



THE CHANGING ROLE OF CROPPING PATTERN ON AGRICULTURAL DEVELOPMENT IN KARNATAKA UNDER RAINFED CONDITIONS WITH SPECIAL REFERENCE TO TUMKUR DISTRICT

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ABSTRACT

Agriculture is the main sector of the Indian economy which contributes about 19.12 percent of the gross national product. Besides, it provides employment for about two third of the population. The performance of agricultural sector during the past three decades has been satisfactory. However, a lower growth rate recorded during the recent years is a cause of concern. The rapid increase in population and standard of living as a result of economic development exerts pressure on demand for food stuffs which can be met only by adequate supply of agricultural output. Despite rapid advances in technology, food security could not be attained. This calls for enormous efforts for sustained growth of agricultural output, which can be achieved through appropriate technological adoptions. Agriculture on rain fed lands is at the mercy of nature and crop yields are subject to violent fluctuations due to the vagaries of the monsoon and other unpredictable natural factors like temperature, wind and humidity. Added to this, is the outbreak of diseases and pest infestations. These result in an unstable portfolio in the drought prone areas the yields are also highly uncertain. The variability in yields affects the prices resulting in a risky pay-off from crop cultivation in these areas. This study throws enough light on the selected crops and their changing cropping pattern in rain fed cultivated areas.

Key Words: Agriculture, Indian Economy, Employment, Variability, Yields, Technology, Rain fed, fluctuations.

INTRODUCTION

By cropping pattern is meant the proportion of area under different crops at a point of time. A change in cropping pattern implies a change in the proportion of area under different crops. Cropping pattern express the shares of different crops in the farmer's total cultivated area in an agricultural year. Cropping pattern is an important indicator of a farmer's decision-making ability, which witness dynamisms over space and time in response to the changes in factors, which determine the later. According to some agricultural economists; "cropping pattern means the proportion of area under various crops at a point of time". Quite often the area statistics are used to denote the cropping pattern viz; agricultural Commission, Govt. of India (1960) determined cropping pattern according to relative acreage of various crops in a district or a group of district (agricultural situation in India, 1964).

According to Kanwar (1972) cropping pattern means "both the time and sequence of crops. It includes the identification of the most efficient crops of the region which is considered a homogenous soil and climate belt, the rotation in which the crop fits and the intensity of cropping". It (cropping pattern) is "a spatial and temporal arrangement of crops to be raised in a parcel of land"(Harwoost, 1973, Modified by Gomez and Gomez, 1983).The term cropping pattern is used to denote, "the spatial and temporal contribution of crops on a plot management used to produces them" (Zandrastra 1981). Cropping pattern refers to, "the relative arrangements of crops on a farm, region, province or country with due consideration to natural features (soil and climate) crop production, efficiency, land capability and infrastructure (changeable) and the nation's agricultural policy" (Mahendra Pal, 1985)..

Rain fed cultivation:

The terms "rain fed farming" (dry farming) and "dry land farming" may define as conditions where rain water is the only source of moisture for the survival and growth of crops. A distinction exists between the two, depending on annual precipitation and its pattern of distribution. These uncertainties of rainfall and its distribution are supposedly less with dry farming as compared to dry land farming.

Table 1.1: Distinction between dry farming and dry land farming in India

Sl No.	Characteristics	Dry farming (Rain fed farming)	Dry land farming
1	Annual Rain fall	More than 750mm	Less th 750mm
2	Rain fall distribution	Almost certain with less inter	Uncertain with high inter

		and intra seasonal variations	and intra seasonal variations
3	Climate	less inter and intra seasonal variations	high inter and intra seasonal variations
4	Constraints	Soil erosion by wind and water	Soil erosion by water
5	Percent contribution to arable land	42	25

Dry farming and dry land farming have been used synonymously to indicate similar farming situations. It is important to distinguish between dry land agriculture in particular and rain fed agriculture in general. Clearly they both exclude irrigation. The emphasis in rain fed agriculture is often on disposal of excess water, maximum crop yields, high level of fertilizer inputs and water erosion constraints. In dry land agriculture, emphasis is on water conserve action, sustainable crop yields, limited inputs for soil fertility maintenance, and both wind and water erosion constraints. Dry lands generally receive less than 750 mm of annual rainfall in arid and semi-arid regions. However, in the present Indian context, dry lands mean un-irrigated rain fed areas.

