Chapter 1
INTRODUCTION

1.1 Statement of the Problem

Land is one of the crucial natural resources of a region. Land resources are all the more important in a predominately agricultural region. In the agricultural regions, a considerable portion of population depends on the exploitation of its soil and water resources. However, it invites several crucial problems leads to vicious cycle of widespread poverty, malnutrition and low economic status ever increasing pressure on the land and decreasing per capita land resources. The need of the hour is to make a judicious use of these land resources. Every hectare of country’s land must contribute to the optimum of its capacity to serve the society in a sustainable manner.

A crucial problem faced by human beings is the unbalanced man–land ratio. There is an ever increasing pressure to fulfill the needs of the human beings within the limited land resources. In order to increase the food production, agricultural techniques are developed to make more and more land suitable for cultivation. Besides this, the land which is not sufficiently suitable for cultivation needs to be made suitable for cultivation by giving it required doses of chemical fertilization and insuring assured irrigation on the ploughed land. In the present context, every bit of land has to be utilized at an optimum level to meet the demands of the growing population.

The process of agricultural resource development has a large and long term impact on the natural component of a region through changes in the land use pattern in the recent past. The increasing pressure of population and the changing land use pattern has also introduced variety of new conditions under various driving forces, like; advancement in the field of technological means, extensive use of agricultural resources over the year. Improvement in socioeconomic conditions has enhanced the purchasing power of the agrarian society. This has resulted in greater the investment in agriculture. Besides,
Government has also played an appreciable role in implementing new policies of agricultural advancement.

Because of varied, physical, economic, social and local conditions, each region has its own problems its offers prospects of a change in the existing landuse pattern as well. The landuse pattern has witnessed a considerable degree of change which needs to be further explored. From the data recorded over a period of (1996-97 to 2007-08) for the Budaun district, the percentage changes in the categories like Forest cover, uncultivable waste land, cultivable waste land, fallow land, grazing lands, groves, net sown area and area sown more than once has been noted, observed and analyzed. In this study it has been found that some categories of land use of Budaun District recorded remarkable changes but in others the changes were negligible. Similarly, the intra-regional spatial analysis also revealed that some blocks and villages have depicted remarkable changes as compared to their neighbouring counterparts.

The landuse categories such as net sown area and area sown more than once have shown a considerable change of 2.29 per cent and 16.03 per cent respectively from 1996-97 to 2007-08. While, on the other hand, the categories like uncultivable waste, cultivable waste land, fallow land, grazing land and groves showed a negligible change. This indicates that the landuse in this region has reached a negative stage. This also indicates that there are constraints of the irrigation potential for the reclamation of cultivable wastes and the grazing land under the fold of crop husbandry.

On the basis of the results of the study, it is instructive to understand the reasons behind it. It is also necessary to ensure the remedial measures for the policy making and its effective implementations.

One of the major problems of the area under study is that in order to obtain the maximum return from the agricultural land, heavy doses of fertilizers, insecticides and pesticides have been applied without any proper knowledge of the optimum of the requirements of the agricultural land. This has resulted into the problems like the emergence of toxic soils, culmination of...
resistant pests and insects, flow of toxic water in the drainage channels, multiplication of pesticides, concentration of harmful salts in the agricultural fields, water logging, salinity and alkalinity etc. These are among some of the emerging problems of the agricultural ecology.

Besides, good quality of agricultural land has been brought under non-agricultural uses like roads, buildings and water channels etc resulting into a negative impact on the available agricultural land. These are the main causes of land and environmental degradation.

1.2 Concept and Definition

The terms 'Landuse' and land covers are refers to varied surfacial and dynamic uses of the land and the soil for example, land under cultivation, pasture land, barren land, orchards, fallow, waste land, culturable wastes, settlements, forests, water bodies etc. on different terrain conditions and soil types. In other words landuse is the surface utilization of all developed and vacant land in a specific area, at a given time.

