (25.0%) were in the age of 41-50 while 17 (8.5%) were above 50 years i.e. 91.5% are between age group of 21 to 50 years and only 8.5% farmers are of 51 years and above in the study area. It shows that majority of participants are youth or in the middle age group and are capable of making decision and analyzing the things.

Table 2.3 Showing Educational Qualification of the Respondents

Sl. No.	Level of Education	Taluks		Total
		Deodurga	Sindhhanur	
1.	Illiterate	21 (21.0%)	21 (21.0%)	42 (21.0%)
2.	Read & write	21 (21.0%)	13 (13.0%)	34 (17.0%)
3.	Primary	13 (13.0%)	19 (19.0%)	32 (16.0%)
4.	Higher school	32 (32.0%)	38 (38.0%)	70 (35.0%)
5.	Graduate	13 (13.0%)	9 (9.0%)	22 (11.0%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=33.200

DF=4

α =.000

Field survey 2016

Purpose of this table is to show the educational qualification of the Farmers. The table 2.3 shows that 42 out of 200 (21.0%) farmers are illiterate, in the study areas, 34 out of 200 (17.0%) farmers knew to read and write, 32 out of 200 (16.0%) were educated up to primary level and 70 out of 200 (35.0%) are educated up to high school and 22 (11%) were educated up to graduate level. This shows that majority of the farmers were literates, literacy level of farmers is (79.0%), indicates that residents with good literacy level have adopted agriculture profession to earn income. It may be because of low education they are unable to get skilled labour job. It also means that lowly educated farmer had adopted agriculture profession.

Table 2.4 Caste of the Farmers

Sl. No.	Cast	Taluks		Total
		Deodurga	Sindhhanur	
1.	SC	16 (16.0%)	14 (14.0%)	30 (15.0%)
2.	ST	30 (30.0%)	32 (32.0%)	62 (31.0%)
3.	OBC	46 (46.0%)	47 (47.0%)	93 (46.5%)
4.	GM	8 (8.0%)	7 (7.0%)	15 (7.5%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=72.360

DF=3

α =.000

Field survey 2016

Purpose of this table is to know about the respondent's caste and sub caste. Table 5.4 shows that majority of the farmers in the study area are belong to other backward castes (OBC) their percentage was 46.5 per cent i.e., (46.0%) of Sindhhanur taluk and (47.0%) of Deodurga taluk respectively. 30 (15%) of the farmers belonged to SC i.e., 16 (16.0%) of Deodurga and 14 (14.0%) of Sindhhanur taluk and 62 (31%) respondents were STs (16.0%) of Deodurga and Sindhhanur (14.0%) respectively. Only 15 (7.5%) respondents were of GM category i.e., 8(8%) of Deodurga 7 (7.0%) of Sindhhanur. Thus it is evident that Majority of the respondents were from ST and OBC Categories comprising 155 (77.5%) respondents.

Table 2.5 Showing Classification of Respondents as per Profession

Sl. No.	Other occupation with Agriculture	Taluks	
		Deodurga	Sindhanur
1.	Agriculture	100 (100.0%)	100 (100.0%)
2.	Dairy Husbandry	54 (54.0%)	55 (55.0%)
3.	Business	17 (17.0%)	10 (10.0%)
4.	Others	10 (10.0%)	12 (12.0%)

Field survey 2016

The purpose of table is to show classification of respondents as per their profession. Table 2.5 shows that most of the respondents were having the profession of agriculture and dairy husbandry in respective taluks of study areas. All (100%) respondents are in agriculture profession. Along with agriculture some respondents were engaged in other professions such as Dairy husbandry, small business etc. 54 out of 100 (54.0%) in agriculturists of Deodurga taluk and 55 out of 100 in Sindhanur taluk had dairy husbandry. 17 out of 100 (17.0%) and 10 out of 100 were in business, in respective taluks. 10 out of 100 (10.0%) respondents of Deodurga taluk and 12 out of 100 (12.0%) respondents of respective taluks were engaged as in other farm sector. It indicates that respondents had adopted more than one profession along with agriculture.

Table 2.6 Type of Irrigation Facility

Sl. No.	Type of Irrigation	Taluks		Total
		Deodurga	Sindhanur	
1.	Tube well	11 (11.0%)	10 (10.0%)	11 (5.5%)
2.	Canal	79 (79.0%)	60 (60.0%)	139 (69.5%)
3.	Well	10 (10.0%)	30 (30.0%)	40 (20.0%)
	Total	100 (100.0%)	100 (100.0%)	200(100.0%)

$\chi^2=194.530$

DF=2

$\alpha =.000$

Field survey 2016

The purpose of table is to show type of irrigation facility. Table 2.6 shows that 11 (5.5%) i.e., 11 (11.0%) of Deodurga taluk and 10 (10%) respondents from Sindhanur taluk had tube wells to irrigate their lands, 79 (79%) respondents of Deodurga taluk and 60 (60%) of Sindhanur and district totaling 139 (69.5%) farmers were facilitated by canals, 10 (10%) farmers of Sindhanur taluk and 30 (30%) farmers of Deodurga taluk i.e., total 40 (20%) of 200 farmers from study area are had well irrigation. It is observed that canal irrigation is the major facility in both taluks of the study area i.e., 69.5 per cent.

