CHAPTER I
INTRODUCTION

I.1 The past few decades have witnessed growing concern over disparities between the developed and underdeveloped parts of the world. As a result of this concern, economic development and environmental conservation have emerged as two key themes within the mainstream of social science research. It has been widely recognised that these issues are interlinked in a global network, and that if the ultimate goal of planned measures aims at sustaining or increasing productivity levels and maintaining a stable ecosystem, then there must be a concomitant growth in economic development and social awareness.

In consonance with these basic themes, a great deal of research has been oriented towards the analysis of diverse socio-economic conditions and the causes for disparity between nations, regions and communities. In these attempts, scholars in various disciplines have used different approaches and techniques, though they all find common ground in the subject matter - that of social reality operating at different levels of technology.

1. The level of technology broadly refers to the employed knowledge by which production processes of various goods or services operate.
on the environment within an institutional framework.¹

As observed, "...every society, no matter how primitive is an organisation for coping with the rigours of the external environment and benefitting from its bounty as far as the current levels of technological development permit."² In a broad perspective, therefore, development can be envisaged as the technological and institutional changes required to achieve transformations for the better, such that while the basic needs of society are satisfied, the changes adopted will also protect and improve the environment to respond to human needs for the future.

In the historic past, interaction with the environment began with exploitation and adaptation to suit human needs. Over time, communities of people created a superimposed anthropogenic environment of economic production and exchange, social institutions and political-territorial linkages. These traditionally

1. The institutional structure is taken to be formed by the prevailing social conditions including religion, kinship links, customs and norms besides other aspects of social institutions.

followed a direction which made optimal use of the available resource base at the prevalent levels of technology. By the beginning of the twentieth century, the industrial revolution had led to technological breakthroughs ushering in an era of mass scale mechanised production. This inevitably led to increase in the demand for inputs in the production process and thus enhanced exploitation of resources. At the same time the technological revolution greatly amplified human power to modify and adapt the environment through mechanisation and energy conversion. This in turn led to industrialisation, urbanisation, increased agricultural production and a number of other socio-economic changes.

The spread and assimilation of better technology was limited to a few regions that represent the present day developed areas. Large parts of the world, however, remained undeveloped or underdeveloped\(^1\) and continued to operate largely under traditional technological methods in spite of the growing environmental exploitation that was required to sustain the increasing population. From

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1. Here undeveloped refers to areas like remote mountainous regions or tribal areas which have remained relatively isolated, while underdeveloped refers to those areas which were part of the global economic world, though they did not reap the benefits of widespread economic prosperity.
the economic point of view, better technology and the possibility of increasing productivity levels dramatically increased the complexities of resource exploitation and socio-economic interactions between groups of people. From the ecological point of view, the increased capacity for matter-energy conversion essential for economic development, was often indiscriminate and led to severe environmental deterioration.

The range of disparity in standards of living thus continued to escalate between the developed and underdeveloped parts of the world. Till the 1950's, this disparity was explained by the concept of development which idealised an economy passing through various stages of development. Thus, under Classical and Neo Classical European imperialist thought, an underdeveloped economy was still in the first stages of development. Subsequent more realistic case studies, however, demonstrated that this viewpoint was quite erroneous, and that the further development of developed areas was often at the cost of increasing underdevelopment of other regions.

1. Refer Appendix I for selected themes and theories of Development.
Thus, though the path and direction of development seemed to converge in the case of some economies, the mechanism through which this change occurred, differed in various critical ways. These differences depended not only on the traditional socio-economic conditions of the region but also on the type of impetus to change and the variations in the environment and resource base.

There have been numerous methods and approaches used to analyse the diversity and disparity in environments and socio-economic conditions. One of the most important of these methods employs the regional approach through which the vertical integration of socio-economic conditions and its horizontal variations over space can be understood. By using the regional approach, a unit of spatial organisation of human activity can be identified on the basis of some physical homogeneity or on the basis of some functional linkages.

In economies like that of India, regionalisation has become a very important method of understanding the types of differences in natural and social phenomena. In accordance with the nesting principle of regions, spatial units of different levels are integrated into a comprehensive whole. Thus, the smallest spatial units or micro units are grouped in larger units, which in turn
get integrated into a macro regional system. Under the scheme of regionalisation, the Himalayas form one of the macro regions of India. When seen in the historical perspective, the Himalayas with its rugged mountain topography has remained comparatively more underdeveloped and isolated than the other macro regions of India.

Within its ranges, the Himalayas contain among the most diversified ecosystems ranging from rain forests in the east to near tundra type conditions in the northwest. The spatial organization of human activities and their adaptation to the different types of Himalayan ecosystems, have resulted in diverse dynamic processes and life styles, ranging from the jhumming i.e. slash and burn shifting cultivation in Arunachal Pradesh to the Changpa nomadic herders in Changthang of Eastern Ladakh.

Throughout the Himalayan ranges, however, the growing population has necessitated an increase in resource exploitation over the years. In large parts of the lower Himalayas\(^1\), the over-utilization of resources as shown by deforestation, intensive cultivation, quarrying and overgrazing has led to serious environmental

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1. For example, the Doon Valley.
deterioration in spite of the apparent economic development of some selected pockets. On the other hand, the relative inaccessibility and remoteness of some parts of the upper Himalayas has caused these areas to remain relatively untouched by industrial technology.

