CHAPTER- I

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CHAPTER- I
INTRODUCTION

1. INTRODUCTION

The Science of cultivating soil, growing and harvesting of crops, domestication of animals and raising of live stock is known as agriculture. Agricultural land use is the basic resource, which play a strategic role in the socio-economic development of the nations. Among the land resources agricultural land resource have always played a vital role since time immemorial, engaging the largest percentage of the inhabitants of the world.

Agricultural land use is of vital importance, because land is finite and its uses restricted, which in most normal circumstances has been put to agricultural activity; supplying the life source to the mankind. The importance of monitoring for land use and agriculture become vital because both factors have direct bearing on the sustenance of man. So much so that even the progress and performance of the industrial sector. Besides meeting food necessities of India’s huge population, agriculture provide the raw material to agro-based industries, accounts for the largest chunk of employment to the labour force, and earns considerable amount of valuable foreign exchange.

The traditional methods of cultivation continued to dominate the since till we achieved independence. The agriculture continued in this country more as way of life than as an occupation. The knowledge of cultivation transfer from one generation to another. As such for a very longer period, there was absolutely no change either in the method of cultivation or in the cropping system. There has been unvarying change in the pattern and type of land use with the increasing pressure of population and consequent demand for cereals, development action and technological improvement. Some noticeable trends include raise in the net sown area during the last five decades, so as to reach optimum level during the investigation period. Where as decrease in the area of barren and uncultivated land, cultivable waste land and fallow land, more recently, growing complexity of land use due to urbanization and industrialization, intensification of rural land use through multiple cropping, mixed farming and crop
diversification and emphasis is on profit oriented land use. In sum, there is considerable change in pattern of agricultural land use during last two decades.

1.2 CHOICE OF THE REGION AND TOPIC

The choice of the region and the topic under investigation has been influenced by several considerations. The selection of the topic for the purpose of research and its application to certain region is in fact, a very difficult task. Each topic has its own problem and direction. How to tackle them is a work of researcher. Once, the topic is selected then the work only remains to investigate the problem associated with the region. Every researcher selects the problem of his own interest and the region generally is selected, which is more familiar and accessible to the researcher. It is generally proximate region to the researcher that enable researcher to understand the problem more precisely. The topic entitled “spatio-temporal change in agricultural land use in Ratnagiti District: A Geographical Analysis”, also satisfies the above mentioned condition.

Ratnagiri district is situated between 16°13’ to 18°04’ N. latitudes and 73°02’ to 73°52’ E. longitudes. It is surrounded by the Raigad district in the north, Sindhudurg district in the south, Arabian Sea in the west, and in the east the Sahyadri ranges, beyond the Western Ghat Kolhapur, Satara and Sangli districts are located. Ratnagiri district comprising the nine tahsils, namely Mandangad, Dapoli, Khed, Chiplun, Guhagar, Ratnagiri, Sangameshwar, Lanja and Rajapur. Ratnagiri district has an area of 8208 sq. km and population 1615069 persons as per 2011 census. It ranks 18th in term of area and 23rd in term of population and 27th term of density. To investigate the correlation between population distribution and agricultural land use in the district.

The horticulture farming is native to this region, it has established and developed from land use with the passage of time and has been done successfully. Ratnagiri district may be regarded as the horticultural heart land of Konkan. Within Konkan the Ratnagiri district has significant position as regards to area. There is good scope to increase the area under horticulture crops. The geographical setting and ecological factors have given boost to it. To study the percentage share of horticultural crops in the total cropped area of the district.
The district of Ratnagiri occupies a very significant position in the south konkan. Terrain and altitude differences in the district though not large, all the same, have set their stamp upon the agricultural land use of the region. Therefore, it is required to study the entire region in a geographical view.

The average annual rainfall in the district is about 4841 M.M. which is unevenly distributed. It is the most dominant single weather parameter and climatic hazard in the district that influences plant growth and crop production because of its uncertainty and variable nature of rainfall. Annual variation in rainfall from year to year is very large in the study region. Therefore, it is necessary to study entire district in a climatic view.

