CHAPTER-IV
PATTERN OF RURAL-URBAN INTERACTION
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4.1 Introduction

Process of urbanisation in the region involves the interaction of the internal and external forces that bring out the changes from a traditional agrarian society to more modern and urbanised form. This is a continuous process that is not only changing the physical landscape, but also the economic and social environment of the neighbouring areas surrounding the city.

The interaction comes into existence when rural and urban areas mutually act and react, adapt and adjust in terms of a systematic relationship. Socio-economic disparities play an important role in shaping the pattern of rural-urban interaction. The type of interaction occurring between the rural and urban areas and their relative magnitudes are predicated upon the degree of socio-economic disparity existing between the two ostensibly contrasting regions i.e. "greater the spatial disparities, the larger the flows and interactions".

The functions of the urban settlements constitute the main unifying bonds between the people of the town and zone of influence. They are conspicuous by virtue of their services, which they perform for rural inhabitants. By virtue of their distinct location and layout, the urban centres form a socio-economic hub for the surrounding region, disseminating cultural influence and acting as collecting and distributing centres of regional produce.

The close relationship between rural and urban areas has been evinced in the daily quick delivery of perishable goods like milk and vegetable to the town dwellers. However such close ties depend upon the facilities of transport. The commuter relations between the urban places as centres of employment and the rural areas as the residences of the employees are another link between urban centres and their hinterland. Urban centres as regional administrative head quarter constitute another reason for the link between the town and the country.

The intensity of rural-urban interaction has been increasing with decreasing size of land holdings in rural areas and declining share of absorption of labour force in
agricultural activities for other alternative jobs leading to greater interaction. On the other hand, employment opportunities in the cities attract rural folk for greater scope of employment, income and other facilities of urban areas.

The city stimulates rural economy through the provision of services, facilities and markets for agricultural products, as well as absorbs surplus labour as agriculture production become more labour efficient.

It is therefore apparent that town and villages are interdependent and cannot be studied in isolation. Moreover, it is true that each of them have an independent location and functional structure. These two should be studied together as part of the same continuum. Cities act as catalysts in introducing new innovations in rural areas although the process of change is slow but nonetheless inevitable. Many rural settlements at the fringe of urban centres are urban or rural just because the municipal limits do or don’t include them. The impact of the city on these settlements needs to be studied deeply. In the process of urbanisation, interaction and relations among the rural and urban areas are noticeable in the region. The variety and amount of nodal services are increasing and becoming more complex. The processing and manufacturing (secondary) activities are being added to rural areas. The impulses, which these changes generate, are not restricted to towns only, but also carried into the countryside as well.

The urban centres affect both the character and structure (of the households) in rural settlements especially their occupational structure, social structure (education, sex ratio), consumer behaviour patterns, shopping pattern, changing attitude towards rural way of life etc.

It is important to mention that the type and intensity of interaction between urban and surrounding rural areas is governed by a variety of factors. The physiography, and the productivity of the region, socio-economic status of the population nature and functional character of the city are some of the main factors. All these factors play an important role in governing the pattern of rural-urban interaction. However, it is observed that the internal dynamics and the interaction patterns governing the small towns and cities in the hierarchy are different than those operating in the metropolis or mega polis. For instance, the migration pattern to an intermediate town is different.
from that of the metropolis; similarly the economic (trade and commerce) and socio
cultural bonds are structured differently.

People in the adjacent rural areas avail employment opportunities in the city and are
engaged in different kinds of non-agricultural activities. Moreover, people from the
surrounding rural areas migrate to the city and suburbs for better scope of
employment, income and attraction of urban facilities and urban way of life.

Studying rural-urban linkages is very important as it provides the basis for measures
that can improve both rural and urban environments. If well managed the interaction
between towns and countryside are the basis for a balanced regional development,
which is economically, socially and environmentally sustainable.

It is felt that, 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
need to be studied in detail to analyse the relationship that exist among the settlements
in general and with the Haridwar City in particular. The study of interaction of the
settlements with the city gives clear understanding of the role of the city in the overall
development of the region and presence of gaps. It helps to identify the nodes for
further planning and development of the region. Thus, it would be interesting to study,
examine and analyse the cumulative effects of the city-region relationship and
interactions.

4.2 Objectives

Against this backdrop, an attempt is made in the present chapter to examine the
pattern of linkages of surrounding settlements among themselves and with the city.
The main objectives of the present chapter are:

- To observe and understand the pattern of rural-urban interaction based on
  Zipf's Gravity model.
- To observe and understand the pattern of interaction and interdependence of
  rural settlements among themselves and the degree of interaction of these
  settlements with the city.
- To calculate an overall interaction index measuring the intensity of interaction
  of rural settlements with the city.
Although there are several aspects of the rural-urban interaction, however, the present study is confined to some specific aspects of immediate relevance and significance i.e. demographic, social and economic characteristics and changes in quality of life. An attempt has been made to identify the differences in the nature of rural-urban linkages in different villages through the pattern of flow of goods and services in terms of lower order goods and services like grocery, green grocery, fuel, services of barber, tailor and cobbler etc and higher order goods like jewellery, leather goods etc. and services like health, education etc.

The chapter is divided in five sections. The first section is introductory in nature; in the second section, the pattern of interaction is measured on the basis of theoretical models based on secondary observations. In the third section, an attempt is made to examine the pattern of interaction of villages with the city based on the field observations. This section is further divided into sub-sections and deals with the dependence of city on villages for various types of goods and services. This section gives detailed pattern of interaction and is further divided into general, economic, social, service delivery and organisational linkages.

In the forth section, intensity of interaction of villages with the city has also been worked out by calculating the interaction index of all the sample villages based on the level of facilities and type of interaction.

Fifth and final section of the chapter examines the general dependency of city on the surrounding rural areas for various types of goods and services.

<table>
<thead>
<tr>
<th>Table 4.1</th>
<th>Types of Linkages and its Determinants: HDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of Linkages</td>
<td>Determinants</td>
</tr>
</tbody>
</table>
| Physical | • Road network. Condition of road. Mode of transport  
| | • Availability of public transport facilities  
| | • Frequency of public transport facilities  
| | • Distance from the nearest city  
| | • Availability of market facilities |
| Population | • Journey to work |
| Economic | • Market patterns (sale of agricultural products and purchase of agricultural inputs)  
| | • Raw materials and flows of intermediate goods  
| | • Consumption, expenditure and shopping patterns |
| Social | • Kinship, rites, rituals, Religious activities  
| | • Entertainment |
| Service Delivery | • Credit and financial services  
| | • Education services and Health services |
| Political, Administrative | • Visits to tehsil and district H.Qs |
| Organisational | • Judicial services |
4.3 Pattern of Rural-Urban Interaction (Based on Secondary Observations)

4.3.1 Gravity Model: A Concept

For decades, social scientists have been using a modified version of Newton's Law of Gravitation to predict movement of people, information, and commodities between cities and even continents. The gravity model, as social scientists refer to the modified law of gravitation, takes into account the population size of two places and their distance. Since larger places attract people, ideas, and commodities more than smaller places and places closer together have a greater attraction, the gravity model incorporates these two features (population and distance).

Gravity Model is a mathematical model based on an analogy with Newton's gravitational law which has been used to account for aggregate human behaviours related to spatial interaction, mainly migration, traffic flows and shopping activities. Newton's law states that the attractive force between two bodies is directly related to their size and inversely related to the distance between them.

Thus, the interaction between settlements is measured using 'Gravity Model' concept. (Zipf, G.K1, 1949 and Llyod and Dikens2, 1972). It states that the magnitude of movement between any two settlements will be directly proportional to the product of their 'mass' and inversely proportional to the distance between them.

\[
I_{ij} = \frac{P_i P_j}{D_{ij}^b} \quad \text{P} = \text{Population of I & J} \quad k \& b = \text{Constants}
\]

George Zipf's \( \frac{P_i P_j}{D_{ij}} \) hypothesis is probably the most widely accepted form of the gravity model. Migration between two cities i and j is proportional to the product of the two cities' populations and inversely proportional to the intervening distance.

The relative strength of a bond between two places is determined by multiplying the population of city 'I' by the population of city 'J' and then dividing the product by the distance between the two cities squared.

\[
The \text{Gravity Model} = \frac{\text{Population}_1 \times \text{Population}_2}{\text{Distance}_2}
\]
Many scholars have attempted to develop theoretical models of city region on the basis of spatial interactions of population of urban centers and their retail trade and other economic activities. An example of such studies is one by Illeris who used a gravity model to measure the interaction between the centers and their surrounding areas. In a similar way Park used Reilly’s Law of Gravitation in 1929-30 to define service areas of cities taking newspaper circulation as the criterion. Another type of effort in this line has been made to find the optimum location of hinterland boundaries. Such an approach has been used by Yeates who uses a linear programming function for deriving the boundaries of school district in U.S.A. although this type of study does have limitations in defining boundaries properly. It has significance in the fact that it helps to formulate a generalised picture of hinterland and city-region boundary.

However, in the present study a pre-delineated Haridwar Development Region has been taken and an attempt is made to work out the existing pattern of interaction.

4.3.1 (i) Data Source

The population data used for deriving the interaction pattern has been taken from District Census Handbook and Town Directories of Census of India volumes, and the distances between the settlements have been measured from the Survey of India topographical sheets (1:50000). It is essential to mention that direct inter-settlement distance have been calculated rather than along the highways and other transport lines.

4.3.1 (ii) Methodology

For studying the interaction pattern among the settlements the Gravity Model is used taking into consideration the location of all the rural and urban settlements in the study area. For analysing the intensity of interaction of settlements with each other, interaction index is derived by multiplying the population of each settlement with the population of other and then dividing it with the square of the distance separating them. This exercise has been done for each settlement and thus an index is worked out, which shows the intensity of interaction of each settlement. Based on the above assumption, the interaction values between one settlement and all the other centers have been drawn on the basis of the potentials secured by each centre. It is observed
that the values of isopotential lines go on decreasing in all directions as the distance from the city increases.

The break point concept is also utilized to find out the breaking points of interaction between Haridwar and all the other settlements.

Kilometers from A to B, Where, A is main urban centre (Haridwar), B= next settlement

\[ 1 + \sqrt{\frac{\text{Population of A}}{\text{Population of B}}} \]

4.3.2 Total Interaction Index

Total interaction index is worked out by measuring the square of the distance of each settlement with other and dividing it with the product of their population. This exercise is done for all the fifty (habited) rural settlements and four urban centres viz. Haridwar, BHEL, Rishikesh and Munni-Ki-Reti of the region and a composite index is derived.

Five levels of interaction of settlements have been worked out on the basis of the scores of these settlements. It is observed that there are wide variations in the index values. It ranges from 0.98 (in lakhs) in Kalanzara Block to 7918 in Haridwar. The co-efficient of variation of interaction index is very high (251.97 percent) among the settlements.

4.3.2 (i) First Order

The settlements in this category have interaction scores below 150. The score range from 0.98 for Kalanzara Block to 137.78 of Jiapota. There are twenty-four rural settlements in this level. Out of the total settlements, 12 are located in Haridwar tehsil while 10 are from Rishikesh tehsil.

4.3.2 (ii) Second Order

The interaction scores of settlements in this category ranges from 150 to 250. There are 12 settlements in this category. All the settlements in this class ranges from 10-15 kms from the city centre except Tapovan village. Out of the total twelve settlements in this category, six are located in Haridwar tehsil while five are located in Rishikesh tehsil and the remaining one village is located in Narendranagar tehsil of Garhwal district.
Table 4.2
Number of Settlements in each Hierarchical order:
Total Interaction Index

<table>
<thead>
<tr>
<th>Hierarchical Order</th>
<th>No. of Settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>First order (Below 150)</td>
<td>24</td>
</tr>
<tr>
<td>Second order (151-250)</td>
<td>12</td>
</tr>
<tr>
<td>Third order (251-500)</td>
<td>7</td>
</tr>
<tr>
<td>Fourth order (501-1000)</td>
<td>8</td>
</tr>
<tr>
<td>Fifth order (1000 &amp; above)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>


4.3.2 (iii) **Third Order**
There are seven settlements in this class. The interaction score ranges from 303 in Dadoopur Govindpur to 499.77 in Sarai. All the settlements in this category are within 12 km from the nearest city (except Jonk village, which is located 25 km away from Haridwar, which it is located adjacent to Rishikesh city). Out of the total seven settlements in this class, six are located in Haridwar tehsil and village Jonk is located in Kotdwara tehsil of Pauri-Garhwal district.

4.3.2 (iv) **Fourth Order**
This hierarchical order contains settlements having interaction scores varying from 500 to 1000. Eight settlements are covered under this class. These are Dhalwala, Bhadarabad, Bhagtanpur Abidpur, Jageetpur, Munni-ki-Reti, Salempur Mahdoood, Aslampur Begum and Jamalpur Kalan. Six out the total eight settlements in this category are located in Haridwar tehsil while two settlements, Munni-ki-Reti and Dhalwala are from Narendranagar tehsil of Tehri-Garhwal district. Munni-Ki-Reti categorised as urban by the Census of India, while the population of the other village is Dhalwala exceeds 10000 in the year 2001, which explains its high score.

4.3.2 (v) **Fifth Order**
The fifth hierarchical order ranges from 1000 and above score. There are only three settlements in this order. All these settlements are urban viz. BHEL, Haridwar and Rishikesh and have very high population which leads to their high scores.
4.3.3 Haridwar Interaction Index

For analysing the interaction pattern of settlements with Haridwar city, interaction index for all the other settlements is calculated with Haridwar city. The settlements are then arranged into a five-order hierarchy on the basis of the index values scored by each settlement (Map 4.1).

The table 4.3 shows that there are great variations in the score of settlements. The coefficient of variation is 528.44. The score ranges from 0.21 in Kalanzara Block to 5716.13 in BHEL.

4.3.3 (i) First Order

The score in this class ranges from 0.21 in Kalanzara block to 23.26 in village Ruhalki Kishanpur. There are thirty-two settlements in this class. Out of the total settlements, sixteen villages are located in Haridwar tehsil, ten in Rishikesh tehsil, four in Narendranagar tehsil of Tehri-Garhwal district and remaining one in Kotdwara tehsil of Pauri-Garhwal district. All these settlements are located at a distance of more than 7 km from the city.

<table>
<thead>
<tr>
<th>Hierarchical Order</th>
<th>No. of Settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>First order (Below 23.50)</td>
<td>32</td>
</tr>
<tr>
<td>Second order (26.53-69.42)</td>
<td>11</td>
</tr>
<tr>
<td>Third order (77.32-126.90)</td>
<td>7</td>
</tr>
<tr>
<td>Fourth order (158.34-396.36)</td>
<td>3</td>
</tr>
<tr>
<td>Fifth order (5716.13 &amp; above)</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
</tr>
</tbody>
</table>


4.3.3 (ii) Second Order

The interaction score in this class ranges from 26.53 in Missarpur Mustakam to 69.42 in Gadowal village. There are eleven settlements in this category. All the settlements are located within 6 to 11 kms distance from the city. Analysis of the data shows that out of the total eleven settlements, nine are located in Haridwar tehsil while remaining two are in Rishikesh tehsil.
Level of Interaction with Haridwar City (2001)

4.3.3 (iii) Third Order

The score of settlements in third hierarchical order ranges from 77.32 in village Haripur Kalan to 126.90 in Rishikesh. There are seven settlements in this category. These are Haripur Kalan, Salempur Mehdood, Rawali Mehdood, Sitapur Majra Jwalapur, Bahadarpur Jat, Sarai and Rishikesh. All the settlements except Rishikesh are located within 7 to 8.5 km from the city. Rishikesh is the only urban centre in this order.

