CHAPTER 1
INTRODUCTION
CHAPTER -I

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1.1 Introduction

The Indian cities have been growing at a very rapid rate. The urban population is expected to rise from 28 percent in 2001 to 36 percent in 2025. Moreover, the growth of industrialisation and development in trade and transport has given a new dimension to the pattern of urbanisation. Thus, the cities are not only changing in their population and area, but their influence on the neighbouring areas is also becoming more and more pronounced. Similarly, the areas surrounding the cities are also changing owing to the increased relationship and interaction between the city and its neighbouring areas. Moreover, city being a focal point of a wider region, the city and country have a 'symbiotic relationship' in which the city and country are parameters at large. The study of urban centres with reference to its regional setting is more meaningful and important, as the city cannot be understood with reference to its arbitrarily defined administrative area. It has to be studied as an organic part of a social group. R.E Dickinson's 'City and Region' highlights the relevance of this geographical concept and explains how in an economic sense, the city reflects its region, the city depends on the region for its needs stemming from agricultural production; and in a complementary way the region is dependent on the city for all those specialised functions which hinge on exchange, manufacture and service. The relationship between the city and the region is mutual both in social, economic, as well as political considerations. Rural-urban interaction is a two-way process. The city or the town extends its sphere of influence or dominance on the countryside and the countryside reacts to this urban challenge through responses in spatial, socio-economic and demographic aspects. The rural region also influences the town through the environmental constraints as well as its resource supplies.

It is seen that the influence of the city is spreading in the rural areas in various ways. It is not only changing the physical landscape, but also the economic and social environment of the neighbouring areas of the city. Thus, it would be interesting to study, examine and analyse the cumulative effects of the city-region relationship and interactions and identify the patterns of human characteristics-demographic, social and economic that the city exerts on its neighbouring areas. Against this backdrop, an
attempt is made in this study to identify the pattern of rural-urban interaction and its impact on surrounding rural region.

The Haridwar city is an ancient Hindu pilgrimage centre as well as a district headquarters, which entertains around fifty lakh (five million) pilgrims every year (Tourist Office Records, Haridwar, 2000). Thus, the city has to cater to the need of not only its own residential population but also to meet the demand of the huge floating population that visits the city on several fairs, festivals and occasions. The National Commission on Urbanisation (NCU) has identified Haridwar as Special Priority City (SPC) and Haridwar-Dehradun-Rishikesh-Uttarkashi as Spatial Priority Urban Region (SPUR). Moreover, NCU\(^3\) has identified Haridwar as a Generator of Economic Momentum (GEM).

The importance of the City has further increased, as it is now the second largest city, (after Dehradun) of the newly carved Uttaranchal State. Hence, it would be meaningful to study the land-use pattern and functional structure of the city; linkages and inter-relationship of the city with its surrounding settlements and its impact on the demographic, social and economic characteristics and changes in land use pattern of the surrounding region.

Haridwar, the area of the proposed study, is a religious, commercial, industrial and principle service centre. The growth rate of population was 4.5 percent in 1951-61. It increased to 32.22 per cent in 1961-71 and further to 45.71 percent in 1971-81. Due to high population growth and unregulated development of the city in the 70's and 80's, the city was declared a regulated region in 1980. Later in 1986, the present Haridwar Development Region comprising of sixty-three villages and three urban centres was formed\(^1\).

1.2 Rural-Urban Interaction: A Concept

1.2.1 Definitions

Before going into the complexities of the Rural-Urban Interaction and its related literature and studies, it is important to understand the terms 'Rural', 'Urban' and 'Interaction'.

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\(^1\) Haridwar Mahayojana (1986-2001). Town and Country Planning Division, Meerut, UP.
Village or Town is recognised as the basic area of habitation. In all censuses throughout the world this dichotomy of Rural and Urban areas is recognised and the data are generally presented for the rural and urban areas separately. In the rural areas, the village generally follows the limits of a revenue village that is recognised by the normal district administration. The revenue village need not necessarily be a single agglomeration of the habitations. But the revenue village has a definite surveyed boundary and each village is a separate administrative unit with separate village accounts. It may have one or more hamlets. The entire revenue village is one unit. There may be un-surveyed villages within forests etc., where the locally recognised boundary of each habitation area is followed within the larger unit of say the forest range officers' jurisdiction.

The Census, however, designates all rural places as villages. The compact settlements with a population of 500 persons or more, but less than 5000 persons, constitute villages.

The Indian Census (2001) defines an urban place as:-
(a) All places with a Municipality, Corporation or Cantonment or Notified Town Area
(b) All other places which satisfy the following criteria:
   (i) A minimum population of 5,000
   (ii) At least 75% of the male working population is non-agricultural
   (iii) A density of population of at least 400 person per sq. km. (i.e. 1000 per sq. mile)

The Director of Census of each State/Union Territory is, however, given some discretion in respect of some marginal cases, in consultation with the State Government, to include some places that have other distinct urban characteristics or to exclude undeserving cases.

This definition of urban has been in vogue in Census since 1971.

The distinctions between rural and urban are probably inescapable for descriptive purposes; however, it often implies a dichotomy, which encompasses both spatial and sectoral dimensions. In census and other similar statistical exercises, rural and urban populations are usually defined by residence in settlements above or below a certain size; agriculture is assumed to be the principal activity of rural population whereas urban dwellers are thought to be engaged primarily in industrial production and
services. In reality, however, things tend to be far more complex: the ways in which nations define what is urban and what is rural can be very different; the boundaries of urban settlement are usually more blurred than portrayed by administrative delimitations.

Definitions based on a sharp distinction between urban and rural settlements often assume that the livelihoods of their inhabitations can be equally reduced to two main categories: agriculture based in rural areas, and a reliance on manufacture and services in urban centers. However, recent research has shown that the number of urban households engaged in agriculture and that of rural households whose income is derived from non-farm activities is far higher than usually thought (Mishra, 1986; Saint and Goldsmith, 1980).

E.L Ullman, first coined the term spatial interaction. The term *interaction* indicates interdependence between two geographic areas. It includes the movement of goods, people (passengers), migrants, capital (money), information, ideas *etc.* between geographic areas. The concept is similar to the 'geography of circulation' that was popular among French human geographers at the beginning of the twentieth century (Johnston, 1981).

In the present study, the words ‘interaction’, ‘inter-relationship’ and ‘linkages’ are used interchangeably.

**1.3 Review of Literature**

Despite a long tradition of geographical research into rural-urban migration, there has been a dearth of material published on wider interactions and linkages between urban and rural areas. However, a bulk of research has been devoted to the analysis of urban and rural development as separate issues. Since 1980, a growing awareness about the importance of urban-rural relationships and dissatisfaction with urban based centralised models of development has led to considerable theoretical reappraisal of such models and issues. By focusing on separate urban and rural themes, attention has been drawn away from the connections between these two foci of change. Increasingly, it is now being argued that urban and rural change could be seen, not as process in themselves, but as the product of deeper structural transformations in society. By concentrating on the linkages and flows between town and countryside...
more comprehensive, grasp of the processes of social and economic change effecting the rural can be achieved.

