INTRODUCTION

Land use simply means the surface utilization of all developed and vacant lands on a specific point at a given time and space. This “leads one back to the village farm and the farmer to the fields, gardens, pastures, fallow lands, forests and to the isolated farmsteads” (Freeman 1968) as geography deals with the spatial relationships between these aspects and planning. This is because the land use changes to meet the variable demands of the land by the society in its new ways and conditions of life. The demand for new uses of land may be inspired by the technological change, or by a change in the size, composition and requirements of a community. Some changes are short-lived, whereas other represents a more constant demand (Jackson, 1963). A clear understanding of these dynamic qualities in land use will emerge from a historical survey designed to reveal the successive development of inherent characteristics of land.

In this way, land utilization is the use of land by the man, as surveyed and mapped in a series of recognized categories. The primary uses of land are for crops, forests, pastures, mining, transportation, gardening, residential, recreational, industrial, commercial and uncultivable waste, barren and fallow land etc. It is not possible to use land for two or more purposes simultaneously though sometimes even this is possible i.e., the pastured woodland. In most cases the proportion of wasteland is quite large.

The concept of land use planning has been recently introduced in land utilization studies which means the formulation and administration of
land policies aimed at the employment of land resources and the use for which they are socially, politically and economically best suited. The idea of land use hierarchy varies with the production and consumption factors. The production factors are the land, transportation facilities and the stage of technological advancement. The consumption factor includes the number of people, consumption of goods per person and the gross exports. Any shift in the consumption of commodities may change the consumption of other commodities. The growth of population may change the forest and pasture land into crop land, including residential and industrial land utilization survey made up till now mostly concerned with the smaller areas of rural and urban sectors. This involves a description of the use of land, trend in utilization and the classification of land based on physical and economic factors. The data of land tenure, farm area and non-farm area are collected in order to know the productivity of several classes of land. Whether the land is used for crops, pastures and forests should be studied so that the comparison of yields, values and the costs of agricultural commodities can be made. This leads to the study of systems of farming on various categories of land and economic prosperity of the region as well. With the help of land utilization survey, probable change in the use of land can be estimated in the close connection with the institutional, social and public expenditure in the area.

The difference in the land use and land utilization is important. Land use is the use, actually made of any parcel of land, house, apartment and industrial location or land use categories, whereas the term residential, industrial and agricultural refers to a system of land utilization implying
roads, neighborhoods retail and service activities as well as location of industries and carrying of agricultural pursuits. In rural areas, tree crop or row crop would identify land use, where as orcharding, truck farming and grazing indicates a system of land utilization. Land is the basic resource of human society. Its utilization shows a reciprocal relationship between the prevailing ecological conditions of a particular region and man. The term “land utilization” is also used for varied utilization of land and soil surveys e.g., land under cultivation, pasture, barren, orchard, fallows, waste, culturable waste and settlements, forest, water bodies etc.

According to J.L.Buck, “land utilization is the farm population derives from the type of agricultural developed, the provision for future production and the contribution to national needs” (1951). According to Salter “land utilization research can be described as dealing with the problem situations in which people in a given locality are in the process of transformation from activities with certain land requirements to activities with different land requirements.

Land utilization involves an examination of the natural factors affecting both harnessed and potential; productivity of land in a changed situation of the locality and its requirements. These factors are land, temperature, rainfall and soil, which in a configuration together constitute the physical background of agriculture and determine the limits of both the culturability and productivity of the land.

Land use is very much related with the occupancy of land by man for settlements. The growth of population results in the establishment of new settlement, which alters the agricultural land to non-agricultural use
(settlement). This means that the productive land becomes unproductive at the cost of settlement.

Settlement is the basic necessity of man for some sort of shelter for safe rest. For shelter he select tree branches, caves or pits of rock cut hiding places. These shelter places become the most concrete expression of human cultural activity and assume various forms as well as names. Houses, group of dwellings/houses, abodes, habitations-all form human habitat, more specifically settlements. With the establishment of any sort of dwelling the foundation of a civilization is laid which grows flourishes and spreads like petals of blossoming flowers in all directions in varied tint and colour and temporal/spatial variations in the form of habitations. These become the concrete expressions of anthropogenic and later on technogenic adaptations of human beings. Although all living organisms built nests, dwellings, hives, beaver etc., for themselves. An animal only produces what it immediately need for itself or its siblings. This university of houses and their groupings in the form of settlements exhibits variation in size, shape, pattern and types as well as multi-distributional aspects-all being the subject matter of systematic study.