4.3.3 (iv) Fourth Order

The score of settlements in this class ranges from 158.34 to 396.36. There are only three settlements in this category. These are Jamalpur Kalan, Bhagtanpur Abidpur and Jageetpur. All these settlements are located in Haridwar tehsil and are within 10 km distance zone from the city. In case of Jagjeetpur and Jamalpur Kalan, the distance determines interaction while in Bhagtanpur Abidpur, population determines the same.

4.3.3 (v) Fifth Order

There is only one settlement, i.e., BHEL in this category. It has the interaction score of 5716.13. Very high population and low distance is the determining factor for the highest interaction with the Haridwar city. It is located at a distance of 3.1 km from the Haridwar. There is wide gap between score of BHEL and next settlement i.e., Jageetpur.

BHEL has highest interaction with Haridwar, Jagjeetpur, Jamalpur Kalan, Sitapur Mazra Jwalapur, Bagtanpur Abidpur and Sarai. All these settlements are located within 5 kms from BHEL (ITS).

4.3.4 Rural Interaction Index

Analysing the Total and Haridwar Interaction index it is realised that there is a wide gap in the scores obtained by the rural and urban settlements. Hence, to have a more balanced index score and to understand interaction of rural settlements among themselves an attempt is made to measure the Rural Interaction Index. In this exercise, the interaction of all the rural settlements (fifty inhabited villages) has been calculated by excluding the urban centres.
The index score in this case varies from 0.67 in Kalanzara Block to 797 in Bahadrabad. Table 4.4 shows that there are less variations in the rural interaction index as compared to that of total interaction index (including both rural and urban settlements) as there are not much variation in population. This index also categorised the settlements into five hierarchical orders.

4.3.4 (i) First Order
This class has interaction score below 100. It ranges from 0.67 in Kalanzara Block to 99.15 in Tapovan. There are twenty-five settlements in this category; thirteen of these settlements are located in Haridwar while eight are in Rishikesh tehsil of Dehradun district and remaining four in Narendranagar tehsil of Tehri-Garhwal district.

4.3.4 (ii) Second Order
This level has interaction scores from 100.01 to 200. It ranges from 111.69 in Garhimay Chak to 190.88 in Pratitinagar; both of these villages are located in Rishikesh tehsil. There are thirteen settlements in this category, out of which six in Haridwar tehsil, six are in Dehradun tehsil and one is located in Kotdwara tehsil of Pauri-Garhwal district.

4.3.4 (iii) Third Order
There are eight settlements having scores from 200 to 500. All the settlements in this category are located in Haridwar tehsil; four of these settlements are located in 5-10 km zones while the remaining five are located in 10-15 km zones.

<table>
<thead>
<tr>
<th>Hierarchical Order</th>
<th>No. of Settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>First order (Below 100)</td>
<td>25</td>
</tr>
<tr>
<td>Second order (101-200)</td>
<td>13</td>
</tr>
<tr>
<td>Third order (201-500)</td>
<td>8</td>
</tr>
<tr>
<td>Fourth order (501-700)</td>
<td>3</td>
</tr>
<tr>
<td>Fifth order (700 &amp; above)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

*Excluding urban settlements and uninhabited villages.
4.3.4 (iv) Fourth Order
The interaction score of settlements in this class ranges from 500.01 to 700. There are only three settlements in this order. These are Aslampur Begumpur, Bhagtanpur Abidpur and Salempur Mehdood.

4.3.4 (v) Fifth Order
The interaction score of settlements in this order ranges from 700 and above. There is only one settlement at the apex i.e. Bahadarabad. Its score value is 796.92 and it has a population of 6116. Bahadarabad has highest interaction with Aslampur Begum followed by Salempur Mehdood. The six settlements with which Bahadarabad has highest interaction are all located in immediate proximity of this village.

4.4 Pattern of Rural-Urban Interaction (Based on Field Observations)
It is observed from the above analysis that measuring the level of interaction of the settlements based on the theoretical model portrays only a broad pattern of the interrelationship between settlements, as the above mentioned concept is based on only two factors i.e., distance and population. Moreover, the existing physical distance considered in this analysis is aerial and not measured along the transport radials and this distorts the analysis especially in the region with vast physiographic variations. However, field observations show that the process is far more complex than observed using gravity model. Various other physical, social, cultural and economic factors play an important role in determining the linkages among settlements. Hence, in the following part of the chapter, an attempt is made to explore the pattern and intensity of interaction among settlements based on the field observations.

4.4.1 Physical Linkages- Determinants of Rural-Urban Interaction
Before studying the existing rural-urban linkages in HDR, it is essential to understand the existing physical linkages and factors that determine the pattern and type of rural-urban interaction in the region. As was also stated earlier, the region is spread from the southern tip of (Ganga Basin) lesser Himalayas and extends into the Bhabar and Ganga Plain. The region has vast physiographic variations. The northern part of the
study area has hilly terrain and the southern part lies in the foothills of Shiwaliks and Chandi hills. Considerable part of the region also lies in the Bhabhar and Tarai.

The existing physical linkages include road networks, railroad networks, availability of public transport facilities, principal means of transport available and travel cost. The condition of roads especially those connecting the rural settlements with the city and the frequency and cost of public transport available on these transports radials are very important in determining the existing physical linkages. These linkages are governing both the types as well as pattern of linkages in the region.

4.4.1 (i) Traffic and Transportation Radials

The existing circulation pattern of the region is pertained to its physical constraints and haphazard linear development. The development of the region including the two cities has been sandwiched between the hills and the river and consequently the transport network has been oriented in linear shape from north-east to south-west direction. The development of the region has been sub-divided by different land use pockets. State highways are the principal regional roads and are discussed below (Map 4.2).

- NH-58 links Haridwar to Delhi in south-west direction and Nitipass in northeast direction;
- Nazibabad road links Haridwar to Nazibabad and Bijnor in the east side;
- Laksar road links Haridwar to Laksar in the south eastern side;
- Rishikesh road links Haridwar to Rishikesh and Dehradun.

The railway network comprises the northern railway linking Haridwar to Dehradun in north-west and Rishikesh in north. It connects Haridwar to Delhi in southern-side.

There are four regional highways that link majority of rural settlements to their nearest city. Thirty-five out of the total sixty settlements (seven of the total nine sample villages) are accessible through the above mentioned highways, while remaining twenty-seven are linked to these highways through village roads.

Table 4.5 shows that 35 rural settlements are linked to the city with good conditioned metalled roads while the remaining villages have some proportion of kutch/a/semi-pucca (semi-metalled) seasonal roads linking with the highway or directly with the city.
Transport Network in HDR (2001)

District Tehri-Garhwal

To Ramnagar

To Dehradun

Reserve forest

District Dehradun

To Dehradun

Reserve forest

District Haridwar

To Mohand

To Roorkee

To Delhi

LEGEND

Map Unit

Transport Line

Roads/Highways

Railway Line

River

Source: Master Plan (1985-2001) Haridwar, HDA
Almost all the villages in the region are within the range of 16 kms from the nearest city either of Haridwar or Rishikesh. Out of the total 319 households surveyed in nine villages, it is observed that all the households are in close touch with the city.

Table 4.5
Number of Villages Accessible to the City (by different type of roads)

<table>
<thead>
<tr>
<th>Tehsils</th>
<th>Highway</th>
<th>Metalled Road</th>
<th>Partial Un-metalled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haridwar</td>
<td>24</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Rishikesh</td>
<td>6</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Narendranagar</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kotdwara</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HDR</td>
<td>35</td>
<td>27</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

The intra-city transport network is a part of inter-city regional system. The major roads meeting the travel needs are Station Road, Kankhal Road, Bypass Road, Hill By-pass, Rishikesh Road and Sapt-Rishi Road. These roads radiate from the principal road corridor of NH-58 at the staggered locations. The orbital circulation is totally missing, putting the total strain on highways. The high-density areas developed along the Station road, Kankhal Road and Rishikesh Road has further, aggravated the traffic problems. The Station Road being the spine of urban road network system has the highest development of mixed land use pattern along the road. The Bypass Road and Hill By-pass Road are almost parallel to the Station Road and the railway-line.

4.4.1 (ii) Availability of Public Transport Facilities

Apart from the good condition/all season roads, availability of public transport facility at lower travel fare and its frequency is an important factor determining urban-rural linkages. The availability of public transport facility ensures greater interaction with the city. It is observed that use of public transport facilities is very significant in the study area.

Public transport facility includes the facilities provided by the government as well as the intermediate means of transport i.e. auto, Vikarm, (shared three wheeler) cycle rickshaw (local name for three wheeled vehicle) and mini bus.

It is observed that the availability of public transport facility that caters to the needs of the surrounding rural population is negligible in the study area. Government buses ply
and thus cater to rural settlements located mainly along the highway. Moreover, their frequency is low and also don’t entertain the local population for shorter distances. These buses do not have stops near the villages and so they pick up and drop the passengers at their request. Hence, the intermediate modes of transport like Vikarm, Auto, Mini Bus and Jugaad (a temporary arrangement) are important vehicles that cater to the needs of the adjoining rural areas.

Vikarm is an important mode of transport on all major roads especially on Rishikesh-Haridwar, Haridwar-Nazibabad, Haridwar-Laksar and Haridwar-Roorkee highway, i.e., in Ghuntiyani, Dhalwala, Bhattowala, Kangri and Pratitnagar villages. i.e., five out of the total nine villages depend on Vikarm; Jiapota and Jagjeetpur villages mainly use mini bus, while ‘Jugaad’ caters to the travel needs of Puranpur, however, in Ranipur no particular type of public transport facility is available.

4.4.1 (iii) Principal Modes of Transport used to Travel to the City

Vikarm: It is a three-wheeler with a seating capacity of 10 people. It is a chartered /shared auto that charges according to the distance/per person. It is one of the most important mode of public transport in the study area about 65.5 percent of population is dependent on this mode of transport for travelling to and from the city.

All the villages situated along the important transport radials like Kangri, Bhattowala, Pratitnagar, Dhalwala, Ghungtiyani villages are approachable through Vikarm.

Mini Bus: In Jagjeetpur and Jiapota villages mini bus with a seating capacity of about 25 persons is an important mode of public transport. It charges Rs.3/- per person for each trip from the city to any village on Laksar road up to a distance of 6 kms. Hence, it is the cheapest and frequently available mode of public transport.

Jugaad: A temporary arrangement with a diesel engine attached to a trolley is an important mode of transport available in all the villages of Haridwar tehsil especially the villages located in the interior (away from the city as well as the highway). All the Kutchha (un-metalled) and seasonal roads have this mode of transport. This temporary arrangement has a seating capacity of about 15-20 persons. Advantage with this type of arrangement as the name suggests is that the engine and trolley can be attached or detached for other uses as and when required. Trolley with big tyres has
an advantage over other vehicle on the *kutch/semi-pucca* (semi-metalled) seasonal roads. Puranpur and other villages in the south-western part of the study area are connected with the city only through these temporary arrangements, otherwise people have to manage with their own private vehicles.

Other modes of transports like cycle-rickshaw, auto-rickshaw are also available in the region. These modes of transport are usually used by the people of villages located nearer to the city especially for shorter distances. However, these modes of transport are more expensive and hence are used by very low (1.38) percent population. Horse carts are also used in some parts but they are not very popular these days and percent population dependent on this mode of transport is minuscule.

Field observations have confirmed that the availability of transport is one of the most important determining factors of rural-urban interaction. The availability of public transport facilities and its frequency play an important role in the study area, especially in the villages far from the city.

Analysis of the percent share of various modes of transport (both public and private) shows that the public transport facilities play an important role in linking the rural settlements with the cities of study area. Even in public transport, the role of intermediate transport modes is very significant. As mentioned earlier, the government transport facilities are negligible (it is used by less than 0.05 percent).

Table 4.6 shows that about 41 percent of households use intermediate transport followed by, two wheelers (27.5 percent) and cycle (20.8 percent) for commodity to the city while the remaining 8.7 percent travel to the city on foot from the neighboring areas.

Settlement-wise analysis shows that the use of intermediate transport is highest in village Pratitnagar (86.6 percent) followed by Bhattowala (53.3 percent), Kangri (52.9 percent), Ghungtiyani Talli (52.9 percent) and Jiapota (44.4 percent) villages. All these villages (except Bhattowala) are situated along the highway and so have comparatively better transport facilities.

On the other hand, the share of public transport is nil in village Ranipur. Similarly, village Jagjeetpur is located adjacent to the urban boundary and the main market is about 2 kms from the village. No public transport facilities are available on this road.
as it is not profitable to ply on shorter distances and thus majority of population has to depend on private vehicles for visiting the city.

About 80 percent households in Ranipur and 91.4 percent households in Jagjeetpur villages travel to the city by cycle or two wheelers.

**Table 4.6**

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Foot</th>
<th>Cycle</th>
<th>Two wheeler</th>
<th>Four wheeler (Car)</th>
<th>Public transport</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>13.3</td>
<td>40.0</td>
<td>40.0</td>
<td>6.7</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>27.9</td>
<td>11.8</td>
<td>20.6</td>
<td>0.0</td>
<td>39.7</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>2.5</td>
<td>39.2</td>
<td>53.2</td>
<td>0.0</td>
<td>3.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>14.2</td>
<td>27.7</td>
<td>38.3</td>
<td>0.6</td>
<td>19.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ghungtiyanni</td>
<td>29.4</td>
<td>11.8</td>
<td>5.9</td>
<td>0.0</td>
<td>52.9</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Kangri</td>
<td>0.0</td>
<td>29.4</td>
<td>17.6</td>
<td>0.0</td>
<td>52.9</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jiapota</td>
<td>3.7</td>
<td>25.9</td>
<td>18.5</td>
<td>0.0</td>
<td>44.4</td>
<td>7.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>9.8</td>
<td>23.0</td>
<td>14.8</td>
<td>0.0</td>
<td>49.1</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Bhattowala</td>
<td>6.7</td>
<td>0.0</td>
<td>33.3</td>
<td>6.7</td>
<td>53.3</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Pratimagar</td>
<td>0.0</td>
<td>0.0</td>
<td>9.0</td>
<td>4.5</td>
<td>86.6</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Puranpur</td>
<td>0.0</td>
<td>31.7</td>
<td>31.7</td>
<td>0.0</td>
<td>36.6</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>0.8</td>
<td>10.6</td>
<td>19.5</td>
<td>3.3</td>
<td>65.9</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>HDR</td>
<td>8.7</td>
<td>20.8</td>
<td>27.5</td>
<td>1.4</td>
<td>41.0</td>
<td>0.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

It is striking to observe that as much as 27.9 percent households of Dhalwala and 29.4 percent households of Ghungtiyani travel to the city on foot and, this is mainly on account of two reasons. Most of the households in both the villages are located on hill slopes and the people from hilly region are used to walking for a longer distance, hence travelling to the city on foot is not difficult for them. Further, the market is very close to the village which enables the population to reach the city on foot without any difficult.
In case of Prattnagar and Puranpur villages, the percent of population visiting to the city on foot is nil because the distance from the village to the nearest city is not less than 8 to 12 kms and thus it is not possible to cover the distance on foot.

4.4.1 (iv) Cost of Travel to the City

The distance variable is frequently used to measure the intensity and pattern of interaction among settlements. However, it is realised that this variable may not be significant in all the cases in determining the interaction pattern. For example, a village may be located only 3 Kms. from city, and yet access to the market may be more difficult than for a village located 8-10 Kms. away, if the later has good road condition, availability of cheap public transport facilities at regular intervals.

Hence, it can be analysed that not only the intervening road distance but many other institutional factors also influences the pattern and degree of interaction.