Urban and rural change, therefore, need to be seen as parts of an overall social formation, and in the present study an attempt is made to achieve this through an analysis of the interactions between these two foci of change.

One of the first attempts to define this interaction was undertaken by Preston (1975), who identified five main categories of interaction: movement of people, movement of goods, movement of capital, social transactions and administrative and service provision. Gould (1982) has recorded how “rural–urban interaction was the theme of the first of a series of four workshops on the third world to be sponsored during 1982 by Human Geography Committee of the SSRC” (Social Science Research Council). This workshop highlighted three principal aspects of interest in the subject: population mobility, resource transfer, and social interaction. These interests were further developed in 1984-85 by the establishment of a Rural-Urban Interaction Network by the Developing Areas Research Group of the Institute of British Geographers. This was designed to elicit research proposals concerned with the issue of rural–urban interaction in the third world. Within this context, Gould (1985) noted that rural-urban interaction could be considered “as the two way flow of people, goods, money, technology, information and ideas between rural and urban areas, themselves seen as metaphors for a wide range of spatial categories at various scales”, and he further suggested that these flows are not only symptoms of the ‘development processes’ but are in themselves active features in the transformation of rural-urban places”. Such ideas have in turn been followed up in Dixon’s edited volume of case studies of rural-urban interaction in various parts of the so-called developing world.

Underlying this shift in attention to a specific concern with linkages and flows between the rural and urban areas has been a theoretical reappraisal of certain urban based models and ideas which have been used in planning policies by various governments throughout the world over the past decades.
1.3.1 (i) Theories of Urban-Rural Interaction

Lipton (1977, 82) advocated the policy of Urban Bias. This seeks to illustrate that "the most important class conflict in the poor countries of the world today is not between labour and capital. Nor it is between foreign and national interest. It is between the rural classes and the urban classes". He identifies a clear bias in the allocation of resources. Lipton's argument is that the power of urban people is such that they are able to direct a disproportionate share of resources towards their own interests and away from the rural population. He is of the view that this urban bias not only keeps poor people poor, but he also asserts that 'inequalities within in rural areas also owe much to the urban biased nature of the development policy'. Lipton has provided a useful account of the flows of surpluses between the countryside and the towns.

Rondinelli (1983) argued, "Rural development goals, no matter how carefully conceived, cannot be achieved in isolation from the cities or entirely through bottom-up strategies". He further suggests that "linkages are crucial because the major markets for agricultural surpluses are in urban centers; most agricultural inputs come from organizations in cities; workers seek employment as agricultural productivity frees labour; and many of the social, health, educational and other services that satisfy basic needs in rural areas are distributed from urban centers." Consequently he suggests that if governments in developing countries wish to achieve widespread development, in both social and spatial terms, they must develop a geographically dispersed pattern of investment and this can be achieved through a creation of "a deconcentrated, articulate, and integrated system of cities" which provides potential access to markets for people living in any part of the country or region.

Central to this approach is the argument that neither the diffusion pole nor the parasitic view of small cities is appropriate, and instead that the "decentralised investment in strategically located settlements can create the minimal conditions that enable rural people to develop their own communities through 'bottom-up' and autonomous processes."

Rohndinelli see the development of what he terms 'secondary cities, as providing five main beneficial results. Firstly, he argues that it relieves pressures on the largest cities in terms of housing, transport, pollution, employment and service provision.
Secondly, it reduces regional inequalities. since if it is accepted that the standard of living is higher in urban than in rural areas, then the spread of secondary cities would lead to the spread of the benefits of urbanisation. Thirdly, it is seen as stimulating rural economies through the provision of services, facilities and markets for agricultural products, as well as being able to absorb surplus labour should agricultural production become more labour efficient. Fourthly, it provides increased regionally decentralized administrative capacity, and fifthly, it helps to alleviate poverty in intermediate cities where the problem of poverty and marginality are often most acute and visible.

Unlike Lipton, Rohndinelli has argued that rural change can best be implemented and encouraged by the provision of social and economic facilities in medium-sized urban settlements. This is closely similar to arguments put forward by Wanmali\textsuperscript{13} (1981) who suggests that, in the Indian context, it is the lack of service provision in the smaller towns that has been one of the most important constraints on rural change.

<table>
<thead>
<tr>
<th>Linkage Type</th>
<th>Elements</th>
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<tbody>
<tr>
<td>Physical linkages</td>
<td>Road networks, River and water transports networks, Railway networks, Ecological interdependencies</td>
</tr>
<tr>
<td>Economic linkages</td>
<td>Market patterns, Raw materials and intermediate goods flows, Capital flows, Production linkages-backward, forward and lateral, Consumption and shopping patterns, income flows, Sectoral and interregional commodity flows, cross linkages</td>
</tr>
<tr>
<td>Population movement linkages</td>
<td>Migration-temporary and permanent, Journey to work</td>
</tr>
<tr>
<td>Technological linkages</td>
<td>Technology interdependencies, Irrigation systems, Telecommunication systems</td>
</tr>
<tr>
<td>Social interaction linkages</td>
<td>Visiting patterns, Kinship patterns, Rites, rituals, and religious activities, Social group interaction</td>
</tr>
<tr>
<td>Service delivery linkages</td>
<td>Energy flows and networks, Credit and financial networks, Education, training and extension linkages, Health services delivery systems, professional, commercial and technical service patterns, Transport service systems</td>
</tr>
<tr>
<td>Political, administrative and organizational linkages</td>
<td>Structural relationship, Government budgetary flows, Organisational interdependencies, Authority-approval-supervision pattern, Inter-jurisdictional transaction patterns, informal political decision chains</td>
</tr>
</tbody>
</table>

Source: Rohndinelli (1985)
Rohndinelli's arguments, however, assume that beneficial rural change will necessarily be promoted by the development of such things as marketing facilities within the towns, and yet he fails to provide convincing argument that the changes instilled will be mutually beneficial to people living in both rural and urban areas.

Rohndinelli has drawn together a broad basis for the analysis of major linkages in spatial development; the elements included within the linkage types are of very different kinds of category, ranging from systems to patterns and interdependencies (Table 1.1). This analysis of the author provides a broad framework in which the rural-urban interaction in the following study is viewed.

The work of Stöhr and Taylor (1981) represents a complete contrast. They argue that the top-bottom development policies need to be fundamentally integrated with bottom-up approaches if 'development' is to become more equitable. Development from below considers "development to be based primarily on maximum mobilization of each area's natural, human and institutional resources with the primary objective being the satisfaction of the basic needs of the inhabitants of that area. It is oriented directly towards the problems of poverty and must be motivated and initially controlled from the bottom". Stöhr and Taylor identify three other features of development from below: it is determined from within and is therefore unique to each society; it is egalitarian and self reliant; and it is communalist. They argue that it involves selective growth, distribution, self-reliance, and employment creation and above all it respects human dignity. This is therefore very different type of definition of 'development' from that used by Rondinelli and Lipton.

The shift of balance towards social rather than economic is also reflected in the work of Friedmann and Douglas (1978) who advocated of agro-politic development where the "primary objective is no longer economic growth but social development with focus on specific human needs." For them "development must be fitted to ecological constraints; priority attention (in agrarian economics) must be given to rural development; and planning for rural development must be decentralised, participatory, and deeply immersed in the particulars of local settings."