Dry farming or rain fed farming has not received sufficient attention as they deserve and green revolution had certainly left the rain fed farming areas in backlog. Their contributions was not much as compared to irrigated areas, may be due to continued low productivity, inhabitancy by poorest segments of the country, crop failures, highly erratic and undependable rainfall pattern, intermittent dry spells during crop growth, neglected soil and crop management practices and so on. The terms “rain fed farming” (dry farming) and “dry land farming” may are defined as conditions where rain water is the only source of moisture for the survival and growth of crops. A distinction exists between the two, depending on annual precipitation and its pattern of distribution (table: 1.1). These uncertainties of rainfall and its distribution are supposedly less with dry farming as compared to dry land farming.

In India, rain fed farming regions (inclusive of farming both in arid and semi-arid regions) cover 67 percent (about 95 million hectares) of the net arable area (142, million hectares). Their contribution is sufficient in Indian agriculture as they support estimated 40 percent of human population and 300 million cattle population. These regions contribute about 44 percent of total food grain production. The principal crops growth under rain fed land and their contribution in Indian Agriculture. (Dr. K. Govindan- Principles and practices of dry land agriculture).

Over large areas in Karnataka State agriculture is carried on under rain fed conditions. In 10 out of 30 districts, the normal rainfall is less than 750 mm; a few among these receive even less than

550 mm. Unfortunately, the districts that receive low rainfall are also those that have poor irrigational facilities. Another peculiarity of these districts is the undulating nature of their terrain.

The undulating terrain, the uneven pattern of rainfall, the unscientific cultivation practices and the non-adaptation of soil conservation measures have together led to severe soil erosion in these tracts. There are also certain saline and alkaline patches in these dry tracts which give rise to soil management problems. Such lands normally occur in the poorly drained low lands. Certain areas, by the sides of some streams are also saline because of the blocking of the natural drainage lines.

Resulting from all factors, agriculture in the dry districts of Karnataka is backward in several ways; first, the land in these districts is not fully exploited; a small percent of the net sown area is sown more than once. Second, remunerative crops like rice, sugar cane, potato and tobacco are hardly cultivated except in small pockets having the advantage of irrigation. Third, even the less remunerative but more extensively cultivated crops like jowar, ragi, bajra and other minor millets give only low yields. Even so, agriculture continues to be the main occupation of the bulk of the population in these areas.

Indian agriculture is predominantly a rain fed agriculture under which both dry farming and dry land agriculture is included. Dry farming was the earlier concept for which amount of rainfall (less than 500 mm annually) remained the deciding factor for more than 50 years. In modern concept, dry land areas are those where the balance of moisture is always on the agriculture, there is no consideration of amount of rainfall. It may appear quiet strange to a layman that even those areas which receive 1100 mm or more rainfall annually fall in the category of dry land agriculture.

The importance of dry land is evident from the fact that only 30 percent of the cropped area is irrigated in India. Even if we extend irrigation to its full potential, more than half of cultivated area would still be left uncovered and dependent on rainfall.

Prioritization of Rain fed Area in India- National Rain fed Area Authority Planning Commission. GOI. New Delhi. Feb-2012. Rain fed areas currently constitute 55 per cent of the net sown area of the country. Even after realizing full irrigation potential, about 50 per cent of the cultivated area will continue to remain rain fed. Moreover, two thirds of livestock and 40 per cent of human population of the country live in rain fed regions.