The total travel cost of commuting to the city is computed by summing the total money spent by the villager to reach the city. It is one of the most important determinants influencing the interaction pattern, especially for less expensive lower order goods and services. The travelling cost varies not only according to the distance from the city but also depends upon the mode of transport used. Thus, the cost is worked out for two types of modes i.e., public transport and the private transport. It is observed that the use of public transport facilities has highest share in the study area. Hence, the focus is mainly on the intermediate mode of public transport facilities and two wheelers as the private mode of travel, used by the people to visit the city. The percent of households using four wheelers to visit the city is almost negligible (1.4 percent).

4.4.1 (iv-a) Travel Cost by Public Transport

Intermediate form of public transport is used by about 41.6 percent of households, is comparatively cheaper than the private vehicles. The villages are categorised into three zones on the basis of road distance and each zone has three villages.

**Inner Zone**- Most of the population of this zone depends upon the nearest city for their basic needs. All the villages in this zone are less than 5 kms from the nearest city. All the three villages share common boundary with the city but in some cases the
distance to the city varies within the village itself. Two of these villages (Ranipur and Jagjeetpur) are nearer to Haridwar City while village Dhalwala is located adjacent to Rishikesh city. It is observed that people spend between Rs. 3 to 5 per person to reach the nearest city. However, it varies from village to village and with type and mode of transport available and used by the rural people.

In case of Dhalwala village, connectivity (accessibility) in terms of availability as well as frequency of public transport is very good. Hence, people have to spend only Rs. 3/- per one side travel (Rs. 6/- per trip). On other hand, in case of Ranipur, although the distance is only 2 km but they do not have cheap public transport, as Vikarm (the cheapest mode of transport) are not available from this village. The only mode of transport is cycle Rickshaw that costs Rs. 5 to 8 per side. Similarly, in case of Jagjeetpur also it costs about Rs.3/- (for one side) if Vikarm is used and Rs. 8/- to 10/- if cycle Rickshaw is used to reach the city. In case of private modes of transport, the travel cost comes to around two to three rupees for reaching the city that is comparatively cheaper than the travel cost if public mode of transport is used.

**Middle Zone**: All the villages in this zone are located at a distance of about 5 to 10 kms from the city. These are Kangri, Jiapota and Ghungtyani Talli: all the three villages are located along the highway. However, in case of Kangri and Ghungtiyani, distance of 1 km is to be covered on foot from village to reach the highway from where public transport is available. On the other hand, Jiapota village is located along the highway so public transports are available within walking distance. Moreover, frequency of public transport facilities is satisfactory in village Jiapota, followed by village Kangri while village Ghungtiyani has relatively lower frequency.

Villagers spend about Rs. 5-8 on one side fare for visiting to the city, hence; a trip to the city cost around Rs.10-15. Vikarm is the most important mode of transport followed by private mini buses, especially in Jiapota where it is the only available public transport.

In all the three villages of this zone, villagers spend about Rs. 5 to 8 (same as in public transport) if they use two wheelers (private mode of transport) to visit the city.

**Outer Zone**: The outer zone covers villages that are more than 10 kms. from the city. This zone again has three villages. These are Puranpur, Bhattowala and Pratitnagar
villages. Village Puranpur is in Haridwar tehsil while the other two villages are located in Rishikesh tehsil.

Field observations show that both Puranpur and Bhattowala villages are about 5 and 3 kms away from the highway, respectively, while Pratitnagar is located along Haridwar-Rishikesh highway. The road connecting village Puranpur and Bhattowala to the highway is semi-\textit{Pucca} and seasonal. The condition of the road is not motorable during the rainy season.

Villagers spend about Rs.10-15 as one side fare to reach the nearest city. People from Puranpur usually visit Haridwar while inhabitants of Bhattowala village prefer Rishikesh. Pratitnagar has a better option, as it is located equidistance (14 Kms.) from both Rishikesh and Haridwar cities. However, it has a well developed market within the village. But villagers visits Rishikesh or Haridwar according to their requirements, especially for higher order goods and services. Field observations show that major share of population (86.6 percent) depend on public mode of transport especially \textit{Vikarm} or government buses in some cases. The reason being these villages are located on the highway where the public transport is easily available, secondly it is comparatively cheaper than using two wheelers as the single side trip to city costs more than Rs.15/- by two wheelers while the cost for public transport is between Rs.8 to10 only.

It is observed that, if only one member of the family travels to the city they prefer public transport while on the other hand they prefer to use their personal conveyance when family move in group.

Analysing the mode of transport and travel cost from various settlements to the city one observes that, public transport is relatively cheaper and most popular in all the settlements that are located farther from the city, while two wheelers (cycles, scooters and bikes) are used more frequently in the villages that are nearer to the city.

This pattern of use of various mode of transport also corresponds to the cost of travel by the two different modes of travel. It is cheaper to use personal vehicles especially two wheelers for shorter distances while public mode of travel is more economic and convenient for villages situated more than 5 kms from the city.
4.4.1 (v) Availability of Marketing Facilities

The development of market or establishment of shops in the villages is also governed by the distance from the city, highways and the demand of the residents of that village. In the villages that are relatively far from the city like Puranpur and Bhattowala villages, shops for essential items have come up in the village. Majority of people depend on them, as it is not cost effective to travel to the city for small and lower order goods and services. However, people who have to travel to the city for other purposes, especially, for work, depend on the city for these lower level of goods and services as they need not spend extra for the journey and they get more choice and variety in quality at relatively lower prices in the city.

While on the other hand, although the number of shops are more in the villages nearer to the city and have relatively developed and well established market, still people do not depend cent percent on these shops for their day to day requirements because city is close and they can even walk to the city to fulfill their needs. Hence, it is more cost effective, as they do not have to spend on fare while they get more varieties at comparatively cheaper rates.

4.4.1 (vi) Access to Primary and Secondary Market

Two types of marketing pattern are basically found in rural regions that is primary and secondary market facilities. A primary market is a periodic market where buyers and sellers assemble generally once a week to trade agricultural products, products of rural industries and other consumer goods etc. Sellers operate from mobile shops, the number of traders in such market ranges from 500 to 2000. These markets are very important for rural population. Variety of goods and services are available at these periodic markets. Weekly markets are known as Haat in the region. These weekly Haats are held in Jagjeetpur and Pratitnagar villages of HDR. Around 22.20 percent of settlements have weekly markets within the village while again 22.20 percent households avails these services within 2 kms range from the village. It shows that around 45 percent of the households have the facility of weekly markets within 2 kms range, while the remaining (55 percent) have to travel more than 5 kms to avail this facility.
A secondary market is larger than a primary market, and in contrast, businesses are housed in permanent structures, and transactions are daily. Wholesale trade and stocking of goods are normal features of a secondary market. Sometimes primary market also functions as a periodic market. Access of villagers to the secondary market is obviously lower than that to primary markets.

After studying the availability of shops and various establishments, and their nature in the villages, it is observed that in almost all the villages majority of shops are of general category like, basic needs, daily essential goods and services like grocery, atta chakki (floor mill), variety store, tea stall, barber, tailor, cycle repair etc.

It is also observed that in the villages near to the city, the establishments are permanent, larger and more organised, while in far off villages the structure is temporary/semi-pucca, small and unorganised. It is observed in these villages that one shop has variety of goods i.e. grocery, confectionary, cosmetic, footwear, stationary and in some cases even tea stall. All these goods are available under one roof.

Village-wise analysis of these establishments shows that, on an average there are 2.8 shops per hundred population. However, there are variations among the settlements. It ranges from 0.2 shops for every hundred population in village Bhattowala to about 6 shops in Pratinagar.

It is noticed that in case of Ranipur village, although there are 10 shops but nine of these are located along the highway and do not cater to the local population. Most of the shops sell eatables, wine and beer that cater to the needs of the floating population. There is only one multi purpose shop that caters to the needs of the village.

Apart from these permanent establishments various vendors are functioning to meet the needs of inhabitants in these villages. These hawkers sell a variety of things like vegetable, fruit, essential items like footwear, cloth, repair of cookers, gas, umbrella and eatables etc. They do not visit a particular village regularly, their visits are very irregular and uncertain, and usually come on bicycles or tricycles or 'Redis' and cover various villages in a day.
4.4.2 Visits to the Nearest City

The urban centres act as the main goods and service provider for the surrounding rural region that lacks these essential services. Almost all rural areas depend on the city for meeting one need or the other. Thus, the frequency of visits to the city is one of the most important and strong indicator showing the existing relationship and linkages between the rural areas and the urban centre.

Table 4.7 shows that four villages (Dhalwala, Ghungtiyani Talli, Bhattowala and Pratitnagar) are in close proximity with Rishikesh while the other five villages (Kangri, Ranipur, Jaipota, Puranpur and Jageetpur) are in close touch with Haridwar (Jwalapur and Kankhal) city.

Table 4.7
Closest City with Which People Have Highest Interaction

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Haridwar</th>
<th>Jwalapur</th>
<th>BHEL</th>
<th>Kankhal</th>
<th>Haridwar</th>
<th>Rishikesh</th>
<th>Any Other City*</th>
<th>Other Villages**</th>
<th>Total Sample HHs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>0.00</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>0.00</td>
<td>55.84</td>
<td>0.00</td>
<td>41.56</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>0.87</td>
<td>51.95</td>
<td>13.85</td>
<td>66.67</td>
<td>33.33</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Ghungtiyanni</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>20.00</td>
<td>80.00</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kangri</td>
<td>52.94</td>
<td>17.65</td>
<td>29.41</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Jiapota</td>
<td>3.70</td>
<td>96.30</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>18.88</td>
<td>37.98</td>
<td>9.80</td>
<td>66.67</td>
<td>6.67</td>
<td>0.00</td>
<td>26.67</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Bhattowala</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>11.84</td>
<td>9.21</td>
<td>0.00</td>
<td>0.00</td>
<td>21.05</td>
<td>75.00</td>
<td>3.95</td>
<td>0.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Puranpur</td>
<td>0.00</td>
<td>14.29</td>
<td>4.76</td>
<td>0.00</td>
<td>19.05</td>
<td>0.00</td>
<td>9.52</td>
<td>71.43</td>
<td>100.00</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>3.95</td>
<td>7.83</td>
<td>1.59</td>
<td>0.00</td>
<td>13.37</td>
<td>58.33</td>
<td>4.49</td>
<td>23.81</td>
<td>100.00</td>
</tr>
<tr>
<td>HDR</td>
<td>6.23</td>
<td>29.68</td>
<td>0.59</td>
<td>10.98</td>
<td>47.48</td>
<td>37.98</td>
<td>2.08</td>
<td>12.46</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)
N.B.- * Any other cities include Roorkee, Dehradun, Saharanpur, Nazibabad etc.
** Jwalapur, BHEL, Kankhal etc. are the part of Haridwar U.A

Field observations show that about 38 percent households visit Rishikesh city while around 48 percent go to Haridwar for their basic requirements. About 2 percent of households are dependent on other cities outside the region like Roorkee, Dehradun, Saharanpur and Nazibabad etc. The remaining households usually visit other nearby villages and are not dependent on city.

It is striking to observe that all the households in Bhattowala, Dhalwala and Ghungtiyanni villages and more than 75 percent households of Pratitnagar depends on Rishikesh city. The households in the villages around Haridwar city have more diverse marketing options, apart from Haridwar other centres like Jwalapur, Kankhal.
Bahadarabad and BHEL are more preferred markets for the local residents. Moreover, the residents of villages surrounding Haridwar prefer Jwalapur and Kankhal as compared to Haridwar which is considered relatively costlier and specialised in catering to the floating (tourist) population. Cent percent households of village Ranipur, 96.3 percent of Jiapota villages and 56 percent households of Jagjeetpur village visit Jwalapur for their day to day needs. However in Kangri village majority (52.94 percent) of households prefer Haridwar.

Analysis of the data shows that only 19 percent of households of Puranpur village visit Haridwar, while as much as 71.4 percent household prefer other villages i.e. Bahadarabad for their basic requirements. It is also noticed that as much as 9.5 percent of households of this village also visit other city, Roorkee which is (21 kms) relatively far from the village. Roorkee was tehsil H.Qs prior to 1986 when Haridwar was made the tehsil H.Qs of these villages but it is observed that these people have maintained their preference in terms of shopping pattern to this urban centre especially for higher order services like healthcare and other facilities like jewellery, clothes, textile, leather goods etc.

Relatively developed rural settlements around the cities can further be developed as growth centres (as satellite towns) to release the pressure from the two cities.

Field observation show that Shyampur, Dhalwala and Tapovan villages are relatively more developed villages near Rishikesh City where people go for all types of day to day needs. Similarly, Bhardarabad (Block H.Qs), Jagjeetpur, Shyampur Nuabad villages can be developed as a growth centres around Haridwar City.

4.4.2(i) Distance to the City

Analysis of the data (Table 4.8) shows that about 40.6 percent of households have to travel less than 2 kms to reach the nearest city and almost 59.4 percent travel less than 5 kms.

<table>
<thead>
<tr>
<th>Distance Traveled</th>
<th>Percent Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2 kms.</td>
<td>40.6</td>
</tr>
<tr>
<td>2.1-5.0 kms.</td>
<td>18.9</td>
</tr>
<tr>
<td>5.01-10.00 kms.</td>
<td>15.2</td>
</tr>
<tr>
<td>10.01 Kms. and above</td>
<td>25.2</td>
</tr>
<tr>
<td>HDR</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)
However, 25.2 percent of households cover the distance of more than 10 kms to reach the nearest city. The villages situated in close proximity to the city are Dhalwala, Ranipur and Jagjeetpur while the villages situated relatively farthest are Ghungtiyani, Kangri, Jiapota, Pratitnagar, Bhattowala and Puranpur villages, respectively.

<table>
<thead>
<tr>
<th>Distance Zone</th>
<th>Villages</th>
<th>No. of Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Zone (Less than 5 km)</td>
<td>Dhalwala, Ranipur, Jagjeetpur</td>
<td>3</td>
</tr>
<tr>
<td>Middle Zone (5-10 km)</td>
<td>Jiapota, Ghungtiyani, Kangri</td>
<td>3</td>
</tr>
<tr>
<td>Outer Zone (10-15 km)</td>
<td>Bhattowala, Puranpur, Pratitnagar</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

It is examined that on an average the households of Kangri, Bhattowala, Pratitnagar have to travel 8 to 10 kms because these villages are situated farthest from the city. Of these four villages, Pratitnagar and Kangri villages are located on the highway. While Bhattowala and Puranpur village are about 3 and 9 kms away from the highway, respectively. Analysis of the data shows that 10 percent of households travel more than 20 kms for their basic needs (for higher order goods/services).

Finally, it can be concluded that the existing road distance is one of the most important factors in determining the pattern of interaction. However, other factors like the condition of roads, transport facilities and travel cost also play a significant role in determining the linkages between two places.

4.4.2 (ii) Frequency of Visits to the City

It is observed that apart from the distance of the village to the city, frequency of visits to the city is affected by various factors, for example, if the village or nearby villages have sufficient market facilities, then the villagers need not have to travel to the market in the city daily especially for their day to day basic needs; if the village does not have sufficient shops (as the case in Ranipur village) the people are compelled to travel all the way to the city even for basic necessities. Similarly, good condition and

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1 Travelling longer distances for a particular commodity does not mean that it is not available in the close proximity. It signifies the ability and urge of the consumer for better goods and services and thus travelling to a longer distance for fulfilling their basic requirements.
all weather metalled roads. availability of frequent public transport also encourages the frequency of visits to the city.

The frequency of visit to the city has been categorised into seven types. It starts from daily visits to bi-weekly, weekly, fortnightly, bi-monthly, and lastly occasional visit for rare or special shopping for some occasions. ceremonies, functions, fairs, festivals family get together etc.