The soil mantle of Ratnagiri is derived from the Deccan trap and be studied under the lateritic soils and the non-lateritic soils. The soil characteristic in the study area differ from place to place being mostly controlled by local topography, underlying rocks, and the types of vegetation. Soil erosion is the main problem in the study area. Therefore, to suggest the remedies to control the soil erosion.

There is no major irrigation project in the district, only four medium irrigation projects are found in the region, of which the work Jamada irrigation project is not still start. Nearly about 981 minor irrigation projects are completed at the end of 2014 census. It means, there is wide scope for the irrigation development in the field of agriculture of the district.

The majority of people’s livelihood is mainly depend upon agriculture, but the proportion of per capita cultivable land is very less and proportion of level land is limited, it confined to coastal regions and along the river valleys in the form of patches. The large part of the district is less useful agriculturally, being rugged and having greater proportion of average slopes. That’s why, it is necessary to study the region from the agricultural point of view.

The forms of agricultural activities and farm economy as a whole are influenced in a large measure by relief, soil and climate. This investigation proposes to deal with the main physiographic characteristics of Ratnagiri district in order to provide a perspective for investigation the various land use crop, livestock and agricultural practices in the study region.

The Vasishti, Shastri, Bar, Muchkundi, Jaitapur and Jagbudi etc. are important rivers in the district. Whole the rivers are short and mostly parallel. But in the middle part of tributary pattern tends to be rectangular, suggesting stream adaptation to local
rock structure. It is also well marked in the sharp meanders, which are noticeable in the middle and lower reaches and deeply entrenched nature of the beds. To consider all these characteristics of the river systems, it is very essential to study the drainage pattern in the view of irrigation.

Out of the total geographical area of the district, about 72.45% of land is cultivable, but due to estuaries, undulating topography, only about 45.95% area is actually brought under cultivation. To investigate, the how much changes are occurred in land use pattern during the period under observation.

Agriculture in the region is mainly of intensive subsistence type since longtime, where in paddy or wet rice is the single dominant crop. In recent years, especially after the commencement of planned development in the country parts of Ratnagiri district is being affected by far-reaching influences and pressures from external sources. These include the impact of commercialism on traditional farming practices. Therefore, it is become necessary to investigate, which crops are disappear and which crops are new enter in the cropping pattern of the district.

The work on the “spatio-temporal changes in agriculture land use in Ratnagiri 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 the agricultural land use. So, the researcher has selected this region and topic for the purpose of geographical investigation.

1.3 OBJECTIVES

The present research work is to study the spatio-temporal changes in the agricultural land use in the Ratnagiri district, during the period of least two decades from geographical view point. This broad objective can be broken in to the following main components.

1) To analyses spatial variation in agricultural land use in the context of physio-socio-economic environment.
2) Critical analysis of the spatial pattern in agricultural land use at the end of the investigation.
3) To study the spatial and temporal changes in agricultural land use efficiency during the period of investigation.
4) To study the population characteristics and its effects on agricultural land use.
5) To assess the impact of use of high yielding variety seeds, mechanical etc. inputs on agriculture.

6) To analyze and map the spatio-temporal distribution of irrigation facilities and its effects on cropping patterns.

7) To study the role of agricultural credit society, marketing, transport, electricity etc. non-physical determinants in the transformation of agricultural land use of the district.

8) To investigate the agricultural cropping pattern and its variation in the district.

9) To assess the trend of crops production and yield in the district.

10) To study land use and cropping pattern of selected villages.

11) To draw conclusions and find out the agricultural problems and suggest suitable remedies to solve them.

1.4 HYPOTHESIS

Hypothesis is needed for any research to arrive at specific goals. It is provisional formulation and tentative solution of the problem facing the scientific knowledge. In this work also hypothesis can help a great deal for attaining scientific approach. On this background following general assumption, which this inquiry follows…..

a) Relief, climate and soil have put broad limit on the use of land, and cultural factors, may play an important role, in the making the change in agricultural land use.

b) The region under study is agriculturally backward, whereas the physiographic control and input differential are responsible for this. The general land use and cropping pattern is changing, as per irrigation facilities and percentage of monsoon rains. Agricultural problem can be solved by improving land use pattern and by maintaining quality of land.

