

1.1 The Problem

‘Agricultural Geography’ in this word, agri. explains the study of this subject, whereas the word ‘geography’ explains the comprehension of the study of the subject. The word ‘Agriculture’ has been derived from the Latin word ‘Agricultura’. The word ‘Agricultura’ is made up of two parts ‘Ager’ means a field and ‘cultura’ mean to culture or cultivate. It means we can say that agriculture means cultivation of a field. It includes crops plantation and rearing of animals from it, so can say that “Agriculture means cultivation of field in order to produce crops and rearing of animals. According to Sahfi, “Agriculture geography is the study of agricultural activities of people.”

Agricultural geography studies the agricultural activities of man and his economic actions for the fulfillment of his needs (B. S. Negi). Agriculture geography is to basically explain how agriculture activity is practiced in different region of the Earth surface, the regional production, types of crops, farming method, rotation of crops, and extensive and intensive agriculture. It also explain the method irrigation, dry farming, application of chemical fertilizers, the nature of agriculture implements, agro-processing industries, etc.

Agriculture is one of the world's oldest industries. It began to develop about 11,000 years ago in the Middle East. At that time, certain Middle Eastern tribes discovered how to grow plants from seeds and how to raise animals in captivity. By about 10,000 years ago, they had mastered these skills and had begun to depend chiefly on farming for food. Before the development of agriculture, people got all their food by gathering wild plants, hunting, and fishing. They had to search for food continually, which left them little time for other activities. But as agriculture developed and farm output increased, fewer people were needed to produce food. The non farmers could then develop the arts, crafts, trades, and other activities of civilized life. Agriculture therefore greatly affected the food supply and made civilization possible.

Agriculture still forms the backbone of Indian economy, inspite concerned efforts towards industrialization in last three decades. Agriculture contributes a high
share of net domestic product by sectors in India. Further, it is not surprising in the Indian economy, with agriculture as the dominant activity, the main source of livelihood is agriculture itself agriculture also has been the source of raw material to India’s leading industries. Agriculture geography has thus become a unique branch of Geography in which physical environment and it’s response to it have become cardinal points of research and regionalization.

Horticulture is the branch of agriculture which specializes in fruits, vegetables, flowers, and ornamental shrubs and trees. Today, Horticulture contributes over 24.5 percent agriculture GDP over 10 percent of the total agriculture export earnings, and is supporting more than 19 percent of the labour force of the country. India is second largest producer of fruits and vegetables in the world. In India the fruits are grown over an area of 3.73 million hectares contributing to an annual production of 46.6 million tons. Indian basket comprises a wide variety of fruits like mango, banana, papaya, guava, grapes to apple peach, almond and walnut among the temperature fruits and anole, bor, pomegranates etc. are the arid zones.

Fruit farming means cultivation of fruit crops in large area in open fields on a commercial scale. Fruit farming is the science and arts of growing fruit plants. This is one of the ways to improve economic condition of farmers. Fruit farming has credibility for improving productivity of land, generating employment, improving status of farmers, enhancing export potential, one-time of capital investment & continuous flow of money and eco-friendly system. In drought-prone areas huge waste land is under cultivation which is improving the rural economic structure. Fruit farming is also very important because the well maintained established orchards give better returns than traditional crops. Traditional fruit crops are normally planted at the farm corners only to fulfill the family needs.

Geographical analysis of food grain to fruit farming in Drought Zone Area of Sangli District is concerned with the physical and socio-economic factors. These factors affect the cropping pattern and selection of crops. Farmers in dry zone area always try to cultivate low water required and high beneficial crops. That’s why, the food grain crops to fruit crops transformation is analyzed in this study.

1.2 Selection of the region

India is a predominantly agricultural nation and Maharashtra state in India occupies a very important position which ranks third in area and second in population.
Fruit farming is mainly concentrated in Nasik, Sangli, Amravati, Ahmenagar, Jalgaon, Nagpur and Solapur districts. These districts are leading in respect of area and production under fruit crops. Though the fruit farming is not native to this region, it has emerged as well as established form of land-use with the passage of time and has been done successfully.

Within Maharashtra the Sangli district has significant position as regards to area. There is good scope to increase the area under fruit crops. The geographical setting and ecological factors have given boost to it.