The Himalayan regional system is generally subdivided\(^1\) into five meso regions, i.e. Kashmir Himalaya, Himachal Pradesh, Uttar Pradesh Himalaya, Eastern Himalaya and the Purvanchal region. Within the Kashmir region, two further first order regions can be identified as (i) the Southern Kashmir including Kashmir Valley and Jammu-Mirpur region, (ii) the northern Kashmir or Ladakh region.

The Ladakh region with its high altitude, arid and cold environment provides one of the most impressive cases of human adaptation to a harsh environment. Both the traditional agro-pastoral economy and the institutional structure based on Lamaistic Buddhism evolved in consonance to conditions of the general inelasticity of the natural environment to sustain increase in resource exploitation under the traditionally used technological methods.

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Nevertheless, for centuries the population adapted to the harsh environmental conditions and finite resource base. This was characterised by more or less self-sufficient village community units, with a semi-static balance between the inflow and outflow of energy and matter.

The harsh mountainous topography and thus general inaccessibility, greatly restricted inter-regional mobility. Before 1960 this resulted in Ladakh retaining its traditional agro-pastoral subsistence economy with very limited influence from the socio-economic and technological changes that the surrounding territories experienced. Within the past two decades, however, the strategic importance of Ladakh forged into focus following the 1962 Indo-Chinese border conflict. The following years saw the steady increase in the inflow of industrial technology and monetization of the economy. The completion of the Leh-Srinagar road in 1966 widened territorial linkages and increased the spread of cash capital. In 1974 Ladakh (earlier a restricted area to the civilian population) was opened to tourism, and it emerged on the international tourist map as an exotic mountainous land where Lamaistic Buddhism was a living religion. This inevitably led to far reaching changes
in the traditional socio-economic structure and thus in the process of human interaction with the environment. In the past two decades, Ladakh has come within the orbit of the world-wide economy. The pace of changes in social values, economic standards, political awareness and environmental exploitation has been staggeringly rapid in some selected settlements, though the larger part of rural Ladakh remains still relatively unchanged. Ladakh thus offers a unique example of a high-altitude region where the pace of life remained unchanged for centuries before it was radically altered in the past two decades.

Ladakh was administratively a single district upto 1979, when it was subdivided in Leh district and Kargil district as shown by Map I.1. Leh district with an assessed village reporting area of 394 square kilometres has 109 villages and one town i.e. the district headquarter Leh. Kargil district is divided in two tehsils; Kargil tehsil with 143 square kilometres village area distributed in 104 villages and Kargil town the district headquarter, and Zanskar tehsil with a village area of 43 square kilometres and only 25 villages.¹

The present study is concerned with Zanskar tehsil which forms a well defined micro unit of Ladakh in terms of both physical and socio-economic homogeneity. Grounds for the selection of Zanskar were further justified by the fact that Zanskar is the only tehsil not immediately along the sensitive border zone and therefore, more assessible for empirical research. Moreover, a regional analysis of Zanskar will augment the existing quantum of knowledge on underdeveloped economies operating within the framework of harsh environment. Zanskar tehsil thus offers an excellent example for the analysis of the man-environment interaction process and the resulting socio-economic conditions in a high altitude arid and cold environment. Though local variations do exist, the broad trend in physical, social and economic linkages are comparable with other parts of rural Ladakh.

As Map 1.2 shows, Zanskar tehsil is situated between 76°5'E and 77°30'E longitude and 32°50'N to 34°N latitude. With a geographical area of approximately 5,754 square kilometres of which 43 square kilometres are demarcated as assessed village area, the tehsil supports a population of 8,175 persons (1981). Zanskar tehsil largely coincides with the Zanskar river basin. Two headstreams, the north-west south-east flowing
ZANSKAR TEHSIL

- PENSILA (4400m)
- PURFILA (3950m)
- NAMTSELA (4350m)
- CHACHARLA (5200m)
- SHAPODAKLA (5646m)
- PHIRTSELA (5250m)
- UMASILA (5930m)
- POATLA (5716m)
- SHINGOLA (5100m)

Map. 1-2
Doda and the south-east north-west flowing Tsarap-Lingtichu join to form the main Zanskar river. These two headstreams locally called the Stot and Lunak\(^1\) rivers contain almost all the settlements of Zanskar tehsil in their valleys. The entire tehsil is traversed by the Zanskar range and is flanked to the west and south-west by the Great Himalayan range.

The only access into the main inhabited valleys of Zanskar tehsil, is through high passes\(^2\) situated in the Zanskar range, the Great Himalayan range and their offshoots. The most important of these passes as shown on Map I.2, include the Pensila (4,400 metres) leading to Kargil tehsil situated to the north-west; the Purfila (3,950 metres), Namatsela (4,350 metres), Charchala (5,200 metres) and Shapodakla (5,648 metres) leading to Leh in the northeast; the Phirtsela (5,250 metres) and Shingola (5,100 metres) leading to Lahul in the south-east; and the comparatively little used Umasila (5,930 metres) and Poatla (5,716 metres) leading to Kishtwar in the west.

