CHAPTER-I
INTRODUCTION

Agriculture is the principle activity in India with more than seventy per cent of the working population engaged in agriculture and Maharashtra is not an exception. Maharashtra exhibits variation in physiographic characteristics such as western undulation 'Ghat' region and the extensive eastern 'Desh' region with rolling plains and valley beds. The chief food crops of the state are jowar, bajra, rice, wheat, pulses and the other important crops are cotton, oilseeds, sugarcane, vegetables etc. Introduction of irrigation facilities in Maharashtra through five year plans since last fifty years has been instrumental changing the agricultural landscape, particularly the introduction of cash crops like cotton, sugarcane, horticulture etc. Irrigation facilities i.e. development in the irrigation methods like drip irrigation, loan facilities, agro based industries, use of various machinery and communication system have strongly influenced on the scene of agriculture.

Inspite of this, the agricultural productivity is less than national average in Maharashtra. A more so in the tribal area of which Nandurbar tahsil of Nandurbar district is a part. Therefore, an attempt is made here to study the agricultural productivity at micro level and understand the factors influencing the productivity. The knowledge of present landuse, cropping pattern and the changes that have taken place in recent past is also important in this respect.

With the consideration of physical variation, economic condition and agricultural production, four different villages were selected from the tahsil Nandurbar, district Nandurbar, which is a part of Tapti basin, lying in the northern part of Maharashtra. It possesses considerable variations in physical and economic conditions, and tribal and non-tribal population as a social factor.

The villages which selected are 1) Khondamali, 2) Talwade BK, 3)Waghale, 4) Nandpur. Khondamali and Nandpur are setteled in the plain of
Tapti where, Nandpur has hundred per cent tribal population while Khondamali has about thirty per cent. On the contrary Talwade Bk and Waghale are settled in the southern part of the Sahyadri hills, among which Talwade Bk has less than thirty per cent population is tribal and Waghale has hundred per cent tribal community.

The main reason for selection of this study area is that these villages have not only variation in the physico-economic set up but also have tribal and non-tribal population. Also, it will give us a clear picture of changing landuse and cropping pattern and agricultural productivity at micro level. It is more convenient for field work and data collection.

1.1 Aims and Objectives of the work -

The real field of agricultural geography is to explain the mutual relationships between production and man’s actions on physical environment. Production is directly or indirectly related to environment. In this view, agriculture is the first example of primary production. Most of the people of the world are employed in agriculture. The main occupation of the man in the developing countries of the world is agriculture. It includes the different ways of sowing crops, types of crop and their kind. The type of agriculture practised in a region depends to a great extent on climatic factors like rainfall, temperature and even on the kind of soil. Agriculture is source of food for human being and as well as for animals too. It is the source of raw materials for factories and industries and therefore it is also called as the original occupation.

About seventy per cent of Indian rural life is depend on agriculture. It is the real wealth of rural life, upon which depends the economy, not only of villages, but of the cities and the whole country. The present work is done with considering such views and some objectives are kept in mind. The main objective of the work undertaken is to study the agricultural landuse of Nandurbar tahsil.
The view of the study is to examine the influence of the physico-economic factors on the cropping pattern and productivity at tahsil level. The important objectives of the present study are as given below.

1) To make detail survey at tahsil level for the study of agriculture.
2) To find out changes in agricultural and general landuse of the tahsil.
3) To identify the landuse and cropping pattern and their ranking at tahsil as well as village level.
4) To study the impact of socio-economic factors on landuse and productivity.
5) To analyse physical factor i.e. soil and its impact on agricultural productivity.
6) To find out correlation between the crop yield and physical parameters of soil or elements in the soil and other socio-economic factors.
7) To study the concentration and diversification of crops in the tahsil.

1.2 Hypothesis -

The objectives of the present study are designed to address following major hypothesis.

1) To test the variation in agricultural and general landuse in Nandurbar tahsil as a whole.
2) To examine the role of physico-socio-economic factors in the tribal area influencing the agricultural productivity.
3) To compare the characteristics of agriculture in tribal and non-tribal areas of Nandurbar tahsil.
4) To examine the relationship in between agricultural productivity and physico-socio-economic factors in tribal and non-tribal areas of the tahsil.
1.3 Methodology -

The special aspects of agricultural productivity in the villages are studied from geographical point of view. The landuse patterns, chemical and mechanical analysis of soil are depicted through maps. Also, for showing the association between physico-socio-economic factors and agricultural productivity, some quantitative techniques like co-efficient of correlation and multiple regression, crop concentration and diversification methods are used. To study the agricultural and general landuse at tahsil and micro-level, sampling technique is applied, which is useful to process the data. Random sampling is used at tahsil level while at micro-level to find out the productivity and landuse, purposive sampling technique is used. The work largely concentrates on the published or secondary data and the primary data which will give us an idea about the habitat terrain, agricultural activities as they occur. The primary data is collected by observation, interview and questionnaire method.