A stake, the rope, the leather cover of a tent for igloos or felt for yurts, a pit dug in the surface, a house cut in the loess or a cave cut in rocks, a wattle-daub dwelling in the forests or herder’s/hunters hut-all bespeak humanization hence, interaction with environment. The more advanced the civilization, the more complex becomes interaction. This needs for the perfection of any study, the understanding of the concerned surroundings environment as a whole. Houses roads and fields are also the
essential facts of human occupation, the distinctive feature of the landscape. Man is not only the product of earth surface, its relation to nature has emerged not as one of self interrogation, nor even of simple dialogue, but of a conference with others present and in which social man increasingly has the right of veto. How much rational he is in adopting or imposing the later is explained better through the form of settlements than anything else. Hence settlement needs explanation along with the study of physico-ecological, economic and geographic aspects in the unique noosphere.

a) IMPORTANCE OF LAND USE

There can be no doubt of significance of land use. On the one hand we all require land on which to live, on the other, the use of any given parcel of land affects not only those who resides there or have use of that land- for whatever purpose- but also those who live on or have use of adjacent and surrounding areas.

Land reform programme’s have been seen in many countries as vital to economic and social progress and have often been fierchy resisted by those who vested interest in land; such reform programme have often affected not only land owner ship but also land use. At a more mundane level, interaction occurs between every day behavior and future land use patterns, existing land use arrangements in part determine where people live, where they work and how when they travel, where they shop, where they play etc., while such behavior in turns helps to shape future land use patterns. It was recognition of this mutual inter-relationship between land use and travel behavior that underpinned the development of land
use/transportation planning. One particular recent manifestation of this concern for land to be allocated to its “proper” use is the concern with derelict land which developed as part of more general environmental movement in 1960’s. More recently, there has developed a specific concern with the identification of urban wasteland and derelict land and the subsequent creation and implementation of plans to return the land to more productive use. Now the question arises that why the land use is as it is? While knowledge of what currently exists is often a necessary condition for answering questions related to the use of land, it is rarely a sufficient one. To know how a particular parcel of land came to have its present use-for example, turning from forests to enclosed farmland to huge, hedge less fields or from green field too urban sprawl to decaying inner city slum-demands at a minimum a longitudinal profile of changes in use through time. Some such data exists for particular time periods and places. In order to understand ‘why’ land use changes as well as ‘how’ the changes occur, it may be necessary to have information on who currently owns and who has owned the land. Yet information on land ownership may be-indeed, usually is-potentially sensitive and, as a consequence, is not always easy to obtain accurately and in detail.

**Importance of land use studies:**

The objectives of land use study also go to facilitate economic use of land. It is thus necessary to classify the land according to the productivity, workability and conservability. Proper management of grazing land is also essential for better livestock raising.
Afforestation is the best use of land which also checks soil erosion. Agricultural operations may be economical at the cost of reduced timber supply and firewood, but this will pave the way for soil erosion. Thus the best study of land is to classify it according to the productivity for preventing its improper use. The land use study should be made in close connection with the water resource management, flood protection scheme and irrigation utilities.

**b) OBJECTIVES OF THE STUDY**

In the present work an attempt has been made to study “Land use and settlement pattern in Chenab basin” A Geographical Study of district Doda. The district has been selected as the study area because it is laying upper altitudinal area where maximum area is covered by forests. Since, in this mountainous area, it very important to maintain the natural ecological conditions at the cost of population changes. For a proper planning it is the need of hour to make an in-depth study in respect of land use and settlement pattern so that the process of development may not alter the natural environmental conditions. The present study has certain objectives:-

1) To examine the physical landscape of the area.
2) To assess the trend of population growth and to examine how it effects in changing land use and settlement pattern.
3) To identify how settlement pattern affects the land use of the study area.
4) To examine the agricultural potential of the region.
5) To identify the regional variations of the study area in terms of agricultural and infrastructural development.
6) To assess the role of river Chenab in land use and settlement pattern of the study area.

c) HYPOTHESIS
a) With the variation in altitude there is a variation in land use pattern.
b) Population growth is a cause for changes in land use variation and settlement pattern.
c) There is a positive relationship between population growth and cultivated area.