Choice of crops and cropping systems under rain fed conditions

The choice of the crops grown under rain fed conditions depends on length of the humid period during the crop growing season is important in arid regions, where rainfall is above 300 mm, the length of humid period is about 1 to 4 weeks., short duration drought resistant pulses such as mungbean, moth bean, cowpea and cereals of 10 to 12 weeks duration such as pearl millet and minor millets are suitable. In semi-arid regions, where the length of the humid period is around 6 weeks, rainy season crops are grown in soil moisture, in soils that can hold more than 200 mm. in sub-humid areas, where humid period is more than 12 weeks duration and the rainfall is twice that of PET, paddy based cropping system is suitable as other crops cannot tolerate water stagnation.

STATEMENT OF THE PROBLEM

India is an agriculturally predominant country. The main occupation of our country even today is agriculture. Notwithstanding the fact that the country has been globalised, the open regime only promoted consumption and fast moving consumer goods (FMCG). The importance given to information technology and other service sectors resulted in the neglect of agriculture considerably. The government policy tilted towards infrastructure creation, urban development and creation of infotech society.

This is lopsided development, even today 60% of the Indian population are engaged in agriculture solely relying on agricultural income, but the scenario is not quite satisfactory because our agricultural production and productivity is based on monsoon and rainfall. The rainfed cultivation is subjected to uncertainty and this has resulted in low or no agricultural yield. The farmers are put to great hardships and untold misery especially in rainfed and drought prone regions of our country including the most backward taluk in the state of Karnataka called “PAVAGADA TALUK”.

Adding salt to the injury, the government policy assistance and delivery is not quite effective. The farmers in Pavagada Taluk are directionless, helpless and hopeless. The cropping pattern is also very traditional and primitive covering Groundnut, maize, jowar, ragi and others. Infact, the farmers are facing the drinking water problem and question of availability of water for cattles and agriculture is ruled out.

The Pavagada Taluk of Tumkur District in Karnataka was adjudged as “Drought prone and famine hit area by the state government perennially”, the funds allocated for the region to elevate the farmers are insufficient and not properly distributed and utilized. The farmers are suffering

in the said taluk is an account of crop failure, low output, low return and experiencing of drought situation continuously and historically. The Human Development Index (HDI) in the taluk has come to standstill and naught.

SIGNIFICANCE OF THE STUDY

The study is relating to the performance of agriculture in Karnataka. Agricultural production, being biological in nature shown wide variations across different districts, seasons, agro climatic regions, soils rainfall, topography, temperature and infrastructure facilities like irrigation, credit and marketing greatly influence agricultural production. It is important to understand and appreciate the changes in cropping pattern over the years and the factors influencing the changes. In this study an attempt has been made to study the yield levels along with crops over a period of ten years the factors which influenced them.

SCOPE OF THE STUDY

The cropping pattern in the state varies from region to region, district to district and from season to season, and vast changes have taken place in cropping pattern. In certain regions and their changes are continuing new crops are being introduced and the traditional crops being on the decline. The growth rates of area, production and yield of principal crops vary across districts and over time. Above all the instability in crop production varies significantly across crops and districts in the state. In essence, the state has more heterogeneity in crop production than homogeneity assisting from its varied agro climatic production conditions. To understand the changing cropping pattern and agricultural development. There is need to examine the time series data on Karnataka agriculture. So, the study is confined particularly for the period from 2000 to 2010 in Tumkur district.

- ✓ Such a time series study on principal crops is also needed to identify the crops and causes for stagnation in Karnataka agriculture.
- ✓ The area, production and yield is changing in course of time the study is take up a look on selected crops.
- ✓ A comparison of area under agricultural crops and non-agricultural crops is also studied.

OBJECTIVES OF THE STUDY

- ✚ To examine the levels of output of various rain fed crops in Karnataka;
- ✚ To examine the emerging cropping pattern under rain fed cultivation;

- ✚ To study the factors affecting the cropping pattern under rain fed cultivation in the study area; and
- ✚ To derive findings and offer a few suggestions based on this study.