Rondinelli's (1985) classification of linkages in spatial development provides a broad framework for the consideration of rural-urban interaction. However, it conflates different kinds of linkages and likewise different kinds of element. He thus classifies
population movement linkages as a separate category from physical and social interaction linkages and he includes 'systems', 'networks', 'patterns', 'flows', and 'inter-dependencies, within his general elements. Other authors have listed various types of flow and linkage between rural areas.

Stöhr (1981) has identified four key areas where changes need to be introduced in the balance between the two if development from below is to be successful. At a political level, he suggests that rural areas need to be given a higher degree of self-determination so that the flow of political power does not become urban to rural in nature. Secondly, he suggests that national pricing policy should be introduced which offer terms of trade more suitable to agricultural and other rural products. Likewise productive activities in rural areas should be encouraged to exceed regional demand so that a pattern of export flows is generated. Finally, he suggests that the whole transport and communication network should be reorganised, both between urban and rural areas, and also at a village-to-village level. Bottom-up approaches such as these therefore seek to change the balance of a perceived inequitable flow of resources from rural to urban areas through "integrated regional resource utilisation at different spatial scales".

Individual authors have concentrated on different aspects of rural-urban relationships. Morgan (1985) pays specific attention to energy flows in tropical Africa, and then considers the broader significance of these in terms of social and economic linkages.

El-Bushra (1984) provides a detailed case study of urban crises in the Sudan, and focuses on the question of population flows from peripheral rural regions to the Khartoum conurbation. An evaluation in this evidence suggests that heavy migration has resulted in a range of social and economic problems in both rural and urban areas.

Harriss (1982) in a comparative study of Tamil Nadu in South India and Hausaland in West Africa explored food flows in the context of grain commercialization and the emergence of marketing systems. Following a theoretical assessment of the economies and social linkages associated with the development of market systems, the author focuses specifically on the commercialisation of grain in her two case studies and the consequences of this for the nutrition of peasant households.

Thus it is realised from the above literature focussing on various developmental issues in rural and urban areas that these areas are inter-related and inter-dependent areas.
Moreover, the rural and urban areas share a symbiotic relationship. Hence, both rural and urban have equal significance in sustainable development of the region.

Various types of linkages exist between the rural and urban areas which have been discussed by various authors. However, in the present study an attempt is made to examine the pattern of physical, social, economic and service delivery linkages in the study area and analyse the cumulative effects of these linkages on various aspects of the rural population in the region.

1.3.2 (ii) Other Related Studies:
Various studies have been conducted on urban settlements and their region, which examine the different thematic issues. Some of the studies are discussed below:

1.3.2 (a) Studies on the Demographic Structure
The demographic structure of the city is another important component while analysing the growth of the city and intra-city variations in the demographic and socio-economic characteristics of population. Brush\(^{19}\) (1968) has pointed out the inappropriateness of the western models in the Indian cities, using the density-distance relationships. Four sets of deviation i.e., (a) high density in central area and low population density in the periphery, (b) extremely high density in the central area for the first mile and gradual decline over a distance of five miles, (c) presence of two distinct nodes of high density, and (d) low population density throughout the urban area were identified as the main factors. Singh and Singh\(^{20}\) (1980) found great intra-city variations in various demographic tracts while analysing the spatial demographic structure of Patna. Tyagi et al.\(^{21}\) (1981) have analysed the level of variation in infant mortality rate in commercial town Hapur. The authors found that although the infant mortality rate has gone down with the improvement of medical facilities for the city as a whole, but it showed wide intra-city variations.

1.3.2 (b) Studies on Land Use Pattern
The land use pattern of various Indian towns has been dealt in detail in some studies. Survey conducted by TCPO\(^{22}\) (1960) in selected Indian cities and towns revealed that the residential use constitutes the largest category in our urban settlements while commercial use accounts for only 3 per cent of developed land. The areas under industrial, recreational, public and semi-public purposes are higher in larger cities. It
was also found that the area devoted to road and streets in old cities are very less. Gautam\textsuperscript{23} (1978) highlighted the advantages of aerial photo interpretation techniques for the study of land use and settlement and finds that the advantages in terms of time efforts and accuracy are considerable. Similarly, Raghuswamy and Vaidyanadhan\textsuperscript{24} (1980) in the case study of Vishakapatnam demonstrated the significance of land use studies from aerial photographs. Md. Atallah\textsuperscript{25} (1985) in his book 'Urban Land its Use and Misuse' has compared the landuse of Patna, Bhagalpur, Monghyr, Hazipur, Begusari and Barauni, all of which are along Ganga. The study indicates an inverse relationship between the size of the town and the space occupied by residential and open land.

Swaminathan\textsuperscript{26} (1981) analysed the changing land values of Coimbatore during the period of 1960-73 and found that the greater amount of change as well as highest bidding in values was in the Central Business District and residential areas. Biswas (1976)\textsuperscript{27} studied Calcutta’s ethnic composition and the residential patterning of the minorities. He concluded that, the occupational considerations, economic, and historical factors, seem to be more important than ethnic/religious factors in determining residential land use. Parsad and Oraon\textsuperscript{28} (1976) examined the historical, geographical, economic and social factors, which have moulded the residential areas of Ranchi city. The authors analysed that the residential areas have evolved along lines of tribal, non-tribal, profession, income and status level, with sighs of 'ghettoisation' of the economically and socially deprived tribal groups.

Yadav\textsuperscript{29} (1978) emphasised on the typology of residential areas in Delhi and reviewed the city's residential structure in the light of western models of city structure. Desai\textsuperscript{30} (1980,1981) focused on the role of perception and behaviour of the people in cognizing their spaces and living preferences in Ahmedabad city in terms of income, status, religious and ethnic affinity and exposure to worldly values. Raju\textsuperscript{31} (1982) discussed the organisation of India's urban residential space as a reflection of traditional social order, as well as the contemporary socio-cultural situations that are important in governing the residential space in an area. Chaurasia\textsuperscript{32} (1987) has analysed the land use of three towns Doab (Azamgrarh, Gazipur and Ballia) of the Ganga-Ghagra in assessing the assets and chronic problems of the recent land use. Roy\textsuperscript{33} (1987) based his spatial model in temporal land use of Lucknow urban
Agglomeration on the concept of simple ‘Markov Chains Analysis’ to highlight the trend of the land use changes in the city.

Mohan and Gupta\textsuperscript{34} (1986) discussed the need for an efficient land use evaluation and monitoring system for land use as a dynamic process/phenomena. The study points out the utility of land data for land use classification and monitoring purposes, which is essential for management of urban environment.

1.3.2 (c) Studies on Functional Base:

Various studies focussed on specific functional and economic base of urban areas. Gondatra and Patel\textsuperscript{35} (1979) examined the economic structure of urban centres of Gujarat for the period 1951-71. The author also investigated the association between the urban population growth and changes in the functional structure of the urban centres.

