Introduction
INTRODUCTION

In the past few decades, geographers have been paying great attention to the rural and urban relationships with respect to economic and regional development. In ancient times, rural and urban areas were clearly demarcated. In rural areas, people were engaged in agricultural activities while people in cities were engaged in non-agricultural ones. But now the scenario has changed. Rapid urbanization with unprecedented growth of population has enhanced the magnitude and character of economic activities of urban centres. Hence, the cities are expanding beyond their administrative boundaries.

Urbanization and urban growth have accelerated in many developing countries in the past few decades. In 1970, 37 per cent of the world’s population lived in cities. In 1995, this figure rose to 45 per cent. Although in many third world cities, natural population growth is the major contributor to urbanization; though migration has accelerated this growth (Masika, 1997). Urbanization in India has been relatively slow over the past forty or fifty years as compared to many other developing countries. According to 1991 census, its urban population of 217 million provides a place to India along with China as the countries with the largest urban system in the world (Naik and Rahman, 2007). As census of 2001 shows, India’s population increased from 361 million to 1028 million from 1951 to 2001. It shows less than three fold increase within five decades. It is expected to increase up to 1,462 million by 2021 which would be an increase of less than four fold over a period of seven decades. Likewise, over the same period, urban population of India increased from 62 million in 1951 to 286 million in 2001 and further it is projected to increase up to 459 million in 2021. It is an increase of over three times. Whereas, the rural population has noticed almost two fold increase from 298 to 742 million within the period of 1951 to 2001 which is expected to bounce up to 1,006 million in 2021. The growth rate of urban population has increased from 26.49 per cent in 1951-61 to 31.48 per cent during 1991-2001. This growth rate is much higher than the growth rate of rural population which declined from 21 per cent to 18 per cent from 1951-61 to 1991-2001. The number of million plus cities has increased from 5 (1951), 7 (1961), 9 (1971) and 12 in 1981. The population of 23 million cities accommodated a population of 77.7 million in 1991. Now in 2001, there are 35 million cities with 107.9 million population which represents 38 per cent of the total urban population.
These cities are growing merely in population not in prosperity. They are becoming merely over blown villages without urban characteristics and scenes of extreme social and economic inequalities (Mukherjee, 2001). Therefore, the big cities attained inordinately large population size leading to virtual collapse in the urban services and quality of life. The picture of urbanization in Uttar Pradesh makes it clear that it ranks at 25th position in 2001 standing with those states which have relatively lower percentage of urban population. In 1951, its share to total population was only 13.65 per cent which has gone up and stands at 19.84 per cent in 1991 and 20.78 per cent in 2001. It is expected to increase up to 22.36 per cent by 2021. Urban population of Aligarh district was registered 0.029 million in 1951 which experienced a marked increase up to 0.086 million in 2001 and further expected to be 0.094 million by 2021. It is almost more than three times increase in urban population from 1951 to 2021. Urban population shared 18.76 per cent proportion to total population of the district in 1951. It slowed down till 1961 but thereafter acceleration phase continued till 2001 which would be 37.88 per cent in 2021 (Census of India, 2001).

The urban centres have been developed as the seat of accumulated power, wealth and prosperity. They generally act as a magnet to the surrounding areas and related to it through production, consumption, employment, financial linkages and provision of other various types of economic and social services. The towns with relatively stronger symbiotic links with the surrounding villages constitute the channels through which the impulse of growth is transmitted from urban nodes to rural hinterland. The city or town expands its sphere of influence on the countryside which reacts to such urban influence through response in spatial, socio-economic and demographic changes (Kumar, 1988). Thus, the expansion of cities is intimately related to the development dynamics at village level and vice-versa. The wealthier the city, the more its commercial importance and its wealthy consumers will draw on such resources and functions from beyond its surrounding region (Tacoli, 1998).

As long as cities are the centres of opportunities and rural areas remain aloof of the benefits of the development, it is not possible to imagine the city without rural-urban interaction. In this way, the villagers go to urban centres in order to sell their produce, to buy consumer, intermediate or producer goods, to obtain short or medium term loans from co-operative and commercial banks or to obtain their services with progressive modernization of rural middle class which wants a high standard of living. In India, nearly 1.7 million people migrate from rural areas to the cities every
year in search of employment and other related economic activities. This has put strain on the urban resources and has resulted in urban and social environmental degradation. There is an unorganized flow of population which leads severe strains on the available infrastructure. This leads to growth of slums even in the best cities. As a result, they are suffering from acute problems of deteriorating existing infrastructure in the form of poor housing, inadequate availability of drinking water, scarcity of drainage and sewerage facilities, electricity and virtual breakdown of local public transport. It results in many socio-economic problems and making all the existing facilities appreciably inadequate to the accelerating population. Thus, the attraction that cities hold need to be accessible to all irrespective of whether one belongs to rural or urban. It is not possible to concentrate development and opportunities together in a particular place. If we want to keep people where they are, we have to make their areas attractive by way of development, opportunities, facilities and sustainable growth. Therefore for achieving such growth, geographers need to understand the existing rural-urban interaction in the light of regional disparities. In addition, it should be sought to reinforce the synergetic links and mitigate adverse impacts arising from resource flows and exchanges between both types of locations.