RESEARCH METHODOLOGY

The collected data were classified, processed, tabulated and analysed with some statistical tools like and percentages and averages wherever necessary and interpret the result to arrive at findings. Therefore the study assumed descriptive and survey because it is fact finding investigation.

METHODOLOGY

A systematic designing of the study is sine-qua-non for any scientific enquiry. In this chapter, the general description of the study area, sampling design, the data base and analytical tools and techniques used in the study are presented.

The present study covers the entire state of Karnataka as a single unit and the Tumkur district in particular. The study is based on both primary and secondary data.

Primary data

The primary data is collected from four villages which have been randomly selected from four Taluks of Tumkur district, viz; Balammana Hally of Pavagada Taluk, ID Hally of Madhugiri Taluk, Surena Hally of Koratagere Taluk and Chennana Kunte of Sira Taluk. These four taluks comes under Central Dry Zone of Karnataka. The data required for the study was collected through personal interview of the researcher with the sample farmers with the aid of a schedule. 50 samples were collected from each village and 200 in total.

The questionnaire contained simple questions, but the questions were asked in such a way to have a good discussion with farmers.

The data was collected on the basis of size of land holding, family size, and age of the family members, fertilizers used, income and cost of production. Then required appropriate statistical techniques and tools were adopted to make the maximum use of data and to derive valid inferences.

Though, the data contained various crops, only selected major crops were considered for the analysis, from primary and secondary data.

Secondary data

The secondary data required for Area of cultivation, crops, yield, prices, cost of production and other variables have been collected from various sources such as published and unpublished.

SURVEY OF LITERATURE:

The review of earlier research studies will help in identifying the conceptual and methodological issues for the further research in any study. The past research would enable the researcher to collect relevant data and information and subject them to give healthy reasoning and effective interpretation.

Abedullah and Mubarak Ali (2011) studied the changes in cropping pattern by quantifying the extent and nature of risks in alternative cropping pattern in Claveria, Philliphines, High input and cropping intensity can reduce crop production risk under the rain fed conditions when analysis is conducted at the farm level, weather turned out to be the major risk factor in crop production in his study. Prices played minor role. However, it cannot construe as a general rule and may be valid under the particular situation of rain fed farming.

Singh, and Vivek Kumar, (2011) viewed tribal regions are experiencing agricultural intensification, the market forced one also influencing the cropping system and crop specialization as result of ecological economic changes as well as impact of public policy of technology transfer and resource use demand.

Sing and Sukhvinder (2011) observes that farmers, being more concerned to sustain their livelihood than any ecological considerations, consider the economic aspect of sustainability as the most important criteria while selecting a cropping pattern for themselves. The wheat rice cropping pattern, under given set of marketing and productivity parameters, has been and continues to give them the best returns to sustain their livelihood.

Gill and Brar (1996) examined the competitiveness of some selected agricultural crops in the light of empirical evidence of domestic and international prices, the world commodity situation and the globalization of agriculture will create increased international trading opportunities for those countries/regions which produce a large surplus both in wheat and rice crops, but to be internationally competitive in wheat and rice, the country like India will have to increase farm productivity, introduce efficiency in market handling and lower the tax rates in marketing of these crops. He suggested to concentrate on the export of processed materials instead of non-processed agricultural commodities which will not only retain a large part of the value added with in the country but also helps in generating more employment.

DATA ANALYSIS AND INTERPRETATION:

The collected data were tabulated and presented through percentages and weighted averages. For the purpose of the analysis of the data in this study, generally the tabular analysis is adopted. Wherever necessary, percentages, ratios and growth rates are calculated to facilitate the significance or otherwise of the phenomenon in the data. Necessary graphs were used for enhancing the clarity in the presentation of the data.

Details of Farmers in Tumkur District

Tumkur District has 4, 22,603 of agricultural families and the total land holdings are 698640 hectares. Among them only 4,426 are the big farmers and they hold 65537 hectares. Marginal farmers' families are 206989, and their own shipment is 99015 hectares.