Tripathy and Sinha\textsuperscript{36} (1979) evaluated the capacity of Bhubaneswar to generate multi-sectoral and ultra-sectoral employment opportunitities.

Octania and Diddee\textsuperscript{37} (1997) in their article “Functional Base of Medium Town: The Maharashtra Experience” examined the occupational structure and its changes in the medium town during 1971-91. The authors also tried to bring out the relation between the occupational structure and the growth behaviour of the town using various statistical techniques.

1.3.2 (d) Studies on Morphology and Internal Structure of Urban Settlements

The most comprehensive review of research on morphology of Indian cities was made by Brush\textsuperscript{38} (1962). In his article on the morphology of Indian cities, he observed that the typical Indian urban centre contains a congested old section, adjacent to which is the planned spacious section of the British Era showing a blending of indigenous and European features. He finds a sharp density differences between wards in central old urban areas and the periphery; but in spite of the sharp density gradient, there is lack of centralisation in urban functions and slight development of fringe areas. He concluded that Indian cities have their own peculiar structure and the theories evolved for the western cities are not relevant to them. Smailes\textsuperscript{39} (1969) in his articles on the morphological model of an Indian city has identified four main morphological periods of evolution; pre-urban nucleus, Mughal period, British period and post independence
period. He finds two distinct developments in the city i.e., the indigenous city and the British annexes. This model was based on his personal observation. Dutt and Amin \( ^{40} \) (1986) have represented the typology of South Asian cities as traditional bazaar, colonial and planned cities. A mixed model combining features of bazaar, colonial and planned cities, emanates from the interaction among or between them. The authors are of the view that, it is necessary to understand the typology in its existing form so that necessary adjustments can be made for their future.

Among the case studies on morphology of individual urban places in India, the pioneer work of Singh \( ^{41} \) (1955) on Banaras set a pattern for later researches in this field. Singh in his work used the term ‘Umland’ to mean the area which is socio-economically related to the city. He demarcated the umland boundary by using certain criteria like vegetable supply, newspaper circulation, etc. the work, however has less relevance in demarcating the umland boundary in the Indian context. Guha \( ^{42} \) (1953) and Kar \( ^{43} \) (1960) on Calcutta; Singh, R. L \( ^{44} \) (1955, 1956, 1956) on Gorakhpur, Balia and Mirzapur, Deshpande \( ^{45} \) (1956) on Visnanagar in North Gujarat.

R. L. Singh and K.N Singh \( ^{46} \) (1957) examined the morphology of the twin township of Dehri-Dalmianagar. Chatterjee \( ^{47} \) (1964) did the morphology of Hawrah City, while Ajmer and Itarsi were studied by Upadhaya \( ^{48} \) (1965) and Singh (1967) \( ^{49} \) respectively.

The functional zones of Ranchi were described by Singh and Mukherji \( ^{50} \) (1957) and those of Dharwar by Prabhu \( ^{51} \) (1953). Punjabi \( ^{52} \) (1958) gave a detailed description of the planned city of Chandigarh and Singh, U \( ^{53} \) (1959,1964) identified the functional regions of Allahabad and Mugalsarai. Functional zones of Murshidabad were discussed by Bhattacharya \( ^{54} \) (1961) and of Lucknow by Nigam \( ^{55} \) (1964). Nigam traced the growth of Lucknow, which showed a tendency of segregation of functions into separate regions. He analysed that Lucknow is a city with diversified functions. It is a state capital, regional military headquarters, a university town and also a large service centre.

Janaki and Sayed \( ^{56} \) (1962) produced a monogram on Padra Town situated near Baroda. The authors made an intensive study of the characteristics of its population, the social and economic status of the people and the impact of all these on the changing morphology of the town. The authors also explored the possibilities of caste function zoning.
Rao and Desai\textsuperscript{57} (1965) in their study of Greater Delhi give a glimpse of the pre-industrial and post-industrial Delhi and its subsequent growth, both demographic as well as economic. H.F Hirt\textsuperscript{58} (1961) examined the morphology of south Indian towns with particular reference to their Dravidian type of architecture. Bose\textsuperscript{59} (1961), studied a few aspects of social life of Calcutta. In his study the author classified the people into Bengali and non-Bengali communities and then studied their occupations and their involvement in various voluntary organisations in the state. Mathur\textsuperscript{60} (1966) described the urban landscape of Thane.

Following his own approach in the study of Banaras, R.L Singh\textsuperscript{61} (1964) brought out a book on the urban geography of Bangalore. The study was largely based on field observations. He examined the physical setting and the growth of Bangalore City through past decades to present; the demographic, socio-cultural aspects of the city, its public utility services, urban morphology and landuse, its umland and the physical and cultural characteristics of the umland. Finally, the author has given suggestions on the planning and improvement of the city. Ujagar Singh\textsuperscript{62} (1966) in his study of Allahabad, studied the growth and development of the city. He examined the morphological character of the town and demarcated the geographical and cultural zones. The author has also studied the functional regions describing the segregation of different land uses. Analysing the expansion of essential services, transport and communication and level of industrial development, the author has critically examined the master plan for Allahabad and suggested an alternative plan for the development of communities. Finally, the author has taken up the most controversial issue of umland demarcation. Sundaram and Chandrasekhara\textsuperscript{63} (1968) examined the rural-urban relationship in some selected cities including Madurai, Moradabad, Tiruchuapalli and Coimbatore. Sinha\textsuperscript{64} (1970) studied the application of research models and discussed the origin and growth of Sirsi town. After discussing the topographical structure, he studied the functional and occupational aspects of urbanisation. The infrastructural facilities like transportation and communication network of the city were also analysed by the author. Finally, the author applied certain quantitative techniques and delimited the zone of influence for Sirsi town. Guha\textsuperscript{65} (1964) however, suggested a different method of designating morphological regions of Burdwan City. The city was divided into seven types of zones. namely.
dynamic, static, rejuvenated, expanding, waiting for development, derelict and agricultural enclaves.