Till 1949-50, the land area in India was classified into five categories which is known as the five-fold land use classification. The five-fold land utilization classification was however, a very broad outline of landuse in the country and was not found adequate enough to meet the needs of agricultural planning at the country level. The states were also finding it difficult to present a comparable data according to this classification, largely due to lack of uniformity in the definition and scope of classification covered by these five broad categories. To address this difficulty and to breakup the broad categories into smaller constituents for better comprehension, the Technical Committee on Co-ordination of Agricultural Statistics, setup by the Ministry of Food and Agriculture, recommended a nine fold landuse classification, replacing the earlier five-fold classification.

Since 1950-51, the statistics of land utilization have been reported in the nine-category classification of different land uses from National level to the village level in India. Any change recorded in the land use with the passage of
time is known as change in land use pattern but every time the sum of the first
eight categories must be equal to hundred percent. But the percentages of
different categories may fluctuate which is known as land use changes or
changes in land use pattern of a region.
The concept of the land use is wide and complex. It is a function of land,
water, air and man and has been used by man since time immemorial to fulfill
his ever changing demand with the passage of time. Land with its varied
topography, slope, field pattern, soil, temperature, precipitation, natural cover
and countless creations have to be planned to engrave an economy where man
can maintain a standard of existence. Man has played his part on the land to
portray the different phases of his ties with it. Land resources play a strategic
role in socio economic development of the country. Agricultural land resources
have played a vital role since time immemorial in engaging the largest
percentage of inhabitants of the world. The concept of land use has been
developed to serve the practical purpose which implies interaction between
man and environment.

1.3 Aims and Objectives
In order to find out the clear picture of the changing land use pattern and
to suggest the remedies for the effective use of land, following objectives have
been crystallized.
1. To study the changes occurred in the land use pattern.
2. To identify the forces responsible for the changing pattern of land use.
3. To study the impact of driving forces on land use efficiency.
4. To analyze the changes in the land use pattern and its linkages
   particularly to technological advancements.
5. To suggest policy measures for a better future prospects of land use in
   study area.

1.4 Data Sources
The primary as well as the secondary information has been collected to
crystallize the research model. A specially designed questionnaire and some
published sources of data collection have been used as the instruments of data collection.

The secondary data for the micro level study of blocks and primary data for sub micro level study of villages study have been collected from various sources which are as follows:

(a) General statistical informations have been collected from:
   (i) Office of the District Statistical Officer, Budaun district.
   (ii) Blocks Headquarters of Budaun district.
   (iii) District Board of Budaun.
   (iv) National Informatics Centre, Budaun
   (v) Tehsil Headquarters of Budaun, Gunnaur, Dataganj, Bisauli, Sahaswan and Bilsì Tehsil.

(b) Landuse statistical information has been collected from:
   (i) The Office of Economics and Statistics, State Planning Department, District Budaun, Uttar Pradesh,
   (ii) Department of Revenue Records, Budaun district.
   (iii) Department of Land Records, Budaun district.

(c) Meteorological statistical information regarding rainfall and temperature and some other information regarding climatic conditions have been collected from Meteorological stations at Budaun district and from the Gazetteer of Budaun district respectively.

(d) Researcher also surveyed the selected sample villages to record the ground realities at micro level with the help of well prepared Questionnaire set for this purpose.

(e) Very useful information has also been collected through the personal interaction with Gram Pradhan, Village Secretary and habitants of the particular village.

Besides, the above mentioned sources, information has also been collected from the websites listed below

1. www.budaun.nic.in
1.5 Research Methodology and Cartographic Techniques

To study the regional variations of landuse changes in Budaun district, a micro level analysis has been done after taking all 18 Blocks of Budaun district as unit of analysis. Spatio-temporal changes in land utilization have been calculated statistically at two point of time i.e. 1996-97 and 2007-08. All the changes regarding growth and decline at block level have been measured in terms of percentage at given interval of time through simple statistical techniques.

To identify the driving forces for these landuse changes, a number of factors have been taken into account like Physical factors, Technological factors, Infrastructural factors, Social factors and Institutional factors. The magnitude of all these factors of the land utilization has also been calculated at block level at two points of time (i.e. 1996-97 and 2007-08) except the physical factors which cannot be quantified during such a short duration of time but a general picture of physical conditions has been analyzed in respect to changes in the land utilization of the study region.