As mentioned earlier, the surrounding villages are in close touch with the city. Table 4.10 shows that more than half of the household (52.7 percent) visit the city daily while around 15 percent of households travel to the city at least once a week, while 17.20 percent travel at least twice a week. Hence, about 85 percent of the households visit the city at least once a week.

Zone-wise analysis of the frequency of visits to the city shows wide variations. It is observed that the villages of the inner distance zone have highest frequency of visits followed by the middle and outer zones, respectively. However, the frequency decreases from the inner to the outer zone, which clearly shows the distance decay effect.

Analysis of the data shows that cent percent households of Ranipur village commute to the city daily followed by Jagjeetpur and Ghungtiyani Talli villages. On the other hand, only 13.8 percent households commute to the city daily in Pratitinagar followed by Puranpur, Dhalwala and Bhattowala villages. In case of Ranipur (located adjacent to the urban boundary) people are dependent on the city for all most all their basic requirements as there is no local market within the village while in case of Jagjeetpur village people prefer to visit the city for all higher orders goods and services as they find more varieties in the city, at comparatively cheaper rates, after travelling about 1 km (as this village is adjacent to the city).

Settlement-wise analysis of the frequency of visits to the city shows that cent percent population of Ranipur village travel to the city daily, followed by Jagjeetpur (72.7 percent). On the other hand, only 13.8 percent households of Pratitinagar and 38.5 percent households of Puranpur villages travel to the city daily. In case of Ranipur village, the frequency of visit to the city is highest because the villages do not have any market facilities. even the shops for basic needs such as that of groceries are not available in the village. Hence, the people of this village have to go to the nearest
market Jwalapur to meet almost all of their basic requirements. Similarly, in case of Ghungtiyani village also, the villagers have to walk down to another village Tapovon, to purchase all the necessary items.

Table 4.10
Frequency of Visit to the Nearest City in Sample Villages

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Daily</th>
<th>Once a Week</th>
<th>Twice a Week</th>
<th>Once a Month</th>
<th>Twice a Month</th>
<th>Occasionally</th>
<th>Once in Two Months</th>
<th>To. HHs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>44.8</td>
<td>17.2</td>
<td>25.9</td>
<td>5.2</td>
<td>6.9</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>72.7</td>
<td>7.8</td>
<td>19.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>64.7</td>
<td>10.7</td>
<td>20.0</td>
<td>2.0</td>
<td>2.7</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ghungtiyani</td>
<td>35.7</td>
<td>50.0</td>
<td>7.1</td>
<td>0.0</td>
<td>7.1</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Kangri</td>
<td>71.4</td>
<td>7.1</td>
<td>21.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jiapota</td>
<td>55.6</td>
<td>25.9</td>
<td>18.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>54.5</td>
<td>27.3</td>
<td>16.4</td>
<td>0.0</td>
<td>1.8</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Bhattowala</td>
<td>50.0</td>
<td>10.0</td>
<td>10.0</td>
<td>0.0</td>
<td>30.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Pratipalpur</td>
<td>13.8</td>
<td>24.6</td>
<td>7.7</td>
<td>16.9</td>
<td>26.2</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Puranpur</td>
<td>38.5</td>
<td>25.6</td>
<td>30.8</td>
<td>5.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>25.4</td>
<td>23.7</td>
<td>15.8</td>
<td>11.4</td>
<td>17.5</td>
<td>6.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>HDR</td>
<td>52.7</td>
<td>15.0</td>
<td>17.2</td>
<td>5.0</td>
<td>7.8</td>
<td>2.2</td>
<td>0.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

Other villages like Jiapota and Kangri are situated on the highway. These villages have shops for basic goods, however for availing medium and high level goods and facilities they have to travel to the city. In case of Puranpur village which is situated in the outer distance zone and thus relatively far from the city, the nearest urban centre is 9-10 kms away from the village. Moreover, both the road conditions as well as the transport facilities are poor, irregular and infrequent. So, only 38.5 percent of households visit the city daily, while about 25.6 percent visits the city at least weekly.

Figure 4.2
Frequency of Visit to the Nearest City
On the other hand, in Pratnagar 13.8 percent household visit the city daily as it has its own well developed market and so the population travels to the city only for availing higher order goods and services.

Hence, it can be concluded that there are various factors that play significant role in governing the visits of the village population to the city.

Thus, some of the important factors determining the rural-urban linkages identified during the field observations are availability of shops, market within the village, distance to the city, condition of the road, availability of public transport at affordable rate, frequency of public transport facilities etc.

4.4.2 (iii) Average Journey Time Spent from Home to the City

Average journey time signifies the time spent on travelling by the consumers from their place of residence to the city, especially to the market. This is one way time spent to reach the city. The average journey time spent by the population from their respective villages to the nearest city is categorised into four classes, i.e. Class- I (less than 15 minutes), Class-II (15 to 30 minutes), Class-III (30 to 45 minutes) and Class-IV (more than 45 minutes). Field observations reveal that the households from all the settlements can reach the city within 60 minutes.

**Class-I (Less than 15 minutes)**

It is observed from the analysis that around 18 percent households spend less than 15 minutes to travel to the city. However, the zone and settlement-wise analysis shows wide variations. Zone-wise analysis shows that the households from the inner zone spend relatively less time to reach the city as compared to the middle and outer zones. Settlement-wise analysis show that around 40 percent households of Dhalwala and Ranipur villages and 35 percent households of Jagjeetpur village spend less than 15 minutes to travel to the city. All these settlements are in the inner zone and are located adjacent to the city.

**Class-II (15-30 Minutes)**

This class has highest percent of population. About 42 percent of households spend between 15 to 30 minutes to travel to their nearest city. The highest percent households are in village Kangri followed by Jagjeetpur, Jiapota, Ranipur, Dhwiala
and Ghungtiyani Talli villages. The least percent of households in this category are from Puranpur and Pratitnagar villages as both the settlements are situated at a distance of more than 10 kms. from the city.

Table 4.11
Average Journey Time Spent from village to the City in Sample Villages

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Less than 15 minutes</th>
<th>15-30 minutes</th>
<th>30-45 minutes</th>
<th>45-60 minutes</th>
<th>Above 60 minutes</th>
<th>To HHs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>40.0</td>
<td>60.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>39.7</td>
<td>58.6</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>35.1</td>
<td>63.6</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>37.3</td>
<td>61.3</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ghungtiyanni</td>
<td>14.3</td>
<td>57.1</td>
<td>28.6</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Kangri</td>
<td>0.0</td>
<td>78.6</td>
<td>14.3</td>
<td>7.1</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jiapota</td>
<td>0.0</td>
<td>63.0</td>
<td>37.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>3.6</td>
<td>65.5</td>
<td>29.1</td>
<td>1.8</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Bhattowala</td>
<td>0.0</td>
<td>20.0</td>
<td>70.0</td>
<td>10.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>0.0</td>
<td>1.5</td>
<td>96.9</td>
<td>1.5</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Puranpur</td>
<td>0.0</td>
<td>7.7</td>
<td>71.8</td>
<td>15.4</td>
<td>5.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>0.0</td>
<td>5.3</td>
<td>86.0</td>
<td>7.0</td>
<td>1.7</td>
<td>100.0</td>
</tr>
<tr>
<td>HDR</td>
<td>18.2</td>
<td>42.0</td>
<td>36.4</td>
<td>2.8</td>
<td>0.6</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

Class-III (30-45 minutes)
This category has second largest share of households. Table 4.11 shows that about 36.4 percent households visiting the city spend around 30-45 minutes to reach the city. On the other hand, there are as many as five villages namely Kangri, Bhattowala, Pratitnagar, Jiapota and Puranpur villages where journey time for cent percent household is more than 15 minutes. All these villages are far and people cannot commute on foot. Majority of households of the outer zone spend more than 30 minutes to reach the nearest market in the city.

Class-IV (Above 45 minutes)
Field observations reveal that only 3.4 percent households spend more than 45 minutes and only 0.6 household spend more than one hour to reach the city. The highest share in this category is from Puranpur village followed by village Bhattowala, both of these villages are situated not only far from the city but are also located in the interior away from the highway and don’t have metalled roads. Moreover, the availability of public transport from these villages to the city is less frequent and irregular.
In case of Dhalwala village which is located adjacent to urban boundary, 60 percent households spend almost half an hour to reach the city because large population prefer to travel on foot on account of smaller distance. Similarly in Ghungtiyani Talli village that is located 5 kms away from the city, about 86 percent household spend more than 15 to 30 minutes to reach the city as about 30 percent households travel to the city on foot.

Table 4.3
Average Journey Time Spent to Reach the City

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 15 minutes</td>
<td>36.4%</td>
</tr>
<tr>
<td>15-30 minutes</td>
<td>18.2%</td>
</tr>
<tr>
<td>30-45 minutes</td>
<td>2.8%</td>
</tr>
<tr>
<td>45-60 minutes</td>
<td>2.0%</td>
</tr>
<tr>
<td>&gt; 60 minutes</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Thus, it can be concluded that in both Dhalwala and Ghungtiyani Talli villages, mode of transport plays more important role than distance traveled, while in case of Puranpur, Bhattowala and Pratitnagar villages, distance covered, availability of transport facilities (in terms of frequency) and road conditions play an important role in determining the time spent by the households to reach the city.

From the above observations the general pattern of interaction of the rural settlements with the city, their frequency of visit, average distance traveled, time spent to reach the city, mode of transport used, travel cost, etc has been analysed. However, in the following part of the present chapter, an attempt is made to examine the pattern of interaction (linkage) among the rural settlements and with the two cities on the basis of the order (level) of facilities and purpose (type) of interaction for which the households travel to the city.
4.4.3 Interaction Based on Level of Facilities (Goods/Services)

As studied earlier that there exist inequalities and disparities in the availability of facilities in any area and these inequalities gives rise to the linkages or interactions between the two centres.

It is generally assumed that the basic facilities are available in the rural settlements and so it is the higher order goods and services for which the people depend on the city. In the present chapter, an attempt has been made to categorise various goods and services into four classes viz. lower order goods, lower order services and higher order goods and services.

This classification of goods and services into various levels was made on the basis of the importance of the facilities. Goods like grocery, green grocery, cereals, cooking fuels and stationary items are categorised as lower order goods. While basic services like services of cobbler, barber, studio and tailor are categories as lower order services.

Similarly, goods and services, which are important but are not available in small centres as they need larger threshold to survive are categorised as higher order goods and services. These are goods like textiles, leather, jewellery, inputs used in agriculture and services like health, higher education; sale and processing of agriculture produce, banks, administrative services and social facilities etc.

**Criterion of Classification of level of Facilities**

Various goods and services were classified into higher or lower level on the basis of following factors (cost, importance and frequency of use)

- Scarcity in terms of availability
- Importance and frequency of use in day to day life
- Cost of the item or facility
- Threshold of the facility

The goods were arranged in hierarchical structure, from ordinary consumption items of daily use like grocery (cereals, pulses etc.) and green grocery to expensive and less frequently required articles like leather items, textiles and jewellery.
Similarly, the services such as repair of cycles, barber, tailor were categorised into lower order services while the services that cost more and are required less frequently such as health care services, higher education, financial, entertainment etc are classified into higher order services.

4.4.3 (i) Interaction for Lower Order Goods

Analysis of the data of dependency and pattern of travel of population to the city for lower order goods shows that an average of 23.26 percent households in the region are dependent on the city for these lower order goods. However, the percent of households dependent on city for basic goods shows wide inter-zonal and inter-settlement variations. It ranges from 88 percent in Ranipur village of the inner zone to 3.59 percent in village Puranpur in outer zone.

Physiographic location of Ranipur village discourages development of infrastructure facilities in the village. Although it is engulfed by BHEL on one side and Haridwar city on the other but as the canal forms the boundary of the village and the city, the development of the village towards the city is restricted. Location of BHEL on the one side also discourage its development as industrial township is self dependent/independent do not encourage infiltration by the villages. Location of PAC camp on the boundary between the village on one side and BHEL on the other side further discourages the development of the village on this side.

Field observations shows that there is lack of market facilities for basic requirement in Ranipur village and hence people visit to the city for various goods and services. They either depend on the weekly Haat in BHEL or travel to the nearest market in Jwalapur for even ordinary consumption items like green grocery, grocery, flour mill and fuel for cooking etc. Moreover, there is tendency among the villagers to out-migrate especially the younger generation which has discouraged growth of any marketing facilities within the village and hence people have to ultimately visit the city for their basic requirements.

On the other hand, 3.69 percent households of Pratimagar and 3.6 percent households in Puranpur villages and 4 percent in Bhattowala village depend on the city for their day to day requirements. All these three villages are located in the outer zone.
Table 4.12
Population Dependent on City for Various Orders of Goods and Services

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>LOG</th>
<th>LOS</th>
<th>HOG</th>
<th>HOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rani pur</td>
<td>88.00</td>
<td>100.00</td>
<td>82.14</td>
<td>73.33</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>34.48</td>
<td>22.41</td>
<td>83.35</td>
<td>67.19</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>24.68</td>
<td>11.69</td>
<td>82.02</td>
<td>64.23</td>
</tr>
<tr>
<td>Ghungiyan</td>
<td>38.57</td>
<td>23.21</td>
<td>76.19</td>
<td>57.40</td>
</tr>
<tr>
<td>Kangri</td>
<td>28.57</td>
<td>37.49</td>
<td>86.39</td>
<td>61.22</td>
</tr>
<tr>
<td>Jiapota</td>
<td>20.00</td>
<td>13.89</td>
<td>77.72</td>
<td>50.92</td>
</tr>
<tr>
<td>Bhattowala</td>
<td>4.00</td>
<td>25.00</td>
<td>50.00</td>
<td>57.38</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>3.69</td>
<td>1.92</td>
<td>54.06</td>
<td>57.52</td>
</tr>
<tr>
<td>Puranpur</td>
<td>3.59</td>
<td>3.85</td>
<td>44.35</td>
<td>49.59</td>
</tr>
<tr>
<td>HDR</td>
<td>23.26</td>
<td>17.95</td>
<td>70.16</td>
<td>60.78</td>
</tr>
</tbody>
</table>

| Co-efficient of Variation | 122.08 | 140.00 | 40.80 | 31.81 |

LOG/LOS = Lower Order Goods/Services, HOG/HOS = Higher Order Goods/Services
Source: Field Survey (2003)

In Puranpur and Bhattowala villages, the higher cost of travel on account of longer distance discourages population to travel to the city for their requirements. Hence, most of the households depend on the shops within the village or other nearby villages. About 20 percent households of Puranpur and 60 percent of Bhattowala depend on Bahadarabad and Shyampur villages respectively, for daily requirements. The percent figures for Puranpur village are lower because majority of households use wood as fuel for cooking and thus depend on jungle for firewood while in village Bhattowala 80 percent of households uses LPG cylinders which are available in nearby village Shyampur. Hence, dependency on other village is more in case of Bhattowala village.

In Pratitnagar, the dependency of population on the city for basic requirement is very low as the village itself has a well developed market facility. Moreover, the city is far and there are not many variations in per unit cost of commodities available in the village and in the city, so they need not travel to the city for their basic necessities.

Village-wise analysis shows that there are great variations in the dependency of the villages on the city for lower order goods. The co-efficient of variation for these goods is 122.

4.4.3 (ii) Interaction for Lower Order Services

The lower order services constitute the basic requirements like the services of barber, tailor, cobbler and facility of the studio. Around 18 percent households visit to the city for lower order services. The lower order services also show wide inter-zonal and
inter-settlement variations. It varies from 100 in Ranipur of the inner zone to 1.9 percent in Pratitnagar and 3.85 percent in Puranpur village of the outer zone.