Alam 66 (1965) examined the growth patterns of the twin cities of Hyderabad-Secundrabad within the framework of Dickinson's, Burgess and Hoyt's theories of urban growth and morphology. Two sets of indices, i.e., the principle elements and reflexive elements were studied, the former indicating the direct impact of the city and the later indicating the central functions of the city. The author identified three regions i.e. the derelict region-pre urban section, the static region-area of the walled city and the region of internal dynamism-that is the focus of the metropolitan function and developmental activities. Similarly, Singh 67 (1974) has studied the general characteristics of functional morphology in various classes of service centres like Varanasi, Gaziabad, Unnao, Mugal Sarai and Basara. Studies indicate that a hierarchy of various functions exists among the centres and also a hierarchy among the various zones in the internal structure of the centres. Some authors analysed the morphology of modern industrial complexes. Ahmed and Srivastava 68 (1976) examined the growth, morphology and ethnic character of Ranchi-Dhunam urban complex. Agarwal 69 (1976) studied the Durg-Bhilai complex in terms of its morphology and growth. Kudriaoutsey and Kubetshaya 70 (1976) analysed the structural features of the formation of the new capitals and restructuring of old ones in the developing countries including India. Ramachandran 71 (1976) examined the internal structure of a fast growing city Vijayawada while Tameskar 72 (1977) discussed the patterns of the walled town of Amrawati. Sharma 73 (1978) discussed the broad elements of town planning and reconstructed the morphology of four most important Harappan towns. He finds that all these towns reflected a great uniformity in their lay out. Saxena 74 (1978-79) highlighted some theoretical aspects of the market towns and referred to a case study of Sriganganagar. Vithal Reddy 75 (1982) looked into the spatial pattern and functional transformation of Secundrabad. Rajeshwar Singh 76 (1973) has analysed physical and cultural factor leading to the rapid growth of Jabalpur city from a humble settlement to the most modern complex urban settlement of today, commanding huge bulk of population and various multifarious activities. The author reported that the city occupies an excellent natural defense site in a rocky basin and its evolution bears intimate relationship with the physical setting. P.C Sharma 77 (1987) identifies the physical, climatic, geological controls and cultural controls like impact of transport.
and communication, impact of trading commercial establishments etc. which have modified the layout and structure of towns in Himachal Pradesh. Singh\(^7\) (1990) has used the concept of development biology with the three stages of histogenesis-pattern, formation and morphogenesis to describe the morphological characteristics of eleven towns in North Bihar. The functional structure of the town has been evaluated with due importance given to the problems associated with various morphological areas. Along with the well-known models of urban growth propounded by Burgess, Hoyt and Harris and Ullman, he has taken into account Colby’s views regarding the centripetal and centrifugal forces, which play a role in town development. Naidu\(^7\) (1990) in an in-depth study of the walled city of Hyderabad, investigates, the causes and extent of urban decay, which reinforces one of the factors of inter-communal enmities. The possibility of restoring walled cities to a viable urban form were also explored in the study. Mehra\(^8\) (1991) examines the interface between society and policies involved in plans for urban renewal in the walled city of old Delhi. The author analyses that the urban policies have a great influence on urban environment in contemporary India and understanding of local politics is essential for the perception of evolution of old Delhi.

The literature on various aspects of morphology and land use pattern in this section has formed the basis for examining the land use pattern of Haridwar city in the present study.

1.3.2 (e) Studies on Influence of the City on its Region

The impact of urban centers on their surrounding area is another vital aspect of the theme of city-hinterland relationship studies. Some studies that have highlighted the influence of the city on its region areas follows-

Sen\(^8\) (1971) have examined the processes of rural growth centres in Miryalguda Taluka and formulated models for central village planning on the basis of three variables, \textit{i.e.} socio-economic activities, land use and the transport network.

Bhat and others\(^8\) (1971) have identified central places in Karnal and evaluated their roles in the trickling down and development processes to the adjoining hinterlands. Wanmali\(^8\) (1970) has also examined the role of service centres in Maharashtra. Rao\(^8\) (1977) while identifying the potential growth centres for regional development examined the existing facilities, their type, their standard and the level of development.
Mandal\textsuperscript{85} (1981) has also identified the rural services centres in Bihar plain. He has also examined the developmental waves exerted from these rural service centres. In the end he has identified potential service centres for the overall regional development.

Kulkarni\textsuperscript{86} (1981) has examined the growth and development of Nasik city. The internal structure of Nasik taking into consideration the social areas was analysed and the spatial mobility and linkage pattern between social areas were studied on the basis of the commuting patterns, telephone connection, money flows and shopping characteristics. The field of influence of Nasik city was also delimited on the basis of the data relating to supply of various perishable and non-perishable commodities and circulation of newspaper. The study also takes into account Dickinson's city region concept, Berry's spatial behavioral patterns and Smailes urban structure while analysing linkage patterns. Deshpande\textsuperscript{87} (1980) in their study have examined and analysed the rural and urban interaction with special reference to the impact of the metropolitan city Bombay, on the south Kolaba region of Maharashtra. The authors found that the influence of Bombay has resulted in the increased transport and communication facilities, which have led to demographic imbalance and economic stagnation, thus the traditional hierarchical spatial network of the region is seriously disturbed. It was concluded that the traditional 'pull' factor rather than the 'push' factor prevails in this rural-urban interaction.

Gupta\textsuperscript{88} (1989) studied the functional landscape of the Bharatpur city. The author examines the relation of the city with its environs through variables like demography, economy, society and infrastructure. The trend of aerial distribution of population and economic functions was studied by classifying the city and the settlements of its environs into functional types and also by analysing the social amenities available in the region. Thus, the city revealed the inter-relationship between the city and its environs. Sinha\textsuperscript{89} (1980) has made a qualitative assessment of the fringe and its physical characteristics and its problems in Patna city. Delimiting the fringe, the author has studied its physical characteristics and assessed the impact of location, transport, recreational, medical, and institutional facilities on the living conditions of the people in the fringe areas, in terms of their housing, food habits and dress etc. The author has further examined the influence of Patna on the change in the landuse pattern of the nine sample villages from the fringe using the primary data. Borah\textsuperscript{90}
(1985) has made an effort to highlight how and in what measure a fast growing city is influencing the rural life in the regions around it. Focusing on the largest urban centre in the north-east India, the study thematically explores the gradient of the city's influence towards its peripheral areas. Thus, investigating the extent and characteristics of Gauhati's influence both in immediate vicinity and in the distant areas of its environs, the author brings out the pattern of induced effects of the city as reflected in some socio-economic and demographic features in the area around the city. Using gravity influence model she has studied the extent of the city's influence in relation to its accessibility and also how its spatial pattern is influenced by the regional characteristics. In the case study of Bilaspur, Khan (1994) has taken up an intensive study of the structural pattern of the city and its relationship with its environs. The study highlighted the mismanagement of the city's environment and has suggested remedies for the removal of the problems.

Wanmali (1991) explore the geographical analysis of the provision and use of hard and soft infrastructural services in rural regions of North Arcot District of Tamil Nadu, India, based on survey data collected in 1982-83. The analysis relates to the demographic, spatial and functional features of the settlement system of the study region. The study has identified service center hierarchies in the study region based on the provision of hard and soft rural infrastructural facilities services. The study also identifies 'gaps' in the provision of services within the study region. An attempt was also made to determine what effect hard infrastructure such as roads has on the emergence and development of soft infrastructural services, such as distribution of credit, banking, seeds, fertilizers, pesticides, marketing of agricultural products, animal husbandry, communication, health, education, and other goods and services.

Impact of access to rural infrastructural services on the expenditure pattern of the households was analysed after examining the socio-economic characteristics of the sample households. The study paid special attention to the household expenditure on production and consumption goods and services. Based on the geographical analyses of gaps in the provision of rural infrastructural services, the median population threshold for services, and the results of the analysis of the impact of access to rural service infrastructure on the expenditure pattern for consumption and production goods and services at the household level were also examined. The author presented a
list of locational priorities to enable the policy makers to make decisions on the geographical pattern of investment in rural infrastructural services.

The study from this section of the review of literature provided an insight in examining the pattern of the rural-urban interaction and its impact on the surrounding region.