1.5 THE STUDY REGION

Ratnagiri district lies along the west coast forming a part of traditional ‘Konkan land’ between 16°13’ to 18°04’ North latitudes and 73°02’ to 73°52’ east longitudes. The district is bounded by Raigarh district in the north, Arabian Sea
towards the west, Sindhudurg district on the south and Satara, Sangli and Kolhapur
districts to the east. The headquarters of the district is at Ratnagiri, which is 370 kms.
far from capital of Maharashtra, Mumbai. It is well connected from Mumbai and
Kanyakumari by Konkan Railway, which passes through the district. District also has
a good network of roads, which connects it from the other parts of the country.

1.6 DATABASE AND METHODOLOGY

The data information are the most vital requirement for a research. The
analysis of the entire research is to be based on the data and information collected.
Data and the information are the basis for analysis of any problem. The types of data
and its authenticity influence the result emerging from the analysis. If, the data is not
correct and authentic, the results may not be derived correctly.
Data has been collected through primary and secondary sources for the period (1991-
92 and 2011-12). Primary data has been collected through field visits, for which
special interview schedule was prepared by considering objectives of the study.
Primary data gives more authentic result, and then the secondary data has been
obtained from socio-economic reviews of the district, district census handbook,
gazetteers, agricultural epitomes, bulletin, periodicals, seasons and crop reports etc.
Data regarding consumption of fertilizers, high yielding variety seeds, pesticides had
been collected from Zilla Parishad Office Ratnagiri.

For micro-level study six villages were randomly selected and plot to plot
survey has been carried out during the course of research work. The data regarding
the agriculture such as sources of irrigation, area under various crops, general land use,
population, live stock and problems of agriculture has been collected.

The collected data was processed, edited and analyzed by applying different
statistical methods and is presented through tables, maps and diagrams. Figures are
prepared and certain statistical and quantitative techniques have been applied to find
out the relation between different parameters.

For studying the pressure of population on agricultural land, agricultural
density, caloric and nutritional densities has been calculated. These densities have
been computed by using parameters i.e. area and population. For measuring the actual
pressure of population on agricultural land the relative co-efficient values of over
population has been computed by taking in to consideration the standard hectares.
For study the degree of dynamism in land use, the index of total volume of change is calculated by using Jasbir Singh (1974) method. As per this method in a given area unit, the summation of positive changes in land use types on one side and the summation of negative change in land use on other side, would given certain value and which is the degree of dynamic

Jasbir Singh’s formula is as follows.

\[
\text{The index of total volume of change} = \frac{F + B + C + A}{0}
\]

Where,

A= Agricultural land.
B= Forest.
C= Fallow land
F= Non-cultivable land.
O= Other uncultivated land

Above letters have been group in a combination form, where letters present the land use type and figures show their role and rank.

The index of land use efficiency is calculated by dividing gross cropped area by net sown area into hundred. Index of land use efficiency is calculated by following formula.

\[
\text{Land use efficiency} = \frac{\text{Gross cropped area}}{\text{Net sown area}} \times 100
\]

Weaver’s method is used for delimitation of crop combination in the study region. The procedure of this method is explained as follows.

\[
\text{S.D.} = \sqrt{\frac{\sum d^2}{n}}
\]

However, as weaver pointed out, the relative, not absolute value being significant, square roots were extracted, so the actual.
Formula used was as follows.

\[
\text{Variance} = \frac{\sum d^2}{n}
\]

Where,

\[ d = \text{the difference between the crop percentage in a given areal unit and the percentage in the theoretical percentage.} \]

\[ n = \text{the number of crops in a given combination. Bhatias method has been used for the computation of index of crop concentration.} \]

<table>
<thead>
<tr>
<th>Index for determining Concentration of Crop</th>
<th>Area of the crop ‘a’ in the component areal unit</th>
<th>Area of crop ‘a’ in the entire region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area of all crops in the component areal unit</td>
<td>Area of all crops in the entire region</td>
</tr>
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</table>

In order to assess agricultural productivity, Jashir Singh’s Method (1972) of crop concentration indices ranking co-efficient has been employed. On the basis of index values high medium and low productivity category regions were demarked and the maps were prepared.