Zone-wise analysis shows gradient pattern in the percent households visiting the city for lower order services. The data shows that the inner zone has highest percent of households visiting the city for lower order services followed by the middle and outer zone. This again shows the importance of distance as an important determining factor for the lower order services.

Settlement-wise analysis shows that non-availability of services in Ranipur village compels the people to visit the city even for the basic services of barber and cobbler. Similarly, Puranpur village also lacks in basic services but due to longer distance from the city residents avail these facilities from nearby village Bahadarabad.

It is observed that in Bhattowala, Ghungtiyani and Puranpur villages, large proportion of population is dependent on near-by villages Shyampur, Tapovan and Bahadarabad, respectively for these services. It is noticed that in three settlements i.e., Jagjeetpur, Jiapota and Dhalwala, all the lower order facilities are available within the village yet considerable percent of population travel to the city for these, because of shorter distance. On the other hand, in Pratinagar all these services are available within the village and thus only 1.9 percent households travel to the city for these services.

Settlement-wise analysis confirms great variations among settlements. The co-efficient of variation in dependency of the settlements on the city for lower order services is 140.

4.4.3 (iii) Interaction for Higher Order Goods

The higher order goods constitute the items like textile, readymade garments, leather goods, jewellery and inputs used in agriculture. All these articles are either relatively costly or are used less frequently or both and hence may not be available in all the rural settlements.

Table 4.12 shows that as much as 70.2 percent households travel to the city for this level of goods. However, inter-zonal as well as inter-settlement variations are observed in the region. Zone-wise analysis shows that the settlements in inner zone have in highest percent of households dependent on the city for the above mentioned higher order goods.
Settlement-wise analysis shows that among settlements the percent is highest (86.4 percent) in village Kangri. However, it is observed that the variation is not large i.e. there is not much disparity in terms of percent households dependent on city for higher goods in the sample villages. It varies from lowest percent (44.3 percent) in Puranpur village to highest percent (86.4 percent) in Kangri village. Both these villages are in the middle zone which clearly shows the existing intra-zonal variations. The highest percent of households dependent on the city in Kangri village is on account of absence of any other developed village or growth centre in this part of the study area; hence most of the settlements located on the right bank of Ganga river depend on Haridwar city for all their requirements.

The co-efficient of variation for higher level of goods is 40.8. In six out of the nine sample villages, more than 75 percent households travel to the city for higher order goods and services. In remaining two villages, i.e. Bhattowala and Puranpur distance to the city is again one of the most important determining factors for lower dependency on city. Moreover, in both the cases near-by developed villages (Shyampur and Bahadarabad) play an important role in catering the needs of the population. On the other hand, in Pratitnagar almost 42.5 percent households buy the goods from the village, although it has a well developed market facilities.

The analysis of the data shows that the co-efficient of variation is relatively lower for higher order goods and services as compared to the co-efficient of variation for lower order goods and services.

4.4.3 (iv) Interaction for Higher Order Services

The expensive and less frequently used services which are very essential for the population are categorised as the higher order services. It includes facilities like higher education, secondary and tertiary health care, financial institutions like services of banks and credit societies. Social facilities like visits to the city for religious purposes, entertainment, cultural services, administrative and organisational services like services of tehsil, district and judicial services are also included in this category. Other important variable is dependency of the rural population on the city for livelihood. An average of about 61 percent households depend on the city for higher
order services in the region. However, the inter-zonal as well as intra-zonal variations are observed in dependency of the households on the city for higher order services.

Settlement-wise analysis shows there is not much variation in population dependency on city for high order services. It ranges from 49.6 percent in village Puranpur to 73.7 percent in Ranipur village. The co-efficient of variation is 32.8 for these services. It is observed that in all the villages more than half of the population depends on the city for these services.

It is examined that the variables like distance to the city, accessibility in terms of public transport, its availability and frequency along with travel cost are the governing factors for the dependency on the city for lower order goods and services. While, in case of higher order goods and services ‘accessibility’ is the significant factor. Other important determinants include the requirement of the facility, occupation of the household their awareness regarding the facility etc. Another interesting feature observed during field observation is that while for lower order goods and services the population traveled to the nearest city. On the other hand, for higher order goods and services, the villagers traveled not only to the nearest city but also to other cities outside the region. Moreover, the lower order goods and services have greater co-efficient of variation in terms of percent households dependent on the city as compared to the higher order goods and services.
4.4.4 Interaction Based on Type of Facilities

Classification of major linkage types

As discussed earlier, the type and intensity of interaction between the urban and the adjoining rural areas is governed by variety of factors. Accessibility in terms of road distance, condition of road, mode of transport, availability of public transport facilities, travel cost are important determinants. However, it is observed that other factors like the physiography and productivity of the region (land), socio-economic status of the population of the umland along with size, nature and functional character of the city also plays an important role in governing the pattern and type of interaction between two centres.

Moreover, it is observed that the type and pattern of interaction governing the small towns or cities are different than those operating at the metropolis or megapolis. Similarly, the functional nature of the city plays an important role in the pattern of interaction with neighbouring rural settlements.

Taking into account the above factors, it has been attempted in the section to examine various types of linkages existing between the rural and urban settlements of the region.

We have categorised the different linkages into six types- these are physical linkages, population movement linkages, economic linkages, social interaction linkages, service delivery linkages, political, administrative and organisational linkages etc.

4.4.4 (i) Population Movement Linkages

It includes the percent of households (head of the household) that commute to the city daily for work. This daily travel is either for services which includes both government and private services and other self employment activities in the formal as well as informal sector.

As discussed earlier, the two religious cities (Haridwar and Rishikesh) entertain large floating population. Moreover, after the formation of Uttarakhal as separate state, the region has tremendous potential for growth. The study area is considered most suitable for developing many infrastructural facilities including industries, as the region is one of the few stretches of plain areas available in the State. The State authorities are planning to encourage industrial development in the region. Hence,
these development activities are expected to provide immense potential in terms of job opportunities in the region.

### Table 4.13
**Households Dependent on City for Various Facilities In Percent**

<table>
<thead>
<tr>
<th>Distance Zone</th>
<th>Villages</th>
<th>Economic</th>
<th>Education</th>
<th>Health</th>
<th>Social</th>
<th>Financial</th>
<th>Administrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner</td>
<td>Dhalwala</td>
<td>60.00</td>
<td>74.47</td>
<td>98.30</td>
<td>67.20</td>
<td>29.31</td>
<td>65.52</td>
</tr>
<tr>
<td></td>
<td>Ranipur</td>
<td>76.47</td>
<td>100.00</td>
<td>100.00</td>
<td>80.00</td>
<td>13.33</td>
<td>86.67</td>
</tr>
<tr>
<td></td>
<td>Jagjeetpur</td>
<td>41.41</td>
<td>30.00</td>
<td>94.81</td>
<td>48.70</td>
<td>0.00</td>
<td>94.81</td>
</tr>
<tr>
<td>Middle</td>
<td>Gungstiyani</td>
<td>52.38</td>
<td>63.64</td>
<td>64.30</td>
<td>28.60</td>
<td>42.86</td>
<td>85.71</td>
</tr>
<tr>
<td></td>
<td>Kangri</td>
<td>37.50</td>
<td>50.00</td>
<td>100.00</td>
<td>35.70</td>
<td>28.57</td>
<td>64.29</td>
</tr>
<tr>
<td></td>
<td>Jiyapota</td>
<td>40.00</td>
<td>10.00</td>
<td>92.60</td>
<td>40.70</td>
<td>0.00</td>
<td>98.00</td>
</tr>
<tr>
<td>Outer</td>
<td>Bhattowala</td>
<td>33.33</td>
<td>25.00</td>
<td>90.00</td>
<td>50.00</td>
<td>20.00</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>Pratinagar</td>
<td>10.45</td>
<td>25.93</td>
<td>89.2</td>
<td>66.2</td>
<td>27.7</td>
<td>73.85</td>
</tr>
<tr>
<td></td>
<td>Puranpur</td>
<td>17.07</td>
<td>29.63</td>
<td>58.98</td>
<td>46.80</td>
<td>28.21</td>
<td>83.70</td>
</tr>
<tr>
<td>IDR</td>
<td></td>
<td>38.12</td>
<td>37.40</td>
<td>88.70</td>
<td>55.49</td>
<td>16.60</td>
<td>79.31</td>
</tr>
</tbody>
</table>

| Co-efficient of Variation | 51.03 | 67.79 | 17.45 | 32.16 | 59.77 | 13.49 |

Source: Field Survey (2003)

Field observations show that 38.12 percent households of the surrounding villages depend on the city for livelihood. However, further analysis of the data shows wide inter-zonal and inter-settlement variations. Analysis of the data shows that the settlements of inner zone have highest percent of households dependent on the city followed by the settlements in the middle and outer zones.

### Figure 4.5
**Households Dependent on City for Various Facilities**

![Bar chart showing households dependent on city for various facilities](image)

Note: Eco. - Economic, Edn.-Education, Fin. - Financial and Adm.-Administrative
Settlements-wise analysis shows that the dependency of rural population on the city for work ranges from 10.45 percent in Pratitnagar in the outer zone to 76.5 percent in Ranipur village in inner zone. More than 50 percent households of three villages viz. Dhalwala, Ghungtiyani and Ranipur villages visit to the city for work, followed by more than 40 percent in Jagjeetpur and Jiapota villages. On the other hand, the percent households travelling to the city for work is relatively lower in Kangri, Bhattowala and Puranpur villages, as majority of population of these villages is engaged in Primary activities especially agriculture and allied activities.

In Pratitnagar, only 10.45 percent households are dependent on city while 89.65 percent households work within the village. Majority of population of the village are employed in two major sub-categories of the tertiary sector, one is services mainly in Army (as cantonment is located in the village) and secondly, self employed or business, where shops (within the village) forms the highest share.

City wise Dependency

City-wise dependency of the rural settlements show that out of the total households dependent directly on city for economic activities 57.32 percent are dependent on Haridwar city while 33 percent visit Rishikesh, the remaining 9.58 percent depends on other cities like Roorkee, Dehradun and Saharanpur etc.

Analysis of the data shows that there is a general trend of population usually depending on nearest city for work. For example, inhabitants from villages like Kangri, Jiapota, Jagjeetpur and Ranipur commute to Haridwar for work while people from Ghungtyani and Dhalwala villages commute to Rishikesh. In Pratitnagar, 42.8 percent of inhabitants go to Haridwar while 43 percent visit Rishikesh and remaining 14.3 percent travels to Dehradun for work.

4.4.4 (ii) Service Delivery Linkages

City acts as the major service delivery centre not only for its own population but also for the surrounding rural settlements, which lack the major services especially higher order facilities like medical, education financial etc.
Interaction for Education Facilities

Availability of education facilities is satisfactory in almost all the villages except Kangri, Bhattowala and Ghungtiyani Talli villages. People travel to less than 2 kms. to avail education facilities in all villages except the above mentioned villages.

Table 4.14 shows that about 77 percent of households avail education facilities, while 23 percent do not avail education facilities anywhere. Out of the total population availing this facility, 62.6 percent use the facility within the village (51.63 percent) or nearby village (10.98 percent) while remaining 37.40 percent travel to the city for education. Students availing facility within the village and from other villages include primary and high school education in government and public schools. On the other hand, education facility in city includes mainly education in public schools and higher or technical and professional education in various institutes.

City-wise dependency for education facilities in the region shows that students in Bhattowala, Dhalwala, Ghungtiyani villages and also some students from Pratitnagar avail education facilities from Rishikesh. While villages like Jiapota, Jagjeetpur, Ranipur and Puranpur use education facilities in Hardiwar (including Jwalapur, Kankhal, BHEL and Bahadarahad). Out of the total population dependent on the cities for education about 43.48 percent is dependent on Haridwar, and 50.00 percent on Rishikesh and remaining 6.52 percent on other cities like Dehradun, Roorkee, Delhi, Tehri and Pauri. Field observations reveal that villagers prefer Dehradun, Roorkee and Delhi for higher education.

Settlement-wise analysis for availability of education facilities shows that all the sample villages except Ghungtiyani Talli and Ranipur villages have at least one primary school and Anganwadis within the village. Similarly, Dhalwala, Pratitnagar and Jagjeetpur villages have high school facility and two villages i.e. Dhalwala and Pratitnagar have secondary school facility within the village while all the other villages (Ranipur, Kangri, Jiapota, Bhattowala, Puranpur and Ghungityani) have high school and intermediate school within the range of 5 kms from the village.

However, there is no primary level education in Ghungtiyani Talli village and the students have to travel to a nearby village Tapovan at a distance of 2 kms. Similarly, in Bhattowala village students have to walk about 2 to 3 kms for availing high and senior secondary school education facilities in another village, Garhiway chak.
However, during rainy season, the direct un-metalled road is flooded with water and the children have to cover 10 kms distance to reach the school. Ghungtiyani Talli village has also to face such problem during rainy season.

### Table 4.14
City-wise Dependency for Education Facilities

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Haridwar</th>
<th>Rishikesh</th>
<th>Within Village</th>
<th>Other Village</th>
<th>Other City</th>
<th>Availing facility</th>
<th>Not Availing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>73.33</td>
<td>26.67</td>
<td>100.00</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>0.00</td>
<td>70.21</td>
<td>25.53</td>
<td>0.00</td>
<td>4.26</td>
<td>81.03</td>
<td>18.97</td>
<td>100.00</td>
</tr>
<tr>
<td>Jagiupur</td>
<td>30.51</td>
<td>0.00</td>
<td>67.80</td>
<td>1.69</td>
<td>0.00</td>
<td>76.62</td>
<td>23.38</td>
<td>100.00</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>24.79</td>
<td>28.21</td>
<td>44.44</td>
<td>0.85</td>
<td>1.71</td>
<td>78.00</td>
<td>22.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Ghungtiyanni</td>
<td>0.00</td>
<td>0.00</td>
<td>60.00</td>
<td>40.00</td>
<td>0.00</td>
<td>71.43</td>
<td>28.57</td>
<td>100.00</td>
</tr>
<tr>
<td>Kangri</td>
<td>50.00</td>
<td>0.00</td>
<td>40.00</td>
<td>10.00</td>
<td>0.00</td>
<td>71.43</td>
<td>28.57</td>
<td>100.00</td>
</tr>
<tr>
<td>Jiapota</td>
<td>10.00</td>
<td>0.00</td>
<td>45.00</td>
<td>45.00</td>
<td>0.00</td>
<td>74.07</td>
<td>25.93</td>
<td>100.00</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>17.50</td>
<td>0.00</td>
<td>47.50</td>
<td>35.00</td>
<td>0.00</td>
<td>72.73</td>
<td>27.27</td>
<td>100.00</td>
</tr>
<tr>
<td>Bhattrovala</td>
<td>0.00</td>
<td>25.00</td>
<td>0.00</td>
<td>75.00</td>
<td>0.00</td>
<td>80.00</td>
<td>20.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>0.00</td>
<td>20.37</td>
<td>74.07</td>
<td>0.00</td>
<td>5.56</td>
<td>83.08</td>
<td>16.92</td>
<td>100.00</td>
</tr>
<tr>
<td>Puranpur</td>
<td>14.81</td>
<td>0.00</td>
<td>59.26</td>
<td>22.22</td>
<td>3.70</td>
<td>69.23</td>
<td>30.77</td>
<td>100.00</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>4.49</td>
<td>14.61</td>
<td>62.92</td>
<td>13.48</td>
<td>4.49</td>
<td>78.07</td>
<td>21.93</td>
<td>100.00</td>
</tr>
<tr>
<td>HDR</td>
<td>16.26</td>
<td>18.70</td>
<td>51.63</td>
<td>10.98</td>
<td>2.44</td>
<td>77.12</td>
<td>22.88</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

In Kangri village, children have to travel 1.5 km to other villages like, Gajiwali and Shyampur for their high school and senior secondary education. Similarly, village Ranipur has no school within the village but Jwalapur being (southern part of Haridwar city) at a distance of only 2 kms, children have to commute to the area for all types of education facilities.