The Block wise and Village wise data were calculated and statistically analyzed using statistical method of Z-score. The Z-score was calculated by the use of MS-Excel. Maps were drawn with the help of GIS Arch view & AUTO CAD Techniques. The composite z-score for these driving forces has been calculated to find out the composite effect of various factors mentioned above on the landuse changes and also to evaluate the impact of all driving forces on landuse change in general and the impact of technological, institutional and infrastructural factors in particular. Z-score statistical technique has been implied to assess the impact of all the driving forces on land use pattern through Block level and village level statistical information.
Z-Score indicates how many standard deviations and observation or datum is above or below the mean. It is a dimensionless quantity derived by subtracting the population mean from an individual raw score and then dividing the difference by the population standard deviation. This conversion process is called standardization or normalization.

The standard deviation is the unit of measurement of the z-score. It allows comparison of observations from different normal distributions, which is regularly done in research enquiries.

Standard scores are also called z-values, z-scores, normal scores, and standardized variables; the use of "Z" is because the normal distribution is also known as the "Z distribution". They are most frequently used to compare a sample to a standard normal deviate (standard normal distribution, with \( \mu = 0 \) and \( \sigma = 1 \)), though they can be defined without assumptions of normality.

The Z-score is

\[
Z = \frac{(X - \mu)}{\sigma}
\]

where:

- \( x \) : is a raw score to be standardized;
- \( \mu \) : is the mean of the population;
- \( \sigma \) : is the standard deviation of the population.

The quantity \( z \) represents the distance between the raw score and the population mean in units of the standard deviation. \( Z \) is negative when the raw score is below the mean and it is positive when the score is above the mean.

When a population is normally distributed, the percentile rank may be determined from the standard score and statistical tables.

Composite Mean Z score:

The composite mean Z score is calculated as

\[
CSM = \frac{\Sigma Z_{ij}}{N}
\]

Where,

- \( CSM \) : Composite Mean Z score
$Z_{ij}$ : Total sum of z scores of variable j of observation i

$N$ : number of variables

**Sampling Techniques**

In this study, 18 blocks of Budaun district have been divided into five categories in terms of their cropping intensity. The characteristics blocks have been named as various regions. Then 18 blocks from these five regions have been selected by using simple stratified random sampling technique on the basis of various ranking of cropping intensity.

The basis of classification of the blocks into various regions is to maintain the inter-region heterogeneity and intra-region homogeneity.

Regions were identified according to the various ranking of cropping intensity in all eighteen blocks. Region one comprising blocks with very low cropping intensity while region five is having very high cropping intensity. From each block of different regions, one village has been selected randomly

**1.6 Hypotheses to be Tested**

To understand the impact of driving forces and to assess the changes in landuse pattern in Budaun district, the following research hypotheses have been developed. The same have been statistically tested and analyzed in the present study.

- Adoption of New Technology is the main cause of landuse changes in the study region.
- Landuse changes are the result of Changing Cropping pattern in the study region.
- Changes in landuse are largely determined by the institutional factors.
- Infrastructural driving forces are responsible for the increase in area under non-agricultural uses as well as in the gross cropped area.
- Physical factors played negligible role in determining the land use changes in the region.
- Landuse changes are the result of infrastructural development in the region.
The Net Sown Area has increased at the cost of cultivable waste land.

1.7 Organization of the study

A brief outline of the thesis has been presented below. The thesis has been divided into six chapters.

First Chapter commenced with the introductory note which highlights the statement of the problem, concept and definition of the research topic, basic objectives of the study, sources of data collection and methodology adopted for the selection of villages for primary survey and different statistical methods used in this study to arrive at the necessary conclusion. The location and other relevant information have also been given in this chapter. Besides, a brief review of literature related to the topic of research has also been presented.

Second Chapter deals with the physical characteristics of the study region such as its Structure and Relief, Soil Characteristics, Prevailing Climatic conditions, and existing Drainage System etc.

Third Chapter presents a detailed account of the prevailing landuse changes at meso level in Budaun district.

Chapter Four of this thesis explains the performances of the different driving forces responsible for landuse changes in the study area.

Chapter Five is a key one, which is based on the primary survey done by the researcher at village level to compare, tally and verify the meso level result of landuse changes and responsible driving forces at micro level by selecting five sample villages on the basis of cropping intensity.