Table: 2.3 No. of families and land holdings

Sl.No.	Category	No. of families	Land holding (in lakh hectares)
1	Marginal farmers(less than one hectare)	2,06,989	99,015
2	Small farmers (1-2 Hec)	10,79,24	1,54,043
3	Medium farmers (2-4 H)	71,335	1,95,375
4	Medium farmers (4-10 H)	31,929	1,84,670
5	Big farmers (10 Hec.)	4,426	65,537
	Total	4,22,603	6,98,640

Source: Tumkur district at a glance. 2009-10 DES

Medium framers families are 71335, and their land is 195375 hectares. Medium farmers who are having 4-10 hectares, their families are 31929 and their land holdings are 65537 hectares. This table tells us that there is glaring inequality in own shipment of the land holdings and easily guess the impact on agricultural operations. Apart from this, the district has 3.13 lakhs agricultural labourers.

FINDINGS:

The major findings of the study based on the field survey data

- ✓ The farmers in the study area using both organic and chemical fertilizers but they found difficult to bear the mounting prices of chemical fertilizers.
- ✓ Farmers have been facing marketing problems; they could not sell their agricultural produces in the open market, as most of them entered into some agreements with the local money lenders or big farmers to sell their agricultural produces at predetermined prices, which are usually far less compared to open market prices. In a situation like this, farmers have been exploited and deprived of benefits from the market situation of selling their produces at higher prices. This perhaps is one of the main causes for the vicious circle of poverty among farming community.
- ✓ A majority of the sample respondents seems to have been ignorant of the various Government schemes intended to benefit farming community.
- ✓ A limited number of respondents making use of the services of the Agriculture Extension Officers in respect of raising new crops, knowing the newer methods of cultivation and it is significant to state that a majority of them practiced monoculture cropping pattern, which has been handed over to them by their fore fathers.

SUGGESTIONS

In the light of the major findings of the study the following measures have been suggested for the fast growth and development of agriculture under rain fed conditions in the district.

- ✓ The state Government has to constitute an expert committee consisting of an Agronomist, an economist, an industrialist, a statesman and the farmers to prepare a road-map for all round development of the district.
- ✓ The state Government has to ensure a corrupt-free administration to effectively implement all developmental programmes/ schemes in letter and spirit in the district.
- ✓ The state Government has to gear-up its machinery, Revenue and Banks- to identify and appropriate local specific economic activities to be pursued for the upliftment of the rural people who largely, hitherto remained excluded from the process of socio-economic development. Besides the NGOs need to be incentivized to create sufficient awareness among the rural people to actively participate in the agricultural allied activities for it paves a way for their economic development.
- ✓ The institutional support rendered to the agricultural sector was not enough as evidenced by the present study. Hence, it is suggested that the institutional agencies have to identify viable opportunities in agriculture and banks are to be directed to provide easy access to

financial assistance to the agricultural sector without insisting on collateral security in disbursing loans to the farmers.

CONCLUSIONS

Tumkur, the sample study area, a drought prone and famine ridden area offers a lot of scope for innovative methods of cropping pattern. Water is the scarcest input in the district. The existing water resources are to be utilized economically to maximize returns from agriculture and allied activities. This situation calls for a suitable cropping pattern of raising such crops which are not water intensity crops. It is, therefore, concluded that farmers may going for new cropping pattern of raising horticulture, floriculture, sericulture, production of oilseeds and all those millets which can be raised in a span of 100 to 120 days under rain fed conditions. In this regard the State Government policy should be such as to encourage farmers through a package of incentives and subsidies to raise such crops other than traditional food crops whose returns are not much lucrative compared to the cropping pattern suggested here above. In order to ensure food security the State Government may initiate steps to arrange to supply the necessary food grains to the people of the district by way of transporting them from the places where they are grown economically in abundant quantity.

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