The region under study i.e. Sangli district lies to the southern part of Maharashtra state on the border of Maharashtra and Karnataka State. The district of Sangli lies between 16°45’ north to 17°33’ north latitudes and 73°42’east to 75°40’ east longitudes. The average height of Sangli district from mean sea level varies from 500 meters to 1100 meters. The district is bounded by Satara District on the north western side. On the northeastern side it is bounded by Solapur district. On the southern side it is bordered by the Belgaum and Bijapur district of Karnataka state at the centre and east and Kolhapur district is in the west. The Ratanagiri district lies on the west of Sangli district. The total area of Sangli District is about 8601.5 square kilometer.

For Geographical study of food grain to fruit farming in Dry Zone area of Sangli District is selected as a study region. For the purpose of study, the six tahsil (Atpadi, Khanapur, Jat, Tasgaon, Miraj and K.Mahankal) are selected which belong in dry zone area. The region under investigation has been influenced by several considerations.

1. Climatically entire region falls in the rain shadow area. Climate of the region is generally dry except, during south-west monsoon season. There is a spatial as well as temporal variation in the distribution of rainfall. The rainfall variability is more in the study region.

2. The study region has irrigation facilities through wells, tube wells and canals. Irrigation has played an important role in transforming the agricultural landscape and life of the rural people in the study region.

3. Soils of the region are mainly derived from trap rocks. Basaltic rock-structure is the main parent material for the formation of soils. Agriculture is developed in the region of deep and medium black soils, where irrigation facilities are
available. Shallow and medium deep soils of the region are more suitable for fruit crops.

4. Economy of the region has an agrarian base. Out of the total working population nearly 80 percent working population is engaged in primary economic activities, especially in agriculture and allied activities.

5. Out of the total gross cropped area in the study region about 24.76 percent area is under irrigation. Irrigation has played an important role in transforming the agriculture landscape in general and fruit farming in particular, and life of the rural people in the study region.

6. The study region has a fairly good system of road and rail network. This region has accessibility for market through transportation and communication network. Transport plays an important role in the economic development of the region and rural-urban interaction.

7. The physical and socio-economic environment of the region has provided a good potential for the development of the fruit farming.

8. Farmers of this region have given much response to “Phalodyan Vikas Yojana” (1990-91) and innovations in water supply systems, particularly drip irrigation system.

9. The researcher, who is born and brought up in the study region i.e. Sangli district, is quite aware and well-acquainted with the geographical environment of the area. So, it is helpful in carrying out the field work and required data for the purpose of study.

10. The work on the “Grain Farming to Fruit Farming: A Geographical study in Dry Zone of Sangli District” has not yet been attempted by any other geographer and such type of work can be useful for preparing and implementing developmental schemes regarding fruit cultivation. So the researcher has selected this region and topic for the purpose of geographical investigation.

1.3 Selection of Crop

The fruit farming is very important for developing countries like India in order to meet increasing demand of food, to make a balanced diet, to improve the rural economy, to solve the problem of unemployment, to bring the huge waste land under cultivation, to improving the economic condition of farmers in drought-prone area to develop agro-based industries in rural area. It is also important because it plays an
important role in generating employment potential in farm and non farm sector. They are best situated for agro-forestry, social forestry and water-shade development programmerse.

The economic aspect of fruit farming i.e. well maintained and established orchards, give better returns than the traditional crops. The importance lies in per unit area yield, high net profit, source of raw material, efficient utilization of resources, and utilization of waste and barren land, ability of earning for high exchange, one-time capital investment and continuous flow of money. Moreover, fruit farming is one of the important branches which diversified farming in the study region. It also promises the development of several ancillary industries like preservation, dehydration, essence oils, packages, transport and refrigeration etc.

The accumulative effect of these many-sided efforts is farmers in Sangli district are shifting over to the cultivation of Fruits. Therefore, the researcher has selected the food grain to fruit crops for the present investigation based on following considerations.