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1. These local names the Stot and Lunak will be used throughout the subsequent pages.

2. Source: 1:1,000,000 topographical sheet N1-43, Kashmir, Survey of India. In Tibetan, the word 'la' denotes a pass and is used as an affix to the name of the pass i.e. Pensila or Pensi Pass.
All the major villages are situated at an altitude below 3,800 metres, excepting a few small hamlets and isolated homesteads found up to a height of 4,000 metres. Seasonal pastures that support livestock during summer are found along the upper slopes at slightly higher altitudes, especially near the passes. The highest pastures in Zanskar found near the Shingola and Pensila are located approximately below 4,500 metres. Thus, the major impact of human activities in terms of agricultural cultivation and pastoralism is approximately limited up to an altitude of 4,500 metres.

On the basis of the broad physiography of Zanskar and the altitudinal limit of human interaction with the environment, two first order regions can be identified as (1) the mountain summits and upper slopes, (2) the lower slopes and valley bottoms. The dividing line between these two regions has been selected as the 4,500 metre contour line, for as explained above, this altitude approximately limits the direct impact of human influence on the environment.

Though the upper slopes and ridge summits occupy a substantial portion of the tehsil area, they lie beyond the fringe of inhabitation. However, this part does have the vital mountain passes that link valleys by bridle
paths used for transport purposes and glaciers that supply melt water to streams. This area, however, has insignificant direct economic use and therefore helps little in understanding the pressures under purview in the present analysis.

The study, geared to the analysis of the socioeconomic conditions and the man-environment interaction process, is primarily concerned with the lower slopes and valley floors to which most human activity is restricted. On the basis of the broad altitudinal variations and drainage, the lower slopes and the valley floor area can be further subdivided into three second order units as shown by Map I.3. The first of these smaller subdivisions is the Central plain or the confluence zone and Zanskar valley, where the villages are situated at elevation approximately below 3,500 metres. The second subregion is formed by the Stot Valley with villages situated approximately between 3,500 metres to 3,650 metres; and the third Lunak valley, where villages lie approximately at an altitude ranging from 3,650 metres to 3,800 metres above mean sea level.

The general inhospitality of the environment can be gauged from the fact that there are only 25 census villages comprising 106 hamlets and isolated homesteads
in the tehsil. Ten of these census villages fall in the central confluence zone, eight in the Stot valley and seven in the Lunak valley.¹ These second order sub-regions form viable units to analyse the inter and intra-regional variation in the dynamics of socio-economic processes.

1.2 Previous Work on the Study Region

Literature on Ladakh in general and on Zanskar in particular is very scanty and mostly found in the form of travelogues. Accounts on Zanskar are varied and appear as a part of the write-up on the larger area of Ladakh. Some notable exceptions do exist and the writing of some observers of the late nineteenth and twentieth century, have yielded significant information on the physical, economic, social, political and religious aspects of the region. Following the border dispute in 1962, a spate of material was published on the political strategic importance of Ladakh, though including only superficially any academic account of the life style. Post-1974,

¹ Appendix II gives the names of these Census villages and the names of the major hamlets that are grouped into each village. The phonetic spelling of the local village names given in the appendix have been used throughout the following pages.
however, when the hitherto 'Forbidden Land' was opened to tourism, Ladakh was revealed to the outside world as an exotic mysterious land with an as yet unstudied ethnic character. The past few years have attracted a stream of visitors who came to 'see the land of monasteries and mountains'. Literature post 1974 has thus been mostly of the glossy photographs and general account category geared to the needs of tourists with little indepth analysis that is validated with empirical evidence.

I.2.1 Earlier Records

The earliest documents reach back to the ancient Greeks. In his Cesi Pliney writes of the land that lies along the Indus and its tributaries and is surrounded by desert and mountains. Ptolemy's Akhassa region agrees equally well with the location of Ladakh said to be eastward of Byltae; while Herodotus describing the lands of the Dards on the Indus, writes of the 'gold digging ants',¹ a story repeated by Megasthenes the Greek Ambassador to the Indian court. In the days of Herodotus the inhabitants of Ladakh were probably a tribe of Mongoloid nomadic herders.

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¹ These gold digging ants can be identified with marmots who burrow into the ground for shelter, throwing up earth in the process as described by A.H. Franke, *Ladakh The Mysterious Land* (Ess Ess, New Delhi, 1980)(reprint), p.12.
The first texts of Indian historical information date back several centuries before the Christian era. According to the *Mahavamsa* and *Dipavamsa*, Emperor Ashoka had sent a Buddhist Mission to Kashmir, while the *Mulasarvastivada-Vinayavastu* states that a Bhiksu named Madhyadina had spread Buddhism throughout Kashmir. In A.D. 100 King Kanishka further spread Buddhism throughout Central Asia, Tibet and Ladakh.¹ A sacred monument the Kanika Chorten a stupa like structure at village Sani in Zanskar is a standing testament of ancient Buddhist belief during this period.

In A.D. 399-400, the Chinese pilgrim Fa-Hian crossed over the Tsung-Ling mountains southwards to Kie-cha which can be identified with Ladakh.² Here it was said the country was mountainous and so cold that no grain except corn ever ripened.