For the completion of the work, it is divided into two parts - 1) Field work and 2) Laboratory work

1.4 Field Work -

It is carried out with many visits to the selected villages and the fields. It helped to find out the impact of various physico-socio-economic factors on the agricultural landuse and productivity, which is a major theme. From the field work primary data is collected through questionnaire and personal interview of the agriculturist. Total village area is observed and found out the locations for collecting soil samples to analyse. The cropping pattern i.e. agricultural landuse and general landuse also have been studied.

Secondary data is collected from various sources like statistical department of District Collectorate, revenue (record) office of the tahsil Nandurbar, Talathi of the respected villages. District Census Handbook is used to find out the data and other required information of the tahsil. Many journals like National Geographic Journal of India, Transaction of Indian Institute of
Geographers, Maharashtra Bhugolshastra Parishad, reference books regarding Agricultural Geography, District Gazzettear, online journals, reference articles related to this work through internet are collected. Topographical maps are studied for physiography of the region. Similarly, Aerial photographs and Landsat imageries are also used to complete the work. Some of the Ph.D. thesis and M. Phil. dissertations also referred for the present work. Soil samples which are collected from the fields are analyzed from the laboratory of Agriculture College Shahada. The results are the major source as a secondary data to analyze.

(a) Library Work -

The library of S.S.V.P.S's Science College, Dhule, G.T. Patil College, Nandurbar, North Maharashtra University, Jalgaon, Agriculture College, Shahada, Rahuri Krushi Vidyapeeth library, Library of Gokhale Institute of Economics and Politics, Pune and Jaykar library of University of Pune became very helpful for this work. In all these libraries various journals, periodicals, magazines, news papers, weekly news papers and Ph.D. thesis were received for this work which proved to be very helpful for the work.

(b) Laboratory Work -

Preparation of base maps and analysis of the collected data is completed through the laboratory work. Some of the charts, tables and graphs have been prepared to understand the fieldwork. Photographs have been made and used as a resource for completing this work.

To show the existence of various elements in the soil on the map following method is used.

**Interpolating using Natural Neighbors**

1) Arc tool box - Spatial analysis tools - Interpolation - Natural Neighbors.
2) Select the input layer that contains the point.
3) Select the field that contains the 'soil analysis data' values.
4) Enter the output all size.

5) Enter the name of the o/p GRID.

6) Click ok

   Natural neighbor interpolation finds the closest subset of input samples to a query point and applies weights to their based on proportionate areas in order to interpolate a value. (Sibson-1981)

   It is also known as Sibson or "area stealing" interpolation. Its basic properties are that its local using only a subset of samples, that surrounds a query point and that interpolated heights are guaranteed to be within the range of the samples used. It adapts locally to the structure of the input data, requiring no input from the user pertaining to search radius sample counter shape. It works equally well with regularly and irregularly distributed data (Watson 1992).

1.5 Choice of the region -

   The work will be done to assess the influence of various physico-socio-economic factors on agricultural productivity in the tribal and non-tribal areas of the Nandurbar tahsil. It has been thought that such study at micro-level would provide a useful approach to obtain a more complete understanding of the problem of agriculture and its productivity in the region. The Nandurbar tahsil is important in many respect like physiography, drainage, climate, soils, natural vegetation and other socio-economic phenomena and therefore the study will help to understand the variation in agricultural landuse and productivity in different physico-socio-economic set ups.

1.6 Outline of the work -

   This work is based on collection of landuse data, actual field observation, measurement and analysis of productivity in the sample villages. To achieve the above mentioned objectives the present study is divided into six chapters.
Chapter-I: Deals with the introduction of the region, the description of the situation of agriculture in Nandurbar tahsil.

Chapter-II: It includes the survey of general and agricultural landuse over the tahsil and spatio-temporal variation in general and agricultural landuse over the tahsil. Also general landuse and its ranking and agricultural landuse and its ranking have been studied.