- Today, fruit cultivation is an option of food grain crops of the region.
- Fruit crops are required low water compare to food grain crops.
- Drip irrigation system are used for fruit crops which is water saving technology, however it is not easy to use for food grain crops that’s why flood irrigation system used which waste amount of water.
- Among the fruit crops, the inter crop are cultivated which support farmers at the time of crop failure, but in food grain inter crops are not cultivated.
- State and central Govt. has give more subsidies for fruit crops for plantation, tree crops, irrigation, etc. which are not available for food grain crops.
- Shallow soil is best useful for fruit crops which 60 percent to total soil in DZSD while it need more water for food grain cultivation.
- National and international markets are available for fruit crops while food grain crops are sold in only local and domestic markets.
- Agro-processing industries for fruit crops in region or state while no agro-processing industries for food grain crops in the region and very few in the state.
- New agriculture technology used for fruit crops cultivation like tractor, chemical weed control, chemical fertilizers in drip, etc. and other hand food grain crops are cultivated in proper old method that’s why production cost of food grain increased compare to fruit crops.
The environmental parameter affects growth, quality, size, distribution, concentration and production of fruit crops.

Fruit cultivation has influenced the farmer’s economy to a considerable extent due to high per hectare return compared to food grain crops in the drought prone area.

So it has been decided to study food grain to fruit crops in dry zone area of Sangli district. Because out of these considerations the fruit crops has been selected for the study.

1.4 Selection of Period

For the present study, the selected period is twenty year and this is 1989 to 2009. The main reasons of this period selection are followings.

1. The population pressures on agriculture land use tremendously increase after 1990 as well as literacy of population increased. Increasing unemployed population turned to agriculture and cultivated crops in scientific matter.

2. The Government gives more subsides on fruit farming.

3. The fallow land and shallow soil share in total geographical area is huge which is favorable for fruit cultivation. Literate and young farmers want to cultivate fruit farming for maximum profit.

4. The new ideas of fruit farming in dry region are provided by Govt., Agencies and NJO. For exam- Drip irrigation system and farm storage tanks etc.

5. Agro processing industries developed, however the demand of fruit crop increased and cost also increased.

6. The transport and communication are developed; therefore farmers sold their fruits on big city easily. The communication like mobile, television, farmer conferences, agriculture exhibition, agro won news paper are well developed which gives new ideas and suggestion for best fruit farming.

1.5 : Objectives

Following are the main objectives of the study:

1. To identify the dry zone area of Sangli District.

2. To study the physical setting of the region as a basis for food grain and fruit crops.

3. To study the socio-economic setting of the region as a basis for food grain and fruit crops.
4. To analyse the spatio-temporal changes in food grain crops and fruit crops in the study region.

5. To measure and examine the food grain to fruit crop transformation.

6. To assess the causes of agriculture transformation in study region.

### 1.6 Data Base

Data has been collected through primary and secondary sources. Primary data has been collected through field visits to the farmers with interview schedule for which special interview schedule was prepared by considering objectives of the study. Data regarding the farmers was collected by observation of the farms and personal talk with the farmers. Secondary data has been obtained from socio-economic reviews of the district, district census handbooks, gazetteers, agricultural epitomes, bulletins, periodicals, seasons and crop reports, etc. The data thus collected through primary and secondary sources has been classified, tabulated and analyzed by using various statistical techniques and presented by using various cartographic methods by using GIS.

In the present work Dry Zone Area of Sangli District (DZSD) is selected as a study region in general and each tahsil of the district as a component areal unit. Period of investigation is of twenty years (1989 to 2009). For the micro study 45 villages from DZSD have been selected. Among the 45 villages 4 farmers are selected in each village. Micro study focuses on farmer’s socio-economic status, physical situation of farms, food grain crops, fruit crops area and changes in during the investigation period.

### 1.7 Methodology

This research work is based on secondary and primary data. Secondary data have been processed and represented by many cartographic techniques and different statistical methods. The data have been analysed and shown by many cartographical and statistical methods.

In the present work Dry Zone Area of Sangli District is selected as a study region in general and each tahsil of the district as a component areal unit. Period of investigation is of twenty years (1989 to 2009). The spatio-temporal changes in
general landuse, agriculture landuse are analysed during investigation period in study area. The annual variation, index number and agriculture transformation of food grain and fruit crops are calculated in this study.

For micro level study area consist six tahsils of Sangli District which located in Drought prone area. Then all villages arranged alphabetically in each tahsil of study area. Then the 10 percent villages are selected as a sample in each tahsil of study area. In this way, the total 45 villages are selected form total villages (449) of study area. After that the four farmers are selected purposive sampling in each selected village and the total 180 farmers are selected to study food grain to fruit crops transformation.

Sum of the methods used in the analysis of the present study are given below.