d) METHODOLOGY
The land use and settlement pattern of Chenab basin with reference to district Doda for land use and settlement pattern has been conducted through various stages, tools, techniques and aids which are as follows:

Collection of Maps and Data
Various topographical maps with number 43-O/8, 52-C, 43-O/12, 43-O/15, 43-O/11, 43-O/12/NE, 43-O/15, 43-O/12/NW, 43-O/10/NE, 43-O/9, 43 O/11/SE, 43-O/10, 43-O/15/SW were used for the preparation of base map regarding altitudinal map and drainage map of the region. The data were collected from primary and secondary sources. The primary source of data was collected through:
a) Survey of study area.
b) Survey of sampled respondents on the basis of questions and interviews.

The field work was done by the researcher during the years 2009-10. For getting the accurate information the sampled villages were visited
frequently. Data from secondary sources have been collected from various Government bulletins and offices of the district Doda i.e.,
1) Revenue department.
2) Statistical department.
3) Tourism department.
4) Census department.
5) District commissioner office.
6) Agricultural department.
7) Horticulture department.
8) Hydrology department.
9) Meteorology centre.

Data Analysis

Various statistical techniques were used for further processing of data. J. C. Weaver and Doi’s method were applied to find the crop combination of the study area. Simple percentage methods were used to show the trend of growth, arithmetic density, agricultural density, cropping intensity. GIS techniques i.e., Arc GIS software has been used throughout the study to prepare maps such as slope analysis, drainage density, stream order, digital elevation model, altitudinal zones. Computer cartography is being used to show the choropleth maps.

Six villages and an Urban-fringe area were sampled on the basis of various criteria chosen for an in-depth study. These seven case studies were done on the basis of altitudinal variations, backwardness in terms of agriculture and development, water scarcity, dominance of vegetable and
cash crops, single crop domination and impact of Baglihar dam. A total of 420 respondents were selected randomly from seven selected areas.

e) REVIEW OF LITERATURE

Pandit. A.K., (1913) in his book, “Geography of Jammu And Kashmir State” presents the comprehensive and unique picture of the state. It explains the charm and beauty of its waterfalls, lush green meadows and its exhilarating climate which was not generally known till the beginning of present century.

Chisholm, Michael, (1962) in his book, “Rural Settlement and Land use” explains the relationship between land use and settlement pattern that how these two attributes are interlinked together. The book is much more directly with a resume of the location ideas relating to agriculture expounded by Von Thunen in 1826.

Mishra, (1963) in his book, “Agricultural Geography of Himachal Pradesh” has explained the evolution of agrarian structure of the state. The article emphasized field pattern, fragmentation of landholdings, aspect of hilly agricultural operations and crop rotation. The cultivated land fringing hamlets and beyond its pasture land, scrub forests are found and land use pattern is chiefly controlled by the altitude and degree of slope.

Das, S. L., (1971) in his book, “Patterns of Population and Land Use in District of Bhagalpur” shows the distribution, growth and future estimate of the population and agricultural land use in different “Anchals” of the district. In this way he has investigated the pressure of population on land after considering various attributes of the environment.
INTRODUCTION

Mandal. R. B. (1982) in his book, “Land utilization” provides a good explanation of land use planning such as formulation and administration of land policies. It also provides the measures for different problems related to society and region as a whole. Various land use planning proposals were proposed by Mandal. Hence, this book provides a good basis for the study of land planning and land use.


Swarup and Sikka (1983) have studied, “Agricultural Development of Himachal Pradesh” during 1966-67 and 1979-80 on the basis of secondary data. The study adequately explains that enough attention has been given for the development of agricultural economy in the state. Land use, cropping pattern, size of landholdings have been thoroughly examined in the book.

Singh. Jasbir, Sharma. V. K and Sharma R. L., (1988) in his book, “Agricultural Land Use Planning” present a work on North-east Haryana which exclusively includes relevant information for agricultural planning and development for those who are engaged in the formulation and implementation of agricultural development programs. It also lays emphasis on land evaluation as a pre-condition for improvement in agricultural production. Further, it examines land utilization survey as a
pre-requisite for land use planning. And finally it puts forth agricultural land use planning and recommendations for each agro-environmental unit.

Negi, (1988) has studied “Agricultural Cropping and Land use pattern with challenges of food grain production in Himachal Pradesh”.