**Selection of the Study Area and Statement of the Problem**

Aligarh city has been chosen as the unit of analysis. Aligarh city is distinctly different from other cities in terms of historical, physical, socio-economic and demographic characteristics and prospects of growth and development. It is needed to understand these aspects under the shadow of rural-urban relationships. This study brings out the role of urban places as a regional focus indicating the varied relationships with the region in return for its services. A number of studies have been done on individual cities in this respect. The earlier studies on Umland highlighted only the functional characteristics of the cities with the service zones based on certain methodologies of its delimitation. The salient feature of this study is to analyze in detail the functional linkages of the city and its countryside with the existing disparities in socio-economic conditions of delimited Umland which is widening with the passage of time. Various studies have also been done on Aligarh city-the study area by adopting different problems of different aspects. But no study yet has been done on this ground. Hence, this will generate a ground reality of actual flow and direction of goods and services among the people. Consequently, it is helpful to
demarcate the regions of interaction of a particular service. It gives information regarding the dependency of surrounding area on the city. It provides a clue for the direction of further expansion of the city. It is due to the reason that if higher is the impact area of a particular urban centre in a direction, higher will be the prospects of its further expansion in the same direction. The study also provides base for investigating the unserved areas which would provide the basis for a new strategy for the expansion of infrastructure and other socio economic facilities. Besides, it also opens doors for various studies - recently undergoing - based on different aspects of fringe and peri-urban areas.

Objectives
The study conceptualizes to measure the influence area of Aligarh city in relation to socio-economic disparities. Precisely the main objectives of the study are as follows:

- To sketch out and analyze the historical background along with demographic and non-demographic characteristics of the city and its surroundings,
- To identify the pattern of functional linkages by demarcating the Umland of the city on the basis of flows of people, goods and certain services,
- To find out the spatial difference in frequency of persons with respect to distance and their socio-economic conditions,
- To analyze the tahsilwise spatio-temporal variations in socio-economic development of the delimited Umland, and
- To discuss the problems and suitable measures for the proper growth of the city and its surrounding

Hypotheses
The following hypotheses have been formulated:

- Whether influence zone of facilities over the surrounding areas varies with order of facilities,
- Whether the impact of distance from the city has bearing on travel behaviour of persons,
- Whether socio-economic development of people is associated to the distance from the city, and
- Whether the socio-economic conditions of the people has any impact on their
movement and purpose.

Data Sources

The nature of study dictates the requirement of the primary as well as secondary sources of information. The study has been evaluated on three levels:

First, the city has been taken as the unit of analysis for fulfilling the purpose of measuring the level of interaction between the city and its countryside. This level of study is based on both primary and secondary sources of data. Second, the delimited Umland has been taken as the unit of analysis for finding out the gap between the highly developed and very low developed regions and various associated reasons therein. It is totally concerned with the secondary sources of data. Finally, sampled villages have been selected from the delimited Umland which is based on primary sources of data by conducting interviews with the respondents.

Accordingly the required data have been collected from Census of India, 1991 and 2001; National Informatics Centre (NIC), Vikas Bhavan and Nagar Nigam, Aligarh; Deputy Regional Marketing Centre, Aligarh; Statistical Handbook of Aligarh, Etah, Hathras, Bulandshahr, Mathura and Budaun Districts for the years 2001 and 2008 published by Economics and Statistical Sources, Planning Department, Government of Uttar Pradesh; Ministry of Agriculture, Department of Statistics and Economics, Lucknow. Data for delimiting the boundaries of Umland of various services have been collected through field survey and unpublished records maintained in the offices of hospital, education, bus stand, telephone and mandis. Secondary information regarding the supply of foodgrains, vegetables and fruits have been supplemented with the data collected from the commission agents and the farmers of the mandis and bi-weekly markets. Data regarding the milk supply zone have been gathered from milk collection centres and milk dairies functioning in the city and its outskirts. Data of labour supply zone are obtained from the different collection points and entry points during morning and evening hours.

Methodology

The data are analyzed and interpreted using various statistical techniques i.e. Quartiles and Factor Analysis
Quartiles

It is sometimes helpful to group the data into several equal groups for analyzing measurements of a continuous variable. The quartiles are the values found at quarterly intervals if the data are ordered from the lowest to the highest. Lower quartile denoted as $Q_1$ is defined as the value which leaves $\frac{1}{4}$ of the values below and the third quartile denoted as $Q_3$ is the value which leaves $\frac{3}{4}$ of the values below it. In this way, the data of frequency are ranked from 1 to $n$ in order of increasing size. The quartile is obtained by calculating:

- $Q_1 (25\%) = \text{value of } (N+1)/4$
- $Q_2 (50\%) = \text{value of } N/2$
- $Q_3 (75\%) = \text{value of } 3(N+1)/4$

Where, $Q =$ Quartile value

$N =$ Number of Settlements

The upper limit of the frequency for the first quartile is the level for which 25 per cent of the settlement has low interaction with the city and 75 per cent has comparatively higher interaction. The upper limit of the second quartile also referred to as the median has medium frequency. The estimate of the raw data is not presented in the analysis. It has been shown with the help of maps by drawing the zones of high (75 per cent), medium (50 per cent), and low (25 per cent) frequency. In addition, dot maps have been prepared for showing the variations in person’s visits in order to measure the interaction of city and countryside. The outer dots were joined together to get the boundary of various functional zones.

Factor Analysis

Factor analysis is a multivariate technique that is concerned with the identification of structure within a set of observed variables (Stewart, 1981). It has been used extensively as a data analytic technique for examining patterns of interrelations, data reduction, classification, description of data and data transformation (Rummel, 1970). The first step in factor analysis is to compute a correlation matrix from the observed set of variables. For a given data set using a correlation matrix, a factor matrix is obtained. A factor matrix consists of derived factors as columns and the original variables as rows. The cell entries of the factor matrix are known as factor loading. Factor loading indicates the degree to which each of the observed variables correlates with each of the factors. Factor loading matrix
was rotated according to the normal matrix. The criterion employed rotated the factor matrix to such a position where a minimum possible number of variables load high on each factor. The factor structure, thus, becomes simpler and more easily interpretable. The mathematical manipulation of the standard score matrix and factor loading matrix (and the eigen values), a factor score matrix was obtained. These factor scores provide a measure of position for each observation. On the new factors, eigen values are the sum of squared factor loadings for each factor indicating the amount and proportion of total variance in the original data accounted for each factor. The sum of the squared factor loading across each row of the factor loading matrix are known as communalities and till the proportion of total variance of each variable which is accounted for the factor together. Thus if an observation has a large value in an original variable which, in turn, is largely loaded on a new factor, it will have a high score for that particular factor.