Later, during the mid seventh century around A.D. 640 Huen-Tsang wrote about the kingdom of Mo-lo-

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pho which probably is the highlands of Chang-Thang and the country of the San-pho-lo, a literal translation of the Indus.

In A.D. 759 another Chinese pilgrim Ou-Khong reached Kashmir and gave an insight into the communication links at that time. He mentions the road to Thou-fan or Tibet, which corresponds to the Zojila route connecting Kashmir with Tibet via Ladakh.¹

This leads to the interesting period when the Devanagari alphabet and Grammar were taken from Kashmir to Tibet by the learned Lama Thumi Sambhota and the monasteries began to keep written records. Till recently, the educated Ladakhis were generally the lamas monks and written matter was highly religious in nature. Since the monasteries, however, also own land in the village, they have an administrator chhak-zod or manager lama, who besides his religious duties, keeps detailed account of matters such as historical events, land transfers, genealogical records and details of the amount of grain and butter and other donations that come into the

monastery. Unfortunately almost all this information which would give invaluable insights into the historic past has yet to be revealed and translated. An exception is an extract of great interest from the Bo-yig or letter or measure listing the amount of grain sent annually to Phugtal Gompa. ¹ This chronicle was found in the possession of the Chief of Testa, a village in the Lunak valley close to Phugtal gompa, and translated by Franke.² These documents contain information about the popular traditions of Zanskar and the conditions in the late sixteenth century. These records also reveal that the first links of Zanskar lay with Kashmir, largely due to the efforts of Buddhist missionaries. Later, however, following the successful Tibetan raid on the Fort of Tranze in the Lunak valley the links of Zanskar with Tibet grew much stronger. These documents also give other details of conquest and local intrigues as reported during the reign of Tshan-rgyal-po.³

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¹. A monastery in the Lunak valley of Zanskar.


³. Refer Appendix III for the historical outline of Zanskar.
One of the earliest travelogues of the sixteenth century was the *Tarikh-e-Rashidi* written by Mirza Haider¹, giving useful information on political events, routes, the society and economic structure of that time. Though it deals with all of Ladakh this account brings out the history of political events through border skirmishes and local intrigue between chieftans. We thus learn that Zanskar was an unimportant vassel Kingdom. The major routes have also been described along with their role in trade and commerce. Some aspects of the subsistence level agrarian conditions have been discussed along with social customs, the dress and eating habits of the people.

More information is found in the translation of the Tibetan manuscripts preserved in Zhonkul² monastery on the life and works of the Zanskari saint Khrul-Zig Nag-Daban-Tshe-Rin born in 1717.³ From accounts of his life one can glean information of the 'dreadful epidemic that broke out during 1717'; of the fact that Ladakhki

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2. A monastery close to Atting Village in the Stot Valley.

kings made prisoners construct mane-walls made up of rocks and boulders by the wayside and at cross roads; or that 'as a result of the annexation of Ladakh's richest possessions in Nga'-ris by Tibet, the inflow of taxes in the form of gold, furs, wool, animals, etc., stopped and Ladakh was gradually reduced to a 'border area' suffering from chronic poverty.  

I.2.2 Writings of the 18th, 19th and early 20th Century

Most of the books written on Ladakh during this period were general accounts mostly in the form of travelogues, by Europeans who visited the area as missionaries and Administrative or Army personnel. A few were dedicated scholars, and among the first writings were those of the Moravian missionaries Le Pere Hippolyte Desideri (1715) who gave a geographical account, followed by Francisco Orazio della Penna di Billi (1730) with his prosaic though accurate observations especially on the Buddhist religion. In Desideri's work Zanskar is mentioned as a remote land, and not dealt with in detail.  

In 1774 George Bagle was deputed to Ladakh by Warran Hastings but no account of his mission has been  

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1. Ibid., p.34.  
2. A. Cunningham, op. cit., p.67.
preserved. A Chinese note written by Ma-Shao-Yun (1786) is short but consise on the various religious festivals. This Commissary-General of the Chinese army had been sent to expel the Gorkhas from Tibet.

In 1820, Moorcraft an adventurous Englishman began his travels that were to last two years. His extremely shrewd and scrupulously accurate observations of the physical environment and socio-economic conditions were the first that could be termed academically oriented. Unfortunately, he died 'after a few days illness' and his memoirs were published posthumously by his friend Trebeck in 1841.

Around the same time as Moorcraft, the Hungarian scholar Csoma-de-Kores came to Ladakh in 1820 in the pursuit of his study of the Tibetian language and stayed on for 10 years. He is of special interest being the first Tibetologist, and further more so because he stayed in Zanskar in Phugtal Gompa and Zangla castle during his studies. Even today his roughly etched name is visible in both places, though the old Zangla castle has now been abandoned.

Perhaps the most interesting and accurate account was written by Sir, then Major Alexander Cunningham who
visited Ladakh as the official British envoy in 1846-47. In October 1846 Cunningham travelled from Simla to Ladakh and via Kulu, Manali, the Bara Lachala pass. He was a meticulous observer and carried a number of instruments with him, thus collecting valuable climatic data. In his monumental work, he has given a detailed account of the physical, historical, cultural and economic conditions prevalent. Thus from Cunningham's account, we learn that the closest links of Ladakh lay with Tibet both in the religious and economic sphere. Valuable data relating to trade products, taxes etc. give details of the economic conditions, while physical and climatic data bring out the harsh environmental conditions.