Nath. M. L., (1989) in his book, “The Upper Chambal Basin- A geographical study in rural settlements” provides good information of rural settlements. This book is more advanced and comprehensive volume on the subject which portrays fully, the concept of rural settlements. The author has gone in detail through his field and personal surveys rather than official sources to present the chronological evolution, toponymy, regional distributions, size, spacing density, dispersion, centrality, types-morphological structure, dwellings and problems and planning’s of rural settlements. Hence, this book will be invaluable for references to researches, geographers, planners, administrators and above all to students of allied subjects.

Main. G.S. (1989) has attempted to explain social, cultural and economic life of the people of Himachal Pradesh. An attempt has been made to highlight physical setting of the state and present wholesome picture of its natural wealth, development potentialities besides associated problems. The economy of the state explains in context of agriculture, horticulture and forest land use and cropping pattern.

Mishra. B. N. (1990) in his book, “Land Utilization and Management in India” present humble attempt to examine and to highlight
the problems of land use in various parts of India and to provide practicable solutions for the proper utilization and management of the same.

Kaur. Dhian., (1991) in his book, “Changing Pattern of Agricultural land use” provides a basis to study the changing pattern in agricultural land use. The reason for this transformation are, extension of irrigation, introduction of improved and high yielding varieties of seeds, chemical fertilizers, insecticides, weedicides and mechanization of farming. This book explain the trends and problems of agricultural land use more explicitly and offer a better frame work for rational planning of our agricultural land which is vital limited and is coming under greater stress.


Maurya. S. D., (1991) in his book, “Settlement system in India (Urban Settlements)” provides a good knowledge about the urban settlement in India in last eighty years. It also throws light on the spatial analysis of relationship between ranks of actual and potential population. The book is related to the study of urban settlements which includes a number of aspects like origin and growth of urban centers, urban morphology, functional classification, urban influence area, urban size and space relationship. Hence, this book provides a good basis for the study of urban settlement and urban planning.

of impact of IRDP on the rural uplift in J&K State. It highlights the weakness of the programme and the author has offered certain suggestions for removing the drawbacks and for making the programme a real success.

Singh. R. Y., (1994) in his book, “Geography of Settlements” provides a good knowledge about the rural settlement. This book is an outcome of long period of research and teaching experience for settlement studies and provides full information about the discipline and its place and significance along with detail on approaches, growth of studies and classifications. It also describes the pattern of settlements and integrated planning and rationalization of settlements.

Joshi, (1994) in his book, “Geography of Himachal Pradesh” has given special treatment to physical features, resources, agriculture, population and settlement of the state. Each parameter has been cartographically illustrated through maps and diagrams.


Vaidya. B. C., (1997) in his book, “Agricultural Land Use in India” provides a humble endeavor in analysis of agricultural land use pattern in Yashoda Basin. It attracts the attention of planners, agriculturists in particular and laymen in general. This exercise spotlights the past and present characteristics of agricultural land use pattern of the basin. The book is also useful for in-depth study of the agricultural land use and its problems in near future.
Khan. A. R., July 1st 2007, in his book, “Geography of Jammu & Kashmir” tries to know more and more about the regional structure of three regions i.e., Jammu, Kashmir and Ladakh. It is a comprehensive account of various feature of this “land of supreme bliss”, which attracts every traveler, trader and tourist. Efforts were made to incorporate the latest available data on socio-economic aspects of the region.

Das. K. K. L. studied about, “Population and land Resources in North Bihar Plain-West of Kosi” in which he has shown the relationship between population and intensity of utilization of land in the study area.

Jha. B. N. studied, “Problems of utilization in Kosi Basin” which passes through various physical and cultural activities including the emerging problems of land utilization in the region.

Tripathi. V. B and Garg. S. P (Dehradun) has applied Weaver’s and Doi’s method to study the crop combination and changing patterns.

Mishra. S. N. has studied, “Land Use in Khaddar and Ravines of Lower-Middle Gomati Valley” in which he attempted to explain land use planning for better adjustment of agriculture to the physical environment for optimum exploitation and conservation of natural resources.