In the analysis, factor analysis including indicators of socio-economic development might be helpful in the analysis of complex relationship between all the variables. Keeping in view, the personality of the area and theoretical constructs of factors, 44 variables have been selected. They are grouped under 3 heads: infrastructure development, urban and demographic development and rural and agricultural development. The loading of different indices are treated as their weights on the socio-economic development. These loadings are multiplied by the standardized scores of the respective variables and then they are summed up to get factor scores. It is a linear transformation of original data in such a way that its means become zero and its standard deviation becomes unity. Further, the results of the standard scores obtained for the different indicators were aggregated in order to find out the composite index, so that the regional difference in the level of socio-economic development in tahsils may be obtained on a common scale. These variations are measured by dividing twenty three tahsils into five development groups i.e., very high (above $\bar{X} +1.5$ SD), high ($\bar{X} +0.5$ to $\bar{X} +1.5$ SD), medium ($\bar{X}-0.5$ to $\bar{X}+0.5$ SD), low ($\bar{X}-0.5$ to $\bar{X}-1.5$ SD) and very low socio-economic development region (above $\bar{X}-1.5$ SD). Hence, we get a picture of the spatial variations in the levels of development of 23 tahsils of the delimited Umland.

The choropleth technique has been employed for the preparation of maps wherever spatial pattern distribution is to be represented. Tabulation was done to
Table A: List of Sampled Villages

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Sampled Village</th>
<th>Tahsil</th>
<th>District</th>
<th>Total Population</th>
<th>Total Households</th>
<th>Sampled Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Jirollidor</td>
<td>Koil</td>
<td>Aligarh</td>
<td>2258</td>
<td>354</td>
<td>35</td>
</tr>
<tr>
<td>2.</td>
<td>Musepur Jalal</td>
<td>Koil</td>
<td>Aligarh</td>
<td>661</td>
<td>112</td>
<td>11</td>
</tr>
<tr>
<td>3.</td>
<td>Khera Sattu</td>
<td>Khair</td>
<td>Aligarh</td>
<td>2658</td>
<td>395</td>
<td>40</td>
</tr>
<tr>
<td>4.</td>
<td>Noratha</td>
<td>Atrauli</td>
<td>Aligarh</td>
<td>736</td>
<td>118</td>
<td>12</td>
</tr>
<tr>
<td>5.</td>
<td>Ramnagar</td>
<td>Iglas</td>
<td>Aligarh</td>
<td>217</td>
<td>27</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>Hargovindpur</td>
<td>Gunaur</td>
<td>Budaun</td>
<td>1340</td>
<td>188</td>
<td>19</td>
</tr>
<tr>
<td>7.</td>
<td>Farana</td>
<td>Khurja</td>
<td>Bulandshahr</td>
<td>1801</td>
<td>271</td>
<td>27</td>
</tr>
<tr>
<td>8.</td>
<td>Pitampur</td>
<td>Siana</td>
<td>Bulandshahr</td>
<td>367</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>9.</td>
<td>Teyor Buzurg</td>
<td>Shikarpur</td>
<td>Bulandshahr</td>
<td>7427</td>
<td>1200</td>
<td>120</td>
</tr>
<tr>
<td>10.</td>
<td>Begampur</td>
<td>Jalesar</td>
<td>Etah</td>
<td>183</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>Pilua</td>
<td>Kasganj</td>
<td>Etah</td>
<td>4464</td>
<td>717</td>
<td>72</td>
</tr>
<tr>
<td>12.</td>
<td>Nagla Pipal</td>
<td>Etah</td>
<td>Etah</td>
<td>242</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>13.</td>
<td>Lutsan</td>
<td>Sasni</td>
<td>Hathras</td>
<td>5669</td>
<td>890</td>
<td>89</td>
</tr>
<tr>
<td>14.</td>
<td>Parsara</td>
<td>Hathras</td>
<td>Hathras</td>
<td>5573</td>
<td>863</td>
<td>86</td>
</tr>
<tr>
<td>15.</td>
<td>Neem Gaon</td>
<td>Mat</td>
<td>Mathura</td>
<td>5043</td>
<td>790</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>38639</strong></td>
<td><strong>6056</strong></td>
<td><strong>606</strong></td>
</tr>
</tbody>
</table>

Source: Census of India, 2001

Synthesis the data for a comparative study. Simple statistical techniques such as simple percentage and frequencies have also been applied. For the micro level study, the process of selection of villages has been done on the following bases: 1) In the first stage, with the help of primary and secondary data, the zones of Umland of Aligarh city have been delimited. 2) In the second stage, the whole Umland has been divided into five regions of very high, high, medium, low and very low on the basis of socio-economic conditions with the help of secondary sources of data. 3) In the third stage, in order to find out the impact of city on the socio-economic conditions of surroundings, Fifteen villages have been chosen out of 664 delimited villages (Table A) on the basis of stratified purposive sampling, taking into consideration population of the village, distance from the city and distance from the road (km). Delimited villages or settlements are those in which remarkable interaction have been noticed during the collection of primary data. From these settlements, people are availing facilities in the city. Keeping in mind, household selected is a good representative of persons belonging to different socio-economic groups, 10 per cent households out of
total households were sampled randomly for fulfilling the purpose of the research. The respondents were interviewed during 2007-08 with the help of well-structured questionnaire I and questionnaire II (see Appendix A and B).