1.3.2 (f) Studies on the city- hinterland relationship

The entire process of the theme of interaction and relationship between a city and its region is a two way process. The city extends its influence on its surrounding rural areas, which in turn react through the changes in socio-economic structures in them. Studies relating to metropolitan dominance or urban influence are not new. Ellefsen's (1962) 'City Hinterland relationships' can be said to be the pioneering one. The author has attempted to define the zones of influence of five metropolitans of India, viz. Bombay, Delhi, Madras, Hyderabad and Baroda by considering the criteria like density, sex ratio, literacy rate, non-agricultural population and commercial population. On the basis of these criteria he has found that the influence of an urban centre decreases in general along with the increase of distance from it. Accessibility, however, plays an important role in this context. He has further found that the influence of the urban centers is highly limited and it extends only up to the neighbouring peripheral areas. Some Indian geographers have also worked in this line to find economic criteria to find out the zones of urban influence on the basis of demographic and socio-economic criteria. One such work is by Dixit and Sapiwan (1974) who have attempted to examine the spatial extent of Poona's influence on the basis of gradient shown by variables like bus services, newspaper circulation, commutation, supply and distribution of essential commodities, post and telegraph, etc. Another significant work in this field is done by Sharma (1974), in his study the author has attempted to explore the extent of the spread of city's influence and the pattern of urban induced effects in India as reflected in the economic, demographic and social characteristics in the areas surrounding a number of cities and towns. For this study the cities and towns like Ahmedabad, Hyderabad, Poona, Baroda, Nadiad, Vismanagar, Nizamabad, Warangal and Mahbubnagar, representing four regions have been taken. The author finds great regional variations in the impact of the cities on their surrounding rural areas and such variation is found to vary not only according to the size of the urban centre, but from variable to variable as well. Accessibility is thus
found to play an important role in the spread of urban influence in this study also. Nangia\textsuperscript{96} (1976) in her study of Delhi Metropolitan Region has studied the characteristics of attributes of settlement pattern and on their basis delimited the Delhi Metropolitan Region. The study provides a structural basis for the planning of the Metropolitan Region and has shown how the city and its region depend upon each other, with different degree of impact, for multifarious activities. The author has calculated population potential and ‘rate of interactance’ to measure the energy of interchange of a settlement, with respect to a series of settlements in Delhi Region. The author has further examined the linkage pattern of settlement taking distance as determining factor of interaction between any two points on the basis of network and graph theory. She finds that distance has an important bearing on the settlement structure and the population size of the region. Growth and density of population and percentage of workers engaged in tertiary activities show a gradient pattern with distance from the metropolis. The gradients however, vary from one variable to another showing both positive and inverse relationships.

H. Ramachandran\textsuperscript{97} (1980) outlines the concept of village cluster and its use in development planning. He has described the method of identifying village clusters for micro level planning. The author has stressed the importance of lateral links (rather than the vertical links) and interaction among contiguous villages and suggested to convert such cluster into an instrument of fundamental change by promoting intra-cluster interactions.

Khan and Shashi\textsuperscript{98} (2000) in their article have delimited the area of influence in one of the fastest growing towns of NCR i.e. Gurgaon.

Joshi\textsuperscript{99} (1977) in his study of Indore city found that there was no significant effect on the size of farm and ownership of land. However, the urban impact increased the fragmentation of land that resulted in a phenomenal rise in the input and capital formation in agriculture. Gowda and Mahadev\textsuperscript{100} (1977) in their studies of changing nature of agriculture in the rural-urban fringe of Bangalore, found that the intensity of agriculture is high near the cities. The land is positively related to the intensity of market gardening, which in turn is negatively related to the distance from the city. The authors conclude that land use control measures have helped in preserving market gardening, which also serves as a green belt. Kumar\textsuperscript{101} (1980) worked on the rural-urban fringe of Bhopal city and found that the commercialisation and city market
oriented agriculture production were two significant factors for changes in agricultural activity. Wadhawa\textsuperscript{102}(1982) made a case study of Ahemdbad city and found that increasing land value due to urban growth was the major factor for conversion of fringe land from rural to urban uses. Khan\textsuperscript{103}(1982) worked out the rural-urban migration and urbanisation in Bangladesh and concluded that the economic and administrative decentralisation with increased emphasis on comprehensive rural development is imperative to tackle the problems of rapid urbanisation. Lal\textsuperscript{104}(1987) in his study on the city and fringe of Bareilly found that primary or secondary fringe is characterized by changes in land use particularly extension of settlements at the cost of other uses, most likely urban agriculture. The secondary or the outer fringe is characterised by extensive land uses. In this zone, single cropped land is now converted into double and multiple cropping zones. Desai and Gupta\textsuperscript{105}(1987) in their study of Ahemdbad city found that loss of agricultural land, land acquisition, lack of infrastructure and dual characteristics of the fringe in regard to the socio-economic conditions of the people are some of the problems that have come up due to the change in land use. Sethi and Pandey\textsuperscript{106}(1987) identified population growth as the single most powerful factor besides industrial expansion contributing to land use changes in urban territory of Delhi.

Sinha\textsuperscript{107}(1984) studied the process of urban development in Haryana and the nature of rural and urban relationship. The study showed that the urban centres have influenced the mental construct of the rural people, increased income and mobility of the rural folk and more often contacts with the city have undoubtedly led the urban mode of life to extend far beyond the boundaries of the urban centre. Deva\textsuperscript{108}(1998) has examined the degree of influence that an urban centre exercises over its complementary region and the nature and the character of the rural-urban interdependence that is emerging in Manipur. The author also studied the dominating role of Imphal city. Deva has used both the theoretical as well as empirical methods to delimit the urban region of the towns of Manipur.

Joshi\textsuperscript{109}(1978) evaluated the impact of the urbanisation in Madhya Pradesh on various aspects of agriculture viz. farm productivity, degree of commercialisation and farm population density. Again the same author\textsuperscript{110}(1978) analysed quantitatively the impact of urbanisation on the agricultural development like commercialisation, diversification, adoption of agricultural innovations, increase in investment in
agriculture and changes in the market and credit system. He finds that urbanisation is an important aspect in the process of economic and social change. The economic incentives provided by the urban demand and marketing system together with the new social and cultural atmosphere of modernity bring fast changes in the type of agriculture, paving a way towards development. Irshad\textsuperscript{11}(1980) has examined the urban encroachment of Muzaffarnagar town on its adjacent villages. The study consolidated the account of loss of area and production (value) of crops accruing from accommodating the uncontrolled urban expansion. Dixit\textsuperscript{12}(1983) examined the spatial distribution of market places in the umland of Kanpur using the nearest neighbour analysis and finds the nature of terrain as an important determinant in the distribution of market centres in the umland.