During the same time, Dr. Thompson travelled through Ladakh and Zanskar and wrote his narrative of the journey giving details of the physiography and society. In 1857 Fredrick Drew from the Geological Survey came to Ladakh. He joined the service of the Maharaja of Kashmir in 1862 and retired as the Governor of Ladakh in 1872. Drew was the first author to describe the geology and geomorphology of different geographical units of Ladakh. His detailed accounts of the stratigraphy and morphology of Ladakh have been the basis for a number of subsequent studies.
Other works of this period were mostly in the form of travelogues by missionaries and European administrators and adventures. Among these were Monsieur Vigne (1842) Hermann V. Schlagintweit (1856), Rev. H.A. Jaschke (1857) and Dr. K. Marx (1891), who further documented historical evidence and unearthed original portions of the Ladakhi chronicals giving dynastic details of the ruling clan. Another interesting though brief account is that of Aitchinson (1874) dealing primarily with trade products of Leh. In the following years Dr. M.A. Stein, Biscoe (1892), Deasy (1902) and Fraser (1907) gave further historical accounts.

In 1907-1925, A.H. Franke published his monumental work; Antiquities of Indian Tibet in two volumes which has since been regarded as an authoritative work on the historical evolution of Ladakh. The first volume describes the history, monasteries, religious customs, social customs, political events and geographical features along the route from Simla in the Satluj Valley, through the Indus Valley and south-east Ladakh to Leh city and from Leh to Kargil, Dras and Srinagar. The second volume gives a very detailed account of the history of Ladakh based on translations of the major and minor chronicals. These chronicals give the genealogy of different chieftans
in a historical narrative, some religious legends and other historical information. The next work to appear was the *Imperial Gazetteer of Jammu and Kashmir* published in 1908 with the names of every settlement and a brief general description of each village. Under the Survey General of India, Maj. Kenneth Mason (1929) published a detailed account of the routes in the Western Himalayas of which Ladakh forms an important part.

A different sort of account is found in the *Tarique-Jamnii* written in Urdu by Hashmat Wallah Lacknavi (1923). This highly comprehensive account gives a detailed descriptive analysis of the location of the administrative regions in Ladakh and details of the agricultural production, the historical evolution of settlements and changing linkages and a population census.

Other accounts written prior to the border conflict in 1962 are mostly historical and socio-religious. More comprehensive accounts include the works of L. Petech (1939), M. Pallis (1939), G. Dainelli (1933), J.N. Gauhar and P.N. Gauhar (1956), P. Carrasco (1959), Anagarika Govinda (1960) and J.A. Stein (1962). In 1940 De Terra presented a detailed account of the geological structure of the Ladakh and Zanskar range.
The most important analysis of the border dispute is found in the book by R. Fisher and others (1963) in their explanations of the Sino-Indian rivalry in Ladakh. They have also discussed historical events leading to the border alignment of Ladakh. Other publications to appear till 1974 dealt mainly with historical, religious and social aspects and included the work of M.C. Goldstein (1971), Lama A. Govinda (1969), T.S. Murty (1970), G. Trungpa (1973) and L.A. Waddell (1972).

1.2.3 Recent Publications of Post 1974

After 1974 when Ladakh was opened to foreign nationals, a spate of books have been written, and the foreign publications especially articles certainly far out number publications from within the country. A number of books and articles have been written in French, German, and other European languages, and have not as yet reached the Indian market or most library shelves. The publications that are available, can be further subdivided into three categories: (i) Tourist oriented guide books, (ii) General accounts and (iii) Academically oriented research work. Often the first and second type overlap in the form of travelogues. In this analysis, the first category has been deleted, while the second is selective and the third detailed.
Some of the academic publications, though not directly dealing with Ladakh give illuminating information on Buddhist society and other aspects in high altitude regions. Articles that appeared in *Himalaya* (1976) based on the UNESCO-CNRS funded seminar contain three articles of Ladakh and numerous others on various parts of the Himalayas. The *Cultural Heritage of Ladakh* (1978) an Education Ministry publication also has a number of articles on the socio-cultural and geographical aspects.

Other recent publications on Ladakh include those by Hassnain (1975) which gives a detailed analysis of the history, people, culture and religion of Ladakh. Snellgrove and Skorpusi (1977) have given an interesting account of the history and religious institutions in prevalent Tibetan Buddhist Society, and have studied the architectural structure of monasteries like Alchi built during the eleventh century by Renchan Zampo. Gergan and Hassnain (1977) have represented A.H. Franke's old work with an informative introduction and profuse annotations. H. Singh (1977, 1979) has published a number of articles dealing with the agricultural conditions, spatial linkages of Ladakh and on the general socio-economic conditions in terms of levels of development.
Other more general accounts especially on the history, social structure, culture and religion of the region are found in the works of T. Rabgyas (1978), A.R. Heber and K.M. Heber (1976), C. Jest (1975) and N.R. Jora (1977). S. Koshal (1979) has done a detailed study of the grammatical structure of the Ladakhi language. Among other recent authors, are B.N. Aziz (1978) who has worked on social and genealogical structure and the travelogues of the famous mountaineer H.P.S. Ahluwalia (1980) and the traveller H. Harrer (1978). M.C. Godstein (1971-1983) has also contributed to the understanding of social stratification, structure and population dynamics in a number of articles. One of the latest book to appear on Ladakh by J. Rizvi (1983) is a comprehensive account of the regional, socio-economic and cultural aspects of Ladakh.