**Related Literature Review**

Certain cities in urban areas have greater value for certain specific purposes. This value is established by a web of relationships with other surrounding uses and their value structure. In the western countries, attempt is being made to demarcate the city region of all the towns in order to suggest coherently compact administrative units. In advanced countries especially in the United States, the towns and their neighbouring villages have become one social and economic unit. Western geographers have selected important elements for study which form the pivots of the interrelationships between the city and its region. The study of urban places in India received due attention only after the publication of R.L.Singh’s book on Banaras (1955). A number of studies on individual cities followed his approach and pattern. The local field work and the availability of rich materials in municipal records and different gazetteers facilitated such studies. The rapid growth of urban places in the country also stimulated interest in such studies. In this chapter, the review has been considered under two headings: i) Review at National Level, ii) Review at International Level.

**(i) Review at National Level**

In the studies on the Indian cities, Singh’s study of Banaras stands out as an unique and pioneering effort. For Banaras, Singh used six criteria. The vegetable zone, milk supply zone and the grain supply area represent the areas on which the city is dependent while the newspaper circulation area and administrative areas depend on the city for these services. The bus service area delimits the area with which the city interacts both ways. The bus service area is an appreciate surrogate for a number of central place services and is a useful criteria for delimiting area of cities with a population of one lakh or more. He came to the conclusion that relationship between a city and its Umland is not a simple one, so the boundary of its Umland can not be easily marked.

*Acharya (1956)* surveyed the villages within 9.6 km of Nasik city and noticed the dependence of the villagers on city for economic needs and changes in the
occupational pattern, in the dress, food and houses of the villagers under its influence. Singh (1956), in his work on Agra, presented a theoretical discussion of delineating its Umland. Bus service was taken for analysis. The routes of minor importance radiating from main roads have also been considered. He concluded that the shape of bus service zone is irregular, since the motor transport services are only the neighboring areas along the radial roads up to a distance of 4 to 5 miles on both sides.

Gananathan (1959) noted that a village which is 10-20 miles from a big city is continuously in touch with it. Such a village shows occupational diversification, higher literacy, and has tea stalls, bicycle, repair shops, tailoring houses, dispensaries, schools, centers for collection and distribution of vegetables and milk. It has a good number of houses which are renovated by villagers working in the city and good number of abandoned houses, abandoned by villagers who had migrated to the city.

Desai (1961) recognized the changes in the rural society as a result of urban influence. He recorded that villagers adopt the food and dress habits of the urban people, use bicycle, play cricket and football, cinemas, schools, libraries, modern houses with many and larger windows, separate kitchens and bathrooms, cement tiled floors appear on village scene.

Singh (1961) has presented a detailed study on Umland of Allahabad. He has taken into account the following criteria: 1) Vegetable supply zone, 2) Milk and Khoya supply zone, 3) Primary catchment area of intermediate colleges, 4) Secondary catchment area of intermediate colleges, 5) Grain supply and trade area, 6) Main bus routes. He considered that the Umland delimited by different services zone form a region of which the city is capital dominating for other smaller urban centers within the area. City and countryside together form a cultural unit, suitable for being a homogenous administrative district.

Quite different from others, Nath (1962) has presented a theoretical discussion on the concept of Umland and its delimitation. He established regional relationship of towns with the countryside. He examined the importance of different criteria in delimiting the sphere of influence and further described its importance and usefulness in planning.

Mukherjee (1962) has demarcated the Umland of Modinagar by analyzing the variables into 3 categories: 1) Economic Category: a) milk supply, b) vegetable supply, c) foodgrains supply, d) bus services, e) rickshaw, f) banking services, 2) Social Category: a) educational, b) hospital, c) drug sale, d) police, e)
communication, 3) Cultural Category: a) cinemas, b) newspaper circulation. He found out that the Umland of Modinagar is essentially a Pargana (tahsil) feature, as the greater part extends over this area. Degree of urban influence of Modinagar in Jalalabad tahsil, Ghaziabad tahsil and Meerut district has been calculated.

Dikshit and Sawant (1968) have illustrated the hierarchy of hinterlands following the hierarchy of towns and built-in hierarchy of mono-functional hinterlands around the city by taking into account a case study of the hinterland of Pune. The validity of certain population attributes to delineate the hinterland has been tested. The spatial variation in population attributes applies to a limited range of a few miles, beyond which no gradient is noticed and the landscape becomes monotonously rural. The hinterland, however, does not restrict itself to the area where the population attributes seem to carry with them the imprint of urban influence, but it covers even the exclusively rural territory in one way or the other.

Aziz (1968) has worked on “Impact of Urbanization on Rural Land”. In order to study the impact of urbanization, he has defined all those things as urban which the typical Indian countryside did not witness before the impact of urbanization. He mentioned three kinds of urban impact on rural lands: a) Changing of rural land into urban uses such as development of factory sites, b) Transformation of rural land uses into non-agricultural uses and oriented to urban needs such as development of brick kilns, c) Different use of rural land for agricultural purposes such as changes in crop pattern, changes oriented to urban requirements.

Srivastava and Rame Chandran (1969) while taking various stages of transformation of villages into consideration have noticed the urban influence in daily movements of people, supply of goods, vegetables, flowers and milk, in improvements in amenities, in occupational change and in the way of life in villages.

Rao (1970) has distinguished three types of urban impact on villages. First is that in which a large number of villagers migrate for employment in far off cities and send money regularly. The second type of impact is to be seen in villages which are near an industrial town. Third type of impact is seen in villages lying on the outskirts of an expanding city.