Sengupta\textsuperscript{13}(1988) discussed the process of development of urban fringe in India with special reference to Ahemdabad and its impact on changing land use pattern and finally the problems that have cropped in. Josephine Olu Abiodun\textsuperscript{14}(1983) examined the trends of urbanisation and its pattern in Nigeria. The author discusses the problem and prospects of the vast expanding urban peripheries in Nigerian cities with special reference to the fast expanding periphery of the city of Ibadan. The conditions of residential facilities in the neighbourhood and the nature of the problems experienced there have also been investigated by the author. The study highlighted that, in the process of city expansion, surrounding villages have been engulfed and incorporated into the city and several neighbourhood have emerged on the periphery of the city. Roy\textsuperscript{15}(1977) delimited the service zones of selected cities using the gravity concept of distribution and equilibrium of population taking into consideration the economic activities as well as physiographical characteristics in the formation of typograms of the service centres. Prasad, Roy and Sahu\textsuperscript{16}(1978) have examined the structure of urban villages around Ranchi in Bihar, and analysed the recent changes and trends in land use because of the influence of the city. Jafri and Sahu\textsuperscript{17}(1979) analysed the impact of Shillong city on the socio-economic life of rural settlements lying in the immediate vicinity of the city boundary along the axial routes. The authors find that the fringe of the city is spreading both in temporal and spatial terms and the villages along the roads have high level of infrastructural facilities than the one in the interior \textit{i.e.} accessibility in terms of distance is the determining factor. Mukerji\textsuperscript{18}(1962) delimited the umland of Modinagar using thirteen indicators and finds that Modinagar
has superseded the administrative and pargana centre Jalalabad as a dominating service centre because its accessibility has determined the number and complexity of its market functions which have enlarged its umland.

Gopal Krishan (1970) delimited the umland of planned city Chandigarh. He measured the intensity of functional relations of various parts of the umland and also identified the service centre of various orders situated within the umland. The author concludes that the formation of the umland of a planned city is a slow process, at least in the early stages. Bradnock (1974) used three new techniques; viz. modified metropolitan dominance, regression analysis and trend surface analysis to delimit the hinterlands of Madras and Bangalore. The author believes that one or two indices of economic activity do not spell out all the relationships possible between the country and town, and so the use of multivariate statistical methods are capable of using meaningful and wide range of data; and helps in providing a deeper analytical understanding of the problem. Swaminathan (1974) worked out the functional hierarchy of settlements in terms of their central functions. The multivariate statistics like principal component analysis and distance cluster analysis were also used by the author. The analysis showed that there exists a five level hierarchy of settlement in Coimbatore Metropolitan area, with more than 140 central functions and where more than 4000 establishments stand out predominantly as a first order centre.

1.4 Approach to the Study:
The review of literature leads to recognise two important facts. While it is potential field for research both from academic as well as practical point of view; the need of intensive studies of the rural areas around an urban centre is imperative for proper understanding of the rural-urban interaction and inter-linkages. Moreover, it is also realised during the review of the literature that most of the studies are focused on the larger cities/metropolis where the problem of unregulated expansion of the city in the surrounding area has reached at an alarming stage. Even the regular planning of these cities has not been able to regulate such expansion. Hence, there is an urgent need for intensive studies of the cities where the problem has not yet reached at an alarming stage and proper planning and regulation process can lead to the balanced development of the region. In this respect, an attempt has been made to achieve the goal in the present study.
Studying Rural-Urban linkages is also an important subject that provides measures to improve both rural and urban environments. With proper management, the interaction between towns and the surrounding rural areas becomes a strong base for economically, socially and environmentally balanced and sustainable regional development.

The Haridwar development Region (HDR) is selected for the present study. The HDR was formulated in 1986 to have an overall planned and regulated development of the city and its surrounding region. It comprises of Haridwar U.A, Rishikesh M.B and Muni-ki-Reti notified area and sixty- three villages covering five districts. The area includes thirty-nine villages in Haridwar tehsil of Haridwar district, four villages in Najibabad tehsil (now in Haridwar tehsil) of Bijnor district, fourteen villages in Dehradun tehsil (now in Rishikesh tehsil) of Dehradun district, five villages in Devprayag (now in Narendranagar) tehsil of Tehri- Garhwal district and one village in landsdown (now in Kotdwara) tehsil of Pauri-Garhwal district (Map 1.1).

The Haridwar City is located at 29°58' north latitude and 78°10' east longitude. The population of the city has increased from 79,277 in 1971 to 1,49,011 in 1991 and further to 1,75,340 in 2001. The decadal growth rate of population in 1991-2001 is 22.50 per cent. The city covers an area of 15.07 sq. km. It lies on the right bank of river Ganga at the southern base of Shiwalik range, through which, by a natural breach, the river enters the plains, the width of which at its narrowest point is more than one kilometre.

The population of Haridwar U.A (comprising of the Haridwar M.B and the neighboring localities of Jawalpur Mahavidyalaya, Gurukul Kangri and B.H.E.L) has increased from 1,45,946 in 1901 to 1,87,392 in 1991 and 1,20,767 in 2001. The total area of Haridwar U.A is about 42.01 sq. km.

The focus of the present study is to examine the existing pattern of rural-urban interaction and the impact of this interaction on the spatial pattern of change in the land use and cropping pattern in the surrounding region. It also analyses the impact of these interactions on the demographic, social and economic characteristics of the rural settlements in the region. The interaction pattern of the settlements in terms of commutation of the inhabitants to the city and other neighbouring areas for various goods and services is also studied in detail to analyse the relationship that exists among the settlements in general and with the city in particular. The study of pattern
and intensity of interaction of the rural settlement with the city gives us the clear understanding of the role of the city in the overall development of the region. It also help us to identify the nodes (growth centres) to accelerate further development of the region. Taking into consideration the above background, the present study is based on the following objectives:

1.5 Objectives

1. To study the spatial and temporal changes in land use and cropping pattern in the region.
2. To examine the spatio-temporal trends in the demographic and socio-economic characteristics in the region.
3. To study the pattern of interaction among the settlements and also examine the degree of interaction of rural settlements with the city.
4. To analyse the changes in demographic, social and economic characteristics and quality of life of people based on intensity of interaction with the city.

1.6 Hypotheses

1. The area under cultivated land has positive relationship with the distance from the city, while the area under non-agricultural uses has an inverse relationship.
2. The higher the intensity of interaction of the settlements with the city, the greater are the changes in the land-use pattern.
3. The distance from the city has an inverse relationship with population growth, population density, literacy rate, percent workers in non-agricultural activities while it has a direct relationship with percent workers in agricultural activities.
4. Intensity of interaction has positive relationship with shift from agricultural to non-agricultural activities: change in land use and cropping pattern and vice versa with the distance and travel cost.
5. Literacy levels, housing characteristics, household amenities, per capita expenditure have positive relationship with intensity of interaction.
1.7 Data Base and Research Methodology

Data from both primary and secondary sources are used to facilitate the present study.

1.7.1 Secondary sources

Population related data like demographic characteristics, social facilities and economic activities of population, and the general land use data are collected from various District Census Handbooks, Town Directories, occasional papers and other reports of Census of India. However, the Census data for 1991 and 2001 has been obtained from electronic data processing unit of Census of India.

The land use data provided by Census give the idea of general land use only (in five broad classes). Hence, to have a more detailed information on land use and its change over time, alternative sources like land records, topographical maps of Survey of India, village revenue records, tehsil office records 'hadbast' (Khatia and Khatuni) records of Patwaris and records of Municipal Body, Town and Country Planning Department of Haridwar Development Authority and Master Plan of the cities etc. have been used for the present study.