To investigate the spatial patterns of crop diversification in the study region, J. Singh’s (1976) formula is used as given below –

\[
\text{Index of crop Diversification} = \frac{\% \text{ of total cropped area in } ‘n’ \text{ crops}}{\text{Number of } ‘n’ \text{ crops}}
\]

1.7 REVIEW OF LITERATURE

Before one start working on particular concept it origin and development should be considered. It would be more useful for comparing the views and ideas expressed in the researcher’s findings the light of work done earlier. Brief account is given as under.

1. **Sharma R. P. (1978)**: has studied spatial characteristics of land use and efficiency of Chhatisgarh region. In his study he tried to explain the efficient ways of land utilization, he used the developed land use efficiency concept ranking score basis.
Six variables such as net sown area, non-cultivable land, cultivable land, irrigated area, area cropped more than once and cropping intensity have been considered in calculating the ranking scores. On the basis of the above mentioned method, he grouped the tahsils of the region into three efficiency groups. According to him technological attainments act as an important factor is different land use stages, but not always with the same intensity mainly because of (I) topographic unsuitability (II) friction of distance and (III) socio-economic factors such as cultural lag least contact and economic lag.

2. Das M.M.(1979): he has studied land use pattern in Assam. One of the most significant features of land use in Assam is that a large proportion of its area is not suitable for agricultural activities. Therefore, he has given emphasis on increasing the productivity of crops and also on multiple cropping on the existing farmlands in the coming decade. He used weaver’s index to find out the volume of land use change. District wise indices are classified into three categories dynamic, semi dynamic and static, which are represented in chiropleth map.

He concluded that scientific planning is necessity for the development and proper utilization of the most valuable land resource of the state. Agricultural land should not be extended further at the cost of other categories of land use. Instead of expansion, more emphasis should be given on intensive use of the cultivable areas with the help of modern input like fertilizers, irrigation, better seeds etc. in order to get optimum level of growth and development.

3. Mohammad and Bandooni(1981): Both authors have studied the impact of out migration on patterns of agricultural land use in the Pauri Garhwal district of U. P. Himalayas. The study is predominantly based on primary data but secondary data have also been used for meso-level study. The impact of out migration on pattern of agricultural land use has been assessed at two levels i.e. the district level and the respondent level. The former is based on secondary data taking tahsil as unit of analysis, while the later is based on primary data collected from 14 selected villages located in different physiographic zones of the district. From these villages 168 households have been selected for in depth micro-level study. The study reveals that there has been a lot of inter and intra-sectorial changes in the uses of land. The different categories of land use excluding forest have shown a positive change with 0.2 to 3.18 index of volume of change. The maximum increase is recorded incase of
area under groves and fruits which indicates a structural shift. In cropping pattern from crop farming to horticulture.

4. Siddiqi, M.F. (1985): In his article, he has described and explained the agricultural practices and agricultural changes during 1950-51 and 1985-86 in Bundelkhand region of Uttar Pradesh. The author has given a reasoned account of agricultural development, general land use and its irrigation system in the region, where canal is dominant source of irrigation accounting 75% of the irrigated area. Kharif and rabi are the main agricultural seasons. Bajra and small millets are the major crops of the former. While wheat, gram, lentil, oilseeds are principal crops of the latter season. He noticed that this system is adopted due to typical environmental conditions mainly in case of soil and climate. He also observed that due to poor quality of soil, the double cropped area is in significant and the change of its increase is also very meager.

5. Majeed, Abdul (1989): In his paper, he has given a critical review of the major land use surveys conducted in the world, and has ascertained that there are mainly three approaches to land use surveys viz. census approach, unit area approach, and sampling approach.

6. More, K.S. and Shinde, S.D. (1978): Both authors have studied the population pressure on agricultural land in south Maharashtra by measuring the pressure of population on agricultural land. They have computed different land use densities such as crude, physiological, agricultural nutritional caloric. They have also computed the relative co-efficient of over population. Their study shows that the relative co-efficient of over population of the region was 1.49 and that for Maharashtra state was 0.76. The region exhibits an example on south Maharashtra with its increasing pressure of population on agricultural land. Which is more pronounced in plains than upland parts of the region. In their study, they have suggested that for minimizing the pressure of population on agricultural land, agricultural production has to be substantially raised by making more intensive use of land.