Singh (1972) has attempted to determine the primary Umland and the secondary Umland of Kanpur. He further subdivided it into two regions: the outer secondary Umland and the inner secondary Umland according to the intensity of the influence of the city and vice-versa. The positive influence determined by different
indices such as bus services, newspaper circulation, medical services, and educational services, labour supply, vegetable and milk supply have been considered.

Aziz (1973) made an attempt to measure the influence of Aligarh on the basis of literacy rate of the population in the surrounding countryside and on the functions of trade and commerce, manufacturing, agriculture and another services. The whole area has been divided into seven major and one minor sector, designated by alphabets such as ABC. A distance of one mile is marked out by lines parallel to the roads on either side. A distance of one mile in depth from the road is considered to be the distance which can readily receive the impulses from the city up to a linear distance of 15 miles from the city. Concentric circles have been drawn at one mile radius from the centre of the city up to 15 mile distance. Values in percentages were calculated. For each sector a line of median value and a line midway between highest and lowest value was drawn. This positional arrangements of values indicated values which are too low and too high. Ten mile line is midway between the whole ranges of 15 miles.

Bansal (1975) visualized the town country relations in the city region of Saharanpur. Two sets of indices have been selected for delineating the city region: a) Economic Indices: i) milk supply, ii) vegetable supply, iii) The bullock cart service, iv) the bicycle service, v) the sugarcane supply, vi) the commuter’s zone, vii) the educational service, viii) the foodgrains supply, ix) the non-agricultural product supply, x) the bus service, xi) the recreational service, xii) high medical service and xiii) the newspaper circulation. b) Social Indices: i) sex ratio, ii) literacy rate, iii) non agricultural workers and iv) commercial workers. The city region has been taken as a basic unit for the study. He discussed the nature and problems of rural-urban interdependence in the region to reveal the urgent necessity for strengthening the separate regional economies.

Similarly, Singh (1975) delimited the Umland of Gorakhpur city. For that purpose, he took into consideration only six indices: i) milk supply zone, ii) vegetable supply zone, iii) bus services, iv) medical services, v) educational services, and vi) newspaper circulation. Method of superimposition and personal observation have been adopted. He explained that the extension of Umland in east and west is restricted due to the influence of other urban centers such as Deoria and Basti respectively. Nangia (1976) while studying the zone of influence of Delhi recognized the influence of the city on functional, occupational and demographic pattern of villages.

Prabha (1978) made an attempt to analyze the linkage pattern of Punjab town.
Development of their spatial pattern is contributed by the factor of complementarity, intervening opportunities and transferability. To analyze the linkage pattern of Punjab towns, bus services has been chosen. The linkage pattern has also been viewed in terms of telephone connections. The degree of connectivity has been measured through the connectivity index. The linkage patterns have been examined both for the bus trips and the distribution of telephones in the context of potential interactions. The multivariate technique of factor analysis has been adopted to identify the connectivity nodes.

Sarikwal (1978), in his book, “Sociology of Growing Town” has discussed urbanization in Ghaziabad city (about 20 kilometres from Delhi) and its relationships with demography, morphology, occupational structure, industrialization and structural functional differentiation. He also discussed about the relationship of Ghaziabad city with its surrounding area. For the purpose of analyzing the relationship of Ghaziabad city with its surroundings, he divided his discussion into 2 parts: a) Relationship of Ghaziabad with the metropolitan city of Delhi and other similarly situated towns in the urban belt of Delhi, b) Relationship of Ghaziabad with surrounding villages within a radius of 11 kilometers. The purpose of this two-fold discussion is to develop a theory of urbanization which can be integrated into general theory of urbanization. He concluded that the nearer a town to a larger city, the more it is likely to be absorbed into the latter or turn into its hinterland

Ara and Saleem (1978) made an attempt to study the urban impact of Lucknow city on the surrounding countryside. In this study, techno-economic aspect of urban influence has been studied. The study highlights occupational diversification in the agricultural economy and the increasing use of technical paraphernalia in the villages. The study reveals that the city plays a significant role on the areal distribution of techno-economic influence in the villages.

Rao (1981) has worked on the structure, growth and regional relationships of a historical city in the Deccan Plateau. His main objectives were to trace the histogenetic factors of growth of Warangal city and its constituent units, to analyze the demographic, industrial, commercial and social structures. Further, he studied the patterns and types of interrelationships between the city and its region. He has divided its complementary region into three distinct areas: 1) urban core, 2) semi-urban periphery, 3) rural hinterland. A simple model for theoretical delimitation of Warangal is done. He considered four variables: i) supply of vegetables, ii) milk
supplied, iii) hospital service zone and iv) frequency of bus services.

Rao (1983) has made an analysis of urbanization in India with some theoretical underpinnings and policy implications. He has brought out the spatial imbalances based on the analysis of the urban and regional interrelationships. The main focus was on the complexities underlying the urbanization process, patterns and correlation. With a case study of Karnataka, the importance of intercity linkages at higher levels in the urban system and of town hinterland linkages at lower levels in the integration of the system has been established.

In order to understand symbiotic relationship between city and surrounding region, Sharma (1985) attempted to identify linkages that exist between Rohtak and its Umland. He also identified central places included in the Umland to examine its spatial-functional structure. Hierarchy of central places was established on the basis of centrality index values.

Barai and Vijyalakshmi (1997) have attempted to analyze the role and impact of central places of medium towns in the development of the hinterland of Bangalore metropolitan areas. The study is based on a city hinterland of nine towns in the hinterland of Bangalore. The study also included awareness of media among the residents of these nine towns, its effect on socio-economic changes as a result of their proximity to Bangalore.