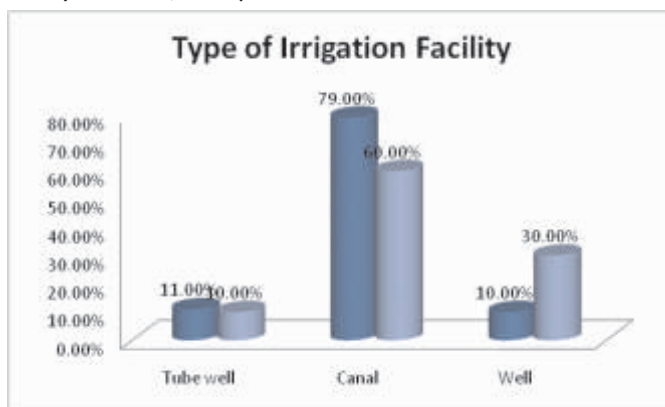


Table 2.7 Farming Types

Sl. No.	Types of Farming	Taluks		Total
		Deodurga	Sindhanur	
1.	Crop	95 (95.0%)	79 (79.0%)	174 (87.0%)
2.	Pastoral	5 (5.0%)	0 (0.0%)	5 (2.5%)
3.	Mixed	0 (0.0%)	21 (21.0%)	21 (10.5%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=261.130

DF=2

α =.000

Field survey 2016

The purpose of table is to show types of farming practiced by the respondents. From table 2.7 it is evident that 174 (87.0%) farmers i.e., 95 (95%) of Deodurga taluk and 79 (79%) of Sindhanur taluk were cultivating crops, 5 (5%) farmers that too only from Deodurga taluk were engaged in pastoral farming and 21 (21%) farmers from Sindhanur taluk were engaged in mixed farming. Thus it is clear that majority of farmers from both taluks in study area were engaged in crop farming.

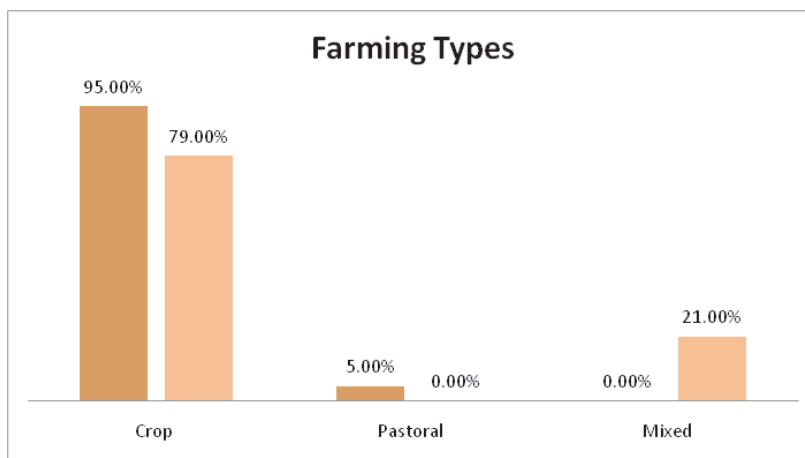


Table 2.8 Rainfall Effect is Positive on Agriculture Production.

Sl. No.	Opinion	Taluks		Total
		Deodurga	Sindhanur	
1.	Yes	60 (60.0%)	65 (65.0%)	125 (62.5%)
2.	No	40 (40.0%)	35 (35.0%)	75 (37.5%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

X²=12.500

DF=1

α =.000

Field survey 2016

The purpose of table is to know whether there was any long-term change in the agriculture production by the effect of rainfall. From table 2.8 it is evident that 125 (62.5%) farmers i.e., 60 (60%) of Deodurga taluk and 65 (65%) of Sindhanur taluk evidenced that there were long term changes in the agriculture production, while only 75 (37.5%) farmers i.e., 40 (40.0%) of Deodurga taluk and 35 (35.0%) of Sindhanur taluk evidenced no long

term changes in the agriculture production. Thus it is clear that majority of farmers had evidenced that there were long term changes in the agriculture production by the effect of rainfall. Hence it can be assumed here that there were long term changes in the growth of agriculture.