Thus, the availability of education facility is satisfactory in almost all the villages as even the high school and intermediate schools are within 5 kms distance from the villages. However, in some villages accessibility in terms of road condition especially during rainy season and availability of cheap public transport facility and its frequency are not satisfactory.

It is interesting to observe that although the availability of educational facilities is satisfactory in the villages yet as much as 37.40 percent households (Table-4.13) avail the education facilities in the cities. However, there are inter-zonal and inter-settlement variations in terms of dependency on the city for education facilities. Zone-wise analysis shows that the inner zone has highest percent of students availing the education facilities from the city followed by middle and outer zone, respectively. Settlement-wise analysis shows that the percent of students dependent on city ranges...
from 10 percent in Jiapota village in the middle zone to almost cent percent in Ranipur village and about 75 percent in Dhalwala village of the inner zone.

It is observed that more than 50 percent school going population of Kangri and Ghungtiyani villages of the middle zone and Dhalwala and Ranipur villages of inner zone visit to the city while more than 50 percent population of Pratitnagar, Puranpur (of the outer zone) and Jagjeetpur village (inner zone), use the education facility within the village.

(b) Interaction for Healthcare Facilities

Analysis of the data shows that the availability of public health facilities is unsatisfactory in the region. It is observed that although all the villages have weekly visits by community health workers and auxiliary nursing midwife (ANM). However, these visits are very short and irregular. The field visit to various dispensaries and health centres showed pathetic conditions in terms of buildings, availability of the doctors as well as the medicines.

Hence, most of the people depend on private health facilities and sometimes are at the mercy of quacks. Field observations show that these so called medical practitioners do not have any registration or in many cases even no knowledge of science or medicine. The miniscule population that avail Government health care facilities, is at the district hospital.

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Haridwar</th>
<th>Rishikesh</th>
<th>Within Village</th>
<th>Other Village</th>
<th>Other City</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>0.0</td>
<td>98.3</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>94.8</td>
<td>0.0</td>
<td>5.2</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Inner Zone</td>
<td>64.9</td>
<td>32.8</td>
<td>2.3</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ghungtiyani</td>
<td>0.0</td>
<td>64.3</td>
<td>0.0</td>
<td>35.7</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Kangri</td>
<td>100.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Jiapota</td>
<td>92.6</td>
<td>0.0</td>
<td>0.0</td>
<td>7.4</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Middle Zone</td>
<td>64.2</td>
<td>21.4</td>
<td>0.0</td>
<td>14.4</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Bhattowala</td>
<td>0.0</td>
<td>90.0</td>
<td>0.0</td>
<td>10.0</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>13.8</td>
<td>67.7</td>
<td>4.6</td>
<td>6.2</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Puranpur</td>
<td>10.3</td>
<td>0.0</td>
<td>0.0</td>
<td>41.0</td>
<td>48.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Outer Zone</td>
<td>8.0</td>
<td>52.6</td>
<td>1.5</td>
<td>19.1</td>
<td>18.8</td>
<td>100.0</td>
</tr>
<tr>
<td>HDR</td>
<td>43.9</td>
<td>37.3</td>
<td>2.5</td>
<td>8.8</td>
<td>7.5</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)
Four villages namely Kangri, Jiapota, Ranipur and Jagjeetpur depend on Haridwar while Bhattowala, Dhalwala, Ghungtiyani and Pratitnagar villages depend on Rishikesh for almost all type of health services.

Analysis of the data in table 4.15 shows that about 11.3 percent households avail the facility either in the village or visit any other near-by villages, while the remaining 88.7 percent visit the city to avail various types of health care facilities (Table 4.13).

It is interesting to observe that about 41 percent households of Puranpur village are dependent on Block H.Qs Bahadarabad for primary health, similarly 35.7 percent households of Ghungtiyani visit Tapovan and 10 percent population of Bhattowala and 6.2 percent population of Pratitnagar avail the health services in Shyampur village. Thus, these three villages i.e.; Bahadarabad, Tapovan and Shyampur have relatively well developed health facilities and most rural settlements of the surrounding region depend on these villages for health care facilities. However, most of the health facilities in these villages are private.

Table 4.16 shows that out of the total population availing health care facility in the city 13.59 percent visit to avail primary health care services, 42.05 visits for secondary and 44.36 percent avail tertiary health care facilities in the city.

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Primary</th>
<th>Secondary</th>
<th>Tertiary</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranipur</td>
<td>33.33</td>
<td>33.33</td>
<td>33.33</td>
<td>100.00</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>20.90</td>
<td>39.55</td>
<td>39.55</td>
<td>100.00</td>
</tr>
<tr>
<td>Jagjeetpur</td>
<td>13.66</td>
<td>40.37</td>
<td>45.96</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Inner Zone</strong></td>
<td><strong>19.12</strong></td>
<td><strong>39.12</strong></td>
<td><strong>41.76</strong></td>
<td><strong>100.00</strong></td>
</tr>
<tr>
<td>Ghungtiyani</td>
<td>22.22</td>
<td>38.89</td>
<td>38.89</td>
<td>100.00</td>
</tr>
<tr>
<td>Kangri</td>
<td>17.24</td>
<td>37.93</td>
<td>44.83</td>
<td>100.00</td>
</tr>
<tr>
<td>Jiayapota</td>
<td>1.92</td>
<td>46.15</td>
<td>51.92</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Middle Zone</strong></td>
<td><strong>11.97</strong></td>
<td><strong>41.88</strong></td>
<td><strong>46.15</strong></td>
<td><strong>100.00</strong></td>
</tr>
<tr>
<td>Bhattowala</td>
<td>29.63</td>
<td>37.04</td>
<td>33.33</td>
<td>100.00</td>
</tr>
<tr>
<td>Pratitnagar</td>
<td>2.34</td>
<td>48.44</td>
<td>49.22</td>
<td>100.00</td>
</tr>
<tr>
<td>Puranpur</td>
<td>5.00</td>
<td>46.25</td>
<td>48.75</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Outer Zone</strong></td>
<td><strong>6.38</strong></td>
<td><strong>46.38</strong></td>
<td><strong>47.23</strong></td>
<td><strong>100.00</strong></td>
</tr>
<tr>
<td>HDR</td>
<td>13.58</td>
<td>42.05</td>
<td>44.36</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

It is striking to note that only 2.5 percent of the total sample households use the health facilities within the villages and it includes both the private and government health care facilities. While 8.8 percent households visit other villages. On the other hand,
about 43.90 percent of population travels to Haridwar and 37.30 percent to Rishikesh to avail health services. remaining 7.50 percent go to other cities like Roorkee, Saharanpur, Dehradun etc. Thus, the three cities cater to the needs of health services of about 88.7 percent of households of the region.

It is observed that 100 percent population of Kangri and Ranipur villages depend on the city for all types of healthcare facilities because there are no health facilities available within these villages.

4.4.4 (iii) Agricultural Inputs and Sale of Agricultural Products

One of the most important services provided by the city to the rural folks is for inputs used in agriculture like seeds, fertilizers, insecticides, pesticides, agricultural implements and its repair etc. On the other hand, city also serves as an important market for agricultural products.

Thus, dependency of farmers on city for purchase of agricultural inputs and for marketing of agricultural products is an important form of linkages/relationship, which affects and stimulates various other types of interactions.

It is observed from the field analysis that about 32.81 percent of the total farming households depend on the city for purchasing agricultural inputs and selling the agricultural products. However, the percent of farmers dependent on the city for purchase of agricultural inputs is relatively lower (20.14 percent) than that for marketing of agricultural products (42.79 percent). This is on account of the reason that agricultural inputs are easily available within or in nearby villages and Block H.Qs. Moreover, there are not much price differences in agricultural inputs available in village and the city while there is considerable price gap in the prices of agricultural products. Thus, it is observed that in almost all the villages, percent farmers travelling to the city for marketing of agricultural products are greater than those visiting for purchasing of agricultural inputs except in Kangri and Ghungtiyani villages. It is observed that in Ghungtiyani village, the size of land holding is very small and agricultural outputs are used for self consumption and the surplus, if any, is sold within the village. However, both the services show wide inter-zonal as well as inter settlement variations.
Zone-wise analysis shows that the highest percent of farming households in the inner zone are dependent on the city for purchasing agricultural inputs as well as for processing or selling of agricultural products followed by the middle and outer zone.

(a) Linkages for Agricultural Inputs

Agricultural inputs include fertilizers, seeds, pesticides, insecticides, seeds, purchase or hiring of agricultural implements etc. All these goods, services and facilities are usually available in villages or cluster of villages still it is observed that considerable share of farmers avail the facility from the nearest city. The farmers depending on the city for this facility vary from nil in Bhattowala village to 76.1 percent in Kangri village. As mentioned earlier, in case of Kangri village there is no other relatively developed village in the surrounding area and hence for all types of facilities the population of villages in this part of the study area have to depend on Haridwar City.

Settlement-wise analysis shows that in majority (77.7 percent) of villages, less than 30 percent farmers visit the city for purchasing agricultural inputs while in 22.3 percent villages more than 45 percent farmers visit the city for availing this facility.

In almost all the sample villages except in Kangri and Puranpur this facility is available within 3 kms from their respective village. While in Kangri, farmers have to visit the city and in Puranpur village farmers avail this facility from the Block H.Qs, Bahadarabad, located at a distance of about 9 kms from the village.

### Table 4.17
Percent Population Dependent on City for Agricultural Products

<table>
<thead>
<tr>
<th>Sample Villages</th>
<th>Agriculture Inputs</th>
<th>Agriculture marketing and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rani pur</td>
<td>28.57</td>
<td>50.0</td>
</tr>
<tr>
<td>Dhalwala</td>
<td>45.47</td>
<td>53.3</td>
</tr>
<tr>
<td>Jagieetpur</td>
<td>28.07</td>
<td>59.0</td>
</tr>
<tr>
<td><strong>Inner Zone</strong></td>
<td><strong>34.67</strong></td>
<td><strong>55.90</strong></td>
</tr>
<tr>
<td>Ghungiyan</td>
<td>4.76</td>
<td>25.0</td>
</tr>
<tr>
<td>Kangri</td>
<td>67.01</td>
<td>75.0</td>
</tr>
<tr>
<td>Jiapota</td>
<td>10.88</td>
<td>47.5</td>
</tr>
<tr>
<td><strong>Middle Zone</strong></td>
<td><strong>23.64</strong></td>
<td><strong>48.77</strong></td>
</tr>
<tr>
<td>Bhattowala</td>
<td>0.00</td>
<td>25.0</td>
</tr>
<tr>
<td>Prattnagar</td>
<td>10.08</td>
<td>29.7</td>
</tr>
<tr>
<td>Puranpur</td>
<td>10.71</td>
<td>20.7</td>
</tr>
<tr>
<td><strong>Outer Zone</strong></td>
<td><strong>9.65</strong></td>
<td><strong>24.02</strong></td>
</tr>
<tr>
<td>HDR</td>
<td>20.14</td>
<td>42.79</td>
</tr>
<tr>
<td><strong>Co-efficient of variation</strong></td>
<td><strong>95.7</strong></td>
<td><strong>43.6</strong></td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)
(b) Linkages for Marketing Agricultural Products

Marketing of agricultural products include all types of output from the farm. It includes grains, oil seeds, vegetables, fruits, flowers, sugarcane etc. About 42.79 percent farmers are dependent on the city for marketing of their agricultural products to the city while remaining either sell their products within the village or sell it in some other villages.

Again, there are zones-wise as well as settlement-wise variations in percent farmers travelling to the city for selling agricultural products. Table 4.17 shows that it varies from 20.7 percent in Puranpur village to 75 percent in village Kangri. It is observed that percent farmers visiting city is greater in villages located closer to the city as compared to villages situated relatively far from the city. The percent share of farmers travelling to the city is very low in Bhattowala, Ghungtiyani, Pratitnagar and Puranpur villages. On the other hand, it is high in Jagjeetpur, Ranipur and Dhalwala villages.

However, Kangri and Jiapota villages are exceptions, even though these villages are about 8 kms i.e. in the middle zone in terms of distance but still significant percent share of farmers sell their products in the city, as there is no primary market or other facilities within or near by villages and existing gap in prices lure the farmers to sell their products in the city. Good road conditions further accelerate and encourage them to travel to the city. as both the villages are located along the highway.

Another important feature observed is that the agricultural input has greater co-efficient of variation in terms of percent farmer households dependent on the city as compared to the percent farmers dependent for sale and processing of agricultural produce which shows relatively lower co-efficient of variation.

4.4.4 (iv) Political, Administrative and Organisational Linkages

These types of linkages are very important in studying the pattern of existing rural-urban relationship. Travel to the city is inevitable for administrative services as the city also represents the tehsil and district HQs. Although the frequency of the visit to the city varies but people do travel to the city to avail facilities of tehsil for land records, revenues, registries; to court for judicial services, domicile and other type of certificates etc.
In the region, about 79.31 percent households visit the city (in the last six months) for administrative services. Relatively lesser inter-zonal and inter-settlement variations are observed for these services. However, it ranges from 64.29 percent in Kangri to 98 percent in village Jiapota. The co-efficient to variation is very less i.e. 13.49 for administrative or organisational services, as most of the households in the region travel to the city for availing any of the above mentioned services.

4.4.4 (v) Financial Facilities

Two types of banks usually operate in rural areas; they are commercial banks or specialised banks.

Commercial banks accept deposits and advance loans. Specialised banks such as agricultural development bank generally advance loans only to farmers.

It is observed that four out of the total nine villages have banking facilities within the village while in the remaining five villages, four have this facility within 5 kms from the village and only one village Puranpur has nearest bank at a distance of about 10 kms from the village. Field observations show that 85 percent of households have banking facilities within walking distance of 3 kms from the village. Hence, dependency of these villages on the city for financial purposes is comparatively low.

It is observed that about 16.60 percent households use banking facilities in the city, while the remaining households either avail this facility in the village or in the nearby village. There are variations among settlements in using banking facilities in the city. It varies from nil percent in Jagjeetpur and Jiapota villages to 42.86 percent in Ghungtiyani village. Both the villages are located in the middle distance zone. About, 29 percent households of village Dhalwala and 28 percent households of Pratitnagar use banking facility in the city although both the settlements have the facility within the village.

4.4.4 (vi) Social Interaction

Social interaction linkages include visiting patterns of the rural population to the city for social gathering, meeting relatives, kins and friends, visits to the city for religious activities (rites, rituals, fairs, festivals, bathing occasions as both Haridwar and Rishikesh are religious centres) and for entertainments (cinema, theatre, circus etc.)
(a) Religious Activities

As mentioned earlier Haridwar and Rishikesh are well known Hindu pilgrim centre. Obviously large population from surrounding villages visit the city for religious activities, like fairs, festivals, major bathing occasions and for rites and rituals. It is observed that 94.04 percent households visit the city for religious ceremonies, of which 56.67 percent prefer exclusively Haridwar followed by Rishikesh (16 percent), while 15.33 percent inhabitants visit both Haridwar and Rishikesh depending on the nature of occasions. On the other hand, the remaining 6 percent households visit Roorkee, and majority of them are Muslims who visit the Piran Kaliar (a famous Muslim shrine near Roorkee). About 6 percent households do not go to any city for these activities.