Pratap (1997) presented an analysis of linkages (backward, forward and sectoral spatial) based on input-output systems of Jamshedpur industrial complex which have facilitated the complex to be one of the cheapest and best producers of iron and steel and its products in the world.

Bhaduri (1999) made an attempt to assess the importance of Calcutta in terms of railway and road commuting patterns which serves as one of the tools for expanding metropolises. The author explained that motor transport brought the city’s influence deep into the hinterland and interrelationships between the city and the country was gradually strengthened. There exists a high degree of interdependence between the development of a transportation system and the geographical pattern of urban economic growth.

Afsar (1999) has discussed the main causes and consequences of rural-urban migration in Bangladesh and explores their implications for poverty alleviation and spatial distribution policies. She concluded that the manufacturing and service sectors have rapidly expanded in rural areas and in urban areas. There is substantial relocation
within the tertiary sector and significant change in the gender composition of the manufacturing sector. Gaps between rural and urban areas with respect to service provision are also narrowing as both rural and urban poor households face insufficient access to them.

*Mazumdar (2000)* suggested a strategy to upgrade inner cities in India, to improve their “carrying capacity” and at the same time to preserve the heritage of cities in a transformed context, with specific examples from the city of Mysore. This is essential since the “inner cities” from the hub of wholesale trade generate plenty of informal employment and have an inherent tendency to deplete the tax base by not contributing to the tax revenue. This has a negative impact on the infrastructure. While in the west, urban revitalization policies have been formulated to improve “inner cities”. India has so far experienced with only short term programmes.

*Khan and Shekhar (2000)* have made an attempt to analyze the changing physical and socio-economic characteristics of a hinterland of a fast growing city, Gurgaon. According to them, the fast pace of urbanization has been responsible for the changes in whole gamut of activities in its rural hinterland. Industrial profile of the hinterland has been a manifold increase over the years. It is, therefore, significant that the city and its surroundings should be planned together. Functional classification has been attempted on the basis of Cumulative Frequency Index. The emerging final functional classification has been assessed on the basis of aggregating the final weightage in the form of Composite Index.

*Roy (2000)* has focused on the development of urban corridors and has emphasized on developing a synthetic model in Indian urbanization. The problems of urban governance and urban management in developing countries with special reference to India have been reviewed by him. *Ram (2001)* has done a detailed study of Loni village located in the vicinity of Pune. He finds that the basic amenities have definitely improved due to government interventions and planning and development of agro-based on local resources is necessary in order to withhold the process of migration and emergence of slums.

*Kundu, Pradhan and Subramanian (2002)* have analyzed the impact of urban centers on their periphery. The objective of the present paper is to examine the impact of distance of a village from the nearest town on its socio-economic characteristics. It has been found out that the values of socio- economic indicators around a city or town do not necessarily follow a smooth pattern. The pattern of interdependency among the
indicators has been analyzed and a few generalizations made with regard to rural-urban linkages. The interdependency of the select indicators with distance by putting the scatter in a two dimensional graph have been examined and gave non-parametric plot to the relationship.

_Bhagat (2005)_ argued, in his paper, that rural and urban statistical categories are highly significant for local governance. He examined the criteria and limitation of the rural-urban classification followed by the census, its congruence with the dynamics of the state accorded municipal/non-municipal status and some implications for municipal governance in India.

_Dash (2005)_ in his paper “Hierarchy of Market Centers in the Rural Hinterland of Cuttack-Bhubaneshwar in Orissa, India” has discussed the distribution, periodicity, functional attributes and hierarchy of market centers in the rural hinterland of the area. Both subjective and objective weighting techniques methods have been applied. Various parameters and functional attributes like market size in terms of resident population, approach road quality, distance from the nearest urban center, bus stop, railway station, water facility, periodicity of market education, health, post, telegraph, and banks have been chosen for the computation of Composite Index.

_Narain and Nischal (2007)_ described the peri-urban interface in two villages- Shahpur Khurd and Karnera - located in the state of Haryana in north-west India. They argues that devising policy interventions for the peri-urban interface requires the explicit attention to strengthening rural-urban linkages that materialize through the two way flow of goods and services between villages and urban centers. Improving transportation and connectivity have a clear role in this and this requires collaboration across not only rural-urban governments but also across authorities at various levels - village, state and national.

_Singh (2007)_ has done an analytical work on functional linkages of Patiala city with its surrounding areas. For that purpose, milk supply, vegetable supply, grains supply, fodder supply, labour supply, transport services, agro services, medical services and educational services have been selected as indicators to demarcate its Umland. He also studied internal structure of Patiala city under the shadow of various theories namely, Concentric Zone Theory of Burgess, Sector Theory of Hoyt and Multiple Nuclei Theory of Harris and Ullman of urban growth.
(ii) Review at International Level

Harris (1940) in a study of Salt Lake City delimited the areas for 12 selected services or functions. Five of these boundaries: those for retail trade, wholesale, grocery trades, wholesale drug trades, radio broadcasting and generalized were taken from published sources. Three of the service areas - the telephone, the bakery and the petroleum product areas were based on interviews. The newspaper circulation area was based on his compilation from data of the Audit Bureau of Circulation (ABC).

Cleef (1941) has presented an article “Hinterland and Umland” in which the difference between them has been outlined. Umland has been explained as the area contiguous to a trade center (extending to and indicating its suburbs) whose total economic and cultural activities are essentially one with those of the primary centre.

Lipman (1952) has summarized the history; methods and findings of the technique developed in recent years by geographers and social scientists for studying the areas of influence of urban and rural centers and discussed its significance for administration. The different grades of urban and rural centers and their respective areas of influence or service for various purposes have been explained.