Other recent publications of a more scientific nature deal with the technical aspects of solar energy and its application in Ladakh. These include the works of C.L. Gupta, et al. (1981), H. Norberg-Hodge (1979), C. Strambolis (1979) and R.P. Sarkar (1980).

A number of geological studies have been conducted in the Ladakh and Zanskar ranges in the past decade. Among these, numerous articles relating to the stratigraphy
and geological history of these ranges have been published by V. Gupta (1971, 1974, 1975), I.C. Pande (1971), M.N. Saxena (1972) and B.S. Tiwari (1970).

The first book to appear on Zanskar separated from broader accounts on the Ladakh region, was the travelogue on Zanskar written by the Tibetan speaking traveller M. Peissel (1979). This account is primarily a narrative of a journey in the summer of 1976 through the Zanskar region, giving details of the routes, people, customs, houses and the general cultural and socio-economic linkages and transactions. The most glaring fact that emerges from this narrative is the comparative isolation and lack of contact with the world beyond the Zanskar valley, and the simple way of life in close contact with the natural environment. The second book to appear on Zanskar is another travelogue by O. Pollmi (1982) on the way of life during winter in Zanskar. This account describes the difficulty of travelling over the only winter route open from Zanskar over the frozen river and snow covered passes.

Accounts of a more academic nature on Zanskar have as yet not appeared in book form, though a number of articles based on case studies have been published as university papers or in journals and other books relating to mountain lands.
The only detailed analysis done on Zanskar as a regional unit from the developmental point of view is the project report analysis conducted by Haq Consultants (1981), a consortium of Techno-Economic Consultants who have given a proposal of developmental targets for the proposed seventh plan.

Research on Zanskar to appear in article form includes papers published at Bristol University by J. Crowden (1977) on the agricultural conditions of the areas in terms of land, water, agricultural operations, inputs and output. A second paper by S. Fraser (1978) was followed by a team of researchers from Bristol University during the summer of 1980 and 1981, who studied the geomorphology, social change, religion, nutrition and health aspects in Tongde and Shun villages. Their work **Himalayan Buddhist Villages** is under publication. An earlier article by one of their members J.H. Crook (1980) deals with social change in what is called Indian Tibet, including analysis of parts of Zanskar and Leh town.

A number of papers relating to the history, culture, sociology and ecology of Ladakh appeared in the book **Recent Research on Ladakh** edited by Detlef Kantowsky and Reinhard Sander following the proceedings of a
conference held at the Universitat Konstanz in November 1981. In the book two case studies of Zangla village in Zanskar have been published. There is, however, little to no analysis of a larger sample size, and these articles are based on data collected from field surveys and case studies.

Statistical information relating to the Zanskar region is available from Census publications, specifically the District Census Handbook Ladakh 1961, 1971; the Statistical Hand Book - Kargil district 1980-81; Provisional Population Tables J&K 1981; and other state government publications including information from the Agricultural Census and Livestock Census.

I.3 Purpose of Study and Research Design

From the preceding discussion, it becomes apparent that most of the literature published on Ladakh and Zanskar is in the form of travelogues and general accounts. There are practically no empirical studies on Zanskar and very few on Ladakh as a whole that relate to the man-environment interaction process in terms of the resource base and the dynamics of the socio-economic structure.

There is thus a glaring lack of published material relating to the Zanskar region. Analysis of the dynamic interdependencies between the man-environment interaction
process and the resulting socio-economic conditions in high altitude mountain regions like Zanskar will help to scientifically examine the physical, social and economic linkages in order to understand the problems of regional development and to suggest ways and means of overcoming these. In the broader perspective development itself is an outcome of and at the same time reflects the level of man-nature interaction.

Though the way of life in Zanskar in terms of a simple existence lie close to the ideals emphasised by thinkers like Gandhi and Schumacher, nonetheless the material culture is underdeveloped and economically this region is poor. Since the tendency to improve the material base of life is intuitively desirable, the main problem lies in how to develop the rural economy. In this context it becomes important to understand the process of changing human interaction with the environment, so that problems and weak links can be identified, and changes for the better can be channelized through a planned direction.

This study of Zanskar is oriented towards the analysis of the dynamic relationship between the natural ecosystem and the human influences on it. The main purpose has been to scientifically understand the following:
1) The network of linkages evolved by human society in the natural and socio-economic interaction processes.

2) The cumulative effects of the interaction mechanism in the integrated natural, economic and social spheres, such that levels of development in the villages can be identified.

Given the background of a region which lies at the fringe of the habitable world and has remained relatively isolated till the past decade, the subsequent discussion has been based on the following major observations:

(1) The natural environment provides the basic land, water, mineral and energy resources that sustain human population even though the harsh environment of Zanskar in terms of the rugged mountainous terrain, severe climate, lack of resources and natural vegetation, has created a unique high altitude environment that is largely inhospitable to human activity.