Data pertaining to origin and evolution of the city are collected from historical records, published monograms, memoirs, gazetteers, old maps and census surveys.

The data on the level of interaction pattern of the settlement are collected through field survey. However, secondary data have also been suitably utilised for the same.

1.7.2 Primary Sources

To strengthen and support the present study, along with secondary database, primary data has also been collected from the selected households of the sample villages.

The sample villages for the present study are selected on the basis of accessibility in terms of distance from the city and level of infrastructural facilities available in these villages.

Total nine villages are selected for primary survey. Three villages (one each having high, medium and low level of infrastructural facility) are selected from each distance zone for studying the pattern of interaction of the rural settlements with the city.
The data has been collected through a proper field survey in the study area using a structured questionnaire. During the selection of sample households a proportional random sampling method has been used for selecting the sample and sub-samples.

The head of the household have been interviewed using a detailed structured questionnaire that seeks to attain various characteristics of the population. Apart from the head of the households, village Pradhans, Sarpanchs, Patwaris and other elderly people have also been interviewed at length for detailed information. Besides, the survey has also been conducted at various government functionaries and concerned officials like, Block Development Officers, Rural Development Officers, Town Planners and Municipal officials etc. Discussions have been conducted with tehsildars (SDM Revenue), village Lekhpals (Patwaris), real estate agents and property dealers relating to the change in land use pattern, land value pattern, socio-economic conditions and development potentials of the region and also about the behaviour of the people in the process of overall development of the region.

To study the interaction pattern of the city with the settlements, survey have been conducted at various institutions (Vegetable and grain mandies, hotels/lodges, different wholesalers and other small/big business organizations) in the city to examine the dependence of the city on the surrounding rural region.

1.7.3 Methodology

Various quantitative, statistical and cartographic methods and techniques are used for data compilation, tabulation, analysis and representation. Statistical techniques like simple percentage, ratios, growth rates, correlation, co-efficient of variations have also been used. Cartographic methods like coroplething and statistical diagrams like bars, graphs, pie charts, and pyramids are also suitably used.

The demographic, socio-economic characteristics of population and pattern of land use changes in the region have been analysed using simple percentage, ratio and growth rates.

To study the land use of Haridwar city topographical maps of Survey of India, Haridwar Master Plan and other maps of Town and Country Planning office have been fully utilised. Village revenue maps are used to analyse the changes in land use.
at the village level. These maps have been substantiated by intensive field study. GIS techniques are utilised to prepare the thematic maps.

The functional structure of Haridwar city has been studied from various District Census Handbooks and Town directories of Census of India, Statistical Handbooks along with the primary level information.

The association between the population size, degree of interaction, distance from the city and level of socio-economic development has been studied by using simple statistical methods.

The interaction between settlements is measured, by ‘Gravity Model’ concept (Zipf, G.K, 1949 and Llyod and Dikens, 1972) using the secondary data. The concept states that the magnitude of movement between any two settlements will be directly proportional to the product of their ‘mass’ (in this case population has been used) and inversely proportional to the distance between them.

The above-mentioned method for calculating the intensity of interaction among settlements is based on the secondary data. Hence, to have further understanding of the pattern and intensity of interaction of the villages with the urban areas for various types of goods and services i.e. the commutation pattern of the inhabitants to the city and other neighbouring settlements have been studied using the primary data collected during field survey. Intensity of interaction of the rural settlements with the city is measured on the basis of the type of facilities and services for which the rural population is dependent on the city, i.e. social, economic, financial, service delivery and organisational linkages.

1.7.4 Questionnaire for the Survey:

The questionnaire used for the collection of the primary data has been prepared at three levels: - (a) village level, (b) household level and (c) city level.

The village-level questionnaire is framed in such a way that every detail of the village could be observed and noted minutely. It provides information regarding:

i. Origin, age, population and area of the village

ii. Number of households, density of the village

iii. Economic activities and land use pattern in the village
iv. Public utility services like educational, medical, community facility in the village

v. Specific plans or programs for the village, mode of transport available to reach the city, physical infrastructure, condition of roads etc.

A comprehensive questionnaire has also been framed for the survey of the households in the sample villages to study their demographic, social and economic characteristics.

The questionnaire has been divided into various sections. The first section covered the information regarding the demographic characteristics and processes of the members of the households and it includes:

vi. Number of family members

vii. Religion, caste, age, marital status, literacy and educational status of each member

viii. Pattern of Migration

The second section deals with the detailed economic characteristics of the household and includes employment status, occupation pattern and its change etc. The third section takes into account the social characteristics of the households that includes:

ix. Family assets

x. Housing and basic amenities

xi. Personal hygiene/health status

xii. Perception of people on the accessibility to city, rural-urban interrelationship and its impact on rural population and problems faced by the village community

The fourth section of the questionnaire takes care of the pattern of interaction i.e. the commutation pattern of rural inhabitants to the city and other settlements for various goods and services. This section of the questionnaire covers detailed information about the frequency of visit (s), purpose of visit (s), conveyance used, time and money spent on transport for each visit etc.

The questionnaire also covers the people's perceptions on various issues like the impact of urbanisation and increased intensity of interaction of the rural areas with the city and its consequent impact on land use changes, occupational structure. Moreover, people views regarding social and cultural impact of migrants on the village community, problems of accessibility to the city and impact of large scale floating population has also been studied.
To study the dependency of the city on the surrounding rural areas, a city level questionnaire has been framed. The questionnaire covers various aspects regarding the dependency of the city on surrounding rural areas for various goods and services viz. agricultural & allied products, labour, raw materials, finished products from small scale industries etc.

1.8 Organisation of the Study:

The present study is organised into the following chapters:

Chapter I, is introductory in nature and explains the background of the study, the relevant review of literature; the objectives and hypotheses; database; research methodology; sample plan and design and finally the organisation of the chapters.

Chapter II, presents a brief regional profile of the study area covering the physical, demographic, social and economic characteristics of the HDR. An attempt is also made in the last section of the chapter to categorise all the rural settlements on the basis of the existing infrastructural facilities available in these villages. The settlements are then arranged into three classes viz., settlements having high, medium and low level of infrastructure.

Chapter III examines the land use pattern of the settlements of the region and discusses the temporal changes in the pattern. It also discusses the changing face of agriculture which includes classification of landholdings, farmers, cropping pattern, crop diversification and livestock.

Chapter IV, the first section of the chapter measures the rural-urban interaction based on theoretical (Gravity model) model while the second section examines the pattern of interaction (in terms of movement of goods, services and people) of the rural settlements with the city based on field observations. The chapter also categorises the rural settlements on the basis of their degree of interaction with the city.

Chapter V, examines the impact of the existing interactions on the demographic, social and economic characteristics and quality of life in the rural settlements.

Chapter VI, analyses the changes in housing, household amenities and environment in HDR owing to the interaction with the city. It gives an account of the perception of the local people on various issues related to rural-urban interaction like. accessibility to the city, the intensity of interaction and its impact on them.
Chapter VII is conclusion in nature, it highlights the summary and conclusions that have emerged from the study as well as put forward certain suggestions for further improvement and development of the region.


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