Capland (1954) has worked out a paper to show how F.H.W. Green’s studies of urban hinterlands have been put to practical use by a commercial organization. For this purpose, the sphere of influence has been drawn for each of the eleven towns including Nottingham. Provision has been made to deal with it in four separate divisions: a) The county Borough as the centre b) the urban areas contiguous to it, c) The remaining urban areas in the hinterland, d) The non-urban hinterland. A random sampling of these localities have been drawn taking the town at the center and the hinterland as separate strata in each case and the resulting 50 to 60 localities were plotted on large scale maps.

Eyre (1959) has determined a particular geographical combination of truck garden and orchard zones that supply its fresh vegetables and fruits to Tokyo. He explained that commercialization in vegetable and fruit has reached such proportions that truck garden and fruit zones based on urban markets have become a conspicuous feature of many parts of rural Japan.

Neft (1959) has worked on some aspects of rail commuting of New York, London and Paris. The purpose of the study is to prepare the facilities offered for commuting by rail, three of the world’s largest urban centers: New York, London and
Paris. In comparing rail transportation in these three areas, two factors are considered: 1) The number and distribution of passenger stations in the area, 2) The frequency of services, that is the number of trains within a certain time period stopping at a station between 5 and 50 miles from the centre of the city and traveling to a point within 5 miles of the centre. Correlation analyses have been used to highlight the relationship between distance and frequency of services.

Ullman (1959) has given a general description of the American Commodity Flow Pattern, emphasizing the dominance of north-eastern urban industrial belt. He has developed the concept of complementarity, intervening opportunity and transferability as the underlying causes of traffic flow which he called “spatial interaction”

Schwartzberg (1961), in studying villages of Lucknow region, found that villages under city’s influence show a definite effect on non-agricultural workers who seek supplementary work in city factories and on artisans who are hired by the city.

Ellefesen (1962) delimited hinterlands for five cities namely Mumbai, Delhi, Madras, Hyderabad and Baroda. He explained his paper on the basis of village data available in the 1951 census. He took five indicators of city’s influence: a) Density of population, b) The sex ratio stated as a percentage of males in the population, c) The proportion of literates in the population, d) The proportion of persons dependent on non-agricultural occupations for their livelihood, e) The proportion of persons dependent on commerce stated both as percentage of the total population and as a percentage of the non-agricultural population. Raw demographic data were converted to proportions, ranked and grouped in quartiles. A map was prepared of the administrative units of surroundings of each city. He divided the city into inner wards and suburban wards. He concluded that the immediate hinterland is proportionately smaller in area than its western counterparts.

Dickinson (1964) studied about the Umlands of Leeds and Bradford. According to him, these cities have got semi-common Umland. The Leeds is more and more oriented towards administrative services and Bradford towards manufacturing. After demarcation, Dickinson classified the Umland into three regions: a) intensive region comprising residential area of the city b) commercial region around the core of the city and c) the surrounding hinterland around the town.

Smailes (1970) studied the Umland of different cities in England. The author started investigation right from grocery shop to retail business of different items and
knowing their influence around the surrounding areas of a town. After analyzing, it is concluded that the limits of urban fields are rarely definite or stable lines. Relations between town and surrounding areas are essentially fluid and considered margins as zones rather than lines which fluctuate.

Berry et al. (1974) have evaluated an interaction model of delineating of urban sphere of influence. Data on newspaper market circulation in the United States have been used to assess the validity of using interaction models as a basis for measuring urban spheres of influence and thereby delineating the planning regions. A random sample of 337 counties has been taken, stratified by states, and for each of these counties, the number of daily newspapers has been tabulated for the four cities supplying the greatest number of newspaper of the county in 1971. Although there were some counties purchasing newspapers from more than four cities, four was the number that most reasonably sources accounting for the majority of newspapers purchased throughout the country. Finally, alternative forms of the distance decay functions have been evaluated, as are alternative specifications of the interaction model.

Gurung, Pondel and Gurung (1985) made an attempt to identify the nature and characteristics of commercial functions being carried out in the Umland of Pokhara. For this purpose, various functions have been identified. Identical functions have been grouped and ordered according to their local importance. He considered eight functional groups: a) retail convenience goods, b) retail non-convenience goods, c) wholesaling, d) retail industry, e) personal services, f) professional services, g) catering and h) finance. This study has revealed that the commercial activities are mostly of subsistence level. They pointed out that several markets of different hierarchical orders have emerged creating an organized marketing system particularly in the eastern and southern part of the study area.

Baker (1995) tried to highlight the aspects of rural-urban interaction between the district headquarters town of Biharamula and four surrounding villages in Kagera region, north-west Tanzania in 1993. Further it has been attempted to explain the nature of village economies from a household perspective, to investigate the kinds of village households’ linkages having with the town of Biharamula, to investigate the degree of economic differentiation between households within the villages and finally to analyze the types of urban and rural households which have adopted successful survival and accumulation strategies.
Carter (1995) has discussed the method of establishing tributary or market areas. He explained two approaches to the identification of urban sphere of influence. The first looked forward from the town in order to identify the various areas served by it. The second looked inward from the countryside and has been more concerned with consumer behaviour and the behaviour in which people use the various centers.

Cecilia Tacoli’s (1998) review of the International literature on rural-urban interactions provides some insights into the dimensions of this debate. She observes that although a distinction between ‘rural’ and ‘urban’ is probably inescapable for descriptive purposes, the reality is much more complex. The varied ways which different countries define what is urban and rural, the impacts that cities have on surrounding areas through their ecological “footprints” and the nature of economic and social exchanges are factors at the heart of understanding the importance of rural-urban interactions. Tacoli describes four main types of interactions: flows of people, flows of goods, flows of wastes and sectoral interactions. In a similar study, Chateard and Dubresson (1999) have shown the diversity of the relationships which link urban centers and rural areas in a number of countries in Africa, Asia and Latin America.