Chapter Six draws the conclusion of the present research work and suggests various policies for the improvement in the existing land use pattern in the study area and their implications for the balanced landuse pattern in the study region on the basis of analysis of various parameters of land use pattern and responsible drives for its change.

1.8 Nature and Extent of the Study Area

This study has explored an unexplored aspect of Budaun district i.e. its landuse practices, pattern and intensity. Geographically Budaun District is
located near the Holy River Ganga. Extension of Badaun district is between the parallel of 27° 11' 30" north to 28° 28' 28" north latitude and meridians of 78° 16' 20" east to 79° 30' 12" east. The district covers an area of 5,168 sq. km. The district stretches in length to 144 km in NW to SE direction and its width is 60 km. (Fig. 1.1)

Badaun has an average elevation of 169 meters above mean sea level (554 feet). The western boundary of the district is well defined by the river Ganga. The Budaun district, by virtue of its neighboured has, have a privilege to be surrounded by the landuse propelling gravity of eight Districts, i.e, Bareilly, Shahjahanpur, Farrukhbad, Etah, Muradabad, Bulandshahr, Aligarh and Kasganj.

The area consists of alluvial plains formed by the Ganga river system. It has a gentle slope from northwest to southwest. A level plain crossed by numerous rivers, and much of it requires little irrigation in the normal rainfall years. A high ridge of sand, more than 4 to 5 miles broad, running through the district from north west to south east, once formed the high bank of old Ganga. Between this and the present course of river is low tract of country, traversed by a chain of swamps or lakes. The main rivers are Ganga and Ramganga with numerous tributaries like Mahawa, Sot, and Aril. Besides these, visibly a number of other seasonal and permanent lakes of various size and shapes exist. Their water visibly drains during the rainy season and the seasonal lakes being shallow, dry up during the hot weather seasons. During the rainy season they attain a steep rise and some times they are connected with each other or with a river due to overflow and produce flood causing much distress to the rural population. These lakes, infact, are the ox-bow lakes of the palaces channels of Ganga. The problem of poor drainage in the central low land in particular is critical and adversely affects the agricultural land use and necessitates a careful study of the area for the remedial measures. The total area of Budaun district according to 2001 census is 5,168 sq. km with two parliamentary seats and seven state legislative assembly seats.
Location Map of Study Area

Fig. 1.1
Administratively, Budaun is divided in six Tehsils i.e. Tehsil Budaun Sadar, Sahaswan, Bilsi, Bisauli, Dataganj, Gunnaur and eighteen Blocks namely, Rajpura, Gunnur, Junawai, Asafpur, Islam Nagar, Bisauli, Wazirganj, Dehgawan, Saheswan,ambiapur, Salarpur, Jagat, Ujhani, Qadarchowk, Miaon, Usawan, Samrer and Dataganj. According to census 2001, there are 1069 gram panchayats & 2081 villages out of these 1,782 are reported inhabited villages and the remaining 299 as uninhabited villages.

1.9 A Brief Review of Work Done

The monumental study on land use by Sir Dudley Stamp in Great Britain and J. L. Buck in China are the examples of work carried out in the thirties. The objective of Dudley Stamp’s work was to orient the landuse practice and pattern in consonance with the texture and structure of the soil and the nature of slope. A further objective of Buck's survey was to train student in the methods of research in land utilization and to make available knowledge of research in land utilization of China's agriculture for its improvement, and a basis for national agricultural policy.

The land utilization survey of Britain has been the most ambitious and successful of the land surveys. In less than ten years it provided a detailed cartographic record of the use to which every acre of land in England, Scotland and Wales was put to. The technique of the survey was to make a systematic record of land use by placing the appropriate letter in its relevant place on the map. After recording the use of land, maps were reduced to a scale of 1:63360 and suitable colours were also assigned to different features.

The American land utilization survey aimed at better planning of land for agricultural and other purposes, which were generally government sponsored projects. In three of these surveys, the American geographers have had ample of opportunity to test the system of classification which was developed during the 1920s. It is interesting to compare these surveys with the

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similar land utilization survey of Great Britain which was undertaken during the 1930s\textsuperscript{2}. These American surveys were mainly concerned with the problems related to soil conservation at district level in the U.S.A. Land use planning programme in the Tennessee Valley Authority (TVA) areas, and rural zoning in the cut over areas of northern lake states in the U.S.A\textsuperscript{3}.