(2) The population inhabiting the region has, however, adapted itself to these environmental rigidities through its institutional structure and social customs.

a) The distribution of population is largely guided by the location of a few environmentally favourable sites within the valleys.
b) The growth of population has been slow till the recent past because of the low carrying capacity of land, which resulted from the finite resource base and a lack in the possibility of increasing production that could sustain large increases in total numbers.

c) Within the past two decades coinciding with the widening territorial linkages and socio-economic changes the population composition has undergone a change in terms of the age-sex ratio with a large proportion of young population and a trend of male selective immigration in some villages as a result of increasing economic possibilities.

(3) The spatial organisation that has resulted from the location of human activity along drainage lines is reflected by the linear pattern of settlements. Within the villages the house types show a close consonance with the environment.

(4) The human activities in these settlements still operate largely at the traditional technological level, and are geared to self-sufficiency in terms of the economic structure.

a) The high altitude ruggidity, steep slopes, poor soils and lack of water denoting harsh environmental conditions are seen through the land-use pattern of villages, where cultivated land is generally less than half the total village area.
b) The overwhelming importance of agriculture in the economy is brought out by the occupational structure, with almost all the working population employed in primary activities.

c) Within the agricultural sector, cultivation practices are dependent on environmental conditions as reflected by the agricultural season, cropping pattern and the need for communal use of labour. The close links between the villages and monasteries are shown by the tenurial system, where the majority of peasants are owner cultivators and the remaining are mostly tenants of monasteries. The low level of technology is reflected by the relatively low productivity level when compared to the demonstration plots operated by the agricultural department.

d) Livestock rearing is second in importance only to agriculture and the products obtained from livestock are very important in sustaining the population.

(5) The changes brought about in the past decade can be seen best by the rapid diversification of the economy to non-primary activities in some settlements. These have been largely induced by government sponsored development bringing about infrastructural changes and tourism bringing in commercialisation.
I.4 Data Base

Data required for analysis was obtained from primary and secondary sources. Almost all the data for 1981 relating to household units was obtained by primary surveys conducted with the help of questionnaires. This included information on demographic variables, livestock numbers and cultivated area by crops for the 42 major hamlets of Zanskar. A more detailed analysis was done for three sample villages which were chosen as characteristic of each sub-region. Sample households in Padam, Ichar and Phe selected on a random basis provided data for the analysis of the family size and age-sex structure; tenurial conditions and farm size in the agricultural structure.

Additional data at the tehsil, and village level was obtained through secondary sources mainly Government publications and unpublished data from institutions. These sources of data include mainly the following:

3) Ladakh District Statistical Handbook 1975-76.
6) Indian Meteorological Tables.
vii) Agricultural Returns Census 1972-82 (Padum).


ix) Tourist Office - Zanskar (Padum) 1981-82.

x) Weaving Centre Zanskar (Padum) 1975-82.

xi) Block Development Office, Zanskar (Padum).

xii) Office of the Sub-Divisional Magistrate Zanskar.

Topographical sheets at the quarter inch scale were used in the analysis of physiographic conditions and the distribution of settlements at the tehsil level.

1.5 Methodology

The primary objectives of analysing the network of linkages evolved by human activity in the natural, social and economic inter relationships and the cumulative effects of these mechanisms, have been dealt with in the following way:

i) To understand the basic dynamics of the human environment interaction process, it was thought necessary to first study the characteristics of the environment and the resource base.

ii) The institutions that evolved in response to the environment were then analysed along with demographic dynamics in the form of quantitative and qualitative changes in the population that interacts with the environment.
iii) The spatial organizations evolved by the man-environment interactions were subsequently studied through the settlement structure.

iv) The human response to the environment in terms of land use and economic activities were analysed through the study of agriculture, pastoralism and other non-primary activities.

v) Finally, various socio-economic aspects were analysed to reveal which are comparatively more important in explaining spatial variations and in indicating levels of socio-economic development among the villages of Zanskar.

The methodology adopted in the analysis of these processes has been theoretically descriptive, with the empirical evaluation of relevant statistical data. Both statistical and cartographic technique have been used in the analysis. The statistical techniques used, have basically helped in comparing sets of variables within themselves and between each other.¹ Thus, the most important aspect of statistical analysis has been to make the basic data matrix variables comparable. This

¹. For example, the variation within the size of area and population in different villages were studied along with the variation in land use and age structure.
has been done by computing percentages, ratios, quartiles and averages. The degree of relationship between some variables has been calculated by using the one parametric chi-square test. Multiple correlations and the factor analysis method were used to calculate the cumulative relationship between some selected socio-economic indicators. The results obtained were, however, very unsatisfactory in their explanatory power, and thus an alternate method was used.

Twenty indicators divided into five sets have been selected to explain the cumulative effects of socio-economic conditions in determining the level of development in each hamlet vis-a-vis the others. To make the indicators comparable, each value of every column in the raw data matrix was divided by the mean of the respective column, to give a standardised data matrix. For each of the five sets, the standardised values were added row-wise to give cumulative factor scores for every village. These five scores were then added to get a composite index showing the level of development or of man-nature interaction in every hamlet in context of the chosen indicators.