Furuseth and Lapping (1999) in their paper entitled “Contested Countryside: The Rural-Urban Fringe in North America” described various aspects of North American rural urban fringe. This has been defined as the ever-growing and evolving territory lying within 40 to 50 miles of every major urban concentration. They examined the spatial structure and organization form of the contemporary rural-urban fringe in North America. They also presented three case studies of the relationships between countryside and large urban centers.

Roy and Lawrence (2000) have discussed the urban system evolution on the frontier of the Ecuadorian Amazon. They accepted the conformity of urbanization as a fundamental component of frontier development in South America. They analyzed that the urbanization process is not a sign of regional economic strength. Capital gains at the periphery are transferred to the nation’s core region. Urban centers in the Ecuadorian Amazon continue to grow and to drain surrounding rural areas of younger and more educated individuals.

In case of achieving sustainable cities, Finco and Nijkamp (2001) suggested that we should try to evolve ‘the concept of smart city’ which is eco-friendly and environment enriching and is able to sustain the social, economic and cultural shocks and onslaughts. For this, it is essential to address the local conditions or the environs
because there is a symbiotic relationship between city and its surroundings.

Diyamet, et al. (2001) worked on exploring rural-urban interactions in Tanzania. A detailed, holistic picture of how the livelihood strategies of different groups straddle the rural-urban divide has been provided. In order to identify critical factors determining opportunities and constraints, two locations have been selected, each consisting of an urban centre and two villages in its surrounding region. Demographic and infrastructural aspects, social aspects (availability and quality of services, gender and generalized norms, religion, migration and ethnic diversity), commercial criteria (international and national markets, proximity to borders), production characteristics (land availability and fertility, food versus cash production, industrial development, large and small scale farming) and administrative criteria (land tenure system, administrative status, presence and role of international donors) have been included in the study.

Smith (2002) has argued that by the 1950’s, a majority of Hispano were living in regional urban centers of the upper Rio Grande country, where wages were higher and employment was secure. This Hispano experience is a crucial for examining how urbanites attachment rural places is manifested in many cultural expressions brought from country to city. Taylor and Walker (2004) in the article entitled, “The Urban Hinterworlds Revisited” have further developed and used to define the global network connectivity of 315 cities. The methodology has illustrated by dividing and mapping the hinter worlds of London and Manchester.

Simon et al. (2004) have illustrated the key features of rural-urban interface and associated definitional issues drawing on research in eight villages around the city of Kumasi, Ghana. The extent of the changes in villages was influenced by many factors other than distance including whether the village was within Kumasi’s boundaries. This supports the concept of a non-linear and non-uniform gradient of urban influences on peri-urban areas. Thanh et al. (2005) described the ways in which different rural households in different locations rely on varying combinations of assets and activities closely related to rural-urban linkages and the factors affecting their strategies and their changes in the past 15 years. Lastly, they came to the conclusion that Vietnam’s Red River Delta is underlying a major transformation as its economic base moves away from subsistence farming towards intensive, high value food production for export and local urban markets and non-farm employment.

Lynch (2005) took rural-urban relations as its focus rather than considering
them as only a part of either urban development or rural development. A range of interactions has been examined between the rural and the urban by considering interactions as flows that can take place in either direction. Migration has been considered just as a series of flows, in terms of food, people, ideas, environment and money between rural and urban areas.

Yasenovskiy and Hodgson (2007) have combined concepts and methods from hierarchical spatial systems, spatial interaction modeling and location-allocation modeling to derive optimal hierarchical facility systems. A new model has been presented that incorporates a spatial choice interaction model attributing attendance and benefits to facility size, distance and neighbourhood accessibility. Their approaches have been demonstrated with 150 nodes, three level oppong’s problem of locating health care facilities in Suhum district, Ghana.

In advanced economies, flows play an important part in connecting urban nodes. Limtanakool et al. (2007) have set up a framework for identifying and classifying the pattern of the urban system from an interaction perspective. Three ‘S’ dimensions and a set of indices have been proposed. Using the European Long Distance Mobility Database (DATELINE), the framework has been applied to examine the pattern of interaction between functional urban areas (FURs) in France and Germany. The analysis has been carried out separately for three journey purposes: business, leisure and holiday.

But the generalization derived from these western cities can not be taken as universal validity. Such study does not prove to be applicable to the Indian cities which are distinctly different from the western one in physical outlook and socio-economic and cultural aspects.

**Organization of the Study**

The present study has been organized into five chapters followed by conclusion. The study starts with introduction along with the statement of the problem, review of literature, objectives and hypotheses, data sources and methodology. Chapter first begins with the brief description of the historical background, physical environment and socio-economic personality of the study area. It also studies the growth and development of population, industrial and educational development. Chapter second is concerned with the conceptual framework of Umland and explains various factors which affect the shape and size of service zones. It also
outlines briefly the concept of socio-economic development, reciprocal relationship of city and countryside and the active role of city in the development of countryside. Chapter third deals with the symbiotic functional relationship of city and its countryside with relation to distance and frequency of persons to and from the settlement to avail the facilities in the city. An attempt has been made to delimit the zones of various services and to give the composite area of influence under the impact of Aligarh city. Chapter fourth is devoted to the detailed descriptive and analytical study of socio-economic development of tahsils lying in the delimited Umland. It also establishes relationship between variables of urban, infrastructure and agricultural development and finally delineates the socio-economic development regions. Chapter fifth throws light on the micro level study by taking into account the socio-economic development of the persons living in the sampled villages. It also studies the impact of distance and socio-economic conditions on the frequency and purpose of the visits of the inhabitants. In the last, conclusion emerging out of the study has been presented.
Reference


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