The Michigan Land Economic Survey was first of these governmental sponsored projects which was initiated in 1919 by the Michigan Academy of Sciences and started in 1922\textsuperscript{4}. The project came into existence when the waste land problem in the Northern Michigan became so acute that the whole state began to feel the burden of supporting the social orders.

The Country was considered as the unit of operations and an inventory of few counties was prepared in each season. The compass and pacing methods were used by both soil and forest surveyors, who worked in pairs, the soil and its type was mapped simultaneously on a given area. Each pair of map marker was assigned an area of one quarter of a township or nine square miles at a time. These men worked back and forth across this area on the section and quarter section lines, keeping their direction by compass and the distance travelled by pacing. In this way, each section was crossed at least twice and no feature was more than one fourth of a mile from a ground contact point where the mapper had marked. Boundaries were found by making perpendicular offsets to them, or by triangulation. Mapping was done on a Vellum paper on which was printed the section, quarter section, and eight section lines of a quarter township, in such a way that each line was a graduated scale. Thus, obviating the necessity of applying a scale of the map each time a boundary or other feature was drawn.

\textsuperscript{3} Hudson, G.D.(1936),The Unit Area Classification, \textit{Annals of The Association of American Geographer}, Vol. 26, No. 2, pp. 99-112
The second major American Survey, the land survey of the Tennessee Valley Authority, was quite similar to the Michigan project. Like the Michigan survey, it was concerned essentially with an appraisal of resources. This appraisal in turn was for the use of a central planning agency, which had a variety of problems to solve. In short, the unit area method of land classification contributes both to the field of geography and to the field of planning. In geography it affords another tool of investigations one that partially fills, at least the gap between the methods of detailed field analysis and the methods of reconnaissance. In planning, its use yields results which are vital to the development of an effective land plan.

The techniques employed in these three American surveys were suitable for conditions prevailing at the time, the surveys were undertaken. Development of new techniques in the rapidly changing circumstances have rendered these surveys of minor utility. At present surveys employing new techniques have been carried out both by government and private agencies. Following is a brief description of the some recent American Land use surveys.

Greatly encouraged by the splendid work of British geographers on land utilization of Great Britain carried out under the guidance of L. D. Stamp, Polish geographers, following the initiative of Dziewonsky, the director of the Research Bureau in the central office of Physical Planning, made preparations in 1947 for a similar survey of Poland. It has followed almost the same principles as those of the land utilization survey in Great Britain barring the differences that polish work is more detailed as regards the utilization of arable land. Some of the samples of land use maps of various countries which were presented by Dziewonsky at the International Geography Seminar at Aligarh in 1956. Lack of good laboratories, scientific instruments and also trained personal offered several impediments in a detailed land use survey in Poland.

Pilot Land Use Surveys in India, have been conducted by individual geographers and post-graduate students in geography at various universities, who have constantly been attracted to study the problems of land use in the
country to find the means and ways for a scientific utilization of land. Such studies range from inventories of land use surveys to isolated tropical or regional descriptive account of land variations both in space and time. Recently the studies are shifted towards the application of quantitative techniques in the analysis of various land use components.

The problem of covering the whole country by land use survey was taken up by Chatterjee\(^5\) who did not place much reliance on the sample surveys in a country where numerous variations in physical conditions occur from place to place. Rao\(^6\) doubts the feasibility of a total survey for such a large country with atomistic structure of land use. In his comprehensive essay on "The Scope of Land Utilization Survey for India", Ahmad\(^7\) has pointed out that the methods employed in British model of land utilization survey could not be successfully applied in India. This is because the condition's prevailing in these two countries are so widely different that they call for a great difference in the methods employed for such a survey. He further pointed out that the techniques employed in the USA could be successful in a country where agriculture is already highly rationalized, but in India one has to go a step further. After a thorough study of the three techniques, he suggested that a land use survey similar to that carried out in China (1929 - 33) by Buck could be accomplished with a greater degree of success.