(b) Entertainment Linkages

Rural inhabitants visit the city for various types of entertainment activities like cinema, theatre, circus or sometimes exhibitions held in the city. Visits to the city for these purposes determine the entertainment linkages.

Analysis of the data shows that only 32.30 percent households visits the city for entertainment, while 67.70 percent do not go anywhere for entertainment.

It is interesting that majority of rural population considered cinema as the major source of entertainment. But with the availability of T.V. sets in almost every home and cable connections, dish antennas and VCDs in every village, the inhabitants do not prefer to go to movie halls in the city. Rather they prefer to watch them on VCR/VCD which are available in almost all the villages.

However, settlement-wise analysis shows variations, it ranges from 20 percent in Bhattowala to 57.14 in Kangri village. It is observed that villages that are relatively nearer to the city (Dhalwala, Ranipur and Jagjeetpur) have a comparatively larger percent population visiting the city for entertainment as compared to the villages Bhattowala, Pratitnagar and Puranpur that are far villages of the outer zone.
(c) Social Gathering

Social linkages mean maintaining social ties with the population in the city. Social gatherings, visits to meet relatives, friends, attend ceremonies, functions and marriages etc.

About 55.50 percent of rural households from the surrounding region has social links with the city while 44.50 percent have social relations only within or in near-by villages. However, the percent of households visiting the city for social gatherings varies from village to village. It ranges from 28.60 percent in Ghungtiyani to 80 percent in Ranipur village.

4.4.5 Overall Interaction Index

An overall interaction index is calculated showing the intensity of interaction of villages with the city based on the above variables discussed types of linkages in the chapter. (Based on various order of goods and services and types of linkages). The index is calculated using all the above-discussed variables, these variables are standardised and assigned weights. The interaction index is calculated to have a single score for each settlement by combining various types of facilities for which the rural areas are dependent on the city. In all, 20 sub-types of goods and services have been identified under four major heads (Table 4.18).

Taking into consideration the type of facilities their importance in terms of use, each facility/sub-facility is assigned weights. The weights are assigned out of the total value as hundred. The weighting diagram of index of interaction is shown in table 4.18. Amongst the major facilities the highest weights are assigned to higher order goods and services. These individual values are summed up to derive a single composite score. The sample villages are then categorised as having high, medium and low level of interaction based on the scores in the interaction index.
Table 4.18
Weights Assigned to Various level of Goods and Services for Calculating Interaction Index

<table>
<thead>
<tr>
<th>Level of Goods &amp; Services</th>
<th>Purpose of Visit</th>
<th>Weights</th>
<th>Sub-Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Order Goods</td>
<td>Grocery</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Green grocery</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Flour mill</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fuel</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Stationary</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Lower Order Services</td>
<td>Barber</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Tailor</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cobbler</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Studio</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Higher Order Goods</td>
<td>Textiles</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Leather goods</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Purchase of Agricultural Inputs</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Jewellery</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Higher Order Services</td>
<td>Education</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Health</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Sale of Agricultural Products</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Financial</td>
<td></td>
<td>3</td>
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<tr>
<td></td>
<td>Administrative</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Religious</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Economic (Occupational Dependency)</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

4.4.5 (i) High Level of Interaction

Four of the nine villages have high level of interaction with the city. Ranipur has highest interaction followed by Dhalwala and Jagjeetpur villages. These three villages are located in the inner distance zone and are adjacent to the urban boundary, while Kangri village is located 8 kms from the city along the Haridwar-Nazibabad highway. Ranipur village is engulfed by Haridwar and BHEL on the one side and Bahadarabad (block HQs) on the other. It lies adjacent to the Bahadarabad industrial unit which is being developed and encouraged as an industrial centre. Ranipur village lacks in basic facilities like hospital, primary school, shops or market for basic items. Hence, people are dependent on the city for all their needs from lower order goods and services like grocery, stationary, tailor, barber to higher order goods and services like leather items, jewellery, utensils, health care, education and banking facilities.

Moreover, the city is only 2 kms from the village and more than 75 percent heads of households are engaged in economic activities outside the village. The BHEL
Industrial Township was carved out from this village and the land of the inhabitants was acquired in 1960 and jobs were given to the villagers as compensation for their acquired land. Also industrial development is taking place in surrounding villages that has led to increased share of workers in secondary sector. Finally, it can be analysed that Ranipur village has highest intensity of interaction with the city.

Table 4.19
Level of Interaction in Sample Villages

<table>
<thead>
<tr>
<th>Level of Interaction</th>
<th>Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Ranipur, Dhalwala, Jagjeetpu and Kangri</td>
</tr>
<tr>
<td>Medium</td>
<td>Jiapota and Ghungtiyani Talli</td>
</tr>
<tr>
<td>Low</td>
<td>Bhattowala, Pratitnagar and Puranpur</td>
</tr>
</tbody>
</table>

Source: Field Survey (2003)

In Dhalwala and Jagjeetpur villages too, the intensity of interaction and relationship is very high as both the villages are located adjacent to Rishikesh and Haridwar, respectively. Hence, the influence of the city is relatively higher. On one hand, the rural population utilises the job opportunities provided by the city which further increases the interaction with the city. Moreover, these villages provide cheap land for residential and commercial activities to the people who cannot afford high prices and rents in the city.

Both the villages partly fulfill the criteria of urban as per the census definition i.e. population of the village is more than 5000 persons, population density is more than 400 person per sq. km. and more than 75 percent population is engaged in non-agricultural activities. These villages have a well developed market facilities, schools and private health care facilities and bank. In spite of this, large proportion of population prefers to visit the city for all type of facilities.

In case of Kangri village, the level of interaction is very high on account of non-availability of basic facilities like education, healthcare and market facilities in and around the village, which can cater to all the needs of the villages. Therefore, the village is totally depended on the nearest city, Haridwar. Secondly, this village is located on the state highway and has satisfactory availability of public transport facilities. Moreover, about 52 percent population of the village is engaged in city based non-agricultural activities and about 37.5 percent workers travel to the city daily for work (Table 4.13).
Fig 4.6

**TYPES OF INTERACTION BETWEEN CITY & SURROUNDING AREAS**

**Physical Linkages**
- Road Network
- Condition of roads
- Mode of transport
- Distance from the city
- Availability of public/private transport
- Market facility

**Population Linkages**
- Flows of raw materials & intermediate goods
- Capital flows
- Consumption & shopping pattern
- Other travels
- Journey to work

**Social Linkages**
- Marital patterns
- Market patterns
- Social, Rites & Rituals
- Educational & Health

**Economic Linkages**
- Flows of raw materials & intermediate goods
- Capital flows
- Consumption & shopping pattern
- Other travels
- Journey to work

**Political & ADM. Linkages**
- Tehsil, District head quarters, Judicial services and other services

**Services Linkages**
- Credit & Financial
- Education & Health

**Supporting Linkages**
- Road Network
- Physical Linkages
- Population Linkages
- Social Linkages
- Economic Linkages
- Political & ADM. Linkages

**Surrounding areas**
- Physical Linkages
- Population Linkages
- Social Linkages
- Economic Linkages
- Support Linkages
Thus, Ranipur, Dhalwala, Kangri and Jagjeetpur villages are categorised as villages having high intensity of interaction with the city.

4.4.5 (ii) Medium Level of Interaction

Two villages, namely, Ghungtiyani Talli and Jiapota are categorised as having medium level of interaction with the city. Both the villages are located in the middle zone and are on the highways. Village Ghungtiyani Talli is located along Rishikesh-Devprayag highway and Jiapota village on Haridwar- Laksar highway.

It is observed that both the villages have basic facilities of education, health and banking within or near the village, while for higher order goods and services they have to travel to the nearest city.

In case of Ghungtiyani, this village is situated about 5 kms from Rishikesh city and has medium level of interaction with the city. Field observations reveal that the village lacks all the basic facilities like market facilities, shops for basic requirements and services like health and education, however, all these facilities are available in the near-by village Tapovan. Therefore, a medium level of interaction is found between the village Ghungtiyani Talli and the nearest city (Rishikesh). The village has only 35.5 percent population engaged in primary activities while 64.5 percent population is engaged in non-agricultural activities. The population in primary sector has been decreasing since 1971 while the share of population engaged in non-agricultural activities is increasing steadily. More and more percent of population is looking towards the city for employment opportunities.

Analysis of the field data shows that in case of Jiapota village, comparatively longer distance, infrequent availability of public transport, no direct transport facility to the city and higher travel cost has resulted in medium level of interaction with the city. While on the other hand, in case of Ghungtiyani Talli village, availability of almost all the goods and services in the nearby village Tapovon has led to the medium level of interaction with the city.

It can be concluded from the above analysis that the presence of alternative growth centres where all types of facilities required by the population are available, can reduce the pressure and dependency of the rural settlements on the city.
4.4.5 (iii) Low Level of Interaction

Field observations have confirmed that the distance play determining role in rural-urban linkages. Analysis of the data shows that three villages (Bhattowala, Puranpur and Pratitnagar) have low intensity of interaction with the city. It means that frequency of visits and dependency on the city is relatively lower and it is mainly for higher order goods and services that are not available within or in nearby villages.

Analysis of the data shows that all these settlements are located more than 10 kilometers from the city. Pratitnagar is situated along the Haridwar-Rishikesh highway. It is equidistance both from Haridwar and Rishikesh. On the other hand, Bhattowala and Puranpur villages are located at a distance of, 3 and 9 kms interior, away from main road, respectively. This stretch of road is un-metalled and seasonal. There is no direct public transport facility available from these villages to the city. People of Bhattowala village have to cover this distance, (from village to the highway) on foot or use private mode of transport to reach the highway from where public (intermediate) transport is available; while for Puranpur village, a temporary arrangement known as ‘Jugaad’ is available to reach Bahadarabad from where other modes of transport are available to reach the city. In both the villages, the availability of transport facility to reach the city is unsatisfactory, infrequent and hence not dependable.

Thus, it can be concluded that accessibility is very poor which leads to lower level of interaction of these villages with the city. Both these villages lack basic facilities of health, education and financial (bank and credit) services but still the frequency of visit to the city is low because majority of inhabitants in both the villages visit other near by villages for essential items and depend on the city only for occasional and especially for purchasing high order goods and services and for services that are not available even in the near-by villages. Moreover, both these villages Bhattowala (64 percent) and Puranpur (66.7 percent) have significant percent of households engaged in agricultural activities.

Majority of population of Bhattowala village depends on another near-by village Shyampur, while people in Puranpur village rely on the Block H.Q. Bahadarabad for all types of facilities. Both these villages (Shyampur and Bahadarabad) are well
developed with all the facilities available within the village and have comparatively better accessibility in terms of transport facilities.

Pratitnagar has an altogether different reason for having low level of interaction with any of the cities. It has high population growth, very well developed market facilities (It has about 400 shops of all varieties). All types of goods and services and facilities are available within the village and so even if accessibility in terms of intermediate mode of transport is available, the villagers visit to the city only to avail very high order goods and services or for occasional shopping. The village has more than 82 percent of workers engaged in non-agricultural activities within the village. Only 10 percent of inhabitants are dependent on the city and commute daily for work.

Raiwala cantonment is located adjacent to the village which provides employment opportunities and also influences the economy of the village. Most of the shops and other business establishments cater to the population in the cantonment as it is the only nearest market. The cantonment is dependent on the village for all types of basic necessities like groceries, Dairy products, vegetables and other requirements etc.

The village has well-developed infrastructural facilities and sufficient employment opportunities within the village.

Analysis of the data on dependency of the villages on the city has shown that if the basic facilities are provided within the villages then the frequency of visit to the city can decrease significantly which on the other hand, can help to ease the pressure on the two sprawling cities. As it is not possible to provide the entire infrastructure and other facilities in each village; hence, it is suggested to develop certain villages as growth centres.

On the basis of the pattern and intensity of interaction of settlements among themselves five rural settlements are identified as growth centres during the study. These are Shyampur Nuabad, Bahadarabad, Jagjeetpur, Shyampur and Tapovan. All the above villages are relatively more developed have basic facilities of health, education, finance etc. and thus can be developed as growth centers for the region (Map 4.3).
Proposed Growth Centres in HDR
(2003)

Map 4.3

District Tehri-Garhwal

Proposed Growth Centres
1. Bahadabad
2. Jagjeenpur
3. Shyampur Nalab (Haridwar)
4. Shyampur (Rishikesh)
5. Tapovan

Source: Field Survey (2003)
4.4.6 Interdependence of Level of Interaction and Its Determinants

After calculating the interaction index for sample households in the study area, an attempt has been made to determine the relationship among the interaction index and its determinants (factors affecting the level of interaction). For this analysis, 17 variables have been selected and simple correlation co-efficients have been worked out. Table 4.20 shows that interaction index (intensity of interaction) has negative correlation with distance from the city and this relation is highly significant at 5 percent level. It implies that the distance from the city plays an important role in determining the level of interaction between two settlements. The areas located near the city have higher interaction with the city as compared to the villages located comparatively far from the city.

Level of interaction is negatively correlated with the travel cost or money spent in each trip to the city, and this relationship is highly significant at 1 percent level. This shows that the amount spent to reach the city is also an important determinant of interaction. The higher the money spent in each trip the lower will be the level of interaction between two settlements and vice versa. This is more true for lower order goods and services as the cost of these goods is relatively low and thus extra expenditure on travel will further increase the cost and hence it would not be beneficial for people to travel for longer distances for these items. Thus, it is observed that accessibility in terms of distance as well as travel cost are the two important factors governing the level of interaction between settlements. Level of interaction has positive correlation with sex ratio but this relationship is not significant.

Level of interaction has negative correlation with percent population engaged in agricultural activities. It implies that in the settlements having higher linkages with the city, the percent population engaged in agricultural activities is lower and vice-versa.

Level of interaction has positive correlation with percent population engaged in non-agricultural activities. It implies that the areas having relatively higher interaction with the city have comparatively higher percent population engaged in non-agricultural activities. It shows that influence of the city and of urbanisation on the settlements having higher interaction with the city is greater than on the areas having comparatively lower interaction.
Table 4.20 Interdependence of Level of Interaction and Its Determinants

<table>
<thead>
<tr>
<th>Index</th>
<th>GR</th>
<th>Den</th>
<th>SR</th>
<th>WPR</th>
<th>Agri</th>
<th>Non_Agri</th>
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<th>C_Occ</th>
<th>Div_Occ</th>
<th>PCE</th>
<th>Grad</th>
<th>Toi</th>
<th>Bath</th>
<th>Pucca</th>
<th>Storey</th>
<th>Dist</th>
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<td>-0.042</td>
<td>-0.367</td>
<td>-0.913**</td>
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</table>

Source: Census of India and field observation

* and ** are significant at 0.01% and 0.05% level of significance level.

Note:
- Index - Level of interaction
- GR - Growth rate
- Den - Population density
- SR - Sex ratio
- WPR - Work participation ratio
- Agri - % Workers in agriculture activities
- Non_Agri - % Workers in non-agriculture activities
- Supp_Occ - % Households having supplementary occupation
- C_Occ - % Change in occupation
- Div_Occ - Level of occupational diversification
- PCE - Average monthly per capita expenditure
- Grad - Percent graduates
- Toi - % Households having closed toilet facilities
- Bath - % Households having bathroom facilities
- Pucca - % Households having pucca houses
- Storey - % Households having multistory
- Dist - Distance from the village to the city
- T_Cost - Travel cost to reach the city

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The interaction index has negative correlation with percent area under cultivation. It is noticed that the settlements having higher interaction with the city, have comparatively lower percent area under cultivation, putting more and more land under non-agricultural uses, like, residential, commercial and industrial.