Chapter-III: Contains a micro-level study of soils, general landuse and agricultural landuse is considered with temporal and spatial variation.

Chapter-IV: It includes the measurement of agricultural productivity. The yield of major crops and their relation with different elements of soil and economic factors are studied, with the help of correlation and multiple regression analysis.

Chapter-V: It includes hypothesis testing with the help of various statistical methods applied for the work. It covers, crop concentration index, crop diversification index and yield index. The tahsil is divided in six circles to study in detail with the help of the methods given above.

Chapter-VI: It gives summary and conclusion followed by Appendix and Bibliography.

1.7 Review of Literature -

The agricultural landuse studies have been carried out by many scholars in order to understand the land and its characteristics for suitable and proper planning of land in future for increasing high yield per hectare and total production. Such studies can be explained as follows-

The study regarding landuse was first introduced by Von Thunon (1826), who put the theory of location concerned with agriculture. Changing landuse pattern of cropping pattern was the base of his study. Later, L.D.
Stamp (1930), Baker (1929) also studied the land use survey and the trends of land utilization and emphasized the need of land classification and survey.

In the latter half of the 20th century, land use and productivity was studied by many scholars. S.R. Roy (1976), found a statistical relationship between land use and rural settlements of Bhojpur and Rohtaus districts in Bihar. Majid Hussain (1978, 2002, 2004), studied about new approaches in the agricultural land use and productivity, land utilization and major types of land use have been studied. Aphale (1968), studied about the land ownership of the tribal people. Bhatia (1967), explained new measures of agricultural efficiency in Uttar Pradesh. Edison Dayal (1984) used three indexes of agricultural productivity viz. land productivity, labour productivity and aggregate productivity. These indexes were employed to measure crop productivity and patterns in India. He explained that agricultural productivity depends on about thirteen variables. Kashi Nath Singh and Babban Singh (1970), have studied the land use, cropping pattern and their ranking in Shahaganj tahsil of Uttar Pradesh. He presented the analysis of village based data and various aspects of land use.

Syamapada Santra (1993), studied the factors determining present agricultural land use of Haora and studied factors which govern specifically the agricultural development of the district. Ranjana Gupta (1993), studied fertility and productivity of the major crops of the Sundarban in South 24 parganas of West Bengal. She studied the impact of soil fertility on yield rate of the major crops. Shafiquallah (1999), focused on the levels of agricultural development in Goda District. Pranab Kumar Maji and Pannalal Das (1996) studied the impact of soil on crop productivity and even on land use changes and environmental degradation. Vishwakarma (2003), focused on relationship between structural determinants and agricultural productivity. Social factors are new technologies and inputs are studied to get an output from the agriculture. Impact of irrigation on land use pattern where land-man ratio, per capita net area sown, per capita total cropped area etc. are important variables are studied by A.C. Omkar and
N. Ram Krishna Rao in (1997). Hangaragi (2010) has mentioned patterns of crop diversification in Bagalkot district of Karnataka and also explained spatio-temporal variations in agricultural landuse pattern at micro-level in Solapur district. He discussed about agricultural production which is influenced by physical, climatological, socio-economic, technological and organisation factors. Besides this many books have been published by the geographers for the study of agricultural geography. e.g. Hussain M. (2002) Systematic Agricultural Geography, Jasbir Singh (1989), and Dhillon (1989) Agricultural Geography, King L.J. (1969) Statistical analysis in Geography, Raina J.L. (1997) Agricultural Geography, Suryawanshi D.S. (2010) Geography of Tribal Agriculture, Vaidya B.C. (1997) Agricultural Landuse in India, Vink A.P.A. (1975) Landuse in Advancing Agriculture. Recently Wikipedia, the encyclopedia is one of the source for the knowledge of Agricultural Geography. Herfizar Rahman and Suman Lata (2012) have studied the relationship between cropping intensity and irrigated area of Uttar Pradesh. They have also used the Karl Pearson's correlation coefficient technique and linear regression analysis. Moumita Talukdar and Surendra Singh (2012) have focused on crop diversity and farm productivity in Tinsukia district of Assam. They have concluded that farm land size has positive relationship with productivity and crop diversification in the entire region of Brahmaputra Valley. N.I. Hashmi and Gomatee (2012) both have made emphasis on spatio-temporal variation of crop diversification in Bulandshahar district of Uttar Pradesh. Jasbir Singh's index of crop diversification method has been applied in their research work.