On the contrary Ali\(^8\) considered both the British and Chinese approaches as unfit for India and suggested that neither the British model, where the primary concern is the determination of the present use of land, nor the Chinese pattern, which provides a generalized land use picture is suited to the national land use planning of India. He suggested that the system best suited to our country should be more or less on the American lines, considering the factors viz, vastness of the country.

Shafi\(^9\) focused on the problem of field research in Indian conditions and advocated the adoption of purposive sampling technique to select areas for spatial study. He further attempted\(^{10}\) to solve an important problem on land use survey in India. He is of the opinion that any technique which is adopted for rural land use planning in India should aim at recording the existing use of land in the first instance followed by mapping of land capability or land potential at the next stage.

Many geographers have undertaken descriptive studies which range from local case studies to regional evaluation of land use problems. Chaterjee\(^{11}\) has selected a small area to study the influence of physical environment and socio-economic factors on the utilization of land in 24 parganas district. Another systematic study of a region was made by Siddiqui\(^{12}\) who submitted a thesis on land utilization in the central Ghaggar land at the Aligarh Muslim University. He analyzed the physical setting of the plain and studied its utilization to bring out the distribution of natural and cultural factors. A micro study has come from Karimi\(^{13}\) who thinks that the yield of crops in village Dinapur, Ghusahra (Bihar) may be doubled by proper utilization of land.

Ganguli\(^{14}\) carried out a sample survey in a village near Gynpur and prepared a large scale map of the village. After studying five types of land uses he pointed out the scarcity of irrigation water as the main problem of the village. The study of changing cropping pattern during the past seventy years near Sarnath was conducted by Singh\(^{15}\) and found that crops like indigo are being replaced by the crops like potatoes in the present century. The ecological

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context for agricultural landuse of Kashmir Valley was studied by Hoon (1955) when he described the agricultural landuse of Kashmir Valley on the basis of soil characteristics. Ahmad has presented a most important case study dealing with one village. He has analyzed in detail, all the physical elements and various land use types and concluded that the slope factor can hardly be ignored in any development scheme in the village.

Singh (1958) while referring to the depletion of forest in the valley made an ecological analysis of agricultural landuse and soil erosion. Dest (1959) presented the statistical methods of studying the agricultural landuse in the altitudinal zones of Britain. Stamp (1960) emphatically described the importance of Kashmir Valley ecology in the whole region of western Himalayas. Anderson (1961) has analyzed the physical factors affecting agricultural landuse and pleaded for a more effective assessment of the physical and non-physical factors in the agricultural landuse studies.

Although Shafi's subsequent work is based on strenuous field work and original research, yet the quantitative aspect of food concerning malnutrition is not fairly emphasized. In this connection it should be noted that the intake of calorie is not the only yardstick of measuring good health. Among the prominent individual geographers, Shafi's work may be considered outstanding and of immense value. It initiated a new technique and broke a new ground in the studies of land use in India, and numerous regional studies have been completed under similar lines. He further made an attempt to solve an important problem of agricultural land use on the waste land. He mentioned different types of waste lands and the methods of their reclamation. In a very

valuable paper\textsuperscript{23} published in 'Science Today' he concluded that the carrying capacity of the Indian land is considerably large so much so that it can feed five times of India's population if it is coaxed well.

Chandrashekhar and Sundram\textsuperscript{24} have recommended the enquiry of the problems of arid and semi-arid regions together with the necessary changes that may be made in land utilization before chalking out any scheme of irrigation in the Rajasthan canal area.

Raina\textsuperscript{25} carried out a study to illustrate the basic factors affecting the utilization of land use in the floating garden region of Kashmir valley and encountered many problems. For instance, extreme fragmentation of land and insufficient water resources due to the low rainfall in summer and precipitation in the form of snow in winter are adversely affecting the proper utilization of land.

Singh\textsuperscript{26} has extended the nature of his studies around Mirzapur town and has now calculated the carrying capacity of land on the basis of land fertility and output of foodgrains, potential production units and the standard nutritional units.

Much neglected Himalayas were the subject of land use study by Kayastha\textsuperscript{27}. His study of Himalayan Beas basin has shown that only a small area in the region is given to cultivation while major part of land is occupied by forest and other uncultivated lands. In view of the small area of good agricultural land, he suggested to save it from misuse through scientific land utilization.