7. Shinde, S.D. (1980): In his book “Agriculture in an undeveloped region.” The book has been organized into ten chapters. The study is confined to the taluka of the five districts (old four districts) comprising the Konkan region. The entire discussion in this book thus rests on what has emerged from some seventy five maps based on detailed data, with its stress on the spatial patterning of agriculture, focuses
attention on the interplay of environmental and socio-economic forces as they operate in the region. The factors of farming underlying contemporary land use, cropping pattern and changes there in are outlined according to the evidence of statistical analysis from 1950-51 to 1970-71.

The spatial approach, and the agricultural regions worked out here, may provide a basis for future planning and development.

8. Suryawanshi, M. V. (2008): In his Ph.D. thesis entitled “changing pattern of Agricultural Land use in Raigad District” submitted to Dr. B.A. Marathwada University Aurangabad. He analyzed the spatio-temporal changes in agricultural land use for the period 1980-81 and 2004-05. This study has been organized into eight chapter’s introduction, objectives, Database methodology, review of literature study plan etc. is presented in chapter first. The second chapter divided into part first part A deals with the environmental setting covering detailed information of relief, climate, drainage, Geology and Soils. In the part B author has focus on the major socio-economic factors as bases of farming in the study region and includes the analysis of demographic structure, transport live stock, agricultural implements and other inputs. Sources of irrigation, spatial pattern of irrigation and intensity of irrigation are discussed in chapter third. The concept of land use, tahsil-wise land utilization and degree of dynamism in land use, changing cropping pattern, tahsil-wise trends in area under various crops, agricultural regionalization and land use efficiency are considered in chapter fourth and fifth. Agricultural productivity and micro-level analysis of selected villages are discussed in sixth and seventh chapter. The last chapter forms the concluding a brief review of the problems confronting agriculture in Raigad district. Finally, author has concluded that the forms of agricultural activities and farm economy, as whole influenced in a large measure of relief, climate, and soil.

9. Suresh Phule (1999): He recorded in his Ph.D. thesis entitled. “Agricultural Geography of the Marathwada Region of Maharashtra state.” He has focused on the impact of physical and cultural factors on the general land use cropping pattern, productivity and trend of crop production. The work is based on primary and secondary data, for the period of 1970-71 to 1994-95. Finally he concluded that the traditional cropping pattern is the obstacle in the development of agriculture in the Marathwada region.
1.8 A TENTATIVE CHAPTER SCHEME

The present study is divided into eight chapters. The first chapter is concerned to the introduction, choice of the topic and the region, objectives, hypothesis, the study region, database and methodology, review of literature and a tentative chapter scheme.

The second chapter deals with location and boundaries, historical background, territorial changes, physiography, drainage, climate, soil types and natural vegetation of the district.

The third chapter is associated with non-physical determinants such as irrigation, demographic characteristics, animal resources, agricultural implements, improved seed, organic manures and chemical fertilizers, agricultural credit and finance, electrification, etc.

The fourth chapter deals with the introduction, meaning and importance of land use, land use pattern in Ratnagiri district, tahsil-wise trends in land use, overall volume of change in land use and land use efficiency.

In the fifth chapter an attempt is made to study mean standard deviation, variability and compound growth rate of selected crops. This chapter also considered with changing cropping pattern, tahsil wise area under various crops, crop combination, crop concentration and pattern of crop diversification and changes therein the study area.

The sixth chapter deals with the broad trends and variations in production and yield of selected crops in the study region. Tahsil-wise trends of production, yield, productivity and overall productivity are analyzed in this chapter.

The seventh chapter concerned with the case study of selected villages in the study region. In which general land use, cropping pattern, live stock, agricultural implements etc. of selected villages are studied at micro level.

The last chapter is associated with the conclusion and suggestion. It gives certain generalization of the work done in all concerned chapters. At the same times it also provides results and findings obtained by the analysis. This section also suggests some of the important remedies and suggestions to solve the problems.
1.9 REFERENCES