Harold. Carter in his book, “Urban and Rural settlement” provides good information about urban and rural population. The book comprises real case studies on global and local scales abound throughout, providing a continuing, but ordered and necessary real world perspective.
f) STUDY AREA

The Chenab basin is a significant drainage artery in the state of J&K, both in terms of length and volume of water. The Chenab is the mainstay of agriculture, forestry, landuse and settlements especially in upper catchment areas where the impact is evidently seen. Hence, for the purpose of study many researchers of social sciences have taken the upper areas of rivers as the main study area where down flow effect can be over seen from the study area itself. Hence the study covers the upper Chenab basin which extends from 75°-0' & 76°-45' East Longitude and 32°-50' & 34°-15' North latitude. The study area covers district Doda comprising 6 blocks with 426 villages. The study area acquired the status of district when it was carved out from erstwhile district Udhampur in 1948, lying in the middle and outer Himalayan ranges of Jammu region. In view of its vastness and due to inconvenience faced by the people living in its far-flung areas and for making the whole area manageable administratively this bifurcation was done. The state government in July 2006, trifurcated the district into three new districts viz., Doda, Ramban and Kishtwar. Administratively the study area comprises four tehsils viz., Bhaderwah, Doda, Thathri and Gandoh with six rural blocks viz., Doda, Bhaderwah, Thathri, Assar, Gandoh, and Bhagwah which comprises 232 panchayats and 423 inhabited villages. The northern part of this trifurcated district (study area) is surrounded by Anantnag, north-eastern part by Kishtwar, and its southern part is surrounded by Udhampur, Chamba and Kathua.

The topic “Land Use and settlement pattern in Chenab basin” A geographical study of district Doda is new and helps in exploring many
things which are still unexplored due to certain factors. From research point of view the district is more important for study as maximum portion of the district is drained by Chenab River. The study area is agricultural as majority of population is directly or indirectly engaged in agricultural pursuit’s inspite of the fact that the Chenab River doesn’t play any role in agricultural activities because of hilly terrain. But the river plays an important role in generating hydro-electricity which makes it an important asset for the region as a whole. The river was not navigable before the construction of dam because of its devastating nature and high velocity but recently after the construction of Baglihar Hydel project it becomes navigable under “Ferry Boat act” from Pull Doda to Batote which enhances the tourism. The stagnation of water also provides fishing grounds at some sites which can be also proved an important asset to generate the economy of region. Besides all these factors it disturbs the prior scenario of the region as some settlements of the area are greatly affected.

From resource point of view Doda district is economically important as it is known for its forest wealth also called as “Black Gold” of the state, which covers about 44% of the total area comprising timber varieties like Deodar, Chir, Pine etc.,. The district is also important from tourism point of view as it comprises many fascinating tourist spots which resembles with that of Kashmir valley but some of its pockets are still unexplored which can be proved as best tourists spots which inturns helps in generating the economy of the region. The district is industrially backward because of its hilly topography as only few small scale industries are established in the district. The area has lot of agricultural potential. So in nutshell, it is
imperative to study the region as a whole for future planning as the region has vast potential in terms of various resources.

**g) CHAPTER SCHEME**

The whole study is divided into six chapter excluding introduction and conclusion. The study area has been categorized chapter wise as under:-

**Introduction**

The introductory part starts with the statement of the problem concerning the landuse and settlement pattern in Chenab basin. Its selection for geographical study with reference to the settlements and land use patterns has been elaborated. The element of methodology has been succinctly narrated.

**Chapter first** contains physical landscape whose study sub stained by field study traverses in addition to GIS techniques like slope analysis, drainage density etc.

**Chapter Second** deals with cultural landscape in which population growth, distribution, density, occupational structure and sex ratio is studied.

**Chapter Third** elaborates land utilization and cropping patterns. The study of land use types, agricultural crops, cropping pattern, cropping intensity, irrigation and agricultural practices, has been attempted in-depth based on field study traverses, collection of data and their processing by GIs techniques.
Chapter Fourth examines settlement. The study of site, origin, size and function of settlements has been attempted in detail. Besides this types and patterns of settlements and house types have also been studied.

Chapter Fifth contains case studies of sample villages. Six villages with an urban fringe area have been chosen for an in-depth study. These villages represent different aspects and parts of the valley.

Chapter Sixth contains land use settlement typology. The study of typology upto third order types has been attempted based on physical characteristics, arithmetic and agricultural density, cultivated land, cropping intensity, crop combinations, site of settlements, settlement types and their functions, storey’s and building material. The changing pattern in land use and settlements are studied showing the correlation between land use and settlement.

Finally conclusion is drawn on the basis of detailed investigation.