\textsuperscript{25} Raina, A.N. (1962), Floating Gardens: Land use study, Proceeding SSG Shimla.
\textsuperscript{26} Singh, V.R. (1964), Carrying Capacity of Land Around Mirzapur Town, \textit{National Geographical Journal of India}.
\textsuperscript{27} Kayastha, S.L. (1964), Some Aspects of Land use in the Himalayan Beas Basin, \textit{The Himalayan Beas Basin: A Study in Habitat Economy and Society, Banaras Hindu University, Varanasi}. 
Yadav\(^28\) presented a paper, analyzing the land use pattern in Rajasthan and concluded that in the desert environment of the region, the variation in the amount of rainfall, soil types and irrigation facilities considerably influenced the agricultural land use. According to capabilities of man to make use of these resources, Amrite\(^29\) has dealt with the impact on Thana districts. Bose\(^30\) has presented a descriptive account of the physical conditions and related land use in Maland region spreading over 300 kms from north to south along the western margin of Mysore.

Harvey (1966)\(^31\) while giving theoretical concepts for the analysis of agricultural land use patterns has described the methods of correlation coefficient derivation and their efficacy in the agricultural land use studies of those regions where physical factors for agriculture show marked diversity.

Singh\(^32\) has revealed that the pressure of population on cropped land was increasing day by day in north eastern Uttar Pradesh. It is obvious from his study that an elaborate land use survey can help in the planning for the improvement of agricultural and other material resources.

A micro-regional study of land use, crop pattern and their ranking has been attempted by Singh\(^33\) in Baraut block of Meerut district. In this study he has concluded that all the small size villages may still increase their cultivated area by bringing uncultivated land under the plough.

Singh\(^34\) has describe the general land use in Dunai village which is situated some 11 kms to the west of Aligarh city where 21 per cent of the

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culturalable waste land could be utilized with better irrigation facilities and mixed cropping.

Husain (1968)\textsuperscript{35} interpreted agricultural land use through selected village, and discussed cropland use and other uses of land depicted on the map.

Rafiullah\textsuperscript{36} after analyzing the demographic factors and agricultural use of the land in the doab emphasized on the need for diversification of agro-based cottage industries for a better and more balanced use of land in the region.

Mishra (1969)\textsuperscript{37}, Singh (1970)\textsuperscript{38}, Amani (1976)\textsuperscript{39}, Mandal (1982)\textsuperscript{40} have given valuable contribution to the study of land utilization. Most of these works have dealt either with a specific physical or political region of India for land use studies.

Mohammad\textsuperscript{41} discussed and analyzed the land character and land capability classification to assess the land evaluation and to frame the proper landuse planning. He also emphasized the role of cropping pattern in overall agricultural development.

Sharma (1991)\textsuperscript{42} in his book, Landuse Survey in Tarai gave a comprehensive account of the factors affecting landuse pattern and dynamics of general landuse in the Tarai Region of Eastern Uttar Pradesh and micro level landuse survey of some selected villages of Tarai Region in Eastern Uttar Pradesh.

\textsuperscript{35} Husain S.S. (1968), Land Utilization in Budaun and Shahjahanpur districts, \textit{Unpublished Doctoral Thesis} submitted at Aligarh Muslim University, Aligarh.


\textsuperscript{39} Amani, K.Z. (1976), \textit{Agricultural Landuse in Aligarh District}, Kumar Publication, Aligarh.

\textsuperscript{40} Mandal, R.B. (1982), \textit{Land Utilization Theory and Practice}, Concept Publication, New Delhi.


Ghimire and Khanal (2003) in their study on landuse Scenario of Nepal observed that many socio-economic and political factors are involved in landuse changes and the country should develop an integrated landuse policy for the overall development of the country.


Singh (2006) pointed out the constraints in the management of land resources.

Shafi (2006) emphasized the need of conservation of natural resources with special reference to land and water resources.

After going through the above mentioned literature survey on different topics related to landuse studies in various regions of the world and India as well, the researcher selected Budaun district as his study region to find out the impact of various drives on the changing landuse pattern with different aims and objectives.