1. Irrigation Intensity:

\[
\text{Intensity of Irrigation} = \frac{\text{Net Irrigated area}}{\text{Gross cropped area}} \times 100
\]

2. Population Growth Rate :

\[
\text{PGR} = \frac{P_2 - P_1}{P_1} \times 100
\]

Where:

PGR = Population Growth Rate
P2 = Population of Current Year
P1 = Population of Previous Year

3. Population pressure on Agriculture land:

\[
\text{Relative coefficient of over population} = \frac{\text{Per Capita Land (Hect.)}}{0.4047 \text{ hect.}}
\]

Where –

0.4047 - Standard hectarage 0.4047 hect. suggested by Swamithan (1974)

4. Agriculture Density :
Cultivators + Farm Workers

Agriculture Density = ---------------------------------
Agriculture Area

5. Index number of crops

\[ P_1 \]

Area Index = \( \frac{P_1}{P_0} \times 100 \)

Where

\( P_1 \) = Area crop in current year
\( P_0 \) = Area of crop in base year

6. Analysis of correlation

\[
r = \frac{\sum dx \sum dy (n) - (\sum dx)(\sum dy)}{\sqrt{\sum dx^2(n)(n) - (\sum dx)^2} \sqrt{\sum dy^2(n)(n) - (\sum dy)^2}}
\]

1.8 Review of Literature

The knowledge of research work done in the past relating to the research problem is necessary & helpful to proceed in the right direction. Researcher would be able to make an improvement over the existing studies & also expand horizon of investigation. The review could also help refuting the concepts & statements made in earlier studies as well as supporting the findings of present study following foreign as well as Indian, scholars who have contributed and carried out the study related to fruit farming in India.

Majid. Husain (2004):

He has made important contribution in his book entitled “Agricultural Geography” that fruit farms are small and are located where communication links with the consumption centers are appreciably good. Soil fertility is maintained by the heavy application of manures and fertilizers.


This is committee formed by government of Maharashtra for the development of fruit growth potential in drought prone area of Maharashtra, In his report committee has rightly pointed out the significance of horticultural crops for the
development of the state economy. This committee has acquired importance all over the world because of horticultural crops play an important role in human nutrition, help to improve the economic status of the farmers, generate employment potential on farm and non-farm sectors in rural area and help in conserving soil and environment.

**Pujari. A. G. (1993):**

In his Ph.D thesis entitled “The Progress and Prospects for Development of Pomegranate and Ber Fruits in Solapur District” he stated that about the cost of establishment, cost of cultivation and cost – benefit ratio of ber and pomegranate orchards.


In their article ‘Fruit Farming in Drought Prone Area of Maharashtra - A Micro Level Analysis of Pomegranate Farming”, they highlight the various aspects of fruit farming with special reference to pomegranate in drought-prone area of Maharashtra.

**Bal. J. S. (2003):**

In his Book “Fruit Growing” he tried to give scope of fruit farming in India. He stated that the living standard of the people can be judged by production and consumption of fruits per capita. He has also pointed out that India is climatically favorable for the production of a variety fruits.

**Hajare. R.V. (2007):**

He recorded in his Ph.D. thesis entitled “A study of Fruit Farming in Maharashtra Plateau” that though the fruit farming is not native to this region it has emerged as well as established form of land-use with passage of time and has been done successfully. This region has developed various fruit pockets. The geographical setting and ecological factors have given boost to fruit farming.

**Todkari. G.U. (2009):**

In his Ph.D thesis entitled “Impact of environmental factors on crop land use in Solapur district with Special reference to grapevine cultivation” he analysed the Spatio-temporal variation in grape fruit farming, economy, and marketing of graps in Solapur district.

**Prasad. S. and Kumar. U. (2010):**

In his book “A Handbook of Fruit Production” stated that the nature is given to diverse geographical soil and agro-climatic condition in varies region. Hence it is possible to grow various kinds of fruits in the different stats of India. The
classification of fruit reflects the fundamental structure of the flowers from which the fruits are derived. The fruit is as the product of the entire gynoecium and the floral parts that may be associated with the gynoecium at the fruit age.

Prasad C.S. (Edited 2006)

He has examined the sixty years of Indian agriculture 1947 to 2007. He has worked as senior research officer in the planning commission of the Govt. of India, New Delhi from 1975 to 1981. He has explained Indian Agriculture past and present. This work is divided into six parts. Part I covers fourteen chapters, Part II covers with the first to the tenth five year plans part III covers the year wise review of agricultural development in India, 1947-2006. Part IV is related with time series data (1950-51 to 2004-05) on Indian agriculture. The whole scene of the Indian agriculture has been explained by Dr. Prasad.