The level of interaction has positive correlation with average monthly per capita expenditure of each household. It implies that the settlements having higher interaction with the city have comparatively higher per capita expenditure (PCE). This relationship confirms the impact of the city, influence of urbanisation and urban way of life on rural population in the settlements. The higher interaction of the villages with the city influences the attitude of the rural population. They appreciate the modern and urban way of life, become more interested in non-agricultural activities. Moreover, the increasing land prices and decreasing land holding lure the farmers to sell their land, and accept non-agricultural occupations. Increased impact of the city, sale of land and population growth in the region has decreased the cultivated land.

4.5 Dependency of Urban Areas on Surrounding Rural Region: A Case Study of Haridwar City

The city is dependent on surrounding villages for a variety of goods and services. The rural area provides food grain, dairy products, animal products like eggs & meat, flowers, fruits and vegetables, fodder for animals, building, construction materials and other goods to the city. The city also depends on the surrounding areas for raw materials for industries, finished goods from cottage industries in the villages, other consumable items.

In this section, an attempt is made to examine the dependency of Haridwar city on the surrounding rural region. Haridwar city entertains more than 5 million floating population every year. So, the surrounding rural areas not only cater to the needs of the inhabitants of the city alone but also of the population visiting the city on various occasions round the year.

After listing of all the establishments of the city, about 150 establishments showing dependency on the rural settlements for variety of goods and services were selected for the analysis.
4.5.1 Dependency on Rural Settlements for Milk and Agricultural Products

There are about 150 registered dairies in the city. Out of these 8 milk dairies and milk collectors were interviewed at various locations in the city. It was analysed that the total demand of milk in the city is about 95,000 liters per day. However, the demand of milk ranges 1,10,000 liters in summer season to 80,000 liters in winter season. Almost all the villages of the region supplies milk to the city. However, there are inter-settlement variations in quantity of milk supplied to the city. Analysis of the dependency of the city on the surrounding rural region for milk and other milk products shows that, as the demand of these goods is very high, the adjoining region alone is not able to fulfill this demand and hence the milk is supplied to the city from as far as 50 kms distance. Field observations show that the study region contributes only a small proportion (11.21 percent) and most of the milk comes from distance places.

However, most of the milk from this study region comes from Kangri, Shyampur and Gajiwali in south-east, Jagjeetpur, Ranipur, Jiapota in the south and Puranpur, Salempur Mehdood and Rawali Mehdood in south-west part of the region.

Field observations also reveal that a significant proportion of milk supply also comes from the forest villages located in the study area. Majority of population in these villages constitutes of Gujjar population who have traditional occupation of keeping livestock.

Dependency of City for Poultry, Vegetables, Cereals, Flowers, etc.

As discussed earlier, the Haridwar city is sacred place of Hindus and hence the sale of liquor and animal products like eggs, meat etc. is prohibited in the city. However, field observations revealed that they are consumed in significant proportion in the city. Thus, the surrounding rural villages cater to the demand of these items for the city. Liquor shops located in Jagjeetpur, Bahadarbad, Ranipur and Pratitnagar villages have significant proportion of sales for the city. Similarly, a number of poultry farms located especially in the villages in Rishikesh tehsil caters to the demand of eggs and meat for the residents of the city.

The city also depends on the surrounding rural region for seasonal vegetables. The district vegetable mandi itself is located in Sitapur Majra village south of Haridwar city. Field observations reveal that although most of the vegetables come from as far
as Himachal Pradesh and hill districts of Uttaranchal, however, about 5.5 percent of the vegetables auctioned in the mandi daily come from the villages in the study region (Table 4.21). Most of these are seasonal vegetables like radish, cauliflower, tomato, gourds, peas, beans, onion etc.

### Table 4.21

<table>
<thead>
<tr>
<th>Dependency on Rural Areas of HDR</th>
<th>Percent Demand</th>
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</thead>
<tbody>
<tr>
<td>Milk &amp; milk products</td>
<td>11.21</td>
</tr>
<tr>
<td>Cereals</td>
<td>6.30</td>
</tr>
<tr>
<td>Vegetables</td>
<td>5.50</td>
</tr>
<tr>
<td>Flowers</td>
<td>2.00</td>
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<tr>
<td>Commercial vehicles</td>
<td>23.00</td>
</tr>
<tr>
<td>Building/construction materials</td>
<td>48.58</td>
</tr>
<tr>
<td>Finished products from small-scale industry</td>
<td>68.64</td>
</tr>
</tbody>
</table>


Survey of the wholesale cereal market located in Jwalapur shows that about 6.30 percent of the total cereals is supplied by the villages of the region, while the remaining comes from the rural areas beyond the region. The main cereals are wheat, maize, paddy etc.

As mentioned earlier, Haridwar is an important Hindu religious center of the country, hence, the demand for flowers is very high. The region provides only a marginal share (2 percent) which comes from the villages located along Haridwar-Laksar highway. These are Jagjeetpur, Missarpur Ahatmali, Devpur Mustakam, Garowali, Ajeetpur villages etc. all these villages have fertile soils and better surface irrigation facilities. Thus, the irrigation facilities and location of these villages along the highway facilitate floriculture in these villages.

**Fodder for Livestock**

Field observations reveal that the city is also dependent on the rural areas for fodder. About 90 percent of the total demand of fodder for the livestock population of the city comes from the region. Ranipur, Jagjeetpur, Jiapota, Kangri are the main villages that caters to most of this demand of green fodder, hay etc.
4.5.2 Dependency for Labour

The city provides great employment opportunities for the surrounding rural region. It is dependent on the rural areas for both skilled and unskilled labour. Field observations show that most of the skilled labour comes from Ranipur, Jagjeetpur, Bahadarabad, Rawali Mehdood villages while unskilled labour comes from almost all the villages of the region located adjacent to the city and along major highways. Most of the skilled labourers work in industries, restaurants, automobile and repair shops etc. while the unskilled labourers are employed mainly in construction activities come from the villages located adjacent to the urban boundary or from villages along the highway as it is easier for them to commute to the city for work. Field observations show that most of these labourers are from Jagjeetpur, Jiapota, Missarpur, Kangri, Bahadarabad, Sitapur, Rawali Mehdood etc.

Moreover, majority of people working in informal sector, especially the hawkers, vendors, shopkeepers of temporary shops, built during the fairs and bathing occasions are also from the rural areas of the region.

4.5.3 Dependency for Commercial Vehicles

Apart from being an important religious center and transit point for transfer of goods to and from the hills, the city is also the starting point of the ‘Char Dham Yatra’ in the hills. Hence, the demand for commercial vehicles like tractors and trolleys, trucks, buses, cars, lorries etc is very high. Field observations show that about 23 percent of commercial vehicles are provided by the inhabitants of surrounding rural region.

The rural people especially the farmers of villages adjoining the city have sold land and invested in the commercial vehicles which can be observed by the fact that about 2 percent of the households in the villages of the inner zone have commercial vehicles.

4.5.4 Dependency for Building/construction Materials

Field observations reveal that the building and construction activities have shown significant increase after the formation of HDR, Haridwar as district HQs and more recently formation of Uttaranchal as a separate state. The city has great demand for bricks, cement, concrete, sand etc. Since, most of the brick kilns and stone crushers
have been shifted out of the city, hence, dependency of the city on the surrounding rural region has gone very high.

Field observations show that about 49 percent of the demand of the city of all the construction materials is provided by the region while the remaining comes from the rural region of Nazibabad, Bijnor and Roorkee tehsils.

The city also depends on the surrounding area for bamboo, ‘phoose’ san and ‘baan’ used for making ropes etc. It comes from the villages located along the Ganga river and seasonal rivulets like Rani Rao, Pathri Rao. Majority of supply is from Puranpur, Salampur Mehdood, Ajeetpur, Devpur Mustkam. Kangri etc where large area along these river channels supports growth of this grass.

4.5.5 Location of Various other Activities

During the field survey it is observed that the city uses the surrounding rural area for activities which need more space and are not conducive in the urban environment. Hence, their activities are preferred to be located in the rural areas where the land price and rental value is relatively cheaper.

Field observations show that these type of activities are already coming up in the villages surrounding the city. One sewerage treatment plant located in Jagjeetpur village is already working while the other in Sarai village is under proposal. Numbers of godowns, warehouses, automobile service centres are located in villages of the inner zone and also in villages located along the highway as these locations provide easy accessibility to the city. These activities are mainly concentrated in Jagjeetpur, Sitapur Majra, Bahadarabad, Ranipur, Haripur Kalan villages along Haridwar-Delhi and Haridwar-Rishikesh Highway.

4.5.6 Raw Materials and Finished Products

The city is dependent on the rural industries which provide various industrial goods and raw materials to the city. Field observations show that small scale and household industries, making toys, ‘Kawar’, ‘Doona’, sweet boxes, Ganga Jali are located in the surrounding rural areas of the region and cater to the demand of the city.
Haridwar being religious center, the demand of such items is very high and about 69 percent of the demand of the city is fulfill by the surrounding region while the remaining items come either from the city or from the rural areas beyond the region.

4.5.7 Dependency of City for Education Facilities
As discussed earlier, it has been noticed during the field survey that most of the education institutions especially the public schools are shifting to the surrounding rural areas adjacent to the city. As these institutes are becoming more specialised and offer a variety of other extra curricular activities like horse riding, swimming, skating and also day boarding or hostel facilities along with academic curriculum and hence they require large area to meet these demands. As large areas and vacant land is not available within the city. Hence, these institutes are shifted to the surrounding rural region especially the inner and middle zone where the land value is relatively lower in these areas. Five out of the total twenty senior secondary and high schools in Haridwar city are located in the rural areas, and three have already purchased land and are planning to shift to these rural areas in near future. The most preferred villages for these institutions are Jagjeetpur, Devpur Ahatmali, in the south-east, Bahadarabad, Sitapur Majra in the south and Haripur Kalan in the north of Haridwar city. All these villages area adjacent to urban boundary or along major highway which provide easy accessibility. Two schools are surveyed and it is observed that about 92 percent of the students enrolled are from the urban areas.

All these schools were located in the city earlier and have moved out only after the formation of the region.

4.5.8 Development of Residential Colonies
The population of the city has increased tremendously since 1970's. The population density of the city has increased from 6656 to 11635 persons per square kms. in 1971-2001. Thus, it is observed that increase in population of the city has resulted in increase in demand of land, which leads to rise in land prices and rental values.

As land is a fixed resource, thus increase in demand for more houses and resulted rise in land prices has led to the expansion (over-spilling) of the city towards the surrounding rural areas.

Field observations show number of residential colonies are coming up in villages adjacent to the urban boundary. It is observed that the distinctions between the rural
and urban areas are invisible in these areas. The villages which are serving as absorbing areas of the over spilling city are Jagjeetpur, Devpur Ahatmali, Jamalpur in south-east; Sitapur Majra, Bahadarabad, Jamalpur Kurd and Sultanpur Majra in southern part and Haripur kalan in the north of the city. Similar development is also seen in Roshanbad in the west of the city where the residential colony is developed for the government officials. Field observation showed development of three such new residential colonies in Devpur Mustakam village where majority of people belong to old part of the city.

Hence, it can be concluded that the city is dependent on the surrounding rural areas not only for agricultural products, labour etc but also for relatively cheap land for residential and other commercial purposes to meet the needs of its growing population.

4.6 Summary

The spatial pattern of interaction of the settlements in the region is measured on the basis of Zipf's Gravity Model. However, as the level of interaction of settlements based on this portrays only a broad pattern of the interrelationship between settlements as it considers only two factors distance and population. Hence to have further understanding of the pattern and intensity of interaction of the settlements in the region, the commutation pattern of the rural inhabitants to the city and other settlements for various goods and services has been studied using the primary data collected during the field survey.

The existing network of the region has developed into a linear form from north-east to south-west direction because of physical constraints, as the region is surrounded by lesser Himalayas in the north and Shiwaliks in the west and east.

Analysis shows that the private conveyances used by the population are the most important mode of transport for travelling to the city. However, the Government facilities are negligible.

The cost of travel by private conveyance to the city is cheaper for shorter distance while the public means of transport is more cost effective for longer distances.
About 40.6 percent households have to travel less than 2 kms to reach the city while about 25.2 percent cover more than 10 kms. About 60 percent of households visit to the city at least once a week.

Dependency of the rural settlements on city for various facilities shows that highest percent (88.70) of households are dependent on city for healthcare services followed by administrative facilities (79.31 percent) and social facilities (55.50 percent). About 38 percent of population commutes to the city for work. However, vast inter zonal and intra zonal variation are observed.

The co-efficient of variation is high for lower order goods and services as compared to the co-efficient of variation for higher order goods and services.

Analysis of various types of linkages also shows wide inter-settlement variations. However, the co-efficient of variation is highest in dependency on city for education facilities, followed by the financial and economic linkages. On the other hand, dependency on the city for healthcare facilities, administrative, social, religious and entertainment services has relatively lower co-efficient of variation.

Field observations reveal the interdependency and relationship of the inhabitants of the villages with the city for various types of goods and services shows that various types of interactions are mutually inter-related and inter connected and affects each other.

Accessibility in terms of distance is an important determining factor for intensity of interaction (between any two centres) especially for lower order goods and services. However, physical factors like condition of roads, availability and frequency of public transport facility, and economic factors like travel cost, inequality and disparities in availability of goods and services, quality and variety of facilities available, affordability and awareness of the population are other important factors determining the level of interaction. These factors are more important in case of higher order goods and services.

Analysis shows that the availability of marketing facilities within or in the nearby villages and distance are important factors in governing the pattern of interaction. They also influence the frequency and mode of transport used to travel to the city. The frequency of visit to the city has positive relationship with the distance from the city and modes of public transport facilities.
The dependency of rural population on the city varies for various facilities. The highest co-efficient of variation for education, financial services and work and also higher percent of households in the settlements of the inner distance zone depending on the city for these services clearly shows greater impact (role) of the city on the settlements that are closer to the city and thus importance of distance as the important determining factor. Another reason is availability of all basic requirements within or in the nearby villages. On the other hand, the co-efficient of variation is relatively lower for health services. Analysis of the data has shown that the rural settlements in the region have unsatisfactory health care services, moreover the government health services are almost negligible and hence most of the population in all the rural settlements irrespective of the differences in accessibility, occupation structure, class and income levels depend on private health care services in the city. Analysis shows that the presence of alternative growth centres where the required facilities can be accessible for all the requirements of the rural population can reduce the pressure and dependency of the inhabitants of the rural settlements on the city.

Inter-relationship of the intensity of interaction and its determinants shows that the interaction has negative relationship with distance, travel cost, percent population engaged in primary activities and percent area under cultivation while on the other hand, sex ratio, percent population in non-agricultural activities and per capita expenditure have positive relationship with the intensity of interaction.

The city is dependent on surrounding villages for a variety of goods and services. The study reveal that Haridwar city is dependent on its surrounding villages for food grains, dairy products, animal products, flowers, vegetables, fodder for animals, building, construction materials etc. It also depends on the surrounding areas for raw materials and intermediary products for industries. finished goods from cottage industries of the villages and other consumable items.

The surrounding rural region also provides labour (skilled and unskilled) to the city in various sectors. Most of the labours comes from the villages located adjacent the urban boundaries and along the highways.

Various education institutes are also shifting from the congested area of the city to the surrounding rural region.
Many activities which are not conducive in urban environment or needs more space are located in rural areas.

The surrounding rural area also serves as dumping ground for solid and liquid waste disposal of the city. In some villages the facilities like godowns, warehouses, working units and small scale industries are coming up. Many residential colonies have come up in villages adjacent to the city.