Table 2.9 Number of Rainfall days Changed

Sl. No.	Opinion	Taluks		Total
		Deodurga	Sindhanur	
1.	Increased	31 (31.0%)	16 (16.0%)	47 (23.5%)
2.	Decreased	29 (29.0%)	49 (49.0%)	78 (39.0%)
3.	No Changes	40 (40.0%)	35 (35.0%)	75 (37.5%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

$\chi^2=8.770$

DF=2

$\alpha = .012$

Field survey 2016

The purpose of table is to know whether the number of mean rainfall days over the past 20 years had increased or decreased. From table 5.9 it is evident that 47 (23.5%) farmers i.e., 31 (31%) of Deodurga taluk and 16 (16%) of Sindhanur taluk evidenced increase in the mean rainfall over past 20 years, 78 (39%) farmers i.e., 29 (29%) of Deodurga taluk and 49 (49%) of Sindhanur taluk evidenced decrease in the mean rainfall over past 20 years. While 75 (37.5%) i.e., 40 (40%) respondents from Deodurga taluk and 35 (35%) from Sindhanur taluk had evidenced no change in the mean rainfall over past 20 years as also seen from table 5.8. Thus it is clear that majority of farmers who had evidenced long term changes in the mean rainfall over past 20 years had evidenced decrease in mean rainfall. Hence it can be assumed here that there were long term changes in the mean rainfall over past 20 years.

Table 2.10 Number of Times the Land Cultivated under Irrigation in a year.

Sl. No.	No. of times	Taluks		Total
		Deodurga	Sindhanur	
1.	One	33 (33.0%)	48 (48.0%)	81 (40.5%)
2.	Two	67 (67.0%)	52 (52.0%)	119 (59.5%)
3.	Three	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Total	100 (100.0%)	100 (100.0%)	200 (100.0%)

$\chi^2=7.220$

DF=1

$\alpha =.007$

Field survey 2016

From table 2.10 it is evident that 119 (59.5%) farmers i.e., 67 (67%) of Deodurga taluk and 52 (52%) of Sindhanur taluk cultivated two times in a year, only 81 (40.5%) of farmers i.e., 33 (33.0%) of Deodurga taluk and 48 (48.0%) of Sindhanur taluk cultivated one time in a year. While none of the farmers (respondents) from both taluks cultivated three times in a year. Thus it is clear that majority of farmers were cultivating two times in a year under irrigation.

Table 2.11 Production of Principle Crops

Sl. No.	No. of times	Deodurga	Sindhanur	Total
1	Paddy	45 (35%)	20 (40%)	65 (32.5%)
2	Jawar	35 (45%)	60 (60%)	95 (47.5%)
3	Wheat	20 (50%)	55 (65%)	75 (32.5%)
4	Bajra	15 (15%)	30 (70%)	45 (22.5%)
5	Maize	25 (35%)	55 (55%)	80 (40%)
6	Tur	27 (27%)	66 (56%)	93 (46.5%)
7	Cotton	11 (21%)	5 (5%)	16 (8%)
8	Sugarcane	10 (30%)	45 (45%)	55 (27.5%)
9	Soybean	15 (15%)	49 (49%)	54 (27%)

Field survey 2016

Above table shows that almost all principle crops are cultivated in both Deodurga and Sindhanur taluks. It was Cotton and Bajra which were in low production. And accept for cotton and rice almost all crops were cultivated and produced in Sindhanur taluk in more quantity. Hence it is clear that majority of the farmers in the study area were growing all principle crops.

SUGGESTIONS:

Government of Karnataka should reach its policies to the farmers like provide technical information on crop selection, to provide primary seed and soil testing facilities locally. This increases the production capacity of the farmers. The following recommendations are made for planned and scientific agriculture development through planned and scientific development of ground water.

1. Further the infrastructure facilities are also not adequate in the study area. Kuccha roads, dependence on private transport and their costly transport costs are marring the poor small and marginal farmers further.
2. Hence adequate public or cooperative infrastructural facilities are to be facilitated to the farmers so that they get the needed agricultural implements, fertilizers, seeds etc, in time.
3. It was also noticed that as majority of the farmers were small or marginal cultivators they were cultivating their lands by both traditional methods of cultivation.
4. Hence these farmers are to be encouraged to form cooperatives and adopt modern methods of cultivation.
5. The present day Raita Samparka Kendra working should be activated in order to provide sufficient opportunities for the farmers to extend their initiatives for cultivation.
6. The Raita Samparka Kendra should provide all the technical and non- technical help to the farmers so as to create an activism in the development of agricultural operations.

CONCLUSION:

During the study it was found that in the total geographical area only 35 % of land was cultivable land and 20% was barren or uncultivable land, hence more land is to be brought under cultivation. Farmers of the study area depend upon local religious seers to know about the climate and rainfalls, Government and environmentalist should takes steps to make the farmers aware of the changing climatic conditions scientifically and proper land use practices. Also Cropping pattern varies from district to district. Kharif and Rabi are the two seasons during which lands are cultivated. Summer cultivation is done in comparatively small areas that are

assured with irrigation, hence new possibilities and probabilities of irrigation are to be made so that summer cultivation is also undertaken by the farmers.

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