Maps using chorochromatic and dot methods have been used to depict the spatial variations of different
socio-economic variables at the village level. According to the range of variations between the values of every village, different classes were identified. Depending on the value of the village, different levels were assigned to each village and shown by the maps. Simple and compound graphs, curves and diagrams have been drawn to illustrate various aspects of socio-economic and environmental conditions.

During the field surveys, statistical data regarding population, livestock and agricultural conditions were collected by questionnaires and qualitative information regarding social customs etc. was obtained through verbal questions. 42 major hamlets given in Appendix II were surveyed. Extremely difficult field conditions and general inaccessibility prevented surveys of all the remaining scattered homesteads and small hamlets located in side valleys.

Detailed information was obtained from three sample villages, one from each subregion. Thus, Phe village central to the Stot valley, Ichar village central to the Lunak valley and Padam which dominates the Central plain sub-region were selected. Phe in the Stot valley is located on an alluvial fan representing the site of most hamlets in the Stot valley. It also has area and
population close to the average for villages in the Stot valley. Similarly, Ichar is situated on a terrace representing the site most common in the Lunak valley and has area and population close to the average for the villages in the entire Lunak valley. In the Central plain, Padam though not representative of the general conditions of the subregion, was selected because the village represents the effects of modernisation best, as it is the tehsil headquarters, road terminal and major service centre of Zanskar. Most of the changes in the traditional structure through external inputs are, therefore, reflected through the changing conditions of socio-economic variables in Padam.

The Census of 1961 and 1971, provide data for 25 villages. These census villages are actually formed by grouping adjacent homesteads and hamlets. For the purpose of comparing 1961 and 1971 village level data with 1981, the same method has been used, and the 42 hamlets surveyed in 1981 have been grouped\(^1\) into the 25 census villages. According to the Census in 1981

\(^1\) For example, the census village Tescha-Khaser is composed of the two hamlets Tescha and Khaser. Accordingly these were combined to give a comparable value of 1981 with the previous years.
the total population was 8,175 persons, while that
surveyed for the 42 hamlets was 6,588 persons. Though
the years 1961, 1971 and 1981 are, therefore, not strictly
comparable, they do provide information regarding the
general trend of temporal change.

I.6 Organization of Material

This study related to the man-environment inter-
action process and the resulting socio-economic conditions
in high altitude mountain lands, has been organised at
three levels. At the first level is the analysis of the
physical environment, the second level comprises the
superimposed environment with settlements and agriculture
and at the third level is the abstract environment of
economic transactions and social systems; all three of
which interact with each other through dynamic inter-
linkages within the region. The study has thus been
subdivided into six chapters, each representing the
analysis of a certain facet of this interaction process.

The introductory chapter essentially provides a
theoretical framework of the diverse types of inter-
relationships between human activity and the environment
and the role of technology in increasing the capacity of
human endeavour to adapt the environment in order to
suit demands. The conditions of mountain environments
have been brought out, with the specific case of Zanskar tehsil in the high altitude Ladakh region identified as a land where the existing pattern can be analysed. A brief review of available literature on the region has also been presented. Finally, the data base, methodology and presentation of research have been discussed.

The second chapter comprises an analysis of the natural environment and resource base. The geomorphic and climatic processes involved in sculpting the landscape of Zanskar have been discussed, and the potential of this environment in terms of the available land, water, vegetation, mineral and energy resources identified.

The third chapter deals with the dynamics of the human resources that are influenced by and interact with the environment. Qualitative aspects like the institutional structure and social customs, and the quantitative aspects that characterise the population in terms of distribution, growth, age-sex composition and literacy, have been discussed at the spatial and temporal level.

The fourth chapter deals with the spatial organization of settlements that have evolved in response to the human environment interaction process. Thus the genesis, pattern, form and functional hierarchy of settlements have been studied along with transport links.
The next chapter comprises an analysis of the human response in terms of economic activities. This has been studied through the land use pattern and through the occupational structure that show primary activities to be the most important. Agricultural land with settlements are thus the most obvious manifestation of human adaptation of the environment. Conditions of agricultural institutions and production processes have been therefore analysed through tenancy conditions, crop season, cropping pattern, farm size classes and input-output structure. Livestock products and inputs have also been related with agricultural variables. The other type of economic activities in the non-primary industrial and service sectors have also been analysed in terms of their role of bringing about change.

The sixth chapter attempts to integrate the cumulative effects of natural, social and economic variables into a comprehensive whole, keeping in view the dynamic indigenous and government induced transformations that have taken place during the past decade. This has been done by identifying the key linkages between the natural, social and economic spheres in Zanskar. This chapter also presents a spatial analysis of the socio-economic structure in 1981 as brought out
by selected indicators. It was thus possible to identify constraints to development imposed by non-mechanised technology, weak communication links and harsh natural environment. On the basis of the results obtained from the analysis of conditions in Zanskar some broad outlines for development have also been presented, based on the principle of maximising the potential use of available resource through the use of better technology, by keeping in mind the needs for economic equality, social justice and environmental conservation. Finally a summary of conclusions has been provided to present the main findings.