Shashi Bala Singh (2008)

He has analyzed the changing pattern of land use, land use efficiency and cropping intensity in Sant Ravidas Nagar, Uttar Pradesh. He has also explained the changes in land use efficiency and intensity of cropping in Sant Ravidas Nagar district of Uttar Pradesh. Gyanpur block has highest increase of 160.69% to 133% in 1981. Aurain had the second highest cropping intensity (155.41%) while Suryawan had the third rank (147.71%) during 2001.


He have discussed the changing pattern of irrigation in Andhra Pradesh. They have also explained irrigation as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is imperative for successful agricultural particularly the arid, semi-arid and sub-humid areas which are prone to drought and famine conditions due to partial failure and delayed Arial or early with drawls of the monsoons. The study area Andhra Pradesh has substantial area under semi-arid climate; agriculture is a gamble with monsoon.

Awate S.J. (2013):

He studied the fruit farming in Solapur district which is located in drought prone area of Maharashtra state. He explains very clearly and simply the benefit of fruit cultivation in drought prone area. He measured the spatio-temporal growth of fruit farming in study region. The problem of fruit farmers consisted in his study and suggests best solution.

The landuse pattern in Kohapur district is studied by More K.S. According to him, the technological determinants largely affect on cropping pattern. He calculated the spatial organization of agriculture in Kolhapur district on the base of six villages in Kolhapur district. He measured the agriculture development in Kolhapur district in his study.

1.9 Organization Of The Work

The present study entitled “Grain Farming to Fruit Farming A Geographical Study In Dry Zone of Sangli District (1989 - 2009)” is based on the above objectives and methodology. The thesis includes seven chapters. The contents of each chapter have been presented below.

Chapter I:- ‘Introduction’

This chapter under the title ‘Introduction’ explains the significance of the theme select, the objectives, data base, methodology, and choice of study region, choice of crop and brief review of relevant literature as well.

Chapter II:- ‘Identification of Dry Zone OF Sangli District’

Under the title ‘Identification of Dry Zone OF Sangli District’ the term ‘drought’ and identify the dry zone area of district. In this chapter a detailed explain the ‘drought’ term, types of drought and account of the study area, its location and extent history, administrative setup, of the district. The dry zone area of Sangli District is indentified in this chapter by using quantitative techniques.

Chapter III:- ‘Physical and Socio-economic Setting of the Dry Zone Of Sangli District’

In this chapter under the title ‘Physical and Socio-economic setting of the Dry Zone of Sangli District’ an attempt has been made to study the physical and socio-economic factors which influence on agriculture. In this chapter the relief, geology, drainage, soil, climate, population growth, population density, population literacy, agriculture density, population pressure on agriculture, agricultural implements, and sources of irrigation and transport network are discussed.

Chapter IV:- ‘Land-use’

Under the title ‘Land-use’ the chapter is devoted to the analysis of general land-use pattern and agriculture land-use pattern and changes therein. In this chapter,
the general land-use is divided into major five major categories and temporal changes therein are observed. For the analysis of agriculture land-use, food grain and non food grain crops analysed in the from of spatio-temporal variation.

**Chapter V: ‘Grain Farming to Fruit Farming Transformation’**

Under the title ‘Grain Farming to Fruit Farming Transformation’ it deals with food grain and fruit crops. The measurement of the annual variation, index number of crops and spatio-temporal variation of food grain and fruit crops are discussed here. The agriculture transformation especially food grain to fruit crop are calculated in this chapter.

**Chapter VI: ‘Analysis of survey work’**

Sixth chapter deals with Analysis of survey work. This chapter is completely based on the field survey data. It includes method of sample selection, physio-cultural status of sample farmers, general landuse of sample farmers, agriculture transformation in sample farmers, causes of food grain to fruit crops transformation and problem of agriculture transformation are discussed in this chapter.

**Chapter VII: Conclusions and Suggestions**

The last chapter deals with conclusions and suggestions. In this chapter results emerged from the analysis of the data in the preceding chapters are stated in form of conclusions. The problems related with fruit cultivation discussed in detail. The important suggestions are also given in this chapter to improve the overall condition of the fruit cultivation in the study area.

**References**


